

**PROPOSED SAND MINE ON THE FARM NIAGARA
NO 380, ELUNDINI LOCAL MUNICIPALITY,
EASTERN CAPE PROVINCE**

DRAFT BASIC ASSESSMENT REPORT



DECEMBER 2022

REFERENCE NUMBER: EC 30/5/1/3/2/10749 MP

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EXECUTIVE SUMMARY

World Focus 1143 CC, applied for environmental authorisation (EA) and a mining permit to mine sand from the Tsitsa River on a portion of the farm Niagara No 380 in the Joe Gqabi Magisterial District of the Eastern Cape.

The proposed mining area will be 1.16 ha, extending across the riparian zone and riverbed in an area that were previously used for informal sand mining activities. The proposed operation will be of small scale where the mineral (sand) will be mined from the riverbed and -bank with a TLB (and/or excavator) that will stockpile it (outside the riverbed and >10 m from the riverbanks) until it is loaded onto trucks that will transport it from the site to clients. No mining, from the riverbed, will take place during the high flow periods of the Tsitsa River. Due to the small scale of the operation no infrastructure, other than a chemical toilet, will be established within the mining footprint. Vehicle/equipment maintenance will be done at an existing off-site workshop of the Applicant in town, and the mining area will be reached via the existing farm road.

The proposed project triggers listed activities in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and the Environmental Impact Assessment Regulations 2014 (as amended) and therefore requires an environmental impact assessment (basic assessment process) that assess project specific environmental impacts and alternatives, consider public input, and propose mitigation measures, to ultimately culminate in an environmental management programme that informs the competent authority (Department of Mineral Resources and Energy) when considering the environmental authorisation. This report, the Draft Basic Assessment Report, forms part of the departmental requirements, and presents the first report of the EIA process.

Alternatives:

During the planning phase the project team considered a few alternative site positions, however, Site Alternative 1 was subsequently identified as the preferred site that will have the least impact on the receiving environment. Site Alternative 1 (S1) entails the mining of a 1.16 ha area on the farm Niagara No 380 within the boundaries of the GPS coordinates listed in Table 3.

No other activity alternative exists that would meet the need and desirability of the Applicant other than the no-go alternative which would be to retain the site as an undeveloped area. This would, however, not address the sand need identified in the area. As such no alternative activities were considered.

Due to the nature of the proposed activity and the fact that no infrastructure will be established on site, the layout of the earmarked footprint is of no real consequence and therefore no alternative layouts have been considered further.

Public Participation Process:

During the initial public participation process the stakeholders and I&AP's were informed of the project by means of notification documents that were sent directly to the contact persons. An advertisement was placed in The Reporter, and two site notices were placed at conspicuous places. The newspaper advertisement and on-site notices were all in English and isiXhosa. isiXhosa Flyers were also distributed in the Mt Fletcher and Taung communities. A 30-days commenting period was allowed which expires on 24 January 2023. In accordance with the timeframes stipulated in the EIA Regulations, 2014 (as amended) the Draft Basic Assessment Report was compiled and will be distributed to the I&AP's and stakeholders. A 30-day commenting period, ending 31 January 2023, will be allowed for perusal of the documentation and submission of comments. The comments received on the project and DBAR will be incorporated into the Final Basic Assessment Report (FBAR) to be submitted for decision making to the DMRE.

Basic Assessment Report:

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

The key finding of the environmental impact assessment entail the following:

Topography:

- ∞ Should the sand mining area gradually be sloped from the bank towards the river, and the thalweg of the riverbed be maintained, the risk of bank erosion can be prevented. Considering this, and if the mitigation measures proposed in this report are implemented the potential impact of the mining activities on the topography of the area will be of low significance provided that the area is rehabilitated upon closure.

Visual Characteristics:

- ∞ The viewshed analysis showed that the visual impact of the proposed sand mining operation (S1/S2) will be of low-medium significance, especially as no permanent structures will be constructed and the river will annually reinstate the excavated riverbed. Should the Applicant successfully rehabilitate the riverbank (upon closure), no residual visual impact is expected upon closure of the mine.

Air and Noise Quality:

- ∞ The proposed activity will contribute the emissions of one TLB, three tippers, and occasionally an excavator to the receiving environment for the duration of the operational phase. Should the permit holder implement the mitigation measures proposed in this document the impact on the air quality of the surrounding environment is deemed to be of low significance and compatible with the current land use. The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the traffic driving along the R56.

Hydrology:

- ∞ The Applicant is in the process of applying for a water use authorisation from the DWS.
- ∞ The ABSA notes that due to the current state of the river and riparian areas, it is unlikely the sand mining activities (instream and in the riparian area) will further reduce the condition of the study area. The post-mitigation risk level for all mining related aspects was determined to be moderate. It is the opinion of the specialist that the proposed sand mining of the river and its bank be supported, subject to mitigation measures during the operational phase and rehabilitation of the mining and riparian area post-mining.

Terrestrial Biodiversity, Conservation and Groundcover:

- ∞ Ground-truthing confirmed that the proposed footprint is highly disturbed with a high level of alien infestation. The ABSA concluded that the ecological status of the sampled Tsitsa River (Freshwater: CBA) is largely modified (Class D), and therefore the impact of the proposed sand mining operation on the identified CBA is deemed to be of Low significance. No protected and/or sensitive plant species occur within the proposed mining footprint, and the specialist did not identify any wetland areas/vegetation of concern. If the Applicant implement the mitigation measures proposed in this report the impact of the proposed activity on the riparian vegetation and groundcover in general is deemed to be of low significance.

Fauna:

- ∞ No protected or red data species were identified within the proposed footprint area. The fauna at the site will not be impacted as they will be able to move away or through the site, without being harmed.

- 3 The proposed sand mining operation is expected to have a moderate impact on the aquatic ecology of the Tsitsa River should the mitigation measures proposed in this report be implemented.

Cultural and Heritage Environment:

- 3 The HIA (inclusive of the PIA) notes that no heritage sites were recorded during the study and no adverse impacts to heritage resources are expected. Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure.

Site Specific Infrastructure:

- 3 The mining activities will have no impact on the nearby power line. No other infrastructure exists within the earmarked footprint that can/will be disturbed by the proposed mining activities, and the Applicant will maintain the access road for the duration of the mine.

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

Environmental Management Programme (EMPR)

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

The financial provision amount that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final planned closure gives a sum of R 238 284.28.

LIST OF ABBREVIATIONS

| | |
|-----------------|---|
| ABSA | Aquatic Biodiversity Specialist Assessment |
| ASPT | Average Score Per Taxon |
| BGIS | Biodiversity GIS |
| CARA | Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) |
| CBA | Critical Biodiversity Area |
| DBAR | Draft Basic Assessment Report |
| DEDEAT | Department of Economic Development, Environmental Affairs and Tourism |
| DMRE | Department of Mineral and Resources and Energy |
| DoT | Department of Transport |
| DPWI | Department of Public Works and Infrastructure |
| DWS | Department of Water and Sanitation |
| EA | Environmental Authorisation |
| EAP | Environmental Assessment Practitioner |
| ECBCP | Eastern Cape Biodiversity Conservation Plan |
| ECO | Environmental Control Officer |
| ECPTA | Eastern Cape Parks and Tourism Agency |
| EIA | Environmental Impact Assessment |
| EIA Regulations | Environmental Impact Assessment Regulations, 2014 (as amended 2017) |
| EMPR | Environmental Management Programme |
| ESA | Ecological Support Areas |
| FBAR | Final Basic Assessment Report |
| GDP | Gross Domestic Product |
| GNR | Government Notice |
| HIA | Heritage Impact Assessment |
| I&AP's | Interested and Affected Parties |
| IHAS | Integrated Habitat Assessment System |
| IHIA | Intermediate Habitat Integrity Assessment |
| MHSA | Mine Health and Safety Act, 1996 (Act No. 29 of 1996) |
| MIRAI | Macroinvertebrate Response Assessment Index |
| MP | Mining Permit |
| MPRDA | Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) |
| NEMA | National Environmental Management Act, 1998 (Act No. 107 of 1998) |
| NEM:AQA | National Environmental Management: Air Quality Control Act, 2004 (Act No. 39 of 2004) |

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| NEM:BA | National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) |
| NEM:WA | National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) |
| NFEPA | National Freshwater Ecosystem Priority Areas |
| NHRA | National Heritage Resources Act, 1999 (Act No 25 of 1999) |
| NRTA | National Road Traffic Act, 1996 (Act No. 93 of 1996) |
| NWA | National Water Act, 1998 (Act No. 36 of 1998) |
| PCB's | Polychlorinated Biphenyl |
| PCO | Pest Control Officer |
| PES | Present Ecological State |
| PIA | Palaeontological Impact Assessment |
| PPE | Personal Protective Equipment |
| PSM | Palaeontological Sensitivity Map |
| RA | Risk Assessment |
| S1 | Site Alternative 1 |
| SAHRA | South African Heritage Resources Agency |
| SAHRIS | South African Heritage Resources Information System |
| SAMBF | South African Mining and Biodiversity Forum |
| SQR | Sub Quaternary Reach |
| TWQR | Target Water Quality Range |
| WMA | Water Management Area |
| WULA | Water Use Licence Application |
| WUL | Water Use Licence |

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT
And
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATION IN TERMS OF THE NATIONAL ENVIRONMENTAL 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: | World Focus 1143 CC |
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| FILE REFERENCE NUMBER SAMRAD: | EC 30/5/1/3/2/10749 MP |

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 29 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 can 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.

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, signification, 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

1. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) Details of: Greenmined Environmental

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) the proponent must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the environmental impact assessment (EIA) of any activities regulated in terms of the Act. World Focus 1143 CC (hereafter referred to as the “Applicant”) appointed Greenmined Environmental (Pty) Ltd (hereafter referred to as “Greenmined”) to undertake the study needed. Greenmined has no vested interest in World Focus 1143 CC or the proposed project and declares its independence as required by the Environmental Impact Assessment Regulations, 2014 (as amended) (EIA Regulations).

i) Details of the EAP

| | |
|---------------------------|--|
| Name of the Practitioner: | Ms Christine Fouché (Senior Environmental Specialist) |
| Tel No.: | 021 851 2673 |
| Fax No.: | 086 546 0579 |
| E-mail address: | christine.f@greenmined.co.za |

ii) Expertise of the EAP.

(1) The qualifications of the EAP

(with evidence).

Ms. Fouche has a Diploma in Nature Conservation and a B.Sc. in Botany and Zoology. Full curriculum vitae with evidence is attached as Appendix N.

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

(In carrying out the Environmental Impact Assessment Procedure)

Ms Fouche has seventeen years’ experience in doing Environmental Impact Assessments and Mining Applications in South Africa. Ms. Fouche is a registered Environmental Assessment Practitioner (registration no: 2019/1003) with EAPASA (Environmental Assessment Practitioners Association of South Africa) since 2019. See a list of past projects attached as Appendix N.

b) Location of the overall Activity.

Table 1: Location of the proposed project.

| | |
|---|--|
| Farm Name: | Niagara No 380 |
| Application area (Ha) | 1.16 ha |
| Magisterial district: | Joe Gqabi District Municipality Elundini Local Municipality |
| Distance and direction from the nearest town | ± 20 km (driving along the R56) north-west of Maclear/Nqanqarhu on the southern bank of the Tsitsa River. Using R56 from Maclear to Mount Fletcher, head north-west for approximately ± 20 km. Turn left onto the farm road that leads up to the river. |
| 21 digit Surveyor General Code for each farm portion | C04400000000038000000 |

c) Locality map

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

The requested map is attached as Appendix B.



Figure 1: Satellite view of the proposed mining permit area (blue polygon) of World Focus 1143 CC (image obtained from Google Earth).

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 aforesaid main and listed activities, and infrastructure to be placed on site

The Applicant, World Focus 1143 CC, applied for environmental authorisation (EA) and a mining permit to mine sand from the Tsitsa River on a portion of the farm Niagara No 380 in the Joe Gqabi Magisterial District of the Eastern Cape.

The proposed mining footprint will be 1.16 ha and extends across the riparian zone and riverbed in an area that were previously used for informal sand mining activities. The proposed operation will be of small scale where the mineral (sand) will be mined from the riverbed and -bank with a TLB (and/or excavator) that will stockpile it (outside the riverbed and >10 m from the riverbanks) until it is loaded onto trucks that will transport it from the site to clients. No mining, from the riverbed, will take place during the high flow periods of the Tsitsa River.

Due to the small scale of the operation no infrastructure, other than a chemical toilet, will be established within the mining footprint. Vehicle/equipment maintenance will be done at an existing off-site workshop of the Applicant in town, and the mining area will be reached via the existing farm road.

See attached as Appendix C a copy of the site activities map for the proposed project.

i) Listed and specified activities

Table 2: Listed and specified activities triggered by the associated mining activities

| NAME OF ACTIVITY | Aerial extent of the activity | LISTED ACTIVITY | APPLICABLE LISTING NOTICE |
|---|--------------------------------------|---|--|
| (E.g. For prospecting – drill site, site camp, ablution facilities, accommodation, equipment storage, sample storage, site office, access route etc... etc... etc E.g. for mining – excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.) | Ha or m ² | Mark with an X where applicable or affected | (GNR 324, GNR 325, GNR 326 OR GNR 327) |
| Demarcation of site with visible beacons. | 1.16 ha | N/A | Not listed |
| Site establishment | 1.16 ha | X | GNR 517 LN 1 Activity 21 GNR 327 LN 1 Activity 27, 28 GNR 324 LN 3 Activity 12 |

| NAME OF ACTIVITY | Aerial extent of the activity | LISTED ACTIVITY | APPLICABLE LISTING NOTICE |
|---|-------------------------------|-----------------|--|
| <p>GNR 517 Listing Notice 1 Activity 21:</p> <p><i>Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the mining permit.</i></p> | | | |
| <p>GNR 327 Listing Notice 1 Activity 27:</p> <p><i>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—</i> <i>(i) the undertaking of a linear activity; or</i> <i>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</i></p> | | | |
| <p>GNR 327 Listing Notice 1 Activity 28:</p> <p><i>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:</i> <i>(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or</i> <i>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</i> <i>excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.</i></p> | | | |
| <p>GNR 324 Listing Notice 3 Activity 12:</p> <p><i>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</i></p> <p><u>a. Eastern Cape</u></p> <p><i>ii. Within critical biodiversity areas identified in bioregional plans;</i></p> | | | |
| Winning of sand | 1.16 ha | X | GNR 517 LN 1 Activity 21 GNR 327 LN 1 Activity 28 |
| Stockpiling and transporting material from site. | 1.16 ha | X | GNR 517 LN 1 Activity 21 GNR 327 LN 1 Activity 28 |
| Sloping and landscaping upon closure of the site. | 1.16 ha | X | GNR 517 LN 1 Activity 21 |

ii) Description of the activities to be undertaken

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

Background Information:

The farm Niagara No 380, in the Elundini municipal area, is mainly used for subsistence farming (crop cultivation & grazing). The land use of the property also includes informal sand mining from mainly the riparian area/riverbank of the Tsitsa River.

Project Proposal:

Considering the above, the Applicant identified the need to apply for environmental authorisation (EA) and a sand mining permit (MP) over 1.16 ha of the property from where the sand resource can be utilised (see Figure 2). The proposed mining footprint was restricted to the earmarked footprint, so as not to encroach onto the adjacent fields of the landowner.

Table 3: GPS Coordinates of the proposed mining footprint.

| NUMBER | DEGREES, MINUTES, SECONDS | | DECIMAL DEGREES | |
|--------|---------------------------|--------------|-----------------|------------|
| | LAT (S) | LONG (E) | LAT (S) | LONG (E) |
| A | 30°56'44.87" | 28°26'29.75" | -30.945797° | 28.441596° |
| B | 30°56'43.56" | 28°26'30.43" | -30.945433° | 28.441785° |
| C | 30°56'42.76" | 28°26'30.65" | -30.945211° | 28.441846° |
| D | 30°56'42.61" | 28°26'30.76" | -30.945170° | 28.441877° |
| E | 30°56'41.54" | 28°26'31.27" | -30.944871° | 28.442020° |
| F | 30°56'40.51" | 28°26'32.08" | -30.944585° | 28.442245° |
| G | 30°56'39.88" | 28°26'32.94" | -30.944411° | 28.442483° |
| H | 30°56'39.63" | 28°26'34.32" | -30.944341° | 28.442868° |
| I | 30°56'39.57" | 28°26'35.26" | -30.944325° | 28.443128° |
| J | 30°56'39.73" | 28°26'36.75" | -30.944369° | 28.443542° |
| K | 30°56'39.81" | 28°26'39.07" | -30.944391° | 28.444187° |
| L | 30°56'39.97" | 28°26'39.70" | -30.944436° | 28.444360° |
| M | 30°56'40.39" | 28°26'40.88" | -30.944552° | 28.444690° |
| N | 30°56'40.38" | 28°26'41.07" | -30.944549° | 28.444743° |
| P | 30°56'40.55" | 28°26'41.64" | -30.944597° | 28.444900° |
| Q | 30°56'40.78" | 28°26'42.10" | -30.944662° | 28.445028° |
| R | 30°56'42.30" | 28°26'44.06" | -30.945083° | 28.445571° |
| S | 30°56'42.84" | 28°26'45.20" | -30.945232° | 28.445889° |
| T | 30°56'42.95" | 28°26'45.64" | -30.945263° | 28.446010° |
| U | 30°56'43.91" | 28°26'47.30" | -30.945530° | 28.446471° |

| NUMBER | DEGREES, MINUTES, SECONDS | | DECIMAL DEGREES | |
|--------|---------------------------|--------------|-----------------|------------|
| | LAT (S) | LONG (E) | LAT (S) | LONG (E) |
| V | 30°56'44.56" | 28°26'46.95" | -30.945710° | 28.446375° |
| W | 30°56'44.52" | 28°26'46.53" | -30.945701° | 28.446259° |
| X | 30°56'44.16" | 28°26'45.94" | -30.945599° | 28.446094° |
| Y | 30°56'43.82" | 28°26'45.49" | -30.945506° | 28.445970° |
| Z | 30°56'43.14" | 28°26'44.67" | -30.945316° | 28.445742° |
| aa | 30°56'41.90" | 28°26'42.81" | -30.944972° | 28.445224° |
| bb | 30°56'41.11" | 28°26'41.76" | -30.944754° | 28.444933° |
| cc | 30°56'40.60" | 28°26'40.43" | -30.944612° | 28.444563° |
| dd | 30°56'40.24" | 28°26'39.26" | -30.944512° | 28.444239° |
| ee | 30°56'40.25" | 28°26'37.78" | -30.944514° | 28.443828° |
| ff | 30°56'40.57" | 28°26'35.57" | -30.944603° | 28.443213° |
| gg | 30°56'40.83" | 28°26'33.81" | -30.944675° | 28.442726° |
| hh | 30°56'41.34" | 28°26'32.67" | -30.944818° | 28.442408° |
| ii | 30°56'42.68" | 28°26'31.54" | -30.945188° | 28.442094° |
| jj | 30°56'45.14" | 28°26'30.22" | -30.945872° | 28.441728° |
| kk | 30°56'45.00" | 28°26'29.98" | -30.945832° | 28.441660° |



Figure 2: Satellite view showing the position of the proposed mining area (blue polygon). (Image obtained from Google Earth).

The proposed mining method will entail direct excavation of the sand from the permitted area, to win building and filling sand suitable for the construction and road building industry.

The proposed mining activities will entail the following:

- ∞ The existing farm road will be used to access the mining area. The road will be upgraded if needed and maintained for the duration of the project, but no new roads need to be constructed;
- ∞ The Applicant will remove the sand from the permitted mining area with a TLB (and/or excavator when needed) that will stockpile it outside the riverbed but within the mining footprint, until it is loaded onto tipper trucks that will transport it to the clients.
- ∞ Mining of sand from the riverbed will take place during low flow periods of the Tsitsa River (May-October). The permit holder will however continue with the mining of sand from the riverbank and sales of stockpiled material throughout the year. All machinery will be removed from the riverbed during high flow periods.
- ∞ The mining operations will be limited to daylight hours (07:00 – 17:00 Monday – Saturday).

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

- (1) *Site establishment phase* which will involve the demarcation of the permitted mining area. Site establishment will necessitate the clearing of vegetation from the riverbank, the stripping and stockpiling of topsoil, and the introduction of the mining machinery.
- (2) *Operational phase* that will entail the removal of the sand with a TLB (and/or excavator) from the earmarked area, stockpiling, and hauling of the material to clients.
- (3) *Decommissioning phase* which entails the rehabilitation of the affected environment prior to the submission of a closure application to the Department of Mineral Resources and Energy (DMRE). From previous experience it is known that the river will annually replenish the sand resource and in doing so naturally rehabilitate any disturbance to the riverbed. The decommissioning phase will therefore mainly entail the reinstatement and seeding of the riverbank/riparian area. Once the mining area was rehabilitated, the permit holder will submit a closure application to the DMRE in accordance with section 43(4) of the MPRDA, 2002. The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

PHASES OF THE PROJECT

1. *Site Establishment Phase:*

Site establishment entails the demarcation of the mining boundaries, clearance of vegetation and stripping and stockpiling of topsoil from the riverbank/riparian area, and the introduction of the mining equipment as detailed below:

∞ Demarcation of Mining Boundaries:

Pursuant to receipt of an EA and MP, and prior to site establishment, the boundaries of the mining area will be demarcated with visible beacons.

3 Clearing of Vegetation and Topsoil Stripping (Riverbank/Riparian Area):

According to Mucina and Rutherford (2012) the vegetation type of the natural areas is known as the East Griqualand Grassland (Gs12). The proposed mining footprint extends across the riparian zone of the river onto a largely modified area. The specialist did not identify any wetlands (other than the river) and/or protected plant species in the earmarked area that needs to be preserved. The area is also highly infested with Silver Wattle (*Acacia dealbata*) and Weeping Willow (*Salix babilonica*).

The hydrologist proposed a 10 m buffer around the riparian zone (see Figure 35) to prevent sedimentation of the river from the stockpiles and recommended that no sand stockpiles are kept within the buffer zone. The ABSA (Aquatic Biodiversity Specialist Assessment) does however allow for the mining of the riverbank, provided that a slope is maintained to prevent erosion and/or increased flooding.

Considering this, upon commencement the Applicant will strip the vegetation layer and topsoil of the area to be mined. The woody material will be donated to the community as firewood (in agreement with the landowner). The complete A-horizon will be stripped and stockpiled to be replaced during the rehabilitation of the area. If it is unclear where the topsoil layer ends the top 300 mm of soil will be stripped. It will be part of the obligations of site management to prevent the mixing of topsoil heaps with other soil heaps. The topsoil berm will measure a maximum of 2 m in height to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. The Applicant will ensure all stockpiles remain outside the proposed 10 m buffer zone.

3 Access Road:

The Applicant will use the existing gravel farm road (± 1.8 km), to access the mining area and transport material from the mine. The farm road has a formal entrance from the R56. If necessary, the farm road will be upgraded, and maintained by the permit holder for the duration of the operational phase.



Figure 3: Satellite view showing the access road (dark red line) to the proposed mining area (bright red polygon).

At the mining area a single entrance point will be made through the riparian area (and buffer zone) into the river. Once the access point was made mining platforms will be established ± 2 m from the delineated bank from where the sand will be mined from the riverbed. The entrance point will be demarcated to prevent sprawling.

3 Introduction of Mining Machinery:

As mentioned earlier, no infrastructure, other than a chemical toilet, will be established within the mining area, and no infrastructure will be placed in the riverbed. Mining machinery that will operate within the footprint is expected to consist of the following:

- TLB (1);
- Excavator (1) (occasional); and
- Tipper Trucks (3).

The Applicant will not construct/establish any permanent infrastructure (such as a workshop or storage facilities) within the permitted mining area.

2. *Operational Phase:*

The operational phase will involve the recovery of the sand with a TLB (and/or excavator) that will stockpile it outside the riverbed and proposed 10 m buffer zone until it is loaded onto trucks that will transport it from the site to clients. The Applicant will make use of a single access point into the river to limit damage to the riparian zone.

The layout of the mining area will be simple, consisting of a sand recovery zone (riverbed and -bank) and an area used to stockpile the material until it is sold (>10 m from the riverbank). As mentioned earlier, mining from the riverbed, will only take place during the low flow periods of the Tsitsa River, and all machinery and equipment will be removed from the river during high flow. The permit holder will however continue with the mining of sand from the riverbank and sales of stockpiled material throughout the year.

Mining of the riverbank will be sloped to prevent erosion and increased flooding. As mentioned earlier, all stockpiles will be outside the 10 m buffer zone to prevent increased sedimentation of the river.

The proposed sand mine will appoint eight employees. No chemicals will be stored on site, and vehicle/equipment maintenance will be done at an existing off-site workshop of the Applicant (in town). Sand mining will take place during normal work hours (no work on Sundays).

3 Water Use:

As no sand washing is proposed for this project, the Applicant will exclusively use water for dust suppression purposes on the access road when needed. Approximately 5 000 litre water/day will be needed during the dry months.

Dust generated on the access road will, as far as possible, be managed through alternative dust suppression methods to restrict water use to the absolute minimum.

These measures will include a combination of the following:

- The speed of all mining equipment/vehicles will be restricted to 40 km/h on the internal farm road to minimize dust generation;
- The Applicant will attempt to lessen denuded areas (dust source) to the absolute minimum.

Under very windy/dusty conditions the permit holder might have to substitute the above mentioned dust suppression methods with the spraying of water, in which case water will be bought and transported to the farm in a water truck that will moisten the problem area. The water truck driver will receive proper training to ensure effective use of the water on problem areas preventing water wastage.

3 Electricity:

The proposed project does not require any electricity.

3 Waste Handling:

Due to the nature of the project, the small scale of the proposed operation, and the fact that no infrastructure will be established, or maintenance work done within the earmarked footprint, very little to no general waste will be generated as a direct result of the mining activities. Any waste generated during the operational phase, will be contained in a sealable refuse bin that will be removed from site when full, and incorporated into the existing waste disposal system at the workshop of the Applicant (in Maclear/Nqanqarhu).

Likewise, very little (if any) generation of hazardous waste is expected. Hazardous waste will mainly be the result of accidental spillages or breakdowns. Such contaminated areas will be cleaned up immediately (within two hours of the occurrence) and contaminated soil will be contained in a designated hazardous waste container to be removed daily to the hazardous waste storage area at the Applicant's workshop where it will be disposed of as part of the hazardous waste by a registered hazardous waste handling contractor.

The chemical toilet, to be placed on site, will be serviced by a registered contractor.

3 Servicing and Maintenance:

No workshop or service area will be established within the boundaries of the permitted area. Any maintenance/services will be performed at the existing (off-site) workshop of the Applicant.

Decommissioning Phase:

The decommissioning phase will entail the reinstatement of the mined footprint (1.16 ha). The end goal is for the riverbank/riparian area to return to agricultural use (grazing) and the Tsitsa River to reinstate the riverbed. No buildings/infrastructure, other than the chemical toilet, needs to be removed. The access road will remain intact to be used by the landowner.

The decommissioning activities will consist of the following:

- 3 Removal of all mining machinery from the footprint;
- 3 Removal of the chemical toilet;
- 3 Removal/levelling of all stockpiled material;
- 3 Landscaping the mining area, and replacing the topsoil;
- 3 Vegetating the reinstated area; and
- 3 Controlling the invasive plant species.

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

3 Rehabilitation of the Excavated Area (riverbed):

As mentioned earlier, the Tsitsa River annually replenish the sand resource and rehabilitate disturbance to the riverbed. Considering this, upon closure of the mine the Applicant will remove the mining machinery from the river to allow it to be reinstated during the next high-flow period. The entrance into the river will be rehabilitated and landscaped to prevent erosion of the bank once the site is closed.

3 Rehabilitation of the Riverbank/Riparian Area:

The chemical toilet and stockpiled material will be removed from the riverbank/riparian area. Compacted areas will be ripped and landscaped and previously stockpiled topsoil will be reinstated. The reinstated area will be seeded with a locally adapted grassmix, and invasive plant species will be controlled for at

least one growth season. The reinstated area will be monitored for signs of erosion until the cover crop (grass layer) established.

3 Final Rehabilitation:

Final rehabilitation of the surface area shall entail landscaping, levelling, maintenance, and clearing of invasive plant species. All equipment, plant and other items used during the mining period will be removed from site (section 44 of the MPRDA, 2002). Waste material of any description will be removed entirely from the mining area and disposed of at a registered landfill facility. It will not be permitted to be buried or burned on the site. The management of invasive plant species will be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site. Final rehabilitation shall be completed within a period specified by the Regional Manager (DMRE).

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

e) Policy and Legislative Context

Table 4: Policy and Legislative Context.

| APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process) | REFERENCE WHERE APPLIED | HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT. (E.g. in terms of the National Water Act a Water Use License has/has not been applied for) |
|---|---|--|
| Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). | Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity: <i>Physical Environment – Geology and Soil.</i> Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Management of invader plant species.</i> | The mitigation measures proposed for the site includes specifications of the CARA, 1983. |
| Elundini Local Municipality Integrated Development Plan (2020-2021) | Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Socio-economic Environment.</i> | The description of the study area's socio-economic status is in accordance with that of the IDP. |
| Integrated Environmental Management Guideline: Guideline on Need and Desirability (2017). | Part A(1)(f) Need and desirability of the proposed activity. | The need and desirability of the proposed project was assessed in terms of this guideline. |
| Mine Health and Safety Act, 1996 (Act No 29 of 1996) read together with applicable amendments and regulations thereto including relevant OHSA regulations. | Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Management of Health and Safety Risks.</i> | The mitigation measures proposed for the site includes specifications of the MHSA, 1996 |
| Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) read together with applicable amendments and regulations thereto. ↻ Section 27 | Part A(1)(d) Description of the scope of the proposed overall activity | Application for a mining permit submitted to DMRE-EC. Ref No: EC 30/5/1/3/2/10749 MP |
| National Environmental Management Act, 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014 (as amended) ↻ GNR 517 Listing Notice 1 Activity 21 ↻ GNR 327 Listing Notice 1 Activity 27 ↻ GNR 327 Listing Notice 1 Activity 28 ↻ GNR 324 Listing Notice 3 Activity 12 | Part A(1)(d)(i) Listed and specified activities. | Application for environmental authorisation submitted to DMRE-EC. Ref No: EC 30/5/1/3/2/10749 MP |

| APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT | REFERENCE WHERE APPLIED | HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT. |
|---|--|--|
| <p>National Environmental Management: Air Quality Control Act, 2004 (Act No 39 of 2004) read together with applicable amendments and regulations thereto specifically the National Dust Control Regulations, GN No R827.</p> | <p>Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Air and Noise Quality</i>.</p> <p>Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Fugitive Dust Emission Mitigation Measures</i>.</p> | <p>The mitigation measures proposed for the site consider the NEM:AQA, 2004 and the National Dust Control Regulations.</p> |
| <p>National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004) read together with applicable amendments and regulations thereto.</p> | <p>Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity - <i>Biological Environment</i></p> <p>Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Management of Vegetation Removal & Management of invader plant species</i>.</p> | <p>The mitigation measures proposed for the site includes specifications of the NEM:BA, 2004.</p> |
| <p>National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) read together with applicable amendments and regulations thereto.</p> <p>NEM:WA, 2008: National norms and standards for the storage of waste (GN 926)</p> | <p>Part A(1)(d)(ii) Description of the activities to be undertaken</p> | <p>The mitigation measures proposed for the site consider the NEM:WA.</p> |
| <p>National Heritage Resources Act. 1999 (Act No 25 of 1999).</p> | <p>Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Human Environment</i>.</p> <p>Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Archaeological, Heritage and Palaeontological Aspects</i>.</p> | <p>The mitigation measures proposed for the site includes specifications of the NHRA, 1999.</p> |
| <p>National Water Act, 1998 (Act No 36 of 1998) read together with applicable amendments and regulations thereto.</p> | <p>Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Hydrology</i>.</p> <p>Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk –</p> | <p>The proposed project entails sand mining from the Tsitsa River and falls within 100 m of a watercourse and therefore requires Water Use Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No.</p> |

| APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT | REFERENCE WHERE APPLIED | HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT. |
|---|--|--|
| | <p><i>Potential Impact on the wetland system.</i></p> <p>Part B(1)(d)(iii) Has a water use licence been applied for?</p> | <p>36 of 1998) for water uses as defined in section 21(c) and section 21 (i).</p> <p>The mitigation measures proposed for the site includes specifications of the NWA, 1998.</p> |
| Public Participation Guideline in terms of the NEMA EIA Regulations | Part A(1)(h)(ii) Details of the Public Participation Process Followed | Public participation was conducted in accordance with the guidelines published in terms of the NEMA EIA Regulations |

f) Need and desirability of the proposed activities.

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

The increase in building, construction, and road maintenance projects in the vicinity of the earmarked area triggered the need of the Applicant to trade with the available sand from a permitted area. As the Tsitsa River replenishes the sand deposit annually the mining of the mineral was identified as a feasible business opportunity that will also bring about the diversification of activities on the property, extending it from agriculture to include formal small scale mining.

Approximately eight people will be employed for the duration of the operational phase. The project will contribute to the local economy, both directly and through the multiplier effect that its presence will create, as equipment and supplies are purchased locally, and wages are spent at local businesses, generating both jobs and income in the area.

The ABSA prepared by The Biodiversity Company (2022) concluded that the Risk Class of the proposed sand mine is Moderate (see Appendix G) and that the proposed mining of the river and its bank may be supported, subject to mitigation measures during the operational phase and rehabilitation of the mining and riparian area post-mining

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

Table 5: Need and desirability determination.

| 1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES | | |
|--|--|-----------------------|
| How will this development impact on the ecological integrity of the area? | | |
| Question | Response | Level of Desirability |
| How were ecological integrity considerations taken into account? | <p>The ABSA concluded that the post-mitigation risk level for the mining related aspects was determined to be moderate. The specialist report stipulates that if all the prescribed recommendations and mitigation measures are implemented the proposed sand mining of the Tsetsa River and its bank may be supported.</p> <p>Also refer to:</p> <ul style="list-style-type: none"> 3 Part A(1)(d)(ii) Description of the activities to be undertaken; 3 Part A(1)(h)(i) Details of the development footprint alternatives considered; 3 Part A(1)(h)(iv) The environmental attributes associated with the alternatives; 3 Part A(1)(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; 3 Part A(1)(l) Environmental impact statement. | Desirable |
| How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? | | |
| How will this development pollute and/or degrade the biophysical environment? | <p>Should the mitigation measures proposed in this document be implemented the potential of the activity polluting the area is of low significance while degradation of the biophysical environment was categorized as moderate by the specialist.</p> <p>Also refer to:</p> <ul style="list-style-type: none"> 3 Part A(1)(h)(viii) The possible mitigation measures that could be applied and the level of risk. | Desirable |
| What waste will be generated by this development? | <p>The general waste to be generated at the mine will mainly consist of items such as food wrappers and water bottles from the employees. All general waste will be contained in a sealable refuse bin that will be placed adjacent to the chemical toilet. Once the bin is full, the waste will be removed to the Applicants off-site workshop (Maclear/Nqanqarhu) to be incorporated into its established waste removal system. As mentioned earlier, hazardous waste may result from accidental spillages/breakdowns. Such contaminated areas will immediately (within first hour of the occurrence) be cleaned and the contaminated soil will be contained in a designated hazardous waste container that will immediately be removed to the off-site workshop, from where it will be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste contractor. The chemical toilet will be serviced by an accredited contractor. No waste will be disposed of, buried, burned, or treated on the farm.</p> | Highly Desirable |

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES

How will this development impact on the ecological integrity of the area?

| Question | Response | Level of Desirability |
|--|--|-----------------------|
| How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? | The Heritage Impact Assessment (HIA) (inclusive of the PIA) compiled by Beyond Heritage did not identify any archaeological sites of significance within the study area (S1 & S2). The palaeontologist confirmed that the potential for disturbance or destruction of quaternary palaeontological resources was considered negligible. | Highly Desirable |
| How will this development use and/or impact on non-renewable natural resources? | If approved the Applicant will mine the resource identified on the farm Niagara No 380 from the Tsitsa riverbed and -bank that is annually replenished during high flow periods. Considering this, the Applicant will mine the available sand for a maximum of five years (allowable period of a mining permit) without depleting the resource. The sand resource will therefore be mined sustainably. | Highly Desirable |
| How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? | It is proposed that approximately 5 000 litres of water will be needed per day during the dry months (amount to decrease during the rainy season) to manage dust emissions. As mentioned earlier, the contractor will strive to manage dust generation through alternative suppression methods to restrict water use to the absolute minimum. Presently, it is proposed that water will be bought and transported to site. The contractor will be encouraged to consider the use of non-potable water for mining related activities. The project will not require the use of any other renewable natural resource. | Desirable |
| How were a risk-averse and cautious approach applied in terms of ecological impacts? | Refer to the following sections: <ul style="list-style-type: none"> ∩ Part A(1)(d)(ii) Description of the activities to be undertaken; ∩ Part A(1)(h)(i) Details of the development footprint alternatives considered; ∩ Part A(1)(h)(iv) The environmental attributes associated with the alternatives; ∩ Part A(1)(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; ∩ Part A(1)(l) Environmental impact statement. | Desirable |
| How will the ecological impacts resulting from this development impact on people's environmental right? | The mine will be managed in accordance with the specifications of the lease agreement with the landowner and should the mitigation measures proposed in this document be implemented the potential visual-, dust-, and noise impacts associated with the mining operation will be of low-medium significance. If the monitoring programs, proposed in this document, be implemented it is believed that the environmental rights of the surrounding residents/public will not be affected by the ecological impacts associated with the proposed activity. | Highly Desirable |
| Describe the linkages and dependencies between human wellbeing, livelihoods and | If approved, the mine will create at least eight new work opportunities and will also contributed an additional source of income (compensation) to the landowner. It is proposed that the mine will contribute to the local economy of the area, both directly | Highly Desirable |

1. SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES

How will this development impact on the ecological integrity of the area?

| Question | Response | Level of Desirability |
|---|--|-----------------------|
| ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts. | and through the multiplier effect that its presence will create. Equipment and supplies will be purchased locally, and wages will be spent at local businesses, generating both jobs and income in the area. | |
| Based on all the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area? | If the mitigation measures proposed in this document are adhered to, the project entails the mining of the 1.16 ha area without influencing the status of the ecosystem type, red data species or the conservation targets set out for a CBA area. | Desirable |
| Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified, resulted in the selection of the "best practicable environmental option" in terms of ecological considerations | Also refer to: ☹ Part A(1)(d)(ii) Description of the activities to be undertaken – Clearing of Vegetation; ☹ Part A(1)(h)(i) Details of the development footprint alternatives considered; ☹ Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Mining and Biodiversity; ☹ Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Biodiversity Conservation Areas; ☹ Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Groundcover; ☹ Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover. | |

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

What is the socio-economic context of the area?

| Question | Response | Level of Desirability |
|---|---|-----------------------|
| What is the socio-economic context of the area? | Please refer to Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Socio-Economic Environment. | Highly Desirable |
| Considering the socio-economic context, what will the socio-economic impacts be of the development, and specifically also on the socio-economic objectives of the area? | If approved, the mine will create at least eight new work opportunities and will also contributed an additional source of income (compensation) to the landowner. It is proposed that the mine will contribute to the local economy of the area, both directly and through the multiplier effect that its presence will create. Equipment and supplies will be purchased locally, and wages will be spent at local businesses, generating both jobs and income in the area. | Highly Desirable |
| How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities? | | |
| Will the development result in equitable impact distribution, in the short- and long-term? | The proposed mine will be operated in a socially and economically sustainable manner during both the short- and long term. The procurement progression plan of the Applicant entails the support of local enterprises, of which preference will be given to HDSA & women owned local suppliers (if available). | Highly Desirable |
| In terms of location, describe how the placement of the proposed development will contribute to the area. | Mining the resource on the property will contribute to the area in that the landowner will receive compensation, the project will create employment opportunities, and the sales of the material will directly and indirectly promote the economy of the area as mentioned earlier. | Highly Desirable |
| How were a risk-averse and cautious approach applied in terms of socio-economic impacts? | No negative socio-economic impacts could, at this stage, be identified that cannot be managed through the implementation of mitigation measures included in this report. | Highly Desirable |
| How will the socio-economic impacts resulting from this development impact on people’s environmental right? | As mentioned in Part A(1)(t)(i)(1) <i>Impact on the socio-economic conditions of any directly affected person</i> , the activity may have an impact on the visual characteristics of the surrounding environment and may affect air quality and the noise ambiance of the study area. However, the mine will be managed in accordance with the specifications of the lease agreement with the landowner and should the mitigation measures proposed in this document be implemented the potential visual-, dust-, and noise impacts associated with the mining operation will be of low-medium significance. If the monitoring programs, proposed | Highly Desirable |

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

What is the socio-economic context of the area?

| Question | Response | Level of Desirability |
|--|--|-----------------------|
| | in this document, be implemented it is believed that no environmental rights of the surrounding residents/public will be affected by the ecological impacts associated with the proposed activity. | |
| Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts? | If approved, the mine will create at least eight new work opportunities and will also contributed an additional source of income (compensation) to the landowner. It is proposed that the mine will contribute to the local economy of the area, both directly and through the multiplier effect that its presence will create. Equipment and supplies will be purchased locally, and wages will be spent at local businesses, generating both jobs and income in the area. | Highly Desirable |
| What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations? | If the mitigation measures proposed in this document is adhered to, the project entails the mining of the 1.16 ha area without influencing the status of the ecosystem type, red data species or the conservation targets set out for a CBA area. Should the permit application be approved, the project will directly contribute to the socio-economic status of the receiving environment through the employment of at least eight people, and support of the local economy. Also refer to: <ul style="list-style-type: none"> ∩ Part A(1)(h)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected. | Highly Desirable |
| What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons? | | |
| What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination? | The mine will operate in accordance with, amongst others, the following: <ul style="list-style-type: none"> ∩ CARA, 1983 – to ensure agriculture related compliance; ∩ Financial Provision Regulations, 2015 – to ensure compliance in terms of rehabilitation; ∩ Mine Health and Safety Act, 1996 (as amended) – to ensure employee safety; ∩ MPRDA, 2002 (as amended) – to ensure mining related compliance; ∩ NEM:AQA, 2004 – to ensure air quality related compliance; ∩ NEM:BA, 2004 – to ensure biodiversity related compliance; ∩ NEM:WA, 2008 – to ensure waste related compliance; ∩ NEMA, 1998 (as amended) – to ensure environmental related compliance; | Highly Desirable |
| What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been | | |

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

What is the socio-economic context of the area?

| Question | Response | Level of Desirability |
|---|--|-----------------------|
| addressed throughout the development's life cycle? | As mentioned earlier, the procurement progression plan of the Applicant entails the support of local enterprises, of which preference will be given to HDSA & women owned local suppliers (if available). | |
| Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community that is consistent with the priority needs of the local area. | Presently, it is proposed that the mine will create a minimum of eight employment opportunities. In a municipal area with an unemployment rate of 44.4%, new job opportunities are of high significance. Further to this, and as mentioned earlier, the procurement progression plan of the Applicant supports local enterprises, of which preferences are given to HDSA & women owned local suppliers (where possible). | Highly Desirable |
| What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected. | The mine will operate in accordance with the specifications of the Mine Health and Safety Act, 1996 as well as the Occupational Health and Safety Act, 1993. Site management will arrange regular toolbox talks with the site personnel regarding the work to be performed and the environment in which the work will take place. Grievances/concerns can be lodged during the toolbox sessions and site meetings. | Highly Desirable |
| Describe how the development will impact on job creation in terms of, amongst other aspects? | As mentioned earlier, the proposed mine will appoint eight employees (including management), all of which will be from the magisterial district. | Highly Desirable |
| What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage. | The proposed mine will operate under a valid environmental authorisation and mining permit to be issued by the DMRE-EC as well as a water use licence to be issued by the DWS. Compliance of the site with the approved EMPR, EA- and WUL conditions will be reported on as per departmental specifications. Considering this, the proposed activity will take place in an environmentally sustainable manner with the least possible impact on the receiving environment. | Highly Desirable |
| Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left. | It is believed that the mitigation measures proposed in this document is realistic and can be implemented (when applicable) by the mine. As mentioned earlier, the Tsitsa River annually replenishes the sand and rehabilitate the riverbed. The rehabilitation option is therefore to reinstate the riverbank/riparian area upon final site closure. The reinstated areas will be top-dressed with topsoil and vegetated with an appropriate grass mix and the area will be returned to agricultural use (grazing). If the disturbed areas are successfully rehabilitated no long-term management burden will be left behind. | Highly Desirable |

2. PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

What is the socio-economic context of the area?

| Question | Response | Level of Desirability |
|---|--|-----------------------|
| What measures were taken to ensure that the costs of remedying pollution, environmental degradation, and consequent adverse health effects and of preventing, controlling or minimising further pollution environmental damage or adverse health effects will be paid for by those responsible for harming the environment. | In terms of Section 41 of the MPRDA, 2002 a mining permit holder must submit a financial provision to the DMRE that is sufficient to rehabilitate or manage the negative environmental impacts related to the mining activity. Upon approval of this application, the Applicant will lodge a financial guarantee with the DMRE that will be deemed sufficient to cover the financial provision amount needed to rehabilitate the mining footprint. The environmental liability of the operation will annually be reviewed and if a shortfall is indicated, the guarantee will be accordingly adjusted. | Highly Desirable |
| Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified, resulted in the selection of the best practicable environmental option in terms of socio-economic considerations | If the mitigation measures proposed in this document are adhered to, the project entails the mining of the 1.16 ha area without influencing the status of the ecosystem type, red data species or the conservation targets set out for a CBA area. Also refer to: 3 Part A(1)(h)(vii) The positive and negative impacts that the proposed activity and alternatives will have on the environmental and the community that may be affected. | Highly Desirable |
| Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area. | The surrounding landscapes are exclusively used for agricultural purposes, with the R56 provincial road passing the property to the east. The proposed project will be developed in co-operation with the landowner and create eight employment opportunities. The project will be of temporary nature and although it will add visual-, air- and noise impacts to the surroundings it is believed that these impacts can be mitigated to an acceptable level. The socio-economic benefit of mining the sand as a material source for the local industry is however of substantial importance. Upon closure the mining footprint will be rehabilitated, and the area left in an acceptable manner for the landowner to continue the use of the area. | Highly Desirable |

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

The proposed site (Site Alternative 1) was identified as the preferred site alternative based on the following:

- ∞ The ABSA allows for the mining of this area provided that the proposed mitigation measures are implemented.
- ∞ Site alternative 1 will not encroach onto or affect any wetlands and stockpiling of the sand outside the proposed 10 m buffer zone will minimise the potential of increased sedimentation of the river.
- ∞ The proposed mining area is outside the servitude of the adjacent power line and will therefore not have an impact on the electrical infrastructure.
- ∞ Mining of the sand resource can take place without disturbing the cultivation of the adjacent fields of the landowner.
- ∞ The Tsitsa River annually replenishes the sand deposit and reinstates the riverbed, thereby eliminating any residual impact that the sand mining activity may have on the flow of the river, or visual characteristics of the receiving and/or surrounding environment.
- ∞ Mining of the sand resource will bring about the clearing of the alien vegetation from the riverbank (within the approved footprint). Invader plant management will also be implemented for the duration of the proposed activity, and upon closure the area will be rehabilitated with indigenous vegetation.
- ∞ Access to the proposed mining area is possible via the existing farm road with a formal (existing) entrance onto the R56.
- ∞ The quality of the sand, in the earmarked area, complies with the requirements of the Applicant's clients and/or contracts.

The environmental impact assessment process assessed the feasibility of the proposed site alternative to identify fatal flaws that are deemed as severe as to prevent the activity continuing or warrant another site or project alternative. The outcome of the assessment showed that should the mitigation measures and monitoring programmes proposed in this document be implemented, no fatal flaws could be identified that prevents the activity continuing. Considering the above, the mining proposal was updated to incorporate the project related mitigation measures and monitoring programmes identified during the assessment process. The preferred development footprint was subsequently finalized and is depicted on the attached site activities plan (Appendix C).

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.

i) Details of the development footprint alternatives considered.

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

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

1. SITE ALTERNATIVE

During the planning phase the project team considered two alternative site positions (as discussed below), however, Site Alternative 1 was subsequently identified as the preferred site that will have the least impact on the receiving environment.

Site Alternative 1 (Preferred Site Alternative):

Site Alternative 1 (S1) entails the mining of a 1.16 ha area within the GPS coordinates as listed in the table below and depicted in Figure 2 above.

Table 6: GPS Coordinates of Site Alternative 1 (preferred site alternative)

| NUMBER | DEGREES, MINUTES, SECONDS | | DECIMAL DEGREES | |
|--------|---------------------------|--------------|-----------------|------------|
| | LAT (S) | LONG (E) | LAT (S) | LONG (E) |
| A | 30°56'44.87" | 28°26'29.75" | -30.945797° | 28.441596° |
| B | 30°56'43.56" | 28°26'30.43" | -30.945433° | 28.441785° |
| C | 30°56'42.76" | 28°26'30.65" | -30.945211° | 28.441846° |
| D | 30°56'42.61" | 28°26'30.76" | -30.945170° | 28.441877° |
| E | 30°56'41.54" | 28°26'31.27" | -30.944871° | 28.442020° |
| F | 30°56'40.51" | 28°26'32.08" | -30.944585° | 28.442245° |
| G | 30°56'39.88" | 28°26'32.94" | -30.944411° | 28.442483° |
| H | 30°56'39.63" | 28°26'34.32" | -30.944341° | 28.442868° |
| I | 30°56'39.57" | 28°26'35.26" | -30.944325° | 28.443128° |
| J | 30°56'39.73" | 28°26'36.75" | -30.944369° | 28.443542° |
| K | 30°56'39.81" | 28°26'39.07" | -30.944391° | 28.444187° |

| NUMBER | DEGREES, MINUTES, SECONDS | | DECIMAL DEGREES | |
|--------|---------------------------|--------------|-----------------|------------|
| | LAT (S) | LONG (E) | LAT (S) | LONG (E) |
| L | 30°56'39.97" | 28°26'39.70" | -30.944436° | 28.444360° |
| M | 30°56'40.39" | 28°26'40.88" | -30.944552° | 28.444690° |
| N | 30°56'40.38" | 28°26'41.07" | -30.944549° | 28.444743° |
| P | 30°56'40.55" | 28°26'41.64" | -30.944597° | 28.444900° |
| Q | 30°56'40.78" | 28°26'42.10" | -30.944662° | 28.445028° |
| R | 30°56'42.30" | 28°26'44.06" | -30.945083° | 28.445571° |
| S | 30°56'42.84" | 28°26'45.20" | -30.945232° | 28.445889° |
| T | 30°56'42.95" | 28°26'45.64" | -30.945263° | 28.446010° |
| U | 30°56'43.91" | 28°26'47.30" | -30.945530° | 28.446471° |
| V | 30°56'44.56" | 28°26'46.95" | -30.945710° | 28.446375° |
| W | 30°56'44.52" | 28°26'46.53" | -30.945701° | 28.446259° |
| X | 30°56'44.16" | 28°26'45.94" | -30.945599° | 28.446094° |
| Y | 30°56'43.82" | 28°26'45.49" | -30.945506° | 28.445970° |
| Z | 30°56'43.14" | 28°26'44.67" | -30.945316° | 28.445742° |
| aa | 30°56'41.90" | 28°26'42.81" | -30.944972° | 28.445224° |
| bb | 30°56'41.11" | 28°26'41.76" | -30.944754° | 28.444933° |
| cc | 30°56'40.60" | 28°26'40.43" | -30.944612° | 28.444563° |
| dd | 30°56'40.24" | 28°26'39.26" | -30.944512° | 28.444239° |
| ee | 30°56'40.25" | 28°26'37.78" | -30.944514° | 28.443828° |
| ff | 30°56'40.57" | 28°26'35.57" | -30.944603° | 28.443213° |
| gg | 30°56'40.83" | 28°26'33.81" | -30.944675° | 28.442726° |
| hh | 30°56'41.34" | 28°26'32.67" | -30.944818° | 28.442408° |
| ii | 30°56'42.68" | 28°26'31.54" | -30.945188° | 28.442094° |
| jj | 30°56'45.14" | 28°26'30.22" | -30.945872° | 28.441728° |
| kk | 30°56'45.00" | 28°26'29.98" | -30.945832° | 28.441660° |

Site Alternative 1 was identified during the assessment phase of the environmental impact assessment, by the Applicant and project team, as the **preferred site alternative** due to the following:

- ∞ The ABSA allows for the mining of this area provided that the proposed mitigation measures are implemented.
- ∞ Site alternative 1 will not encroach onto or affect any wetlands and stockpiling of the sand outside the proposed 10 m buffer zone will minimise the potential of increased sedimentation of the river.
- ∞ The proposed mining area is outside the servitude of the adjacent power line and will therefore not have an impact on the electrical infrastructure.
- ∞ Mining of the sand resource can take place without disturbing the cultivation of the adjacent fields of the landowner.
- ∞ The Tsitsa River annually replenishes the sand deposit and reinstates the riverbed, thereby eliminating any residual impact that the sand mining activity may have on the flow of the river, or visual characteristics of the receiving and/or surrounding environment.
- ∞ Mining of the sand resource will bring about the clearing of the alien vegetation from the riverbank (within the approved footprint). Invader plant management will also be implemented for the duration of the proposed activity, and upon closure the area will be rehabilitated with indigenous vegetation.
- ∞ Access to the proposed mining area is possible via the existing farm road with a formal (existing) entrance onto the R56.
- ∞ The quality of the sand, in the earmarked area, complies with the requirements of the Applicant's clients and/or contracts.

Site Alternative 2:

Site Alternative 2 (S2) entails the development of the proposed sand mine (1.5 ha) within the GPS coordinates as listed in the following table and figure.

Table 7: GPS Coordinates of Site Alternative 2

| NUMBER | DEGREES, MINUTES, SECONDS | | DECIMAL DEGREES | |
|--------|---------------------------|--------------|-----------------|------------|
| | LAT (S) | LONG (E) | LAT (S) | LONG (E) |
| A | 30°56'54.10" | 28°26'16.81" | -30.948360° | 28.438002° |
| B | 30°56'53.87" | 28°26'19.40" | -30.948297° | 28.438724° |
| C | 30°56'54.44" | 28°26'24.65" | -30.948457° | 28.440180° |
| D | 30°56'54.50" | 28°26'25.92" | -30.948472° | 28.440533° |
| E | 30°56'54.24" | 28°26'27.14" | -30.948401° | 28.440873° |
| F | 30°56'53.89" | 28°26'28.02" | -30.948304° | 28.441116° |
| G | 30°56'53.32" | 28°26'28.42" | -30.948146° | 28.441228° |
| H | 30°56'52.69" | 28°26'28.49" | -30.947969° | 28.441248° |
| J | 30°56'52.30" | 28°26'28.35" | -30.947862° | 28.441208° |
| K | 30°56'49.96" | 28°26'28.24" | -30.947211° | 28.441177° |
| L | 30°56'50.17" | 28°26'29.47" | -30.947269° | 28.441519° |
| M | 30°56'54.00" | 28°26'29.48" | -30.948334° | 28.441523° |
| N | 30°56'55.12" | 28°26'28.60" | -30.948643° | 28.441278° |
| P | 30°56'55.61" | 28°26'24.58" | -30.948779° | 28.440161° |
| Q | 30°56'55.02" | 28°26'20.03" | -30.948618° | 28.438896° |
| R | 30°56'55.17" | 28°26'17.29" | -30.948658° | 28.438137° |



Figure 4: Satellite view showing the position of Site Alternative 2 (orange polygon) in relation to the property boundaries (white lines). (Image obtained from Google Earth).

Site Alternative 2 was considered during the assessment phase of the environmental impact assessment, by the Applicant and project team, but were **not deemed the preferred site alternative** due to the following:

- ∞ The ABSA considered the possibility of mining sand from this area, however, S2 was rejected as a viable option as this alternative will encroach onto a seep wetland (see Figure 12) and impact a tributary and various drainage lines in addition to the Tsitsa River. The significance of mining sand from S2 is unacceptably high if compared to S1 that will not affect any wetlands, tributaries, and/or drainage lines.
- ∞ The Applicant also rejected this site due to the various drainage lines crossing into the area, and the highly invaded riverine bush (exotic) that would need to be cleared before mining of the riverbank is possible.

Although the position of S2 will still allow the mining of sand from the river, it is believed that the impacts associated with this site alternative will be unacceptably high, and the management measures that will be required are too extensive without the need or motivation justifying it.

2. ACTIVITY ALTERNATIVE

No other activity alternative exists that would meet the need and desirability of the Applicant other than the No-go Alternative which would be to retain the site as an undeveloped area. This would, however, not address the sand need identified in the area. As such no alternative activities have been considered.

3. LAYOUT ALTERNATIVE

Due to the nature of the proposed activity and the fact that no infrastructure will be established on site, the layout of the earmarked footprint is of no real consequence. The use of the earmarked area will require the clearance of the vegetation cover from the greater part of the footprint to allow access to the sand. The stockpiles will be placed at the most practical location (>10 m from the riverbank). Refer to Appendix C for a copy of the Site Activities Plan. No alternative layouts have been considered further.

4. NO-GO ALTERNATIVE

The no-go alternative entails no change to the *status quo* and is therefore a real alternative that must be considered. The sand to be mined from the riverbed and - bank will be sold to the building, road rehabilitation/maintenance and associated construction industry. If however, the no-go alternative is implemented:

- ∩ the Applicant cannot utilise the mineral resource of the property;
- ∩ the proposed employment opportunities will be lost;
- ∩ the Maclear/Nqanqarhu and Mt Fletcher people/businesses, in need of sand will have to transport it from other sources that will affect product pricing;
- ∩ the landowner will not receive compensation from the Applicant, and in doing so diversity the income generated from the property;

Considering this, the no-go alternative was no deemed the preferred alternative.

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.

The Applicant entered into a land use agreement (see Appendix F) with the landowner who in principle supports the project. English and isiXhosa site notices were placed at

the entrance onto the farm from the R56, and the Maclear/Nqanqarhu Library on 02 December 2022. The project was advertised (English and isiXhosa) in The Reporter (02 December 2022), and isiXhosa flyers explaining the project were distributed in the Mt Fletcher and Taung communities. Stakeholders and I&AP's were informed of the project with notification letters that was emailed directly to them. The commenting period for perusal of the documentation and submission of comments ends 24 January 2023. The DBAR will also be distributed for a 30-days commenting period, ending on 31 January 2023. Any comments received during the initial public participation period (02 December 2022 – 24 January 2023) and/or the DBAR (09 December 2022 – 31 January 2023) will be incorporated into the final BAR to be submitted to the DMRE for decision making. The following I&AP's and stakeholders were thus far informed of the project:

Table 8: List of the I&AP's and stakeholders that were notified of this application.

| SURROUNDING LANDOWNERS & INTERESTED AND AFFECTED PARTIES | STAKEHOLDERS |
|---|--|
| <p><u>Landowner:</u></p> <p>☞ Mr D Sambamba Niagara No 380</p> <p><u>Surrounding landowners & lawful occupiers:</u></p> <p>☞ Mt Fletcher Community (care of the ward councillors) Farm No 222</p> <p>☞ Taung Community (care of the chief and chairman) Farm No 214</p> <p>☞ Republic of South Africa (care of DPWI) Webster Drift Trading Site-A 9 Ebden Police Reserve No 96 Tsitsa No 94 Portion 1 of Tsitsa No 94</p> <p>☞ Mr GJM Mvengo Ebden No 97</p> <p>☞ Goeiehoop Farming (Pty) Ltd Farm No 381</p> | <p>☞ Department of Economic Development, Environmental Affairs and Tourism (Queenstown & East London offices);</p> <p>☞ Department of Labour;</p> <p>☞ Department of Public Works and Infrastructure;</p> <p>☞ Department of Rural Development and Agrarian Reform (Bisho & East London offices);</p> <p>☞ Department of Transport;</p> <p>☞ Department of Water and Sanitation;</p> <p>☞ Elundini Local Municipality;</p> <p>☞ Elundini Local Municipality Ward 16;</p> <p>☞ Elundini Local Municipality Ward 17;</p> <p>☞ Eskom;</p> <p>☞ Eastern Cape Parks and Tourism Agency (ECPTA);</p> <p>☞ Joe Gqabi District Municipality;</p> <p>☞ South African Heritage Resources Agency.</p> |

iii) Summary of issues raised by I&APs

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

Table 9: Summary of issues raised by IAPs

| Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted | | Date Comments Received | Issues raised | EAPs response to issues as mandated by the applicant | Section and paragraph reference in this report where the issues and or response were incorporated. |
|--|---|------------------------------|--|--|--|
| AFFECTED PARTIES | X | - | - | - | - |
| Landowner/s | | - | - | - | - |
| Mr D Sambamba ☞ Niagara No 380 | X | | Mr Sambamba supports the application and signed a land use agreement with the applicant (refer to Appendix F). | | |
| Lawful occupier/s of the land | | - | - | - | - |
| N/A | | N/A | N/A | N/A | |
| Landowners or lawful occupiers on adjacent properties | X | - | - | - | - |
| Mt Fletcher Community (care of the ward councillors) ☞ Farm No 222 | X | | Any comments received on the project will be incorporated into the final BAR. | | |
| Taung Community (care of the chief and chairman) ☞ Farm No 214 | X | | Any comments received on the project will be incorporated into the final BAR. | | |
| Republic of South Africa (care of DPWI) ☞ Webster Drift Trading Site-A 9; ☞ Ebden Police Reserve No 96; ☞ Tsitsa No 94; and ☞ Portion 1 of Tsitsa No 94. | X | | Any comments received on the project will be incorporated into the final BAR. | | |
| Mr GJM Mvengo ☞ Ebden No 97 | X | | Any comments received on the project will be incorporated into the final BAR. | | |

| Interested and Affected Parties List the name 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. |
|---|--|---|---|---|
| Goeiehoop Farming (Pty) Ltd 3 Farm No 381 | X | Any comments received on the project will be incorporated into the final BAR. | | |
| Municipal councillor | | - | - | - |
| Cllr. M Masiso (Ward 16) | X | Any comments received on the project will be incorporated into the final BAR. | | |
| Cllr. D Mfono (Ward 17) | X | Any comments received on the project will be incorporated into the final BAR. | | |
| Municipality | | | | |
| Elundini Local Municipality (ELM) | X | Any comments received on the project will be incorporated into the final BAR. | | |
| Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA e | | | | |
| Department of Transport (DoT) | X | Any comments received on the project will be incorporated into the final BAR. | | |
| Eskom | X | Any comments received on the project will be incorporated into the final BAR. | | |
| Department of Water and Sanitation | X | Any comments received on the project will be incorporated into the final BAR. | | |
| Communities | Refer to <i>landowners or lawful occupiers on adjacent properties.</i> | | | |
| Dept. Land Affairs | X | Any comments received on the project will be incorporated into the final BAR. | | |

| Interested and Affected Parties | | 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. |
|--|-----|---|----------------------|---|---|
| List the name of persons consulted in this column, and | | | | | |
| Mark with an X where those who must be consulted were in fact consulted | | | | | |
| Traditional Leaders | N/A | - | - | - | - |
| Dept. Environmental Affairs | | - | - | - | - |
| Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) | X | Any comments received on the project will be incorporated into the final BAR. | | | |
| Other Competent Authorities affected | | | | | |
| Department of Labour | X | Any comments received on the project will be incorporated into the final BAR. | | | |
| Department of Public Works | X | Any comments received on the project will be incorporated into the final BAR. | | | |
| Department of Rural Development and Agrarian Reform (Bisho) | X | Any comments received on the project will be incorporated into the final BAR. | | | |
| Department of Rural Development and Agrarian Reform (East London) | X | Any comments received on the project will be incorporated into the final BAR. | | | |
| Joe Gqabi District Municipality | X | Any comments received on the project will be incorporated into the final BAR. | | | |
| South African Heritage Resources Agency (SAHRA) | X | Any comments received on the project will be incorporated into the final BAR. | | | |
| <u>OTHER AFFECTED PARTIES</u> | | - | - | - | - |
| N/A | | - | - | - | - |
| <u>INTERESTED PARTIES</u> | | - | - | - | - |
| N/A | | - | - | - | - |

iv) The Environmental attributes associated with the alternatives.

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

(1) Baseline Environment

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

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

This section describes the biophysical, cultural, and socio-economic environment that may be affected and the baseline conditions, which are likely to be affected by the proposed mining activity.

PHYSICAL ENVIRONMENT

CLIMATE

The following chart shows the maximum, minimum and average temperatures (21°C daytime, 15°C night-time) of the Maclear/Nqanqarhu region. Maclear/Nqanqarhu experiences its highest temperatures during the summer months from November – March with peaks of up to 28°C; thereafter the mercury drops to as low as 2°C during June/July.

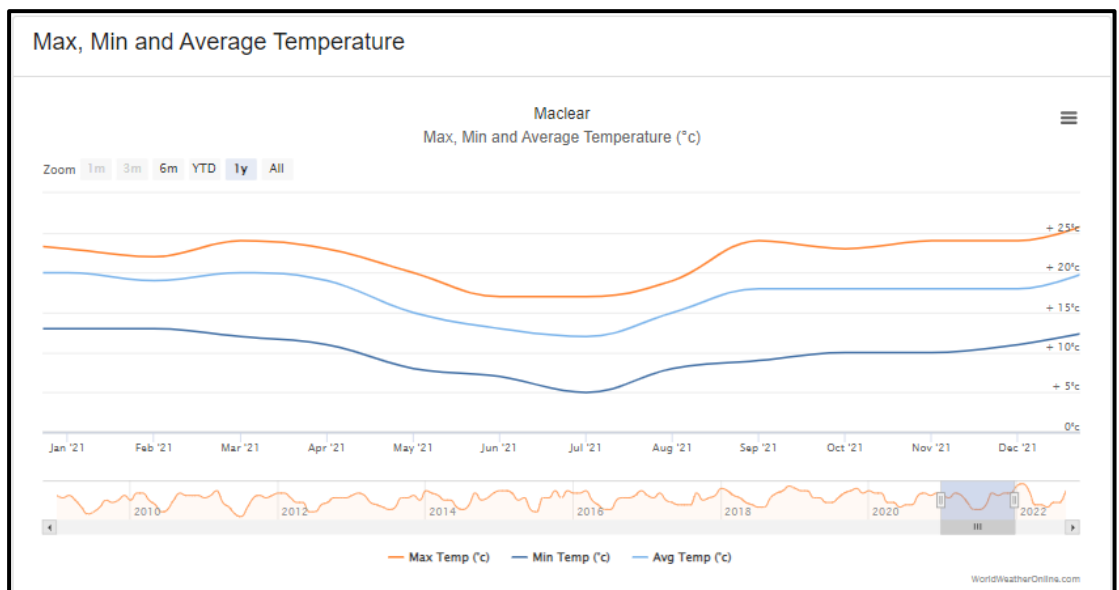


Figure 5: Maximum, minimum, and average temperature of the Maclear/Nqanqarhu region for 2021 (chart obtained from <http://www.worldweatheronline.com>).

The following chart obtained from World Weather Online shows that the measured rainfall average for 2021 was ±1 079 mm, while the area received the lowest rainfall during the months of May and July and the highest during the summer (January - March).

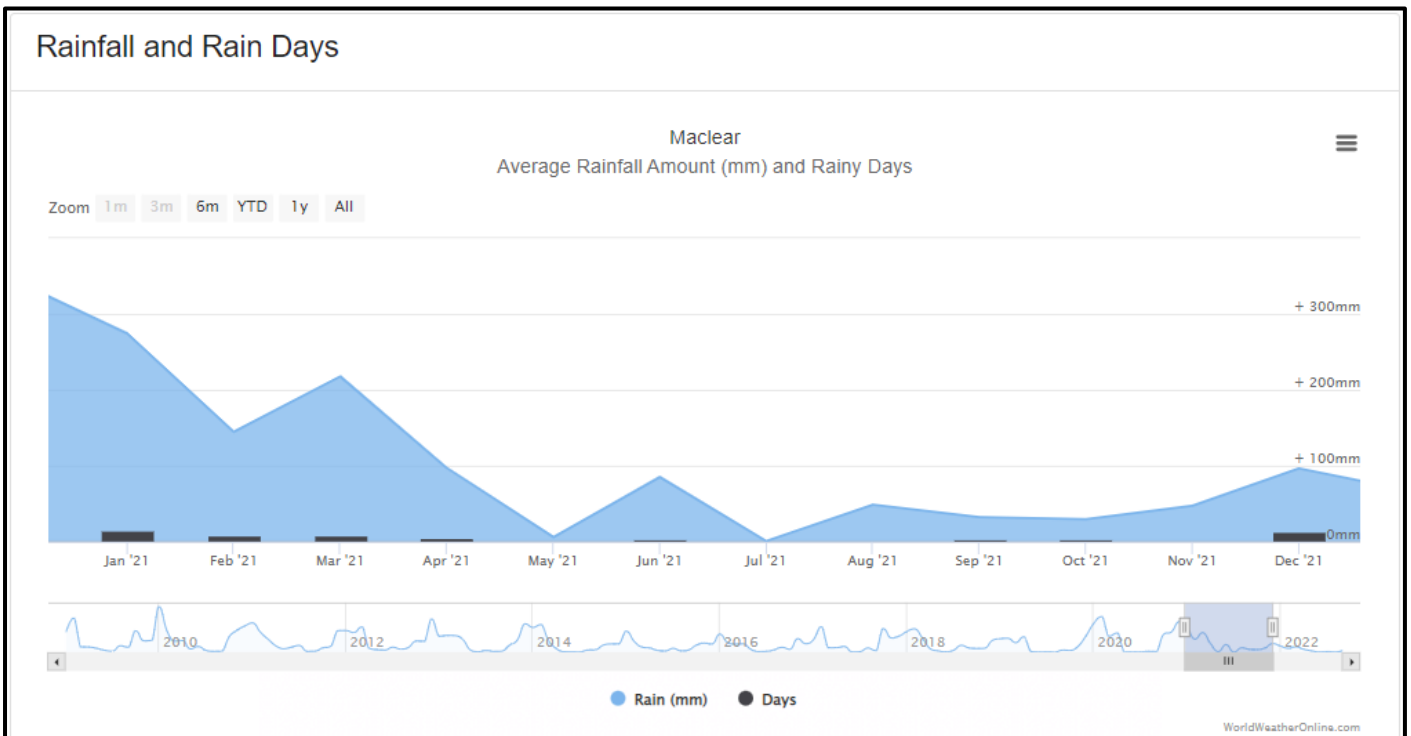


Figure 6: Average rainfall amount and rainy days count for the Maclear/Nqanqarhu region (chart obtained from <http://www.worldweatheronline.com>)

TOPOGRAPHY

The topography of the greater study area is known as hilly country with slopes covered by grassland in places, and patches of bush clumps (Mucina and Rutherford, 2012). The area has elevations generally ranging between 1 218 – 1 328 mamsl.

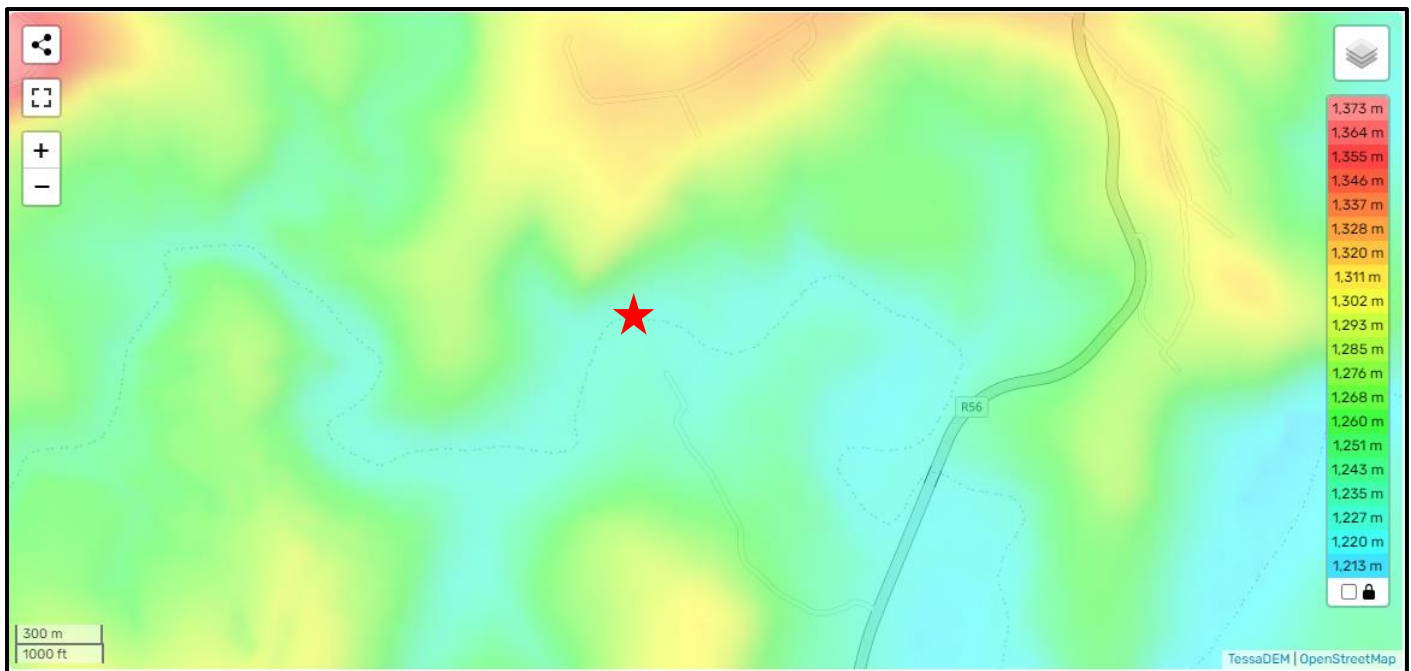


Figure 7: Map showing the topography of the greater Maclear/Nqanqarhu area where the red star indicates the application area (image obtained from <http://www.en-za.topographic-map.com/map-6m7zs/South-Africa/?centre=-30.94504%2C28.44579&zoom=15>).

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

VISUAL CHARACTERISTICS

The visual character of the surrounding areas mainly comprises of an agricultural setting, intersected by Wattle plantations, and occasional small scale sand mining from the river and/or -bank. The aesthetic ambiance of the study area is that of a rural area with highly natural landscapes.

AIR AND NOISE QUALITY

The air quality of the study area is generally very good given the area's predominant agricultural use and rural character. Likewise, the noise ambiance is very low (classified as ambient rural / pastoral) with noise levels mainly affected by traffic along the R56, and the farming equipment operational in the surrounding environment.

GEOLOGY AND SOIL

(Information obtained from the Palaeontological Impact Assessment attached as Appendix H)

The Palaeontological Impact Assessment (PIA) reports that the greater study area lies in the central part of the Karoo basin where the upper Karoo Supergroup strata are exposed. Along the rivers and streams much younger reworked sands and alluvium overly the older strata.

The Karoo Supergroup rocks cover a very large proportion of South Africa and extend from the northeast (east of Pretoria) to the southwest and across to almost the KwaZulu-Natal south coast. It is bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks.

The basal Dwyka Group comprises diamictites, tillites and shales that were deposited by the receding glaciers and ice sheets. Then the Ecca Group shales and mudstones represent the gradual infilling of the Karoo Basin and in the northeast, they include several coal seams. As the basin continued to fill and the environment slowly dried out the Beaufort Group sandstones and mudstones were deposited. Finally, the much reduced basin filled with Stormberg Group sediments that were capped by the massive outpourings of basalt, the Drakensberg Group. Associated with the basalt outpourings are numerous intrusive dolerite dykes of Jurassic age.

Stormberg Group rocks are absent from the western part of the basin but are more uniform across the central and eastern part of the basin. The Stormberg Group formations are the lower Molteno Formation shales, the Elliot Formation that has recently been divided into the lower and upper Elliot Formation, and the upper Clarens Formation. Most of the rocks are covered by much younger sands and soils that have formed by the weathering of the old shales and sandstones.

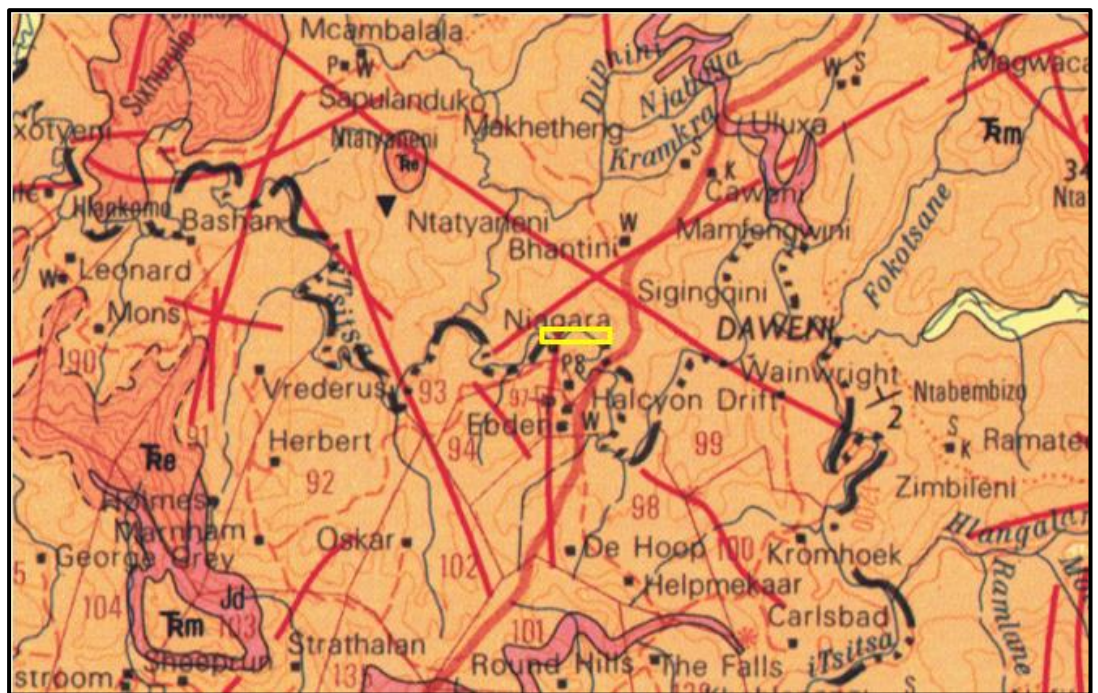


Figure 8: Geological map of the area around the Farm Niagara 380 and the Tsitsa River shown within the yellow outline. Abbreviations of the rock types are explained in the following table (map obtained from the PIA).

Table 10: Explanation of symbols for the geological map and approximate ages (Johnson et al., 2006; Partridge et al., 2006). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project

| SYMBOL | GROUP/FORMATION | LITHOLOGY | APPROXIMATE AGE |
|---------|---------------------------------------|---|----------------------------------|
| (white) | Recent | Alluvium and debris | Last few millennia |
| Q | Quaternary | Alluvium, sand, calcrete | Quaternary, ca 1.0 Ma to present |
| Jd | Jurassic dykes | Dolerite dykes, intrusive | Jurassic, approx. 183 Ma |
| Tre | Elliot Fm, Stormberg Group, Karoo SG | Red to grey mudstone, siltstone | Triassic-Jurassic Ca 219-192 Ma |
| Trm | Molteno Fm, Stormberg Group, Karoo SG | Mudstone, buff-coloured shale, sandstone, rare coal seams | Late Triassic Ca 242 – 219 Ma |

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

HYDROLOGY

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

The project area falls within the T35D quaternary catchment within the Mzimvubu-Tsitsikama Water Management Area (WMA 7) and the South Eastern Uplands – Upper aquatic ecoregion. The watercourse associated with the proposed sand mining project is within the T35D-5721-iTsitsa Sub Quaternary Reach (SQR) of the Tsitsa River.

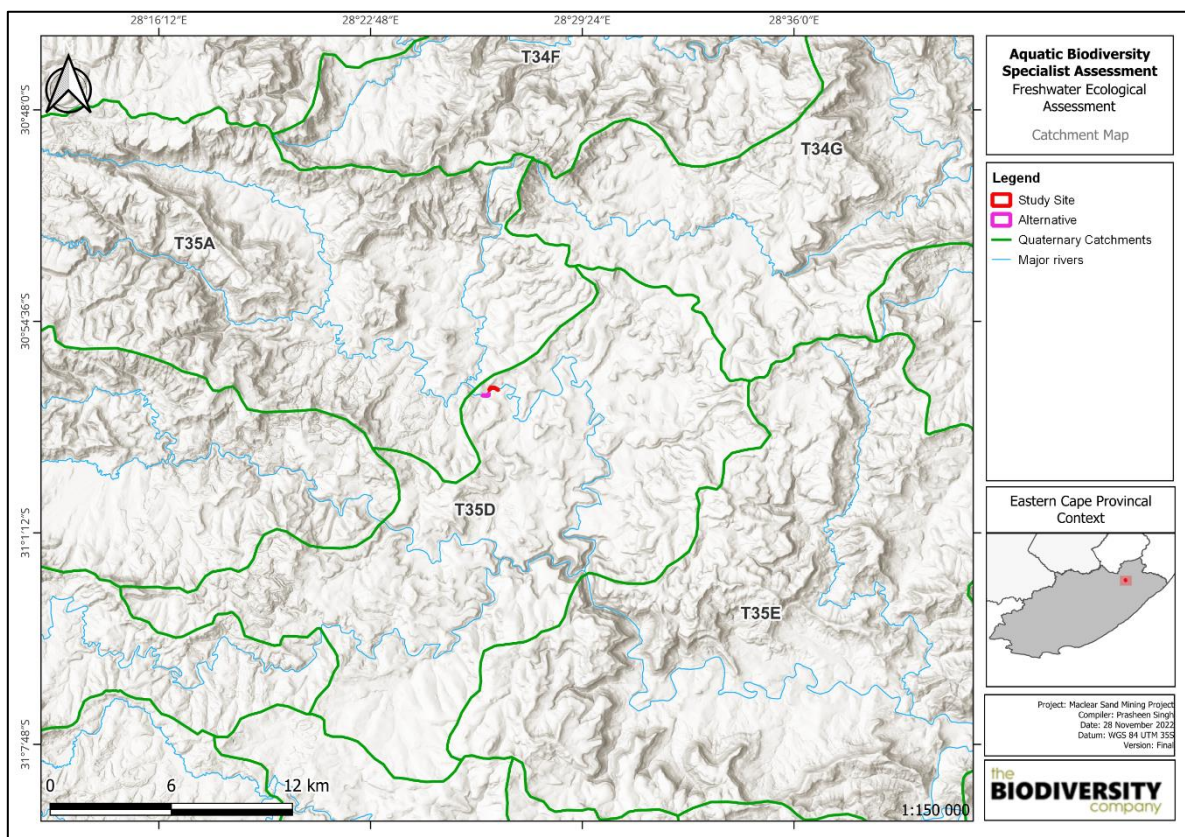


Figure 9: Map showing the location of the project area in relation to the quaternary catchments (map obtained from the ABSA)

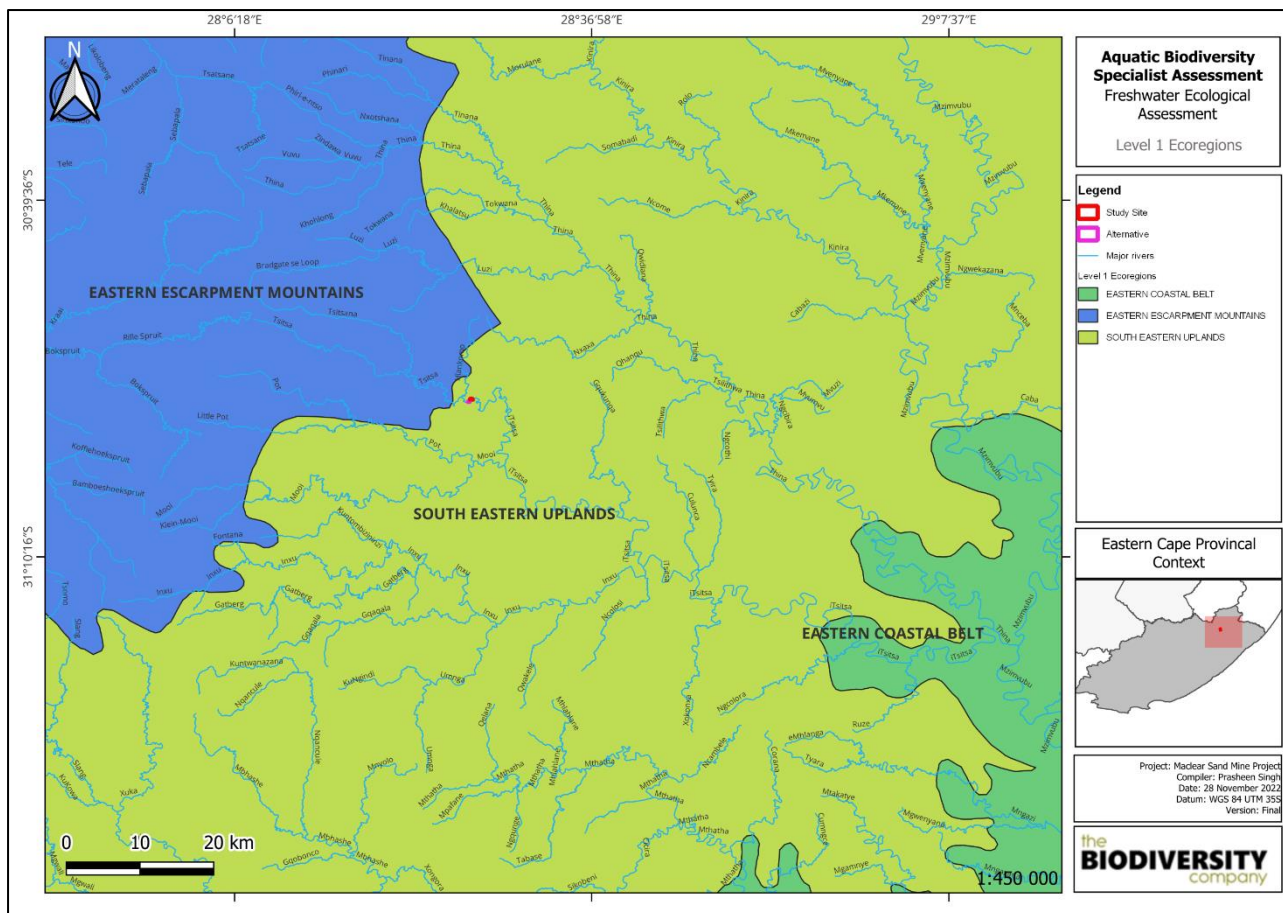


Figure 10: Map showing the location of the project area in relation to the Level 1 Ecoregions (map obtained from the ABSA)

The system at a desktop level is regarded as largely natural (Class B) by the Department of Water and Sanitation (DWS, 2014) due to the presence of commercial farms, alien riparian vegetation, degraded grasslands, forestry, rural settlements, and extensive dryland cultivation.

The Present Ecological Status (PES) category of the reach is classed at a desktop level as largely natural (class B) (following table). The largely natural state of the reach is attributed to a small impact on wetland and riparian zone continuity, wetland and riparian zone modifications, flow modifications and potential impacts on physico-chemical (water quality) conditions. No instream habitat continuity modifications and potential instream habitat modification activities (DWS, 2014).

Table 11: Present Ecological Status of the T35D-5721-iTsitsa at desktop level

| Present Ecological State | Ecological Importance | Ecological Sensitivity |
|--|-----------------------|------------------------|
| B (Largely Natural) | High | High |
| Anthropogenic Impacts | | |
| Habitat & continuity (fish): Commercial farms; alien riparian vegetation. Riparian/wetland zone & continuity: Degraded grasslands; forestry; rural settlements. Physico-chemical: Settlements; erosion; extensive dryland cultivation. | | |

The T35D-5721-iTsitsa has no national freshwater ecosystem priority area (NFEPA) designated to it (following figure). The Tsitsa River forms an important upstream management area.

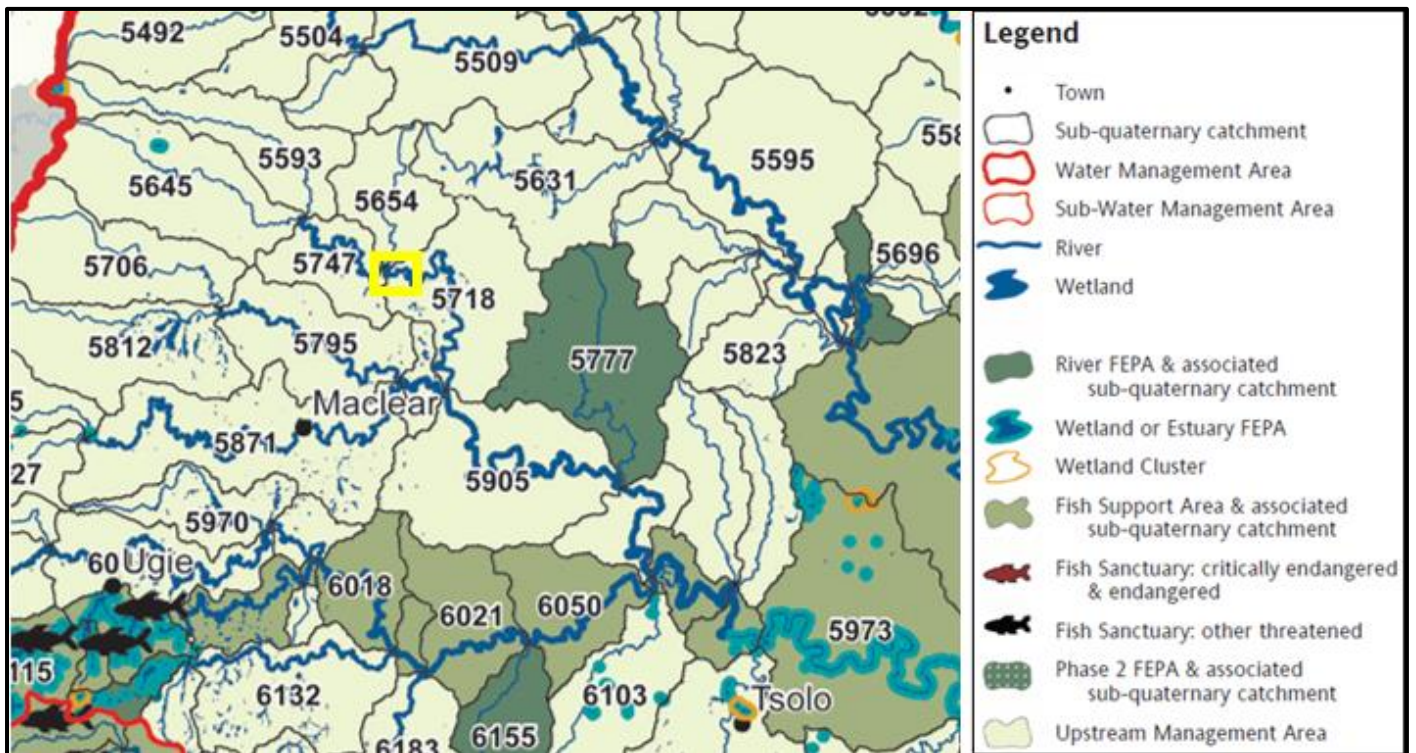


Figure 11: Map showing the NFEPA's for the project area (yellow square). (Image obtained from the ABSA)

National Wetland Map 5 of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) includes wetlands and estuaries, associated with river line data and many other data sets within the SAIIAE (2018). According to SAIIAE dataset, a single wetland was identified as a river (Tsitsa River) (following figure). There are also seepage wetlands to the south of the mining area and alternative sites. Site Alternative 2 will encroach on a seep wetland whilst the proposed mining area (S1) does not pose a risk to the proximal seep zone, as the latter is drains into the Tsitsa River. The focus of this study is on the proposed mining area. Owing to this fact no further ecological assessment of the wetland has been completed for this project, with emphasis rather afforded to the aquatic assessment of the Tsitsa River possibly at risk because of the proposed project.

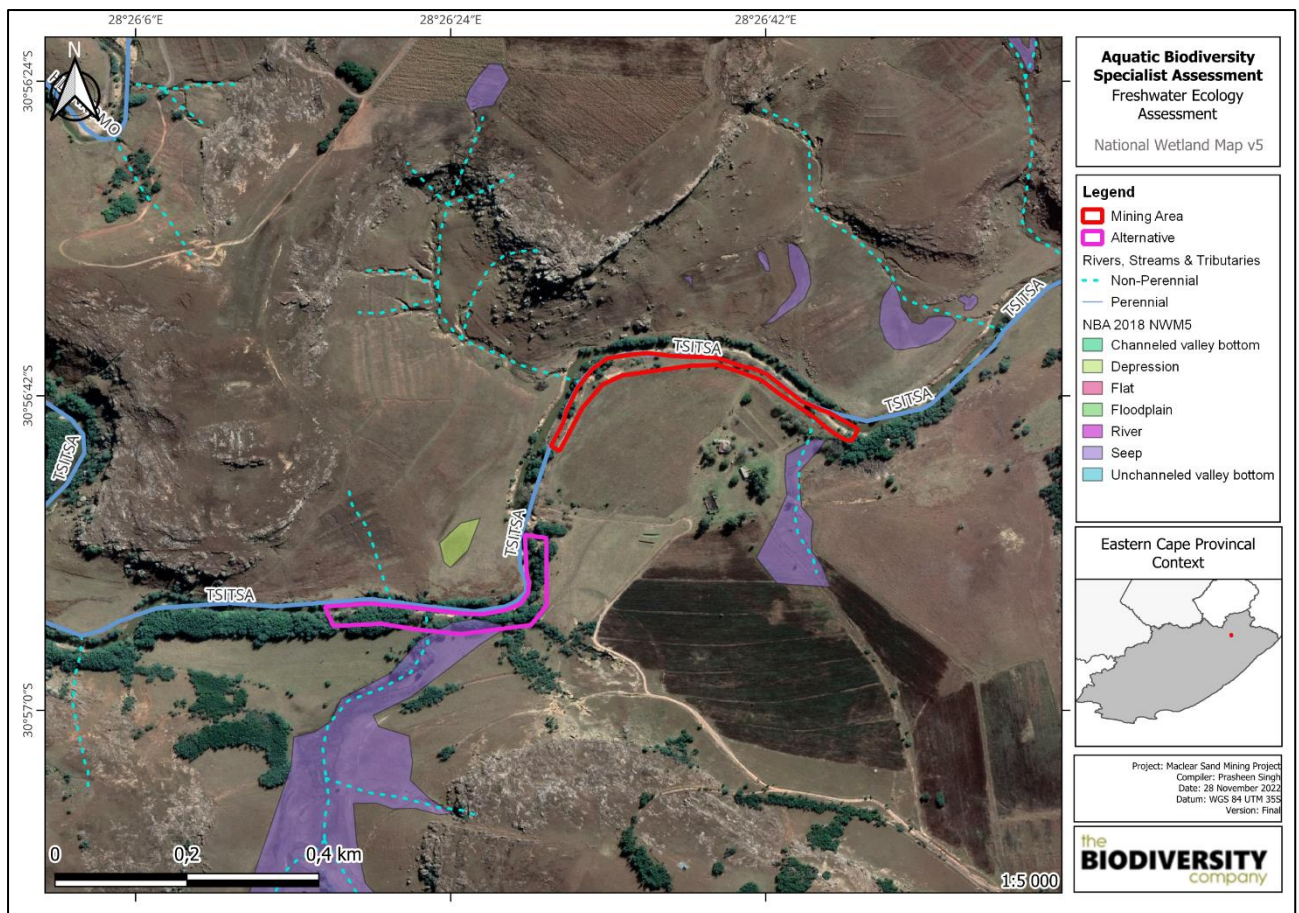


Figure 12: Map of the SAIIAE wetlands within the project area. (Image obtained from the ABSA)

The Eastern Cape Biodiversity Conservation Plan (ECBCP, 2019) for the freshwater biodiversity assessment of the Eastern Cape Province classifies areas within the province based on their contribution to reaching the conservation targets within the province. These areas are classified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). The CBAs are classified as either 'CBA1' (Irreplaceable and must be maintained in a natural state, if disturbed then biodiversity targets will not be achieved), or 'CBA2' (maintain in a natural or near-natural state, some flexibility in landscape to achieve biodiversity targets).

The following figure illustrates the project area superimposed on the CBA map. The project area does overlaps with CBA2 and ESA1 areas.

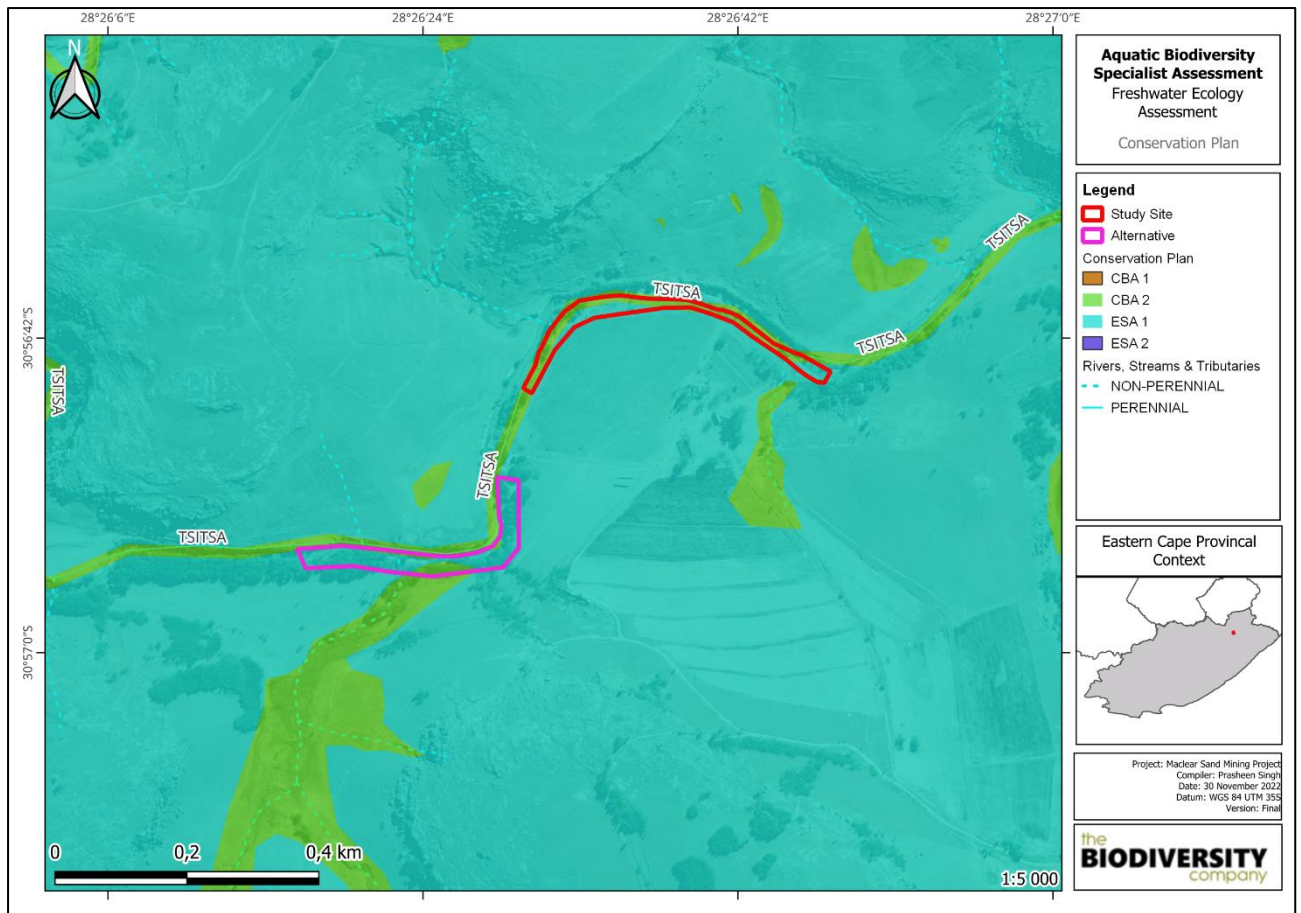


Figure 13: Map illustrating the project area in relation to CBA's and ESA's. (Image obtained from the ABSA)

According to the SAIIE, the Ecosystem Threat Status (ETS) of aquatic ecosystem types is based on the extent to which each aquatic ecosystem type had been altered from its natural condition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Concern (LC), with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer et al., 2019; Skowno et al., 2019) This reach of the Tsitsa River is Critically Endangered and Not Protected (following figures).

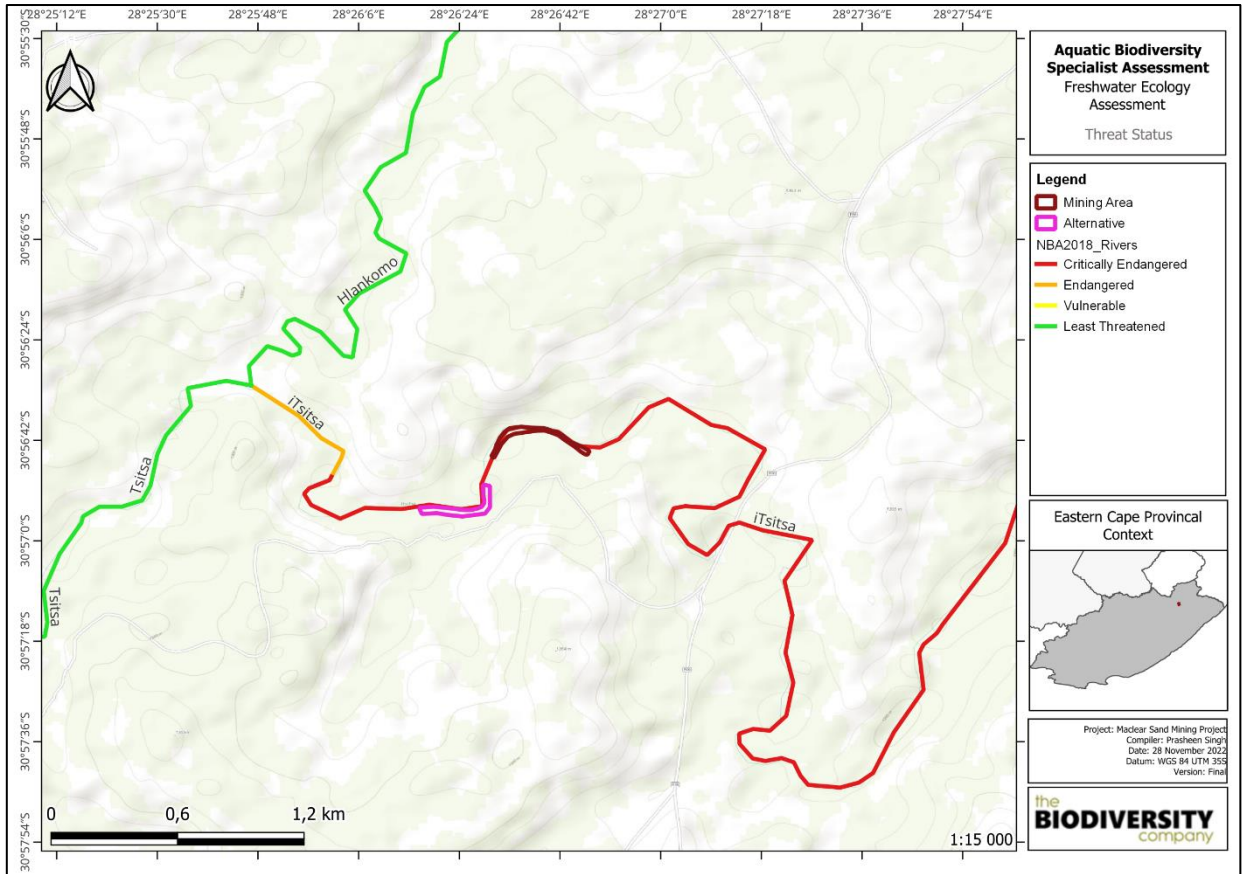


Figure 14: Map illustrating SAIIE riverine Ecosystem Threat Status associated with the project area. (Image obtained from the ABSA)

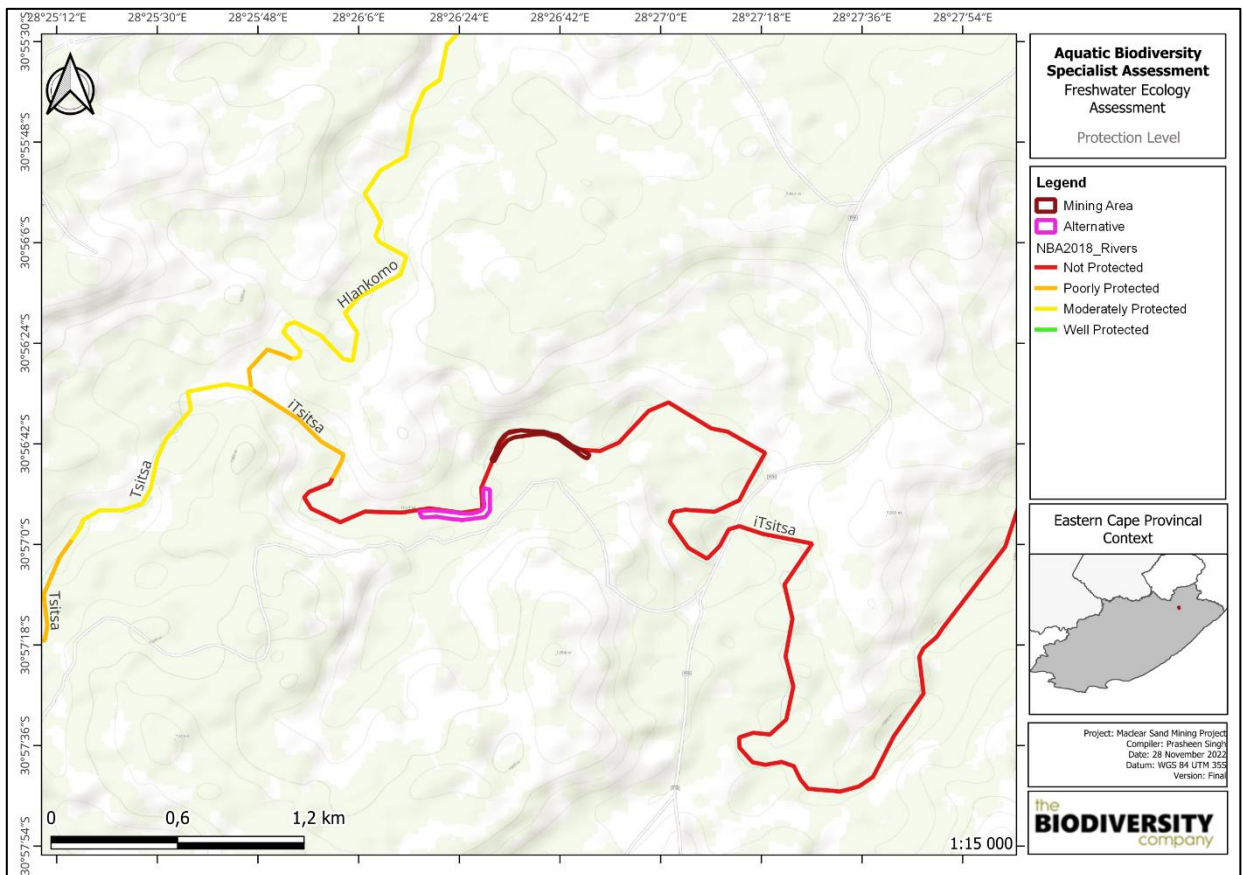


Figure 15: Map illustrating SAIIE riverine Ecosystem Protection Level in proximity to the project area. (Image obtained from the ABSA)

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

BIOLOGICAL ENVIRONMENT

MINING AND BIODIVERSITY

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

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

When the study areas (S1 & S2) are layered over the Mining and Biodiversity Map, as shown in the figures below, it falls over an area of highest biodiversity importance with a corresponding rating of highest risk for mining. The Mining and Biodiversity Guideline's describes areas of highest biodiversity importance as: *"these areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being."* The guideline notes that environmental screening, the EIA and specialists should focus on confirming the presence and significance of biodiversity features and provide a site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making.

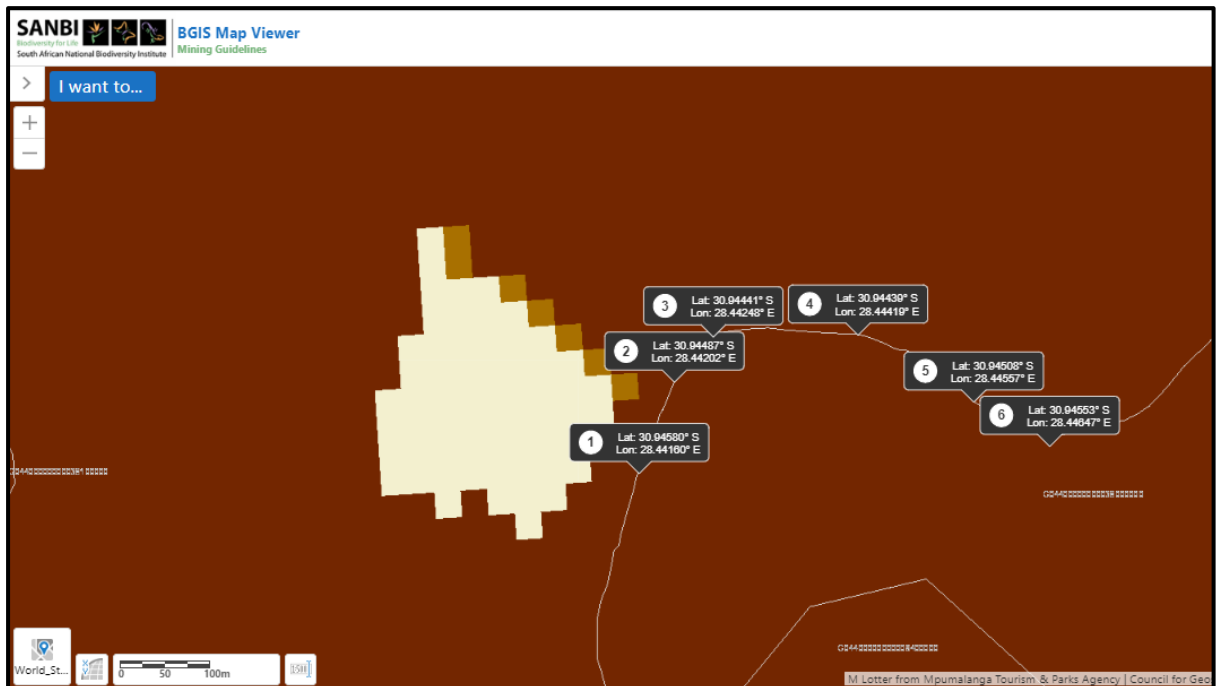


Figure 16: The Mining and Biodiversity importance map with the proposed mining footprint (S1) indicated by the GPS Coordinates. Dark brown – highest biodiversity importance, highest risk for mining,

light brown – high biodiversity Importance, high risk for mining (image obtained from the BGIS Map Viewer – Mining Guidelines).

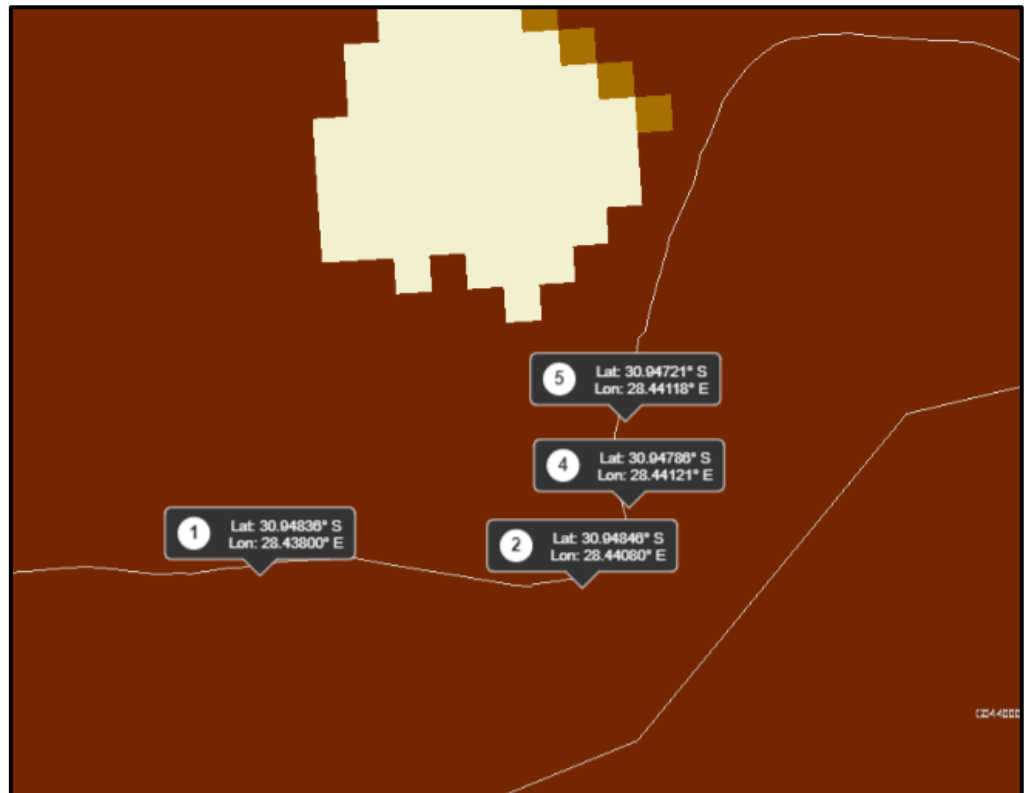


Figure 17: The Mining and Biodiversity importance map with the footprint of S2 indicated by the GPS Coordinates. Dark brown – highest biodiversity importance, highest risk for mining (image obtained from the BGIS Map Viewer – Mining Guidelines).

Also refer to Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover.

BIODIVERSITY CONSERVATION AREAS

As mentioned above the ECBCP shows that the study areas fall within a Freshwater Critical Biodiversity Area (CBA).

The Lexicon of Biodiversity Planning in South Africa provides the following definitions:

- ∞ Critical Biodiversity Area (CBA): “an area that must be maintained in a good ecological condition in order to meet biodiversity targets. CBA’s collectively meet biodiversity targets for all ecosystem types as well as for species and ecological processes that depend on natural or near-natural habitat, that have not already been met in the protected area network.”



Figure 18: Eastern Cape Biodiversity Conservation Plan showing the proposed mining area (S1) (GPS Coordinates) in relation to the Freshwater: CBA (blue shading). The yellow shading indicates a Terrestrial: CBA (Image obtained from BGIS Map Viewer – Eastern Cape Conservation Plan).



Figure 19: Eastern Cape Biodiversity Conservation Plan showing the footprint of S2 (GPS Coordinates) in relation to the Freshwater: CBA (blue shading). The yellow shading indicates a Terrestrial: CBA (Image obtained from BGIS Map Viewer – Eastern Cape Conservation Plan).

According to the ECBCP, the study areas (S1/S2) do not extend across any Terrestrial: CBA's. The study areas (S1 & S2) are also more than 5 km from any NEM:PAA listed private game or nature reserve, or other conservation areas. The nearest National Protected Area Expansion Strategy (NPAES) area to the earmarked sites is the Southern Berg Griqualand NPAES that is ± 7 km to the north-west.

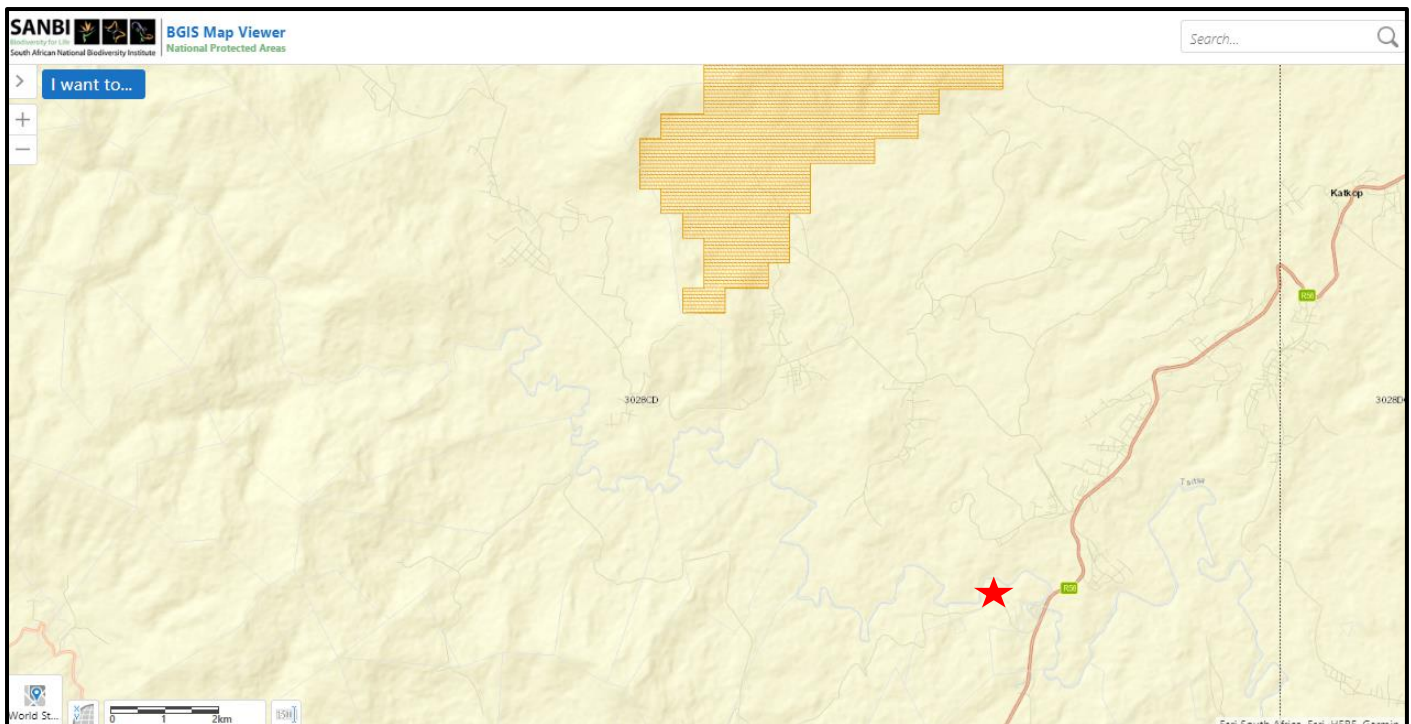


Figure 20: National Protected Areas Map showing the footprint of the Southern Berg Griqualand NPAES area (brown shading) in relation to the study area (red star). (Image obtained from BGIS Map Viewer – National Protected Areas).

Also refer to Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover.

GROUNDCOVER

According to Mucina and Rutherford (2012) the vegetation type of the natural areas is classified as East Griqualand Grassland (Gs12). The vegetation and landscape features of this vegetation type is characterised hilly country with slopes covered by grassland in places, with patches of bush clumps with *Leucosidea sericea* (only wet sites) or *Diospyros lycioides*, *Acacia karroo* and *Ziziphus mucronata* in low-lying and very dry sites.

Some of the important taxa found in this vegetation type include *Alloteropsis semialata* subsp. *eckloniana*, *Aristida congesta*, *A. junciformis* subsp. *galpinii*, *Brachiaria serrata*, *Acanthospermum australe*, *Centella asiatica*, *Conyza podocephala*, *Haplocarpha scaposa*, *Helichrysum herbaceum*, *Anthospermum rigidum* subsp. *pumilum*, *Chaetacanthus setiger*, *Erica caffrorum* var. *caffrorum*, and *Felicia filifolia* subsp. *filifolia*.

The vegetation type is classified as Vulnerable and according to Mucina and Rutherford (2012) only 0.2% of the unit is conserved in statutory or private conservation areas. More than 25% of the vegetation type has already undergone

transformation for cultivation (maize), plantations and by urban sprawl. A conservation target of 25% was set for the vegetation type.

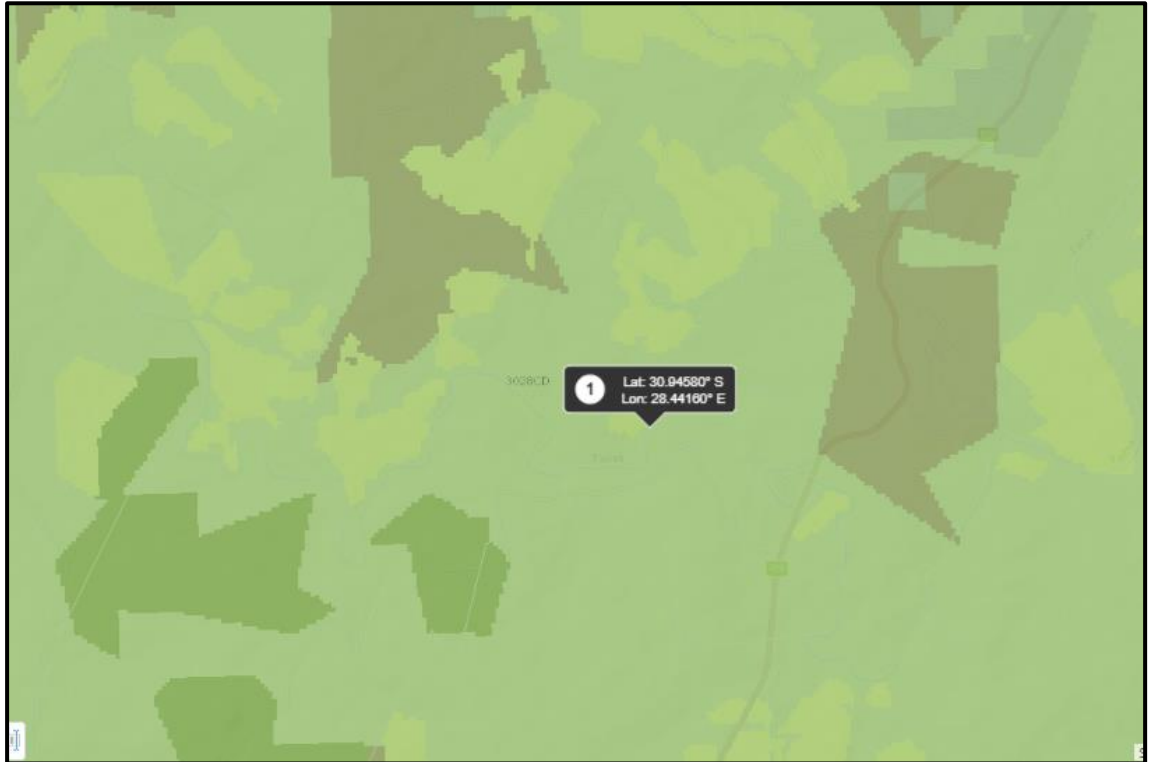


Figure 21: National vegetation cover map showing the study area (GPS Coordinate) within the East Griqualand Grassland (Gs12) (green shading). (Image obtained from BGIS Map Viewer – National Vegetation Map).

Also refer to Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Terrestrial Biodiversity, Conservation Areas, and Groundcover.

FAUNA

Most of the farm is used for livestock grazing with small scale maize production in some parts. Informal farming and dog hunting has caused wild fauna to become very scares. Apart from the domestic animals on the farm, the faunal action in the study area is mainly contained to the natural vegetated areas and riparian areas along the riverbank. The following small mammals are known to occur in the surroundings (traveling through properties):

- ≈ Aardvark (*Orycteropus afer*)
- ≈ Aardwolf (*Proteles cristatus*)
- ≈ African Wild Cat (*Felis lybica*)
- ≈ Black Backed Jackal (*Canis mesomelas*)
- ≈ Cape Clawless Otter (*Aonyx capensis*)
- ≈ Caracal (*Felis caracal*)

- ↯ Duiker (*Sylvicapra grimmia*)
- ↯ Porcupine (*Hystrix africaeaustralis*)
- ↯ Rock Dassies (Hyrax) (*Procavia capensis*)
- ↯ Scrub Hare (*Lepus saxatilis*)
- ↯ Small Grey Mongoose (*Galerella pulverulenta*)
- ↯ Spring Hare (*Pedetes capensis*)
- ↯ Steenbok (*Raphicerus campestris*)
- ↯ Striped Polecat (*Ictonyx striatus*)
- ↯ Water Mongoose (*Atilax paludinosus*)
- ↯ Yellow Mongoose (*Cynictis penicillata*)

Also refer to Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Hydrology for a discussion on the aquatic fauna of the study area.

HUMAN ENVIRONMENT:

CULTURAL AND HERITAGE ENVIRONMENT

(Information extracted from the Heritage Impact Assessment see attached as Appendix H)

The proposed mining footprint was selected over an area with deep sandy soil, thick wooded vegetation and impacted on by sheet erosion with evidence of previous sand extraction along the riverbank.

The South African Heritage Resources Agency (SAHRA) compiled the Palaeontological (fossil) Sensitivity Map (PSM) to guide developers, heritage officers and practitioners in screening palaeontologically sensitive areas at the onset of a project. When the footprint of the study area (S1 & S2) is placed on the PSM, it extends over an area of very high (red) concern as presented in the figure below.

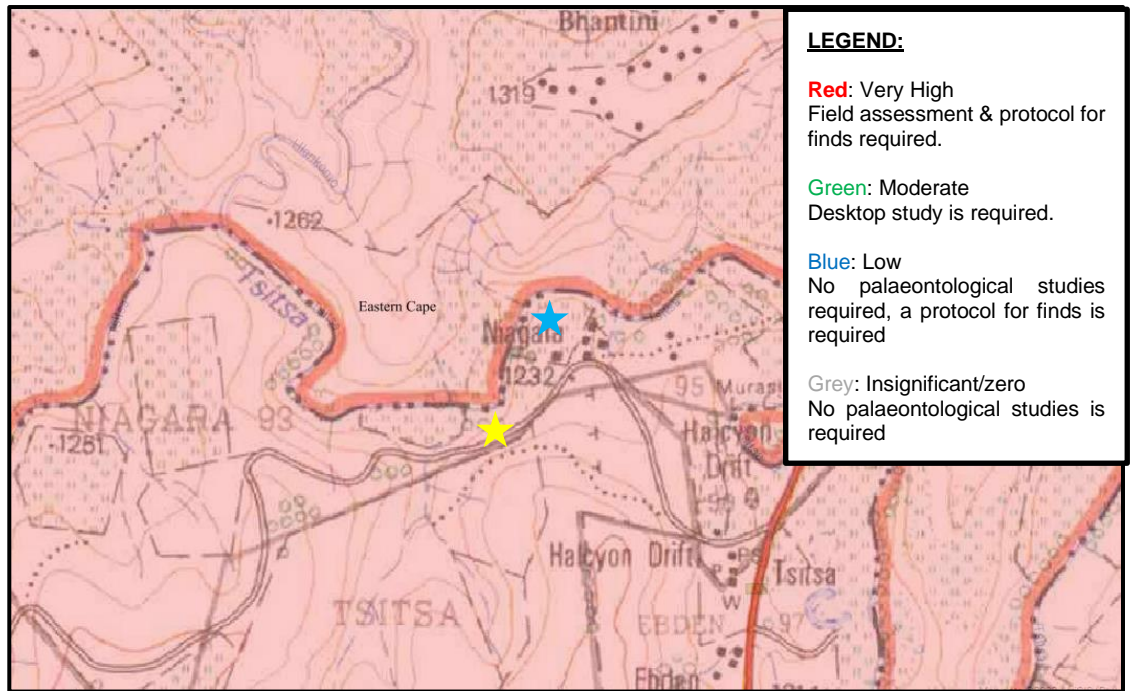


Figure 22: The SAHRA palaeontological sensitivity map shows the study area (blue star) and S2 (yellow star) fall in an area of very high (red) concern.

Also refer to Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Cultural and Heritage Environment.

SOCIO-ECONOMIC ENVIRONMENT

(Information extracted from the Elundini Local Municipality Integrated Development Plan 2020-2021)

The study area extends into ward 16 (S1) and 17 (S1 & S2) of the Elundini Local Municipality (ELM). The ELM is a Category B municipality located in the Joe Gqabi District in the north-eastern part of the Eastern Cape Province. The municipality is the smallest of three municipalities in the district, making up a quarter of its geographical area.

The urban areas and commercial farming district are the highest employers, where people have found employment in the agriculture, commercial and service sectors. There are very low levels of employment in the rural settlements. This can be partly attributed to the fact that these areas do not have a strong economic base, and partly to the fact that most inhabitants are involved in subsistence-related activities with little surplus being produced for economic profit (ELM IDP 2020 – 2021).

The ELM is the most populous municipality in the Joe Gqabi district with an estimated population of 144 929 an increase of 6 788 people (4.7%) from the Census 2011 figures. The largest population of ELM is made up of females which constitute 60.9% (88 247) of the total population and males constitute 39.1% (56 682) of the total

population. According to StatsSA, the following chart indicates that the gender ratio in ELM is comprised of 47.4% males and 52.6% females (StatsSA).

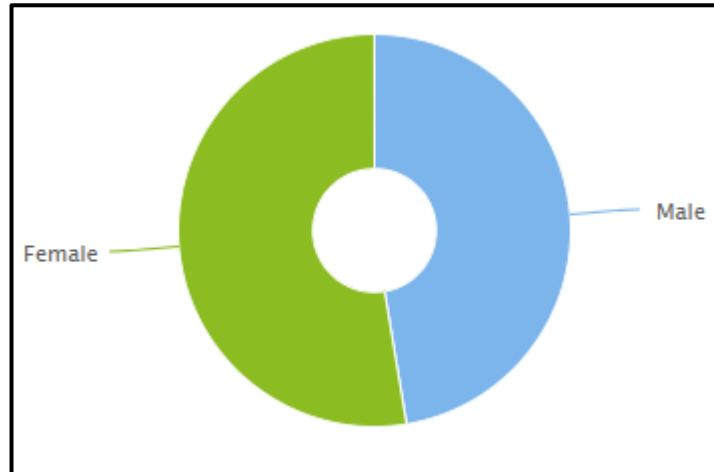


Figure 23: Gender profile (image obtained from https://www.statssa.gov.za/?page_id=993&id=elundini-municipality).

Population Profile

Below is a pie chart which indicates the total Black African population of ELM at 98.1%, Coloured at one percent (1%), Asian/Indian at 0.1% and White population at 0.7%.

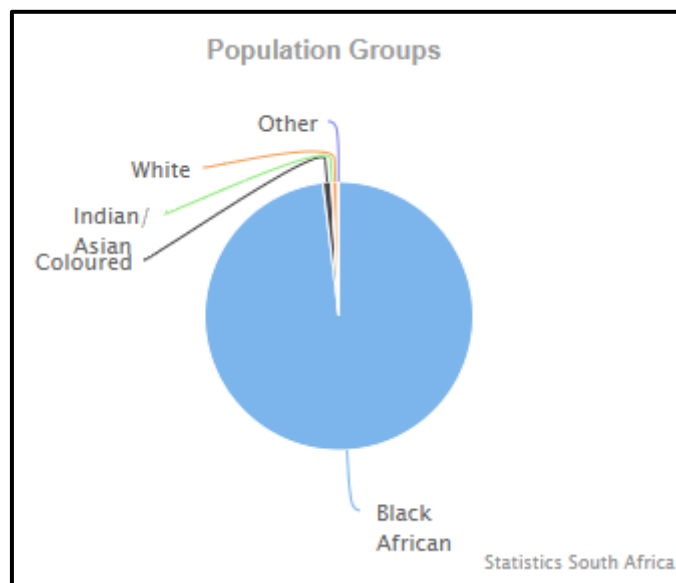


Figure 24: Population profile of the Elundini municipal area (image obtained from https://www.statssa.gov.za/?page_id=993&id=elundini-municipality).

Education Levels

The ELM IDP notes that there has been an increase of 4.7% in the levels of education in Elundini for those between 20 years and above from 2011 to 2016 from 11.9% to 16.6% of the entire population having completed Grade 12 but there has been a slight decrease of 0.4% between 2011 and 2016 from 4.9% in 2011 to 4.5% in 2016 of the

population who has studied further than Grade 12. Community Survey 2016 also revealed that 10.7% has no schooling at all, 20.7% has some primary education, 7.4% has completed some primary education and 44% has completed some secondary education (ELM IDP 2020 – 2021).

Employment and Economic Profile

According to StatsSA (2011) there are 25 530 economically active individuals within the municipality, 44.4% of whom are unemployed. Of the 13 104 economically active youth aged 15 – 35 years, in the area, 52.8% are unemployed.

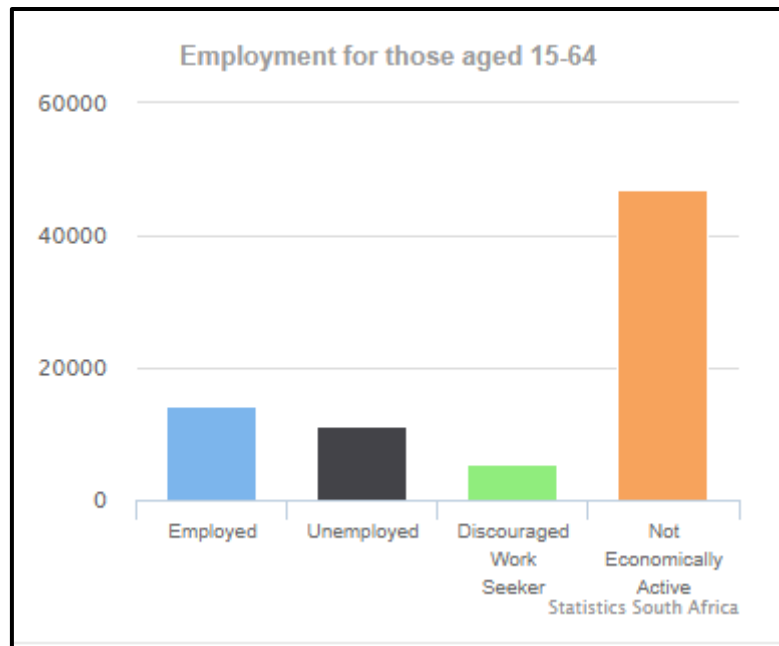


Figure 25: Employment profile of the Elundini municipal area (image obtained from https://www.statssa.gov.za/?page_id=993&id=elundini-municipality).

The ELM lists the following rural industrial possibilities present in the Elundini rural areas:

- ∩ Agro Based Industries (processing of agro products);
- ∩ Forest Based Industries;
- ∩ Mineral Based Industries;
- ∩ Arts and Craft Industries;
- ∩ Renewable Energy Industry;
- ∩ Agricultural Development; and
- ∩ Tourism Development.

The IDP notes that the average annual GDP growth for ELM over the period 1995 – 2011 is 7.9%, which outpaces the growth of Joe Gqabi District (JGD) which had an average growth rate of 5.1%. The Eastern Cape had a growth rate of 2.8%.

The figure below depicts the contribution of different sectors into the GDP of the area.

| SECTOR | 2004 | 2007 | 2011 |
|-------------------------------|------|------|------|
| Agriculture | 8% | 6% | 4% |
| Manufacturing | 6% | 10% | 12% |
| Construction | 2% | 3% | 4% |
| Trade | 12 | 13% | 15% |
| Transport and communication | 9% | 9% | 7% |
| Finance and business services | 19% | 27% | 30% |
| Government | 40% | 33% | 30% |

Figure 26: Sector distribution to GDP (image obtained from the ELM IDP 2020 - 2021).

(b) Description of the current land uses

Niagara No 380 is situated in a rural setting. The Tsitsa River forms the northern boundary of the farm, with the R56 provincial road passing the property to the east. The land use of the property mainly comprises of subsistence farming and grazing of the uncultivated areas.

The main land use of the surrounding properties is communal, focussing on subsistence farming. The Mt Fletcher communal land borders the property to the north, with the Taung Communal lands to the east. The following table provides a description of the land uses and/or prominent features that currently occur within a 500 m radius of the study area (S1 & S2).

Table 12: Land uses and/or prominent features that occur within 500 m radius of the site.

| LAND USE CHARACTER | YES | NO | DESCRIPTION |
|--|-----|----|---|
| Natural area | YES | - | The study area (S1 & S2) is surrounded by natural areas used for various agricultural purposes. |
| Low density residential | - | NO | - |
| Medium density residential | - | NO | - |
| High density residential | - | NO | - |
| Informal residential | - | NO | - |
| Retail commercial & warehousing | - | NO | - |
| Light industrial | - | NO | - |
| Medium industrial | - | NO | - |
| Heavy industrial | - | NO | - |
| Power station | - | NO | - |
| High voltage power line | - | NO | - |
| Office/consulting room | - | NO | - |
| Military or police base / station / compound | - | NO | - |
| Spoil heap or slimes dam | - | NO | - |
| Quarry, sand or borrow pit | YES | - | This application is for the mining of sand from the Tsitsa River. |

| LAND USE CHARACTER | YES | NO | DESCRIPTION |
|----------------------------------|-----|----|---|
| | | | Various informal small scale sand mining activities occur within 500 m of the application area. |
| Dam or reservoir | YES | - | Farm dams exist on the property within 500 m of the study area (S1 & S2). |
| Hospital/medical centre | - | NO | - |
| School/ crèche | - | NO | - |
| Tertiary education facility | - | NO | - |
| Church | - | NO | - |
| Old age home | - | NO | - |
| Sewage treatment plant | - | NO | - |
| Train station or shunting yard | - | NO | - |
| Railway line | - | NO | - |
| Major road (4 lanes or more) | - | NO | - |
| Airport | - | NO | - |
| Harbour | - | NO | - |
| Sport facilities | - | NO | - |
| Golf course | - | NO | - |
| Polo fields | - | NO | - |
| Filling station | - | NO | - |
| Landfill or waste treatment site | - | NO | - |
| Plantation | - | NO | - |
| Agriculture | YES | - | The earmarked areas (S1 & S2) form part of a farm. |
| River, stream, or wetland | YES | - | This application is for the mining of sand from the Tsitsa River. |
| Nature conservation area | - | NO | - |
| Mountain, hill, or ridge | YES | - | A hill borders the study area (S1 & S2) to the north. |
| Museum | - | NO | - |
| Historical building | - | NO | - |
| Protected Area | - | NO | - |
| Graveyard | - | NO | - |
| Archaeological site | - | NO | - |
| Other land uses (describe) | - | NO | - |

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

SPECIFIC ENVIRONMENTAL FEATURES

SITE SPECIFIC TOPOGRAPHY

The natural topography of the application area (S1) is flat, dropping gradually from the riverbank into the riverbed as presented in the following figure. The most eastern and western boundaries of the application area are approximately level with one another at 1220 masl. The (north-south) topography of the study area rises from ± 1216 masl in the riverbed to ± 1221 masl at the edge of the adjacent field.



Figure 27: Elevation profile of the proposed mining footprint (S1) (Image obtained from Google Earth).

The same general topography applies to site alternative 2 (S2) with the elevation dipping slightly where the drainage lines/tributaries cross the study area to enter the Tsitsa River as shown in the following figure. The most eastern and western boundaries of this area are also at ± 1220 masl. The (north-south) topography of the study area rises from ± 1216 masl in the riverbed to ± 1221 masl along the outer edge of the riverine bush.

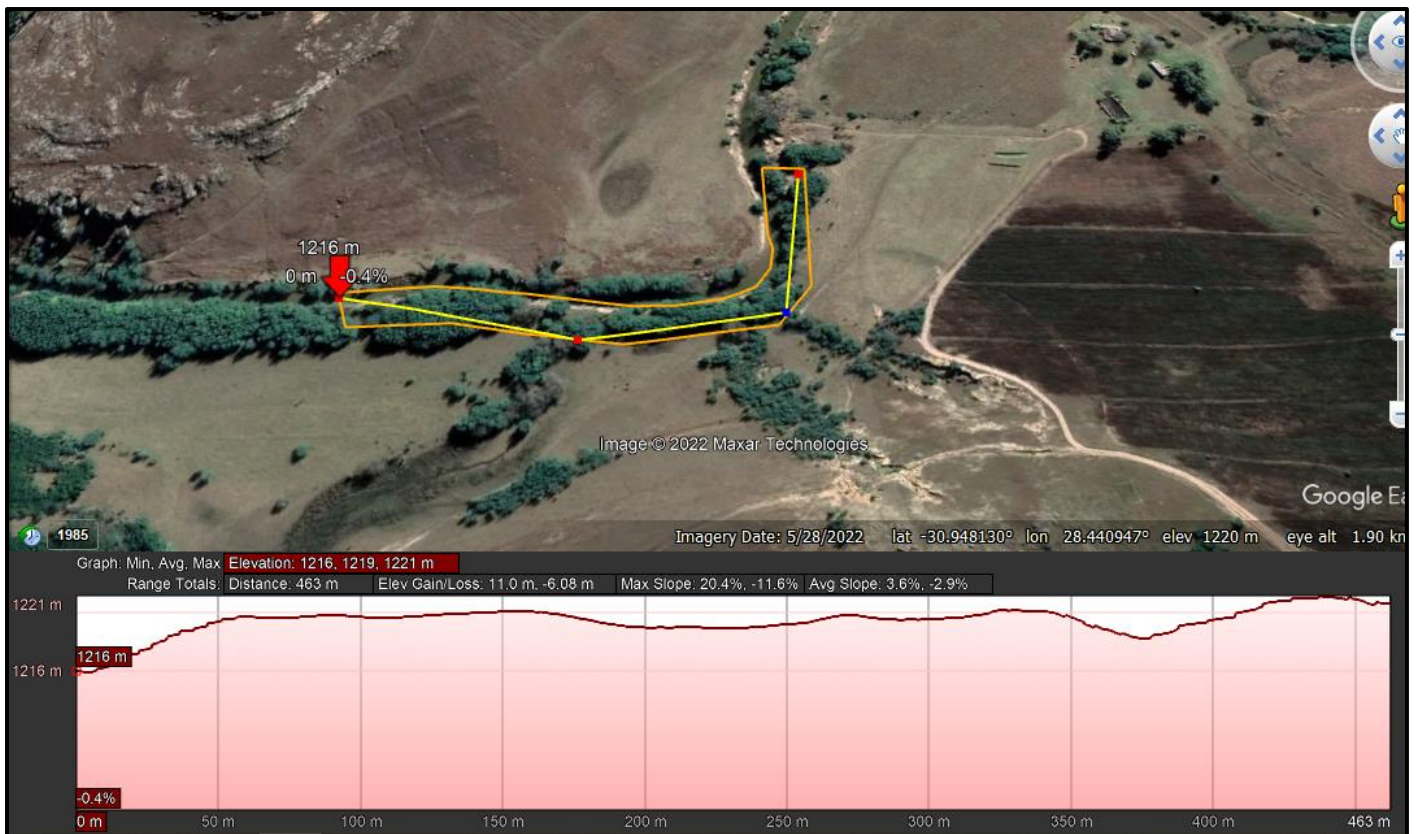


Figure 28: Elevation profile of site alternative 2 (S2) (Image obtained from Google Earth).

The proposed activity (S1/S2) will impact the topography of the earmarked footprint in that the virgin soil level of the riverbank/riparian area will be reduced. However, should the sand mining area gradually be sloped from the bank towards the river, and the thalweg of the riverbed be maintained, the risk of bank erosion can be prevented. Considering this, and if the mitigation measures proposed in this report are implemented the potential impact of the mining activities on the topography of the area will be of low significance provided that the area is rehabilitated upon closure.

SITE SPECIFIC VISUAL CHARACTERISTICS

The proposed mining activities in S1/S2 will be intermittently visible within proximity (± 2 km radius) to the footprint. For S1, visibility will exclusively be from the higher laying areas to the east, south, and south-west. The hill to the north (of the study area) will screen the activities to the communal lands of Mt Fletcher. S2 will mainly be visible from the south-west, west, north-west, and the north.

The figures below show the viewshed analysis (as obtained from Google Earth) for the proposed areas (S1 & S2) within a ± 10 km radius. The green shaded areas show the positions from where the mining area will be visible. From this analysis it is proposed that the visual impact of the proposed sand mining operation, whether established at S1 or S2, will be of low-medium significance, especially as no permanent structures will be constructed and the river will annually reinstate the excavated riverbed. The

small scale of the proposed operation, and the continued reinstatement of the excavation area (riverbed) contributes to the low visual significance. Should the Applicant successfully rehabilitate the riverbank (upon closure), no residual visual impact is expected upon closure of the mine.

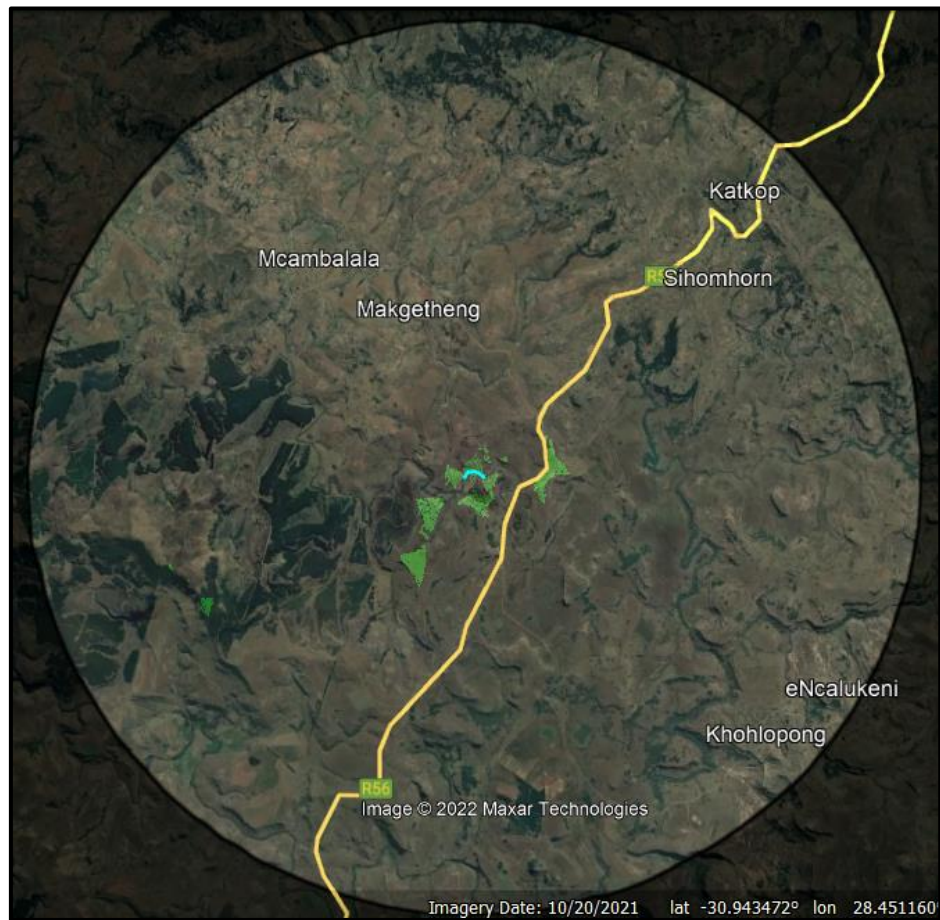


Figure 29: Viewshed analysis of S1 where the green shaded areas show the positions from where the area (blue polygon) will be visible. (Image obtained from Google Earth).

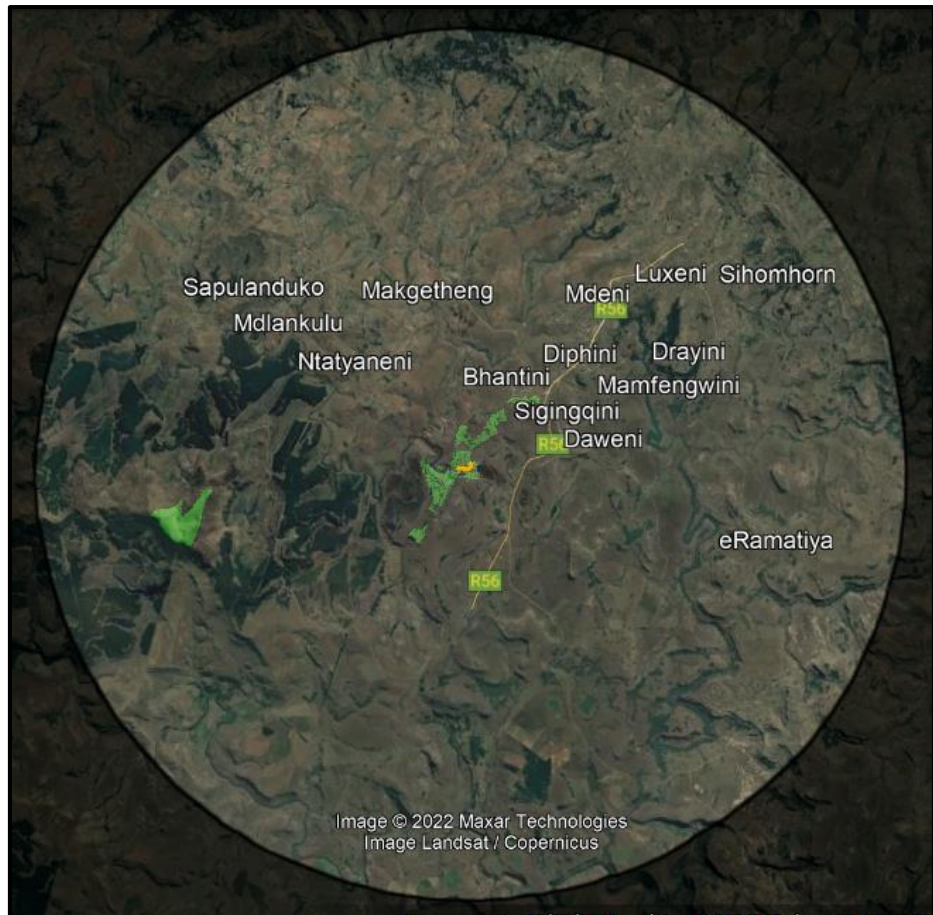


Figure 30: Viewshed analysis of S2 where the green shaded areas show the positions from where the area (orange polygon) will be visible. (Image obtained from Google Earth).

SITE SPECIFIC AIR AND NOISE QUALITY

The farmstead nearest to the proposed footprint of S1 belongs to the landowner ± 100 m (south). This dwelling is degraded, occasionally inhabited; the proposed mining activities will not have an impact on the structure as all mining related activities will be contained in the mining footprint. A second dwelling is situated along the entrance road to the property (at the crossing of the access road and the R56). This dwelling is ± 900 m removed from S1, and ± 1 km from S2. A hill separates the proposed mining areas (S1 & S2) from this dwelling, that will also screen it visually from the house. The first of the Mt Fletcher residences is situated at the back of the hill bordering the property (opposite the river) ± 600 m to the north as shown in the following figure.

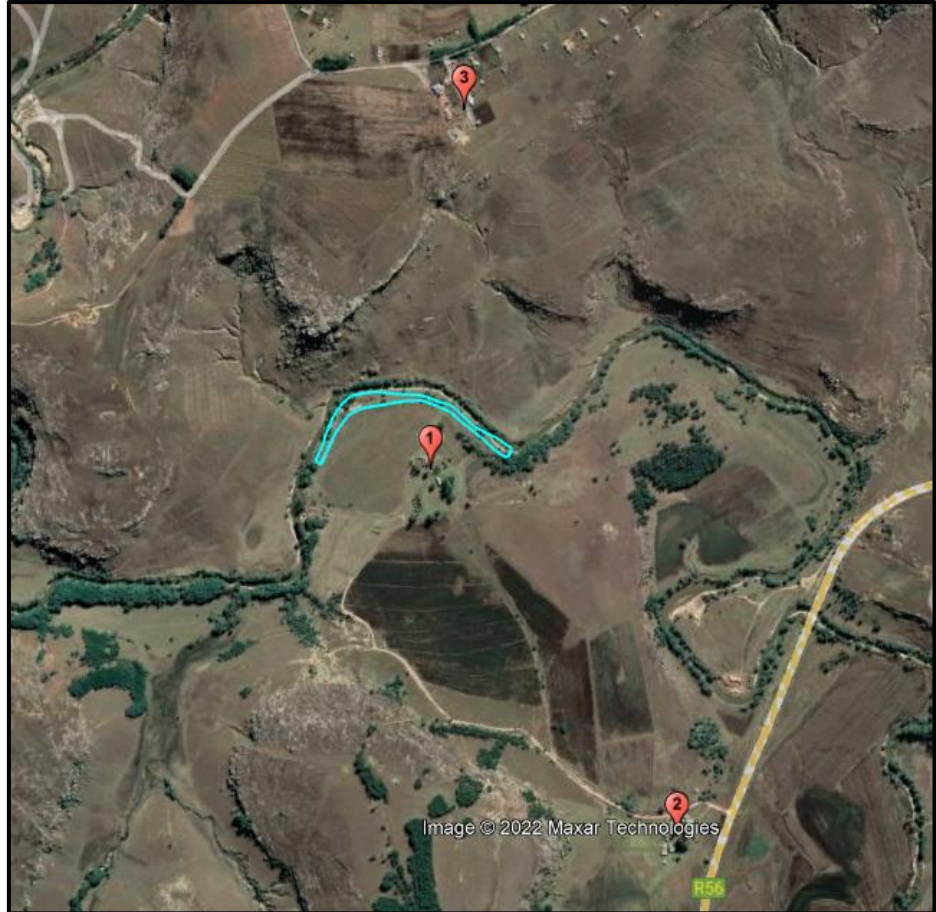


Figure 31: Satellite view showing the location of the nearest residential dwellings to S1, where no 1 is the house on the property, no 2 the house near the entrance to the site, and no 3 the house on the Mt Fletcher communal land (Image obtained from Google Earth).

Site Alternative 2 will be ± 315 m from the degraded house on the property, and ± 1 km from the residence at the entrance to the farm and the nearest residence of Mt Fletcher.

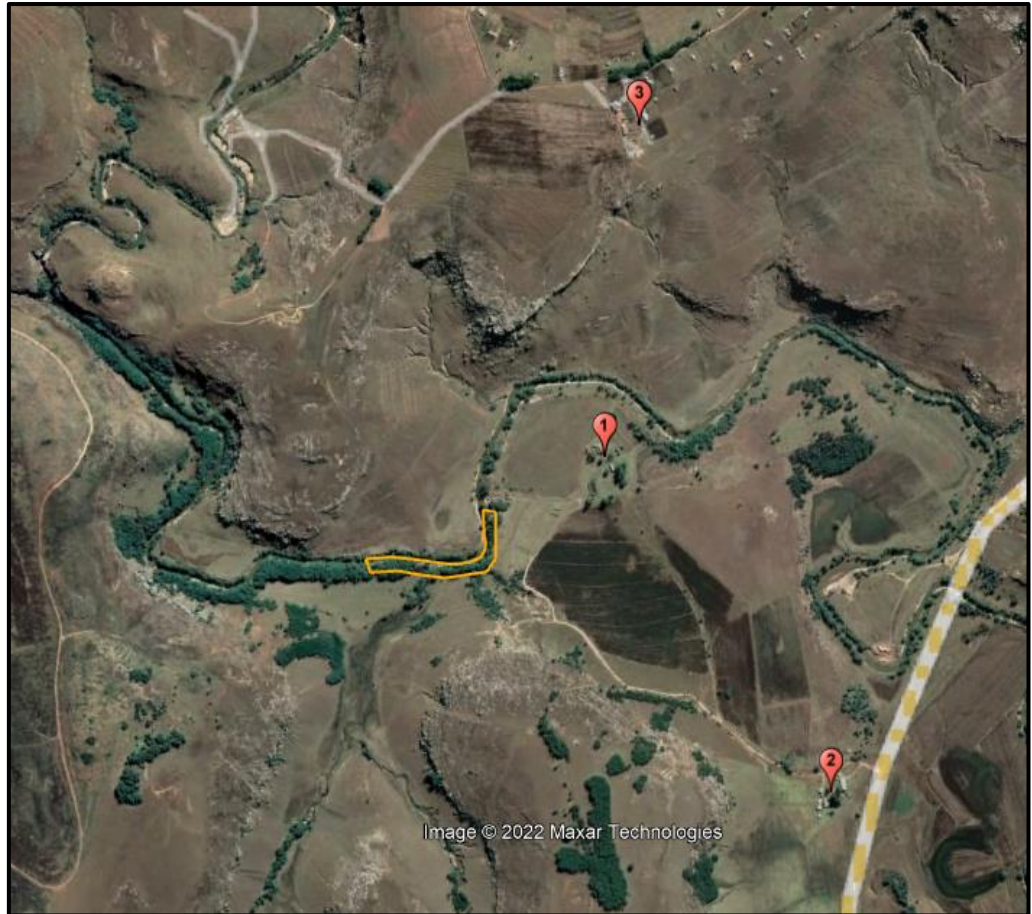


Figure 32: Satellite view showing the location of the nearest residential dwellings to S2, where no 1 is the house on the property, no 2 the house near the entrance to the site, and no 3 the house on the Mt Fletcher communal land (Image obtained from Google Earth).

Currently the air quality of the study area is of good quality, mainly impacted on by the surrounding farming operations, forestry and traffic passing through the area.

Emission into the atmosphere is controlled by the National Environmental Management: Air Quality Act, 2004. The proposed mining activity does not trigger an application in terms of the said Act. The proposed activity will contribute the emissions of one TLB, three tippers, and occasionally an excavator to the receiving environment for the duration of the operational phase. The hills to the north and south of the proposed activity will assist in shielding the surrounding houses from possible dust emissions at the mining footprint. Should the permit holder implement the mitigation measures proposed in this document (i.e. dust suppression on the access road) and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low significance and compatible with the current land use.

The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the traffic driving along the R56. The landowner supports the project and no concern regarding a potential noise impact was raised. Further to this the mine will only operate during daylight hours. No work will take place on Sundays, or at night.

SITE SPECIFIC GEOLOGY AND SOIL

(Information obtained from the Palaeontological Impact Assessment attached as Appendix H)

The PIA reports that the site for development is entirely in the Molteno Formation shales and sandstones. The present river level is ± 3 m below the top bank but there are signs of recent heavy rainfall and erosion of the sands and land adjacent to the river. Away from the river the land rapidly becomes more mountainous and is covered by thick grasslands, with some outcrops of trees in the valleys.

The proposed project area shows signs of past sand excavations that are scattered along the riverbanks, along with high levels of erosion. The route along the river consists of thick unconsolidated transported sands. No rocky outcrops, siltstones or shales occur within the site specific study area.

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

SITE SPECIFIC HYDROLOGY

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

The Aquatic Biodiversity Specialist Assessment (ABSA) focussed on S1, as S2 will impact on a tributary, drainage lines and a possible wetland, in addition to the Tsitsa River (Figure 12). Compared to the impact that S1 may have on the receiving environment, the impacts associated with the development of the proposed sand mine at S2 was deemed to be unacceptably high and the specialist therefore excluded S2 as a viable option.

For the purposes of this assessment, the Tsitsa River was classified as a riverine system and assessed accordingly. No additional wetlands were identified within the 500 m regulation area. A dam is located towards the east of the mining area (S1), which is regarded as an artificial system. The proposed mining activities will have no impact on the dam as the earmarked area does not extend into.

Water Quality:

In situ water quality results assist in the interpretation of biological results because of the direct influence water quality has on aquatic life forms. The results of the November 2022 survey are presented in the following table. The results were compared to the Target Water Quality Range (TWQR) for aquatic ecosystems (DAAF, 1996), and showed that the overall water quality within the sampled river reach would not pose a considerable limitation on diversity and abundance of local biota.

Table 13: Water Quality Results November 2022 (information obtained from the ABSA).

| Site | pH | Conductivity (µS/cm) | DO (mg/l) | Temperature (°C) |
|---------------|----------|----------------------|-----------|------------------|
| TWQR* | 6.5-9.0* | ** | >5.00* | 5-30* |
| MSM_UP | 9.28 | 59.6 | 6.4 | 25.2 |
| MSM_DS | 9.24 | 60.7 | 6.3 | 24.8 |

*TWQR – Target Water Quality Range

The results of the *in situ* assessment indicated limited perturbations (disturbance) in terms of physical water quality within the reach. The dissolved oxygen and water temperature were within the TWQR for aquatic life. The pH indicated alkaline conditions within the Tsitsa River. According to Barbour *et al*, (1996) most fresh waters are usually relatively well buffered and more or less neutral, with a pH range from 6.5 to 8.5, and most are slightly alkaline due to the presence of bicarbonates of the alkali and alkaline earth metals. The pH target for fish health is presented as ranging between 6.5 and 9.0.

Intermediate Habitat Integrity Assessment (IHIA):

The IHIA was completed for the assessed watercourses and is presented below.

Table 14: IHIA for the Tsitsa River Reach (information obtained from the ABSA).

| Instream | Tsitsa River | |
|--------------------------------|----------------------|----------------|
| | Average Impact Score | Weighted Score |
| Water abstraction | 10 | 5.6 |
| Flow modification | 20 | 10.4 |
| Bed modification | 22 | 11.4 |
| Channel modification | 22 | 11.4 |
| Water quality | 12 | 6.7 |
| Inundation | 8 | 3.2 |
| Exotic macrophytes | 5 | 1.8 |
| Exotic fauna | 4 | 1.3 |
| Solid waste disposal | 5 | 1.2 |
| Total Instream | 53 | |
| Category | D | |
| Riparian | Tsitsa River | |
| | Average Impact Score | Weighted Score |
| Indigenous vegetation removal | 10 | 5.2 |
| Exotic vegetation encroachment | 20 | 9.6 |
| Bank erosion | 22 | 12.3 |
| Channel modification | 20 | 9.6 |
| Water abstraction | 5 | 2.6 |
| Inundation | 5 | 2.2 |
| Flow modification | 8 | 3.8 |

| | |
|----------------|----|
| Total Riparian | 51 |
| Category | D |

The results of the instream and riparian integrity assessment both derived a class D (largely modified) status for the considered Tsitsa River reach. Several cumulative impacts were observed within the considered river reach. Bed and channel modification can be attributed to extensive proximal farming and informal sand mining within the river channel resulting in erosion, sedimentation, and alteration of flow.

In addition to instream habitat modification, the riparian zone of the Tsitsa River reach was largely modified because of several cumulative impacts. These impacts included clearance of vegetation and the establishment of alien (tree) stands on the embankments. The establishment of *Acacia dealbata* and *Salix babylonica* is evidence of historical disturbances, attributed to informal sand mining.



Figure 33: Photograph of the observed instream alterations of the Tsitsa River – November 2022 (Image obtained from the ABSA)



Figure 34: Photograph of the alien vegetation (Acacia dealbata and Salix babylonica) on the embankment of the Tsitsa River – November 2022 (Image obtained from the ABSA)

Riparian Delineation and Buffer Zone:

Riparian areas have high conservation value and can be considered as the most important part of a watershed for a wide range of values and resources. Buffers are crucial for riverbank stability and in preventing erosion within the channel (Elmore, and Beschta, 1987). Therefore, they are considered as high priority areas and should be avoided. The delineation of the watercourse riparian zone of the study area and the aquatic recommended buffer are presented in the following figure. The generic 32 m buffer recommended by the ECBCP (2019) has been reduced to 10 m at the discretion of the specialist, due to the current condition of the river, -bank, and riparian area. Furthermore, alien vegetation species are abundant on the bankside and channel edge vegetation.

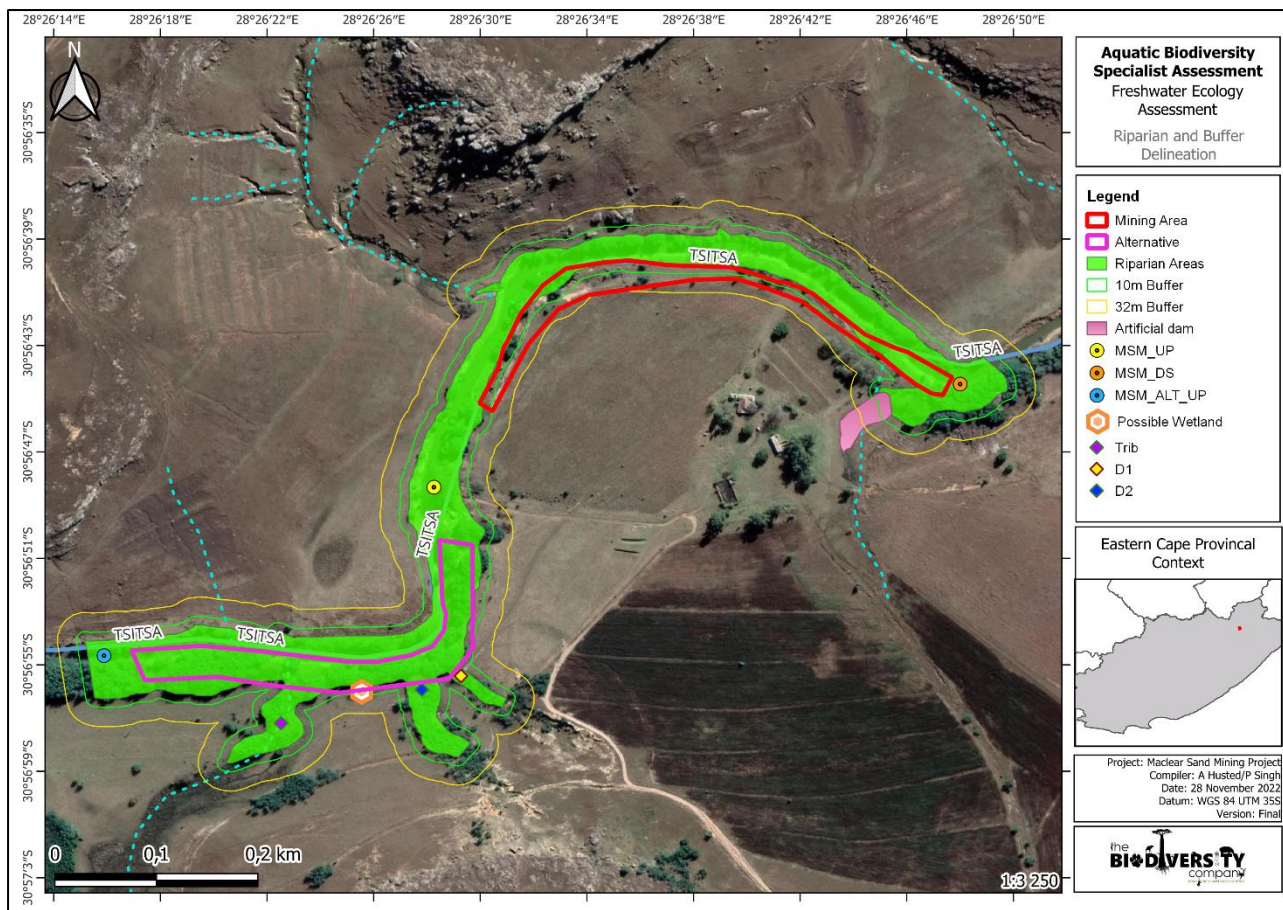


Figure 35: Riparian delineation and aquatic buffer in relation to S1 and S2 (Image obtained from the ABSA).

Aquatic Macroinvertebrates Assessment – Integrated Habitat Assessment System (IHAS):

The IHAS results for the various surveys are presented in the following table. The biotope diversity at both sites was determined to be poor. The stones biotope was absent, with limited marginal vegetation present. The gravel, sand and mud biotope were dominant for the reach.

Table 15: Availability of habitat for aquatic macroinvertebrates based on IHAS results recorded during the November 2022 survey (information obtained from the ABSA).

| Date | | MSM_UP | MSM_DS |
|----------|-------------|----------------|----------------|
| November | Score | 21 | 35 |
| | Suitability | Poor Diversity | Poor Diversity |

Aquatic Macroinvertebrates Assessment – Biotic Integrity Based on SASS5 Results:

The aquatic macroinvertebrate (SASS5) results for the survey period are presented in the following table. The SASS5 assessment results generated SASS5 scores that are categorised as a class E/F (Dallas, 2007) for both sites (S1 & S2) which indicates a seriously to critically modified macroinvertebrate community within the Tsitsa River

reach. The average score per taxon (ASPT) indicated that only the tolerant macroinvertebrate species were collected.

Table 16: Macroinvertebrate Assessment Results – November 2022 (information obtained from the ABSA).

| Survey Date | | MSM_UP | MSM_DS |
|---------------|------------------------------------|--------|--------|
| November 2022 | SASS Score | 13 | 21 |
| | No of taxa | 3 | 5 |
| | ASPT* | 4.3 | 4.2 |
| | Ecological Category (Dallas, 2007) | E/F | E/F |

Aquatic Macroinvertebrates Assessment – Macroinvertebrate Response Assessment Index (MIRAI):

The results of the MIRAI assessment are provided in the following table, for the November 2022 survey.

Table 17: MIRAI results for the November 2022 survey (information obtained from the ABSA).

| Metric Group | Tsitsa River |
|-----------------------|--------------|
| Flow modification | 30 |
| Habitat | 29 |
| Water Quality | 26.4 |
| Ecological Score | 28 |
| Invertebrate Category | E |

The results of the MIRAI derived an ecological category of class E (Seriously modified) state for the Tsitsa River. All three factors (Flow, water quality and habitat) contributed to the seriously modified macroinvertebrate community status. The presence of only few highly intolerant taxa (>10 sensitivity score) indicated modified physico-chemical conditions and poor physical conditions within the reach.

Fish Community Assessment:

No fish were sampled across the Tsitsa River reach. Based on this the ecological integrity of the fish community was determined to be seriously modified (class E).

Present Ecological Status:

The results for the reach-based PES assessment are presented in the following table. The PES assessment derived a largely modified ecological category (class D). This modified status can be primarily attributed to habitat related drivers and riparian areas, which result in flow modifications within the Tsitsa River reach. Alien vegetation encroachment was found to have the highest impact to riparian ecological condition, followed by erosion and subsequent sedimentation within the Tsitsa River.

Table 18: The Present Ecological Status for the Tsitsa River (information obtained from the ABSA).

| Aspect Assessed | Category |
|--|----------------|
| Riparian Ecological Category | 77 |
| Aquatic Invertebrate Ecological Category | 28 |
| Fish Ecological Category | 30 |
| Ecotatus | Class D |

Regulatory Zone:

The following regulatory zone is applicable and pertains to the project area being proximal to the Tsitsa River.

Table 19: The zone of regulation for the project (information obtained from the ABSA).

| Regulatory authorisation required | Zone of applicability |
|---|---|
| Water Use License Application in terms of the National Water Act, 1998 (Act No. 36 of 1998). Department of Water and Sanitation (DWS) | <p>Government Notice 509 as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998) in accordance with GN509 of 2016 as it relates to the National Water Act, 1998 (Act 36 of 1998), a regulated area of a watercourse in terms of water uses as listed in Section 21c and 21i is defined as:</p> <ul style="list-style-type: none"> the outer edge of the 1 in 100 year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; in the absence of a determined 1 in 100 year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or a 500m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation. |

Risk Assessment and Specialist Recommendations:

Instream Aquatic Habitat

Removal of riverbed material in volumes greater than natural replenishment rates can result in riverbed degradation, increased suspended sediment content and the sand/gravel siltation of rapid/cobble areas. The removal of gravel and clay layers alters the physical morphology of the river channel and can create excessive scour and sediment movement resulting in further bed and channel modification.

Due to the increased gradient caused through the removal of the riverbed, head cut erosion, increased flow velocities and concentrated flows can occur upstream of the mining area resulting in the further alteration to instream aquatic habitats. The extraction process causes a diversion of water flow resulting in the formation of pools which can subsequently cut downstream areas of the instream habitat off from water volumes.

Overall the abovementioned physical instream impacts can have a negative effect (pre-mitigation) on aquatic ecology through the direct loss of habitat (cover), loss of spawning habitats and loss of fine sediment sensitive taxa through gill smothering.

Unsustainable extractions are likely to have habitat and morphological consequences that are likely to manifest in the longer term (such as floodplain and beach erosion), which may incur critical impacts at the site and on downstream aquatic environments.

Marginal Vegetation:

If left unmitigated the sand mining operation can potentially degrade the marginal zone of the considered water course through the following processes.

- ∞ Loss of the marginal and riparian zones can occur through the direct loss of habitat during the construction of access routes and mining platforms.
- ∞ The destruction of the riparian zone can result in the destabilisation of the riverbank, increased erosion, loss of cover and increased stream temperatures.
- ∞ In addition, due to the lowered level of water in the active channel, the groundwater levels can drop on associated floodplains resulting in additional stresses to floodplain vegetation, if and where applicable.

Refer to Tables 17 – 19 of the Aquatic Biodiversity Specialist Assessment (Appendix G) for a detailed assessment of the identified impacts and DWS risk impact matrix.

The risk of the removal of sediments from the active river channel and embankment, and subsequent structural changes to the watercourse are detailed below.

- ∞ Considering the criteria for the risk matrix the factors: Flow Regime, Water Quality, Habitat and overall effect on Biota, the proposed removal of sediments (sand) was rated as a high-risk activity, without mitigation.
- ∞ This could be reduced to a moderate risk activity if mitigation measures are implemented.

As presented above in Table 19 of the ABSA, the results of the risk assessment determined low risks for activities occurring outside of the delineated watercourse and 10 m buffer area. However, activities occurring within the instream and riparian zones were derived to be high and moderate risk activities pre-mitigation. The post-mitigation risk level for all aspects was determined to be moderate. The proposed mining is likely to have instream habitat impacts at the site over the mining period. The specialist proposed that a sustainable mining volume for the proposed Tsitsa River must be determined and adhered to if detrimental consequences are to be avoided. This determination will form part of the WULA to be submitted to the DWS if required and the outcome of the assessment will be adhered to as part of the water use licence conditions once issued.

The ABSA provides the following definition for a MODERATE significance:

Adverse changes to a receptor where changes may exceed the range of natural variation or where accepted limits, or standards are exceeded at times. Potential for natural recovery in the medium-term is good, although a low level of residual impact may remain. Medium impacts will require mitigation to be undertaken and demonstration that the impact has been reduced to as low as reasonably practicable (even if the residual impact is not reduced to Low significance). Positive social impacts of medium significance would be those where a moderate level of benefit is obtained by several people or a community, or the local, regional, or national economy for a sustained period, generally more than a year.

Cumulative Impacts:

If not mitigated, the proposed project will cause the PES of the aquatic ecosystem to decrease. There are other sand mining activities along the Tsitsa River reach, and therefore the cumulative impact of another sand mine along the river reach must be considered. The scale of this cumulative impact is however limited to the immediate river reach if mitigation actions are considered. Should no mitigation actions be followed the scale of the impact will extend downstream of the project area.

Considering this, the specialist proposed that the sustainable mining volume for the proposed Tsitsa River must be determined and adhered to. This determination will form part of the WULA to be submitted to the DWS if required and the outcome of the assessment will be adhered to as part of the water use licence conditions once issued.

Aspect Specific Mitigation Measures:

The outcomes of the risk assessment can be mitigated to moderate risk, based on the current condition of the watercourse, and associated riparian area. The following mitigation actions are recommended:

- ∞ Extraction should be limited to low flow periods (May-October);
- ∞ The extraction from the riverbed should not exceed 1 m or deeper than the defined base layer of the river;
- ∞ Bar skimming is recommended if feasible;
- ∞ If possible, the thalweg (lowest point connecting the sections of the river) of the river reach being mined must be maintained. This will ensure that a flat uniform wide channel is not formed which results in thinly spread flows (refer to following figure).

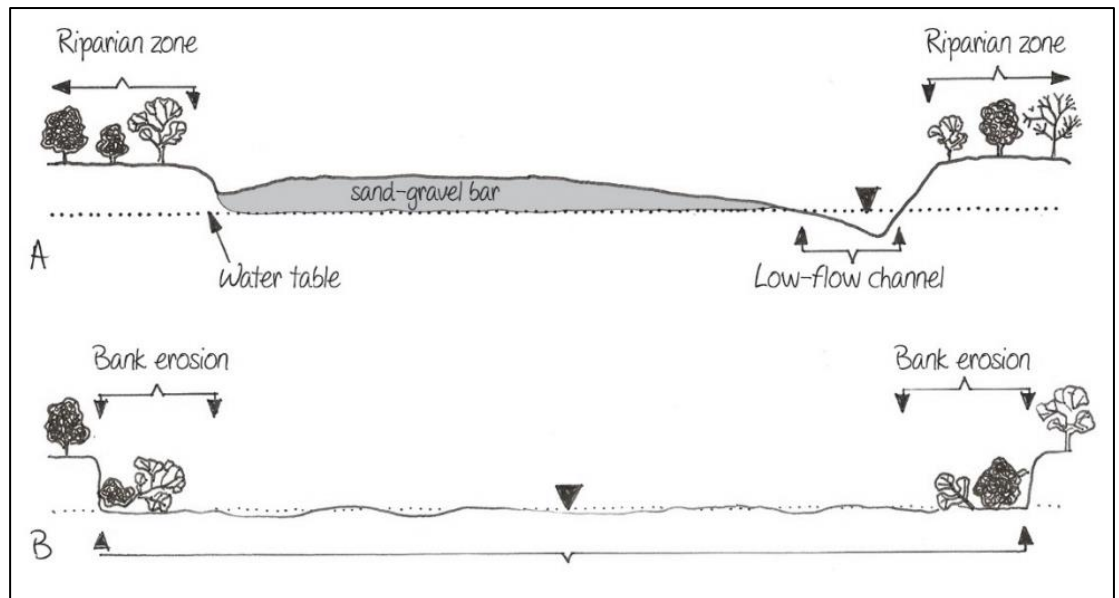


Figure 36: Maintenance of the thalweg where A represents Best Practice and B represents Poor Practice (Image obtained from the ABSA).

- ⌘ A single access point through the delineated vegetation zones (ecological class D) should be made. Once this access point has been created mining platforms should be constructed outside of the delineated zone (i.e. 2 m from the delineated bank);
- ⌘ Erosion control such as gabions must be established at the access point through the vegetation;
- ⌘ Existing roads must be used and access to the river should be made perpendicular to flow;
- ⌘ Temporary storm water management systems must be in place and preferential runoff channels be filled with aggregate and/or logs (branches included) to dissipate flows, limiting erosion and sedimentation;
- ⌘ Silt traps and sediment trapping berms must be in place in drainage lines around the stockpile area;
- ⌘ The footprint area must be kept a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas;
- ⌘ The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly;
- ⌘ All machinery and equipment should be inspected regularly for faults and possible leaks and must have drip trays to contain oil leakage, these should be serviced off-site;
- ⌘ Adequate sanitary facilities and ablutions must be provided for all personnel throughout the construction site. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation);

- ⌘ All solid waste generated on-site during construction and operation must be adequately managed. Separation and recycling of different waste materials should be supported;
- ⌘ Stockpiles of the sand resource should not be kept within the delineated buffer zone (10 m);
- ⌘ Access routes and other infrastructure areas must be rehabilitated;
- ⌘ To avoid floodplain ponding, no floodplain areas (if present) should be mined with the focus of the mining operation on the instream sand resource; and
- ⌘ To monitor for potential environmental degradation downstream of the mining permit bi-annual (high and low flow) aquatic biomonitoring should take place at the sites already assessed in this report.

Specialist Recommendations:

Due to the current state of the river and riparian areas, it is unlikely the sand mining activities (instream and in the riparian area) will further reduce the condition of the study area; hence the following may be considered for the proposed Maclear Sand Mine:

- ⌘ Mining the flood benches or riverbank is allowed, provided that a slope that prevents bulk erosion is maintained and does not increase flood risk or level;
- ⌘ Sand mining activities within 10 m of the bank must have mitigation that prevents bank destabilisation and subsequent collapse;
- ⌘ Where applicable, sand must be mined from features such as sand bars, that are not in the main low flow channel (to reduce fine sediment being resuspended and washed downstream);
- ⌘ Mining of the disturbed riparian vegetation areas may be allowed, subject to rehabilitation with indigenous vegetation;
- ⌘ Access the river from one point along the bank only;
- ⌘ Limit the amount of driving in the river channel;
- ⌘ Prevent erosion of the bank in the direct surrounds of the access point (slope to 1:3 gradient and vegetate steep and bare areas); and
- ⌘ Prevent erosion of the bank and flood bench caused by the erosive power of the return flow (dredge and pipeline option);
- ⌘ Stockpiling in the riparian and buffer areas is allowed if measures are in place to prevent the stockpiles from re-entering the watercourse and are removed regularly to avoid the establishment of alien/invasive vegetation.

Conclusion

According to *in situ* water quality analysis, the water quality conditions within the Tsitsa River reach are not expected to be a notable limiting factor to aquatic biota. The IHIA indicated large modifications to the instream and to the riparian habitat within the assessed reach. The local aquatic macroinvertebrate community within the system was rated as seriously modified according to the biological bands. The average sensitivity scores within the reach indicated that tolerant macroinvertebrate taxa were collected within the sampled Tsitsa River reach. No fish were sampled, and the assigned integrity of the fish community structure was determined to be seriously modified. The overall integrity of the riparian habitat was determined to be moderately modified. The ecological status of the sampled Tsitsa River was determined to be largely modified (class D).

The post-mitigation risk level for all mining related aspects was determined to be moderate. Therefore, the proposed mining volume is likely to have moderate instream habitat effects at the site over the mining period, granted that the necessary mitigation measures are in place. Due to the overall moderate residual risk posed by the project, a Water Use License is required for the operation.

It is the opinion of the specialist that the proposed sand mining of the river and its bank be supported, subject to mitigation measures during the operational phase and rehabilitation of the mining and riparian area post-mining. The proposed mining area (S1) is preferred over the alternative (S2) as the latter footprint would degrade drainage lines, a non-perennial tributary, and a possible wetland area. It is further recommended that should authorisation be issued; riverine monitoring be included as a condition of the authorisation.

SITE SPECIFIC TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS AND GROUND COVER

As mentioned earlier, when the study area (S1 & S2) is layered over the Mining and Biodiversity Map, it falls over an area of highest biodiversity importance with a corresponding rating of highest risk for mining. The High Biodiversity Importance area (in terms of the Mining and Biodiversity Guideline) is supported by the boundaries of Freshwater: CBA identified in terms of the ECBCP.

Ground-truthing however, showed that the proposed footprint is highly disturbed with a high level of alien infestation. The ABSA (Appendix G) concluded that the ecological status of the sampled Tsitsa River (Freshwater: CBA) is largely modified (Class D) and

considering this the impact of the proposed sand mining operation on the identified CBA is deemed to be of Low significance.

Although the earmarked mining area lies within the East Griqualand Grassland, the site specific groundcover is highly altered due to the extensive proximal farming and informal sand mining, erosion, and alien plant invasion. No protected and/or sensitive plant species occur within the proposed mining footprint, and the specialist did not identify any wetland areas/vegetation of concern.

The Applicant will make use of one access point into the river, and a single haul road from the river to the stockpile area, to limit damage to the riparian zone. It is proposed that should the Applicant implement the mitigation measures proposed in the EMPR the impact of the proposed activity on the riparian vegetation and groundcover in general is deemed to be of low significance.

At the time of the inspection, invasive plant species such as Silver Wattle (*Acacia dealbata*) and Weeping Willow (*Salix babylonica*) were noted within the proposed footprint area that established due to the disturbance of the natural groundcover. The Applicant will implement an invasive plant species management plan and constantly monitor the mining area for problem species.

SITE SPECIFIC FAUNA

The terrestrial site specific fauna of the study area represents the fauna of the surrounding environment, and no protected or red data species were identified to be resident within the proposed footprint area (S1/S2). The fauna at the site will not be impacted on by the proposed mining activity as they will be able to move away or through the site, without being harmed. Workers must be educated and managed to ensure that no fauna at the site is harmed.

The proposed sand mining operation is expected to have a moderate impact on the aquatic ecology of the Tsitsa River should the mitigation measures proposed in this report be implemented.

SITE SPECIFIC CULTURAL AND HERITAGE ENVIRONMENT

(Information extracted from the Heritage Impact Assessment see attached as Appendix H)

3 Archaeology / Heritage Resources

The Heritage Impact Assessment (HIA) notes that the area is of low heritage potential and finds were limited to a degraded farmstead situated more than 100 m south of the proposed project area. The farmstead will not be affected by the project and not further discussed here.

The HIA concludes that neither S1/S2 will affect any know heritage resources and both are acceptable from a heritage perspective. The report notes that the impact on heritage resources is low, and the project can be authorised provided that the recommendations in the HIA are adhered to and based on the South African Heritage Resource Authority (SAHRA) 's approval.

3 Palaeontological Heritage

The palaeontological assessment concluded that based on the fossil record and site visit there are no fossils of the Molteno *Dicroidium* flora even though fossils have been recorded from rocks of a similar age and type in South Africa. These plant fossils have been recorded from siltstones and mudstones, not from sandstones or sands. It is therefore extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary (as found on the site). There is a very small chance that fossils may occur below the ground surface in the shales of the Molteno Formation so the specialist proposed that a Fossil Chance Find Protocol must be added to the EMPR.

3 Potential Impact & Reasoned Opinion

The HIA notes that no heritage sites were recorded during the study and no adverse impacts to heritage resources are expected by the proposed project. Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure.

The overall impact of the project is low and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

SITE SPECIFIC INFRASTRUCTURE

A low-voltage Eskom power line passes the study area to the east as shown in the following figure. The power line crosses the Tsitsa River from north to south but does not cross any of the two site alternatives. The mining activities will have no impact on the power line. No other infrastructure exists within the footprint of S1/S2 that can/will be disturbed by the proposed mining activities. As mentioned earlier, the Applicant will maintain the access road for the duration of the mine.

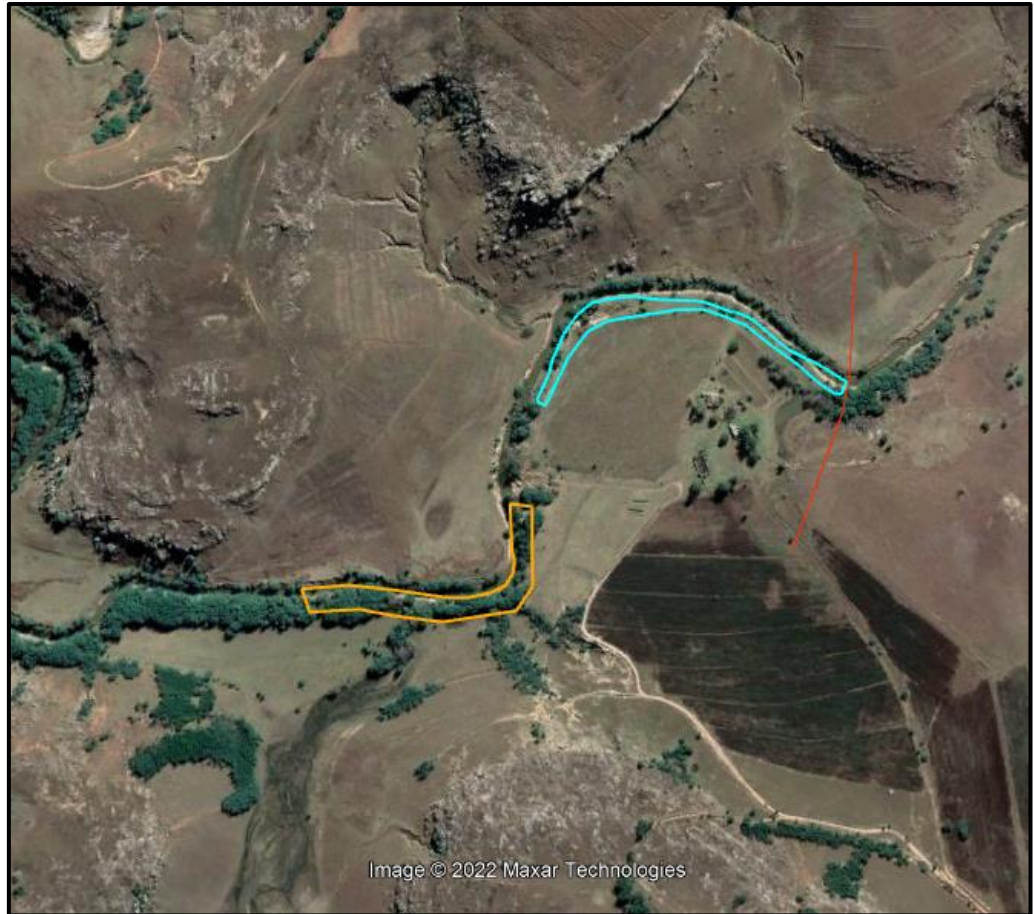


Figure 37: Satellite view showing the Eskom power line (red line) in relation to the footprints of S1 (blue polygon) and S2 (orange polygon) (image obtained from Google Earth).

(d) Environmental and current land use map.

(Show all environmental and current land use features)

The environmental and current land use map is attached as Appendix D.

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

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

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

As the hydrologist already excluded the possibility of Site Alternative 2 as a viable alternative (fatal flaw) for the development of the proposed sand mine, only the project related aspects associated with Site Alternative 1 were further assessed in the report.

SITE ESTABLISHMENT

Visual intrusion because of site establishment

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|---------------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| Rating: Low-Medium | | | | | | Degree of Mitigation: Partial | |
| 1 | 4 | 1 | 2 | 2 | 5 | 3.5 | 7 |

Alteration of natural hydrology through clearing of riparian vegetation and bank shaping to access the resource

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|----------------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| Rating: Medium-High | | | | | | Degree of Mitigation: Partial | |
| 3 | 4 | 4 | 3.6 | 5 | 5 | 5 | 18 |

Infestation of the mining area with invader plant species

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Medium | | | | | | Degree of Mitigation: Full | |
| 3 | 4 | 2 | 3 | 5 | 2 | 3.5 | 10.5 |

Dust nuisance because of site establishment

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Low | | | | | | Degree of Mitigation: Full | |
| 1 | 4 | 1 | 2 | 2 | 2 | 2 | 4 |

Noise nuisance because of site establishment

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| Rating: Low | | | | | | Degree of Mitigation: Partial | |
| 1 | 4 | 1 | 2 | 2 | 2 | 2 | 4 |

Contamination of the surface water and mining area through potential sewage spills and/or solid waste inputs

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Medium | | | | | | Degree of Mitigation: Full | |
| 5 | 3 | 5 | 4.3 | 3 | 3 | 3 | 12.9 |

Potential damage to Eskom power line

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Low | | | | | | Degree of Mitigation: Full | |
| 4 | 3 | 5 | 4 | 1 | 1 | 1 | 4 |

Work opportunities to 8 people (**Positive Impact**)

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance (+) |
|----------------------------|----------|--------|-------------|-------------|-----------|----------------------------------|------------------|
| Rating: Medium-High | | | | | | Degree of Mitigation: N/A | |
| 1 | 4 | 5 | 3.3 | 5 | 5 | 5 | 16.5 |

WINNING OF SAND

Altered geomorphology of the watercourse

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|----------------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| Rating: Medium-High | | | | | | Degree of Mitigation: Partial | |
| 3 | 4 | 4 | 3.6 | 4 | 5 | 4.5 | 16.2 |

Bed, flow, and channel modification due to removal of sand from the river channel and embankment

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|---------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| Rating: High | | | | | | Degree of Mitigation: Partial | |
| 4 | 4 | 5 | 4.3 | 5 | 5 | 5 | 21.5 |

Soil and/or surface water contamination from hydrocarbon spills, waste and/or sewage

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|----------------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Medium-High | | | | | | Degree of Mitigation: Full | |
| 4 | 4 | 4 | 4 | 4 | 5 | 4.5 | 18 |

Noise nuisance because of the mining activities

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

Potential impact on areas/infrastructure of heritage or cultural concern

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Low | | | | | | Degree of Mitigation: Full | |
| 4 | 4 | 5 | 4.3 | 1 | 1 | 1 | 4.3 |

STOCKPILING AND TRANSPORTING MATERIAL FROM SITE:

Increased suspended solids due to stockpiling of mined sand

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Medium | | | | | | Degree of Mitigation: Full | |
| 3 | 4 | 4 | 3.6 | 3 | 3 | 3 | 10.8 |

Dust nuisance because of the transporting of material from site

| | | | Consequence | | | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Severity | Duration | Extent | | Probability | Frequency | | |
| Rating: Medium | | | | | | Degree of Mitigation: Full | |
| 3 | 4 | 3 | 3.3 | 4 | 5 | 4.5 | 14.8 |

Noise nuisance because of the mining activities and/or transportation of material

| | | | Consequence | | | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| Severity | Duration | Extent | | Probability | Frequency | | |
| Rating: Medium | | | | | | Degree of Mitigation: Partial | |
| 3 | 4 | 3 | 3.3 | 4 | 5 | 4.5 | 14.8 |

Potential impact associated with littering and hydrocarbon spills

| | | | Consequence | | | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Severity | Duration | Extent | | Probability | Frequency | | |
| Rating: Medium | | | | | | Degree of Mitigation: Full | |
| 4 | 4 | 4 | 4 | 3 | 4 | 3.5 | 14 |

Infestation of denuded areas with invader plant species

| | | | Consequence | | | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Severity | Duration | Extent | | Probability | Frequency | | |
| Rating: Medium | | | | | | Degree of Mitigation: Full | |
| 3 | 4 | 2 | 3 | 5 | 2 | 3.5 | 10.5 |

Deterioration of the access road to the mining area

| | | | Consequence | | | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Severity | Duration | Extent | | Probability | Frequency | | |
| Rating: Medium | | | | | | Degree of Mitigation: Full | |
| 3 | 4 | 3 | 3.3 | 4 | 5 | 4.5 | 14.8 |

Overloading of trucks having an impact on the public roads

| | | | Consequence | | | Likelihood | Significance |
|----------------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Severity | Duration | Extent | | Probability | Frequency | | |
| Rating: Medium-High | | | | | | Degree of Mitigation: Full | |
| 4 | 4 | 5 | 4.3 | 4 | 5 | 4.5 | 19.4 |

CUMULATIVE IMPACTS:

Potential cumulative impact of mining on the Tsitsa River

| | | | Consequence | | | Likelihood | Significance |
|----------------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| Severity | Duration | Extent | | Probability | Frequency | | |
| Rating: Medium-High | | | | | | Degree of Mitigation: Partial | |
| 4 | 4 | 5 | 4.3 | 4 | 4 | 4 | 17.2 |

Potential impact on downstream users

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|----------------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Medium-High | | | | | | Degree of Mitigation: Full | |
| 4 | 4 | 5 | 4.3 | 4 | 4 | 4 | 17.2 |

SLOPING AND LANDSCAPING UPON CLOSURE OF THE MINE

Erosion of returned topsoil after rehabilitation (riverbank/riparian area)

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|---------------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Low-Medium | | | | | | Degree of Mitigation: Full | |
| 3 | 5 | 2 | 3.3 | 4 | 2 | 3 | 9.9 |

Residual impact on the Tsitsa River

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|---------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: High | | | | | | Degree of Mitigation: Full | |
| 4 | 5 | 5 | 4.6 | 4 | 5 | 4.5 | 20.7 |

Infestation of the reinstated area with invader plant species

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Medium | | | | | | Degree of Mitigation: Full | |
| 3 | 4 | 2 | 3 | 5 | 2 | 3.5 | 10.5 |

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

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Medium | | | | | | Degree of Mitigation: Full | |
| 3 | 5 | 2 | 3.3 | 4 | 4 | 4 | 13.2 |

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

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance (+) |
|----------------------------|----------|--------|-------------|-------------|-----------|----------------------------------|------------------|
| Rating: Medium-High | | | | | | Degree of Mitigation: N/A | |
| 1 | 5 | 5 | 3.7 | 5 | 5 | 5 | 18.5 |

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

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

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

DEFINITIONS AND CONCEPTS:

Environmental significance:

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

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

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

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

Impact

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

Consequence

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

Likelihood

A qualitative term covering both probability and frequency.

Frequency

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

Probability

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

Environment

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

Methodology that will be used

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

$$\text{Environmental Significance} = \text{Overall Consequence} \times \text{Overall Likelihood}$$

Determination of Overall Consequence

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

Determination of Severity / Intensity

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

The table below will be used to obtain an overall rating for severity, taking into consideration the various criteria.

Table 20: Table to be used to obtain an overall rating of severity, taking into consideration the various criteria.

| TYPE OF CRITERIA | RATING | | | | |
|----------------------------|-----------------------------|--|----------------------------------|--------------------------------------|--|
| | 1 | 2 | 3 | 4 | 5 |
| Quantitative | 0-20% | 21-40% | 41-60% | 61-80% | 81-100% |
| Qualitative | Insignificant / Non-harmful | Small / Potentially harmful | Significant/ Harmful | Great/ Very harmful | Disastrous / Extremely harmful |
| Social/ Community response | Acceptable / I&AP satisfied | Slightly tolerable / Possible objections | Intolerable/ Sporadic complaints | Unacceptable / Widespread complaints | Totally unacceptable / Possible legal action |
| Irreversibility | Very low cost to mitigate/ | Low cost to mitigate | Substantial cost to mitigate/ | High cost to mitigate | Prohibitive cost to mitigate/ |

| TYPE OF CRITERIA | RATING | | | | |
|---|---|--|---|--|---|
| | 1 | 2 | 3 | 4 | 5 |
| | High potential to mitigate impacts to level of insignificance/ Easily reversible | | Potential to mitigate impacts/ Potential to reverse impact | | Little or no mechanism to mitigate impact Irreversible |
| Biophysical (Air quality, water quantity and quality, waste production, fauna and flora) | Insignificant change / deterioration or disturbance | Moderate change / deterioration or disturbance | Significant change / deterioration or disturbance | Very significant change / deterioration or disturbance | Disastrous change / deterioration or disturbance |

Determination of Duration

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

Table 21: Criteria for the rating of duration.

| RATING | DESCRIPTION |
|--------|-------------------------------------|
| 1 | Up to ONE MONTH |
| 2 | ONE MONTH to THREE MONTHS (QUARTER) |
| 3 | THREE MONTHS to ONE YEAR |
| 4 | ONE to TEN YEARS |
| 5 | Beyond TEN YEARS |

Determination of Extent/Spatial Scale

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

Table 22: Criteria for the rating of extent / spatial scale.

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

Determination of Overall Consequence

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

Table 23: Example of calculating overall consequence.

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

Determination of Likelihood:

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

Determination of Frequency

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

Table 24: Criteria for the rating of frequency.

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

Determination of Probability

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

Table 25: Criteria for the rating of probability.

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

Overall Likelihood

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

Table 26: Example of calculating overall likelihood.

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

Determination of Overall Environmental Significance:

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

Table 27: Determination of overall environmental significance.

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

Qualitative description or magnitude of Environmental Significance

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

Table 28: Description of environmental significance and related action required.

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

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

- High** Of the highest order possible within the bounds of impacts which could occur. In the case of negative impacts, there would be no possible mitigation and / or remedial activity to offset the impact at the spatial or time scale for which it was predicted. In the case of positive impacts, there is no real alternative to achieving the benefit.
- Medium-High** Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
- Medium** Impact would be real but not substantial within the bounds of those, which could occur. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and fairly easily possible, In case of positive

impacts; other means of achieving these benefits would be about equal in time, cost and effort.

| | |
|---------------|---|
| Low-Medium | Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved or little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these. |
| Low | Impact would be negligible. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap, and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or several ways, than this means of achieving the benefit |
| Insignificant | There would be a no impact at all – not even a very low impact on the system or any of its parts. |

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

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

Refer to Part A(1)(h)(i) *Details of the development footprint alternatives considered*, for an explanation on the development alternatives that were considered. The proposed project will result in the following positive impacts:

POSITIVE IMPACTS ASSOCIATED WITH PROJECT PROPOSAL (S1):

- ∞ The permit holder will be able to exploit the sand resource on the property and supply the Maclear/Nqanqarhu and Mt Fletcher people/businesses at competitive prices;
- ∞ The landowner will receive compensation from the Applicant, and in doing so diversify the income generated from the property;
- ∞ The proposed project will create ±8 employment opportunities;
- ∞ Mining of the sand resource can take place without disturbing the cultivation of the adjacent fields of the landowner.
- ∞ The Tsitsa River annually replenishes the sand deposit and reinstates the riverbed, thereby eliminating any residual impact that the sand mining activity may have on the flow of the river, or visual characteristics of the receiving and/or surrounding environment.
- ∞ Mining of the sand resource will bring about the clearing of the alien vegetation from the riverbank (within the approved footprint). Invader plant management will also be implemented for the duration of the proposed activity, and upon closure the area will be rehabilitated with indigenous vegetation.

- ∩ The presence of the proposed operation will contribute (directly & indirectly) to the local economy with preference give to HDSA & women owned local suppliers (if available);
- ∩ Upon closure of the mine, the area can be returned to agricultural use.

POTENTIAL NEGATIVE IMPACTS ASSOCIATED WITH THE PREFERRED PROJECT PROPOSAL (S1):

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

Table 29: List of potential negative impacts associated with the project proposal.

| ACTIVITY | POTENTIAL IMPACT | SIGNIFICANCE (BEFORE MITIGATION) | SIGNIFICANCE (AFTER MITIGATION) |
|--|--|----------------------------------|---------------------------------|
| ∩ Site establishment | ∩ Visual intrusion because of site establishment. | ∩ Low-Medium | ∩ Low-Medium |
| ∩ Site establishment | ∩ Alteration of natural hydrology through clearing of riparian vegetation and bank shaping to access the resource. ∩ Altered geomorphology of the watercourse. ∩ Bed, flow, and channel modification due to removal of sand from the river channel and embankment. ∩ Potential cumulative impact of mining on the Tsitsa River. | ∩ Medium-High | ∩ Medium |
| ∩ Winning of sand | | ∩ Medium-High | ∩ Medium |
| ∩ Cumulative impacts | | ∩ High | ∩ Medium |
| ∩ Site establishment | ∩ Infestation of the mining area with invader plant species. | ∩ Medium | ∩ Low |
| ∩ Stockpiling and transporting material from site | ∩ Infestation of denuded areas with invader plant species. | ∩ Medium | ∩ Low |
| ∩ Sloping and landscaping upon closure of the mine | ∩ Infestation of the reinstated area with invader plant species. | ∩ Medium | ∩ Low |
| ∩ Site establishment | ∩ Dust nuisance because of site establishment. | ∩ Low | ∩ Low |
| ∩ Stockpiling and transporting material from site | ∩ Dust nuisance because of the transporting of material from site. | ∩ Medium | ∩ Low-Medium |
| ∩ Site establishment | ∩ Noise nuisance because of site establishment. | ∩ Low | ∩ Low |
| ∩ Winning of sand | ∩ Noise nuisance because of the mining activities. | ∩ Low-Medium | ∩ Low |
| ∩ Stockpiling and transporting material from site | ∩ Noise nuisance because of the mining activities and/or transportation of material. | ∩ Low-Medium | ∩ Low-Medium |
| ∩ Site establishment | ∩ Contamination of the surface water and mining area through potential sewage spills and/or solid waste inputs. | ∩ Medium | ∩ Low |
| ∩ Winning of sand | | ∩ Medium-High | ∩ Low |

| ACTIVITY | POTENTIAL IMPACT | SIGNIFICANCE (BEFORE MITIGATION) | SIGNIFICANCE (AFTER MITIGATION) |
|---|--|---|--|
| <ul style="list-style-type: none"> ⌘ Stockpiling and transporting material from site ⌘ Sloping and landscaping upon closure of the mine | <ul style="list-style-type: none"> ⌘ Soil and/or surface water contamination from hydrocarbon spills, waste and/or sewage. ⌘ Potential impact associated with littering and hydrocarbon spills. ⌘ Potential impact associated with litter/hydrocarbon spills left at the mining area. | <ul style="list-style-type: none"> ⌘ Medium ⌘ Medium | <ul style="list-style-type: none"> ⌘ Low ⌘ Low |
| <ul style="list-style-type: none"> ⌘ Site establishment | <ul style="list-style-type: none"> ⌘ Potential damage to Eskom power line | <ul style="list-style-type: none"> ⌘ Low | <ul style="list-style-type: none"> ⌘ Low |
| <ul style="list-style-type: none"> ⌘ Winning of sand | <ul style="list-style-type: none"> ⌘ Potential impact on areas/infrastructure of heritage or cultural concern. | <ul style="list-style-type: none"> ⌘ Low | <ul style="list-style-type: none"> ⌘ Low |
| <ul style="list-style-type: none"> ⌘ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ⌘ Increased suspended solids due to stockpiling of mined sand. | <ul style="list-style-type: none"> ⌘ Medium | <ul style="list-style-type: none"> ⌘ Low-Medium |
| <ul style="list-style-type: none"> ⌘ Stockpiling and transporting material from site | <ul style="list-style-type: none"> ⌘ Deterioration of the access road to the mining area. ⌘ Overloading of trucks having an impact on the public roads. | <ul style="list-style-type: none"> ⌘ Medium ⌘ Medium-High | <ul style="list-style-type: none"> ⌘ Low ⌘ Low |
| <ul style="list-style-type: none"> ⌘ Cumulative impacts | <ul style="list-style-type: none"> ⌘ Potential impact on downstream users. | <ul style="list-style-type: none"> ⌘ Medium-High | <ul style="list-style-type: none"> ⌘ Low-Medium |
| <ul style="list-style-type: none"> ⌘ Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> ⌘ Erosion of returned topsoil after rehabilitation (riverbank/riparian area). | <ul style="list-style-type: none"> ⌘ Low-Medium | <ul style="list-style-type: none"> ⌘ Low |
| <ul style="list-style-type: none"> ⌘ Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> ⌘ Residual impact on the Tsitsa River. | <ul style="list-style-type: none"> ⌘ High | <ul style="list-style-type: none"> ⌘ Low |

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 mitigation or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered)

The following mitigation measures are proposed to address/minimize the impact of the proposed activity on the surrounding environment:

VISUAL CHARACTERISTICS

Visual Mitigation:

- ⌘ The site must have a neat appearance and be kept in good condition.
- ⌘ The permit holder must limit vegetation removal (if applicable), and stripping of topsoil may only be done immediately prior to the use of a specific area.
- ⌘ Upon closure the site must be rehabilitated to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum.

AIR AND NOISE QUALITY

Fugitive Dust Emission Mitigation:

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

Noise Handling:

- ⌘ The permit holder must ensure that employees and staff conduct themselves in an acceptable manner while on site.
- ⌘ No loud music may be permitted at the mining area.
- ⌘ All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996).
- ⌘ Best practice measures shall be implemented to minimize potential noise impacts.
- ⌘ Work hours must be from 07:00 to 18:00 Monday to Saturday. No work may be allowed after hours or on Sundays.

GEOLOGY AND SOIL

Topsoil Management:

- 3 The upper 300 mm of the soil (on the riverbank) must be stripped and stockpiled.
- 3 Topsoil is a valuable and essential resource for rehabilitation, and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes.
- 3 Topsoil stripping, stockpiling, and re-spreading must be done in a systematic way. The mining plan must be such that topsoil is stockpiled for the minimum possible time.
- 3 The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas.
- 3 Topsoil stockpiles must be protected against losses by water and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants (grass or a cover crop) on the stockpiles will help to prevent erosion.
- 3 Topsoil heaps may not exceed 2 m to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.
- 3 The temporary topsoil stockpiles must be kept free of invasive plant species.
- 3 Storm- and runoff water must be diverted around the stockpile area to prevent erosion.
- 3 The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area (riverbank) upon closure of the site.
- 3 The permit holder must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal.
- 3 An indigenous grass layer must be planted, irrigated, and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The grass layer must be fertilized for optimum biomass production. It is important that rehabilitation be taken up to the point of grass layer stabilization. Rehabilitation cannot be considered complete until the first layer of grass is well established.
- 3 The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.

HYDROLOGY

Mitigating the potential impact on the Tsitsa River, riparian areas, and downstream users:

- ∞ The flow of the river may at no point be changed, dammed, or diverted without prior authorisation from the Department of Water and Sanitation (DWS).
- ∞ No activities may take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan.
- ∞ The permit holder must always adhere to the requirements of the water use authorisations to be obtained prior to the commencement of the mining activities.
- ∞ Extraction of sand from the riverbed must be limited to low flow periods (May-October).
- ∞ The extraction from the riverbed may not exceed 1 m or deeper than the defined base layer of the river.
- ∞ Bar skimming is recommended if feasible.
- ∞ If possible, the thalweg (lowest point connecting the sections of the river) of the river reach being mined must be maintained to prevent a flat uniform wide channel which results in thinly spread flows.
- ∞ A single access point through the delineated vegetation zones must be made. Once this access point has been created mining platforms must be constructed outside of the delineated zone (i.e. 2 m from the delineated bank).
- ∞ Erosion control such as gabions must be established at the access point through the vegetation.
- ∞ Existing roads must be used and access to the river must be made perpendicular to flow.
- ∞ Temporary storm water management systems must be in place and preferential runoff channels be filled with aggregate and/or logs (branches included) to dissipate flows, limiting erosion and sedimentation.
- ∞ Silt traps and sediment trapping berms must be in place in drainage lines around the stockpile area.
- ∞ The footprint area must be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.
- ∞ The contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly.
- ∞ All machinery and equipment must be inspected regularly for faults and possible leaks and must have drip trays to contain oil leakage, these must be serviced off-site.
- ∞ Adequate sanitary facilities and ablutions must be provided for all personnel throughout the construction site. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).

- ⌘ All solid waste generated on-site during construction and operation must be adequately managed. Separation and recycling of different waste materials should be supported.
- ⌘ Stockpiles of the sand resource must not be kept within the delineated buffer zone (10 m).
- ⌘ Access routes and other infrastructure areas must be rehabilitated upon closure of the site.
- ⌘ To avoid floodplain ponding, no floodplain areas (if present) may be mined with the focus of the mining operation on the instream sand resource.
- ⌘ To monitor for potential environmental degradation downstream of the mining permit bi-annual (high and low flow) aquatic biomonitoring must take place.
- ⌘ No chemicals of any kind may be stored within the mining area (operational phase).
- ⌘ Upon closure, the permit holder must remove all mining related equipment/machinery from the mining area.

Erosion Control and Stormwater Management:

- ⌘ Drainage must be controlled to ensure that runoff from the mining area (riverbank/riparian area) does not culminate in off-site pollution, flooding or result in any damage to properties downstream or any storm water discharge points.
- ⌘ Storm water must be diverted around the topsoil heaps and stockpiles to prevent erosion.
- ⌘ Erosion control such as gabions must be established at the access point through the vegetation.
- ⌘ Temporary storm water management systems must be in place and preferential runoff channels be filled with aggregate and/or logs (branches included) to dissipate flows, limiting erosion and sedimentation.
- ⌘ Silt traps and sediment trapping berms must be in place in drainage lines around the stockpile area.
- ⌘ Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose:
 - Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems.
 - Dirty water must be collected and contained in a system separate from the clean water system.
 - Dirty water must be prevented from spilling or seeping into clean water systems.

- A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns).
- The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan.

TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS AND GROUNDCOVER

Management of Vegetation Removal:

- ∞ The mining boundaries must be clearly demarcated, and all operations must be contained to the approved mining area. The area outside the mining boundaries must be declared a no-go area, and all staff must be educated accordingly.
- ∞ A pre-commencement environmental induction for all site staff must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc.
- ∞ A single access point through the delineated vegetation zones must be made. Once this access point has been created mining platforms should be constructed outside of the delineated zone (i.e. 2 m from the delineated bank).
- ∞ The wood from cleared vegetation can be donated to the community. Other plant remains can ideally be covered with stockpiled topsoil and the material be retained for future site rehabilitation purposes.
- ∞ The ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially during the site establishment phase, when most of the vegetation clearing is taking place.
- ∞ All vehicles must remain on demarcated roads and no unnecessary driving in the veld outside these areas may be allowed.
- ∞ No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the ECO and without the relevant permits.
- ∞ No fires must be allowed on-site.
- ∞ Spoil heaps and topsoil stockpiles must be provided with a vegetation cover of indigenous grasses.

Management of Invasive Plant Species:

- ∞ An invasive plant species management plan (Appendix K) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management:

Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities.

- ⌘ No planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose may be allowed.
- ⌘ All stockpiles (topsoil) must be kept free of invasive plant species.
- ⌘ Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used:
 - The plants can be uprooted, felled, or cut off and can be destroyed completely.
 - The plants can be treated chemically by a registered pest control officer (PCO) using an herbicide recommended by the PCO in accordance with the directions for the use of such an herbicide.

FAUNA

Protection of Fauna:

- ⌘ The site manager must ensure no fauna is caught, killed, harmed, sold, or played with.
- ⌘ Any fauna directly threatened by the operational activities must be removed to a safe location by the ECO or other suitably qualified person.
- ⌘ All personnel must undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Workers must be instructed to report any animals that may be trapped in the working area.
- ⌘ No snares may be set, or nests raided for eggs or young.
- ⌘ All vehicles must adhere to a low speed limit (40 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises.
- ⌘ No litter, food or other foreign material may be thrown or left around the site. Such items must be kept in the site vehicles and daily removed to the site camp.
- ⌘ Mining may only take place during the low flow period of the river (May-October).

CULTURAL AND HERITAGE ENVIRONMENT

Archaeological, Heritage and Palaeontological Aspects:

- ⌘ All mining must be confined to the development footprint area.
- ⌘ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.

- ∞ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- ∞ The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify SAHRA.
- ∞ Work may only continue once the go-ahead was issued by SAHRA.
- ∞ The following procedure is only required if fossils are seen on the surface and when excavations commence.
- ∞ When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
- ∞ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures.
- ∞ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- ∞ If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
- ∞ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- ∞ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- ∞ If no fossils are found and the excavations have finished, then no further monitoring is required.

EXISTING INFRASTRUCTURE

Managing the Power Line:

- ∞ An adequate no-go buffer (minimum 10 m) must be maintained around the power line as per Eskom standard.
- ∞ Should the line be damaged, Eskom must immediately (within the first hour of occurrence) be informed.

Access Road Mitigation:

- ⌘ Storm water must be diverted around the access road to prevent erosion.
- ⌘ Vehicular movement must be restricted to the existing access road and crisscrossing of tracks through undisturbed areas must be prohibited.
- ⌘ Access to the river must be made perpendicular to the flow.
- ⌘ Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the permit holder.
- ⌘ Overloading of the trucks must be prevented, and proof of load weights must be filed for auditing purposes.
- ⌘ The speed of all mining equipment/vehicles must be restricted to 40 km/h on the access roads.
- ⌘ Access points into the river must be rehabilitated once the mine is closed.

GENERAL

Waste Management:

- ⌘ Regular vehicle maintenance, repairs and services may only take place at an off-site workshop and service area. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a closed container/bin to be removed from the emergency service area (same day) to the workshop to ensure proper disposal. This waste must be treated as hazardous waste and must be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous waste handling contractor. The safe disposal certificates must be filed for auditing purposes. No machinery/vehicle may be repaired in the riverbed.
- ⌘ If a diesel bowser is used on site, it must always be equipped with a drip tray. Drip trays must be used during each refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.
- ⌘ Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the workshop, where it is incorporated into the hazardous waste removal system.
- ⌘ Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a registered facility. Proof of safe disposal must be filed for auditing purposes.
- ⌘ An oil spill kit must be obtained, and the employees must be trained in the emergency procedures to follow when a spill occurs as well as the application of the spill kit.

- ⌘ Spills must be cleaned up immediately, within two hours of occurrence, to the satisfaction of the Regional Manager (DMRE) by removing the spillage together with the polluted soil and containing it in a designated hazardous waste bin until it is disposed of at a registered facility. Proof must be filed.
- ⌘ Suitable covered receptacles must be always available and conveniently placed for the disposal of general waste.
- ⌘ Biodegradable and non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a collecting point to be collected at least once a month and disposed of at a registered landfill site. Specific precautions must be taken to prevent refuse from being dumped on or in the vicinity of the mine area. Proof of disposal must be available for auditing purposes.
- ⌘ Re-use or recycling of waste products must be encouraged on site.
- ⌘ No waste may be buried or burned on the site.
- ⌘ Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet must be anchored, placed outside the 1:100 year floodline of the river and must be serviced at least once a week for the duration of the mining activities by a registered liquid waste handling contractor. The safe disposal certificates must be filed for auditing purposes.
- ⌘ The use of any temporary, chemical toilet facilities may not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the permit holder.
- ⌘ It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities.
- ⌘ Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area.

Management of Health and Safety Risks:

- ⌘ Workers must have access to the correct personal protection equipment (PPE) as required by law.
- ⌘ Sanitary facilities must be located within 100 m from any point of work.
- ⌘ All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).

ix) Motivation where no alternative sites were considered.

Not applicable.

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

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

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

1. **Topography** – Should the sand mining area gradually be sloped from the bank towards the river, and the thalweg of the riverbed be maintained, the risk of bank erosion can be prevented. Considering this, and if the mitigation measures proposed in this report are implemented the potential impact of the mining activities on the topography of the area will be of low significance provided that the area is rehabilitated upon closure.
2. **Visual Characteristics** – The viewshed analysis showed that the visual impact of the proposed sand mining operation, whether established at S1 or S2, will be of low-medium significance, especially as no permanent structures will be constructed and the river will annually reinstate the excavated riverbed. Should the Applicant successfully rehabilitate the riverbank (upon closure), no residual visual impact is expected upon closure of the mine.
3. **Air and Noise Quality** – The proposed activity will contribute the emissions of one TLB, three tippers, and occasionally an excavator to the receiving environment for the duration of the operational phase. Should the permit holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low significance and compatible with the current land use. The potential impact on the noise ambience of the receiving environment is expected to be of low significance and representative of the traffic driving along the R56.
4. **Hydrology** – The ABSA notes that due to the current state of the river and riparian areas, it is unlikely the sand mining activities (instream and in the riparian area) will further reduce the condition of the study area. The post-mitigation risk level for all mining related aspects was determined to be moderate. It is the opinion of the specialist that the proposed sand mining of the river and its bank be supported, subject to mitigation measures during the operational phase and rehabilitation of the mining and riparian area post-mining.

5. **Terrestrial Biodiversity, Conservation and Groundcover** – Ground-truthing confirmed that the proposed footprint is highly disturbed with a high level of alien infestation. The ABSA concluded that the ecological status of the sampled Tsitsa River (Freshwater: CBA) is largely modified (Class D), and therefore the impact of the proposed sand mining operation on the identified CBA is deemed to be of Low significance. No protected and/or sensitive plant species occur within the proposed mining footprint, and the specialist did not identify any wetland areas/vegetation of concern. If the Applicant implement the mitigation measures proposed in the EMPR the impact of the proposed activity on the riparian vegetation and groundcover in general is deemed to be of low significance.
6. **Fauna** - No protected or red data species were identified within the proposed footprint area. The fauna at the site will not be impacted on by the proposed mining activity as they will be able to move away or through the site, without being harmed. The proposed sand mining operation is expected to have a moderate impact on the aquatic ecology of the Tsitsa River should the mitigation measures proposed in this report be implemented.
7. **Cultural and Heritage Environment** - The HIA (inclusive of the PIA) notes that no heritage sites were recorded during the study and no adverse impacts to heritage resources are expected by the proposed project. Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure.
8. **Site Specific Infrastructure** – The mining activities will have no impact on the nearby power line. No other infrastructure exists within the earmarked footprint that can/will be disturbed by the proposed mining activities, and the Applicant will maintain the access road for the duration of the mine.

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)

During the impact assessment process the following potential impacts were identified of each main activity in each phase. An initial significance rating (listed under *v) Impacts and Risks Identified*) was determined for each potential impact should the mitigation measures proposed in this document not be implemented on-site. The impact assessment process then continued in identifying mitigation measures to address the impact that the proposed mining activity may have on the surrounding environment.

The significance rating was again determined for each impact using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. The impact ratings

listed below was determined for each impact **after** bringing the proposed mitigation measures into consideration and therefore represents the final layout/activity proposal.

SITE ESTABLISHMENT

Visual intrusion because of site establishment

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|---------------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| Rating: Low-Medium | | | | | | Degree of Mitigation: Partial | |
| 1 | 4 | 1 | 2 | 1 | 5 | 3 | 6 |

Alteration of natural hydrology through clearing of riparian vegetation and bank shaping to access the resource

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| Rating: Medium | | | | | | Degree of Mitigation: Partial | |
| 2 | 4 | 2 | 2.6 | 3 | 5 | 4 | 10.4 |

Infestation of the mining area with invader plant species

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Low | | | | | | Degree of Mitigation: Full | |
| 2 | 1 | 1 | 1.3 | 2 | 2 | 2 | 2.6 |

Dust nuisance because of site establishment

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Low | | | | | | Degree of Mitigation: Full | |
| 1 | 3 | 1 | 1.6 | 1 | 2 | 1.5 | 2.4 |

Noise nuisance because of site establishment

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| Rating: Low | | | | | | Degree of Mitigation: Partial | |
| 1 | 3 | 1 | 1.6 | 1 | 2 | 1.5 | 2.4 |

Contamination of the surface water and mining area through potential sewage spills and/or solid waste inputs

| Severity | Duration | Extent | Consequence | Probability | Frequency | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| Rating: Low | | | | | | Degree of Mitigation: Full | |
| 2 | 1 | 1 | 1.3 | 2 | 2 | 2 | 2.6 |

Potential damage to Eskom power line

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|--------------------|----------|--------|-----------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low | | | Degree of Mitigation: Full | | | |
| 3 | 1 | 1 | 1.6 | 1 | 1 | 1.6 |

Work opportunities to 8 people (**Positive Impact**)

| Severity | Duration | Extent | Consequence | Likelihood | | Significance (+) |
|----------------------------|----------|--------|----------------------------------|-------------|-----------|------------------|
| | | | | Probability | Frequency | |
| Rating: Medium-High | | | Degree of Mitigation: N/A | | | |
| 1 | 4 | 5 | 3.3 | 5 | 5 | 16.5 |

WINNING OF SAND

Altered geomorphology of the watercourse

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|-----------------------|----------|--------|--------------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Medium | | | Degree of Mitigation: Partial | | | |
| 2 | 4 | 2 | 2.6 | 3 | 5 | 10.4 |

Bed, flow, and channel modification due to removal of sand from the river channel and embankment

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|-----------------------|----------|--------|--------------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Medium | | | Degree of Mitigation: Partial | | | |
| 2 | 4 | 2 | 2.6 | 4 | 5 | 11.7 |

Soil and/or surface water contamination from hydrocarbon spills, waste and/or sewage

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|--------------------|----------|--------|-----------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low | | | Degree of Mitigation: Full | | | |
| 2 | 1 | 1 | 1.3 | 2 | 2 | 2.6 |

Noise nuisance because of the mining activities

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|--------------------|----------|--------|--------------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low | | | Degree of Mitigation: Partial | | | |
| 2 | 2 | 1 | 1.6 | 1 | 2 | 2.4 |

Potential impact on areas/infrastructure of heritage or cultural concern

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|--------------------|----------|--------|-----------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low | | | Degree of Mitigation: Full | | | |
| 2 | 4 | 5 | 3.6 | 1 | 1 | 3.6 |

STOCKPILING AND TRANSPORTING MATERIAL FROM SITE:

Increased suspended solids due to stockpiling of mined sand

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|---------------------------|----------|--------|-----------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low-Medium | | | Degree of Mitigation: Full | | | |
| 2 | 4 | 2 | 2.6 | 2 | 2 | 5.2 |

Dust nuisance because of the transporting of material from site

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|---------------------------|----------|--------|-----------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low-Medium | | | Degree of Mitigation: Full | | | |
| 2 | 4 | 3 | 3 | 2 | 2 | 6 |

Noise nuisance because of the mining activities and/or transportation of material

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|---------------------------|----------|--------|--------------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low-Medium | | | Degree of Mitigation: Partial | | | |
| 2 | 4 | 3 | 3 | 2 | 2 | 6 |

Potential impact associated with littering and hydrocarbon spills

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|--------------------|----------|--------|-----------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low | | | Degree of Mitigation: Full | | | |
| 2 | 1 | 1 | 1.3 | 2 | 2 | 2.6 |

Infestation of denuded areas with invader plant species

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|--------------------|----------|--------|-----------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low | | | Degree of Mitigation: Full | | | |
| 2 | 1 | 1 | 1.3 | 2 | 2 | 2.6 |

Deterioration of the access road to the mining area

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|--------------------|----------|--------|-----------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low | | | Degree of Mitigation: Full | | | |
| 2 | 1 | 3 | 2 | 2 | 2 | 4 |

Overloading of trucks having an impact on the public roads

| Severity | Duration | Extent | Consequence | Likelihood | | Significance |
|--------------------|----------|--------|-----------------------------------|-------------|-----------|--------------|
| | | | | Probability | Frequency | |
| Rating: Low | | | Degree of Mitigation: Full | | | |
| 4 | 1 | 5 | 3.3 | 2 | 1 | 4.9 |

CUMULATIVE IMPACTS:

Potential cumulative impact of mining on the Tsitsa River

| Severity | Duration | Extent | Consequence | | | Likelihood | Significance |
|-----------------------|----------|--------|-------------|-------------|-----------|--------------------------------------|--------------|
| | | | | Probability | Frequency | | |
| Rating: Medium | | | | | | Degree of Mitigation: Partial | |
| 2 | 4 | 2 | 2.6 | 3 | 5 | 4 | 10.4 |

Potential impact on downstream users

| Severity | Duration | Extent | Consequence | | | Likelihood | Significance |
|---------------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| | | | | Probability | Frequency | | |
| Rating: Low-Medium | | | | | | Degree of Mitigation: Full | |
| 2 | 4 | 3 | 3 | 2 | 2 | 2 | 6 |

SLOPING AND LANDSCAPING UPON CLOSURE OF THE MINING AREA

Erosion of returned topsoil after rehabilitation (riverbank/riparian area)

| Severity | Duration | Extent | Consequence | | | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| | | | | Probability | Frequency | | |
| Rating: Low | | | | | | Degree of Mitigation: Full | |
| 2 | 1 | 2 | 1.6 | 2 | 1 | 1.5 | 2.4 |

Residual impact on the Tsitsa River

| Severity | Duration | Extent | Consequence | | | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| | | | | Probability | Frequency | | |
| Rating: Low | | | | | | Degree of Mitigation: Full | |
| 4 | 1 | 2 | 2.3 | 2 | 1 | 1.5 | 3.5 |

Infestation of the reinstated area with invader plant species

| Severity | Duration | Extent | Consequence | | | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| | | | | Probability | Frequency | | |
| Rating: Low | | | | | | Degree of Mitigation: Full | |
| 2 | 1 | 1 | 1.3 | 2 | 2 | 2 | 2.6 |

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

| Severity | Duration | Extent | Consequence | | | Likelihood | Significance |
|--------------------|----------|--------|-------------|-------------|-----------|-----------------------------------|--------------|
| | | | | Probability | Frequency | | |
| Rating: Low | | | | | | Degree of Mitigation: Full | |
| 2 | 1 | 1 | 1.3 | 2 | 1 | 1.5 | 1.9 |

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

| Severity | Duration | Extent | Consequence | | | Likelihood | Significance (+) |
|----------------------------|----------|--------|-------------|-------------|-----------|----------------------------------|------------------|
| | | | | Probability | Frequency | | |
| Rating: Medium-High | | | | | | Degree of Mitigation: N/A | |
| 1 | 5 | 5 | 3.7 | 5 | 5 | 5 | 18.5 |

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).

Table 30: Assessment of each identified potentially significant impact and risk

| ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | SIGNIFICANCE | MITIGATION TYPE | SIGNIFICANCE |
|--|--|---|---|--|--|----------------------------------|
| Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.) | (E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, air pollution, etc...etc...etc.) | | In which impact is anticipated. (E.g. Construction, commissioning, operational Decommissioning closure, post closure.) | If not mitigated. | (modify, remedy, control, or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc etc) E.g. Modify through alternative method Control through noise control Control through management and monitoring through rehabilitation. | If not mitigated. |
| ∩ Demarcation of site with visible beacons. | ∩ No impact could be identified other than the beacons being outside the boundaries of the approved mining area. | N/A | Site Establishment phase | N/A | Control through management and monitoring. | N/A |
| ∩ Site establishment | ∩ Visual intrusion because of site establishment. | The visual impact may affect the aesthetics of the landscape. | Site Establishment & Operational Phase | ∩ Low-Medium | <u>Control:</u> Implementing proper housekeeping. | ∩ Low-Medium |
| ∩ Site establishment ∩ Winning of sand ∩ Cumulative impacts | ∩ Alteration of natural hydrology through clearing of riparian vegetation and bank shaping to access the resource. | This will impact on the hydrology of the receiving environment. | Site Establishment phase | ∩ Medium-High ∩ Medium-High ∩ High | <u>Control:</u> Implementing the mitigation measures proposed by the hydrologist. | ∩ Medium ∩ Medium ∩ Medium |

| ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | SIGNIFICANCE | MITIGATION TYPE | SIGNIFICANCE |
|--|--|--|--|---|---|--|
| | <ul style="list-style-type: none"> ∩ Altered geomorphology of the watercourse. ∩ Bed, flow, and channel modification due to removal of sand from the river channel and embankment. ∩ Potential cumulative impact of mining on the Tsitsa River. | | | <ul style="list-style-type: none"> ∩ Medium-High | | <ul style="list-style-type: none"> ∩ Medium |
| <ul style="list-style-type: none"> ∩ Site establishment ∩ Stockpiling and transporting material from site. ∩ Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> ∩ Infestation of the mining area with invader plant species. ∩ Infestation of denuded areas with invader plant species ∩ Infestation of the reinstated area with invader plant species. | This will impact on the biodiversity of the receiving environment. | Site Establishment-, Operational- and Decommissioning phase | <ul style="list-style-type: none"> ∩ Medium ∩ Medium ∩ Medium | <u>Control & Remedy:</u> Implementation of an invasive plant species management plan. | <ul style="list-style-type: none"> ∩ Low ∩ Low ∩ Low |
| <ul style="list-style-type: none"> ∩ Site establishment ∩ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ∩ Dust nuisance because of site establishment. ∩ Dust nuisance because of transporting of material from site. | Increased dust generation will impact on the air quality of the receiving environment. | Site Establishment- and Operational Phase | <ul style="list-style-type: none"> ∩ Low ∩ Medium | <u>Control:</u> Dust suppression methods and proper housekeeping. | <ul style="list-style-type: none"> ∩ Low ∩ Low-Medium |
| <ul style="list-style-type: none"> ∩ Site establishment ∩ Winning of sand | <ul style="list-style-type: none"> ∩ Noise nuisance because of site establishment. ∩ Noise nuisance because of the mining activities. | Should noise levels become excessive it may have an impact on the noise ambiance of | Site Establishment-, Operational-, and Decommissioning Phase | <ul style="list-style-type: none"> ∩ Low ∩ Low-Medium ∩ Medium | <u>Control:</u> Noise suppression methods and proper housekeeping. | <ul style="list-style-type: none"> ∩ Low ∩ Low ∩ Low-Medium |

| ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | SIGNIFICANCE | MITIGATION TYPE | SIGNIFICANCE |
|--|---|--|--|---|--|--|
| <ul style="list-style-type: none"> ⌘ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ⌘ Noise nuisance because of the mining activities and/or transportation of material. | the receiving environment. | | | | |
| <ul style="list-style-type: none"> ⌘ Site establishment ⌘ Winning of sand. ⌘ Stockpiling and transporting material from site. ⌘ Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> ⌘ Contamination of the surface water and mining area through potential sewage spills and/or solid waste inputs. ⌘ Soil and/or surface water contamination from hydrocarbon spills, waste and/or sewage. ⌘ Potential impact associated with littering and hydrocarbon spills. ⌘ Potential impact associated with litter/hydrocarbon spills left at the mining area. | Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will also incur additional costs to the permit holder. | Site Establishment-, Operational-, and Decommissioning Phase | <ul style="list-style-type: none"> ⌘ Medium ⌘ Medium-High ⌘ Medium ⌘ Medium | <u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan. | <ul style="list-style-type: none"> ⌘ Low ⌘ Low ⌘ Low ⌘ Low |
| <ul style="list-style-type: none"> ⌘ Site establishment | <ul style="list-style-type: none"> ⌘ Potential damage to Eskom power line. | Damage to the power line will have a detrimental effect on the electricity supply of the community. | Site establishment phase | <ul style="list-style-type: none"> ⌘ Low | <u>Stop & Control:</u> Maintain the 10 m no-go buffer zone and keep mining operations within the approved footprint. | <ul style="list-style-type: none"> ⌘ Low |
| <ul style="list-style-type: none"> ⌘ Winning of sand. | <ul style="list-style-type: none"> ⌘ Potential impact on area/infrastructure of heritage or cultural concern. | This could impact on the cultural and heritage legacy of the receiving environment. | Operational Phase | <ul style="list-style-type: none"> ⌘ Low | <u>Control & Stop:</u> Implementing good management practices, as well as the chance-find protocol. | <ul style="list-style-type: none"> ⌘ Low |

| ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | SIGNIFICANCE | MITIGATION TYPE | SIGNIFICANCE |
|--|--|---|-----------------------|---------------------------|--|----------------|
| ⌘ Stockpiling and transporting material from site. | ⌘ Increased suspended solids due to stockpiling of mined sand. | An increase in the suspended solids of the river will affect the hydrology of the system. | Operational Phase | ⌘ Medium | <u>Control & Remedy:</u> Implementing the mitigation measures proposed by the hydrologist, and rectification measures when needed. | ⌘ Low-Medium |
| ⌘ Stockpiling and transporting material from site. | ⌘ Deterioration of the access road to the mining area. ⌘ Overloading of trucks having and impact on the public roads. | Collapse of the road infrastructure will affect the landowner and public. | Operational Phase | ⌘ Medium ⌘ Medium-High | <u>Control & Remedy:</u> Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining. Prevent overloading. | ⌘ Low ⌘ Low |
| ⌘ Cumulative impacts | ⌘ Potential impact on downstream users. | Should the mining activity have a negative impact on the downstream users it will incur extensive complaints that may result in additional costs to mitigate the impacts. | Operational Phase | ⌘ Medium-High | <u>Stop:</u> Manage the activity in accordance with the requirements to prevent downstream impacts. | ⌘ Low-Medium |
| ⌘ Sloping and landscaping upon closure of the mining area. | ⌘ Erosion of returned topsoil after rehabilitation (riverbank/riparian area). | Erosion of the riverbank will affect the hydrology of the area. | Decommissioning phase | ⌘ Low-Medium | <u>Control & Remedy:</u> Implementing stormwater and erosion protection measures. | ⌘ Low |
| ⌘ Sloping and landscaping upon closure of the mining area. | ⌘ Residual impact on the Tsitsa River. | This aspect will affect the hydrology of the area. | Decommissioning phase | ⌘ High | <u>Control & Remedy:</u> Implementing the mitigation measures proposed by the hydrologist. | ⌘ Low |

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

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):-

Table 31: Summary of specialist reports

| LIST OF STUDIES UNDERTAKEN | RECOMMENDATIONS OF SPECIALIST REPORTS | SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with X if applicable) | REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED |
|--|---|---|---|
| <p>Heritage Impact Assessment (inclusive of the Palaeontological Impact Assessment)</p> <p>For the proposed Maclear sand mining permit, Eastern Cape Province.</p> <p><i>(See Appendix H for a full copy of the document)</i></p> | <p>Conclusion and Recommendations:</p> <p>The Project area is situated along a narrow strip on the southern bank of the Tsitsa River. The study area is characterised by deep sandy soil, thick wooded vegetation and impacted on by sheet erosion with evidence of previous sand extraction along the riverbank. The objective of the project is the extraction of sand from the Tsitsa River and riverbanks. The proposed project will be of small scale where the mineral (sand) will be mined from the river with a TLB (and/or excavator) that will stockpile it on the nearby riverbank until it is loaded onto trucks that will transport it from the site to clients. The existing roads on the property will be used to gain access to the proposed mining area.</p> <p>The study area is of low archaeological potential, and this was confirmed during the field survey whereby no heritage resources were noted in the study area. The study area is however of high paleontological significance according to the SAHRA Paleontological sensitivity map and was independently assessed by Prof Marion Bamford (2022), and she concluded that it is extremely unlikely that any fossils would be preserved in the overlying soils and sands of the Quaternary. There is a very small chance that fossils may occur in below the ground surface in the shales of the Molteno Formation so a Fossil Chance Find Protocol should be added to the EMPR.</p> <p>Two alternatives were provided for assessment and neither option would affect any known heritage resources, and both is acceptable from a heritage perspective. The impact on heritage resources is low and the</p> | <p>This report supports all the recommendations proposed by the specialist.</p> | <p>Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Cultural and Heritage Environment.</p> <p>Part A(1)(h)(viii) The possible mitigation measures that could be applied and the level of risk – Archaeological, Heritage and Palaeontological Aspects.</p> <p>Part A(1)(m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.</p> <p>Part B(1)(d)(iv) Impacts to be mitigated in their respective phases.</p> <p>Part B(1)(g)-(k) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon.</p> |

| LIST OF STUDIES UNDERTAKEN | RECOMMENDATIONS OF SPECIALIST REPORTS | SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with X if applicable) | REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED |
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| | <p>project can be authorised provided that the recommendations in this report are adhered to and based on the South African Heritage Resource Authority (SAHRA) 's approval.</p> <p>Recommendations:</p> <p>The following recommendations for Environmental Authorisation apply and the project may only proceed based on approval from SAHRA:</p> <ol style="list-style-type: none"> 1. Implementation of the Chance Find Procedure for the project as outlined in Section 10.2 of the HIA (Appendix H). 2. Day to day monitoring can be conducted by the Environmental Control Officers (ECO). The ECO or other responsible persons should be trained along the following lines: <ul style="list-style-type: none"> 3 Induction training: Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources. 3 Site monitoring and watching brief: As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are from pre-construction and construction activities. The ECO should monitor all such activities. If any heritage resources are found, the chance finds procedure must be followed as outlined in Section 10.2. | | |
| <p>Aquatic Biodiversity Specialist Assessment</p> <p>Freshwater Ecological Assessment for the proposed Maclear Sand Mine Project.</p> | <p>Recommendations:</p> <p>Due to the current state of the river and riparian areas, it is unlikely the sand mining activities (instream and in the riparian area) will further reduce the condition; hence the following revision may be considered for the Maclear Sand Mine:</p> | <p>This report supports all the recommendations proposed by the specialist.</p> | <p>Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – Hydrology.</p> <p>Part A(1)(h)(iv)(1)(c) Description of specific environmental features and infrastructure on the site – Site Specific Hydrology.</p> |

| LIST OF STUDIES UNDERTAKEN | RECOMMENDATIONS OF SPECIALIST REPORTS | SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with X if applicable) | REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED |
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| <p><i>(See Appendix G for a full copy of the document)</i></p> | <ul style="list-style-type: none"> ∩ Mining the flood benches or river banks, provided that a slope that prevents bulk erosion is maintained and does not increase flood risk or level; ∩ Sand mining activities within 10 m of banks must have mitigation that prevents bank destabilisation and subsequent collapse; ∩ Where applicable, mine sand from features such as sand bars, that are not in the main low flow channel (to reduce fine sediment being resuspended and washed downstream); ∩ Mining of the disturbed riparian vegetation areas, subject to rehabilitation with indigenous vegetation. ∩ Access the river from one point along the bank only; ∩ Limit the amount of driving in the river channel; ∩ Prevent erosion of the bank in the direct surrounds of the access point (slope to 1:3 gradient and vegetate steep and bare areas); and ∩ Prevent erosion of the bank and flood bench caused by the erosive power of the return flow (dredge and pipeline option); ∩ Stockpiling in the riparian and buffer areas, provided that measures are in place to prevent the stockpiles from re-entering the watercourse and are removed regularly to avoid the establishment of alien/invasive vegetation. | | <p>Part A(1)(h)(viii) The possible mitigation measures that could be applied and the level of risk – Hydrology.</p> <p>Part A(1)(m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR.</p> <p>Part B(1)(d)(iv) Impacts to be mitigated in their respective phases.</p> <p>Part B(1)(g)-(k) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon.</p> |

I) Environmental impact statement

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

The key findings of the environmental impact assessment entail the following:

Project Proposal

World Focus 1143 CC applied for authorisation to mine sand from a 1.16 ha area that extends over the Tsitsa riverbed and -bank. The proposed mining footprint covers an area where informal sand mining previously took place. The operational phase will involve the direct excavation of the sand with a TLB (and/or excavator) that will stockpile it until it is loaded onto trucks that will transport the sand to clients. The Applicant will make use of a single access point into the river to limit damage to the riparian zone. Due to the small scale of the operation no infrastructure, other than a chemical toilet, will be established within the mining footprint, and the mining area will be reached via the existing farm road.

Topography

The natural topography of both S1 & S2 is flat, dropping gradually from the riverbank into the riverbed. The proposed activity (S1/S2) will impact the topography of the earmarked footprint in that the virgin soil level of the riverbank/riparian area will be reduced. Should the sand mining area gradually be sloped from the bank towards the river, and the thalweg of the riverbed be maintained, the risk of bank erosion can be prevented. Considering this, and if the mitigation measures proposed in this report are implemented the potential impact of the mining activities on the topography of the area will be of low significance provided that the area is rehabilitated upon closure.

Visual Characteristics

The viewshed analysis showed that the visual impact of the proposed sand mining operation, whether established at S1 or S2, will be of low-medium significance, especially as no permanent structures will be constructed and the river will annually reinstate the excavated riverbed. Should the Applicant successfully rehabilitate the riverbank (upon closure), no residual visual impact is expected upon closure of the mine.

Air and Noise Quality

The proposed activity will contribute the emissions of one TLB, three tippers, and occasionally an excavator to the receiving environment for the duration of the operational phase. Should the permit holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low significance and compatible with the current land use. The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the traffic driving along the R56.

Hydrology

The Applicant is in the process of applying for a water use authorisation from the DWS regarding the proposed operation in the river.

The ABSA notes that due to the current state of the river and riparian areas, it is unlikely the sand mining activities (instream and in the riparian area) will further reduce the condition of the study area. The post-mitigation risk level for all mining related aspects was determined to be moderate. It is the opinion of the specialist that the proposed sand mining of the river and its bank be supported, subject to mitigation measures during the operational phase and rehabilitation of the mining and riparian area post-mining.

Terrestrial Biodiversity, Conservation and Groundcover

Ground-truthing confirmed that the proposed footprint is highly disturbed with a high level of alien infestation. The ABSA concluded that the ecological status of the sampled Tsitsa River (Freshwater: CBA) is largely modified (Class D), and therefore the impact of the proposed sand mining operation on the identified CBA is deemed to be of Low significance. No protected and/or sensitive plant species occur within the proposed mining footprint, and the specialist did not identify any wetland areas/vegetation of concern. If the Applicant implement the mitigation measures proposed in the EMPR the impact of the proposed activity on the riparian vegetation and groundcover in general is deemed to be of low significance.

Fauna

No protected or red data species were identified within the proposed footprint area. The fauna at the site will not be impacted on by the proposed mining activity as they will be able to move away or through the site, without being harmed.

The proposed sand mining operation is expected to have a moderate impact on the aquatic ecology of the Tsitsa River should the mitigation measures proposed in this report be implemented.

Cultural and Heritage Environment

The HIA (inclusive of the PIA) notes that no heritage sites were recorded during the study and no adverse impacts to heritage resources are expected by the proposed project. Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure.

Site Specific Infrastructure

The mining activities will have no impact on the nearby power line. No other infrastructure exists within the earmarked footprint that can/will be disturbed by the proposed mining activities, and the Applicant will maintain the access road for the duration of the mine.

ii) Final Site Map

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

See the map indicating site activities attached as Appendix C.

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

The positive impacts associated with the project include the following:

- ∞ The permit holder will be able to exploit the sand resource on the property and supply the Maclear/Nqanqarhu and Mt Fletcher people/businesses at competitive prices;
- ∞ The landowner will receive compensation from the Applicant, and in doing so diversify the income generated from the property;
- ∞ The proposed project will create ±8 employment opportunities;

- ⌘ Mining of the sand resource can take place without disturbing the cultivation of the adjacent fields of the landowner.
- ⌘ The Tsitsa River annually replenishes the sand deposit and reinstates the riverbed, thereby eliminating any residual impact that the sand mining activity may have on the flow of the river, or visual characteristics of the receiving and/or surrounding environment.
- ⌘ Mining of the sand resource will bring about the clearing of the alien vegetation from the riverbank (within the approved footprint). Invader plant management will also be implemented for the duration of the proposed activity, and upon closure the area will be rehabilitated with indigenous vegetation.
- ⌘ The presence of the proposed operation will contribute (directly & indirectly) to the local economy with preference give to HDSA & women owned local suppliers (if available);
- ⌘ Upon closure of the mine, the area can be returned to agricultural use.

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

Table 32: Potential negative impacts with a low-medium or higher significance/risk.

| ACTIVITY | POTENTIAL IMPACT | SIGNIFICANCE (BEFORE MITIGATION) | SIGNIFICANCE (AFTER MITIGATION) |
|---|--|----------------------------------|---------------------------------|
| ⌘ Site establishment | ⌘ Visual intrusion because of site establishment. | ⌘ Low-Medium | ⌘ Low-Medium |
| ⌘ Site establishment | ⌘ Alteration of natural hydrology through clearing of riparian vegetation and bank shaping to access the resource. ⌘ Altered geomorphology of the watercourse. ⌘ Bed, flow, and channel modification due to removal of sand from the river channel and embankment. ⌘ Potential cumulative impact of mining on the Tsitsa River. | ⌘ Medium-High | ⌘ Medium |
| ⌘ Winning of sand | | ⌘ Medium-High | ⌘ Medium |
| ⌘ Cumulative impacts | | ⌘ High | ⌘ Medium |
| ⌘ Stockpiling and transporting material from site | ⌘ Dust nuisance because of the transporting of material from site. | ⌘ Medium | ⌘ Low-Medium |
| ⌘ Stockpiling and transporting material from site | ⌘ Noise nuisance because of the mining activities and/or transportation of material. | ⌘ Low-Medium | ⌘ Low-Medium |

| ACTIVITY | POTENTIAL IMPACT | SIGNIFICANCE (BEFORE MITIGATION) | SIGNIFICANCE (AFTER MITIGATION) |
|--|--|----------------------------------|---------------------------------|
| 3 Stockpiling and transporting material from site. | 3 Increased suspended solids due to stockpiling of mined sand. | 3 Medium | 3 Low-Medium |
| 3 Cumulative impacts | 3 Potential impact on downstream users. | 3 Medium-High | 3 Low-Medium |

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 condition of authorisation.

Table 33: Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

| MANAGEMENT OBJECTIVES | ROLE | MANAGEMENT ACTION | MANAGEMENT OUTCOME |
|---|---|---|--|
| <p>VISUAL CHARACTERISTICS</p> <p>Visual Mitigation</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPr.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ∩ Ensure that the site has a neat appearance and is always kept in good condition. ∩ Limit vegetation removal, and only strip topsoil immediately prior to the use of a specific area. ∩ Upon closure, rehabilitate the site to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum. | <ul style="list-style-type: none"> ∩ Minimise the impact of the mining operations on the visual characteristics of the receiving environment during the operational phase and minimise the residual impact after closure. |
| <p>AIR QUALITY</p> <p>Dust Management</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPr.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ∩ Control the liberation of dust into the surrounding environment using; inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products). ∩ Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. ∩ Limit speed on the haul roads to 40 km/h to prevent the generation of excess dust. ∩ Minimise areas devoid of vegetation. ∩ Flatten loads to prevent spillage and windblown dust during transportation. ∩ Take weather conditions into consideration upon commencement of daily operations. Limit operations during very windy periods to reduce airborne dust and resulting impacts. ∩ Ensure dust generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012). ∩ Implement best practice measures during the stripping of topsoil, loading, and transporting of material from site to minimize potential dust impacts. | <ul style="list-style-type: none"> ∩ Dust prevention measures are applied to minimise the generation of dust. |

| MANAGEMENT OBJECTIVES | ROLE | MANAGEMENT ACTION | MANAGEMENT OUTCOME |
|--|---|---|---|
| <p>NOISE AMBIANCE</p> <p>Noise Mitigation.</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ⌘ Ensure that employees and staff conduct themselves in an acceptable manner while on site. ⌘ No loud music may be permitted at the mining area. ⌘ Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996. ⌘ Implement best practice measures to minimise potential noise impacts. ⌘ Restrict work hours from 07:00 to 18:00 Monday to Saturday. Do not allow work on Sundays or afterhours. | <ul style="list-style-type: none"> ⌘ Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated. |
| <p>GEOLOGY AND SOIL</p> <p>Topsoil Handling</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ⌘ Strip and stockpile the upper 300 mm of the soil (on the riverbank). ⌘ Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process. ⌘ Ensure topsoil stripping, stockpiling, and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time. ⌘ Place topsoil heaps on a levelled area within the mining footprint area. Do not stockpile topsoil in undisturbed areas. ⌘ Protect topsoil stockpiles against losses by water and wind erosion. Position stockpiles so as not to be vulnerable to erosion by wind and water. Establishment of plants on the stockpiles will help prevent erosion. ⌘ Ensure that topsoil heaps do not exceed 2 m to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. ⌘ Keep temporary stockpiles free of invasive plant species. ⌘ Divert storm- and runoff water around the stockpile area to prevent erosion. ⌘ Spread the topsoil evenly over the rehabilitated area (riverbank), to a depth of 300 mm, upon closure of the site. ⌘ Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season. ⌘ Plant and irrigate an indigenous grass layer immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the grass | <ul style="list-style-type: none"> ⌘ Adequate fertile topsoil is available to rehabilitate the mined area. |

| MANAGEMENT OBJECTIVES | ROLE | MANAGEMENT ACTION | MANAGEMENT OUTCOME |
|---|---|--|--|
| | | <p>layer for optimum biomass production. Rehabilitation extends until the first layer of grass is well established.</p> <ul style="list-style-type: none"> ⌘ Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement. | |
| <p>HYDROLOGY</p> <p>Mitigating the potential impact on the Tsitsa River, riparian areas, and downstream users.</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ⌘ Do not change, the flow of the river, or dam or divert it without prior authorisation from the DWS. ⌘ Ensure no activities take place without the necessary DWS approval, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan. ⌘ Always adhere to the requirements of the water use authorisation to be obtained prior to the commencement of the mining activities. ⌘ Limit extraction of sand from the riverbed to low flow periods (May-October). ⌘ Ensure that the extraction from the riverbed does not exceed 1 m or is deeper than the defined base layer of the river. ⌘ Implement bar skimming if feasible. ⌘ If possible, maintain the thalweg of the river reach being mined to prevent a flat uniform wide channel which results in thinly spread flows. ⌘ Establish a single access point through the delineated vegetation zones. Create mining platforms outside the delineated zone (i.e. 2 m from the delineated bank). ⌘ Establish erosion control such as gabions at the access point through the vegetation. ⌘ Use existing roads and establish the access to the river perpendicular to flow. ⌘ Implement temporary storm water management systems and fill preferential runoff channels with aggregate and/or logs (branches included) to dissipate flows, limiting erosion and sedimentation. ⌘ Place silt traps and sediment trapping berms in drainage lines around the stockpile area. ⌘ Keep the footprint area to a minimum. Clearly demarcate the footprint area to avoid unnecessary disturbances to adjacent areas. ⌘ Ensure that the contractors used for the project have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly. | <ul style="list-style-type: none"> ⌘ Mining has the least possible impact on the river and no impact on downstream users. |

| MANAGEMENT OBJECTIVES | ROLE | MANAGEMENT ACTION | MANAGEMENT OUTCOME |
|--|---|---|---|
| | | <ul style="list-style-type: none"> ⌘ Inspect all machinery and equipment regularly for faults and possible leaks and have drip trays to contain oil leakage. All services must be off-site. ⌘ Provide adequate sanitary facilities and ablutions to all personnel throughout the construction site. Enforce the use of these facilities. ⌘ Adequately manage all solid waste generated on-site during construction and operation. Encourage separation and recycling of different waste materials. ⌘ Keep stockpiles of the sand resource outside the delineated buffer zone (10 m). ⌘ Rehabilitate access routes and other infrastructure areas upon closure of the site. ⌘ Do not mine any floodplain areas (if present), to avoid floodplain ponding. ⌘ Implement bi-annual (high and low flow) aquatic biomonitoring. ⌘ Do not store any chemicals within the mining area (operational phase). ⌘ Upon closure, remove all mining related equipment/machinery from the mining area. | |
| <p>HYDROLOGY</p> <p>Erosion Control and Storm Water Management.</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ⌘ Control drainage to ensure that runoff from the mining area (riverbank/riparian area) does not culminate in off-site pollution, flooding or result in damage to properties downstream or storm water discharge points. ⌘ Divert storm water around the topsoil heaps and stockpiles to prevent erosion. ⌘ Establish erosion control such as gabions at the access point through the vegetation. ⌘ Implement temporary storm water management systems and fill preferential runoff channels with aggregate and/or logs (branches included) to dissipate flows, limiting erosion and sedimentation. ⌘ Implement silt traps and sediment trapping berms in drainage lines around the stockpile area. ⌘ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS. | <ul style="list-style-type: none"> ⌘ Impact on the environment caused by stormwater discharge is avoided and erosion is managed. |

| MANAGEMENT OBJECTIVES | ROLE | MANAGEMENT ACTION | MANAGEMENT OUTCOME |
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| <p>TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS AND GROUNDCOVER</p> <p>Management of vegetation removal.</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ∩ Clearly demarcate the mining boundaries and contain all operations to the approved mining area. Declare the area outside the mining boundaries a no-go area and educate all staff accordingly. ∩ Arrange a pre-commencement environmental induction for all staff on site to ensure that basic environmental principles are adhered to. This must include awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. ∩ Only establish a single access point through the delineated vegetation zones. Once this access point has been created construct mining platforms outside of the delineated zone (i.e. 2 m from the delineated bank). ∩ Donate the wood from cleared vegetation to the community. Cover other plant remains with stockpiled topsoil and retain the material for future site rehabilitation purposes. ∩ Arrange that the ECO provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially during the site establishment phase, when most of the vegetation clearing is taking place. ∩ Ensure all vehicles remain on demarcated roads and prevent unnecessary driving in the veld outside these areas. ∩ Do not translocate, uprooted, or disturbed plants for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. ∩ Do not allow fires on-site. ∩ Provide spoil heaps and topsoil stockpiles with a vegetation cover of indigenous grasses. | <ul style="list-style-type: none"> ∩ Vegetation clearing is restricted to the authorised development footprint of the mine. |
| <p>TERRESTRIAL BIODIVERSITY, CONSERVATION AREAS AND GROUNDCOVER</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ∩ Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. Do weed/alien ongoing clearing on throughout the life of the mining activities. ∩ Do not allow planting or importing of any alien species to the site for landscaping, rehabilitation, or any other purpose. | <ul style="list-style-type: none"> ∩ Mining area is kept free of invasive plant species. |

| MANAGEMENT OBJECTIVES | ROLE | MANAGEMENT ACTION | MANAGEMENT OUTCOME |
|---|---|--|---|
| Management of invasive plant species. | | <ul style="list-style-type: none"> ⌘ Keep all stockpiles (topsoil) free of invasive plant species. ⌘ Control declared invader or exotic species on the rehabilitated areas. | |
| <p>FAUNA</p> <p>Protection of fauna.</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ⌘ Ensure no fauna is caught, killed, harmed, sold, or played with. ⌘ The ECO or other suitably qualified person must remove any fauna directly threatened by the operational activities to a safe location. ⌘ Arrange that all personnel undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Instruct workers to report any animals that may be trapped in the working area. ⌘ Ensure no snares are set or nests raided for eggs or young. ⌘ Ensure all vehicles adhere to a low speed limit (40 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises. ⌘ Prevent litter, food or other foreign material thrown or left around the site. Keep such items in the site vehicles and daily removed it to the site camp. ⌘ Only mine during the low flow period of the river (May-October). | <ul style="list-style-type: none"> ⌘ Disturbance to fauna is minimised. |
| <p>CULTURAL AND HERITAGE ENVIRONMENT</p> <p>Archaeological, heritage and palaeontological aspects.</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ⌘ Confine all mining to the development footprint area. ⌘ Implement the following change find procedure when discoveries are made on site: <ul style="list-style-type: none"> ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a | <ul style="list-style-type: none"> ⌘ Impact to cultural/heritage resources is avoided or at least minimised. |

| MANAGEMENT OBJECTIVES | ROLE | MANAGEMENT ACTION | MANAGEMENT OUTCOME |
|--------------------------------|--|---|---|
| | | <p>professional archaeologist for an assessment of the finds who will notify SAHRA.</p> <ul style="list-style-type: none"> ▪ Work may only continue once the go-ahead was issued by SAHRA. <p>∩ Implement the following procedure if fossils are seen on the surface and when excavations commence.</p> <ul style="list-style-type: none"> ▪ When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted. ▪ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures. ▪ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ▪ If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible. ▪ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. ▪ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. ▪ If no fossils are found and the excavations have finished, then no further monitoring is required. | |
| EXISTING INFRASTRUCTURE | Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. | ∩ Maintain an adequate no-go buffer (minimum 10 m) around the power line as per Eskom standard. | ∩ Power line not affected by the mining activities. |

| MANAGEMENT OBJECTIVES | ROLE | MANAGEMENT ACTION | MANAGEMENT OUTCOME |
|---|---|---|--|
| Managing the power line. | Compliance to be monitored by the Environmental Control Officer. | <ul style="list-style-type: none"> ⌚ Immediately, (within the first hour of occurrence) inform Eskom should the line be damaged. | |
| <p>EXISTING INFRASTRUCTURE</p> <p>Management of the access road.</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ⌚ Divert stormwater around the access road to prevent erosion. ⌚ Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas. ⌚ Ensure that the access to the river is perpendicular to the flow. ⌚ Repair rutting and erosion of the access road caused as a direct result of the mining activities. ⌚ Prevent the overloading of the trucks, and file proof of load weights for auditing purposes. ⌚ Restrict the speed of all mining equipment/vehicles to 40 km/h on the access roads. ⌚ Rehabilitate the access points into the river once the mine is closed. | <ul style="list-style-type: none"> ⌚ The access road remains accessible to the road users during the operational phase, and upon closure the road is returned in a better, or at least the same state as received by the permit holder. |
| <p>GENERAL</p> <p>Waste Management</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ⌚ Ensure regular vehicle maintenance, repairs and services only take place at an off-site workshop and service area. Ensure drip trays are present if emergency repairs are needed on equipment not able to move to the workshop. Dispose all waste products in a closed container/bin to be removed from the emergency service area (same day) to the workshop to ensure proper disposal. Treat this as hazardous waste and dispose of it at a registered hazardous waste handling facility, alternatively arrange collection by a registered hazardous waste handling contractor. File safe disposal certificates for auditing purposes. Do not repair any machinery/vehicles in the riverbed. ⌚ If a diesel bowser is used on site, always equip it with a drip tray. Use drip trays during each refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. ⌚ Ensure drip trays are cleaned after each use. Do not allow dirty drip trays to be used on site. Dispose of dirty rags used to clean the drip trays as hazardous waste into a designated bin at the workshop, where it is incorporated into the hazardous waste removal system. | <ul style="list-style-type: none"> ⌚ Wastes are appropriately handled and safely disposed of at registered waste facilities. |

| MANAGEMENT OBJECTIVES | ROLE | MANAGEMENT ACTION | MANAGEMENT OUTCOME |
|-----------------------|------|--|--------------------|
| | | <ul style="list-style-type: none"> ∩ Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a registered facility. File proof. ∩ Obtain an oil spill kit and train the employees in the emergency procedures to follow when a spill occurs as well as the application of the spill kit. ∩ Clean spills immediately, within two hours of occurrence, to the satisfaction of the Regional Manager (DMRE) by removing the spillage together with the polluted soil and containing it in a designated hazardous waste bin until it is disposed of at a registered facility. File proof. ∩ Ensure suitable covered receptacles are always available and conveniently placed for the disposal of general waste. ∩ Store biodegradable and non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., in a container with a closable lid at a collecting point to be collected at least once a month and disposed of at a registered landfill site. Take specific precautions to prevent refuse from being dumped on or in the vicinity of the mine area. File proof of disposal. ∩ Encourage re-use or recycling of waste products. ∩ Do not bury or burn waste on the site. ∩ Provide ablution facilities in the form of a chemical toilet/s. Anchor and place the chemical toilet outside the 1:100 year floodline of the river and arrange that it is serviced at least once a week for the duration of the mining activities by a registered liquid waste handling contractor. File the safe disposal certificates. ∩ Ensure that the use of any temporary, chemical toilet facilities do not cause any pollution to water sources or pose a health hazard. In addition, ensure that no form of secondary pollution arise from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately. ∩ Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the Department of Water and Sanitation and other relevant authorities. ∩ Implement the use of waste registers to keep record of the waste generated and removed from the mining area. | |

| MANAGEMENT OBJECTIVES | ROLE | MANAGEMENT ACTION | MANAGEMENT OUTCOME |
|---|---|---|---|
| <p>GENERAL</p> <p>Management of health and safety risks.</p> | <p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p> | <ul style="list-style-type: none"> ⌘ Ensure that workers have access to the correct PPE as required by law. ⌘ Locate sanitary facilities within 100 m from any point of work. ⌘ Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). | <ul style="list-style-type: none"> ⌘ Employees work in a healthy and safe environment. |

n) Aspects for inclusion as conditions of Authorisation.

Any aspects which must be made conditions of the Environmental Authorisation

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

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

- 3 The proposed mining area extends into and lays within 100 m of the Tsitsa River and requires Water Use Authorization in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for water uses as defined in section 21 (c) and section 21 (i).

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

(Which relate to the assessment and mitigation measures proposed)

The assumptions made in this document which relate to the assessment and mitigation measures proposed, stem from site specific information gathered from site inspections, specialist- and desktop studies, and background information that were gathered. No uncertainty regarding the proposed project or the receiving environment could be identified.

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

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

Should the mitigation measures and monitoring programmes proposed in this document be implemented on site, no fatal flaws could be identified that were deemed as severe as to prevent the activity continuing.

ii) Conditions that must be included in the authorisation

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

q) Period for which the Environmental Authorisation is required.

The Applicant requests the Environmental Authorisation to be valid for a five-year period to correspond with the validity of the mining permit.

r) Undertaking

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

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

s) Financial Provision

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

i) Explain how the aforesaid amount was derived

The annual amount required to manage and rehabilitate the environment was estimated to be R 197 500. Please see the explanation as to how this amount was derived at attached as Appendix J – Financial and Technical Competence Report.

ii) Confirm that this amount can be provided 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).

World Focus 1143 CC will be responsible for the financial and technical aspects of the proposed mining project. The operating expenditure is provided for as such in the Financial and Technical Competence Report attached as Appendix J to this report.

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)

Also refer to Part A(1)(i) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site through the life of the activity.

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

3 **Visual intrusion associated with the proposed mining activities:**

The viewshed analysis showed that the visual impact of the proposed sand mining operation will be of low-medium significance, especially as no permanent structures will be constructed and the river will annually reinstate the excavated areas. The small scale of the proposed operation, and the continued reinstatement of the excavation area contributes to the low visual significance. Should the Applicant successfully rehabilitate the riverbank/riparian area (upon closure), no residual visual impact is expected upon closure of the mine.

3 **Dust nuisance caused because of the proposed mining activities:**

The proposed activity will contribute the emissions of one TLB, three tipper trucks and occasionally an excavator, to the receiving environment for the duration of the operational phase. Should the permit holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low-medium significance and compatible with the current land use.

3 **Noise nuisance because of mining activities:**

The potential impact on the noise ambiance of the receiving environment is expected to be of low-medium significance and representative of the traffic passing the property along the R56 provincial road. The distance of the proposed mining area from residential infrastructure further lessens the potential noise impact.

3 **Impact of downstream water users:**

The Applicant propose to mine sand from the Tsitsa River during low flow spells when access to the sand deposit is available.

Mining near and within the riverbed trigger the National Water Act, 1998 in terms of Section 39, and the Applicant must obtain approval from the Department of Water and Sanitation prior to commencement with the activity. It is proposed that should the Applicant follow the mitigation measures as proposed in this document and the conditions of the water use authorisation the impact of the proposed activity on the aquatic features of the study area

and the rights of downstream users is of low significance, with no residual impact.

3 Employment opportunities and socio-economic impact:

The proposed labour component of the activity will be eight employees. The operation will contribute to the local economy in the area, both directly and through the multiplier effect that its continued presence will create.

Equipment and supplies will be purchased locally, and wages will be spent at local businesses, generating both jobs and income in the area. Although the employees are not resident on the site, they will be from the surrounding communities.

(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 the 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).

No sites or artefacts classified as national estate as referred to in section 3(2) of the NHRA, 1999 were identified within the footprint of the proposed mining area (refer to Appendix H for a copy of the HIA).

u) Other matters required in terms of section 24(4)(a) and (b) of the Act.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix 4)

The alternatives associated with the proposed activity, investigated during the impact assessment process, were done at the hand of information obtained during the site investigation, public participation process, specialist studies as well as desktop studies conducted of the study area. Refer to Part A(1)(h)(i) *Details of the development footprint alternatives considered* and Part A(1)(h)(ix) *Statement motivating the alternative development location within the overall site*.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME.

a) Details of the EAP,

(Confirm that the requirements for the provision of the details and expertise of the EAP are already included in Part A, section 1(a) herein as required).

The details and expertise of Christine Fouché of Greenmined Environmental (Pty) Ltd that acts as EAP on this project has been included in Part A Section 1(a) as well as Appendix N as required.

b) Description of the Aspects of the Activity

(Confirm that the requirements to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

The aspects of the activity that are covered by the draft environmental management programme has been described and included in Part A, section (1)(h).

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)

As mentioned under Part A, section (1)(l)(ii) this map has been compiled and is attached as Appendix C to this document.

d) Description of impact management objectives including management statements

i) Determination of closure objectives.

(Ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The primary objective, at the end of the mine's life, is to obtain a closure certificate at minimum cost and in as short a time as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) [MPRDA]. To realise this, the following main objectives must be achieved:

- ∞ Remove all temporary infrastructure and waste from the mine as per the requirements of this EMPR and of the Provincial Department of Minerals and Resources and Energy.
- ∞ Shape and contour disturbed areas in compliance with the EMPR.

- ∞ Ensure that permanent changes in topography (due to mining) are sustainable and do not cause erosion or the uncontrolled damming of surface water.
- ∞ Use the topsoil effectively to promote the re-establishment of vegetation.
- ∞ Ensure that all rehabilitated areas are stable and self-sustaining in terms of vegetation cover.
- ∞ Eradicate all weeds/invader plant species by intensive management of the mining area.

The site-specific closure objectives are discussed in the attached Closure Plan (Appendix K), however, a summary of the closure objectives for the proposed mine were included below.

The decommissioning phase will entail the return of the riverbank/riparian area to agricultural use (grazing). The riverbed will be rehabilitated by the Tsitsa River during the next high-flow period. No buildings/infrastructure, other than the chemical toilet, need to be demolished and the access road will remain intact to be used by the landowner.

The decommissioning activities will therefore consist of the following:

- ∞ Removal of all machinery from the mining area;
- ∞ Removal of the chemical toilet from the stockpile area;
- ∞ Removal/levelling of all stockpiled material;
- ∞ Landscaping the riverbank/riparian area, and replacing the topsoil;
- ∞ Vegetating the reinstated area; and
- ∞ Controlling the invasive plant species.

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

- ∞ Rehabilitation of the Excavated Area (riverbed):

As mentioned earlier, the Tsitsa River annually replenish the sand resource and rehabilitate disturbance to the riverbed. Considering this, upon closure of the mine the Applicant will remove the mining machinery from the river to be reinstated during the next high-flow period. The entrance into the river will also be rehabilitated and landscaped to prevent erosion of the bank once the site is closed.

3 Rehabilitation of the Riverbank/Riparian Area:

The chemical toilet and stockpiled material will be removed from the riverbank/riparian area. Compacted areas will be ripped and landscaped and previously stockpiled topsoil will be reinstated. The reinstated area will be seeded with a locally adapted grass mix, and invasive plant species will be controlled for at least one growth seasons. The reinstated area will be monitored for signs of erosion until the cover crop (grass layer) established.

3 Final Rehabilitation:

Final rehabilitation of the surface area shall entail landscaping, levelling, maintenance, and clearing of invasive plant species. All equipment, plant and other items used during the mining period will be removed from site (section 44 of the MPRDA, 2002). Waste material of any description will be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site. The management of invasive plant species will be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site. Final rehabilitation shall be completed within a period specified by the Regional Manager (DMRE).

ii) Volume and rate of water use required for the operation

Due to the nature of the sand to be mined (heavy), very little to no water is needed as dust levels will typically be low. Dust generated on the access road will as far as possible be managed through alternative dust suppression methods to restrict water use to the absolute minimum. Under very windy/dusty conditions the permit holder might have to substitute the above mentioned dust suppression methods with the spraying of water, in which case water will be bought and transported to the farm in a water truck that will moisten the problem area. Approximately 5 000 l/day is expected to be needed during the dry months.

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

The proposed mining area extends into and falls within 100 m of the Tsitsa River and requires Water Use Authorization in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for water uses as defined in section 21 of the Act. The WULA will shortly be submitted to the DWS for consideration.

iv) Impacts to be mitigated in their respective phases

Table 34: Impact to be mitigated in their respective phases

| ACTIVITIES (as listed in 2.11.1) | PHASE of operation in which activity will take place. State; Planning and design, Pre-Construction, Operational, Rehabilitation, Closure, Post closure | SIZE AND SCALE OF DISTURBANCE (volumes, tonnages and hectares or m ²) | MITIGATION MEASURES (describe how each of the recommendations herein will remedy the cause of pollution or degradation and migration of pollutants) | COMPLIANCE WITH STANDARDS (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities) | TIME PERIOD FOR IMPLEMENTATION Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either – Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be. |
|--|---|---|--|--|--|
| Demarcation of site with visible beacons. | Site Establishment phase | 1.16 ha | Demarcation of the site will ensure that all employees are aware of the boundaries of the mining area, and that work stay within the approved area. | Mining of sand is only allowed within the boundaries of the approved area. ☞ MPRDA, 2008 ☞ NEMA, 1998 | Beacons need to be in place throughout the life of the activity. |
| ☞ Site establishment | Site Establishment & Operational Phase | 1.16 ha | Visual Mitigation ☞ The site must have a neat appearance and be kept in good condition. ☞ The permit holder must limit vegetation removal (if applicable), and stripping of topsoil may only be done immediately prior to the use of a specific area. ☞ Upon closure the site must be rehabilitated to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum. | Management of the mining area must be in accordance with the: ☞ MPRDA, 2008 ☞ NEMA, 1998 | Throughout the site establishment-, and operational phase. |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|--|---------------------------------|-------------------------------|--|---|--|
| <ul style="list-style-type: none"> ⌚ Site establishment | <p>Site Establishment phase</p> | <p>1.16 ha</p> | <p><u>Mitigating the potential impact on the Tsitsa River, riparian areas, and downstream users:</u></p> <ul style="list-style-type: none"> ⌚ The flow of the river may at no point be changed, dammed, or diverted without prior authorisation from the Department of Water and Sanitation (DWS). ⌚ No activities may take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan. ⌚ The permit holder must always adhere to the requirements of the water use authorisations to be obtained prior to the commencement of the mining activities. ⌚ Extraction of sand from the riverbed must be limited to low flow periods (May-October). ⌚ The extraction from the riverbed may not exceed 1 m or deeper than the defined base layer of the river. ⌚ Bar skimming is recommended if feasible. ⌚ If possible, the thalweg (lowest point connecting the sections of the river) of the river reach being mined must be maintained to prevent a flat uniform wide channel which results in thinly spread flows. ⌚ A single access point through the delineated vegetation zones must be made. Once this access point has been created mining platforms must be constructed outside of the delineated zone (i.e. 2 m from the delineated bank). ⌚ Erosion control such as gabions must be established at the access point through the vegetation. ⌚ Existing roads must be used and access to the river must be made perpendicular to flow. ⌚ Temporary storm water management systems must be in place and preferential runoff channels be filled | <p>All water related matters must be managed in terms of the:</p> <ul style="list-style-type: none"> ⌚ NWA, 1998 ⌚ WUL conditions | <p>Throughout the site establishment-, and operational phases.</p> |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|------------|-------|-------------------------------|---|---------------------------|--------------------------------|
| | | | <p>with aggregate and/or logs (branches included) to dissipate flows, limiting erosion and sedimentation.</p> <ul style="list-style-type: none"> ∩ Silt traps and sediment trapping berms must be in place in drainage lines around the stockpile area. ∩ The footprint area must be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. ∩ The contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly. ∩ All machinery and equipment must be inspected regularly for faults and possible leaks and must have drip trays to contain oil leakage, these must be serviced off-site. ∩ Adequate sanitary facilities and ablutions must be provided for all personnel throughout the construction site. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation). ∩ All solid waste generated on-site during construction and operation must be adequately managed. Separation and recycling of different waste materials should be supported. ∩ Stockpiles of the sand resource must not be kept within the delineated buffer zone (10 m). ∩ Access routes and other infrastructure areas must be rehabilitated upon closure of the site. ∩ To avoid floodplain ponding, no floodplain areas (if present) may be mined with the focus of the mining operation on the instream sand resource. ∩ To monitor for potential environmental degradation downstream of the mining permit bi-annual (high and low flow) aquatic biomonitoring must take place. ∩ No chemicals of any kind may be stored within the mining area (operational phase). | | |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|--|--------------------------|-------------------------------|---|---|---|
| | | | <ul style="list-style-type: none"> ⌚ Upon closure, the permit holder must remove all mining related equipment/machinery from the mining area. | | |
| <ul style="list-style-type: none"> ⌚ Site establishment | Site Establishment phase | 1.16 ha | <p><u>Management of Vegetation Removal:</u></p> <ul style="list-style-type: none"> ⌚ The mining boundaries must be clearly demarcated, and all operations must be contained to the approved mining area. The area outside the mining boundaries must be declared a no-go area, and all staff must be educated accordingly. ⌚ A pre-commencement environmental induction for all site staff must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. ⌚ A single access point through the delineated vegetation zones must be made. Once this access point has been created mining platforms should be constructed outside of the delineated zone (i.e. 2 m from the delineated bank). ⌚ The wood from cleared vegetation can be donated to the community. Other plant remains can ideally be covered with stockpiled topsoil and the material be retained for future site rehabilitation purposes. ⌚ The ECO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially during the site establishment phase, when most of the vegetation clearing is taking place. ⌚ All vehicles must remain on demarcated roads and no unnecessary driving in the veld outside these areas may be allowed. | <p>Natural vegetated areas must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌚ NEM:BA, 2004 | Throughout the site establishment-, and operational phases. |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|--|---|-------------------------------|--|---|---|
| | | | <ul style="list-style-type: none"> ⌚ No plants may be translocated or otherwise uprooted or disturbed for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. ⌚ No fires must be allowed on-site. ⌚ Spoil heaps and topsoil stockpiles must be provided with a vegetation cover of indigenous grasses. | | |
| <ul style="list-style-type: none"> ⌚ Site establishment. ⌚ Winning of sand ⌚ Sloping and landscaping upon closure of the mining area. | Site Establishment- and Decommissioning phase | 1.16 ha | <p><u>Topsoil Management:</u></p> <ul style="list-style-type: none"> ⌚ The upper 300 mm of the soil (on the riverbank) must be stripped and stockpiled. ⌚ Topsoil is a valuable and essential resource for rehabilitation, and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes. ⌚ Topsoil stripping, stockpiling, and re-spreading must be done in a systematic way. The mining plan must be such that topsoil is stockpiled for the minimum possible time. ⌚ The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas. ⌚ Topsoil stockpiles must be protected against losses by water and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants (grass or a cover crop) on the stockpiles will help to prevent erosion. ⌚ Topsoil heaps may not exceed 2 m to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. ⌚ The temporary topsoil stockpiles must be kept free of invasive plant species. ⌚ Storm- and runoff water must be diverted around the stockpile area to prevent erosion. | <p>Topsoil must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌚ CARA, 1983 ⌚ NEM:BA, 2004 ⌚ MPRDA, 2008 ⌚ Closure Plan (Appendix K) | Throughout the site establishment-, operational, and decommissioning phase. |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|---|---|-------------------------------|---|--|---|
| | | | <ul style="list-style-type: none"> ∩ The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area (riverbank) upon closure of the site. ∩ The permit holder must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal. ∩ An indigenous grass layer must be planted, irrigated, and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The grass layer must be fertilized for optimum biomass production. It is important that rehabilitation be taken up to the point of grass layer stabilization. Rehabilitation cannot be considered complete until the first layer of grass is well established. ∩ The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement. | | |
| <ul style="list-style-type: none"> ∩ Site establishment. ∩ Stockpiling and transporting material from site. ∩ Sloping and landscaping upon closure of the mining area. | Site Establishment-, Operational- and Decommissioning phase | 1.16 ha | <p><u>Management of Invader Plant Species:</u></p> <ul style="list-style-type: none"> ∩ An invasive plant species management plan (Appendix K) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities. | <p>Invader plants must be managed in accordance with the:</p> <ul style="list-style-type: none"> ∩ CARA, 1983 ∩ NEM:BA 2004 ∩ Invasive Plant Species Management Plan (Appendix K) | Throughout the site establishment-, operational, and decommissioning phase. |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|---|---|-------------------------------|--|---|--|
| | | | <ul style="list-style-type: none"> ∩ No planting or importing of any alien species to the site for landscaping, rehabilitation or any other purpose may be allowed. ∩ All stockpiles (topsoil) must be kept free of invasive plant species. ∩ Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used: <ul style="list-style-type: none"> ▪ The plants can be uprooted, felled, or cut off and can be destroyed completely. ▪ The plants can be treated chemically by a registered pest control officer (PCO) using an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide. | | |
| <ul style="list-style-type: none"> ∩ Site establishment. ∩ Winning of sand. | Site Establishment- and Operational phase | 1.16 ha | <p><u>Protection of Fauna:</u></p> <ul style="list-style-type: none"> ∩ The site manager must ensure no fauna is caught, killed, harmed, sold, or played with. ∩ Any fauna directly threatened by the operational activities must be removed to a safe location by the ECO or other suitably qualified person. ∩ All personnel must undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Workers must be instructed to report any animals that may be trapped in the working area. ∩ No snares may be set, or nests raided for eggs or young. ∩ All vehicles must adhere to a low speed limit (40 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises. | Fauna must be managed in accordance with the: <ul style="list-style-type: none"> ∩ NEM:BA 2004 | Throughout the site establishment-, and operational phase. |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|---|--|-------------------------------|--|--|---|
| | | | <ul style="list-style-type: none"> ⌘ No litter, food or other foreign material may be thrown or left around the site. Such items must be kept in the site vehicles and daily removed to the site camp. ⌘ Mining may only take place during the low flow period of the river (May-October). | | |
| <ul style="list-style-type: none"> ⌘ Site establishment. ⌘ Stockpiling and transporting material from site. | Site Establishment-, Operational Phase | 1.16 ha | <p><u>Fugitive Dust Emission Mitigation:</u></p> <ul style="list-style-type: none"> ⌘ The liberation of dust into the surrounding environment must be effectively controlled using, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products). ⌘ The site manager must ensure continuous assessment of the dust suppression equipment to confirm its effectiveness in addressing dust suppression. ⌘ Speed on the access road must be limited to 40 km/h to prevent the generation of excess dust. ⌘ Areas devoid of vegetation, which could act as a dust source, must be minimized. ⌘ Loads must be flattened to prevent spillage of material during transportation, also preventing windblown dust. ⌘ Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts. ⌘ All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012). | <p>Dust generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌘ NEM:AQA. 2004 Regulation 6(1) ⌘ National Dust Control Regulations, GN No R827 ⌘ ASTM D1739 (SANS 1137:2012) | Throughout the site establishment-, operational, and decommissioning phase. |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|---|--|-------------------------------|--|---|--|
| | | | <ul style="list-style-type: none"> ⌘ Best practice measures shall be implemented during the stripping of topsoil, loading, and transporting of the sand from site to minimize potential dust impacts. | | |
| <ul style="list-style-type: none"> ⌘ Site establishment. ⌘ Winning of sand. ⌘ Stockpiling and transporting material from site. | Site Establishment-, Operational-, and Decommissioning Phase | 1.16 ha | <p><u>Noise Handling:</u></p> <ul style="list-style-type: none"> ⌘ The permit holder must ensure that employees and staff conduct themselves in an acceptable manner while on site. ⌘ No loud music may be permitted at the mining area. ⌘ All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996). ⌘ Best practice measures shall be implemented to minimize potential noise impacts. ⌘ Work hours must be from 07:00 to 18:00 Monday to Saturday. No work may be allowed after hours or on Sundays. | <p>Noise generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌘ NEM:AQA. 2004 Regulation 6(1) ⌘ NRTA, 1996 | Throughout the site establishment-, operational-, and decommissioning phase. |
| <ul style="list-style-type: none"> ⌘ Winning of sand. ⌘ Sloping and landscaping upon closure of the mine. | Operational Phase | 1.16 ha | <p><u>Storm Water Mitigation:</u></p> <ul style="list-style-type: none"> ⌘ Drainage must be controlled to ensure that runoff from the mining area (riverbank/riparian area) does not culminate in off-site pollution, flooding or result in any damage to properties downstream or any storm water discharge points. ⌘ Storm water must be diverted around the topsoil heaps and stockpiles to prevent erosion. ⌘ Erosion control such as gabions must be established at the access point through the vegetation. ⌘ Temporary storm water management systems must be in place and preferential runoff channels be filled with aggregate and/or logs (branches included) to dissipate flows, limiting erosion and sedimentation. ⌘ Silt traps and sediment trapping berms must be in place in drainage lines around the stockpile area. | <p>Storm water must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌘ CARA, 1983 ⌘ NEMA, 1998 ⌘ NWA, 1998 | Throughout the operational phase. |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|--|---|-------------------------------|---|--|---|
| | | | <p>⌚ Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose:</p> <ul style="list-style-type: none"> ▪ Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems. ▪ Dirty water must be collected and contained in a system separate from the clean water system. ▪ Dirty water must be prevented from spilling or seeping into clean water systems. ▪ A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns). ▪ The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan. | | |
| <p>⌚ Winning of sand.</p> <p>⌚ Stockpiling and transporting material from site.</p> <p>⌚ Sloping and landscaping upon closure of the mine.</p> | <p>Site Establishment-, Operational-, and Decommissioning Phase</p> | <p>1.16 ha</p> | <p><u>Waste Management:</u></p> <p>⌚ Regular vehicle maintenance, repairs and services may only take place at an off-site workshop and service area. If emergency repairs are needed on equipment not able to move to the workshop, drip trays must be present. All waste products must be disposed of in a closed container/bin to be removed from the emergency service area (same day) to the workshop to ensure proper disposal. This waste must be treated as hazardous waste and must be disposed of at a registered hazardous waste handling facility, alternatively collected by a registered hazardous</p> | <p>Mining related waste must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌚ NWA, 1998 ⌚ NEM:WA, 2008 ⌚ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ⌚ NEMA, 1998 (Section 30) | <p>Throughout the site establishment-, operational-, and decommissioning phase.</p> |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|------------|-------|-------------------------------|--|---------------------------|--------------------------------|
| | | | <p>waste handling contractor. The safe disposal certificates must be filed for auditing purposes. No machinery/vehicles may be repaired in the riverbed.</p> <ul style="list-style-type: none"> ∩ If a diesel bowser is used on site, it must always be equipped with a drip tray. Drip trays must be used during each refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling. ∩ Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site. The dirty rags used to clean the drip trays must be disposed as hazardous waste into a designated bin at the workshop, where it is incorporated into the hazardous waste removal system. ∩ Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a registered facility. Proof of safe disposal must be filed for auditing purposes. ∩ An oil spill kit must be obtained, and the employees must be trained in the emergency procedures to follow when a spill occurs as well as the application of the spill kit. ∩ Spills must be cleaned up immediately, within two hours of occurrence, to the satisfaction of the Regional Manager (DMRE) by removing the spillage together with the polluted soil and containing it in a designated hazardous waste bin until it is disposed of at a registered facility. Proof must be filed. ∩ Suitable covered receptacles must be always available and conveniently placed for the disposal of general waste. ∩ Biodegradable and non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., must be stored in a container with a closable lid at a | | |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|--------------------|-------------------|-------------------------------|---|---|-----------------------------------|
| | | | <p>collecting point to be collected at least once a month and disposed of at a registered landfill site. Specific precautions must be taken to prevent refuse from being dumped on or in the vicinity of the mine area. Proof of disposal must be available for auditing purposes.</p> <ul style="list-style-type: none"> ∩ Re-use or recycling of waste products must be encouraged on site. ∩ No waste may be buried or burned on the site. ∩ Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet must be anchored, placed outside the 1:100 year floodline of the river and must be serviced at least once a week for the duration of the mining activities by a registered liquid waste handling contractor. The safe disposal certificates must be filed for auditing purposes. ∩ The use of any temporary, chemical toilet facilities may not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the permit holder. ∩ It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities. ∩ Site management must implement the use of waste registers to keep record of the waste generated and removed from the mining area. | | |
| ∩ Winning of sand. | Operational Phase | 1.16 ha | <p><u>Archaeological, Heritage and Palaeontological Aspects:</u></p> <ul style="list-style-type: none"> ∩ All mining must be confined to the development footprint area. | <p>Cultural/heritage aspects must be managed in accordance with the:</p> <ul style="list-style-type: none"> ∩ NHRA, 1999 | Throughout the operational phase. |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|------------|-------|-------------------------------|---|---------------------------|--------------------------------|
| | | | <ul style="list-style-type: none"> ∩ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. ∩ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. ∩ The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify SAHRA. ∩ Work may only continue once the go-ahead was issued by SAHRA. ∩ The following procedure is only required if fossils are seen on the surface and when excavations commence. ∩ When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted. ∩ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built | | |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|----------------------|--------------------------|-------------------------------|--|---|---|
| | | | <p>into the EMP's training and awareness plan and procedures.</p> <ul style="list-style-type: none"> ∩ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ∩ If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible. ∩ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. ∩ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. ∩ If no fossils are found and the excavations have finished, then no further monitoring is required. | | |
| ∩ Site establishment | Site establishment phase | N/A | <p><u>Managing the Power Line:</u></p> <ul style="list-style-type: none"> ∩ An adequate no-go buffer (minimum 10 m) must be maintained around the power line as per Eskom standard. ∩ Should the line be damaged, Eskom must immediately (within the first hour of occurrence) be informed. | The power line must be protected in accordance with all Eskom specifications. | Throughout the site establishment-, and operational phases. |

| ACTIVITIES | PHASE | SIZE AND SCALE OF DISTURBANCE | MITIGATION MEASURES | COMPLIANCE WITH STANDARDS | TIME PERIOD FOR IMPLEMENTATION |
|--|--|-------------------------------|--|---|--|
| <ul style="list-style-type: none"> ⌚ Stockpiling and transporting material from site. | Operational Phase | 1.16 ha | <p><u>Access Road Mitigation:</u></p> <ul style="list-style-type: none"> ⌚ Storm water must be diverted around the access road to prevent erosion. ⌚ Vehicular movement must be restricted to the existing access road and crisscrossing of tracks through undisturbed areas must be prohibited. ⌚ Access to the river must be made perpendicular to the flow. ⌚ Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the permit holder. ⌚ Overloading of the truck must be prevented, and proof of load weights must be filed for auditing purposes. ⌚ The speed of all mining equipment/vehicles must be restricted to 40 km/h on the access roads. ⌚ Access points into the river must be rehabilitated once the mine is closed. | <p>The access road must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌚ NRTA, 1996 | Throughout the operational phase. |
| <ul style="list-style-type: none"> ⌚ Site establishment. ⌚ Winning of sand. ⌚ Stockpiling and transporting material from site. ⌚ Sloping and landscaping upon closure of the mine. | Site Establishment-, Operational-, and Decommissioning phase | 1.16 ha | <p><u>Management of Health and Safety Risks:</u></p> <ul style="list-style-type: none"> ⌚ Workers must have access to the correct personal protection equipment (PPE) as required by law. ⌚ Sanitary facilities must be located within 100 m from any point of work. ⌚ All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). | <p>Health and safety aspects must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌚ MHSA, 1996 ⌚ OHSA, 1993 ⌚ OHSAS, 18001 | Throughout the site establishment-, operational and decommissioning phase. |

e) Impact Management Outcomes

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

Table 35: Impact Management Outcomes

| ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | MITIGATION TYPE | STANDARD TO BE ACHIEVED |
|--|---|---|---|---|---|
| whether listed or not listed (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc..etc.) | (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..) | | In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)) | (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc..) E.g. <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation. | (Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc. |
| ⌚ Demarcation of site with visible beacons. | ⌚ No impact could be identified other than the beacons being outside the boundaries of the approved mining area. | N/A | Site Establishment phase | Control through management and monitoring. | Mining of sand is only allowed within the boundaries of the approved area. ⌚ MPRDA, 2008 ⌚ NEMA, 1998 |
| ⌚ Site establishment | ⌚ Visual intrusion because of site establishment. | The visual impact may affect the aesthetics of the landscape. | Site Establishment & Operational Phase | <u>Control:</u> Implementing proper housekeeping. | Management of the mining area must be in accordance with the: ⌚ MPRDA, 2008 ⌚ NEMA, 1998 |
| ⌚ Site establishment ⌚ Winning of sand ⌚ Cumulative impacts | ⌚ Alteration of natural hydrology through clearing of riparian vegetation and bank shaping to access the resource. | This will impact on the hydrology of the receiving environment. | Site Establishment phase | <u>Control:</u> Implementing the mitigation measures proposed by the hydrologist. | All water related matters must be managed in terms of the: ⌚ NWA, 1998 ⌚ WUL conditions |

| ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | MITIGATION TYPE | STANDARD TO BE ACHIEVED |
|--|--|--|---|---|---|
| | <ul style="list-style-type: none"> ⌄ Altered geomorphology of the watercourse. ⌄ Bed, flow, and channel modification due to removal of sand from the river channel and embankment. ⌄ Potential cumulative impact of mining on the Tsitsa River. | | | | |
| <ul style="list-style-type: none"> ⌄ Site establishment ⌄ Stockpiling and transporting material from site. ⌄ Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> ⌄ Infestation of the mining area with invader plant species. ⌄ Infestation of denuded areas with invader plant species ⌄ Infestation of the reinstated area with invader plant species. | This will impact on the biodiversity of the receiving environment. | Site Establishment-, Operational- and Decommissioning phase | <u>Control & Remedy:</u> Implementation of an invasive plant species management plan. | Invader plants must be managed in accordance with the: <ul style="list-style-type: none"> ⌄ CARA, 1983 ⌄ NEM:BA 2004 ⌄ Invasive Plant Species Management Plan (Appendix K) |
| <ul style="list-style-type: none"> ⌄ Site establishment ⌄ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ⌄ Dust nuisance because of site establishment. ⌄ Dust nuisance because of the transporting of material from site. | Increased dust generation will impact on the air quality of the receiving environment. | Site Establishment- and Operational Phase | <u>Control:</u> Dust suppression methods and proper housekeeping. | Dust generation must be managed in accordance with the: <ul style="list-style-type: none"> ⌄ NEM:AQA. 2004 Regulation 6(1) ⌄ National Dust Control Regulations, GN No R827 ⌄ ASTM D1739 (SANS 1137:2012) |

| ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | MITIGATION TYPE | STANDARD TO BE ACHIEVED |
|--|---|---|---|---|--|
| <ul style="list-style-type: none"> ⌚ Site establishment ⌚ Winning of sand ⌚ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ⌚ Noise nuisance because of site establishment. ⌚ Noise nuisance because of the mining activities. ⌚ Noise nuisance because of the mining activities and/or transportation of material. | <p>Should noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.</p> | <p>Site Establishment-, Operational-, and Decommissioning Phase</p> | <p><u>Control:</u> Noise suppression methods and proper housekeeping.</p> | <p>Noise generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌚ NEM:AQA. 2004 Regulation 6(1) ⌚ NRTA, 1996 ⌚ NCR, 1992 |
| <ul style="list-style-type: none"> ⌚ Site establishment ⌚ Winning of sand. ⌚ Stockpiling and transporting material from site. ⌚ Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> ⌚ Contamination of the surface water and mining area through potential sewage spills and/or solid waste inputs. ⌚ Soil and/or surface water contamination from hydrocarbon spills, waste and/or sewage. ⌚ Potential impact associated with littering and hydrocarbon spills. ⌚ Potential impact associated with litter/hydrocarbon | <p>Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will also incur additional costs to the permit holder.</p> | <p>Site Establishment-, Operational-, and Decommissioning Phase</p> | <p><u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.</p> | <p>Mining related waste must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌚ NWA, 1998 ⌚ NEM:WA, 2008 ⌚ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ⌚ NEMA, 1998 (Section 30) |

| ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | MITIGATION TYPE | STANDARD TO BE ACHIEVED |
|--|---|---|--------------------------|--|---|
| | spills left at the mining area. | | | | |
| ⌚ Site establishment | ⌚ Potential damage to Eskom power line. | Damage to the power line will have a detrimental effect on the electricity supply of the community. | Site establishment phase | <u>Stop & Control:</u> Maintain the 10 m no-go buffer zone and keep mining operations within the approved footprint. | The power line must be protected in accordance with all Eskom specifications. |
| ⌚ Winning of sand. | ⌚ Potential impact on area/infrastructure of heritage or cultural concern. | This could impact on the cultural and heritage legacy of the receiving environment. | Operational Phase | <u>Control & Stop:</u> Implementing good management practices, as well as the chance-find protocol. | Cultural/heritage aspects must be managed in accordance with the: ⌚ NHRA, 1999 |
| ⌚ Stockpiling and transporting material from site. | ⌚ Increased suspended solids due to stockpiling of mined sand. | An increase in the suspended solids of the river will affect the hydrology of the system. | Operational Phase | <u>Control & Remedy:</u> Implementing the mitigation measures proposed by the hydrologist, and rectification measures when needed. | All water related matters must be managed in terms of the: ⌚ NWA, 1998 ⌚ WUL conditions |
| ⌚ Stockpiling and transporting material from site. | ⌚ Deterioration of the access road to the mining area. ⌚ Overloading of trucks having an impact on the public roads. | Collapse of the road infrastructure will affect the landowner and public. | Operational Phase | <u>Control & Remedy:</u> Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining. Prevent overloading. | The access road must be managed in accordance with the: ⌚ NRTA, 1996 |
| ⌚ Cumulative impacts | ⌚ Potential impact on downstream users. | Should the mining activity have a negative impact on the downstream | Operational Phase | <u>Stop:</u> Manage the activity in accordance with the requirements to prevent downstream impacts. | All water related matters must be managed in terms of the: ⌚ NWA, 1998 ⌚ WUL conditions |

| ACTIVITY | POTENTIAL IMPACT | ASPECTS AFFECTED | PHASE | MITIGATION TYPE | STANDARD TO BE ACHIEVED |
|--|---|---|-----------------------|--|--|
| | | users it will incur extensive complaints that may result in additional costs to mitigate the impacts. | | | |
| <ul style="list-style-type: none"> 3 Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> 3 Erosion of returned topsoil after rehabilitation (riverbank/riparian area). | Erosion of the riverbank will affect the hydrology of the area. | Decommissioning phase | <u>Control & Remedy:</u> Implementing stormwater and erosion protection measures. | Topsoil must be managed in accordance with the: <ul style="list-style-type: none"> 3 CARA, 1983 3 NEM:BA, 2004 3 MPRDA, 2002 3 Closure Plan (Appendix L) |
| <ul style="list-style-type: none"> 3 Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> 3 Residual impact on the Tsitsa River. | This aspect will affect the hydrology of the area. | Decommissioning phase | <u>Control & Remedy:</u> Implementing the mitigation measures proposed by the hydrologist. | All water related matters must be managed in terms of the: <ul style="list-style-type: none"> 3 NWA, 1998 3 WUL conditions |

f) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes in paragraph (c) and (d) will be achieved)

Table 36: Impact Management Actions

| ACTIVITY | POTENTIAL IMPACT | MITIGATION TYPE | TIME PERIOD FOR IMPLEMENTATION | COMPLIANCE WITH STANDARDS |
|--|--|--|--|---|
| <p>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.)</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.) E.g. <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring Remedy through rehabilitation.</p> | <p>Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either: Upon cessation of the individual activity Or. Upon the cessation of mining bulk sampling or alluvial diamond prospecting as the case may be.</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>∩ Demarcation of site with visible beacons.</p> | <p>∩ No impact could be identified other than the beacons being outside the boundaries of the approved mining area.</p> | <p>Control through management and monitoring.</p> | <p>Beacons need to be in place throughout the life of the activity.</p> | <p>Mining of sand is only allowed within the boundaries of the approved area. ∩ MPRDA, 2008 ∩ NEMA, 1998</p> |
| <p>∩ Site establishment</p> | <p>∩ Visual intrusion because of site establishment.</p> | <p><u>Control:</u> Implementing proper housekeeping.</p> | <p>Throughout the site and operational phase.</p> | <p>Management of the mining area must be in accordance with the: ∩ MPRDA, 2008 ∩ NEMA, 1998</p> |
| <p>∩ Site establishment</p> | <p>∩ Alteration of natural hydrology through clearing of riparian vegetation and bank shaping to access the resource.</p> | <p><u>Control:</u> Implementing the mitigation measures proposed by the hydrologist.</p> | <p>Throughout the site and operational phase.</p> | <p>All water related matters must be managed in terms of the: ∩ NWA, 1998 ∩ WUL conditions</p> |
| <p>∩ Winning of sand</p> | | | | |
| <p>∩ Cumulative impacts</p> | <p>∩ Altered geomorphology of the watercourse.</p> | | | |

| ACTIVITY | POTENTIAL IMPACT | MITIGATION TYPE | TIME PERIOD FOR IMPLEMENTATION | COMPLIANCE WITH STANDARDS |
|--|---|--|---|--|
| | <ul style="list-style-type: none"> ⌘ Bed, flow, and channel modification due to removal of sand from the river channel and embankment. ⌘ Potential cumulative impact of mining on the Tsitsa River. | | | |
| <ul style="list-style-type: none"> ⌘ Site establishment ⌘ Stockpiling and transporting material from site. ⌘ Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> ⌘ Infestation of the mining area with invader plant species. ⌘ Infestation of denuded areas with invader plant species ⌘ Infestation of the reinstated area with invader plant species. | <p><u>Control & Remedy:</u> Implementation of an invasive plant species management plan.</p> | <p>Throughout the site establishment-, operational, and decommissioning phase.</p> | <p>Invader plants must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌘ CARA, 1983 ⌘ NEM:BA 2004 ⌘ Invasive Plant Species Management Plan (Appendix K) |
| <ul style="list-style-type: none"> ⌘ Site establishment ⌘ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ⌘ Dust nuisance because of site establishment. ⌘ Dust nuisance because of the transportating of material from site. | <p><u>Control:</u> Dust suppression methods and proper housekeeping.</p> | <p>Throughout the site establishment-, operational, and decommissioning phase.</p> | <p>Dust generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌘ NEM:AQA. 2004 Regulation 6(1) ⌘ National Dust Control Regulations, GN No R827 ⌘ ASTM D1739 (SANS 1137:2012) |
| <ul style="list-style-type: none"> ⌘ Site establishment ⌘ Winning of sand ⌘ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ⌘ Noise nuisance because of site establishment. ⌘ Noise nuisance because of the mining activities. ⌘ Noise nuisance because of the mining activities and/or transportation of material. | <p><u>Control:</u> Noise suppression methods and proper housekeeping.</p> | <p>Throughout the site establishment-, operational-, and decommissioning phase.</p> | <p>Noise generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌘ NEM:AQA. 2004 Regulation 6(1) ⌘ NRTA, 1996 ⌘ NCR, 1992 |

| ACTIVITY | POTENTIAL IMPACT | MITIGATION TYPE | TIME PERIOD FOR IMPLEMENTATION | COMPLIANCE WITH STANDARDS |
|--|---|--|---|--|
| <ul style="list-style-type: none"> ⌚ Site establishment ⌚ Winning of sand. ⌚ Stockpiling and transporting material from site. ⌚ Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> ⌚ Contamination of the surface water and mining area through potential sewage spills and/or solid waste inputs. ⌚ Soil and/or surface water contamination from hydrocarbon spills, waste and/or sewage. ⌚ Potential impact associated with littering and hydrocarbon spills. ⌚ Potential impact associated with litter/hydrocarbon spills left at the mining area. | <p><u>Control & Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.</p> | <p>Throughout the site establishment-, operational-, and decommissioning phase.</p> | <p>Mining related waste must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌚ NWA, 1998 ⌚ NEM:WA, 2008 ⌚ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926) ⌚ NEMA, 1998 (Section 30) |
| <ul style="list-style-type: none"> ⌚ Site establishment | <ul style="list-style-type: none"> ⌚ Potential damage to the Eskom power line. | <p><u>Stop & Control:</u> Maintain the 10 m no-go buffer zone and keep mining operations within the approved footprint.</p> | <p>Throughout the site establishment-, operational-, and decommissioning phase.</p> | <p>The power line must be protected in accordance with all Eskom specifications.</p> |
| <ul style="list-style-type: none"> ⌚ Winning of sand. | <ul style="list-style-type: none"> ⌚ Potential impact on area/infrastructure of heritage or cultural concern. | <p><u>Control & Stop:</u> Implementing good management practices, as well as the chance-find protocol.</p> | <p>Throughout the operational phase.</p> | <p>Cultural/heritage aspects must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌚ NHRA, 1999 |
| <ul style="list-style-type: none"> ⌚ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ⌚ Increased suspended solids due to stockpiling of mined sand. | <p><u>Control & Remedy:</u> Implementing the mitigation measures proposed by the hydrologist, and rectification measures when needed.</p> | <p>Throughout the operational phase.</p> | <p>All water related matters must be managed in terms of the:</p> <ul style="list-style-type: none"> ⌚ NWA, 1998 ⌚ WUL conditions |
| <ul style="list-style-type: none"> ⌚ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ⌚ Deterioration of the access road to the mining area. | <p><u>Control & Remedy:</u> Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better</p> | <p>Throughout the operational phase.</p> | <p>The access road must be managed in accordance with the:</p> <ul style="list-style-type: none"> ⌚ NRTA, 1996 |

| ACTIVITY | POTENTIAL IMPACT | MITIGATION TYPE | TIME PERIOD FOR IMPLEMENTATION | COMPLIANCE WITH STANDARDS |
|--|---|--|---------------------------------------|---|
| | ⌘ Overloading of trucks having and impact on the public roads. | condition than prior to mining. Prevent overloading. | | |
| ⌘ Cumulative impacts | ⌘ Potential impact on downstream users. | <u>Stop</u> : Manage the activity in accordance with the requirements to prevent downstream impacts. | Throughout the operational phase. | All water related matters must be managed in terms of the: ⌘ NWA, 1998 ⌘ WUL conditions |
| ⌘ Sloping and landscaping upon closure of the mining area. | ⌘ Erosion of returned topsoil after rehabilitation (riverbank/riparian area). | <u>Control & Remedy</u> : Implementing stormwater and erosion protection measures. | Throughout the decommissioning phase. | Topsoil must be managed in accordance with the: ⌘ CARA, 1983 ⌘ NEM:BA, 2004 ⌘ MPRDA, 2002 ⌘ Closure Plan (Appendix L) |
| ⌘ Sloping and landscaping upon closure of the mining area. | ⌘ Residual impact on the Tsitsa River. | <u>Control & Remedy</u> : Implementing the mitigation measures proposed by the hydrologist. | Throughout the decommissioning phase. | All water related matters must be managed in terms of the: ⌘ NWA, 1998 ⌘ WUL conditions |

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 entail removing the mining machinery from the river. Removing the chemical toilet, removing/levelling of all stockpiled material and the landscaping of the riverbank/riparian area to allow the replacement of stockpiled topsoil. The reinstated area will be vegetated, and invasive plant species will be controlled during a 12 months' aftercare period to address germination of problem plants in the area. The Applicant will comply with the minimum closure objectives as prescribed by DMRE.

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

This report, the Draft Basic Assessment Report, includes all the environmental objectives in relation to closure and will be made available for perusal by the landowner, registered I&AP's and stakeholders over a 30-days commenting period.

- (c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.**

The requested rehabilitation plan is attached as Appendix E.

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

The decommissioning phase will entail the final rehabilitation of the mining site. Final landscaping, levelling and top dressing will be done. The rehabilitation of the mining area as indicated on the rehabilitation plan attached as Appendix E will comply with the minimum closure objectives as prescribed by the DMRE and detailed below, and therefore is deemed to be compatible:

3 Rehabilitation of the Excavated Area (riverbed):

As mentioned earlier, the Tsitsa River annually replenish the sand resource and rehabilitate disturbance to the riverbed. Considering this, upon closure of the mine the Applicant will remove the mining machinery from the river to be reinstated during the next high-flow period. The entrance into the river will also be rehabilitated and landscaped to prevent erosion of the bank once the site is closed.

3 Rehabilitation of the Riverbank/Riparian Area:

The chemical toilet and stockpiled material will be removed. Compacted areas will be ripped and landscaped and previously stockpiled topsoil will be reinstated. The reinstated area will be seeded with a locally adapted grass mix, and invasive plant species will be controlled for at least one growth seasons. The reinstated area will be monitored for signs of erosion until the cover crop (grass layer) established.

3 Final Rehabilitation:

Final rehabilitation of the surface area shall entail landscaping, levelling, maintenance, and clearing of invasive plant species. All equipment, plant and other items used during the mining period will be removed from site (section 44 of the MPRDA, 2002). Waste material of any description will be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site. The management of invasive plant species will be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site. Final rehabilitation shall be completed within a period specified by the Regional Manager.

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

The calculation of the quantum for financial provision was according to Section B of the working manual.

Mine type and saleable mineral by-product

According to Tables B.12, B.13 and B.14

| | |
|-----------------------------|------|
| Mine type | Sand |
| Saleable mineral by-product | None |

Risk ranking

According to Tables B.12, B.13 and B.14

| | |
|--|---------------|
| Primary risk ranking (either Table B.12 or B.13) | C (Low risk). |
| Revised risk ranking (B.14) | N/A |

Environmental sensitivity of the mine area

According to Table B.4

| | |
|--|-----|
| Environmental sensitivity of the mine area | Low |
|--|-----|

Level of information

According to Step 4.2:

| | |
|--------------------------------|---------|
| Level of information available | Limited |
|--------------------------------|---------|

Identify closure components

According to Table B.5 and site-specific conditions

| Component No. | Main description | Applicability of closure components (Circle Yes or No) | |
|----------------------|---|---|-----------|
| 1 | Dismantling of processing plant and related structures (including overland conveyors and power lines) | - | NO |
| 2(A) | Demolition of steel buildings and structures | - | NO |
| 2(B) | Demolition of reinforced concrete buildings and structures | - | NO |
| 3 | Rehabilitation of access roads | - | NO |
| 4(A) | Demolition and rehabilitation of electrified railway lines | - | NO |
| 4(B) | Demolition and rehabilitation of non-electrified railway lines | - | NO |
| 5 | Demolition of housing and facilities | - | NO |
| 6 | Opencast rehabilitation including final voids and ramps | - | NO |
| 7 | Sealing of shafts, adits and inclines | - | NO |
| 8(A) | Rehabilitation of overburden and spoils | - | NO |
| 8(B) | Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing) | - | NO |

| Component No. | Main description | Applicability of closure components (Circle Yes or No) | |
|---------------|---|---|----|
| | | | |
| 8(C) | Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich) | - | NO |
| 9 | Rehabilitation of subsided areas | - | NO |
| 10 | General surface rehabilitation, including grassing of all denuded areas | YES | - |
| 11 | River diversions | - | NO |
| 12 | Fencing | - | NO |
| 13 | Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater) | - | NO |
| 14 | 2 to 3 years of maintenance and aftercare | - | NO |

Unit rates for closure components

According to Table B.6 master rates and multiplication factors for applicable closure components.

| Component No. | Main description | Master rate | Multiplication factor |
|---------------|---|-------------|-----------------------|
| 1 | Dismantling of processing plant and related structures (including overland conveyors and power lines) | - | - |
| 2(A) | Demolition of steel buildings and structures | - | - |
| 2(B) | Demolition of reinforced concrete buildings and structures | - | - |
| 3 | Rehabilitation of access roads | - | - |
| 4(A) | Demolition and rehabilitation of electrified railway lines | - | - |
| 4(B) | Demolition and rehabilitation of non-electrified railway lines | - | - |
| 5 | Demolition of housing and facilities | - | - |
| 6 | Opencast rehabilitation including final voids and ramps | - | - |
| 7 | Sealing of shafts, adits and inclines | - | - |
| 8(A) | Rehabilitation of overburden and spoils | - | - |
| 8(B) | Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing) | - | - |
| 8(C) | Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich) | - | - |
| 9 | Rehabilitation of subsided areas | - | - |
| 10 | General surface rehabilitation, including grassing of all denuded areas | 150 138 | 1.00 |
| 11 | River diversions | - | - |
| 12 | Fencing | - | - |
| 13 | Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater) | - | - |
| 14 | 2 to 3 years of maintenance and aftercare | 19 980 | 1.00 |

Determine weighting factors

According to Tables B.7 and B.8

| | |
|---|-------------|
| Weighting factor 1: Nature of terrain/accessibility | 1.00 (Flat) |
| Weighting factor 2: Proximity to urban area where goods and services are to be supplied | 1.05 |

Calculation of closure costs

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision

Table 37: Calculation of closure cost

| CALCULATION OF THE QUANTUM | | | | | | | |
|----------------------------|---|----------------|------------|------------------|-------------------------|----------------------|--------------------------|
| Mine: | Niagara Mine | | | Location: | Maclear/Nqanqarhu | | |
| Evaluators: | C Fouché | | | Date: | 19 October 2022 | | |
| No | Description | Unit | A Quantity | B Master rate | C Multiplication factor | D Weighting factor 1 | E=A *B*C*D Amount (Rand) |
| | | | Step 4.5 | Step 4.3 | Step 4.3 | Step 4.4 | |
| 1 | Dismantling of processing plant and related structures (including overland conveyors and power lines) | m ² | 0 | 19 | 1.00 | 1.00 | R 0.00 |
| 2(A) | Demolition of steel buildings and structures | m ² | 0 | 271 | 1.00 | 1.00 | R 0.00 |
| 2(B) | Demolition of reinforced concrete buildings and structures | m ² | 0 | 400 | 1.00 | 1.00 | R 0.00 |
| 3 | Rehabilitation of access roads | m ² | 0 | 49 | 1.00 | 1.00 | R 0.00 |
| 4(A) | Demolition and rehabilitation of electrified railway lines | m | 0 | 471 | 1.00 | 1.00 | R 0.00 |
| 4(B) | Demolition and rehabilitations of non-electrified railway lines | m | 0 | 257 | 1.00 | 1.00 | R 0.00 |
| 5 | Demolition of housing and/or administration facilities | m ² | 0 | 542 | 1.00 | 1.00 | R 0.00 |
| 6 | Opencast rehabilitation including final voids and ramps | ha | 0 | 284 292 | 0.04 | 1.00 | R 0.00 |
| 7 | Sealing of shaft, audits and inclines | m ³ | 0 | 146 | 1.00 | 1.00 | R 0.00 |
| 8(A) | Rehabilitation of overburden and spoils | ha | 0 | 189 528 | 1.00 | 1.00 | R 0.00 |
| 8(B) | Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste) | ha | 0 | 236 054 | 1.00 | 1.00 | R 0.00 |
| 8(C) | Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste) | ha | 0 | 685 612 | 0.51 | 1.00 | R 0.00 |
| 9 | Rehabilitation of subsided areas | ha | 0 | 158 701 | 1.00 | 1.00 | R 0.00 |
| 10 | General surface rehabilitation | ha | 1 | 150 138 | 1.00 | 1.00 | R 150 138.00 |

| | | | | | | | |
|---|---|------|---|--------------|------|--------------------|--------------|
| 11 | River diversions | ha | 0 | 150 138 | 1.00 | 1.00 | R 0.00 |
| 12 | Fencing | m | 0 | 171 | 1.00 | 1.00 | R 0.00 |
| 13 | Water Management | ha | 0 | 57 087 | 0.17 | 1.00 | R 0.00 |
| 14 | 2 to 3 years of maintenance and aftercare | ha | 1 | 19 980 | 1.00 | 1.00 | R 19 980.00 |
| 15(A) | Specialists study | Sum | 0 | | | | R 0.00 |
| 15(B) | Specialists study | Sum | 0 | | | | R 0.00 |
| Sum of items 1 to 15 above | | | | | | | R 170 118.00 |
| Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4) | | 1.05 | | R 170 118.00 | | Sub Total 1 | R 178 623.90 |

| | | | |
|--|-------------------------|--|---------------------|
| 1 | Preliminary and General | 6% of Subtotal 1 if Subtotal 1 <R100 000 000.00 | R 10 717.43 |
| | | 12% of Subtotal 1 if Subtotal 1 >R100 000 000.00 | - |
| 2 | Contingency | 10.0% of Subtotal 1 | R 17 862.39 |
| Sub Total 2 | | | |
| (Subtotal 1 plus management and contingency) | | | R 207 203.72 |
| Vat (15%) | | | R 31 080.56 |
| GRAND TOTAL | | | |
| (Subtotal 3 plus VAT) | | | R 238 284.28 |

The amount that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure gives a total of **R 238 284.28**.

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

Herewith I, the person, whose name is stated below confirm that I am the person authorised to act as representative of the Applicant in terms of the resolution submitted with the application. I herewith confirm that the company will provide the amount that will be determined by the Regional Manager in accordance with the prescribed guidelines.

Mechanisms for monitoring compliance with and performance assessment 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) Mechanisms for monitoring compliance**

Table 38: Mechanisms for monitoring compliance with and performance assessment against the EMPR and reporting thereon.

| SOURCE ACTIVITY | IMPACTS REQUIRING MONITORING PROGRAMMES | FUNCTIONAL REQUIREMENTS FOR MONITORING | ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES) | MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS |
|--|--|---|--|--|
| <ul style="list-style-type: none"> ∩ Demarcation of site with visible beacons | <p>Maintenance of beacons</p> | <ul style="list-style-type: none"> ∩ Visible beacons need to be placed at the corners of the mining area. ∩ Beacons/signs to indicate the 10 m buffer zone. ∩ The 10 m no-go buffer around the power line must be demarcated. ∩ The entry point into the river must be demarcated to prevent sprawling. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ∩ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ∩ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ∩ Ensure beacons are in place throughout the life of the mine. | <p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ∩ Daily compliance monitoring by site management. ∩ Annual compliance monitoring of site by an Environmental Control Officer. |
| <ul style="list-style-type: none"> ∩ Site establishment | <p><u>Visual Characteristics:</u></p> <ul style="list-style-type: none"> ∩ Visual intrusion because of site establishment. | <ul style="list-style-type: none"> ∩ Good housekeeping practices. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ∩ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ∩ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. | <p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ∩ Daily compliance monitoring by site management. ∩ Annual compliance monitoring of site by an Environmental Control Officer. |

| SOURCE ACTIVITY | IMPACTS REQUIRING MONITORING PROGRAMMES | FUNCTIONAL REQUIREMENTS FOR MONITORING | ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES) | MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS |
|---|---|--|--|---|
| | | | <u>Responsibility:</u> ☞ Ensure that the site has a neat appearance and is always kept in good condition. ☞ Limit vegetation removal, and only strip topsoil immediately prior to the use of a specific area. ☞ Upon closure, rehabilitate the site to ensure that the visual impact on the aesthetic value of the area is reduced to the minimum. | |
| ☞ Site establishment ☞ Winning of sand ☞ Cumulative impacts ☞ Sloping and landscaping upon closure of the mining area. | <u>Hydrology:</u> ☞ Alteration of natural hydrology through clearing of riparian vegetation and bank shaping to access the resource. ☞ Altered geomorphology of the watercourse. ☞ Bed, flow, and channel modification due to removal of sand from the river channel and embankment. ☞ Potential cumulative impact of mining on the Tsitsa River. ☞ Increased suspended solids due to stockpiling of mined sand. | ☞ Visible beacons indicating the boundary of the mining area. ☞ The entry point into the river must be demarcated to prevent sprawling. ☞ Beacons/signs showing the boundary of the 10 m zone where no stockpiling may take place. ☞ Stormwater management infrastructure. ☞ Spill kit and drip trays. ☞ Waste bin/s and a formal waste removal system ☞ Indigenous grassmix to seed reinstated areas. | <u>Role:</u> ☞ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ☞ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <u>Responsibility:</u> ☞ Do not change, the flow of the river, or dam or divert it without prior authorisation from the DWS. ☞ Ensure no activities take place without the necessary DWS approval, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan. ☞ Always adhere to the requirements of the water use authorisation to be obtained prior to the commencement of the mining activities. ☞ Limit extraction of sand from the riverbed to low flow periods (May-October). ☞ Ensure that the extraction from the riverbed does not exceed 1 m or is deeper than the defined base layer of the river. ☞ Implement bar skimming if feasible. | Applicable throughout site establishment-, and operational phases. ☞ Daily compliance monitoring by site management. ☞ Bi-annual (high & low flow) aquatic biomonitoring by an appropriately qualified specialist. ☞ Annual compliance monitoring of site by an Environmental Control Officer. |

| SOURCE ACTIVITY | IMPACTS REQUIRING MONITORING PROGRAMMES | FUNCTIONAL REQUIREMENTS FOR MONITORING | ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES) | MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS |
|-----------------|---|--|--|--|
| | <ul style="list-style-type: none"> ∩ Potential impact on downstream users. ∩ Residual impact on the Tsitsa River. | | <ul style="list-style-type: none"> ∩ If possible, maintain the thalweg of the river reach being mined to prevent a flat uniform wide channel which results in thinly spread flows. ∩ Establish a single access point through the delineated vegetation zones. Create mining platforms outside the delineated zone (i.e. 2 m from the delineated bank). ∩ Establish erosion control such as gabions at the access point through the vegetation. ∩ Use existing roads and establish the access to the river perpendicular to flow. ∩ Implement temporary storm water management systems and fill preferential runoff channels with aggregate and/or logs (branches included) to dissipate flows, limiting erosion and sedimentation. ∩ Place silt traps and sediment trapping berms in drainage lines around the stockpile area. ∩ Keep the footprint area to a minimum. Clearly demarcate the footprint area to avoid unnecessary disturbances to adjacent areas. ∩ Ensure that the contractors used for the project have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly. ∩ Inspect all machinery and equipment regularly for faults and possible leaks and have drip trays to contain oil leakage. All services must be off-site. ∩ Provide adequate sanitary facilities and ablutions to all personnel throughout the construction site. Enforce the use of these facilities. ∩ Adequately manage all solid waste generated on-site during construction and operation. Encourage separation and recycling of different waste materials. | |

| 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 |
|--|--|--|---|--|
| | | | <ul style="list-style-type: none"> ⌚ Keep stockpiles of the sand resource outside the delineated buffer zone (10 m). ⌚ Rehabilitate access routes and other infrastructure areas upon closure of the site. ⌚ Do not mine any floodplain areas (if present), to avoid floodplain ponding. ⌚ Implement bi-annual (high and low flow) aquatic biomonitoring. ⌚ Do not store any chemicals within the mining area (operational phase). ⌚ Upon closure, remove all mining related equipment/machinery from the mining area. | |
| <ul style="list-style-type: none"> ⌚ Site establishment ⌚ Stockpiling and transporting material from site. ⌚ Sloping and landscaping upon closure of the mining area. | <p><u>Groundcover:</u></p> <ul style="list-style-type: none"> ⌚ Infestation of the mining area with invader plant species. ⌚ Infestation of denuded areas with invader plant species. ⌚ Infestation of the reinstated area with invader plant species. | <ul style="list-style-type: none"> ⌚ Designated team to cut or pull out invasive plant species that germinated on site. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ⌚ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ⌚ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ⌚ Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983. ⌚ Do not allow planting or importing of any alien species to the site for landscaping, rehabilitation, or any other purpose. ⌚ Keep all stockpiles (topsoil) free of invasive plant species. ⌚ Control declared invader or exotic species on the rehabilitated areas. | <p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ⌚ Daily compliance monitoring by site management. ⌚ Annual compliance monitoring of site by an Environmental Control Officer. |
| <ul style="list-style-type: none"> ⌚ Site establishment | <p><u>Air Quality:</u></p> | <ul style="list-style-type: none"> ⌚ Dust suppression equipment such as a water car. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ⌚ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. | <p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> |

| 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 |
|--|--|---|--|---|
| <ul style="list-style-type: none"> ☞ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ☞ Dust nuisance because of site establishment. ☞ Dust nuisance because of transporting of material from site. | <ul style="list-style-type: none"> ☞ Signage that clearly reduce the speed on the access roads. | <ul style="list-style-type: none"> ☞ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ☞ Control the liberation of dust into the surrounding environment using; inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products). ☞ Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression. ☞ Limit speed on the haul roads to 40 km/h to prevent the generation of excess dust. ☞ Minimise areas devoid of vegetation. ☞ Flatten and cover loads to prevent spillage and windblown dust during transportation. ☞ Take weather conditions into consideration upon commencement of daily operations. Limit operations during very windy periods to reduce airborne dust and resulting impacts. ☞ Ensure dust generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012). ☞ Implement best practice measures during the stripping of topsoil, loading, and transporting of material from site to minimize potential dust impacts. | <ul style="list-style-type: none"> ☞ Daily compliance monitoring by site management. ☞ Annual compliance monitoring of site by an Environmental Control Officer. |
| <ul style="list-style-type: none"> ☞ Site establishment ☞ Winning of sand | <p><u>Noise Ambiance:</u></p> <ul style="list-style-type: none"> ☞ Noise nuisance because of site establishment. | <ul style="list-style-type: none"> ☞ Silencers fitted to all project related vehicles, and the use of vehicles that are in road worthy condition in terms of the | <p><u>Role:</u></p> <ul style="list-style-type: none"> ☞ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. | <p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ☞ Daily compliance monitoring by site management. |

| 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 |
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| <ul style="list-style-type: none"> ⌚ Stockpiling and transporting material from site. | <ul style="list-style-type: none"> ⌚ Noise nuisance because of the mining activities. ⌚ Noise nuisance because of the mining activities and/or transportation of material. | <p>National Road Traffic Act, 1996.</p> | <ul style="list-style-type: none"> ⌚ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ⌚ Ensure that employees and staff conduct themselves in an acceptable manner while on site. ⌚ No loud music may be permitted at the mining area. ⌚ Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996. ⌚ Implement best practice measures to minimise potential noise impacts. ⌚ Restrict work hours from 07:00 to 18:00 Monday to Saturday. Do not allow work on Sundays or afterhours. | <ul style="list-style-type: none"> ⌚ Annual compliance monitoring of site by an Environmental Control Officer. |
| <ul style="list-style-type: none"> ⌚ Site establishment ⌚ Winning of sand. ⌚ Stockpiling and transporting material from site. ⌚ Sloping and landscaping upon closure of the mining area. | <p><u>Waste Management:</u></p> <ul style="list-style-type: none"> ⌚ Contamination of the surface water and mining area through potential sewage spills and/or solid waste inputs. ⌚ Soil and/or surface water contamination from hydrocarbon spills, waste and/or sewage. ⌚ Potential impact associated with littering and hydrocarbon spills. | <ul style="list-style-type: none"> ⌚ Oil spill kit. ⌚ Sealed drip trays. ⌚ Formal waste disposal system with waste registers. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ⌚ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ⌚ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ⌚ Ensure regular vehicle maintenance, repairs and services only take place at an off-site workshop and service area. Ensure drip trays are present if emergency repairs are needed on equipment not able to move to the workshop. Dispose all waste products in a closed container/bin to be removed from the emergency service area | <p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ⌚ Daily compliance monitoring by site management. ⌚ Annual compliance monitoring of site by an Environmental Control Officer. |

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| | <p>∩ Potential impact associated with litter/hydrocarbon spills left at the mining area.</p> | | <p>(same day) to the workshop to ensure proper disposal. Treat this as hazardous waste and dispose of it at a registered hazardous waste handling facility, alternatively arrange collection by a registered hazardous waste handling contractor. File safe disposal certificates for auditing purposes. Do not repair any machinery/vehicles in the riverbed.</p> <p>∩ If a diesel bowser is used on site, always equip it with a drip tray. Use drip trays during each refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.</p> <p>∩ Ensure drip trays are cleaned after each use. Do not allow dirty drip trays to be used on site. Dispose of dirty rags used to clean the drip trays as hazardous waste into a designated bin at the workshop, where it is incorporated into the hazardous waste removal system.</p> <p>∩ Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and remove it from the site, either for resale or for appropriate disposal at a registered facility. File proof.</p> <p>∩ Obtain an oil spill kit and train the employees in the emergency procedures to follow when a spill occurs as well as the application of the spill kit.</p> <p>∩ Clean spills immediately, within two hours of occurrence, to the satisfaction of the Regional Manager (DMRE) by removing the spillage together with the polluted soil and containing it in a designated hazardous waste bin until it is disposed of at a registered facility. File proof.</p> <p>∩ Ensure suitable covered receptacles are always available and conveniently placed for the disposal of general waste.</p> | |

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| | | | <ul style="list-style-type: none"> 3 Store biodegradable and non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., in a container with a closable lid at a collecting point to be collected at least once a month and disposed of at a registered landfill site. Take specific precautions to prevent refuse from being dumped on or in the vicinity of the mine area. File proof of disposal. 3 Encourage re-use or recycling of waste products. 3 Do not bury or burn waste on the site. 3 Provide ablution facilities in the form of a chemical toilet/s. Anchor and place the chemical toilet outside the 1:100 year floodline of the river and arrange that it is serviced at least once a week for the duration of the mining activities by a registered liquid waste handling contractor. File the safe disposal certificates. 3 Ensure that the use of any temporary, chemical toilet facilities do not cause any pollution to water sources or pose a health hazard. In addition, ensure that no form of secondary pollution arise from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately. 3 Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the Department of Water and Sanitation and other relevant authorities. 3 Implement the use of waste registers to keep record of the waste generated and removed from the mining area. | |

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| <ul style="list-style-type: none"> ⌚ Site establishment | <p><u>Existing Infrastructure:</u></p> <ul style="list-style-type: none"> ⌚ Potential damage to Eskom power line. | <ul style="list-style-type: none"> ⌚ Contact number of an Eskom representative that can be contacted if needed. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ⌚ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ⌚ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ⌚ Maintain an adequate no-go buffer (minimum 10 m) around the power line as per Eskom standard. ⌚ Immediately, (within the first hour of occurrence) inform Eskom should the line be damaged. | <p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ⌚ Daily compliance monitoring by site management. ⌚ Annual compliance monitoring of site by an Environmental Control Officer. |
| <ul style="list-style-type: none"> ⌚ Winning of sand. | <p><u>Cultural and Heritage Environment:</u></p> <ul style="list-style-type: none"> ⌚ Potential impact on areas/infrastructure of heritage or cultural concern. | <ul style="list-style-type: none"> ⌚ Contact number of an archaeologist and palaeontologist that can be contacted when a discovery is made on site. ⌚ Induction training: Responsible staff identified by the developer must attend a short course on heritage management and identification of heritage resources. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ⌚ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ⌚ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ⌚ Confine all mining to the development footprint area. ⌚ Implement the following change find procedure when discoveries are made on site: <ul style="list-style-type: none"> ▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate | <p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ⌚ Daily compliance monitoring by site management. ⌚ Site monitoring and watching brief: As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are from pre-construction and construction activities. The ECO should monitor all such activities. ⌚ Annual compliance monitoring of site by an Environmental Control Officer. |

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| | | | <p>supervisor, and through their supervisor to the senior on-site manager.</p> <ul style="list-style-type: none"> ▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. ▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify SAHRA. ▪ Work may only continue once the go-ahead was issued by SAHRA. <p>3 Implement the following procedure if fossils are seen on the surface and when excavations commence.</p> <ul style="list-style-type: none"> ▪ When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted. ▪ Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures. ▪ Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. ▪ If there is any possible fossil material found by the developer/environmental officer then the | |

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| | | | <p>qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.</p> <ul style="list-style-type: none"> ▪ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. ▪ If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. ▪ If no fossils are found and the excavations have finished, then no further monitoring is required. | |
| <p>∩ Stockpiling and transporting material from site.</p> | <p><u>Existing Infrastructure:</u></p> <p>∩ Deterioration of the access road to the mining area.</p> <p>∩ Overloading of trucks having an impact on the public roads.</p> | <p>∩ Grader to restore the road surface when needed.</p> | <p><u>Role:</u></p> <p>∩ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</p> <p>∩ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</p> <p><u>Responsibility:</u></p> <p>∩ Divert stormwater around the access road to prevent erosion.</p> <p>∩ Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas.</p> | <p>Applicable throughout operational phases.</p> <p>∩ Daily compliance monitoring by site management.</p> <p>∩ Annual compliance monitoring of site by an Environmental Control Officer.</p> |

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| | | | <ul style="list-style-type: none"> ⌚ Ensure that the access to the river is perpendicular to the flow. ⌚ Repair rutting and erosion of the access road caused as a direct result of the mining activities. ⌚ Prevent the overloading of the trucks, and file proof of load weights for auditing purposes. ⌚ Restrict the speed of all mining equipment/vehicles to 40 km/h on the access roads. ⌚ Rehabilitate the access points into the river once the mine is closed. | |
| <ul style="list-style-type: none"> ⌚ Sloping and landscaping upon closure of the mining area. | <p><u>Hydrology:</u></p> <ul style="list-style-type: none"> ⌚ Erosion of returned topsoil after rehabilitation (riverbank/riparian area). | <ul style="list-style-type: none"> ⌚ Earthmoving equipment to spread the topsoil. ⌚ Stormwater control infrastructure. ⌚ Designated team to control weeds/invasive plant species that may germinate on the reinstated area. ⌚ Indigenous grassmix to vegetate reinstated soil. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ⌚ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ⌚ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ⌚ Control drainage to ensure that runoff from the mining area (riverbank/riparian area) does not culminate in off-site pollution, flooding or result in damage to properties downstream or storm water discharge points. ⌚ Divert storm water around the topsoil heaps and stockpiles to prevent erosion. ⌚ Establish erosion control such as gabions at the access point through the vegetation. ⌚ Implement temporary storm water management systems and fill preferential runoff channels with aggregate and/or logs (branches included) to dissipate flows, limiting erosion and sedimentation. | <p>Applicable throughout operational phases.</p> <ul style="list-style-type: none"> ⌚ Daily compliance monitoring by site management. ⌚ Annual compliance monitoring of site by an Environmental Control Officer. |

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| | | | <ul style="list-style-type: none"> ∩ Implement silt traps and sediment trapping berms in drainage lines around the stockpile area. ∩ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS. | |
| <ul style="list-style-type: none"> ∩ Site establishment. ∩ Winning of sand. ∩ Stockpiling and transporting material from site. ∩ Sloping and landscaping upon closure of the mining area. | <ul style="list-style-type: none"> ∩ Potential health and safety risks to employees. | <ul style="list-style-type: none"> ∩ Stocked first aid box. ∩ Level 1 certified first aider. ∩ All appointments in terms of the Mine Health and Safety Act, 1996. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ∩ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ∩ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ∩ Ensure that workers have access to the correct PPE as required by law. ∩ Locate sanitary facilities within 100 m from any point of work. ∩ Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996). | <p>Applicable throughout operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> ∩ Daily compliance monitoring by site management. ∩ Annual compliance monitoring of site by an Environmental Control Officer. |
| <ul style="list-style-type: none"> ∩ Site establishment. | <p><u>Geology and Soil:</u></p> <ul style="list-style-type: none"> ∩ Topsoil handling. | <ul style="list-style-type: none"> ∩ Earthmoving equipment to strip, stockpile and spread the topsoil. ∩ Stormwater control infrastructure. ∩ Designated team to control weeds/invaser plant species that may germinate on the topsoil heaps. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ∩ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ∩ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ∩ Strip and stockpile the upper 300 mm of the soil (on the riverbank). ∩ Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process. | <p>Applicable throughout operational phases.</p> <ul style="list-style-type: none"> ∩ Daily compliance monitoring by site management. ∩ Annual compliance monitoring of site by an Environmental Control Officer. |

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| | | <ul style="list-style-type: none"> 3 Indigenous grassmix to vegetate topsoil heaps (when needed) and reinstated soil. | <ul style="list-style-type: none"> 3 Ensure topsoil stripping, stockpiling, and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time. 3 Place topsoil heaps on a levelled area within the mining footprint area. Do not stockpile topsoil in undisturbed areas. 3 Protect topsoil stockpiles against losses by water and wind erosion. Position stockpiles so as not to be vulnerable to erosion by wind and water. Establishment of plants on the stockpiles will help prevent erosion. 3 Ensure that topsoil heaps do not exceed 2 m to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen. 3 Keep temporary stockpiles free of invasive plant species. 3 Divert storm- and runoff water around the stockpile area to prevent erosion. 3 Spread the topsoil evenly over the rehabilitated area (riverbank), to a depth of 300 mm, upon closure of the site. 3 Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season. 3 Plant and irrigate an indigenous grass layer immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the grass layer for optimum biomass production. Rehabilitation extends until the first layer of grass is well established. | |

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| | | | <ul style="list-style-type: none"> 3 Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement. | |
| <ul style="list-style-type: none"> 3 Site establishment. | <p><u>Terrestrial biodiversity, conservation and groundcover:</u></p> <ul style="list-style-type: none"> 3 Management of vegetation removal. | <ul style="list-style-type: none"> 3 Beacons to demarcate the mining boundaries. 3 Tools for bush clearance. 3 Pre-commencement environmental induction for all staff. | <p><u>Role:</u></p> <ul style="list-style-type: none"> 3 Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. 3 Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> 3 Clearly demarcate the mining boundaries and contain all operations to the approved mining area. Declare the area outside the mining boundaries a no-go area and educate all staff accordingly. 3 Arrange a pre-commencement environmental induction for all staff on site to ensure that basic environmental principles are adhered to. This must include awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas, etc. 3 Only establish a single access point through the delineated vegetation zones. Once this access point has been created construct mining platforms outside of the delineated zone (i.e. 2 m from the delineated bank). 3 Donate the wood from cleared vegetation to the community. Cover other plant remains with stockpiled topsoil and retain the material for future site rehabilitation purposes. 3 Arrange that the ECO provide supervision and oversight of vegetation clearing activities and | <p>Applicable throughout operational phases.</p> <ul style="list-style-type: none"> 3 Daily compliance monitoring by site management. 3 Annual compliance monitoring of site by an Environmental Control Officer. |

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| | | | <p>other activities which may cause damage to the environment, especially during the site establishment phase, when most of the vegetation clearing is taking place.</p> <ul style="list-style-type: none"> ⌚ Ensure all vehicles remain on demarcated roads and prevent unnecessary driving in the veld outside these areas. ⌚ Do not translocated, uprooted, or disturbed plants for rehabilitation or other purposes without express permission from the ECO and without the relevant permits. ⌚ Do not allow fires on-site. ⌚ Provide spoil heaps and topsoil stockpiles with a vegetation cover of indigenous grasses. | |
| <ul style="list-style-type: none"> ⌚ Site establishment. ⌚ Winning of sand. ⌚ Stockpiling and transporting materials from site. ⌚ Sloping and landscaping upon closure of the mining area. | <p>Fauna: Protection of fauna.</p> | <ul style="list-style-type: none"> ⌚ Toolbox talks to educate employees how to handle fauna that enter the work areas. ⌚ Contact number of a snake catcher and/or other faunal specialists. | <p><u>Role:</u></p> <ul style="list-style-type: none"> ⌚ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR. ⌚ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit. <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> ⌚ Ensure no fauna is caught, killed, harmed, sold, or played with. ⌚ The ECO or other suitably qualified person must remove any fauna directly threatened by the operational activities to a safe location. ⌚ Arrange that all personnel undergo environmental induction regarding fauna management and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. Instruct workers to report any animals that may be trapped in the working area. | <p>Applicable throughout operational phases.</p> <ul style="list-style-type: none"> ⌚ Daily compliance monitoring by site management. ⌚ Annual compliance monitoring of site by an Environmental Control Officer. |

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| | | | <ul style="list-style-type: none"> 3 Ensure no snares are set or nests raided for eggs or young. 3 Ensure all vehicles adhere to a low speed limit (40 km/h is recommended) to avoid collisions with susceptible species such as snakes and tortoises. 3 Prevent litter, food or other foreign material thrown or left around the site. Keep such items in the site vehicles and daily removed it to the site camp. 3 Only mine during the low flow period of the river (May-October). | |

l) Indicate the frequency of the submission of the performance assessment/environmental audit report.

The Environmental Audit Report in accordance with Appendix 7 as prescribed in Regulation 34 of the EIA Regulations, 2014 (as amended) will annually be submitted to DMRE for compliance monitoring purposes or in accordance with the period stipulated by the Environmental Authorisation.

m) Environmental Awareness Plan

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

Once the Applicant received the mining permit and may commence with the proposed activity, a copy of the Environmental Management Programme will be handed to the site manager for his perusal. Issues such as the mining boundaries, fire principals and waste handling will be discussed.

An induction meeting will be held with all the site workers to inform them of the Basic Rules of Conduct regarding the environment.

ii) Manner in which risk will be dealt with in order to avoid pollution or the degradation of the environment.

The operations manager must ensure that he/she understands the EMPR document and its requirement and commitments before any mining takes place. An Environmental Control Officer needs to check compliance of the mining activity to the management programmes described in the EMPR.

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

3 **Site Management:**

- Stay within boundaries of site – do not enter adjacent properties.
- Keep tools and material properly stored.
- Smoke only in designated areas.
- Use toilets provided – report full or leaking toilets.

3 **Water Management and Erosion:**

- Check that rainwater flows around work areas and are not contaminated.
- Report any erosion.
- Check that dirty water is kept from clean water.

3 **Waste Management:**

- Take care of your own waste
- Keep waste separate into labelled containers – report full bins.
- Place waste in containers and always close lid.
- Don't burn waste.
- Pick-up any litter laying around.

3 **Hazardous Waste Management (Petrol, Oil, Diesel, Grease)**

- Never mix general waste with hazardous waste.
- Use only sealed, non-leaking containers.
- Keep all containers closed and store only in approved areas.
- Always put drip trays under vehicles and machinery.
- Empty drip trays after rain.
- Stop leaks and spills, if safe:
 - ✓ Keep spilled liquids moving away.
 - ✓ Immediately report the spill to the site manager/supervision.
 - ✓ Locate spill kit/supplies and use to clean-up, if safe.
 - ✓ Place spill clean-up wastes in proper containers.
 - ✓ Label containers and move to approved storage area.

3 **Discoveries:**

- Stop work immediately.
- Notify site manager/supervisor.
- Includes – archaeological finds, cultural artefacts, contaminated water, pipes, containers, tanks and drums, any buried structures.

3 **Air Quality:**

- Wear protection when working in very dusty areas.
- Implement dust control measures:
 - ✓ Water all roads and work areas.

- ✓ Minimize handling of material.
- ✓ Obey speed limit.

⌘ **Driving and Noise:**

- Use only approved access roads.
- Respect speed limits.
- Only use turn-around areas – no crisscrossing through undisturbed areas.
- Avoid unnecessary loud noises.
- Report or repair noisy vehicles.

⌘ **Vegetation and Animal life:**

- Do not remove any plants or trees without approval of the site manager.
- Do not collect firewood.
- Do not catch, kill, harm, sell or play with any animal, reptile, bird or amphibian on site.
- Report any animal trapped in the work area.
- Do not set snares or raid nests for eggs or young.

⌘ **Fire Management:**

- Do not light any fires on site, unless contained in a drum at demarcated area.
- Put cigarette butts in a rubbish bin.
- Do not smoke near gas, paints or petrol.
- Know the position of firefighting equipment.
- Report all fires.
- Don't burn waste or vegetation.

n) Specific information required by the Competent Authority

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

The Applicant undertakes to annually review and update the financial provision calculation, upon which it will be submitted to DMRE for review and approved as being sufficient to cover the environmental liability at the time and for closure of the mine at that time.

2. UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports
- b) the inclusion of comments and inputs from stakeholders and I&AP's
- c) the inclusion of inputs and recommendations from the specialist reports where relevant,
and
- d) that the information provided by the EAP to interested and affected parties and any response by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein



Signature of the environmental assessment practitioner:

Greenmined Environmental (Pty) Ltd

Name of Company:

08 December 2022

Date:

UNDERTAKING

I,.....the undersigned and duly authorised thereto
by.....World Focus 1143 CC.....

~~Company / Closed Corporation / Municipality or Council~~

(Delete whichever is not applicable)

hereby undertake to implement all the aspects contained in the BAR and EMPR / ~~EIA and EMPR~~ and
accept full responsibility, therefore.

(Delete whichever is not applicable)

SIGNED at this day of 2022

FINAL DOCUMENT TO BE SIGNED BY APPLICANT

SIGNATURE

WITNESSES:

1.....

2.....

Official use

APPROVAL

Approved in terms of the National Environmental Management Act (NEMA), 1998 (Act 107 of 1998),
as amended.

SIGNED at this day 202.....

REGIONAL MANAGER

EASTERN-CAPE

-END-

APPENDIX A

REGULATION 2(2) MINE MAP



APPENDIX B

LOCALITY MAP



APPENDIX C

SITE ACTIVITIES PLAN



APPENDIX D

LAND USE MAP



APPENDIX E

REHABILITATION MAP



APPENDIX F

PROOF OF PUBLIC PARTICIPATION



APPENDIX G
AQUATIC BIODIVERSITY SPECIALIST
ASSESSMENT



APPENDIX H

HERITAGE IMPACT ASSESSMENT



APPENDIX I
SUPPORTING IMPACT ASSESSMENT



ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, herewith please receive an environmental impact statement that summarises the impact that the proposed activity may have on the environment after the management and mitigation of impacts have been considered, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

As the hydrologist already excluded the possibility of Site Alternative 2 as a viable alternative (fatal flaw) for the development of the proposed sand mine, only the project related aspects associated with Site Alternative 1 were further assessed in the report.

| <u>ENVIRONMENTAL IMPACT STATEMENT</u> | | | |
|---|---|---|--|
| SITE ALTERNATIVE 1 | | | |
| <u>TYPE OF IMPACT</u> | <u>DURATION</u> | <u>LIKELIHOOD</u> | <u>SIGNIFICANCE</u> |
| <u>Site Establishment:</u> ☞ Visual intrusion because of site establishment. ☞ Alteration of natural hydrology through clearing of riparian vegetation and bank shaping to access the resource. ☞ Infestation of the mining area with invader plant species. ☞ Dust nuisance because of site establishment. ☞ Noise nuisance because of site establishment. ☞ Contamination of the surface water and mining area through potential sewage spills and/or solid waste inputs. ☞ Potential damage to the Eskom power line. ☞ Work opportunities to 8 people (Positive Impact) | Duration of site establishment phase (<1 month) | Possible Possible Low Possibility Low Possibility Low Possibility Low Possibility Low Possibility Definite | Low-Medium Concern Medium Concern Low Concern Low Concern Low Concern Low Concern Low Concern Medium-High (+) |
| <u>Winning of sand:</u> ☞ Altered geomorphology of the watercourse. ☞ Bed, flow, and channel modification due to removal of sand from the river channel and embankment. ☞ Soil and/or surface water contamination from hydrocarbon spills, waste and/or sewage. | Duration of operational phase (5 years maximum) | <u>LIKELIHOOD</u> Possible Possible Low Possibility | <u>SIGNIFICANCE</u> Medium Concern Medium Concern Low Concern Low Concern |

ENVIRONMENTAL IMPACT STATEMENT

SITE ALTERNATIVE 1

| | | | |
|--|--|--|---|
| <ul style="list-style-type: none"> ⌚ Noise nuisance because of the mining activities. ⌚ Potential impact on areas/infrastructure of heritage or cultural concern. | | <p align="center">Low Possibility</p> | <p align="center">Low Concern</p> |
| <p><u>Stockpiling and transporting material from site:</u></p> <ul style="list-style-type: none"> ⌚ Increased suspended solids due to stockpiling of mined sand. ⌚ Dust nuisance because of the transporting of material from site. ⌚ Noise nuisance because of the mining activities and/or transportation of material. ⌚ Potential impact associated with littering and hydrocarbon spills. ⌚ Infestation of denuded areas with invader plant species. ⌚ Deterioration of the access road to the mining area. ⌚ Overloading of trucks having an impact on the public roads. | <p align="center">Duration of operational phase (5 years maximum)</p> | <p align="center"><u>LIKELIHOOD</u> Low Possibility Possible Low Possibility Low Possibility Low Possibility Low Possibility</p> | <p align="center"><u>SIGNIFICANCE</u> Low-Medium Concern Low-Medium Concern Low-Medium Concern Low Concern Low Concern Low Concern Low Concern</p> |
| <p><u>Cumulative impacts:</u></p> <ul style="list-style-type: none"> ⌚ Potential cumulative impact of mining on the Tsitsa River. ⌚ Potential impact on downstream users. | <p align="center">Duration of operational phase (5 years maximum)</p> | <p align="center"><u>LIKELIHOOD</u> Possible Low Possibility</p> | <p align="center"><u>SIGNIFICANCE</u> Medium Concern Low-Medium Concern</p> |
| <p><u>Sloping and landscaping upon closure of the mining area:</u></p> <ul style="list-style-type: none"> ⌚ Erosion of returned topsoil after rehabilitation (riverbank/riparian area). ⌚ Residual impact on the Tsitsa River. ⌚ Infestation of the reinstated area with invader plant species. ⌚ Potential impact associated with litter/hydrocarbon spills left at the mining area. ⌚ Return of the area to agricultural use (Positive Impact). | <p align="center">Duration of decommissioning phase (±2 months)</p> | <p align="center"><u>LIKELIHOOD</u> Low Possibility Low Possibility Low Possibility Low Possibility Definite</p> | <p align="center"><u>SIGNIFICANCE</u> Low Concern Low Concern Low Concern Low Concern Medium-High (+)</p> |

APPENDIX J

FINANCIAL AND TECHNICAL ABILITY



APPENDIX K
INVASIVE PLANT SPECIES
MANAGEMENT PLAN



APPENDIX L

CLOSURE PLAN



APPENDIX M
PHOTOGRAPHS OF THE PROPOSED
SITE



**PHOTOGRAPHS OF THE PROPOSED MINING AREA
NOTE PREVIOUSLY MINED PORTION IN THE LAST PICTURE**



PHOTOGRAPHS OF THE FEATURES SURROUNDING THE PROPOSED MINING AREA



Power line passing the area to the east



Dam bordering the area to the south

**APPENDIX N
CV AND PROOF OF EXPERIENCE OF
THE EAP**

