



LEFATSE

Environmental Planning Services (PTY) Ltd

Basic Assessment and Environmental Management Programme Report

Proposed sand mining and associated activities on the farm
Jammerbergsdrift 540/RE, District Wepener, Free State Province

November 2019

Reference: FS 30/5/1/3/3/2/1/10283 MP

Lefatse Environmental Planning Services (Pty) Ltd. (Reg no. 2016/047456/07)

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT And ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT: Glen Shee Zand (Pty) Ltd.

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FILE REFERENCE NUMBER SAMRAD ID: 195169

FILE REFERENCE NUMBER SAMRAD: FS 30/5/1/3/3/2/1/10283 MP

1. 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 Authorisation 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 Regulations, 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 authorisation 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 a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation 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 the 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.

2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

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

PART A
SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

3. Contact Person and correspondence address:

a) Details of

i) Details of the EAP

Name of The Practitioner: Hanri van Jaarsveld
Tel No.: 079 499 7999
Fax No.: -
e-mail address: Hanri@lefatsemail.co.za

ii) Expertise of the EAP

(1) The qualifications of the EAP

(with evidence). Refer to Annexure 1.

B.Sc. (Natural Sciences)
B.Sc. Hons. (Zoology)
Masters in Environmental Management

(2) Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure) Refer to Annexure 1.

The EAP has been involved in environmental management since 2007 with a good knowledge of environmental legislation and its implementation. Personal experience includes amongst other: Coordination of environmental management courses presented at the Centre for Environmental Management, UFS; Project management; Applications for Environmental Authorisation in terms of NEMA (Act 107 of 1998) and related sub-regulations, e.g. waste licences and atmospheric emission licenses; Application for Integrated Water Use Licenses in terms of the NWA (Act 36 of 1998); Environmental compliance auditing; Environmental Management Framework (EMF).

b) Location of the overall Activity

Farm Name:	Remaining Extent of the farm Jammerbergsdrift 540
Application area (Ha)	Approximately 4.99 ha
Magisterial district:	Wepener

Distance and direction from nearest town	Approximately 6 km north west of Wepener
21 digit Surveyor General Code for each farm portion	F04000000000054000000

c) Locality map

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

Refer to Annexure 2 for the locality map.

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

Refer to Annexure 2 for the proposed site layout plan(s).

i) Listed and specified activities

NAME OF ACTIVITY (E.g. For prospecting - drill site, site camp, ablution facility, 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 m²	LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)
Recovery of sand through means of surface mining for commercial use in construction and landscaping. Activities that will be associated with the operation include: Pumping and excavation of sand from the riverbed of the Caledon River; Sieving of sand; Stockpiling of topsoil and product, Loading, hauling and transport; Rehabilitation activities	4.99 ha	X	Listing Notice 1, No. 21 of GNR 327 (EIA Regulations, 2014 as amended)
Clearance of vegetation of operational areas, e.g. stockpile areas.	4.99 ha	X	Listing Notice 1, No. 27 of GNR 327 (EIA Regulations, 2014 as amended)

ii) Description of the activities to be undertaken

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

The Caledon River has a very high sedimentation concentration resulting in large offsets of sand on the banks and bed of the river. According to a study by Compton and Maake (Geological Society of South Africa, 2007), the suspended sediment load for the Caledon River at the N6 bridge was 3 000 mg/l in February 2006 and 520 mg/l in January 2007. Information from “The Orange-Senqu River Basin Infrastructure Catalogue” (Orasecom, 2013) stated that the storage capacity of the Welbedacht Dam within the Caledon River near Wepener has reduced from 115 million m³ to only 16 million m³ within 20 years at the time of the study due to siltation.

The type of commodity to be mined will be sand and the total mining permit area is 4.99 ha. Sand recovery will be undertaken for approximately 950 m along the northern bank of the Caledon River on a portion of the farm Jammerbergsdrift 540/RE. The volume of sand to be recovered is currently projected at approximately 6 000 m³/month (72 000 m³/year).

The proposed recovery of sand will be undertaken through the pumping of sand from the riverbed in a slurry form via a floating pump (platform ±3 m x 3 m in extent) secured with cables to large trees on the riverbank. Pumping will also be conducted by an excavator equipped with a pump. No permanent structure will be constructed.

Slurry will be pumped to a cleared containment area on the riverbank within the riparian zone, allowing the sedimentation to settle and the water to drain back to the river. Depending of the quality of sand on request by clients, the settled sand will be sifted on site and the product stockpiled on the riverbank for sale to commercial buyers. Product will be loaded onto tipper trucks with front end loaders and transported from site by the clients. No consumptive water use will be undertaken as part of the operation.

During dryer periods when the sand cannot be pumped as slurry, sand will be excavated from sandbanks created within the river drainage line. The depth of sand recovery for this operation will be dependent on the depth of the sand offset within the river at the site, but will range between an expected depth of two to nine metres, but not deeper than the bed rock. Care must be taken during pumping and excavation not to impact the banks of the river. Storm water measures and erosion

control measures must be implemented to limit and/or prevent damage to the stability of the riverbank.

Access points will be established within the riparian zone along the river in order to gain access for the equipment for the recovery of sand via one of the above mentioned methods. This will entail the clearance of riparian vegetation and establishment of a ramp approximately 4 m in width to the waterfront.

A mobile chemical toilet will be used on site and a temporary steel shed/container (approximately 3 m x 4 m) will be placed on site for storage of general equipment, e.g. cable, toolbox, etc. No permanent infrastructure will be established on site.

The property borders the R26 towards Wepener. The proposed access road (maximum width of 4 m) will follow a previously used gravel road also extending along the powerline on the property for the most part.

The size of the area exposed and at risk for erosion at any given time will be limited as far as possible. The clearance of vegetation will be limited to operational areas (including the stockpiles, sifting area and loading area) and the access road. Disturbed areas that become available for rehabilitation during any phase of the operation should be rehabilitated to limit environmental risks.

The site is mostly covered by a homogenous layer of sand (refer to HIA report, 2019), thus there is a minimum of topsoil available on site. However, where topsoil is available (e.g. access road), it will be removed prior to any disturbance and stockpiled for use during rehabilitation. Any trees cut down during the establishment must be cut in more manageable pieces and removed from site or can be used in creating natural management measures for example the stabilisation of the riverbank, creating measures for flow reduction of storm water, etc.

Dust control measures will be implemented by means of implementation of operational procedures including the enforcements of speed limits on transport vehicles and limiting activities during high wind conditions.

e) Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines,		(E.g. In terms of the National Water Act a Water Use License has/ has

spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process		not been applied for)
National Environmental Management Act (Act 107 of 1998) and related regulations	Chapters 5 & 90	In terms of the EIA Regulations, 2014 as amended, an Environmental Authorisation is required for an activity that requires a mining permit in terms of Section 27 of the MPRDA (Act 28 of 2002) and for the clearance of vegetation of an area larger than 1 ha but smaller than 20 ha. A Basic Assessment process in terms of Regulations 19 & 20 of the EIA Regulations, 2014 as amended, is herewith undertaken. This includes a public participation process (Annexure 3). The financial provisioning will be determined and subsequent reporting thereof and environmental performance assessments will be in accordance with the NEMA Financial Provision Regulations, 2015.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	Sections 52 & 56	An ecological and wetland survey for the proposed operation was conducted by an ecologist to assess the ecological sensitivity of the site and to identify the occurrence of any protected plant species. This will also indicate the conservation value of the site. Refer to Annexure 5 for the specialist reports.
National Water Act (Act 36 of 1998)	Section 21	The proposed activity will be undertaken within the river and the associated flood line. An application in terms of the NWA, 1998 (Act 36 of 1998) for a Section 21(c) and/or Section 21(i) Water Use was submitted to Department Water and Sanitation (DWS) (Annexure 6).

National Heritage Resources Act (Act 25 of 1999)	Sections 34 – 36; 38	<p>A Phase 1 Heritage Impact Assessment was undertaken by a specialist to assess if there are any objects and/or artefacts of potential heritage significance present within the study area. Refer to Annexure 5 for the specialist reports.</p> <p>A permit in terms of the NHRA, 1999 (Act 25 of 1999) was not applied for, but a request for comment on the proposed project was submitted on SAHRIS (Annexure 3).</p> <p>SAHRA will be notified if any artefacts or object with potential heritage importance are unearthed during the Life of Mine.</p>
Conservation of Agricultural Resources Act (Act 43 of 1983)	Section 15E	Invader and weed plant species that may potential establish on the site due to the disturbance of future mining and associated activities must be managed in terms of Section 15E of the Act.
National Veld and Forest Fire Act (Act 101 of 1998)	Sections 12 – 13; 17 - 18	The permit holder must adhere to the management of fires and/or development of firebreaks in accordance with this Act.
Mineral and Petroleum Resources Development Act (Act 28 of 2002)	Section 27	An application for a mining permit is applied for under the MPRDA, 2002 as part of this application for Environmental Authorisation in terms of the EIA Regulations, 2014 as amended.
Mine Health and Safety Act (Act 29 of 1996)	Chapter 2	The permit holder must comply with this Act to ensure the health and safety of persons working on site.
Occupation Health and Safety Act (Act 85 of 1993)	Sections 8 – 9; 12 - 14	The permit holder must adhere to this Act in terms of the health and safety of the persons working on site and working with mining equipment.
National Environmental Management: Air Quality Act (Act 39 of 2004)	Sections 21; 32 – 34; 37	An Atmospheric Emission License is not required. However, management of the operation must be undertaken in terms of the relevant sections of the Act.

National Environmental Management: Waste Management Act (Act 59 of 2008)	Sections 7; 16; 19; 21; 23; 27	At the time of writing of this report, no activities that required a Waste Management License in terms of Section 19 of the Act were expected to be undertaken and/or were included in the application for authorisation. The permit holder must implement waste management measures in accordance with Section 16 of the Act throughout the life of the operation.
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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).

Glen Shee Zand (Pty) Ltd. is the owner of the property and the site has sufficient sand volumes suitable for construction use.

According to the final Consolidated Integrated Development Plan of Mangaung (2016 – 2017), development projects planned for Wepener and Dewetsdorp include housing, roads, upgrading of water treatment plants and other infrastructure. According to the Draft Reviewed IDP 2017-2022, R17 092 204 is available for Naledi Infrastructure Projects for the 2019/2020 financial year. Sand for construction purposes is required and the proposed sand recovery project will assist in the delivery of sand for this need and material can be transported to these towns without too high transport costs. Sand from the proposed project will also be sold for commercial use in Bloemfontein and surroundings as there is a large and well established market for sand in Bloemfontein. There are limited sand resources in the Bloemfontein area.

g) Motivation for the overall preferred site, activities and technology alternative.

Preferred site:

The preferred site is 4.99 ha and is situated on a portion of the Remaining Extent of the farm Jammerbergsdrift 540, situated in the Magisterial District of Wepener. The landowner is also one of the directors of the company applying for the mining permit area.

The sand offset on the site is suitable for use in construction and a large resource of sand is available at this site due to the constant offset of sedimentation along the

bend during the flow of the river and during natural flood events. The rate of deposition at this locality is expected to be higher than at the alternative site position at the bridge to the west of the property.

According to the Ecological and Wetland Assessment (2019), the site is currently in a degraded state with high infestation of exotic weeds. The proposed access road mainly follows the existing powerline and a previously used two row gravel road that had resulted in alterations to the natural vegetation, making this an ideal route. The route determination for the access road also considered the stone-wall enclosures recorded on a dolerite outcrop approximately 1 km northwest of the preferred mining site.

There is a backwater system towards the eastern border of the proposed mining permit area. According to the Ecological and Wetland Assessment (2019), operational activities such as stockpiling and sifting in this area may lead to an increase in risks of increased sedimentation of the river in the event of flooding. The preferred site layout will consider the backwater system and place the sifting- and stockpile area outside this area. The preferred site layout will also be to include the alternative option to provide for the stockpiles and sifting area to be situated at least 100 m from the watercourse and allow a buffer from the backwater system.

Preferred activities and technology:

The preferred technology will be to recover sand from the riverbed through pumping as it is considered to be the most economic method. Pumping will primarily be undertaken with a pump on a floating platform guided on the river by means of cables which will be secured to a stationary point on the riverbank. This will allow pumping to be undertaken in lateral cross sections along the width of the river, allowing optimum recovery of resource with minimum impact to the riverbank. In addition to the floating pump, an excavator equipped with a pump will be used, although this will not be the primary recovery method. This method is very successful but the extent of the recovery radius is limited to access to the riverfront and the reach of the excavator arm/pump. Access points along the river front will be created where the pump will be lowered into the river and for the excavator to enter.

During dry periods, pumping cannot be undertaken as it needs to be in a slurry form for pumping. In this case, the sandbanks within the river will be excavated by means of an excavator excavating sand from the riverbed. This will only be undertaken when the river is dry enough for earthmoving equipment to operate within the drainage line.

Dependent on the quality and type of sand on request by clients, sand will be sifted with automated sifting equipment. Currently there is no alternative for the processing of sand.

No permanent structures will be constructed or established on site and no consumptive water will be used during the operation. A temporary chemical toilet facility will be placed on site for use by workers rather than a permanent toilet facility due to the expected short term (0 – 5 years) nature of the operation and locality near the river. This also limits the use of water for flushing and risks of seepage of contaminated water to the river system. This facility will be kept clean and any waste will be managed appropriately.

No accommodation facilities will be situated on site and workers will bring their own drinking water and food to site. The site is in close proximity of Wepener and workers will commute to site daily.

Due to the proposed methodology to be used to recover the sand, the potential environmental impacts are anticipated to be localised in nature, provided that the recommended management measures are implemented as minimum. The physical footprint that will be disturbed will be limited to the stockpile- and loading areas, haul road and settling/containment areas. Disturbed areas must be rehabilitated during the Decommissioning Phase and must include as minimum the levelling and sloping of disturbed areas, as well as re-vegetation and stabilisation of the riparian zone and riverbank. Topsoil removed will be stockpiled outside areas prone to erosion and flooding and will be used as cover material during the rehabilitation of disturbed areas.

The activities to be associated with the proposed operation will be undertaken within the 1:100 year floodline, thus appropriate management will be required to limit potential environmental impacts and risks. A Water Use Authorisation in terms of the NWA, 1998 (Act 36 of 1998) is required for the activities within the floodline.

Also refer to Part A, Section 3(d)(ii) of this document for information on the activities to be related with the operation and to Part A, Sections 3(h) and (i) for a description of the alternatives that were considered for this project.

h) Full description of the process followed to reach the proposed preferred alternatives within the 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.

According to the IDP, several development projects have been identified for the Wepener and Dewetsdorp region also providing opportunity for economic development should the proposed mining be continued with. There is also a need for sand for use in construction in the greater Mangaung Metropolitan Municipal area with a large established market for the quality sand from the Caledon River in the Bloemfontein district and surroundings while there are limited legal sand mines in close proximity of Bloemfontein. This therefore makes it economically and practically feasible for the applicant to develop the mining operation in Wepener.

As previously mentioned, the landowner of the property is Mr. S.J. Meyer whom is also one of the directors of the applicant. The sand offset on the site is suitable for use in construction and a large resource of sand is available at this site due to the constant offset of sedimentation along the bend during the flow of the river and during natural flood events.

A baseline site assessment was undertaken by the EAP. Specialist assessments of the study area included an Ecological and Wetland assessment (2019), as well as a Phase 1 Heritage Impact Assessment (including both Archaeology and Palaeontology) (2019). According to the Ecological and Wetland Assessment (2019), the natural state of the specific site is highly degraded and therefore the environmental impact will be limited. Apart from stone-wall structures approximately 1 km to the northwest of the preferred mining site, no objects and/or artefacts of potential heritage importance has been identified during the Heritage Impact Assessment (Phase 1 HIA, 2019). Refer to Annexure 5 for the respective specialist reports.

The layout was determined by the property boundaries, sand resource within the river, possible environmental features and planned method of operation.

A public consultation process was followed during which identified I&APs and stakeholders were consulted and their comments reported. The results of the specialist studies and the comments from I&APs were also considered during the recommendation towards the preferred site locality and layout and will also inform the recommended environmental management measures to be implemented throughout all the phases of the proposed operation. Refer to Annexure 3 of this report for copies of the public consultation process.

i) Details of the development footprint alternatives considered.

With reference to the site plan provided as Appendix 2 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.

a) Property/locality

Preferred property/locality

- The preferred locality for the proposed recovery of sand is approximately 4.99 ha on a portion of the Remaining Extent of the farm Jammerbergsdrift 540, situated in the Magisterial District of Wepener, Free State Province (Locality map under Annexure 2).
- The landowner does not have objections against the proposed operation.
- The bend in the river at this location results in a good offset of sand suitable for construction purposes along the northern bank where the flow of the river is reduced and an increase in deposition of sand occurs.
- The property is in close proximity of Wepener and central to other towns such as Dewetsdorp where development is planned according to the IDP.
- The proposed mining area is degraded and high infestation of exotic weed is present. The continuation of the proposed mining provides the opportunity to reinstate the site during rehabilitation.
- The general topography of the property makes the site accessible.

Alternative property/locality

- No alternative property is applicable to this application.
- An alternative locality on the farm Jammerbergsdrift 540/RE would be along the southern boundary of the property starting at the western boundary and stretching approximately 800 m towards the east of the property. This site is situated on a previous mining permit area.

b) Activity type

Preferred activity type

- The activity type applied for is the recovery of sand from the Caledon River for construction purposes by means of pumping and excavation (only when the river is dry).

Alternative activity type

- There is no alternative type of activity considered for this application.

c) Activity layout

Preferred layout

- Refer to the Site plan attached under Annexure 2 of this report for details of the preferred site layout.
- The layout was determined by the property boundaries, sand resource within the river, possible environmental features and planned method of operation.
- The site stretches approximately 950 m along the northern banks of the Caledon River to provide maximum riverfront and section along the river for sand recovery.
- Due to the nature of the study area and proposed activities, all activities will be undertaken within the 1:100 year floodline. The 1:50 year floodline is uncertain.
- The preferred site layout considers the backwater area identified during the ecological and wetland assessment undertaken on site. The sifting and stockpile area is situated to the west and do not transect the backwater area to the east of the site.
- Access points where the pump will be lowered into the river and for the excavator to enter will be established at areas most accessible with limited environmental risks.
- The access road follows an existing powerline and previously used two row gravel road connecting to the R26 in the north.

Alternative layout

- Due to the nature of the study area and proposed activities, all activities will be undertaken within the 1:100 year floodline. The 1:50 year floodline is uncertain. An alternative layout will be to situate the sifting and product stockpiles 100 m from the river. This will result in an amendment of the preferred site boundaries to incorporate this area and also an adjustment on the route alignment of the access road. Refer to Annexure 2 for a map indicating the proposed alternative layout.
- The existing access road transecting Jammerbergsdrift 540/6 can be used as additional access road to the site.

d) Technology

Preferred technology

- The preferred technology will be to recover sand from the riverbed through pumping primarily with a floating pump on the river and secondary by an excavator equipped with a pump to the extension arm.
- During dry periods, pumping cannot be undertaken as it needs to be in a slurry form for pumping. In this case, the sandbanks within the river will be excavated by means of an excavator excavating sand from the riverbed. This will only be undertaken when the river is dry enough for earthmoving equipment to operate within the drainage line.
- Dependent on the quality and type of sand on request by clients, sand will be sifted with automated sifting equipment.

Alternative technology

- There is no alternative technology considered for this application.

e) Operational aspects

Preferred operation method

- As mentioned, sand will be recovered by means of pumping sand in a slurry form from the riverbed.
- Pumping will primarily be undertaken with a floating pump on the river and secondary by an excavator equipped with a pump to the extension arm.
- During dry periods, the sandbanks within the river will be excavated by means of an excavator equipped with a bucket. This will only be undertaken when the river is dry enough for earthmoving equipment to operate within the drainage line.
- Recovery of sand will not be undertaken deeper than the bedrock, while also leaving a buffer area from the riverbanks.
- Access points to the river should be limited and any unused points must be rehabilitated and the banks of the river stabilised.
- Sand will be pumped to a containment area on the riverbank on a flat area cleared of vegetation. Sand will settle from the slurry and the water will drain back to the river via a channel created in the sand.
- At the time of writing of this report, no consumptive water use was planned on site.
- Recovered sand will be transported to the sifting area and/or product stockpile area.

- Dependent on the quality of sand on request by clients, the recovered sand will be sifted and the final product stockpiled on site for purchase by clients. Apart from sifting, no processing of material will be undertaken on site.
- Sand will be loaded on tipper trucks by front end loaders and mainly transported by tipper trucks and transportation links.
- Speed limits will be enforced on heavy vehicles on site and on the access road to limit dust generation and risks of accidents.
- No potential hazardous substances or material will be stored on site. A temporary steel structure will be placed on site for storage of general equipment, e.g. cable, toolbox, etc.
- Access to the operational area must be regulated to avoid illegal entrance.
- Mining activities will be limited during high wind conditions to limit dust generation.
- Vegetation and topsoil (if any) that was removed prior to the commencement of mining activities will be stockpiled in an area not prone to flooding and erosion for use during rehabilitation of disturbed areas.
- Disturbed areas must be rehabilitated as it become available for rehabilitation.
- Rehabilitation activities will include removal of any waste material, equipment and product; as well as levelling, sloping, re-vegetating and stabilisation of the riverbank at affected areas.
- Due to the nature of the site and regular flooding of this river system, the site will also be rehabilitated naturally to some extent during flood events as areas of depression formed by pumping and excavation will be levelled and filled during offsetting of the sedimentation load in the river.

Alternative operation method

- An alternative operation method in addition to the pumping onto a level area higher up on the riverbank includes the pumping of sand into a settling pond next directly next to the river. This settling pond will be formed in the sand and recovered sand will settle and water will drain back to the river via seepage through the sand and a channel.
- Once the pond is full, the settled sand will be removed with an excavator and transported to the sifting area and/or product stockpile area.
- No permanent structure will be constructed.
- Due to the similar sand layer in the area, rehabilitation of the settling ponds will entail the pumping of sand into the pond and levelling the area to correspond the surrounding levels.

f) Not implementing the activity / No-go option

The 'no-go' alternative was considered throughout the project application. Should the proposed operation not be implemented, the following may be expected:

- No additional impacts on the aesthetics of the area.
- No direct impact on vegetation and the riparian zone, although encroachment of weeds and invasive vegetation is highly likely considering the current degraded status of the site.
- Lost opportunity to clear the exotic weeds currently evident on the site during rehabilitation. However, this can still be achieved dependent on the effort from the landowner.
- No potential generation of dust and noise.
- No potential impact on potential remains of heritage importance.
- No potential impact on any existing infrastructure.
- No additional indirect socio-economic effect on existing sand recovery operations within 1 km of the site.
- Loss of the opportunity for commercial development and income.
- Loss of job opportunities and associated skill upliftment.

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 attended 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.

Refer to Annexure 3 for copies of notifications, comments and response, etc. The public participation process undertaken in terms of regulations 41 – 44 of the EIA Regulations, 2014 as amended as part of the Environmental Authorisation process to date included the following:

- Placement of an onsite notice at the entrance to the site.
- Placement of an advertisement in the local newspaper.
- Written notice with background information to the neighbours and identified I&APs.
- Written notice with background information to identified stakeholders (including amongst other DESTEA FS, DWS, DARD, Free State SAHRA and Municipality).
- Written notice and enquiry on any possible land claims to the Free State Department of Rural Development and Land Reform.

- Availability of the draft Basic Assessment Report (BAR) and Environmental Management Programme (EMPr) for comment.

All notified parties were provided with 30 days to register as I&AP and/or submit any comments on the draft BAR & EMPr to the Environmental Assessment Practitioner (EAP). The comments received during the process were noted in the “Response on consultation report” forming part of this final BAR & EMPr submitted to the competent authority for processing.

iii) Summary of issues raised by I&APs

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

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.
<u>AFFECTED PARTIES</u>				
Landowner/s				
Mr. S.J. Meyer <i>Landowner (offer to purchase):</i> Jammerbergsdrift 540/RE		The applicant is also the landowner of the property (offer to purchase).	N/A	
Lawful occupier/s of the land				
Marib Beleggings (Pty) Ltd Attention: Mr. A.J. Burger <i>Landowner/occupant:</i> Jammerbergsdrift 540/RE; Glen Shee 546/1	X	Letter: 01/11/2019 Telephonic: 11/11/2019	No comments received to date.	Annexure 3 Part B: EMPr
Landowners or lawful occupiers on adjacent properties				
Mr. J.S.F. Groenewald <i>Landowner:</i> Hoffmans Rust 173/RE	X	Letter: 01/11/2019	Telephonic (11/11/2019): - No comments to date.	No response required. Annexure 3 Part B: EMPr

Mr. S.J. Meyer <i>Occupant:</i> Hoffmans Rust 173/RE	X	Letter: 01/11/2019	Telephonic (07/11/2019): - No objections towards the proposed operation.	No response required.	Annexure 3 Part B: EMPr
Mr. and Mrs. Nosi <i>Landowner:</i> Waterford 99/RE	X	Letter: 01/11/2019	No comments received to date.		Annexure 3 Part B: EMPr
Janko Boerdery CC Attention: Mr. W. Lombaard <i>Landowner:</i> Jammerbergsdrift 540/6 (of 1)	X	Letter: 01/11/2019	Telephonic & email (04/11/2019): - No objection towards the proposed operation.	No response required.	Annexure 3 Part B: EMPr
Municipal councillor	X	Registered letter: 15/11/2019	No comments received to date.		Annexure 3 Part B: EMPr
Municipality	X	Letter: 01/11/2019 Draft: 13/11/2019 (Hard copy 26/11/2019)	Email (21/11/2019): - Requested a hard copy of the draft BAR/EMPr. No further response regarding the draft reports have been received to date.	An electronic copy of the draft BAR was made available for comment. One hard copy of the draft report was hand delivered on 25/11/2019 with follow up email 26/11/2019.	Annexure 3 Part B: EMPr
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA etc.)	X				Annexure 3 Part B: EMPr
Eskom Attention: R. de Bruin	X	Letter: 01/11/2019 Draft: 13/11/2019	No comments received to date.	An electronic copy of the draft BAR was made available for comment.	Annexure 3 Part B: EMPr
Communities					

N/A					
Dept. Land Affairs	X				
Department of Rural Development and Land Reform: Land Restitution Support Free State Attention: Ms. Lezzane Naran	X	Letter: 01/11/2019 Draft: 13/11/2019 Email: 28/11/2019	Confirmation regarding any land claims is currently outstanding.	The notification letter also served as enquiry towards any land claims on the affected property. An electronic copy of the draft BAR/EMPr was made available. A follow up mail was made 28/11/2019. Confirmation in this regard is currently still outstanding.	Annexure 3 Part B: EMPr
Traditional Leaders					
N/A					
Dept. of Environmental Affairs	X				
Department of Economic, Small Business development, Tourism and Environmental Affairs Attention: Mrs. G. Mkhosana	X	Letter: 01/11/2019 Draft: 13/11/2019	No comments received to date.	An electronic copy of the draft BAR was made available for comment.	Annexure 3 Part B: EMPr
Other Competent Authorities affected	X				
Department Water and Sanitation Attention: Mr V. Blair	X	Letter: 01/11/2019 Draft: 13/11/2019 Additional information: 06/12/2019	Email (08/11/2019): - Requested a copy of the draft BAR/EMPr. Letter (11/11/2019): - DWS requested additional information with regards to the WULA to be submitted before 10/01/2020.	An electronic copy of the draft BAR was made available for comment. The applicant is currently giving attention to the requests from DWS. Some required information was provided to DWS on 06/12/2019).	Annexure 3 Part B: EMPr

			<p>Letter (18/11/2019):</p> <ul style="list-style-type: none"> - DWS has no objection towards continuation of the proposed project, provided that the conditions in the letter are adhered to. 	<p>Management measures towards limiting and/or mitigating potential negative impacts of the surrounding environment and water resources are described in the BAR/EMPr. The applicant is also in the process of applying for a WULA as required (Annexure 3 & 6).</p>	
<p>Free State Department of Agriculture and Rural Development Attention: Mr J.A.S.</p>	X	<p>Letter: 01/11/2019 Draft: 13/11/2019</p>	No comments received to date.	An electronic copy of the draft BAR was made available for comment.	Annexure 3 Part B: EMPr
<p>Department of Agriculture, Forestry and Fisheries Attention: Mr J. Zeelie</p>	X	<p>Letter: 01/11/2019 Draft: 13/11/2019</p>	No comments received to date.	An electronic copy of the draft BAR was made available for comment.	Annexure 3 Part B: EMPr
<p>Free State Heritage Resources Authority Attention: Loudine Philip</p>	X	<p>Letter: 01/11/2019 Draft notice: 13/11/2019 Draft: 20/11/2019</p>	No comments received to date.	An electronic copy of the draft BAR with Phase 1 HIA documentation were submitted to Me. Philip as SAHRIS was offline.	Annexure 3 Part B: EMPr
<p>Free State Department Police Roads and Transport Attention: Mr. Hannes Maree</p>	X	<p>Letter & Telephonic: 11/11/2019 Draft notice: 13/11/2019</p>	<p>Letter (15/11/2019):</p> <ul style="list-style-type: none"> - DPRT has no objection towards continuation of the proposed project, provided that the conditions in the letter are adhered to. - No vehicles used for sand mining purposes may travel below the river bridge no. 1944 over the Caledon River. 	<p>An electronic copy of the draft BAR was made available for comment.</p> <p>The applicant is currently in consultation with DPRT regarding the proposed access road. A meeting is requested in this regard.</p> <p>The necessary processes should be followed should the proposed access road be preferred for future use.</p>	Annexure 3 Part B: EMPr

			- Access to the site should be obtained through proclaimed tertiary road T850.		
<u>OTHER AFFECTED PARTIES</u>					
N/A					
<u>INTERESTED PARTIES</u>					
N/A					

- iv) **The Environmental attributes associated with the 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).

A desktop study of the region with its known environment and socio-economic status was conducted. Please refer to Annexure 7 attached hereto for a photographic report of the proposed project site and surroundings.

An ecological and wetland assessment was undertaken on a portion of the Remaining Extent of the farm Jammerbergsdrift 540 (refer to Figure x of the ecological assessment report). The footprint of the proposed mining permit area is approximately 5 ha in extent. A Phase 1 Heritage Impact Assessment (Archaeological- and Palaeontological Assessment) was also undertaken on the study area. Refer to Annexure 5 attached to this report for the specialists' reports.

Regional setting

- The preferred site applicable to this mining permit application is situated on the northern banks of the Caledon River on a portion of the farm Jammerbergsdrift 540/RE.
- The study area is situated approximately 6 km northwest of the town Wepener in the quarter degree square 2926DB.
- The site has an altitude ranging between 1418m and 1420 (Ecological and Wetland Assessment, 2019).
- The study area is located in the Upper Orange Water Management Area within quaternary catchment D23J.
- The site is situated in a summer rainfall area with approximately 510 mm/annum and a mean annual temperature of 14.3 degree Celsius (Mucina & Rutherford, 2006).

Physical character

- The geology of the area consists of mud and sandstone of the Beaufort Group and is represented by Early Triassic sedimentary rocks of the

Tarkastad Subgroup (Phase 1 HIA, 2019). These sedimentary rocks form the base for deposits of superficial deposits of Late Cenozoic age.

- According to the Phase 1 HIA (2019), distinctive koppies and flat-topped inselbergs in the region were formed by dykes and sills of resistant Jurassic dolerites, consisting of very dark, medium – grained rock of Jurassic age coinciding with the lava flows of basalts. Shallow to well-developed, alluvium, colluvium and residual soils of varying depth mainly forms the superficial deposits in the region.
- According to the Ecological and Wetland Assessment (2019), soils in this region are generally referred to as 'Podsollic' soils which are generally deeper than 'solonetic' soils and commonly associated with the formation of dongas and surface erosion.
- The floodplain and banks of the Caledon River dominates the topography of the site with a relatively uniform topography (Ecological and Wetland Assessment, 2019).
- The floodplain gradually slopes towards the river, while the riverbank has a sudden steep sandy embankment.
- According to the Ecological and Wetland Assessment (2019), there are no drainage lines transecting the preferred mining site. A small backwater area is situated on the eastern border of the site, although not considered a significant modification.
- The river morphology is largely intact although this system constantly changes due to the flooding regime and removal and deposition of sediments (Ecological and Wetland Assessment, 2019).
- According to the Risk Assessment undertaken by a professional ecologist, the risk factor is: Moderate Risks: Risk and impact on watercourses are notable and require mitigation measures on a higher level. Also refer to Appendix E of the Ecological and Wetland Assessment report of July 2019 attached hereto in Annexure 5.

Biological character

- According to Mucina & Rutherford (2006), the study area consists of Aliwal Dry Grassland (Gh2) (classified to be Least concern) under the National List of Threatened Ecosystems (Notice 1477 of 2009) (National Environmental Management Biodiversity Act, 2004). Although this vegetation type is currently subjected to transformation for dry land cultivation, it is not to such a degree to warrant being listed as a Threatened Ecosystem; therefore the conservation value of the vegetation type on the site is considered to be relatively low (Ecological and Wetland Assessment, 2019).

- The site is situated in an Ecological Support Area 1 and 2 (Free State Province Biodiversity Management Plan (2015) providing ecological support to Critical Biodiversity Areas and/or surrounding watercourses and wetlands (Ecological and Wetland Assessment, 2019). This functioning and support should be retained as far as possible.
- According to the Ecological and Wetland Assessment (2019), the vegetation structure of the site consists of an upper-, lower- and marginal zone. A summary of the main vegetation cover within each of these zones from the Ecological and Wetland Assessment (2019) follows below.
- The upper zone contains a prominent layer dominated by exotic trees and pioneer grass considered a natural component but mostly a remnant of the natural riparian thicket along the river, being significantly degraded from the natural condition.
- The lower zone is dominated by a few riparian trees and a grass/herb layer adapted to a somewhat higher moisture regime. This zone is also disturbed although to a lesser extent than the upper zone.
- The marginal zone does not contain a high vegetation cover and this is most likely attributed to flooding. Vegetation in this zone is dominated by a few wetland species and annual weeds able to re-establish quickly after flooding. The vegetation community present in this zone also indicate significant disturbance although induced by annual flooding.
- Disturbance and degradation to the site can be attributed to the following: 1) it forms part of the Caledon River and its floodplains. Annual flooding result in continues change in the vegetation community, resulting in the site being dominated by pioneer species; 2) Anthropogenic influences resulted in local transformation of the vegetation, also promoting erosion.
- The Ecological and Wetland Assessment (2019) indicated relatively low species diversity with a high percentage of exotic weeds in the floodplain and banks of the Caledon River at the site. This clearly being an indication of disturbance.
- The site does not contain any protected, rare or endangered species of high conservation value and it is considered highly unlikely that such species would occur due to the disturbed nature and current vegetation structure on site (Ecological and Wetland Assessment, 2019).
- The vegetation found along the proposed access road is mostly pioneer vegetation that has been transformed from the natural condition due to a powerline and old road line. This is therefore an ideal alignment for the road.

- Refer to the Ecological and Wetland Assessment report (2019) attached under Annexure 5 for an indication of the dominant species identified to occur within the study area.
- During the Ecological and Wetland Assessment (2019), signs and tracks of mammal species were recorded, although not all could be identified with certainty. These included the following: possibility of a Caracal (*Felis caracal*); shallow foraging of a small unidentified mammal; feral dog or black backed jackal (*Canis mesomelas*); Common Duiker (*Sylvicapra grimmia*) or Steenbok (*Raphicerus campestris*); Vervet Monkeys (*Chlorocebus pygerythrus*).
- Species of concern which may occur in the area, but normally rare and confined to habitat in good condition and not near human activities include: South African Hedgehog (*Atelerix frontalis*); Striped Weasel (*Poecilogale albinucha*); Small-Spotted Cat (*Felis nigripes*); and Cape Clawless Otter (*Aonyx capensis*).
- According to the Index of Habitat Integrity (IHI), the study area has an Instream IHI of Category C: Moderately Modified; and a Riparian IHI of Category D: Largely Modified (Ecological and Wetland Assessment, 2019).
- “The EI&S of the Caledon River has been rated as being Moderate: Floodplains that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains are not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.” (Ecological and Wetland Assessment, 2019).
- The macro-invertebrate assessment of the aquatic fauna undertaken as part of the Ecological and Wetland Assessment (2019) calculated the Average Score per Taxon (ASPT) to be 4 which gives an indication of poor water quality. The site also has a relatively low diversity of taxa, likely to be contributed to the absence of biotopes and low habitat diversity. The dominant habitat at the site is sand, which is also known for low diversity.
- Preliminary data for water sampling at the preferred site indicates high levels of total coliform at 1986 MPN/100ml and *E. coli* of 20 MPN/100ml (Annexure 8).

Socio-economic character (Data obtained from the 2011 census and Community Census of 2016)

- Wepener previously formed part of the Naledi Local Municipality until it was disestablished and merged into Mangaung Metropolitan Municipality on 3 August 2016 (The Local Government Handbook, 2016).
- According to the Draft Reviewed IDP 2017-2022, the Spatial Development Framework (SDF) of Naledi Local Municipality will remain applicable until new spatial strategies have been formulated for this area within the Mangaung SDF.
- Due to a lack of updated information of Naledi Local Municipality as part of the statistics of Mangaung Metropolitan Municipality, historic information of relating to Naledi was used for completion of this section of the report.
- According to the 2011 census, Naledi Local Municipality had a total population of 24 314 with a population group of 92.4% black African persons, 4.9% white persons and 2.7% classified as other. At the time, Naledi Local Municipality had a population growth rate of -1.22% (2001-2011) (Statistics SA, Census 2011).
- According to the 2011 census, of the total population in this municipality, 52% is female and 48% is male and 6.8% is elderly (i.e. persons 65 years and older), 32.5% are children (i.e. persons younger than 15 years) and 60.7% between the ages of 15 and 64 (working age). The unemployment rate at the time was 26.4%. According to the Community census of 2016, grants and subsidies formed 57.7% of the total income of people in this municipal area.
- Economic activities currently undertaken on the affected property is limited to agriculture. Current known economic activities on neighbouring properties within a 1km radius of the preferred site are agriculture and sand mining.

Cultural character

- There are no tribes and/or communities on or in close proximity of the affected property.
- An inquiry regarding any restitution claims on the affected property was lodged at the Office of the Regional Land Claims Commission: Free State. Refer to the letter dated 01 November 2019, attached hereto under Annexure 3. Confirmation in this regard is currently outstanding.
- A Phase Heritage Impact Assessment (HIA) was undertaken by a specialist. Refer to the report titled "Phase 1 Heritage Impact

Assessment of a proposed new sand mine development on the farm Jammerdrif 540/RE near Wepener, FS Province”, dated September 2019 under Annexure 5 of this Basic Assessment Report.

- According to HIA report (2019), the study area is situated within the outcrops of the Beaufort Group (Karoo Supergroup) and is represented by Early Triassic sedimentary rocks of the palaeontologically significant Tarkastad Subgroup. This area is underlain by well developed overbank sediments made up of homogenous and geologically recent (<Holocene) river sand.
- During the survey, no evidence of fossiliferous terrace gravels or paleo-donges (gully) infill deposits were found. There was also no evidence of the accumulation and preservation of intact Quaternary fossil material within the geologically recent alluvial overburden covering the footprint of the preferred site.
- According to the HIA report (2019), it is unlikely that bedrock sediments with potentially fossil-bearing Tarkastad Subgroup strata will be negatively affected by the proposed operation due to the thick sand layer, provided that the excavation activities are restricted to the boundaries of the proposed mining site.
- Findings of the Phase 1 HIA (2019) indicated stone-walled enclosures of the Late Iron Age on a dolerite outcrop approximately 1 km northwest of the western boundary of the preferred mining site.
- According to the HIA report (2019), no other above-ground evidence of in situ Stone Age archaeological material was found within the footprint of the mining area. The geologically recent alluvial sand overburden is generally considered to be culturally sterile in terms of intact Stone Age archaeological remains.
- No indications of rock art, prehistoric structures, graves or historically significant structures older than 60 years were found within the confines of the proposed mining permit area.
- According to this study, the site is assigned the rating of Generally Protected (GP.C) (Low significance).

(b) Description of the current land uses.

The land uses in the area are mainly farming, sand mining and town development with Wepener approximately 6 km to the east of the study area. The current land use of the affected property is limited to farming activities.

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

Also refer to the specialists' reports in Annexure 5 and to the photographic report in Annexure 7.

There is an existing farm stead and associated infrastructure on the farm, situated approximately 415 m to the north, northwest of the preferred site. There is also a powerline and water pipeline extending on a portion of the farm. There is no existing infrastructure within the boundaries of the preferred site applicable to this application. There is previously cultivated land situated approximately 150 m to the northwest of the site. The existing two row gravel access road and powerline will be followed as far possible due to the already disturbed nature of the route.

Findings of the Phase 1 HIA (2019) indicated stone-walled enclosures of the Late Iron Age on a dolerite outcrop approximately 1 km northwest of the western boundary of the preferred mining site.

The site is situated on the northern bank of the Caledon River forming the southern boundary of the property. According to the Ecological and Wetland Assessment report (2019), the site is situated along the riparian zone and within the floodplain of the river which a backwater system crossing the eastern section of the preferred locality. The site is currently in a highly degraded state with high establishment of invasive and exotic weeds.

(d) Environmental and current land use map.

(Show all environmental and current land use features)

Refer to the Land Use map under Annexure 2 of this report.

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).

Refer to the Environmental Impact/Risk and Management Report in Annexure 9 for the nature, significance, extent, duration and probability of the expected potential impacts.

The potential impacts expected to be associated with the proposed sand recovery operation include the following:

- Clearance of vegetation and impact on the riparian area;
- Destabilisation of the riverbank;
- Habitat loss and effect on the general biodiversity;
- Establishment and spread of alien vegetation;
- Erosion and loss of topsoil;
- Loss of agriculture potential due to a change in land use;
- Temporary disturbance to ecosystem function;
- Change in storm water flow;
- Impact on surface water and groundwater quality (e.g. spillage);
- Pollution to the surrounding environment if waste is not managed;
- Dust generation;
- Elevated noise levels;
- Damage or destruction of archaeological remains;
- Health and safety risk to employees on site and people entering the mining area;
- Degradation of the road due to an increase in heavy vehicles on the access road;
- Impact on the general aesthetics of the area and immediate visual impact;
- Risk of veld fires;
- Positive impact on employment opportunities and skills development; and
- Positive impact of economic development.

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

The criteria for determining the impact significance using systematic generic and judgemental criteria specified in the “DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT)” was used to rate the potential impacts. Refer to Annexure 9 for detail on the criteria.

Also refer to Annexure F of the Ecological and Wetland Assessment (2019) attached hereto under Annexure 5 for an indication of the impact methodology used during the ecological assessment.

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)

Preferred locality

Advantages

- The proposed operation will only be undertaken on approximately 4.99 ha of the said property while the remainder of the property can be used for agricultural activities.
- A good economic offset of sand suitable for construction purposes is present along the river on the property. The deposits are of such nature that it can be pumped effectively in an economically manner with limited effect on the stabilisation of the riverbank.
- The specific position of the preferred site locality is on a bend in the river with a higher deposition of load, while erosion of the riverbank is highly likely on the outside of the bend on the southern bank due to a natural increase in flow in this area.
- The natural state of the preferred site is highly degraded and high infestation of exotic weed and invasive species are present. The removal of these species during removal of vegetation and establishment of natural occurring vegetation during rehabilitation will be an advantage.
- The site is not located within a Critical Biodiversity Area.
- No protected species have been identified and/or is likely to occur on the preferred site (Ecological and Wetland Assessment, 2019).
- The general topography of the property and specifically the site makes it accessible for earthmoving equipment, tipper trucks and transportation links for hauling of material.
- The potential impact on topsoil is anticipated to be low and likely limited to the access road.
- The site is covered by a homogenous layer of material/sand and potential impacts on palaeontological remains are unlikely (Phase 1 HIA, 2019).
- The property is in close proximity of Wepener and central towns such as Dewetsdorp where development is planned according to the IDP.

- There is also a great demand for sand from the Caledon River in the greater Mangaung. Recovered sand is currently being transported to Bloemfontein for commercial use.
- Due to the type and scale of the operation, as well as the distance from surrounding dwellings and public roads, the potential noise and visual impact is expected to be low and generation of nuisance dust will be manageable.
- Six permanent job opportunities will be created.

Disadvantages

- There is a backwater system to the east of the site. According to the Ecological and Wetland Assessment report (2019), stockpiling and sifting should not be undertaken within this area.
- The site is situated in an Ecological Support Area 1 and 2 functioning in ecological support to surrounding CBA and also supports the surrounding watercourses and wetlands (Ecological and Wetland Assessment Report, 2019).
- There are two existing mining rights to the east and one mining permit to the west of the site. The proposed operation could potentially indirectly affect the sales of the existing operations. However, no comments were received from existing operations in the area.
- A cumulative impact on the general aesthetics, instability of the riverbank, establishment of invasive vegetation and local increase in suspended solids are possible. However, the recovery of sand from the river is also expected to alleviate the sedimentation load of the river downstream. With the implementation of Environmental Best Practices and operational management measures the potential environmental impacts and risk on the water quality are anticipated to be low – medium, but manageable.
- Erosion is likely if proper management measures are not implemented. However, it is expected that erosion can be managed successfully due to the lower gradient on the site.
- Destabilisation of the riverbank is likely if appropriate management and mitigation measure are not implemented and if unused access points are not rehabilitated.
- All the operational activities will be undertaken within the 1:100 floodline.

Alternative locality

Advantages

- The proposed operation will only be undertaken on approximately 4.99 ha of the said property while the remainder of the property can be used for agricultural activities.

- A good economic offset of sand suitable for construction purposes is present along the river on the property. The deposits are of such nature that it can be pumped effectively in an economically manner with limited effect on the stabilisation of the riverbank.
- The specific position of the alternative site locality is next to an existing bridge on the R26, resulting in a higher deposition of load relative to unaltered sections of the river.
- The natural state of the alternative site has been highly degraded by previous mining activities, resulting in limited additional environmental impacts.
- The general topography of the property and specifically the site makes it accessible for earthmoving equipment, tipper trucks and transportation links for hauling of material. The site is covered by a homogenous layer of material/sand and potential impacts on palaeontological remains are unlikely (Phase 1 HIA, 2019).
- The property is in close proximity of Wepener and central towns such as Dewetsdorp where development is planned according to the IDP. There is also a great demand for sand from the Caledon River in the greater Mangaung. Recovered sand is currently being transported to Bloemfontein for commercial use.
- Six permanent job opportunities will be created.

Disadvantages

- There is one existing mining permit within 1 km to the west on the adjacent property. There are two mining rights to the east, the closest being approximately 2 km. The proposed operation could potentially indirectly affect the sales of the existing operations. However, no comments were received from existing operations in the area.
- A cumulative impact on the general aesthetics, instability of the riverbank, establishment of invasive vegetation and local increase in suspended solids are possible. However, the recovery of sand from the river is also expected to alleviate the sedimentation load of the river downstream.
- Erosion and destabilisation of the riverbank is likely if proper management and mitigation measures are not implemented.
- All the operational activities will be undertaken within the 1:100 floodline.
- There is an existing access road underneath the bridge. However DPRT oppose the use of this road by vehicles related to the mining operation.
- The operation will be visible from the provincial road, i.e. R26.

Preferred site layout

Advantages

- The preferred site layout is based on the maximum permissible mining permit area, i.e. 5 ha, as well as maximum riverfront for recovery of sand.
- The layout was determined by the property boundaries, environmental features and planned method of operation.
- Storm water on site and water from the containment area/settling pond will drain back to the river.
- Due to the nature of the site and the river system, the site will also be rehabilitated naturally to some extent during natural flooding and high flow of the river.
- The position of the site along the northern bank on the inside of the bend will result in constant depositing of mineable sand.
- The backwater system will not be affected by the operation activities, including the sifting- and stockpile area proposed to be situated to the west of the backwater area.
- The proposed route alignment of the access road is on already disturbed areas thus limiting additional impacts on the natural vegetation.
- Nuisance dust generation and effect on neighbouring landowners with the proposed route determination of the road is expected to be low.

Disadvantages

- Product stockpiling and sifting of sand will be undertaken within the 1:100 floodline with the northern boundary ranging between 30 m to 80 m from the river. The 1:50 year floodline is uncertain.

Alternative site layout

Advantages

- Although the 1:50 year floodline is uncertain, the placement of the stockpiles and sifting equipment at least 100 m from the river will limit the possibility of negative impacts (including erosion and increase in sedimentation load) during flooding.
- This site layout also considers the backwater system and allows a buffer area of minimum 50 m from this area.
- The route of the access road will exclude the backwater system, thus limiting potential environmental risks.

Disadvantages

- The riverfront is reduced from a total stretch of 950 m along the river to approximately 730 m.
- Should the existing access road be used, the potential impact of nuisance dust generation, noise and deterioration on neighbouring landowners are expected to be higher.

The 'no-go' alternative

Advantages

- No additional impacts on the aesthetics of the area.
- No direct impact on vegetation and the riparian zone, although encroachment of weeds and invasive vegetation is highly likely considering the current degraded status of the site.
- No potential generation of dust and noise.
- No potential impact on potential remains of heritage importance.
- No potential impact on any existing infrastructure.
- No additional indirect socio-economic effect on existing sand recovery operations within 1 km of the site.

Disadvantages

- Lost opportunity to clear the exotic weeds currently evident on the site during rehabilitation. However, this can still be achieved dependent on the effort from the landowner.
- Loss of the opportunity for commercial development and income.
- Loss of job opportunities and associated skill upliftment.

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).

No objections towards the continuation of the proposed project were received during the consultation process to date. Department of Water and Sanitation and Department of Police, Roads and Transport did specify minimum conditions to be adhered to. Refer to Annexure 3 attached to this report and to the table under section (h)(iii) Summary of issues raised by I&APs above for comments received.

The potential impacts expected to be associated with the proposed operation area discussed in Part A Section 3(v) of this report. Some of the main potential impacts assessed include, but are not limited, to the following:

- Impact on the watercourse.
- Potential risk of pollution to the river.
- Impact on the riparian vegetation.
- Temporary change in land use potential.
- Destabilisation of the riverbank.
- Cumulative impact of sand recovery operations within a 1 km radius, including aesthetics, increase in sediment load, etc.
- Socio-economic effect on employees and existing mining operations within 1 km of the preferred site.

The mitigation measures proposed for implementation include the following:

- The preferred site is degraded and species composition and vegetation structure indicates significant disturbance (Ecological and Wetland Assessment, 2019). Removal of vegetation will be limited to operational areas and the proposed mining will provide an opportunity to address the exotic trees present on site by removing it and reinstating the footprint.
- The number of access points to the riverfront must be limited and unused access points must be rehabilitated and the riverbank stabilised.
- The visual impact and overall impact on the aesthetics of the preferred site site is expected to be low due to its location. This will be reduced further with the implementation of good housekeeping practices.
- No potential hazardous substance (e.g. fuel, oil) will be stored on site as the entire preferred site is situated within the 1:100 year floodline. Fuel for use in equipment must be transported to site in appropriate containers.
- A mobile chemical toilet facility will be placed, but this also needs to be placed at least 100 m from the river to prevent spillage to the watercourse. The facility will be cleaned as and when necessary and the removed chemicals will be handled appropriately.
- No waste generated during the proposed operation will be disposed of on site. General waste will be collected in appropriate receptacles and collected on a weekly basis (or more regularly if necessary) and disposed of at the landfill site in Wepener. Hazardous waste (if any) will be collected in appropriate receptacles and collected by a certified hazardous waste collection company or disposed of at a facility especially for that purpose.

- Equipment on site must be kept in good working order. Conduct daily visual checks on equipment and repair any malfunctions when necessary to prevent leakage and pollution to river.
- Drip trays must be used at stationary vehicles to prevent pollution of potential hazardous substances to the surrounding environment and river.
- No major repairs and/or services must be undertaken on site, but at a workshop of site.
- The applicant will report incidents of major spillages to the Provincial Head: Department of Water and Sanitation within 24 hours.
- Speed limits will be enforced on heavy vehicles on the access road to limit generation of nuisance dust. Operational activities will also be limited during high wind conditions.
- Mining activities will be limited to day time.
- The farm is currently being used for agriculture and mainly grazing purposes. Considering the small scale of the proposed operation, the remainder of the farm could still be used for agricultural uses.
- The final site layout proposed will be to place the product stockpiles and sifting area at least 100 m from the river and also a buffer of at least 50 m from the backwater system. This will limit environmental risks on the river and backwater system.
- No chemicals and/or additives will be used for any processing of product on site.
- The applicant aims to undertaken operations in such manner that potential environmental and residual impacts will be limited throughout all the phases of the operation.
- A Water Use Authorisation in terms of the NWA, 1998 (Act 36 of 1998) is required for the activities being undertaken in the river. An application has been submitted to DWS for processing. No consumptive water use will be undertaken as part of the mining activities.
- Storm water management measures will be implemented to ensure drainage of storm water and water from the containment/settling area back to the river. The storm water management measures will also assist to mitigate erosion on site.
- Daily visual checks for signs of erosion will be undertaken by the site manager and any erosion will be repaired and measures implemented (e.g. gabions) to prevent reoccurrence of erosion.
- No employees will reside on site, but will daily commute to site.
- Access to the operation will be regulated and no unauthorised entrance to the mining permit area will be allowed.
- Concurrent rehabilitation of areas available to rehabilitate will be undertaken as far as possible to limit the area exposed to the natural elements to reduce possible environmental risks and residual impacts.

- On decommissioning of the operation, final rehabilitation will be undertaken, including landscaping and reinstatement of disturbed areas, as well as stabilisation of the riverbank at access points.

Refer to Annexure 9 for an assessment of the potential impacts/risks after mitigation as well as for the recommended management measures and monitoring to be implemented throughout all the phases of the proposed project to limit impacts. Also refer to the Storm Water Management Plan (August 2019) under Annexure 5.

ix) Motivation where no alternative sites were considered.

Refer to Part A, Section 3(h) for a description of the alternatives that were considered during this application for the proposed project.

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

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

After considering the preferred site layout and alternative layout, the motivation for the final site layout includes the following:

- The preferred site and layout was determined by the property boundaries; economic resource deposit; results from specialist studies; the general topography of the site; and planned method of operation.
- The preferred site is 4.99 ha and is situated on a portion of the Remaining Extent of the farm Jammerbergsdrift 540, situated in the Magisterial District of Wepener. The landowner is also one of the directors of the company applying for the mining permit area.
- The rate of sand deposition of the preferred site located at the bend in the river is expected to be higher than at the alternative site position at the bridge to the west of the property.
- The preferred site is currently degraded with high infestation of exotic trees. The impact on natural vegetation will be low.
- The final site layout consider the backwater system and place the sifting- and stockpile area 100 mm from the river with a buffer of approximately 50 m from the backwater system.
- The proposed access road mainly follows the existing powerline and a previously used two row gravel road, making this an ideal route. The final route determination also considered the stone-wall enclosures on the dolerite outcrop, the backwater system to the eastern boundary of the preferred site and shortest

route to the provincial road. However, this will be dependent on consent from DPRT.

- The use of the existing road as additional road can be used as necessary; however this is expected to have a higher impact on neighbouring landowners.

Refer to the Amended Site plan attached under Annexure 2 of this report for details of the proposed final site layout.

Refer to Part A, Section 3(d)(ii) of this document for information on the activities to be associated with the proposed operation and to Part A, Section 3(h) for a description of the alternatives that were considered for this project.

i) 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.)

A desktop study of the local area and its known environmental features was done. A site assessment was done by the EAP to identify any potential sensitive features on the proposed project site and within the study area. Specialists conducted the following studies: Ecological and Wetland Assessment (July 2019); Phase 1 Heritage Impact Assessment (September 2019) on the study area on the affected property (i.e. Jammerbergsdrift 540/RE, Wepener). Based on the results of the site assessments and activities expected to be associated with the proposed sand recovery operation, the potential environmental impacts and risks were identified and assessed.

j) 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).

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
<p>(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc</p> <p>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.)</p>	<p>(Including the potential impacts for cumulative impacts)</p> <p>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)</p>		<p>In which impact is anticipated</p> <p>(e.g. Construction, commissioning, operational Decommissioning , closure, post-closure)</p>		<p>(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)</p> <p>E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.</p>	
<p>Site establishment (Vegetation clearance; establishment of equipment, access points & access road; etc.)</p>	<p>Clearance of riparian vegetation</p>	<p>Aesthetics; Land use; Vegetation; Biodiversity</p>	<p>Development</p>	<p>Low</p>	<p>Avoid through site locality & layout; Remedy current degraded status through rehabilitation; Limit footprint.</p>	<p>Low</p>

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Site establishment (Vegetation clearance; establishment of equipment, access points & access road; etc.)	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Development	Medium	Limit through site layout & number of access points to the river; Avoid unnecessary clearance of riparian vegetation; Limit footprint; Remedy through rehabilitation.	Low
	Establishment of alien vegetation	Vegetation; Biodiversity; Ecosystem function	Development	Medium	Remedy through rehabilitation; Limit footprint; Monitor establishment of invasive species; Control through management plan.	Low
	Habitat destruction	Vegetation; Fauna; Biodiversity; Ecosystem function	Development	Low	Limit through site locality & layout; Remedy current degraded status through rehabilitation; Limit footprint.	Low
	Impact on terrestrial fauna	Fauna; Biodiversity; Ecosystem function	Development	Low	Remedy current degraded status through rehabilitation; Limit footprint; Avoid poaching.	Low
	Erosion	Aesthetics; Land use; Water quality; Soil	Development	Medium	Remedy through rehabilitation; Limit through site locality & layout; Limit footprint; Monitor occurrence of erosion and extent thereof; Control through storm water control and erosion measures.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Site establishment (Vegetation clearance; establishment of equipment, access points & access road; etc.)	Loss of topsoil	Soil; Land use	Development	Low	Limit through site locality & layout; Limit footprint; Control through appropriate topsoil stockpiling (where topsoil is present); Control through storm water control and erosion measures; Monitor occurrence of erosion and extent thereof; Remedy through rehabilitation; Avoid steep slopes for access routes.	Low
	Visual scarring	Aesthetics; Visual; I&APs	Development	Low	Remedy through rehabilitation; Limit footprint; Limit through locality and site layout; Limit with good housekeeping.	Low
	Elevated noise levels	Noise; I&APs; Health and Safety	Development	Low	Limit through operational procedures (including working hours); Limit by using good operating machinery.	Low
	Change in land use (Loss of agricultural potential)	Land use	Development	Low	Limit through site locality & layout; Remedy through rehabilitation; Limit footprint.	Low
	Damage or destruction of objects/artefacts of heritage importance	Heritage; I&APs	Development	Medium	Avoid through site locality & layout informed by the HIA (2019); Create awareness with employees; Limit footprint.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Recovery of sand: Pumping from riverbed via floating pump	Water quality: Increase in suspended solids	Water quality	Operational	Medium	Limit through operational procedures.	Medium
	Water quality: Spillage of hydrocarbons, e.g. oil, diesel	Water quality	Operational	Medium	Limit through operational procedures; Control through monitoring and repairing leakages on equipment.	Medium
	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Operational	Low	Limit through number of access points to the river; Avoid unnecessary clearance of riparian vegetation; Limit footprint; Avoid through operational procedures (including buffers along the riverbank).	Low
	Disturbance to aquatic habitat (or biotypes)	Biodiversity; Ecosystem function	Operational	Low	Limit through operational procedures; Limit footprint.	Low
	Change in surface water drainage: Instream	Natural flow path	Operational	Low	Control through operational procedures; Limit access points to the river; Remedy through rehabilitation.	Low
Recovery of sand: Pumping from riverbed via excavator fitted with a pump	Water quality: Increase in suspended solids	Water quality	Operational	Medium	Limit through operational procedures; Limit access points and movement along the riverbank and/or ramps.	Medium
	Water quality: Spillage of hydrocarbons, e.g. oil, diesel	Water quality	Operational	Medium	Limit through operational procedures; Control through monitoring and repairing leakages on equipment.	Medium

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Recovery of sand: Pumping from riverbed via excavator fitted with a pump	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Operational	Low	Limit through number of access points to the river; Avoid unnecessary clearance of riparian vegetation; Limit footprint; Avoid through operational procedures (including buffers along the riverbank).	Low
	Disturbance to aquatic habitat (or biotypes)	Biodiversity; Ecosystem function	Operational	Low	Limit through operational procedures; Limit footprint.	Low
	Change in surface water drainage: Instream	Natural flow path	Operational	Low	Control through operational procedures; Limit access points to the river; Remedy through rehabilitation.	Low
Recovery of sand: Excavating sand from the riverbed via excavator (only during dry periods)	Water quality: Increase in suspended solids	Water quality	Operational	Low	Limit through operational procedures; Avoid backwater area; Limit access points and movement along the riverbank and/or ramps.	Low
	Water quality: Spillage of hydrocarbons, e.g. oil, diesel	Water quality	Operational	Medium	Limit through operational procedures; Control through monitoring and repairing leakages on equipment.	Low
	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Operational	Medium	Limit number of access points to the river; Limit clearance of riparian vegetation and footprint; Avoid through operational procedures (e.g. buffers along the riverbank).	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Recovery of sand: Excavating sand from the riverbed via excavator (only during dry periods)	Disturbance to aquatic habitat (or biotypes)	Biodiversity; Ecosystem function	Operational	Low	Limit through operational procedures; Limit footprint.	Low
	Change in surface water drainage: Instream	Natural flow path	Operational	Low	Control through operational procedures; Limit access points to the river; Remedy through rehabilitation.	Low
Containment area / Settling pond on the riverbank	Change in surface water drainage	Topography; Storm water; Water quantity	Operational	Low	Limit through site layout; Control through operational procedures; Control through storm water controls; Remedy through rehabilitation.	Low
	Surface water quality: Increase in suspended solids	Water quality	Operational	Medium	Limit footprint; Control through operational procedures; Avoid backwater area; Control through storm water controls; Remedy through rehabilitation.	Low
	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Operational; Decommissioning	Low	Avoid unnecessary clearance of riparian vegetation; Limit footprint; Avoid through operational procedures; Remedy through rehabilitation.	Low
Sifting	Dust generation	Air quality; I&APs	Operational	Low	Limit through operational procedures; Control through implementation of dust control measures.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Stockpiling	Dust generation	Air quality; I&APs	Operational	Low	Control through operational procedures; Limit through dust control and monitoring; Prevent through rehabilitation of disturbed areas.	Low
	Change in surface water drainage	Topography; Storm water; Natural flow path	Operational	Low	Control through storm water controls; Limit through site layout; Avoid backwater area; Remedy through rehabilitation.	Low
	Erosion & loss of topsoil	Aesthetics; Land use; Soil	Operational	Medium	Control through storm water controls; Limit through site layout; Avoid backwater area; Remedy through visual checks and reinstatement of eroded areas; Remedy through rehabilitation.	Low
	Establishment of alien vegetation	Vegetation; Biodiversity	Operational	Medium	Control through monitoring and clearance of invasive species; Remedy through rehabilitation; Limit footprint disturbance; Control through implementation of a weed management plan.	Low
Loading & hauling	Dust generation	Air quality; I&APs	Operational	Low	Control through operational procedures and monitoring; Limit through dust control measures; Limit through speed control; Remedy through rehabilitation.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Loading & hauling	Deterioration of the gravel access road	Infrastructure; I&APs; Road safety	Operational; Decommissioning	Medium	Remedy through visual checks and maintenance of the road; Control through speed control.	Low
	Change in surface water drainage	Natural flow path; Water quantity; Ecosystem function	Operational; Decommissioning	Medium	Control through storm water controls; Limit through site layout; Remedy through visual checks and maintenance of the road; Remedy through rehabilitation.	Low
	Erosion	Aesthetics; Land use; Soil	Operational; Decommissioning	Medium	Control through storm water controls; Limit through site layout; Remedy through visual checks and reinstatement of eroded areas; Remedy through rehabilitation.	Low
	Loss of topsoil	Soil; Land use	Operational; Decommissioning	Medium	Limit through storm water controls; Limit through appropriate topsoil stockpiling and site layout; Remedy through visual checks and reinstatement of eroded areas; Remedy through rehabilitation.	Low
Storage of material and substances with the potential to pollute (e.g. fuel, oil, gas)	Soil contamination from spillages	Soil; Land use	Operational; Decommissioning	Medium	Avoid through operational procedures; Prevent through management; Remedy through rehabilitation	Low
	Water quality: Spillage of hydrocarbons, e.g. diesel	Water quality	Operational; Decommissioning	Medium	Prevent through site layout; Avoid through operational and management procedures; Remedy through cleaning and rehabilitation.	Medium

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Storage of material and substances with the potential to pollute (e.g. fuel, oil, gas)	Fire risk	Health & safety; I&APs; Biodiversity	Operational	Low	Avoid through operational procedures; Avoid through management & appropriate storage control; Limit risks through training and awareness to staff.	Low
Waste generation: General and domestic solid waste	Littering	Land use; Aesthetics; Water quality	Development; Operational; Decommissioning	Low	Prevent through proper waste management.	Low
	Fire risk	Health & safety; I&APs; Biodiversity	Operational	Low	Avoid through operational procedures; Avoid through management & appropriate waste management control; Limit risks through training and awareness to staff.	Low
Waste generation: Sewage	Water quality: Spillage of sewage	Water quality	Development; Operational; Decommissioning	Medium	Avoid through management & appropriate waste management control; Limit through site layout; Remedy through cleaning and reinstatement of affected areas.	Medium
	Soil contamination from spillages	Health & safety; Soil	Development; Operational; Decommissioning	Low	Avoid through management & appropriate waste management control; Remedy through cleaning and reinstatement of affected areas; Remedy through rehabilitation.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
General operational activities (Especially in respect of I&APs and employees)	Visual scarring & impact on the general aesthetics of the area	Aesthetics; I&APs	Operational; Decommissioning	Low	Remedy through rehabilitation; Limit footprint; Limit through locality and site layout; Limit with good housekeeping and operational procedures.	Low
	Elevated noise levels	Noise; I&APs; Health and Safety	Operational; Decommissioning	Low	Limit through operational procedures (including working hours); Limit by using good operating machinery.	Low
	Risk of injury to people entering the operational area	Health & safety; I&APs	Operational; Decommissioning	Medium	Prevent through access control; Avoid through rehabilitation at closure; Prevent through creating awareness through induction.	Low
	Risk of injury to employees working with machinery/equipment on site	Health & safety	Development; Operational; Decommissioning	Medium	Prevent and/or limit through appropriate PPE; Prevent by using good working equipment with required safety standards and mechanisms; Prevent through creating awareness through induction; Prevent through appropriate training to staff on site.	Medium
	Change in land use (Loss of agriculture potential)	Land use	Operational; Decommissioning	Low	Limit through site locality & layout; Remedy through rehabilitation; Limit footprint.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
General operational activities (Especially in respect of I&APs and employees)	Impact on terrestrial fauna	Fauna; Biodiversity; Ecosystem function	Operational; Decommissioning	Low	Remedy current degraded status through rehabilitation; Limit footprint; Avoid poaching.	Low
	Establishment of alien vegetation	Vegetation; Biodiversity; Ecosystem function	Operational; Decommissioning	Medium	Remedy through rehabilitation; Limit disturbance footprint; Monitor establishment of invasive species; Control through clearance and management plan.	Low
	Indirect loss of sales of existing sand recovery operations	I&APs; Socio-economics	Operational	Low	Limit through sustainable mining.	Low
	Job creation & skills upliftment	Community; Economy	Development, Operational; Decommissioning	Medium (Positive)	Achieve through continuation with proposed operation; Achieve through training of staff; Achieve through employment to local people.	Medium (Positive)
	Economic development in the region	Community; Economy	Operational	Low (Positive)	Achieve through continuation with proposed operation; Achieve through delivery of product to Wepener and surroundings, and possibly the larger Free State region (dependent on market).	Medium (Positive)
Cumulative impacts considering other activities within 1km (including sand mining & farming)	Dust generation	Air quality; I&APs	Operational	Low	Control through operational procedures & speed control; Limit through dust control measures; Control through monitoring; Remedy through rehabilitation.	Low

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Cumulative impacts considering other activities within 1km (including sand mining & farming)	Visual scarring & impact on the general aesthetics of the area	Aesthetics; Visual	Development; Operational; Decommissioning	Medium	Remedy through rehabilitation; Limit footprint; Limit through locality and site layout; Limit with good housekeeping and operational procedures.	Low
	Elevated noise levels	Noise; I&APs	Operational	Low	Limit through operational procedures (including working hours); Limit by using good operating machinery.	Low
	Clearance of riparian vegetation	Aesthetics; Land use; Vegetation; Biodiversity	Development; Operational	Medium	Avoid through site locality & layout; Remedy current degraded status through rehabilitation; Limit footprint.	Low
	Erosion & loss of topsoil	Aesthetics; Land use; Soil	Development; Operational; Decommissioning	Medium	Control through storm water controls; Limit through site layout; Remedy through visual checks and reinstatement of eroded areas; Remedy through rehabilitation.	Low
	Change in land use (Loss of agriculture potential)	Land use	Development; Operational	Medium	Limit through site locality & layout; Limit footprint; Remedy through rehabilitation to an end land use potential of agriculture after Closure.	Low
	Change in surface water drainage	Topography; Storm water flow; Water quantity; Ecosystem function	Development; Operational; Decommissioning	Medium	Control through storm water controls; Limit through site layout & operational procedures; Remedy through rehabilitation.	Medium

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Cumulative impacts considering other activities within 1km (including sand mining & farming)	Habitat loss and effect on the general biodiversity	Biodiversity; Ecosystem function	Development; Operational; Decommissioning	Low	Control through operational procedures; Remedy through landscaping and rehabilitation of disturbed areas; Remedy current degraded status through establishment of natural vegetation; Limit through site locality & layout; Limit footprint.	Low
	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Development; Operational	Medium	Avoid unnecessary clearance of riparian vegetation; Limit disturbance by limiting access points to the river; Limit footprint; Avoid through operational procedures; Remedy through rehabilitation.	Low
Rehabilitation (e.g. removal of equipment, reshaping & reinstating disturbed areas, etc.)	Soil contamination from spillages and waste disposal	Soil; Land use	Decommissioning	Medium	Avoid through rehabilitation procedures and waste management; Remedy through clearance and reinstatement.	Low
	Water pollution due to spillages and waste disposal	Water quality	Decommissioning	Medium	Avoid through rehabilitation procedures and waste management.	Low
	Elevated noise levels	Noise; I&APs	Decommissioning	Low	Limit through rehabilitation procedures (e.g. working hours).	Low
	Change in surface water drainage	Topography; Storm water flow; Water quantity; Ecosystem function	Decommissioning ; Closure	Medium (Positive)	Achieve through landscaping and rehabilitation of disturbed areas; Achieve through storm water control measures, e.g. berms.	Low (Positive)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Rehabilitation (e.g. removal of equipment, reshaping & reinstating disturbed areas, etc.)	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Decommissioning	Low	Remedy through rehabilitation.	Low
	Erosion & loss of topsoil	Aesthetics; Land use; Soil	Decommissioning	Low	Control through storm water controls; Remedy through rehabilitation and reinstatement of affected areas; Control through erosion control & monitoring.	Low
	Establishment of alien vegetation	Vegetation; Biodiversity; Ecosystem function	Decommissioning	Medium	Remedy through rehabilitation; Control through monitoring and removal of invasive plants.	Low
Closure	Stabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Post monitoring	Low (Positive)	Achieve through landscaping and rehabilitation of disturbed areas; Achieve through establishment of natural occurring vegetation.	Medium (Positive)
	Establishment of a self-sustaining ecosystem	Land use; Aesthetics; Biodiversity; Ecosystem function	Post monitoring	Low (Positive)	Achieve through landscaping and rehabilitation of disturbed areas; Achieve through establishment of natural occurring vegetation.	Medium (Positive)
	Job creation & skills upliftment: Retrenchment	Community; Economy	Post monitoring	Low	Limit through a retrenchment policy, aiming at re-employment at alternative sites (if possible); Limit impact through training to staff during operational phase.	Low

The supporting impact assessment conducted by the EAP must be attached as an appendix.

[Also refer to Annexure 9 attached hereto for the Environmental Impact, Risk Assessment and Management Report for more detailed information.]

k) 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):- [Refer to Annexure 5 for specialist studies.]

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.
Ecological and Wetland Assessment (July 2019)	The backwater system along the eastern border of the site should not be utilised as stockpile or processing areas. Mining activities in this area should in general be avoided.	X	Part A Sections 3(e), 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Ecological and Wetland Assessment (July 2019)	Disturbance to the marginal zone and steep banks of the river should be minimised.	X	Part A Sections 3(e), 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Ecological and Wetland Assessment (July 2019)	The exotic species on the site must be eradicated as mining progresses and form part of the management of the mining operation.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Ecological and Wetland Assessment (July 2019)	The removal of vegetation especially on the banks and floodplain must be minimised. Only one pump and access road should be utilised at any given time. The disturbed area must be rehabilitated after moving the pump to another location along the site.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9

Ecological and Wetland Assessment (July 2019)	Adequate rehabilitation must be implemented on disturbed areas when it becomes available for rehabilitation and after mining has ceased. This includes re-instatement of the natural topography, topsoil, prevention of erosion and monitoring eradication of problematic weeds.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Ecological and Wetland Assessment (July 2019)	The topsoil should be removed and stored on site and utilised for rehabilitation.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Ecological and Wetland Assessment (July 2019)	Adequate storm water management measures should be implemented, including the diversion of storm water around stockpiles, settling- and processing areas, preventing sediment and silt from entering the river.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Ecological and Wetland Assessment (July 2019)	As the stockpiles and processing area will be located in the floodplain of the river, it will be affected by annual flooding. The necessary precautions and management measures such as berms must be implemented to ensure the diversion of floodwater.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Ecological and Wetland Assessment (July 2019)	The hunting, capturing and trapping of fauna should be prevented.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Ecological and Wetland Assessment (July 2019)	No littering must be allowed and litter must be removed from site.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Ecological and Wetland Assessment (July 2019)	Monitoring of mining and compliance with recommended mitigation measures must be implemented.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Ecological and Wetland Assessment (July 2019)	Construction and operational material must be removed from site after mining has ceased.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9

Phase 1 Heritage Impact Assessment (September 2019)	The proposed operation may proceed with no further palaeontological assessments required.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9
Phase 1 Heritage Impact Assessment (September 2019)	The proposed operation may proceed provided that all excavation activities are restricted to the boundaries of the proposed development footprint.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5
Phase 1 Heritage Impact Assessment (September 2019)	In the unlikely event that fossils and/or archaeological artefacts or remains are exposed during the operational phase, a professional palaeontologist or archaeologist must be informed prior to continuation of activities in the direct area.	X	Part A Sections 3(h), 3(j) and 3(p) Part B Sections 1(d), 1(e) and 1(f) Annexure 5 & 9

I) Environmental impact statement

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

The key findings of the EIA are as follow:

- The study area and preferred site is degraded and high infestation of exotic trees and invasive species are present.
- The river experience annual flooding resulting in significant disturbance of the riparian vegetation and continuous changes in the vegetation community with annual and pioneer species best suited to this disturbance regime.
- There is a small backwater system along the eastern border of the preferred site and wetland conditions are present on this portion. According to the Ecological and Wetland Assessment Report (2019), this system can be characterised as a floodplain wetland according to SANBI (2009).
- The site is situated in the quaternary catchment area D23J.
- The Caledon River is a NFEPA-listed aquatic system; however the river is presently highly modified.
- The Instream IHI of the study area is Category C: Moderately Modified, while the Riparian IHI is Category D: Largely Modified.
- The EI&S of the Caledon River has been rated as being Moderate: Floodplains that are considered to be ecologically important and sensitive on a provincial or local scale.
- The Risk Assessment Matrix for Section 21(c) & (i) water use in respect of the proposed operation at the preferred site indicated Moderate Risks: Risk and impact on watercourses are notable and require mitigation measures on a higher level.
- The study area does not fall within a Critical Biodiversity Area (CBA) but is situated in an Ecological Support Area 1 and 2.
- No endangered or protected species were recorded in the study area during the assessment. Due to the disturbed nature and locality of the preferred site, it also considered unlikely that such species will be present.
- There are no tribes and/or communities on or in close proximity of the affected property.
- The study area is situated within the outcrops of the Beaufort Group (Karoo Supergroup) and is represented by Early Triassic sedimentary rocks of the palaeontologically significant Tarkastad Subgroup. This area us underlain by well developed overbank sediments made up of homogenous and geologically recent (<Holocene) river sad.
- During the survey, no evidence of fosilliferous terrace gravels or paleo-donge (gully) infill deposits were found. There were also no evidence of the

accumulation and preservation of intact Quaternary fossil material within the geologically recent alluvial overburden covering the footprint of the preferred site.

- Stone-walled enclosures of the Late Iron Age were recorded on a dolerite outcrop approximately 1 km northwest of the western boundary of the preferred mining site.
- No other above-ground evidence of in situ Stone Age archaeological material was found within the footprint of the preferred site. The geologically recent alluvial sand overburden is generally considered to be culturally sterile in terms of intact Stone Age archaeological remains.
- No indications of rock art, prehistoric structures, graves or historically significant structures older than 60 years were found within the confines of the proposed mining permit area.
- According to this study, the site is assigned the rating of Generally Protected (GP.C) (Low significance).
- Current known economic activities within a 1 km radius from the preferred and alternative sites on neighbouring properties include farming and existing sand mining operations.
- The operation is expected to create 6 job opportunities.
- The proposed operation may potentially influence the socio-economics of existing sand recovery operations in the area.
- Positive socio-economic impacts include job creation, skill upliftment and indirect economic affect locally.
- Confirmation regarding any land claims on the affected property has not been received at the time of the writing of this report.
- The potential cumulative impact on noise, dust and aesthetics of the proposed operation is anticipated to be low due to the locality of the preferred site and distance from the nearest dwellings and similar operations. This will also be short term (0 – 5 years) dependant on the duration of the mining permit (if considered for approval).
- Sedimentation load in the Caledon River is high resulting in large offsets of sand on the banks and bed of the river. The recovery of sand from the riverbed by sand mining operations is expected to reduce the sediment load downstream to some extent.
- The main issues of concern (but not necessarily limited hereto) to be managed include: The implementation of storm water control measures; Best practice in terms of the storage and handling of any potential hazardous substances; Containment of any spillage; Waste management; Locality of the operation and associated activities within the 1:100 year floodline; Implementation of weed control measures; Implementation of erosion control measures; Stabilisation of the riverbank at disturbed areas.

- The potential environmental impacts expected to be associated with the proposed operation are manageable provided that the recommended environmental management measures be implemented as minimum throughout all the phases of the operation.
- It is recommended that the final site layout exclude mining activities in the area of the backwater system and that the sifting and product stockpile area be situated at least 100 m from the river with a buffer of approximately 50 m from the backwater portion.
- The final route determination is dependent on comment from DPRT and the decision from DMR (if continuation of the proposed operation is considered for approval).
- No objections against the continuation of the operation were received to date.

ii) Final Site Map

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

Refer to Annexure 2 for the proposed final site plan and layout superimposed on the environmental sensitive areas.

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

Proposed operation on preferred site and final layout

(This option refers to the preferred site locality with an alternative site layout considering the backwater system and placement of the sifting and product stockpiles 100 m from the river.)

Positive impacts:

- The high demand for sand for construction makes the operation economically feasible.
- Six permanent job opportunities will be created.
- Relatively higher rate of sand depositing expected on the inside of the bend on the northern banks of the river at the preferred locality.
- Physical recovery of sand from the riverbed will not be affected by the final site layout, thus still ensuring an economically viable operation.
- Approximately 730 m stretch of riverfront accessible for sand recovery.
- The access road follows an alignment of which the natural vegetation has already been disturbed by existing infrastructure and also follows the shortest

route to the provincial road. However, access directly to the provincial road will be dependent on consent and/or approval from DPRT.

- The route alignment for the access road considers the position of the stone-wall enclosures on the dolerite outcrop.
- Limited distribution of nuisance dust to the surrounding area and neighbours due to the locality and type of activities.
- Limited visual impact and elevated noise levels due to the locality of the preferred site.
- Although operational activities are undertaken within the 1:100 year floodline, the final site layout recommends that the sifting and product stockpile area be situated 100 m from the river with a 50 m buffer from the backwater system to the east. This will limit potential increase in sediment loads during high flows and flooding (excluded 1:100 year floods).
- The backwater portion is likely to be flooded annually and floodwater is likely to reside in this area for significant periods of time, thus also preventing mining activities during this time.
- Limit impact on habitat and general biodiversity as the site is currently degraded with high infestation of invasive vegetation.
- Limit impact and risks of instability of the riverbank.
- Potential environmental risks and impacts can be managed.
- The remainder of the property can be used for agricultural use.

Negative impacts:

- Potential environmental impacts include: Loss of topsoil along the access road; Erosion; Dust generation; Noise; Removal of riparian vegetation; Risk of destabilisation of the riverbank; Risk in pollution due to spillages.
- Localised disturbance to the riverbed and riverbank.
- Potential increase in sedimentation in the river.
- Localised change in natural drainage of storm water from the site.
- Temporary change in land use.
- Increased physical footprint on the riverbank.
- Health and safety risks.
- The proposed route alignment to gain direct access to the provincial road is dependent on consent and/or approval from DPRT.

Alternatives that were considered in terms of the site layout

(This option refers to the initial site plan on the preferred site with placement of the sifting and product stockpiles closer than 100 m from the river.)

Positive impacts:

The potential positive impacts expected with this site layout will be the same as for the above site layout with the following main differences:

- Limit physical footprint on the riverbank and riparian zone.
- Approximately 950 m stretch of riverfront accessible for sand recovery.

Negative impacts:

The potential negative impacts expected with this site layout will be the same as for the above site layout with the following main differences:

- Higher risk of an increase in sedimentation load to the river during high flow and flooding of the backwater system and lower reaches of the riparian zone.
- Risk of mining activities within the area of the backwater system being temporary stopped during high flow or flooding. Possibly also damaging any equipment within this portion at the time.
- Higher risks of erosion and loss of soil with placement of the operational areas within 100 m of the river.

Alternatives that were considered in terms of the site locality

(This option refers to the site locality on a portion along the western boundary at the R26 bridge.)

Positive impacts:

The potential positive impacts expected with this site locality will largely be the same as for the preferred final site locality and layout with the following main differences:

- Existing access.
- Previous mining permit area with degraded site.
- Limit impact on habitat and general biodiversity.

Negative impacts:

The potential negative impacts expected with this site locality will largely be the same as for the preferred final site locality and layout with the following main differences:

- The existing access includes travelling under the bridge over the R26. DPRT does not approve of movement of vehicles/equipment used for mining under the bridge.
- Relatively lower rate of sand depositing expected at the bridge than at the preferred site locality.
- Only approximately 500 m stretch of riverfront accessible for sand recovery with the bridge possibly obstructing mining activities.

- Physical recovery of sand from the riverbed may be affected by the bridge, but it still proved to be feasible considering previous mining at this site.
- Higher visual impact due to the locality of the alternative site.
- Higher risks of nuisance dust due to the locality at the provincial road, although this can be managed.
- Health and safety risks.

The 'no-go' alternative

Positive impacts

- No additional impacts on the aesthetics of the area.
- No direct impact on vegetation and the riparian zone, although encroachment of weeds and invasive vegetation is highly likely considering the current degraded status of the site.
- No potential generation of dust and noise.
- No potential impact on potential remains of heritage importance.
- No potential impact on any existing infrastructure.
- No additional indirect socio-economic effect on existing sand recovery operations within 1 km of the site.

Disadvantages

- Lost opportunity to clear the exotic weeds currently evident on the site during rehabilitation. However, this can still be achieved dependent on the effort from the landowner.
- Loss of the opportunity for commercial development and income.
- Loss of job opportunities and associated skill upliftment.

m) 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 authorisation.

The main impact management objectives and outcomes include amongst other the following:

- To ensure that environmental Best Practice is implemented in terms of the management and mitigation of environmental impacts throughout the operation.
- To implement management measures and develop sustainable mining methods to limit and/or prevent the potential environmental impacts expected to be associated with the proposed operation to a minimum.

- To ensure compliance with the relevant environmental legislation.
- To obtain the necessary Environmental Authorisations in terms of the respective legislation.
- To implement mining methods in such manner that the end land use and rehabilitation objectives are reached at closure of the operation.
- To undertake concurrent rehabilitation of mined out areas to limit further environmental impacts and also limit the final rehabilitation costs.
- To create environmental awareness to all personnel on site.
- To comply with recommended and regulated standards in respect of environmental perimeters, e.g. water quality.

n) Aspects for inclusion as conditions of Authorisation.

Any aspects which must be made conditions of the Environmental Authorisation

Implementation of appropriate management measures in respect of, but not necessarily limited to, the following aspects:

- Storm water drainage to allow storm water flow to follow the natural draining of the area as far possible and to ensure drainage to the river system;
- Erosion control measures to limit loss of soil and suspended solids in the river;
- Operational procedures in terms of the recovery of sand to limit potential impacts on the riverbed, riverbank, riparian zone, flood plain and backwater system present to the east of the site;
- Removal of vegetation and topsoil (where necessary) prior to disturbing an area and appropriate stockpiling of topsoil for re-use during rehabilitation;
- No disturbance in the immediate vicinity of the stone-wall remains discovered on the property must be allowed without the necessary approvals from SAHRA;
- Implement appropriate waste management;
- Management of spills and procedures for the handling and disposal of contaminated sand;
- Appropriate stockpiling of product material;
- Stabilisation of the riverbank at areas disturbed by mining activities, e.g. access points. Limit the number of access points and implement erosion control at these areas;
- Concurrent rehabilitation of disturbed areas available for rehabilitation during the operational phase;
- The applicant will be responsible to apply for the necessary authorisations as may be required and/or applicable to any other regulated activity prior to commencement of any such activity in future.

- Undertake the annual environmental performance assessments and a revised quantum in accordance with the NEMA Regulations on Financial Provision for mining, 2015 (or in accordance with subsequent amendments to the regulations).

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

(Which relate to the assessment and mitigation measures proposed)

During the assessment and development of the management measures, it was assumed that the information provided by the applicant, input from I&APs and stakeholders and assessment by specialists were true, correct to the best of their knowledge and unbiased.

The annual volume of sand expected to be recovered during the operational phase is uncertain due to the regular offset of sand during the natural and high flow of the Caledon River. The estimated volume of sand to be recovered per annum included in the Financial and Technical Report, dated July 2019 was estimated on average recovery volumes of surrounding existing sand mining operations.

Confirmation from Department Rural Development and Land Reform in respect of any land claims on the affected property was outstanding at the time of writing of this document.

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

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

According to the Ecological and Wetland assessment report (2019), the site proposed for the operation is considered the preferred site. The condition of the site is already degraded and invaded by exotic trees. Continuation with mining on the site will provide an opportunity to rehabilitate the current degraded site after cessation of mining activities.

According to the Phase 1 HIA (2019), there is no evidence of archaeological- and/or palaeontological significant remains within the footprint of the proposed mining permit area. The route determination for the access road should consider the Late Iron Age stone-walled enclosures on the dolerite outcrop approximately 1 km to the northwest of the site.

Provided that the site layout gives consideration to the backwater system, all the recommended management and mitigation measures are implemented as minimum

measures throughout all the phases of the proposed operation, and the required approvals are obtained in terms of any other applicable legislation and/or regulatory processes, the proposed operation can be considered for continuation.

ii) Conditions that must be included in the authorisation

Conditions recommended for inclusion in the authorisation (if considered for approval) include amongst other, the following:

- Erosion control and storm water control measures must be applied during all phases of the operation.
- Problematic weeds and invasive vegetation must be eradicated and establishment monitored during the operational and decommissioning phases.
- Management measures should be implemented to ensure stability of the riverbank as far as possible. This can be achieved by means of as storm water control and limited removal of vegetation in the riparian zone.
- Operational activities in the direct vicinity of any palaeontological- and/or cultural remains found on site during operation should stop and the provincial department of SAHRA be contacted immediately.
- The access road to the operation should be maintained and appropriate storm water control measures should be implemented on the road.
- Topsoil (if any) should be removed and stockpiled for use during rehabilitation.
- Emergency procedures should be in place for environmental and safety incidents.
- The applicant must submit an Annual Environmental Performance Assessment to the competent authority to verify compliance with the management measures stipulated in the BAR, EMPr and conditions in the Environmental Authorisation (if considered for approval).
- Working hours should be kept to day time (unless otherwise specified by the applicant).
- An application for a water use license should be submitted to Department Water and Sanitation in terms of any unauthorised water use in future.
- Access to the mining permit area should be regulated.
- The Mines Health and Safety Act, 1996 (Act 29 of 1996) should be adhered to at all times.

q) Period for which the Environmental Authorisation is required.

This application for Environmental Authorisation is for a listed activity requiring a mining permit in terms of Section 27 of the MPRDA, 2002 (Act 28 of 2002) for the development and operation of a sand mine. Currently a mining permit is valid for two

years after which the permit can be renewed annually for another 3 years. The Environmental Authorisation in respect of the mining permit, i.e. 4.9 ha operational area would be required for site establishment and at least another 5 years once operational, dependant on the regulations and requirements in terms of NEMA, 1998 (Act 107 of 1998) and regulations at the time that the permit reaches its expiry date. With lapsing of the permit, the applicant can apply for a Closure Certificate or apply for a Mining Right in terms of the MPRDA, 2002, depending on the end-land use to be decided on by the landowner at the time.

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 by the applicant to comply with this BAR and EMPr is provided at the end of the EMPr.

s) Financial Provision

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

The amount to manage and rehabilitate the environmental aspects as estimated in the Financial and Technical Report (Tables 2 & 3.1), dated July 2019 amounts to R25 490.00 per quarter, which totals to R203 920.00 over the first two years of the operation (not factoring in possible changes, external factors and/or annual inflation).

i) Explain how the aforesaid amount was derived.

The quarterly amount of R25 490.00 to manage and rehabilitate the environmental aspects of the operation was accounted as follow:

- Estimated rehabilitation cost divided by 8 quarters (i.e. 2 years) and added to the quarterly cost of mitigation measures (Table 2 of Financial and Technical Report, dated July 2019).

The quantum for financial provision to be provided to DMR was calculated in accordance with DMR's guideline titled "Guideline document for evaluation of the quantum of closure-related financial provision provided by a mine", dated 2005 considering the latest master rates in Section B as well as current rehabilitation costs.

The calculated cost for final closure of the operation by the applicant (i.e. Sub-total 1 of the Quantum) is R191 911.78 (Annexure 10). It is recommended that concurrent rehabilitation of disturbed areas available for rehabilitation be undertaken during the Operational Phase as far possible to also minimise the final amount required for rehabilitation. The calculated cost for current environmental liability by a Third Party (as per quantum calculation) (i.e. Grand Total of the Quantum plus VAT) is R269 252.22.

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).

The total estimated environmental cost of R25 490.00 per quarter for management and rehabilitation of the proposed operation was included in the budget calculation in Table 3.1 of the Financial and Technical Report, dated July 2019 as part of the operating cost. According to this cash flow forecast, calculations indicate that the operation will generate a profit and is therefore expected to be financially feasible.

Refer to the quantum calculation and the Financial and Technical Competence Report submitted as part of this application for Environmental Authorisation.

t) Specific 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 an **Appendix**).

There are no tribes and/or communities on or in close proximity of the affected property. Confirmation in respect of any land claims on the affected party is currently outstanding. Refer to Annexure 3 for proof of the enquiry submitted to Department Land Reform.

There are no person(s) or existing activity at the preferred locality that will be directly affected by the proposed operation or that have to be relocated from the affected property.

There are currently three known existing sand recovery operations upstream from the affected property, i.e. one mining permit and two mining rights. An effect on the current sales of the existing operations with commencement of the new proposed operation is likely. However, it is possible that the existing mining operations have existing clientele and business contracts, in which case the indirect impact may be low.

(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 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

A Phase 1 HIA (2019) was undertaken by a specialist, the report of which is attached hereto under Annexure 5.

According to the HIA report (2019), the study area is situated within the outcrops of the Beaufort Group (Karoo Supergroup) and is represented by Early Triassic sedimentary rocks of the palaeontologically significant Tarkastad Subgroup. This area is underlain by well developed overbank sediments made up of homogenous and geologically recent (<Holocene) river sad. During the survey, no evidence of fosilliferous terrace gravels or paleo-donge (gulley) infill deposits were found. There were also no evidence of the accumulation and preservation of intact Quaternary fossil material within the geologically recent alluvial overburden covering the footprint of the preferred site. It is unlikely that bedrock sediments with potentially fossil-bearing Tarkastad Subgroup strata will be negatively affected by the proposed operation due to the thick sand layer, provided that the excavation activities are restricted to the boundaries of the proposed mining site.

Findings of the Phase 1 HIA (2019) indicated stone-walled enclosures of the Late Iron Age on a dolerite outcrop approximately 1 km northwest of the western boundary of the preferred mining site. No other above-ground evidence of *in situ* Stone Age archaeological material was found within the footprint of the mining area. The geologically recent alluvial sand overburden

is generally considered to be culturally sterile in terms of intact Stone Age archaeological remains. No indications of rock art, prehistoric structures, graves or historically significant structures older than 60 years were found within the confines of the proposed mining permit area.

According to this study, the site is assigned the rating of Generally Protected (GP.C) (Low significance).

u) Other matters required in terms of sections 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).

Refer to Part A, Section 3(h) for a description of the alternatives that were considered during this application for the proposed operation.

PART B
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. 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 3(a) herein as required).

Name of The Practitioner: Hanri van Jaarsveld

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Fax No.: -

Email address: Hanri@lefatsemail.co.za

Refer to Annexure 1 for the expertise of the EAP.

b) Description of the Aspects of the Activity

(Confirm that the requirement to describe the aspects of the activity that are covered by the environmental management programme is already included in PART A, Section (3)(h) herein as required).

The aspects of the proposed operation were described in Part A, Section 1(h) of this document.

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 any areas that should be avoided, including buffers)

Refer to Annexure 2 for the final preferred site superimposed on the environmental sensitive areas.

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)

The impact management and closure objectives took into account the current status quo of the environment, the potential impacts that may be associated with the proposed operation as well as the end land use potential after decommissioning of the operation.

The closure objectives are to:

- Undertake mining activities in a sustainable manner.
- Implement environmental management measures throughout all phases of the operation to prevent and/or limit the significance of associated environmental impacts.
- Reduce financial cost for final rehabilitation through concurrent rehabilitation and Best Environmental Practices and also limiting the mining footprint.
- Rehabilitate the area disturbed by the operation and related activities to a land use potential of agriculture (at least grazing), depending on the end land use planned for at the time.
- To rehabilitate the mining area to a post mining environment that is safe.
- To stabilise the riverbank where disturbance occurred as a result of mining activities (including access points/ramps; riparian zone cleared of vegetation) to prevent carving into the riverbank due to erosion and increase in sedimentation load in the river.
- To limit and/or reduce any residual impacts after decommissioning of the operation.
- To reduce the need for long-term monitoring and maintenance.
- Obtain a closure certificate after decommissioning of the mining activities.

ii) Volumes and rate of water use required for the operation.

At the time of compilation of this report, it was not expected that any consumptive water use will be undertaken during the operation.

iii) Has a water use licence has been applied for?

An application for a Water Use Authorisation for the proposed activities that will be undertaken on the banks of the river and riverbed was submitted to DWS for processing (Annexure 6). Also refer to Annexure 3 attached hereto for proof of consultation with DWS in this regard.

The applicant will be responsible to ensure compliance with the NWA, 1998 (Act 36 of 1998) in the event of commencement of any water use in addition to the above activities applied for in future.

iv) Impacts to be mitigated in their respective phases

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

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
<p>(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc</p> <p>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.)</p>	<p>(of operation in which activity will take place.</p> <p>State; Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure).</p>	<p>(volumes, tonnages and hectares or m²)</p>	<p>(describe how each of the recommendations herein will remedy the cause of pollution or degradation and migration of pollutants)</p>	<p>(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)</p>	<p>Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required.</p> <p>With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:-</p> <p>Upon cessation of the individual activity or.</p> <p>Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.</p>
<p>Site establishment (Vegetation clearance; establishment of equipment, access points & access road; etc.)</p>	<p>Development (Commissioning)</p>	<p>4.99 ha</p>	<p>Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9</p>	<p>The preferred layout considers the backwater area on the eastern border of the site that was identified by the ecologist. Clearance of the site and establishment of equipment must be kept within the permitted mine boundary area and approved site layout.</p>	<p>Limit the footprint during commissioning.</p> <p>Management during commissioning, operational and decommissioning phases.</p> <p>Removal of equipment during decommissioning.</p>

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
					Final rehabilitation of disturbed areas upon cessation of sand mining.
Recovery of sand: Pumping and excavation (during dry periods)	Operational	< 3 ha	Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9	<p>The recovery of sand will be undertaken within the mining permit area of 4.99 ha. The operational procedures will aim to comply with the relevant environmental legislation, as well as Health and Safety legislation.</p> <p>An application for a Water Use Authorisation for the mining activities within the river and floodline has been applied for to ensure compliance with the NWA, 1998 (Act 36 of 1998).</p> <p>Visual checks and monitoring will be undertaken to ensure compliance with Environmental Best Practice.</p>	<p>WULA application during planning and development phases.</p> <p>Management during operational and decommissioning phases.</p> <p>Concurrent rehabilitation as disturbed areas becomes available for rehabilitation.</p> <p>Final rehabilitation upon cessation of mining during decommissioning.</p>
Containment area / Settling pond	Operational	< 0.5 ha in total	Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9	<p>The containment area and/or settling pond (if in use) will be situated in the mining permit area.</p> <p>No material such as cement or concrete will be used to form the settling pond.</p> <p>No permanent structures will be constructed on site.</p> <p>No consumptive water use will be undertaken as part of the proposed operation.</p> <p>The NWA, 1998 (Act 36 of 1998) will be complied with in terms of the activities within the beds and banks of the river.</p>	<p>Management during operational phase.</p> <p>Final rehabilitation upon cessation of pumping during decommissioning.</p>

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Sifting	Operational	± 0.05 ha	Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9.	The sifting equipment will be placed within the approved mining permit area. No chemicals will be used. The recommended site layout will limit impacts on the watercourse.	Site layout determination during planning. Management during operational phase. Final rehabilitation during decommissioning phase.
Stockpiling	Operational	< 1 ha	Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9. Refer to the Storm Water Management Plan in Annexure 5.	Product stockpiles will be placed within the final approved site layout. Stockpiles will be placed outside any storm water drainage lines and managed in accordance with GN704. The recommended site layout will limit impacts on the watercourse.	Site layout determination during planning. Management during operational phase. Final rehabilitation during decommissioning phase.
Loading and hauling	Operational; Decommissioning	Area: ± 1 200 m ² Material: 144 000 m ³ /year ±	Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9. Refer to the Storm Water Management Plan in Annexure 5.	The operational procedures will limit dust generation and noise to acceptable levels. Management and monitoring will ensure that trucks are not loaded beyond its specified load capacity and keep to the designated speed limits. Management measures will limit environmental risks and impacts.	Management during operational phase. Maintenance of access road during operational and decommissioning phase. Final rehabilitation of loading areas and unused haul roads during decommissioning.
Storage of material and substances with the potential to pollute (e.g. fuel, oil, gas)	Operational; Decommissioning	No permanent storage on site	Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9. Refer to the Storm Water Management Plan in Annexure 5.	As the entire mining permit area will be situated within the 1:100 year floodline, it is recommended that no potential hazardous substances or material be stored on site to comply with the NWA, 1998 (Act 36 of 1998). Fuel and oil for use in equipment will be transported to site in appropriate containers and temporarily kept on site (if necessary) within a dedicated bunded and	Management during commissioning, operational and decommissioning phase. Final rehabilitation during decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				lined area at least 100 m from the river and backwater system. All other material will be stored according to best practice as specified for the material type and volume. This includes storage in a designated bunded area with an impermeable layer.	
Waste generation: General and domestic solid waste	Development; Operational; Decommissioning	± 0.5 m ³ /month	Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9. Refer to the Storm Water Management Plan in Annexure 5.	The waste management hierarchy will be implemented and management in accordance with the standards of the NEM: Waste Act, 2008. No waste will be disposed and/or treated on site to comply with the NEM: Waste Act, 2008. Waste separation will be undertaken and each waste type (e.g. general waste, hazardous waste) will be managed and disposed of at registered facilities.	Waste management during commissioning, operational and decommissioning phase. Removal and disposal of remaining waste at Closure.
Waste generation: Sewage	Development; Operational; Decommissioning	± 40 l/month	Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9. Refer to the Storm Water Management Plan in Annexure 5.	No sewage will be disposed and/or treated on site to comply with the NEM: Waste Act, 2008. A temporary chemical toilet facility will be placed on site and cleaned regularly. Removed sewage will be disposed of appropriately.	Management during commissioning, operational and decommissioning phase. Removal of facility at Closure.
General operational activities (Especially in respect of I&APs and employees)	Development; Operational; Decommissioning	Employees on site Direct neighbours & registered I&APs	Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9.	Management and monitoring will ensure compliance with environmental standards, e.g. noise levels. Adherence to SHE legislation will prevent and limit injuries.	Management and monitoring during operational and decommissioning phases.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Rehabilitation (e.g. removal of equipment, reshaping & reinstating disturbed areas, etc.)	Operational; Decommissioning; Closure	4.99 ha	Refer to Table 11 of the Impact & Risk Assessment report in Annexure 9.	The aim of rehabilitation will be to limit environmental risks and impacts, residual impacts, the need for management and monitoring after cessation of mining and to obtain a Closure Certificate after rehabilitation to DMR's specifications.	Concurrent rehabilitation during operational of available areas and final rehabilitation during decommissioning. Removal of any equipment from site during decommissioning and Closure. Post monitoring to monitor rehabilitation until Closure.

Details of mitigation measures are provided for in Annexure 9.

e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ());

ACTIVITY (whether listed or not listed). (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc etc...)	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	MITIGATION TYPE (modify, remedy, control, or stop) Through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation. 	STANDARD TO BE ACHIEVED (Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
Site establishment (Clearance of vegetation; establishment of equipment; establish access points; access road; etc.)	Clearance of riparian vegetation	Aesthetics; Land use; Vegetation; Biodiversity	Development	Avoid through site locality & layout; Remedy current degraded status through rehabilitation; Limit footprint.	Impact avoided or limited and managed effectively where avoidance is not possible. Disturbance limited to operational areas within mining permit area and access road. Rehabilitate disturbed areas to a self-sustaining environment on final rehabilitation.
	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Development	Limit through alternative site layout & number of access points to the river; Avoid unnecessary clearance of	Impact avoided or limited and managed effectively where avoidance is not possible. Keep access points to the river to a

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
				riparian vegetation; Limit footprint; Remedy through rehabilitation.	minimum.
Site establishment (Clearance of vegetation; establishment of equipment; establish access points; access road; etc.)	Establishment of alien vegetation	Vegetation; Biodiversity; Ecosystem function	Development	Remedy through rehabilitation; Limit footprint; Monitor establishment of invasive species; Control through management plan.	Impact managed with implementation of a weed control plan. Impact limited to disturbance footprint.
	Habitat destruction	Vegetation; Fauna; Biodiversity; Ecosystem function	Development	Limit through site locality & layout; Remedy current degraded status through rehabilitation; Limit footprint.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate disturbed areas to a self-sustaining environment on final rehabilitation.
	Impact on terrestrial fauna	Fauna; Biodiversity; Ecosystem function	Development	Remedy current degraded status through rehabilitation; Limit footprint; Avoid poaching.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate disturbed areas to a self-sustaining environment on final rehabilitation.
	Erosion	Aesthetics; Land use; Water quality; Soil	Development	Remedy through rehabilitation; Limit through site locality & alternative site layout; Limit footprint; Monitor occurrence of erosion and extent thereof; Control through storm water control and erosion measures.	Impact avoided or limited and managed effectively where avoidance is not possible.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Site establishment (Clearance of vegetation; establishment of equipment; establish access points; access road; etc.)	Loss of topsoil	Soil; Land use	Development	Limit through site locality & alternative site layout; Limit footprint; Control through appropriate topsoil stockpiling (where topsoil is present); Control through storm water control and erosion measures; Monitor occurrence of erosion and extent thereof; Remedy through rehabilitation; Avoid steep slopes for access routes.	Impact avoided or limited and managed effectively where avoidance is not possible.
	Visual scarring	Aesthetics; Visual; I&APs	Development	Remedy through rehabilitation; Limit footprint; Limit through preferred locality and site layout; Limit with good housekeeping.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate disturbed areas to a potential end land use of agriculture on final rehabilitation.
	Elevated noise levels	Noise; I&APs; Health and Safety	Development	Limit through operational procedures (including working hours); Limit by using good operating machinery.	Acceptable noise levels.
	Change in land use (Loss of agricultural potential)	Land use	Development	Limit through site locality & layout; Remedy through rehabilitation; Limit footprint.	Rehabilitate disturbed areas to a potential end land use of agriculture on final rehabilitation.
	Damage or destruction of objects/artefacts of heritage importance	Heritage; I&APs	Development	Avoid through site locality & layout informed by the HIA (2019); Create awareness with employees; Limit footprint.	Impact on objects of heritage importance avoided.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Recovery of sand: Pumping via floating pump or excavator equipped with a pump	Water quality: Increase in suspended solids	Water quality	Operational	Limit through operational procedures; Limit access points and movement along the riverbank and/or ramps.	Impact avoided or limited and managed effectively where avoidance is not possible. No long-term impact on the water quality. Total sedimentation load expected to be reduced downstream due to removal of sand deposits on the riverbed.
	Water quality: Spillage of hydrocarbons, e.g. oil, diesel	Water quality	Operational	Limit through operational procedures; Control through monitoring and repairing leakages on equipment.	Impact avoided or limited and managed effectively where avoidance is not possible. No long-term impact on the water quality.
	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Operational	Limit through number of access points to the river; Avoid unnecessary clearance of riparian vegetation; Limit footprint; Avoid through operational procedures (including buffers along the riverbank).	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment. No long-term impact on the stability of the riverbank.
	Disturbance to aquatic habitat (or biotypes)	Biodiversity; Ecosystem function	Operational	Limit through operational procedures; Limit footprint.	Impact limited due to limited different habitat biotypes currently in the river. Rehabilitate to a self-sustaining environment. No long-term impact on the water quality.
	Change in surface water drainage: Instream	Natural flow path	Operational	Control through operational procedures; Limit access points to the river;	Impact avoided or limited and managed effectively where avoidance is not possible. No long-term impact on the stability

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
				Remedy through rehabilitation.	of the riverbank. No remaining ramps after rehabilitation.
Recovery of sand: Excavating sand from the riverbed via excavator (only during dry periods)	Water quality: Increase in suspended solids	Water quality	Operational	Limit through operational procedures; Avoid backwater area; Limit access points and movement along the riverbank and/or ramps.	Impact avoided or limited and managed effectively where avoidance is not possible. No long-term impact on the water quality. Total sedimentation load expected to be reduced downstream due to removal of sand deposits on the riverbed.
	Water quality: Spillage of hydrocarbons, e.g. oil, diesel	Water quality	Operational	Limit through operational procedures; Control through monitoring and repairing leakages on equipment.	Impact avoided or limited and managed effectively where avoidance is not possible. No long-term impact on the water quality.
	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Operational	Limit through number of access points to the river; Avoid unnecessary clearance of riparian vegetation; Limit footprint; Limit through alternative site layout; Avoid through operational procedures (including buffers along the riverbank).	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment. No long-term impact on the stability of the riverbank. No remaining ramps after rehabilitation.
	Disturbance to aquatic habitat (or biotypes)	Biodiversity; Ecosystem function	Operational	Limit through operational procedures; Limit footprint.	Impact limited due to limited habitat biotypes currently in the river. Rehabilitate to self-sustaining environment. No long-term impact on water quality.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Recovery of sand: Excavating sand from the riverbed via excavator (only during dry periods)	Change in surface water drainage: Instream	Natural flow path	Operational	Control through operational procedures; Limit access points to the river; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. No long-term impact on the stability of the riverbank. No remaining ramps after rehabilitation.
Containment area / Settling pond on the riverbank	Change in surface water drainage	Topography; Storm water; Water quantity	Operational	Limit through alternative site layout; Control through operational procedures; Control through storm water controls; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Disturbance limited to the specific footprint within the mining permit area. No long-term impact on the stability of the riverbank. Divert storm water to follow natural drainage of the area.
	Surface water quality: Increase in suspended solids	Water quality	Operational	Limit footprint; Control through operational procedures; Avoid backwater area through the alternative site layout; Control through storm water controls; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Disturbance limited to the specific footprint within the mining permit area. Rehabilitate to a self-sustaining environment. No long-term impact on the water quality. No long-term impact on the stability of the riverbank.
	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Operational; Decommissioning	Avoid unnecessary clearance of riparian vegetation; Limit footprint; Avoid through operational	Impact avoided or limited and managed effectively where avoidance is not possible. Disturbance limited to the specific

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
				<p>procedures and possible alternative methods;</p> <p>Remedy through rehabilitation.</p>	<p>footprint within the mining permit area.</p> <p>Rehabilitate to a self-sustaining environment.</p> <p>No long-term impact on the stability of the riverbank.</p>
Sifting	Dust generation	Air quality; I&APs	Operational	<p>Limit through operational procedures;</p> <p>Control through implementation of dust control measures.</p>	<p>Impact avoided or limited and managed effectively where avoidance is not possible.</p> <p>Manageable dust levels and compliance with Particulate Matter (PM) standards.</p>
Stockpiling	Dust generation	Air quality; I&APs	Operational	<p>Control through operational procedures;</p> <p>Limit through dust control and monitoring;</p> <p>Prevent through rehabilitation of disturbed areas.</p>	<p>Impact avoided or limited and managed effectively where avoidance is not possible.</p> <p>Manageable dust levels and compliance with Particulate Matter (PM) standards.</p> <p>Rehabilitate to a self-sustaining environment.</p>
	Change in surface water drainage	Topography; Storm water; Natural flow path	Operational	<p>Control through storm water controls;</p> <p>Limit through alternative site layout;</p> <p>Avoid backwater area;</p> <p>Remedy through rehabilitation.</p>	<p>Impact avoided or limited and managed effectively where avoidance is not possible.</p> <p>Rehabilitate to a self-sustaining environment.</p> <p>Divert storm water to follow natural drainage of the area.</p>
	Erosion & loss of topsoil	Aesthetics; Land use; Soil	Operational	<p>Control through storm water controls;</p> <p>Limit through site layout;</p> <p>Avoid backwater area through alternative site layout;</p> <p>Remedy through visual checks and</p>	<p>Impact avoided or limited and managed effectively where avoidance is not possible.</p> <p>Rehabilitate to a self-sustaining environment.</p>

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
				reinstatement of eroded areas; Remedy through rehabilitation.	
Stockpiling	Establishment of alien vegetation	Vegetation; Biodiversity	Operational	Control through monitoring and clearance of invasive species; Remedy through rehabilitation; Limit footprint disturbance; Control through implementation of a weed management plan.	Impact avoided or limited and managed effectively where avoidance is not possible. Impact managed with implementation of a weed control plan. Impact limited to disturbance footprint. Rehabilitate to a self-sustaining environment.
Loading & hauling	Dust generation	Air quality; I&APs	Operational	Control through operational procedures; Limit through dust control measures; Limit through speed control; Control through monitoring; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Compliance with Particulate Matter (PM) standards. Rehabilitate access road depending on the end land use at the time.
	Deterioration of the gravel access road	Infrastructure; I&APs; Road safety	Operational; Decommissioning	Remedy through visual checks and maintenance of the road; Control through speed control.	Impact avoided or limited and managed effectively where avoidance is not possible. Acceptable and safe ride ability of access roads.
	Change in surface water drainage	Natural flow path; Water quantity; Ecosystem function	Operational; Decommissioning	Control through storm water controls; Limit through site layout; Remedy through visual checks and maintenance of the road; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment. Divert storm water to follow natural drainage of the area.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Loading & hauling	Erosion & loss of topsoil	Aesthetics; Land use; Soil	Operational; Decommissioning	Control through storm water controls; Limit through appropriate stockpiling; Limit through site layout; Remedy through visual checks and reinstatement of eroded areas; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment.
Storage of material and substances with the potential to pollute (e.g. fuel, oil, gas)	Soil contamination from spillages	Soil; Land use	Operational; Decommissioning	Avoid through operational procedures; Prevent through management; Remedy through rehabilitation	Impact avoided or limited and managed effectively where avoidance is not possible. Reinstate affected areas to avoid or limit traces of pollution.
	Water quality: Spillage of hydrocarbons, e.g. diesel	Water quality	Operational; Decommissioning	Prevent through alternative site layout; Avoid by not permanently storing substances on site; Avoid through operational and management procedures; Remedy through cleaning and rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Reinstate affected areas to avoid or limit traces of pollution. Impact on downstream users avoided. No long-term impact on the water quality.
	Fire risk	Health & safety; I&APs; Biodiversity	Operational	Avoid through operational procedures; Avoid through management & appropriate storage control; Limit risks through training and awareness to staff.	Impact avoided or limited and managed effectively where avoidance is not possible.
Waste generation: General and domestic solid waste	Littering	Land use; Aesthetics; Water quality	Development; Operational; Decommissioning	Prevent through proper waste management.	Impact avoided or limited and managed effectively where avoidance is not possible.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Waste generation: General and domestic solid waste	Fire risk	Health & safety; I&APs; Biodiversity	Operational	Avoid through operational procedures; Avoid through management & appropriate waste management control; Limit risks through training and awareness to staff.	Impact avoided or limited and managed effectively where avoidance is not possible.
Waste generation: Sewage	Water quality: Spillage of sewage	Water quality	Development; Operational; Decommissioning	Avoid through management & appropriate waste management control; Limit through site layout; Remedy through cleaning and reinstatement of affected areas.	Impact avoided or limited and managed effectively where avoidance is not possible. Impact on downstream users avoided. No long-term impact on the water quality.
	Soil contamination from spillages	Health & safety; Soil	Development; Operational; Decommissioning	Avoid through management & appropriate waste management control; Remedy through cleaning and reinstatement of affected areas; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Reinstate affected areas to avoid or limit traces of pollution. No long-term impact on the water quality.
General operational activities (Especially in respect of I&APs and employees)	Visual scarring & impact on the general aesthetics of the area	Aesthetics; I&APs	Operational; Decommissioning	Remedy through rehabilitation; Limit footprint; Limit through preferred site locality; Limit with good housekeeping and operational procedures.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment.
	Elevated noise levels	Noise; I&APs; Health and Safety	Operational; Decommissioning	Limit through operational procedures (including working hours); Limit by using good operating machinery.	Impact avoided or limited and managed effectively where avoidance is not possible. Acceptable noise levels.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
General operational activities (Especially in respect of I&APs and employees)	Risk of injury to people entering the operational area	Health & safety; I&APs	Operational; Decommissioning	Prevent through access control; Avoid through rehabilitation at closure; Prevent through creating awareness through induction.	Impact avoided or limited and managed effectively where avoidance is not possible. No fatalities.
	Risk of injury to employees working with machinery/equipment on site	Health & safety	Development; Operational; Decommissioning	Prevent and/or limit through appropriate PPE; Prevent by using good working equipment with required safety standards and mechanisms; Prevent through creating awareness through induction; Prevent through appropriate training to staff on site.	Impact avoided or limited and managed effectively where avoidance is not possible. No fatalities.
	Change in land use (Loss of agriculture potential)	Land use	Operational; Decommissioning	Limit through site locality & layout; Remedy through rehabilitation; Limit footprint.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment. Rehabilitate to a potential end land use of agriculture.
	Impact on terrestrial fauna	Fauna; Biodiversity; Ecosystem function	Operational; Decommissioning	Remedy current degraded status through rehabilitation; Limit footprint; Avoid poaching.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment.
	Establishment of alien vegetation	Vegetation; Biodiversity; Ecosystem function	Operational; Decommissioning	Remedy through rehabilitation; Limit disturbance footprint; Monitor establishment of invasive species; Control through clearance and management plan.	Impact avoided or limited and managed effectively where avoidance is not possible. Impact managed with implementation of a weed control plan.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
					Impact limited to disturbance footprint. Rehabilitate to a self-sustaining environment.
General operational activities (Especially in respect of I&APs and employees)	Indirect loss of sales of existing sand recovery operations	I&APs; Socio-economics	Operational	Limit through sustainable mining.	Impact avoided or limited and managed effectively where avoidance is not possible. Limited impact on the socio-economics of I&APs.
	Job creation & skills upliftment	Community; Economy	Development, Operational; Decommissioning	Achieve through continuation with proposed operation; Achieve through training of staff; Achieve through employment to local people.	Positive impact promoted and dependent on the number of job opportunities and skills required. Positive impact on the socio-economics of employees. Salaries will be in line with the minimum salary scale for the industry.
	Economic development in the region	Community; Economy	Operational	Achieve through continuation with proposed operation; Achieve through delivery of product to Wepener and surroundings, and possibly the larger Free State region (dependent on market).	Positive impact promoted and dependent on the annual production and point of sales. Positive impact on the socio-economics of employees. Limited impact on the socio-economics of I&APs.
Cumulative impacts considering other activities within 1 km	Dust generation	Air quality; I&APs	Operational	Control through operational procedures; Limit through dust control measures; Limit through speed control; Control through monitoring; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Manageable dust levels and compliance with Particulate Matter (PM) standards. Rehabilitate to a self-sustaining environment.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Cumulative impacts considering other activities within 1 km	Visual scarring & impact on the general aesthetics of the area	Aesthetics; Visual	Development; Operational; Decommissioning	Remedy through rehabilitation; Limit footprint; Limit through locality and site layout; Limit with good housekeeping and operational procedures.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment.
	Elevated noise levels	Noise; I&APs	Operational	Limit through operational procedures (including working hours); Limit by using good operating machinery.	Impact avoided or limited and managed effectively where avoidance is not possible. Acceptable noise levels.
	Clearance of riparian vegetation	Aesthetics; Land use; Vegetation; Biodiversity	Development; Operational	Avoid through site locality & layout; Remedy current degraded status through rehabilitation; Limit footprint.	Impact avoided or limited and managed effectively where avoidance is not possible. Disturbance limited to operational areas within mining permit area and access road. Rehabilitate disturbed areas to a self-sustaining environment on final rehabilitation.
	Erosion & loss of topsoil	Aesthetics; Land use; Soil	Development; Operational; Decommissioning	Control through storm water controls; Limit through site layout; Remedy through visual checks and reinstatement of eroded areas; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment.
	Change in land use (Loss of agriculture potential)	Land use	Development; Operational	Limit through site locality & layout; Limit footprint; Remedy through rehabilitation to an end land use potential of agriculture after Closure.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment. Rehabilitate to a potential end land

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
					use of agriculture.
Cumulative impacts considering other activities within 1 km	Change in surface water drainage	Topography; Storm water flow; Water quantity; Ecosystem function	Development; Operational; Decommissioning	Control through storm water controls; Limit through site layout; Limit through operational procedures; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment. Divert storm water to follow natural drainage of the area.
	Habitat loss and effect on the general biodiversity	Biodiversity; Ecosystem function	Development; Operational; Decommissioning	Control through operational procedures; Remedy through landscaping and rehabilitation of disturbed areas; Remedy current degraded status through establishment of natural vegetation; Limit through site locality & layout; Limit footprint.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate disturbed areas to a self-sustaining environment on final rehabilitation.
	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Development; Operational	Avoid unnecessary clearance of riparian vegetation; Limit disturbance by limiting access points to the river; Limit footprint; Avoid through operational procedures; Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Disturbance limited to the specific footprint within the mining permit area. Rehabilitate to a self-sustaining environment. No long-term impact on the stability of the riverbank.
Rehabilitation (e.g. removal of equipment, reshaping & reinstating disturbed areas, etc.) and Closure	Soil contamination from spillages and waste disposal	Soil; Land use	Decommissioning	Avoid through rehabilitation procedures and waste management; Remedy through clearance and reinstatement.	Impact avoided or limited and managed effectively where avoidance is not possible. Reinstate affected areas to avoid or limit traces of pollution.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
					No long-term impact on the water quality.
Rehabilitation (e.g. removal of equipment, reshaping & reinstating disturbed areas, etc.) and Closure	Water pollution due to spillages and waste disposal	Water quality	Decommissioning	Avoid through rehabilitation procedures and waste management.	Impact avoided or limited and managed effectively where avoidance is not possible. No long-term impact on the water quality.
	Elevated noise levels	Noise; I&APs	Decommissioning	Limit through rehabilitation procedures (including working hours).	Impact avoided or limited and managed effectively where avoidance is not possible. Acceptable noise levels (short term).
	Change in surface water drainage	Topography; Storm water flow; Water quantity; Ecosystem function	Decommissioning ; Closure	Achieve through landscaping and rehabilitation of disturbed areas; Achieve through storm water control measures, e.g. berms.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment. Positive impact on the environment and natural drainage of storm water.
	Destabilisation of the riverbank	Riparian zone; Land use; Natural flow path	Decommissioning	Remedy through rehabilitation.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment. Positive impact on the environment with stable riverbank at affected areas.
	Erosion & loss of topsoil	Aesthetics; Land use; Soil	Decommissioning	Control through storm water controls; Remedy through rehabilitation and reinstatement of affected areas; Control through erosion control &	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment.

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
				monitoring.	Positive impact on the environment and reduce risks of erosion after rehabilitation.
Rehabilitation (e.g. removal of equipment, reshaping & reinstating disturbed areas, etc.) and Closure	Establishment of alien vegetation	Vegetation; Biodiversity; Ecosystem function	Decommissioning	Remedy through rehabilitation; Control through monitoring and removal of invasive plants.	Impact avoided or limited and managed effectively where avoidance is not possible. Rehabilitate to a self-sustaining environment. Positive impact on the environment with establishment of natural occurring vegetation and monitoring for weeds after rehabilitation
	Los in jobs & skills upliftment at Closure of the operation	Community; Economy	Closure	Limit through a retrenchment policy, aiming at re-employment at alternative sites (if possible); Limit impact through training to staff during operational phase.	Impact avoided or limited and managed effectively where avoidance is not possible.

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).

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
<p>whether listed or not listed.</p> <p>(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.).</p>	<p>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)</p>	<p>(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)</p> <p>E.g.</p> <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring <p>Remedy through rehabilitation.</p>	<p>Describe the time period when the measures in the environmental management program must be implemented Measures must be implemented when required.</p> <p>With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regards to Rehabilitation, therefore state either:-</p> <p>Upon cessation of the individual activity or.</p> <p>Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.</p>	<p>(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)</p>
<p>Site establishment (Clearance of vegetation; establishment of equipment; establish access points; access road; etc.)</p>	<p>Clearance of riparian vegetation.</p> <p>Destabilisation of the riverbank.</p> <p>Establishment of alien vegetation.</p> <p>Habitat destruction.</p> <p>Impact on terrestrial fauna.</p> <p>Erosion and loss of</p>	<p>Avoid through site locality & layout;</p> <p>Remedy current degraded status through rehabilitation;</p> <p>Limit footprint;</p> <p>Limit through minimising the number of access points to the river;</p> <p>Avoid unnecessary clearance of riparian vegetation;</p> <p>Remedy through rehabilitation;</p>	<p>Limit the footprint during commissioning.</p> <p>Management during commissioning, operational and decommissioning phases.</p> <p>Removal of equipment during decommissioning.</p> <p>Final rehabilitation of disturbed areas upon cessation of sand mining.</p>	<p>The preferred layout considers the backwater area on the eastern border of the site that was identified by the ecologist.</p> <p>Clearance of the site and establishment of equipment must be kept within the permitted mine boundary area and approved site layout.</p> <p>Noise levels below maximum allowed standard.</p> <p>Impact on objects of heritage importance avoided.</p>

	<p>topsoil. Visual scarring. Elevated noise levels. Change in land use (Loss of agricultural potential). Damage or destruction of objects/artefacts of heritage importance.</p>	<p>Monitor establishment of invasive species; Control through management plan; Avoid poaching. Monitor occurrence of erosion and extent thereof; Control through storm water control and erosion measures; Control through appropriate topsoil stockpiling (where topsoil is present); Avoid steep slopes for access routes; Limit with good housekeeping; Limit through operational procedures (including working hours); Limit by using good operating machinery; Create awareness with employees.</p>		
<p>Recovery of sand: Pumping via floating pump or excavator equipped with a pump</p>	<p>Water quality: Increase in suspended solids. Water quality: Spillage of hydrocarbons, e.g. oil, diesel. Destabilisation of the riverbank. Disturbance to aquatic habitat (or biotypes). Change in surface water drainage: Instream.</p>	<p>Limit access points and movement along the riverbank and/or ramps; Control through monitoring and repairing leakages on equipment; Avoid unnecessary clearance of riparian vegetation; Limit footprint; Control through operational procedures (including buffers along the riverbank); Remedy through rehabilitation.</p>	<p>WULA application during planning and development phases. Management during operational and decommissioning phases. Concurrent rehabilitation as disturbed areas becomes available for rehabilitation. Final rehabilitation upon cessation of mining during decommissioning.</p>	<p>The recovery of sand will be undertaken within the mining permit area of 4.99 ha. The operational procedures will aim to comply with the relevant environmental legislation, as well as Health and Safety legislation. An application for a Water Use Authorisation for the mining activities within the river and floodline has been applied for to ensure compliance with the NWA, 1998 (Act 36 of 1998). Visual checks and monitoring will be undertaken to ensure compliance with Environmental Best Practice. No long-term impact on the water quality.</p>

<p>Recovery of sand: Excavating sand from the riverbed via excavator (only during dry periods)</p>	<p>Water quality: Increase in suspended solids. Water quality: Spillage of hydrocarbons, e.g. oil, diesel. Destabilisation of the riverbank. Disturbance to aquatic habitat (or biotypes). Change in surface water drainage: Instream.</p>	<p>Avoid backwater area; Limit access points and movement along the riverbank and/or ramps; Control through monitoring and repairing leakages on equipment; Avoid unnecessary clearance of riparian vegetation; Limit footprint; Limit through alternative site layout; Avoid through operational procedures (including buffers along the riverbank); Remedy through rehabilitation.</p>	<p>WULA application during planning and development phases. Management during operational and decommissioning phases. Concurrent rehabilitation as disturbed areas becomes available for rehabilitation. Final rehabilitation upon cessation of mining during decommissioning.</p>	<p>The recovery of sand will be undertaken within the mining permit area of 4.99 ha. The operational procedures will aim to comply with the relevant environmental legislation, as well as Health and Safety legislation. An application for a Water Use Authorisation for the mining activities within the river and floodline has been applied for to ensure compliance with the NWA, 1998 (Act 36 of 1998). Visual checks and monitoring will be undertaken to ensure compliance with Environmental Best Practice. No long-term impact on the water quality.</p>
<p>Containment area / Settling pond on the riverbank</p>	<p>Change in surface water drainage. Surface water quality: Increase in suspended solids. Destabilisation of the riverbank.</p>	<p>Limit through alternative site layout; Control through storm water controls; Limit footprint; Avoid unnecessary clearance of riparian vegetation; Avoid or control through operational procedures and possible alternative methods; Remedy through rehabilitation.</p>	<p>Management during operational phase. Final rehabilitation upon cessation of pumping during decommissioning.</p>	<p>The containment area and/or settling pond (if in use) will be situated in the mining permit area. No material such as cement or concrete will be used to form the settling pond. No permanent structures will be constructed on site. No consumptive water use will be undertaken as part of the proposed operation. The NWA, 1998 (Act 36 of 1998) will be complied with in terms of the activities within the beds and banks of the river.</p>
<p>Sifting</p>	<p>Dust generation</p>	<p>Limit through operational procedures; Control through implementation of dust control measures.</p>	<p>Site layout determination during planning. Management during operational phase. Final rehabilitation during decommissioning phase.</p>	<p>The sifting equipment will be placed within the approved mining permit area. No chemicals will be used. The recommended site layout will limit impacts on the watercourse. Manageable dust levels and compliance with Particulate Matter (PM) standards.</p>

<p>Stockpiling</p>	<p>Dust generation. Change in surface water drainage. Erosion & loss of topsoil. Establishment of alien vegetation.</p>	<p>Control through operational procedures; Limit through dust control and monitoring; Prevent through rehabilitation of disturbed areas; Control through storm water controls; Limit through alternative site layout; Avoid backwater area; Remedy through visual checks and reinstatement of eroded areas; Limit footprint disturbance; Control through implementation of a weed management plan.</p>	<p>Site layout determination during planning. Management during operational phase. Final rehabilitation during decommissioning phase.</p>	<p>Product stockpiles will be placed within the final approved site layout. Stockpiles will be placed outside any storm water drainage lines and must be managed in accordance with GN704. The recommended site layout will limit impacts on the watercourse. Manageable dust levels and compliance with Particulate Matter (PM) standards.</p>
<p>Loading & hauling</p>	<p>Dust generation. Deterioration of the gravel access road. Change in surface water drainage. Erosion & loss of topsoil.</p>	<p>Control through operational procedures; Limit through dust control measures; Limit through speed control; Control through monitoring; Remedy through visual checks and maintenance of the road; Control through storm water controls; Limit through site layout; Limit through appropriate stockpiling; Remedy through visual checks and reinstatement of eroded areas; Remedy through rehabilitation.</p>	<p>Management during operational phase. Maintenance of access road during operational and decommissioning phase. Final rehabilitation of loading areas and unused haul roads during decommissioning.</p>	<p>The operational procedures will limit dust generation and noise to acceptable levels. Compliance with Particulate Matter (PM) standards. Management and monitoring will ensure that trucks are not loaded beyond its specified load capacity and keep to the designated speed limits. Management measures will limit environmental risks and impacts.</p>

<p>Storage of material and substances with the potential to pollute (e.g. fuel, oil, gas)</p>	<p>Soil contamination from spillages. Water quality: Spillage of hydrocarbons, e.g. diesel. Fire risk.</p>	<p>Prevent through management; Prevent through alternative site layout; Avoid by not permanently storing substances on site; Avoid through operational and management procedures; Remedy through cleaning and rehabilitation. Avoid through management & appropriate storage control; Limit risks through training and awareness to staff.</p>	<p>Management during commissioning, operational and decommissioning phase. Final rehabilitation during decommissioning phase.</p>	<p>As the entire mining permit area will be situated within the 1:100 year floodline, it is recommended that no potential hazardous substances or material be stored on site to comply with the NWA, 1998 (Act 36 of 1998). Fuel and oil for use in equipment will be transported to site in appropriate containers and temporarily kept on site (if necessary) within a dedicated bunded and lined area at least 100 m from the river and backwater system. All other material will be stored according to best practice as specified for the material type and volume. This includes storage in a designated bunded area with an impermeable layer.</p>
<p>Waste generation: General and domestic solid waste</p>	<p>Littering Fire risk.</p>	<p>Avoid through operational procedures; Avoid through management & appropriate waste management control; Limit risks through training and awareness to staff.</p>	<p>Waste management during commissioning, operational and decommissioning phase. Removal and disposal of remaining waste at Closure.</p>	<p>The waste management hierarchy will be implemented and management in accordance with the standards of the NEM: Waste Act, 2008. No waste will be disposed and/or treated on site to comply with the NEM: Waste Act, 2008. Waste separation will be undertaken and each waste type (e.g. general waste, hazardous waste) will be managed and disposed of at registered facilities.</p>
<p>Waste generation: Sewage</p>	<p>Water quality: Spillage of sewage Soil contamination from spillages</p>	<p>Avoid through management & appropriate waste management control; Limit through site layout; Remedy through cleaning and reinstatement of affected areas; Remedy through rehabilitation.</p>	<p>Management during commissioning, operational and decommissioning phase. Removal of facility at Closure.</p>	<p>No sewage will be disposed and/or treated on site to comply with the NEM: Waste Act, 2008. A temporary chemical toilet facility will be placed on site and cleaned regularly. Removed sewage will be disposed of appropriately.</p>

<p>General operational activities (Especially in respect of I&APs and employees)</p>	<p>Visual scarring & impact on the general aesthetics of the area. Elevated noise levels. Risk of injury to people entering the operational area. Risk of injury to employees working with machinery/equipment on site. Change in land use (Loss of agriculture potential). Impact on terrestrial fauna. Establishment of alien vegetation. Indirect loss of sales of existing sand recovery operations. Job creation & skills upliftment. Economic development in the region.</p>	<p>Limit footprint; Limit with good housekeeping and operational procedures; Prevent through access control; Avoid through rehabilitation at closure; Prevent through creating awareness through induction; Prevent and/or limit through appropriate PPE; Prevent by using good working equipment with required safety standards and mechanisms; Prevent through appropriate training to staff on site. Limit through site locality & layout; Remedy current degraded status through rehabilitation; Avoid poaching; Monitor establishment of invasive species; Control through clearance and management plan; Limit through sustainable mining; Achieve positive economic impact through continuation with proposed operation; Achieve through employment to local people; Achieve through delivery of product to Wepener and surroundings, and possibly the larger Free State region (dependent on market).</p>	<p>Management and monitoring during operational and decommissioning phases.</p>	<p>Management and monitoring will ensure compliance with environmental standards, e.g. noise levels. Adherence to SHE legislation will prevent and limit injuries.</p>
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<p>Rehabilitation (e.g. removal of equipment, reshaping & reinstating disturbed areas, etc.) and Closure</p>	<p>Soil contamination from spillages and waste disposal. Water pollution due to spillages and waste disposal. Elevated noise levels. Change in surface water drainage. Destabilisation of the riverbank. Erosion & loss of topsoil. Establishment of alien vegetation. Loss in jobs & skills upliftment at Closure of the operation.</p>	<p>Avoid through waste management; Remedy through removal of equipment and structures and reinstatement of disturbed footprints; Limit through rehabilitation working procedures (including working hours); Achieve a self-sustaining ecosystem through landscaping and rehabilitation of disturbed areas; Limit and control through storm water control measures, e.g. berms; Remedy through rehabilitation and reinstatement of affected areas; Control through erosion control & monitoring; Control through monitoring and removal of invasive plants; Limit through a retrenchment policy, aiming at re-employment at alternative sites (if possible); Limit impact through training to staff during operational phase.</p>	<p>Concurrent rehabilitation of available areas during operational phase. Final rehabilitation during decommissioning. Removal of any equipment from site during decommissioning and Closure. Post monitoring to monitor rehabilitation until Closure. Development of retrenchment policy and training during operational phase.</p>	<p>The aim of rehabilitation will be to limit environmental risks and impacts, residual impacts, the need for management and monitoring after cessation of mining and to obtain a Closure Certificate after rehabilitation to DMR's specifications.</p>
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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 the Regulation.

The closure objectives took into account the current status quo of the environment, the potential impacts that may be associated with the proposed operation as well as the end land use potential after decommissioning of the operation.

The closure objectives are to:

- Rehabilitate the area disturbed by the operation and related activities to a land use potential of agriculture (at least grazing), depending on the end land use planned for at the time.
- To rehabilitate the mining area to a post mining environment that is safe.
- To stabilise the riverbank where disturbance occurred as a result of mining activities (including access points/ramps; riparian zone cleared of vegetation) to prevent carving into the riverbank due to erosion and increase in sedimentation load in the river.
- To limit and/or reduce any residual impacts after decommissioning of the operation.
- To reduce the need for long-term monitoring and maintenance.
- Obtain a closure certificate after decommissioning of the mining activities.

Also refer to the rehabilitation plan under Annexure 2 of this report indicating the proposed end land use with expected extent of the areas rehabilitated at closure.

(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

The environmental objectives as described in this report have been included in the notification with background information on the proposed project that was provided to identified I&APs and stakeholders. The environmental objectives were also included in the BAR and EMPr that were made available for comment in the draft reports.

(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.

Refer to the proposed site plan with the preferred site layout and extent of activities attached under Annexure 2 of this report. Also attached under Annexure 2 is a proposed rehabilitation plan indicating the proposed end land use of the mining permit area at closure after rehabilitation. This will however be dependent on the end land use to be decided upon at the time of closure.

The main aim of rehabilitation would be to prevent and/or limit residual environmental risks and impacts after closure. Concurrent rehabilitation of disturbed areas available for rehabilitation during the operational phase must be undertaken as far as possible. This will entail leveling, reshaping and establishing of vegetation in these areas. Due to the type and nature of the proposed operation, the physical footprint on the riverbank will be limited if appropriate operational procedures are implemented. This include amongst other, to limit the footprint of stockpile and sifting areas. Also limit access points to the river to limit removal of riparian vegetation and also risking destabilization of the riverbank.

Stabilisation of the riverbank and riparian zone must be undertaken where mining activities have caused disturbance along the river. Measures may include the use of gabions and re-establishment of natural occurring vegetation. Professional engineering advice is recommended if destabilization is proven to become problematic during any phase of the operation. The effectiveness of the stabilisation measures should be monitored.

Once mining activities have ceased, an environmental risk assessment should be undertaken and a final rehabilitation plan developed determined by the status quo at the time of decommissioning and rehabilitation of the final disturbed areas (e.g. stockpile areas, settling and sifting areas) should be undertaken. The unrehabilitated areas at the time of Closure will be landscaped and re-vegetated with natural occurring vegetation as far possible. Due to the nature of the mining area along the river being covered by a homogenous sand layer, only the access road will be covered by topsoil during rehabilitation (if not to be used by the landowner in future). Any scarring left by pumping and associated activities in the riverbed and on the floodplains is expected to be naturally rehabilitated during high flow of the

river as sand is transported in the water and settles again during low flow. If this however does not occur, manual landscaping should be undertaken.

(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The proposed Rehabilitation plan was developed with the aim to achieve the closure objectives and a potential end land use of agriculture whilst considering the nature of the impacts expected to be associated with the operation. If the rehabilitation measures are implemented, it is expected that a stable and self-sustainable ecosystem will be established at closure.

(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

The quantum for financial provision to be provided to DMR was calculated in accordance with DMR's guideline titled "Guideline document for evaluation of the quantum of closure-related financial provision provided by a mine", dated 2005 considering the latest master rates in Section B as well as current rehabilitation costs.

The calculated cost for final closure of the operation by the applicant (i.e. Sub-total 1 of the Quantum) is R191 911.78. It is recommended that concurrent rehabilitation of disturbed areas available for rehabilitation be undertaken during the Operational Phase as far possible to also minimise the final amount required for rehabilitation. The calculated cost for current environmental liability by a Third Party (as per quantum calculation) (i.e. Grand Total of the Quantum plus VAT) is R269 252.22.

(f) Confirm that the financial provision will be provided as determined.

The financial provision as calculated in terms of the quantum calculation and as required in terms of the MPRDA, 2002 (Act 28 of 2002) in respect of this application will be provided by the applicant.

Mechanisms for monitoring compliance with and performance assessment against 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

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
<p>Site establishment (Clearance of vegetation; establishment of equipment; establish access points; access road; etc.)</p>	<p>Clearance of riparian vegetation. Destabilisation of the riverbank. Establishment of alien vegetation. Habitat destruction. Impact on terrestrial fauna. Erosion and loss of topsoil. Change in land use (Loss of agricultural potential). Damage or destruction of objects/artefacts of heritage importance.</p>	<p>Visual checks; Verify compliance with conditions of the EA and EMP; Identify non-compliances; Monitor key parameters, e.g. noise levels.</p>	<p>Site manager Designated Environmental Officer Environmental Control Officer (when required)</p>	<p>Weekly visual checks for erosion and extent of vegetation clearance. Weekly visual checks for establishment of declared weeds or invasive plants. Clear and reinstate affected areas. Annual medical tests for employees on site. Report environmental incidents as soon as possible. Report findings of objects of potential heritage importance to the site manager. Record incidents and non-compliances. Implement management measures throughout the commissioning phase. Limit the footprint during commissioning. Management during commissioning, operational and decommissioning</p>

				<p>phases.</p> <p>Removal of equipment during decommissioning.</p> <p>Final rehabilitation of disturbed areas upon cessation of sand mining.</p>
<p>Recovery of sand: Pumping via floating pump or excavator equipped with a pump</p>	<p>Water quality: Increase in suspended solids.</p> <p>Water quality: Spillage of hydrocarbons, e.g. oil, diesel.</p> <p>Destabilisation of the riverbank.</p>	<p>Visual checks; Verify compliance with conditions of the EA and EMPr; Identify non-compliances; Monitor key parameters, e.g. water quality.</p>	<p>Site manager Designated Environmental Officer Environmental Control Officer (when required)</p>	<p>Daily visual checks on equipment for leakage and/or malfunctioning.</p> <p>Report major pollution incidents to the Provincial Head: Department of Water and Sanitation within 24 hours.</p> <p>Water sampling of the river if there is reason to believe the water quality may be affected.</p> <p>Record incidents and non-compliances.</p> <p>Weekly visual checks on the stability of the riverbank. This includes any signs of subsidence and erosion.</p> <p>Management during operational and decommissioning phases.</p> <p>Concurrent rehabilitation as disturbed areas becomes available for rehabilitation.</p> <p>Final rehabilitation upon cessation of mining during decommissioning.</p>
<p>Recovery of sand: Excavating sand from the riverbed via excavator (only during dry periods)</p>	<p>Water quality: Increase in suspended solids.</p> <p>Water quality: Spillage of hydrocarbons, e.g. oil, diesel.</p> <p>Destabilisation of the riverbank.</p>	<p>Visual checks; Verify compliance with conditions of the EA and EMPr; Identify non-compliances; Monitor key parameters, e.g. water quality.</p>	<p>Site manager Designated Environmental Officer Environmental Control Officer (when required)</p>	<p>Daily visual checks on equipment for leakage and/or malfunctioning.</p> <p>Report major pollution incidents to the Provincial Head: Department of Water and Sanitation within 24 hours.</p> <p>Water sampling of the river if there is reason to believe the water quality may be affected.</p> <p>Record incidents and non-compliances.</p> <p>Weekly visual checks on the stability of</p>

				<p>the riverbank. This includes any signs of subsidence and erosion.</p> <p>Management during operational and decommissioning phases.</p> <p>Concurrent rehabilitation as disturbed areas becomes available for rehabilitation.</p> <p>Final rehabilitation upon cessation of mining during decommissioning.</p>
Containment area / Settling pond on the riverbank	<p>Surface water quality: Increase in suspended solids.</p> <p>Destabilisation of the riverbank.</p>	<p>Visual checks; Verify compliance with conditions of the EA and EMP; Identify non-compliances; Monitor key parameters, e.g. water quality.</p>	<p>Site manager Designated Environmental Officer Environmental Control Officer (when required)</p>	<p>Weekly visual checks of the riverbank to identify any unstable areas. This includes any signs of subsidence and erosion.</p> <p>Record incidents and non-compliances.</p> <p>Management during operational phase.</p> <p>Final rehabilitation upon cessation of pumping during decommissioning.</p>
Sifting	Dust generation	<p>Visual checks; Verify compliance with conditions of the EA and EMP; Identify non-compliances; Monitor key parameters.</p>	<p>Site manager Designated Environmental Officer Environmental Control Officer (when required)</p>	<p>Monitor dust fallout only when dust generation during sifting becomes problematic.</p> <p>Site layout determination during planning.</p> <p>Management during operational phase.</p> <p>Final rehabilitation during decommissioning phase.</p>
Stockpiling	<p>Dust generation.</p> <p>Change in surface water drainage.</p> <p>Erosion</p> <p>Establishment of alien vegetation.</p>	<p>Visual checks for loss of topsoil and alien vegetation; Verify compliance with conditions of the EA and EMP; Identify non-compliances; Monitor key parameters.</p>	<p>Site manager Designated Environmental Officer Environmental Control Officer (when required)</p>	<p>Monitor dust fallout only when dust generation during sifting becomes problematic.</p> <p>Weekly visual checks for erosion and extent of vegetation clearance.</p> <p>Implement storm water management measures during establishment and operational phase to limit erosion from</p>

				<p>stockpiles.</p> <p>Weekly visual checks for establishment of declared weeds or invasive plants. Clear and reinstate affected areas.</p> <p>Site layout determination during planning.</p> <p>Management during operational phase.</p> <p>Final rehabilitation during decommissioning phase.</p>
<p>Loading & hauling</p>	<p>Dust generation.</p> <p>Deterioration of the gravel access road.</p> <p>Erosion & loss of topsoil.</p>	<p>Visual checks of the road; Verify compliance with conditions of the EA and EMP; Identify non-compliances; Monitor key parameters.</p>	<p>Site manager</p> <p>Safety Officer</p> <p>Designated Environmental Officer</p> <p>Environmental Control Officer (when required)</p>	<p>Weekly visual checks for signs of deterioration of the road.</p> <p>Record incidents and non-compliances.</p> <p>Weekly visual checks for erosion on the access road and loading area. Implement storm water management measures during establishment and operational phase to limit erosion.</p> <p>Management during operational phase.</p> <p>Maintenance of access road during operational and decommissioning phase.</p> <p>Final rehabilitation of loading areas and unused haul roads during decommissioning.</p>
<p>Storage of material and substances with the potential to pollute (e.g. fuel, oil, gas)</p>	<p>Storage facilities (locality, capacity, functionality, etc.).</p> <p>Soil contamination.</p> <p>Water quality: Spillage of hydrocarbons, e.g. diesel.</p> <p>Fire risk.</p>	<p>Visual checks for contamination, spillages and damaged containers; Verify compliance with conditions of the EA and EMP; Identify non-compliances</p>	<p>Site manager</p> <p>Safety Officer</p> <p>Designated Environmental Officer</p> <p>Environmental Control Officer (when required)</p>	<p>Daily visual checks for any leakage from containers.</p> <p>Report occurrence of fires to the supervisor immediately.</p> <p>Report environmental incidents as soon as possible.</p> <p>Report major pollution incidents to the Provincial Head: Department of Water</p>

				and Sanitation within 24 hours. Record incidents and non-compliances. Management during commissioning, operational and decommissioning phase. Final rehabilitation during decommissioning phase.
Waste generation: General and domestic solid waste	Littering Fire risk.	Visual checks for littering; Verify compliance with conditions of the EA and EMPr; Identify non-compliances	Designated Officer Supervisor	Environmental Daily visual checks for any signs of littering. Clean any littering and dispose of collected waste at an authorised landfill facility. Report occurrence of fires to the supervisor immediately. Report environmental incidents as soon as possible. Waste management during commissioning, operational and decommissioning phase. Removal and disposal of remaining waste at Closure.
Waste generation: Sewage	Water quality: Spillage of sewage Soil contamination from spillages	Visual checks for contamination and spillages; Verify compliance with conditions of the EA and EMPr; Identify non-compliances	Designated Officer Supervisor	Environmental Daily visual checks for any leakage from containers. In the event of spillage, the affected area must be cleaned and reinstated. Contaminated soil/material must be managed appropriately. Management during commissioning, operational and decommissioning phase. Removal of facility at Closure.
General operational activities (Especially in respect of I&APs and employees)	Visual scarring & impact on the general aesthetics of the area. Elevated noise levels. Risk of injury to people	Verify compliance with conditions of the EA and EMPr; Identify non-compliances; Complaints register with comments from I&APs; Visual checks on fences for snares; Log	Site manager Safety Officer Designated Officer	Environmental Report environmental incidents. Record incidents and non-compliances. Determine the extent of disturbance and clearance of the riparian zone and

	<p>entering the operational area. Risk of injury to employees working with machinery/equipment on site. Change in land use (Loss of agriculture potential). Impact on terrestrial fauna. Establishment of alien vegetation.</p>	<p>sheets of legal entrances to the mining area; Record of employee awareness training</p>	<p>Environmental Control Officer (when required)</p>	<p>riverbank bi-annually. Limit disturbed areas by limiting the operational footprint and rehabilitate unused areas. Annual medical tests for employees on site. Monitor noise levels in high operational areas at risk of elevated noise due to the type of equipment (if necessary). A baseline measurement is recommended. Record daily entrance of people on site. Weekly visual checks for erosion and extent of vegetation clearance. Weekly visual checks for establishment of declared weeds or invasive plants. Clear and reinstate affected areas. Report any signs of poaching to the site manager. Management and monitoring during operational and decommissioning phases.</p>
<p>Rehabilitation (e.g. removal of equipment, reshaping & reinstating disturbed areas, etc.) and Closure</p>	<p>Soil contamination. Water pollution. Elevated noise levels. Destabilisation of the riverbank. Erosion Establishment of alien vegetation.</p>	<p>Visual checks for contamination and spillages; Verify compliance with conditions of the EA and EMP; Identify non-compliances</p>	<p>Site manager Designated Environmental Officer Environmental Control Officer (when required)</p>	<p>Weekly visual checks for erosion and establishment of declared weeds or invasive plants during decommissioning. Clear and reinstate affected areas until stabilised. Monitor noise levels in high operational areas at risk of elevated noise due to the type of equipment (if necessary). High pitch noise is not expected during Decommissioning. Weekly visual checks on the stability of the riverbank. This includes any signs of subsidence and erosion. Daily visual checks on rehabilitation</p>

				<p>equipment for leakage and/or malfunctioning.</p> <p>Report environmental incidents.</p> <p>Record incidents and non-compliances.</p> <p>Monitor rehabilitated areas for one year after final rehabilitation.</p> <p>Concurrent rehabilitation of available areas during operational phase.</p> <p>Final rehabilitation during decommissioning.</p> <p>Removal of any equipment from site during decommissioning and Closure.</p> <p>Post monitoring to monitor rehabilitation until Closure.</p> <p>Development of retrenchment policy and training during operational phase.</p>
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(l) Indicate the frequency of the submission of the performance assessment/environmental audit report.

An Annual Environmental Performance Assessment to verify compliance with the approved EMPr must be conducted annually and submitted to DMR as required. The environmental performance assessment and revision of the quantum must be undertaken annually in accordance with the NEMA Regulations on Financial Provision, 2015 or subsequent amendments made in this respect.

(m) Environmental Awareness Plan

(1) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

It is recommended that the permit holder inform employees (including permanent, temporary and sub-contractors) on site by means of at least one of the following, but not limited to these:

- Discuss general environmental risks and conservation during scheduled “Toolbox talks”, covering different environmental aspects relevant to the specific operation and the surroundings. This may include measures to be implemented during the operation to prevent environmental impacts, e.g. waste management, dust control, water conservation, etc.
- Formal environmental training of key personnel/supervisors.
- Placement of graphic information related to conservation on site.
- Induction on environmental awareness and site specific risks to all permanent and temporary employees as well as sub-contractors (if applicable) at the start of their employment on site and/or otherwise regulated by legislation.

The induction must contain as minimum:

- The environmental policy of the company.
- The role of each employee to conserve the environment in accordance with the policy.
- The impact that the employee's action or work could have on the environment.

- Emergency procedures and the individuals to contact in the event of an incident, e.g. major spillage of fuel.

Proof of environmental training/induction must be kept on file and be available for inspection on request.

(2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Refer to Table 11 in the Environmental Impacts/Risks and Management Report in Annexure 9 of this report for environmental management and mitigation measures to be implemented to limit and/or prevent environmental impacts/risks expected to be associated with the proposed operation.

(n) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually).

The financial provision will be reviewed annually in accordance with the NEMA Regulations on financial Provision, 2015 or subsequent amendments.

2 UNDERTAKING

(In respect of the BAR and EMPr for the proposed sand mining on the farm Jammerbergsdrift 540/RE, Wepener.)

The EAP herewith confirms:

The correctness of the information provided in the reports

- a) the inclusion of comments and inputs from stakeholders and I&APs ;
- b) the inclusion of inputs and recommendations from the specialist reports where relevant; and
- c) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.

Signature of the environmental assessment practitioner:

Name of company:

Date:

Signature of the Commissioner of Oaths:

Name:

Designation:

Date:

Official stamp of Commissioner of Oaths (below)