

DRAFT SCOPING REPORT FOR THE PROPOSED MINING OF CLAY, SAND AND COAL

ON A PORTION OF PORTION 85 OF THE FARM GROOTFONTEIN
165 IR AND A PORTION OF THE REMAINDER OF THE FARM
VOGELSTRUISBULT 127, NIGEL, GAUTENG PROVINCE

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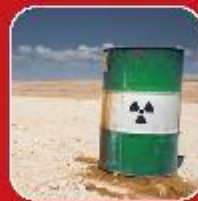
Department of Mineral Resources

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DRAFT

SCOPING REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH THE MINING OF CLAY, SAND AND COAL ON A PORTION OF PORTION 85 OF THE FARM GROOTFONTEIN 165 IR AND A PORTION OF THE REMAINDER OF THE FARM VOGELSTRUISBULT 127, NIGEL, GAUTENG PROVINCE

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

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EXECUTIVE SUMMARY

Environmental Assurance (Pty) Ltd (ENVASS), as independent environmental consultant, was appointed by Brikor Limited to undertake the environmental authorisation process for the proposed mining of clay, sand and coal. The mining is proposed on a portion of Portion 85 of the Farm Grootfontein 165 IR and a portion of the Remainder of the Farm Vogelstruisbult 127 IR, constituting a total area of 105 ha (hectares). The proposed site is located approximately 5 km northwest of the town of Nigel within the Ekurhuleni Metropolitan Municipality in the Gauteng Province of South Africa.

Objective of the Scoping Process

According to the Environmental Impact Assessment (EIA) Regulations, 2014 [as amended], the objective of the scoping process is to, through a consultative process—

“ ...

- (a) *identify the relevant policies and legislation relevant to the activity;*
- (b) *motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;*
- (c) *identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;*
- (d) *identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;*
- (e) *identify the key issues to be addressed in the assessment phase;*
- (f) *agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and*
- (g) *identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored...*”

Description of the Scope of the Proposed Overall Activity

The proposed Grootfontein opencast quarry mine will be used for the extraction of clay, sand and coal, (i.e. brick making raw materials).

The Brikor factory will be the only consumer of the brick clay mined from the proposed quarry. The clay will be used to make bricks and these products will be sold to the open market. The bricks will be burnt in a conventional “clamp” kiln on the Brikor site in the nearby vicinity and on completion of the process, the bricks will be sorted into two categories, - both of which is specified under SABS 227. The specified categories are FBA (Face brick “Aesthetic”) and NFP (Non-face bricks).

The mining operation will consist of earthmoving equipment that will be used to mine and stockpile the clay. The earth moving equipment on site will consist of the following:

- A number of 30 ton articulated dump trucks;
- 45 ton excavators;
- Bell water carts;
- Graders; and
- Bulldozers (D6 or equivalent).

The mining will be conducted over a wide face, which is progressively advanced with the appropriate benching, on the advancing face. The terrain also requires additional earthworks, after mining, to slope sidewalls, etc. Vegetation and topsoil will be removed annually, in advance of the mining exercise. Removed topsoil shall be kept separate from overburden and shall not be used for building or maintenance of access and haul roads. In the event that vegetation does not naturally and quickly establish itself on the bund wall, the bund wall will be protected from being eroded by watering or wind. Rehabilitation of the disturbed surface will be done each year during the mining period. The topsoil and overburden removed yearly, will be used to rehabilitate the area disturbed during the previous year. That is, each year, a further area will be mined/disturbed and an equivalent area will be rehabilitated.

Clay will be used in the brick making process at the nearby Brikor factory. Coal will be used in the brick burning process. Once the bricks have been burnt/fired in a conventional “clamp” kiln at the Brikor brick factory which is in close proximity of the mining site, the following products can be sorted for sale:

- NFP – as “common” building bricks;
- FBA – as “face brick aesthetic” (i.e. a semi-face).

Existing infrastructure on the site includes Eskom power lines, telephone lines and basic secondary roads.

The construction phase will be limited to the grading of haul roads and the removal of overburden in preparation of the mining operations as well as constructing the pollution control dam.

The opening of the initial box-cut involves the removal of topsoil and subsoil in order to acquire access to the ore body. The removal of topsoil usually takes place with an excavator to an average depth of 0.5m. Extracted top soil material is then stored in piles for later use as backfill material during rehabilitation procedures.

Operational Phase (Process Description)

Mining will be done by means of opencast methods, using heavy-duty earth moving equipment as listed above. By using an excavator, the mining is done over a wide face, which is progressively advanced with prominent high walls in the advancing face. An excavator will be employed to remove the clay and mining trucks will transport the clay to a stockpile close to the adjacent factory, which will then be used for the production of bricks. As and when coal is exposed after the mining of clay, the coal will be excavated in exactly the same way as the clay. The raw coal will be transported for coal washing, off site. The material is then washed for better use as an energy resource. As and when sand is exposed, sand will be excavated. Sand will be transported to the nearby brick making factory, crushed, screened, and washed and to be sold off as building material.

Legislative Requirements

The most important legislation applicable to the proposed project are the following:

- *National Environmental Management Act (No. 107 of 1998) [as amended]*

Section 28 (1)

Duty of Care and responsibilities to minimise and remediate environmental degradation.

- *Environmental Impact Assessment Regulations, 2014 [as amended]*

The proposed construction, operational and closure activities of the proposed development triggers the following listed activity, listed in the EIA Regulations, for which a Scoping and Environmental Impact Assessment (EIA) process have to be conducted:

Activity 17:

Any activity including the operation of that activity which requires a mining right as contemplated in Section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which and exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

- *National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended] List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment as promulgated in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended]*

The proposed construction, operational and closure activities of the proposed development may trigger the following listed activities that are listed for which a Scoping and Environmental Impact Assessment (EIA) process have to be conducted:

Category B: "Residue stockpiles or residue deposits" - Activity 11:

The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

- *National Water Act, 1998 (Act No. 36 of 1998) [as amended]; and*
- *Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) (as amended)*

Need and Desirability of the Proposed Project

The main benefits of the Grootfontein Mine will be the:

- Contribution to the economic welfare of the surrounding community by creating working opportunities;

- Contribution to the upliftment of living standards and the health and safety of the local community.

The project is aligned with the objectives of key government guideline documents including *inter alia* the Ekurhuleni Metropolitan Municipality Spatial Development Framework, Environmental Management Framework and the Metropolitan Integrated Development Plan.

Feasible alternatives

The following alternatives were investigated as feasible alternatives:

- The site on which the proposed facility is to be located and location of infrastructure on the site (*site and layout alternatives*);
- The mining method (*technology alternatives*)
- Recycling (*technology alternatives*); and
- Not implementing the mining activities (*No – Go alternative*).

Table 5 contains the analysis of alternatives identified.

Public Participation

A joint Public Participation Process is undertaken for the proposed mine. The process is undertaken to ensure compliance with regard to the requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [as amended] (MPRDA), the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA), the National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) [as amended] (NEMWA), the National Water Act, 1998 (Act No. 36 of 1998) [as amended] (NWA) and the Environmental Impact Assessment Regulations (2014) [as amended].

Tasks undertaken for the Public Participation Process (PPP):

- Identification of key interested and affected parties (affected and adjacent landowners) and other stakeholders (organs of state and other parties);
- Formal notification of the application to interested and affected parties (including all affected and adjacent landowners) and other stakeholders; and
- Consultation and correspondence with I&APs and stakeholders

Potential Impacts Associated with the Proposed Activity

The following potential major direct, indirect and cumulative impacts were identified:

- Land degradation;
- Contamination from coal and hydrocarbons and compaction of soils;
- Erosion;
- Acid mine drainage;
- Blasting of coal;
- Altered landforms - topography;
- Limited loss of agricultural potential and land capability;
- Reduced crop growth;
- Contamination of ground- and surface water quality and decline in quantity;
- Impacts on biodiversity;
- Loss and displacement of fauna;

- Impacts on existing land use of the study and surrounding area;
- Deterioration of local roads used by heavy duty vehicles;
- Mudslides form stockpiles and overburden;
- Destruction or loss of heritage features including graves and other historical sites of importance that may be uncovered during excavations;
- Decreased aesthetic value and impact on “Sense of Place”;
- Poor air quality and decreased visibility due to dust pollution;
- Increased noise levels and impact on surrounding communities and the Marievale Bird Sanctuary;
- Waste generation;
- Increased demand on service infrastructure and resources;
- Slight increase in traffic and need for maintenance of road infrastructure;
- Health and safety impacts;
- Potential injury and loss of health and life of humans; and
- Altered Socio-Economic Environment (Positive or negative).

The following aspects will be assessed as part of the environmental assessment process:

- Topography;
- Geology and Soils;
- Geohydrology;
- Hydrology;
- Climate;
- Biodiversity;
- Socio-economic;
- Dust fallout;
- Ambient noise levels;
- Aesthetic quality (visual); and
- Archaeological aspects.

Specialist studies

Specialist studies that are conducted for the Environmental Impact Assessment phase to assess the above aspects include the following:

- Conceptual and Final Design Report and Designs;
- Geohydrological Study;

- Aquatic Impact Assessment;
- Ecological and Biodiversity Scan;
- Soil and Land Capability Study;
- Waste Classification; and
- Archaeological impact assessment.

Reasoned Opinion of the EAP

Based on the findings of the preliminary impact assessment during the scoping phase, the EAP is of the opinion that the proposed development be approved, due to the positive social and economic impacts it will have on the local and regional communities. The potential negative impacts can be mitigated to acceptable levels, provided that the mitigation measures are strictly implemented and monitored.

Recommendations

In order to achieve appropriate environmental management standards and ensure that the findings of the environmental studies are implemented through physical measures, the recommendations from the scoping report are included within the Environmental Management Programme (EMP). The EMP will be based on all the information to be contained in the Environmental Impact Report (EIR) as well as all the specialists' reports.

Conclusion

A variety of preliminary mitigation measures have been identified that will serve to mitigate the scale, intensity, duration or significance of the potential negative impacts identified. These include guidelines to be applied during the construction, operational and decommissioning phases of the proposed project. The Environmental Management Programme (EMP) will contain more detailed mitigation measures which will also be incorporated into the Environmental Impact Report (EIR).

The proposed mitigation measures, if implemented, will reduce the significance of the majority of the identified impacts. It is therefore the recommendation of ENVASS, based on the assessment of the current available information, that the Scoping Report for the proposed development be accepted by the Competent Authority.

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ABBREVIATIONS

CA	Competent Authority
CSA	Constitution of South Africa (Act No. 108 of 1996)
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism (currently known as DEA)
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Programme
ENVASS	Environmental Assurance (Pty) Ltd
GN	Government Notice
GIS	Geographic Information System
GPS	Global Positioning System
HDPE	High-density polyethylene
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IWULA	Integrated Water Use License Application
IWWMP	Integrated Water and Waste Management Plan
MHSA	Mine Health and Safety Act (Act No. 29 of 1996) [as amended]
MPRDA	Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) (as amended)
NEMA	National Environmental Management Act, 1998 (Act no 107 of 1998, as amended)
NEMAQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NHRA	National Heritage Resource Act, 1999 (Act No. 25 of 1999)
NVFFA	National Veld and Forest Fire Act (Act No. 101 of 1998)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PGMs	Platinum Group Metals
PM	Public Meeting
PPP	Public Participation Process
ROM	Run of Mine
RWD	Return Water Dam
SAHRA	South African Heritage Resources Agency

SAWS	South African Weather Service
SDF	Spatial Development Framework
SM	Site Manager
tpm	tonne per month
WRD	Waste Rock Dump

IMPORTANT NOTICE

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

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

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

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or 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 SCOPING PROCESS

According to the Environmental Impact Assessment (EIA) Regulations, 2014 [as amended], the objective of the scoping process is to, through a consultative process—

“ ...

- (a) *identify the relevant policies and legislation relevant to the activity;*
 - (b) *motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;*
 - (c) *identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;*
 - (d) *identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;*
 - (e) *identify the key issues to be addressed in the assessment phase;*
 - (f) *agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and*
 - (g) *identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored...”*
-

SCOPING REPORT

1. Contact Person and correspondence address

a) Details of:

i) The EAP who prepared the report

Name of The Practitioner: Corrie Retief

Tel No.: 012 460 9768

Fax No.: 012 460 3071

e-mail address: corrie@envass.co.za

ii) Expertise of the EAP

(1) The qualifications of the EAP

(With evidence attached as Appendix 1)

- University of South Africa, BA Hons Geography - 2007
- University of South Africa, BA Environmental - 2005

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

(Attach the EAP's curriculum vitae as Appendix 2)

Corrie Retief is an Environmental Scientist with more than 10 years of experience in applying the principles of Integrated Environmental Management, and in applying the Environmental Legislation to a number of development projects and initiatives in Southern Africa. He has co-ordinated and managed number of diverse projects and programs related to the Environment and Waste within both the public and private sectors and for national, multi-national and international companies. His interpersonal and organisational skills have enabled him to efficiently direct these projects from initiation to implementation. Furthermore his training in sustainability and sustainable project delivery has helped him to deliver profitable sustainability into customers operations throughout the asset lifecycle.

A significant element of public participation is required throughout the life cycle of an EIA process. Corrie has successfully liaised with interested and affected parties, ensuring that all communication procedures and dialogues are open and transparent, and that capacity

building is conducted where necessary. His proficient report-writing skills have been utilised for the compilation of a wide variety of reports, which include but is not limited to Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports, Environmental Management Plans (Planning, Construction, Operation and Closure), Environmental Audit Reports, Opportunities and Constraints Analyses, Feasibility studies, Waste License Applications, Water-Use Application Reports and Mining Right Applications.

The EAP have experience in the following disciplines:

- Environmental risk assessments;
- Environmental site screening, investigation and evaluations;
- Environmental legal screenings;
- Environmental feasibility studies;
- Environmental impact assessments;
- Basic assessments;
- Environmental compliance auditing;
- Compilation, implementation and monitoring of environmental management plans;
- Waste Management;
- Waste Disposal site selection screenings;
- Waste license applications;
- Water-Use License Applications;
- Mining Right applications; and
- Managing and facilitating public participation.

2. Description of the property

Table 1: Description of the property

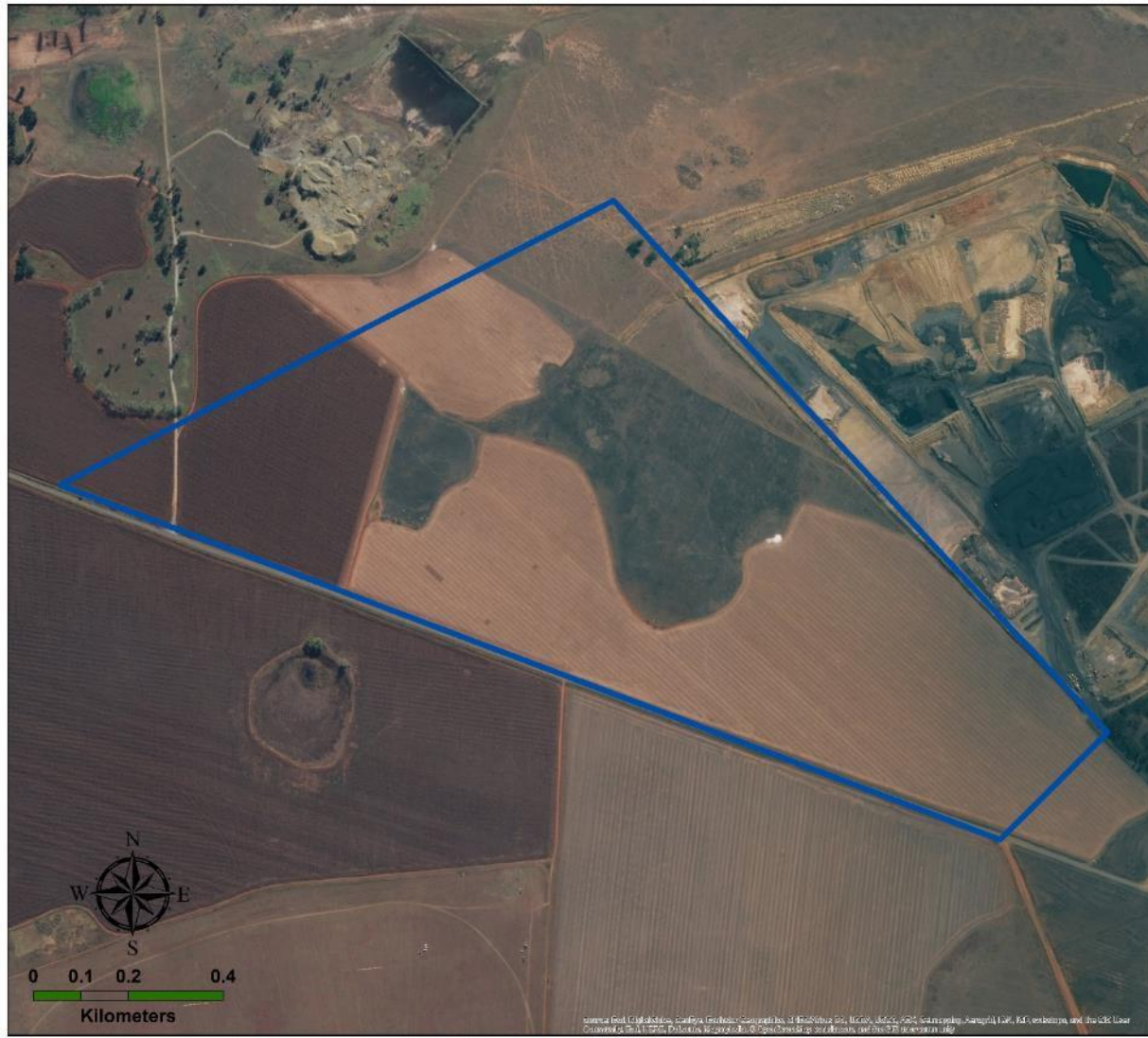
Farm Name:	A portion of Portion 85 of the Farm Grootfontein 165 IR and a portion of the Remainder of the Farm Vogelstruisbult 127 IR
Application area (Ha)	96.3384 ha
Magisterial district:	Ekurhuleni Metropolitan Municipality
Distance and direction from nearest town	Approximately 5 km north-west of Nigel.
21 digit Surveyor General Code for each farm portion	T0IR00000000016500085 T0IR00000000012700000

3. Locality map

(Show nearest town, scale not smaller than 1:250000 attached as Appendix 3)

Please refer to Figure 1 below. The locality map is also appended in Appendix 3.

Proposed Development Site of a portion of Portion 85 of the Farm Grootfontein 165 IR
and a portion of the Remainder of the Farm Vogelstruisbult 127 IR, Nigel, Gauteng Province



Legend

Brikor

— Proposed Development



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Author: L. Taylor
Date: 21-04-2017
Coordinate system: WGS1984



Figure 1: Locality of the Study Area

4. Description of the scope of the proposed overall activity

iii) Listed and specified activities

(Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site and attach as Appendix 4)

Table 2: Listed and specified activities

NAME OF ACTIVITY (All activities including activities 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.)	Aerial extent of the Activity Ha or m ²	LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985 /NOT LISTED	WASTE MANAGEMENT AUTHORISATION (Indicate whether an authorisation is required in terms of the Waste Management Act)
CONSTRUCTION PHASE				
Clearing of vegetation and topsoil and excavation for the access and haul roads, pollution control dam footprint and opencast areas.	TBC	-	NOT LISTED	NOT LISTED
Earthworks to excavate the pollution control dam	TBC	-	NOT LISTED	NOT LISTED
Constructing the pollution control dam liner and walls.	TBC	-	NOT LISTED	NOT LISTED
Dust Suppression	Extent of dirt roads open, non-paved areas.		NOT LISTED	NOT LISTED
OPERATIONAL PHASE				
Clearing of vegetation and topsoil by bulldozer/front-end-loader.	TBC	-	NOT LISTED	NOT LISTED
Stockpiling of overburden in 2 m high wind rows positioned for later rehabilitation.	TBC	-	NOT LISTED	NOT LISTED
Opencast mining using heavy duty earth moving equipment. After removal of overburden, benches are created by the effect of selective mining as well as by the limitation of the machinery regarding excavation depth. The maximum bench height is 3m. The low bench is served by a down ramp that is kept in close proximity to the working face. Excavator employed to remove clay.	TBC	X	Listing Notice 2 Activity 17	NOT LISTED
Loading, hauling and transport by truck of the clay to a stockpile close to the brick making factory to be used for the production of bricks.	N/A	-	NOT LISTED	NOT LISTED
As and when coal is exposed after mining of clay, coal will be excavated in the same	TBC	X	Listing Notice 2 Activity 17	NOT LISTED

NAME OF ACTIVITY (All activities including activities 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.)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985 /NOT LISTED	WASTE MANAGEMENT AUTHORISATION (Indicate whether an authorisation is required in terms of the Waste Management Act)
manner as the clay.				
Raw coal will be transported to the Plant on the adjacent property where the coal will be washed and used as an energy resource.	N/A	-	NOT LISTED	NOT LISTED
As and when sand is exposed, sand will be excavated.	TBC	X	Listing Notice 2 Activity 17	NOT LISTED
Sand will be transported to the Plant on the nearby property for crushing, screening and washing and to be sold off as building sand.	N/A		NOT LISTED	NOT LISTED
Deposition of waste rock onto waste rock dump and storage, if any.	TBC	X	NOT LISTED	NOT LISTED – the WRD is an existing dump on the adjacent Vlakfontein Mine.
Maintenance of the pollution control dam and stormwater management system.	TBC		NOT LISTED	NOT LISTED
Dust Suppression	Extent of dirt roads open, non-paved areas.		NOT LISTED	NOT LISTED

ii) Description of the activities to be undertaken

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

The proposed Grootfontein opencast mine quarry will be used for the extraction of clay, sand and coal, (i.e. brick making raw materials).

The brick making raw materials found in the area occur in Ecca aged sediments which are locally, flat lying with minor flexing in nature. Typically, Ecca sediments in this area consist of shales, with occasional interlayered sandstones and siltstones. The shales typically weather to clays, (i.e. close to surface), which can be used for making bricks whilst the sandstones are of little use as brick making raw materials. The sandstones generally, weather irregularly, resulting in the occurrence of large rocks and boulders. The Geological plan of this area shows the widespread occurrence of Ecca shales with scattered Witwatersrand inliers. Clearly the Ecca is a relatively thin “cover layer”, overlying older Witwatersrand members.

A number of diamond drill holes were initially sunk over the prospect area in order to investigate the geology and define the available clay and coal deposits. Subsequently, in 2015, a further 6 diamond drill holes were sunk, ahead of the current Brikor quarry (Vlakfontein) face, to verify the thickness and quality of the coal and clay raw materials available for mining in the future. The results of this drilling and geological work done, is given in the Mine Works Programme (MWP) and the assessment and the Borehole Logs of the drilling exercise are attached to the MWP (Appendix 5). A number of shallow core drill holes were drilled over the current mining area (Vlakfontein Quarry) and the prospect area to depths ranging to approximately 45 m. In the case of each hole, drilling was, in most cases, stopped as and when Dwyka Tillite was encountered or when the drilling had definitely intersected materials below the brick-making raw materials,(i.e. below the Ecca shales), that is, as non-useable materials were intersected. Considerable thicknesses of clay were found in the central-to-eastern section of the area ahead of the current quarry (Vlakfontein) face. To the north, away from the current quarry (Vlakfontein) face, the deeper, low-iron clays are less weathered and therefore not always suitable as a brick-making raw material. However, areas of extractable brick clays are found in the prospecting area.

The Brikor factory will be the only consumer of the brick clay mined from the proposed quarry. The clay will be used to make bricks and these products will be sold to the open market. The bricks will be burnt in a conventional “clamp” kiln on the Brikor/Vlakfontein site and on completion of the process, the bricks will be sorted into two categories, - both of which is specified under SABS 227. The specified categories are FBA (Face brick “Aesthetic”) and NFP (Non-face bricks).

The mining operation will consist of a team of earthmoving equipment that will be used to mine and stockpile the clay. Open cast mining will be done using conventional earth moving equipment. The earth moving equipment on site will consist of the following:

- A number of 30 ton Articulated dump trucks;
- 45 ton excavators;
- Bell water carts;
- Graders; and
- Bulldozers (D6 or equivalent).

The mining will be conducted over a wide face, which is progressively advanced with the appropriate benching, on the advancing face. The advantages of the method are that the mining advances at a slow rate and has a greater operating depth over a limited exposed

area. The machinery is also suitable for working in adverse conditions. The disadvantages of this method are that additional machines are required for hauling the extracted product to the processing plant. The terrain also requires additional earthworks, after mining, to slope sidewalls, etc. Benches are cut which allow for selective mining of different clay types and also for reasons of safety. As a result of selective mining, the quarry slopes do not always resemble a simple benched operation. Benches are created by the effect of selective mining as well as by the limitation of the machinery excavating depth. The maximum bench height is 3 m. The lower bench is descended by a down ramp which is kept in close proximity to the working face to clear the clay. Topsoil shall be removed from all areas where physical disturbance of the surface will occur (i.e. where mining is about to take place).

Vegetation and topsoil are removed annually, in advance of the mining exercise. Topsoil removed shall be kept separate from overburden and shall not be used for building or maintenance or backfill of access and haul roads. In the event that vegetation does not naturally and quickly establish itself on the bund wall, the bund wall will be protected from being eroded by watering or wind.

Rehabilitation of the disturbed surface will be done each year during the mining period. The topsoil and overburden removed each year will be used to rehabilitate the area disturbed during the previous year. That is, each year, a further area will be mined/disturbed and an equivalent area will be rehabilitated.

Inputs and Outputs

Raw materials

Clay will be used in the brick making process at the nearby Brikor factory and plant adjacent to the site.

Coal will be used in the brick burning process.

Products

Once the bricks have been burnt/fired in a conventional “clamp” kiln on the site, the following products can be sorted for sale:

- NFP – as “common” building bricks;
- FBA – as “face brick aesthetic” (i.e. a semi-face).

Existing Infrastructure

Existing infrastructure on the site includes Eskom power lines, telephone lines and basic secondary roads.

Construction Phase

The construction phase will be limited to the grading of haul roads and the removal of overburden in preparation of the mining operations as well as the construction of the pollution control dam. If the infrastructure has to make way for the mining of specific clay bodies, then the monitoring suggested in the operational phase will still apply.

The opening of the initial box-cut involves the removal of topsoil and subsoil in order to acquire access to the ore body. The removal of topsoil usually takes place with an excavator to an average depth of 0.5m, extracted top soil material is then stored in piles for later use during rehabilitation procedures.

Operational Phase (Process Description)

Mining will be done by means of opencast methods using heavy-duty earth moving equipment as listed above. By using an excavator, the mining is done over a wide face, which is progressively advanced with prominent high walls in the advancing face. The method ensures that the mining advances at a slow rate and has a greater operating depth over a limited exposed area. The machinery is also suitable for working in adverse wet conditions.

The disadvantages of the method are that additional machines are required for hauling the extracted product to the processing plant. The terrain also requires additional earthworks, post-mining, to slope sidewalls, etc. Numerous benches are to be cut which allows for selective mining of different clay types and horizons. Because of selective mining, the quarry slopes do not always resemble a simple two-bench operation. Vegetation and topsoil are to be removed by bulldozer/front-end loader in advance of the face to clear the clay. The overburden will be stockpiled in 2 m high wind rows positioned for later rehabilitation. Benches are created by the effect of selective mining as well as by the limitation of the machinery regarding excavation depth. The maximum bench height is 3 m. The lower bench is served by a down ramp that is kept in close proximity to the working face.

An excavator will be employed to remove the clay and mining trucks will transport the clay to a stockpile close to the factory adjacent which will then be used for the production of bricks.

As and when coal is exposed after the mining of clay, the coal will be excavated in exactly the same way as the clay is. The raw coal will be transported to the coal washing section of the Plant at the Vlakfontein Mine quarry. The material is then washed for better use as an energy resource.

As and when sand is exposed, sand will be excavated. Sand will be transported to the nearby brick making factory, crushed, screened and washed to be sold off as building material.

Mining Schedule

The proposed Grootfontein Mine will be developed as a new operation.

YEAR ONE - An initial box-cut, 80m wide will be developed on the north-western corner of the mining area.

YEAR TWO, THREE, etc. - The long, south-eastern facing open cut of the mine will be advanced to the south west, in a series of blocks, such that the overall south-western side of the mine remains a straight cu. This allows for even side-to side backfilling of overburden over the north-western boundary of the proposed open-cast mine. Topsoil will be stored separately for later rehabilitation / covering, of back-filled areas. Further information is available in the Draft Mine Work Programme attached to the Draft Scoping Report as Appendix 5.

5. Policy and Legislative Context

Table 3: Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(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)</i>	REFERENCE WHERE APPLIED
Constitution of South Africa, 1996 (Act No. 108 of 1996) [as amended] <ul style="list-style-type: none"> • Section 24 <i>Environment.-Everyone has the right-</i> <i>(a) to an environment that is not harmful to their health</i> 	The proposed development could potentially harm the environment, posing a risk to the health and wellbeing of people. The development, however, also have the potential to secure ecologically sustainable economic and social development through reusing process products

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(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)</i>	REFERENCE WHERE APPLIED
<p><i>or well-being; and</i></p> <p><i>(b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that-</i></p> <p><i>i) prevent pollution and ecological degradation;</i></p> <p><i>ii) promote conservation; and</i></p> <p><i>Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</i></p>	<p>and limiting the use of natural resources.</p> <p>The Applicant has the overall responsibility to ensure that the rights of people in terms of Section 24 of the Constitution is protected. The Applicant is required to ensure the activities related to the proposed development will not result in pollution and degradation of the environment.</p>
<p>National Environmental Management Act (No. 107 of 1998) [as amended] Principles of NEMA</p> <ul style="list-style-type: none"> • Section 28 (1) <p><i>Duty of Care and responsibilities to minimise and remediate environmental degradation.</i></p>	<p>The Applicant is the developer and overall responsibility of the mine rests with him of the responsibility includes liabilities associated with the operational phase.</p>
<p>EIA Regulations, 2014 (Government Notices 982 and 984) [as amended]</p> <p><i>The proposed construction, operational and closure activities of the proposed development triggers the following listed activity that are listed in the EIA regulations for which a Scoping and Environmental Impact Assessment (EIA) process have to be conducted:</i></p> <ul style="list-style-type: none"> • Activity 17: <p><i>Any activity including the operation of that activity which requires a mining right as contemplated in Section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which and exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</i></p>	<p>The proposed development requires amendment of the mining right.</p>
<p>Mineral and Petroleum Resources Development Act, 2002 (Act. 28 of 2002) [as amended]:</p>	<p>In terms of Section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) a mining right must be applied for with the Department of Mineral Resources and a Mine Works Programme must be submitted as part of the application.</p>
<p>National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended]</p> <ul style="list-style-type: none"> • Section 16 <p><i>General duty in respect of waste management;</i></p> <ul style="list-style-type: none"> • Section 17; <p><i>Reduction, re-use, recycling and recovery of waste;</i></p> <ul style="list-style-type: none"> • Section 18; and <p><i>Extended producer responsibility; and</i></p> <ul style="list-style-type: none"> • Section 21 <p><i>General requirements for storage of hazardous and general waste.</i></p>	<p>The development activities will produce general and hazardous waste which need to be managed and disposed of according to best practices such as recycling, safe storage, etc.</p>
<p>Waste Classification and Management Regulations and Norms and Standards for the assessment of for landfill disposal and for disposal of waste to landfill, 2013 (Government Notice 634 – 635 of 2013) promulgated in</p>	<p>The construction and operational activities associated with the proposed activities shall be in accordance with the regulations and Norms and Standards.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(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)</i>	REFERENCE WHERE APPLIED
terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended].	
National Water Act, 1998 (Act No. 36 of 1998) [as amended] <ul style="list-style-type: none"> • Section 3 <i>Regulation of flow and control of all water</i> • Section 19 <i>Prevention of pollution to watercourses</i> • Section 21 <i>The water use activities associated with the proposed development requires compliance with the requirements of the NWA as listed under GN No. 19182. An application for an integrated water use license is lodged in terms of Section 21 of the National Water Act, 1998 (Act 36 of 1998) [as amended] to undertake the following activity:</i> <p><i>Section 21: (a) Taking water from a water resource</i></p> <p><i>Section 21: (c) Impeding or Diverting the Flow of Water in a Watercourse</i></p> <p><i>Section 21: (g) disposing of waste in a manner which may detrimentally impact on a water resource;</i></p> <p><i>Section 21: (i) Altering the bed, banks, course or characteristics of a water course</i></p> <p><i>Section 21: (j) removing, discharging or disposing of water found underground for the continuation of mining or for the safety of people.</i></p>	Storm water need to be managed properly in order to achieve prevention of pollution and hazards. The mine will need to dewater the opencast areas, which will be stored in the pollution control dams and used for dust suppression. (Section 21 (a) and (j)). The mining will occur within 500 m of a wetland (Section 21 (c) and (i)). The deposition of dirty storm water to the pollution control dam constitutes the disposal of waste water that may impact on ground water and surface water resources. (Section 21 (g)).
GN 704 4 June 1999 National Water Act, 1998 (Act No. 36 of 1998) [as amended] Regulations on use of water for mining and related activities aimed at the protection of water resources.	The deposition of dirty water to the pollution control dam constitutes the disposal of waste water that may impact on ground water and surface water resources.
Water Quality Management Series: OPERATIONAL GUIDELINE No. M6.1 Guideline Document for the Implementation of Regulations on Use of Water for Mining and Related Activities Aimed at the Protection of Water Resources, 2 nd Edition.	The deposition of dirty water to the pollution control dam constitutes the disposal of waste water that may impact on ground water and surface water resources.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996) [as amended] and associated regulations <ul style="list-style-type: none"> • Chapter 2, Sections 2 – 4 <i>Responsibilities of owner</i> • Chapter 2, Sections 5 – 13 <i>Responsibilities of manager;</i> • Chapter 2, Sections 14 – 18; 	The development activities will create an environment that is not safe and healthy for workers on and visitors to the site. The act provides for measures to prevent threats to the health and safety of humans in the development area.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(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)</i>	REFERENCE WHERE APPLIED
<p><i>Documentation requirements;</i></p> <ul style="list-style-type: none"> • Chapter 2, Section 19 – 20 and 22 to 24 <p><i>Employee's rights and duties; and</i></p> <ul style="list-style-type: none"> • Chapter 2, Section 21 <p><i>Manufacturer's and supplier's duty for health and safety.</i></p>	
<p>National Heritage Resources Act, 1999 (Act No. 25 of 1999)</p> <ul style="list-style-type: none"> • Section 44 (1); <p><i>Preservation and protection of heritage resources;</i></p> <ul style="list-style-type: none"> • Section 3 Types and ranges of heritage resources (i) (i); <p><i>Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens.</i></p>	<p>Protection of indigenous heritage resources on the property.</p>
<p>National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) [as amended]</p> <ul style="list-style-type: none"> • Section 32 <p><i>Control of dust</i></p> <ul style="list-style-type: none"> • Section 34 <p><i>Control of noise</i></p>	<p>Impacts on surrounding landowners need to be managed through dust and noise mitigation measures.</p>
<p>National Dust Control Regulations, 2013 (Government Notice 827 of 2013)</p> <ul style="list-style-type: none"> • Section 3 <p><i>Dust fall standard</i></p> <ul style="list-style-type: none"> • Section 4 <p><i>Dust fall monitoring program</i></p> <ul style="list-style-type: none"> • Section 6 <p><i>Measures for control of dust</i></p> <ul style="list-style-type: none"> • Section 7 <p><i>Ambient air quality monitoring (PM10)</i></p> <ul style="list-style-type: none"> • Section 8 <p><i>Offences</i></p> <ul style="list-style-type: none"> • Section 9 <p><i>Penalties</i></p>	<p>Dust fall out (PM10 and PM2.5) need to be monitored in accordance to the standards set out in the monitoring programme with the specified measures due to the Applicant being liable to offences and penalties associated with non-conformance to dust which may influence employees and surrounding landowners.</p>
<p>Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) [as amended]</p> <ul style="list-style-type: none"> • Section 12 (1) <p><i>Duty of the landowner to prevent fire from spreading to neighbouring properties.</i></p>	<p>Cautionary steps in avoiding the spread of fires to and from neighbouring properties.</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) [as amended]</p> <ul style="list-style-type: none"> • Section 9 <p><i>Norms and standards</i></p> <ul style="list-style-type: none"> • Section 27 	<p>Indigenous vegetation need to be protected and managed in accordance with management measures set out in the management plans developed for the mine and the Applicant need to ensure he is aware of and covers his liabilities.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(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)</i>	REFERENCE WHERE APPLIED
<i>Delegation of power and duties</i> <ul style="list-style-type: none"> • Section 30 <i>Financial accountability</i> <ul style="list-style-type: none"> • Section 43 <i>Biodiversity management plans.</i>	
Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2014 in terms of NEMBA (Government Notice 599 of 2014) <ul style="list-style-type: none"> • Notice 2 <i>Exempted Alien Species in terms of Section 66 (1)</i> <ul style="list-style-type: none"> • Notice 3 <i>National Lists of Invasive Species in terms of Section 70(1)</i> <ul style="list-style-type: none"> – List 1, 3-9 & 11 • Notice 4 <i>Prohibited Alien Species in terms of Section 67 (1)</i> <ul style="list-style-type: none"> – List 1, 3-7, 9-10 & 12 	It is the responsibility of the Applicant to ensure that all prohibited plant and animal species are eradicated as far as possible.
Conservation of Agricultural Resources Act (no. 43 of 1983) <ul style="list-style-type: none"> • Section 5 <i>Prohibition of spreading of weeds</i> <ul style="list-style-type: none"> • Section 12 <i>Maintenance of soil conservation works and maintenance of certain states of affairs</i> <ul style="list-style-type: none"> • Section 16 <i>Regional Conservation Committees</i>	Listed invader/alien plants present on site which requires management measures to be implemented to strive to maintain the status quo environment through the guidelines provided by the Regional Conservation Committee.
Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended] <ul style="list-style-type: none"> • Section 2 <i>Declaration of grouped hazardous substances;</i> <ul style="list-style-type: none"> • Section 4 <i>Licensing;</i> <ul style="list-style-type: none"> • Section 16 <i>Liability of employer or principle</i> <ul style="list-style-type: none"> • Section 9 (1) <i>Storage and handling of hazardous chemical substances</i> <ul style="list-style-type: none"> • Section 18 <i>Offences</i>	The Applicant must ensure the safety of people working with hazardous chemicals (specifically fuels), as well as safe storage, use and disposal of containers during the on-site operational phase together with the associated liability should non-compliance be at the order of the day.
Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995) <ul style="list-style-type: none"> • Section 4 <i>Duties of persons who may be exposed to hazardous chemical substances</i> <ul style="list-style-type: none"> • Section 9A (1) <i>Penalties</i>	Hazardous substances will be stored and utilised on the site and non-compliance to management measures will result in prosecution of the Applicant in terms of his liabilities to the socio-economic environment.
All other relevant national, provincial, district and local municipality legislation and guidelines that may be applicable to the application. Some of these are discussed	-

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(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)</i>	REFERENCE WHERE APPLIED
in the next section, but will be discussed in detail within the EIA / EMP report.	
NEMA: Government Notice. 805 Companion Guideline on the Implantation of the Environmental Impact Assessment Regulations, 2010, October 2012.	The application for Environmental Authorisation is submitted in terms of the EIA Regulations.
NEMA: GN. 806 Environmental Management Framework Guideline, October 2012	The proposed activity is located within the Gauteng Province and the Ekurhuleni Metropolitan Municipality of which both have a promulgated Environmental Management Framework.
NEMA: GN. 807 Public Participation Guideline, October 2012	Consultation with Interested and Affected Parties and Communities.
National Development Plan 2030 (2012)	Land uses
National Framework for Sustainable Development (2008)	Land uses
National Strategy for Sustainable Development and Action Plan 2011 – 2014 (NSSD 1) (2011)	Land uses
Gauteng Spatial Development Framework (SDF)	Land uses
Gauteng Spatial Development Plan (SDP)	Land uses
Ekurhuleni Metropolitan Municipality (EMM) Growth and Development Strategy 2055	Land uses
EMM Integrated Development Plan (IDP) 2016 - 2017	Land uses
Ekurhuleni Metropolitan Spatial Development Framework (MSDF), 2015	Land uses
Ekurhuleni Metropolitan Regional Spatial Development Framework: Region E	Land uses
Department of Mineral Resources Guidelines for the compilation of a Scoping Report with due regard to consultation with communities and Interested and Affected Parties.	Consultation with Interested and Affected Parties and Communities.
Gauteng Province Environmental Management Framework, 2014	Land uses and environmental management
Ekurhuleni Environmental Management Framework, 2008	Land uses and environmental management
Mining and Biodiversity Guideline, 2013	Impacts on biodiversity need to be managed through mitigation measures.
SANS 10103:2008 The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication.	Impacts on surrounding landowners need to be managed through noise mitigation measures.
SANS 1929: Ambient Air Quality – Limits for Common Pollutants	Impacts on surrounding landowners need to be managed through dust mitigation measures.
SANS 1137: Standard test method for the collection and measurement of dust fall (settleable particulate matter).	Impacts on surrounding landowners need to be managed through dust mitigation measures.
SANS 10234: 2008 Globally Harmonised Systems of classification and labelling of chemicals (GHS)	All dangerous goods on site need to be managed according to these standards.

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Government Notice 634. August 2013: Waste Classification	
SANS 10228:2006 The Identification and Classification of Dangerous Goods for Transport	All dangerous goods to be transported to and from the site need to be managed according to these standards.
ASTM d 1739, 1970 or equivalent approved protocol for dust monitoring.	Impacts on surrounding landowners need to be managed through dust mitigation measures.
SANS 241-1:2004 Drinking Water Specification: Physical, Aesthetic, Operational and Chemical and microbial determinants.	Surface water need to be managed.
Gauteng Conservation Plan: Version 3.3	Identifies Critical Biodiversity Areas, Ecological Support Areas, and irreplaceable, protected and important areas. The site is located within an Ecological Support Area.

6. Need and desirability of the proposed activities

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

According to the Guideline on Need and Desirability in terms of the EIA Regulations, (GN. 891 of 2014), the consideration of “need and desirability” in EIA decision-making requires the consideration of the strategic context of the development proposal along the broader societal needs and the public interest. Government decision makers, with Environmental Assessment Practitioners (EAPs) and planners, are therefore accountable to the public and must serve their social, economic and ecological equitably. Development must not exceed ecological limits in order to secure integrity, while the proposed actions of individuals must be measured against the and long-term public interest in order to promote justifiable social and economic development (Section 24 of the Constitution) – i.e. ensuring the simultaneous of the triple bottom-line. The guideline also states that taking the above into “the need for and desirability of a proposed activity must specifically and explicitly addressed throughout the EIA process (screening, “scoping”, and assessment), dealing with individual impacts and specifically in the overall impact summary by account the answers to questions listed in the guideline. These questions will be studied and answered during the EIA phase, when specialist studies are available.

Table 4 below lists the broad categories of questions listed in the guideline.

Table 4: Need and desirability considerations

1. Section 24 of the Constitution: “...securing ecological sustainable development and use of natural resources....”
How will this development (and its separate elements/aspects) impact on the ecological integrity of the area? (Section 24 of the Constitution and Section 2(4) (a)(vi) of NEMA).
2. Section 24 of the Constitution: “promoting justifiable economic and social development”
What is the socio-economic context of the area based on certain considerations?

7. Period for which the environmental authorisation is required

The authorisation for the proposed mining activities is required for a period of 15 years.

8. Description of the process followed to reach the proposed preferred site

(NB!! – This section is not about the impact assessment itself; It is about the determination of the specific site layout having taken into consideration (1) the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result)

i) Details of all 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)*

Considering the merits of a specific application in terms of the need and desirability considerations, it must be decided which alternatives represent the “most practicable environmental option”, which in terms of the definition in NEMA and the purpose of the EIA Regulations are that option that provides the most benefit and causes the least damage to

the environment as a whole, at a cost acceptable to society, in the long-term as well as in the short-term.

According to the Western Cape Department of Environmental Affairs & Development Planning (WC DEADP) Guideline on alternatives: EIA Guideline and Information Document Series (2011) feasible and reasonable alternatives have to be identified for a development as required by the NEMA EIA Regulations and applicable to EIA. Each alternative is to be accompanied by a description and comparative assessment of the advantages and disadvantages that such development and activities will pose on the environment and socio-economy. Alternatives forms a vital part of the initial assessment process through the consideration of modifications in order to prevent and/or mitigate environmental impacts associated with a particular development. Alternatives are to be amended when the development's scope of work is amended. It is vital that original as well as amended alternative identification, investigation and assessment together with the generation and consideration of modifications and changes to the development and activities are documented.

Although an array of alternatives could be investigated for each project, such alternatives will not necessarily be applicable to each project and/or project phase. However, there must always be strived to seek alternatives that maximises efficient and sustainable resource utilisation and minimise any negative impacts on the bio-physical and socio-economic environments.

Feasible alternatives

The following alternatives were investigated as feasible alternatives:

- The site on which the proposed facility is to be located and location of infrastructure on the site (*site and layout alternatives*);
- The mining method (*technology alternatives*)
- Recycling (*technology alternatives*); and
- Not implementing the mining activities (*No – Go alternative*).

Table 5 below contains the analysis of alternatives identified.

Table 5: Alternatives Analysis

TYPE OF ALTERNATIVE: Location	ALTERNATIVE EXPLANATION: <i>Develop on an alternative property</i> <i>Develop on alternative sites on the same property/properties</i>
Study Area: <p>The property on which the mining is proposed is located immediately to the west of the existing Brikor Vlakfontein Quarry. The location of the proposed mining quarry was chosen due to the prospecting results, indicating the available reserves on the property as well as the feasibility studies indicating that it will be economically viable to mine there. Due to the location close to the existing quarry and factory, transport costs and impacts will be kept to a minimum. The vegetation on the study area have been disturbed by agricultural activities with little to no natural vegetation remaining. It is, however, possible that a wetland may occur on this property where mining is proposed. This must be confirmed during the EIA Phase.</p> <p>Area to the east of the existing Vlakfontein Quarry:</p> <p>The property adjoining the existing quarry to the east, is regarded as sensitive due to the possible presence of a large floodplain wetland (refer to Figure 16 of this report).</p>	
TYPE OF ALTERNATIVE: Activity	ALTERNATIVE EXPLANATION: <i>Develop an alternative activity e.g. Incineration of waste vs. landfill disposal, abstraction of water vs. re-use/recycling of water.</i>
<p>The re-use and recycling of water will be preferred above abstraction. However, some water will have to be abstracted from the pits, in order to continue with mining. This water will be used on the site.</p>	
TYPE OF ALTERNATIVE: Design	ALTERNATIVE EXPLANATION: <i>Adapt architectural and/or engineering designs.</i>
<p>No design alternatives have been identified or are assessed as part of this application.</p>	
TYPE OF ALTERNATIVE: Layout	ALTERNATIVE EXPLANATION: <i>Adapt spatial configurations of an activity on any particular site e.g. Locate manure dams away from water resources.</i>
<p>Layout alternatives will be discussed once the specialist studies are completed during the EIA Phase.</p>	
TYPE OF ALTERNATIVE: Technological	ALTERNATIVE EXPLANATION: <i>Adapt methods or processes that can be implemented to achieve the same goal e.g. Introduction of bacteria rather than chemicals to waste water.</i>
<p><i>Mining method:</i></p> <p>The mining will be conducted over a wide face, which is progressively advanced with the appropriate benching, on the advancing face. The advantages of the method are that the mining advances at a slow rate and has a greater operating depth over a limited exposed area. The machinery is also suitable for working in adverse conditions. The disadvantages of this method are that additional machines are required for hauling the extracted product to the processing plant. Alternatives to this</p>	

method will be discussed in detail during the EIA phase.	
TYPE OF ALTERNATIVE: Demand	ALTERNATIVE EXPLANATION: <i>The demand for products and/or services can be met by other means e.g. The demand for paper can be met through deforestation or rather by efficient and viable recycling.</i>
No alternatives to meet demand were identified or are assessed in this application.	
TYPE OF ALTERNATIVE: Input	ALTERNATIVE EXPLANATION: <i>Implement different input materials and/or sources e.g. Utilisation of woodchips for fuelling boilers rather than electricity.</i>
No input alternatives were identified or are assessed in this application.	
TYPE OF ALTERNATIVE: Routing	ALTERNATIVE EXPLANATION: <i>Implement alternative routes for linear developments such as power line servitudes, transportation and pipeline routes e.g. Elongate and divert a railway line to exclude a sensitive environment.</i>
No routing alternatives were identified or assessed in this application. The access and haul roads will be relocated and upgraded to the most efficient locality that will still meet the requirements of the proposed development, but will have the least impact on the environment and surrounding landowners.	
TYPE OF ALTERNATIVE: Transport	ALTERNATIVE EXPLANATION: <i>Method of transportation of product or ore.</i>
This alternative is not applicable to the proposed development.	
TYPE OF ALTERNATIVE: Scheduling and Timing	ALTERNATIVE EXPLANATION: <i>Adapt the order and/or scheduling of a number of measures which plays a part in a program as it will influence the overall effectiveness of the end result.</i>
This alternative is not applicable to the proposed development.	
TYPE OF ALTERNATIVE: Scale	ALTERNATIVE EXPLANATION: <i>Adapt the scale of an activity ex. 15 vs. 35 housing units, 12m² vs. 0.5km².</i> <i><u>P.S. Scale and magnitude is interrelated.</u></i>
At this stage, no alternatives in terms of scale have been identified or are assessed.	
TYPE OF ALTERNATIVE: Magnitude	ALTERNATIVE EXPLANATION: <i>Adapt the magnitude which is directly related to the extent of an activity.</i> <i><u>P.S. Scale and magnitude is interrelated. An activity may be very</u></i>

	<u><i>small scale but can pose an extensive magnitude ex. Destroying an extremely sensitive wetland on a very small scale could result in a magnitude of such as destroying the whole wetland and/or ecological system.</i></u>
At this stage, no alternatives in terms of magnitude have been identified or are assessed.	
TYPE OF ALTERNATIVE: No-Go	ALTERNATIVE EXPLANATION: <i>The option of not undertaking and implementing the activity at all.</i>
<p>According to Section 24 of the Constitution, a development must be ecologically sustainable and also support socio-economic development.</p> <p>The proposed development has the potential to have a negative impact on the ecological environment as well as the social environment of the area. These impacts, however, can potentially be prevented, minimised, mitigated and managed to acceptable levels. This will need to be confirmed during the EIA Phase.</p> <p>The project is aligned with the objectives of the municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP), as well as the Provincial Strategic Priority with reference to job creation, investment creation, rural and urban development, combating crime, skills development, combating the impact of HIV/AIDS and poverty alleviation. The Social and Labour Plan (SLP) drafted for the proposed project addresses all these priorities.</p>	

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)

A joint Public Participation Process is undertaken for the proposed mining development. The process is undertaken to ensure compliance with regard to the requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [as amended] (MPRDA), the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA), the National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) [as amended] (NEMWA), the National Water Act, 1998 (Act No. 36 of 1998) [as amended] (NWA) and the Environmental Impact Assessment Regulations (2014) [as amended] (EIA Regulations, 2014).

Tasks undertaken for the Public Participation Process (PPP)

This section of the report provides an overview of the tasks undertaken for the PPP to date. All PPP undertaken is in accordance with the requirements of NEMA and the EIA Regulations (2014) [as amended]. It further provides an outline of the next steps in the PPP and makes recommendations for tasks to be undertaken during the environmental assessment phase of the environmental authorisation process.

The PPP tasks conducted for the proposed mining development to date includes:

IDENTIFICATION OF KEY INTERESTED AND AFFECTED PARTIES (AFFECTED AND ADJACENT LANDOWNERS) AND OTHER STAKEHOLDERS (ORGANS OF STATE AND OTHER PARTIES)

Public Participation is the involvement of all parties who are either potentially interested and or affected by the proposed development. The principle objective of public participation is to inform and enrich decision-making. This is also its key role in this Scoping and Environmental Impact Assessment (EIA) process.

Interested and Affected parties (I&APs) representing the following sectors of society has been identified:

- National, provincial and local government;
- Agriculture, including local landowners (affected and adjacent);
- Community Based Organisations;
- Non-Governmental Organisations;
- Water bodies;
- Tourism;
- Industry and mining;
- Commerce; and
- Other stakeholders.

FORMAL NOTIFICATION OF THE APPLICATION TO INTERESTED AND AFFECTED PARTIES (INCLUDING ALL AFFECTED AND ADJACENT LANDOWNERS) AND OTHER STAKEHOLDERS

The project was announced as follows:

- Newspaper advertisement

Publication of media advertisement (English) in the Heidelberg/Nigel Heraut Newspaper on 10 May 2017. *Refer to Appendix 6.1 for proof of newspaper notice placement.*

- Site notice placement

In order to inform surrounding communities, affected and adjacent landowners of the proposed development, six site notices were erected on site and at visible locations close to the site on 10 May 2017. *Refer to Appendix 6.2 for proof of site notice placement.*

- Written notification

I&AP's and other key stakeholders, who included the above-mentioned sectors, were directly informed of the proposed development by e-mail on 10 May 2017. Registration and Comment sheets were also supplied to all parties. I&APs are given 30 days to comment and / or raise issues of concern regarding the proposed development. The commenting period will expire on 10 June 2017. *Refer to Appendix 6.3 for a copy of the proof of written notification.*

- Availability of the Draft Scoping Report

I&AP's and other key stakeholders, who included the above-mentioned sectors, were also invited to provide comments on the Draft Scoping Report. I&APs are given 30 days to comment and / or raise issues of concern regarding the proposed development and on the Scoping Report. The commenting period will expire on 10 June 2017. Refer to Appendix 6.1 - 6.3 for copies of the proof of the written, site and newspaper notices containing the invitation to comment and the availability of the Draft Scoping Report.

- Invitation to public meeting

A public participation meeting will be held on 25 May 2017. The invitation to the public meeting was included in the notifications as described above. *Refer to Appendix 6.1-6.3 for proof of public meeting invitation.*

CONSULTATION AND CORRESPONDECE WITH I&AP'S AND STAKEHOLDERS

All I&AP registrations and comments that are received from stakeholders are formally recorded in the Comments and Responses Report. *Appendix 6.4 of the Final Scoping Report will contain a register of I&APs, a comments and responses report as well as copies of all comments and responses received.*

The NEMA Draft Scoping Report (DSR) is released for a period of 30 days from 10 May 2017 to 10 June 2017.

A public participation meeting will be held on 25 May 2017 at the Brikor Limited Offices. All registered I&APs and relevant organs of state are invited to the meeting. *Appendix 6.5 of the Final Scoping Report will contain a copy of the presentation delivered at the Public Meeting as well as the Minutes of the Meeting.*

Hardcopies of the Draft Scoping Report are herewith submitted to all organs of state and relevant authorities. In addition, copies are placed at the Brikor Limited Offices and on the ENVASS website (www.envass.co.za). *Refer to Appendix 6.1 – 6.3 for proof of notification of the scoping report review period and Appendix 6.6 for proof of submission to Organs of State and other relevant parties.*

NEXT PHASES OF THE PUBLIC PARTICIPATION PROCESS

All stakeholders and registered I&APs will have the opportunity to review and comment on all the documents released during the EIA phase. The EIA / EMP report will be released for a period of 30 days for review and comment in due course. During the EIA phase hardcopies and CDs of all reports and supporting documents will be submitted to the organs of state and relevant authorities. All the reports will be placed at the Brikor Limited Offices and will be available for download from the ENVASS website (www.envass.co.za/downloads).

iii) Summary of issues raised by I&APs

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

Table 6: Summary of issues raised

Interested and Affected Parties List the names of persons consulted in this column and mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (consensus dispute, not finalised, etc.)
<u>AFFECTED PARTIES</u>				
Landowner/s				
Ekurhuleni Metropolitan Municipality (Nigel) Contact Person: Agrippa Semata	X			
Ekurhuleni Metropolitan Municipality (Springs) Mr H S Nkosi (Head of Department) Enquiries: Cecilia Rakgoale	X			
Lawful occupier/s of the land				
Andrew Vermaak (farmer)	X			
Linden de Lange (farmer)	X			
Landowners or lawful occupiers on adjacent properties				
Andrew Vermaak (farmer)	X			
Linden de Lange (farmer)	X			
National Government of the Republic of South Africa Department of Defence Dunnottar Military Base	X			

Scoping Report

Interested and Affected Parties List the names of persons consulted in this column and mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (consensus dispute, not finalised, etc.)
Scarlet Sun 33 (Pty) Ltd	X			
Ekurhuleni Metropolitan Municipality (Nigel) Contact Person: Agrippa Semata	X			
Marievale Bird Sanctuary Provincial Nature Reserve Contact Person: Rhulani Maluleke	X			
Municipal councillor				
Ward councillor Ward 88 Mr Wollaston Labuschagne	X			
Municipality				
Ekurhuleni Metropolitan Municipality (Nigel) Contact Person: Agrippa Semata Ekurhuleni Metropolitan Municipality (Springs) Mr H S Nkosi (Head of Department) Enquiries: Cecilia Rakgoale	X			Not finalised
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS etc.)				
Department of Mineral Resources Environmental: Christinah Ramoelo Jimmy Sekgale	X			
Gauteng Department of Agriculture and Rural Development (GDARD)	X			

Interested and Affected Parties List the names of persons consulted in this column and mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (consensus dispute, not finalised, etc.)
Basani Ndindani Simon Mafu				
The Department of Agriculture, Forestry and Fisheries (DAFF)	X			
Gauteng Home Affairs	X			
Gauteng Department of Community Safety	X			
Department of Social Development Nigel	X			
Gauteng Department of Economic Development	X			
Gauteng Department of Sports, Arts Culture and Recreation	X			
Gauteng Department of Health	X			
Gauteng Department of Human Settlements	X			
Gauteng Department of Infrastructure Development	X			
Gauteng Department of Roads and Transport	X			
South African Heritage Resources Agency (SAHRA)	X			
South African National Roads Agency Limited (SANRAL)	X			
Provincial Heritage Resources	X			

Scoping Report

Interested and Affected Parties List the names of persons consulted in this column and mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (consensus dispute, not finalised, etc.)
Authority Gauteng (PHRAG)				
Gauteng Department of Education School District Offices Ekurhuleni South District Director: Jerry Bhagaloo, Ekurhuleni South PA: Busisiwe Mtshali				
Communities				
Marievale Committee Chris Koitsioe Cell: 073 562 5217	X			
Vorsterskroon Committee	X			
Dept. Land Affairs				
Gauteng Department of Rural Development and Land Affairs	X			
Traditional Leaders				
Gauteng Cooperative Governance and Traditional Affairs	X			
Dept. Environmental Affairs				
Lucia Mathutu MOTAUNG Assistant Director, Department of Environmental Affairs CEPA Government Focal Point SOUTH AFRICAN NATIONAL	X			

Scoping Report

Interested and Affected Parties List the names of persons consulted in this column and mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (consensus dispute, not finalised, etc.)
BIODIVERSITY INSTITUTE				
Other Competent Authorities affected				
Department of Water and Sanitation (DWS)	X			
<u>OTHER AFFECTED PARTIES</u>				
Wildlife and Environment Society of South Africa (WESSA) Northern Areas Region				
Ramsar South Africa				
Birdlife SA Important Bird and Biodiversity Areas Programme: Daniel Marnewick				
Happiness Primary School P.L.N. Gama				
Vita Nova Centre Cerebral Palsy Centre Struisbult				
South African Police Services (SAPS) Station: Dunnottar, Nigel				
<u>INTERESTED PARTIES</u>				

9. The Environmental attributes associated with the sites

(1) Baseline Environment

The study area is located on the Remainder of the Farm Vogelstruisbult 127 IR and a portion of Portion 85 of the Farm Grootfontein 165 IR, situated approximately 5 km north-west of the town of Nigel. The study area falls within the Ekurhuleni Metropolitan Municipality in the Gauteng Province.

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

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

Gradient and landscape context

The topography of the study area is characterised by relatively flat terrain with an eastern downwards slope of approximately 1:100 m towards the Blesbokspruit. The study area is located between 1560 and 1580 metres above mean sea level (mamsl).

Geology and Soils

The stratigraphy as indicated on the published 1:250 000 Geological Series 2628 East Rand is typical of the coal bearing margins of the Karoo Sequence. The succession consists of pre-Karoo rocks (dolomite and chert of the Chuniespoort Group of the Transvaal Sequence) overlain by the Dwyka Formation (Dwyka Tillite and shale), followed by the Ecca Group sediments (shale, sandstone and coal beds), of which the Vryheid Formation is the coal-bearing horizon. North-west to south-east dolomite intrusions in the form of dykes are present over a wide area but geophysical surveys conducted over the site did not reflect anomalies that may be correlated with dolomite dykes.

The following information was derived from the report of a Soil Survey around Marievale, East Rand, 2005 by Jacobs and Paterson and the report of an Agricultural Potential Survey on the Remainder of the Farm Vlakfontein 281 IR (the property adjacent to the study area) by J. van der Waals, 2010

The soils on the study area is derived from the underlying (Geological Survey, 1978 as cited by Jacobs & Paterson, 2005), sandstone and clay of the Vryheid Formation. Dolomite and

chert of the Chunispoort group, as well as tillite and diamictite of the Dwyka formation also occurs to the north-east of the study area (Jacobs & Paterson, 2005).

Six units of soil types were identified around Marievale i.e.:

- Avalon (Av);
- Hutton (Hu);
- Katspruit (Ka);
- Rensburg (Rg);
- Witbank (Wb); and
- Wasbank (Wa).

Av: The dominant soil in the area consists of pinkish grey, structureless, sandy loam topsoil on brown to yellow-brown, structureless, non-calcareous, well drained sandy clay loam subsoil, underlain by mottled brown, non-calcareous soft plinthic. The dominant soil form is Avalon (Av3200). On higher ground, the soil may become more reddish and the Bainsvlei soil form may occur. The (yellow) brown non-plinthic subsoil may become thinner in places, causing the underlying soft plinthic material to occur just below the topsoil. A Westleigh soil form can therefore be found in places.

Hu: In the higher areas red, structureless, sandy loam topsoil on red, structureless, non-calcareous sandy clay loam subsoil occurs. The soil is well-drained and belongs mainly to the Hutton (Hu 3200) soil form.

Wa: In the lower areas, the water table is present for longer and occurs higher in the soil profile, causing a cemented, mottled, hard plinthic subsoil. This gives rise to a pinkish-grey to brown, structureless, loamy sand topsoil on a hard plinthic B horizon. The dominant soil form is Wasbank (Wa 1000). Areas with this soil are not cultivated, because of a shallow rooting depth.

Ka: In two area, water tables occur close to the surface during the wet season. The dominant soil consists of a grey, moderately structured, non-calcareous, clay loam topsoil on a mottled grey, clayey calcareous subsoil gley horizon. The dominant soil form is Katspruit (Ka2000). The land use (2005) was grassland and forest.

Rg: In the south-east, bordering the Marievale Bird Sanctuary, a narrow strip of soils with swelling clays occurs. The soils consist of dark-brown, moderately structured, calcareous

clays on dark, swelling calcareous clays overlying a gleyed horizon. The dominant soil form is Rensburg (Rg2000).

Wb: Several old inactive slimes dams occur in the north-east of the area. The soils here are very disturbed and can only be classified as belonging to the Witbank form (man-made soil materials).

Erodibility

All soils will erode over time if the surface is exposed. However, the gentle slopes in the study area, along with the absence of erodible soil characteristics such as a sandy topsoil abruptly overlying a clay subsoil, mean that water erosion hazard is not significant. The topsoils do not have a sandy nature that would make them susceptible to wind erosion. Therefore, there is no significant erosion hazard in the survey area.

Agricultural Potential Background

The assessment of agricultural potential rests primarily on the identification of soils that are suited to crop production. In order to qualify as high potential soils they must have the following properties:

- Deep profile (more than 600 mm) for adequate root development;
- Deep profile and adequate clay content for the storing of sufficient water so that plants can weather short dry spells;
- Adequate structure (loose enough and not dense) that allows for good root development;
- Sufficient clay or organic matter to ensure retention and supply of plant nutrients;
- Limited quantities of rock in the matrix that would otherwise limit tilling options and water holding capacity;
- Adequate distribution of soils and size of high potential soil area to constitute a viable economic management unit; and
- Good enough internal and external (out of profile) drainage if irrigation practices are considered. Drainage is imperative for the removal (leaching) of salts that accumulate in profiles during irrigation and fertilization.

In addition, climatic characteristics need to be assessed to determine the agricultural potential of a site. The rainfall characteristics are of primary importance and in order to

provide an adequate baseline for the viable production of crops, rainfall quantities and distribution need to be sufficient and optimal. The combination of the above mentioned factors will be used to assess the agricultural potential of the soils on the site.

Agricultural potential of the soils around Marievale was assessed by Jacobsen and Paterson (2005) and is indicated in Table 7 below.

Table 7: Agricultural Potential of Soils around Marievale

Map Unit	Dryland Potential	Irrigation Potential
Av	Moderate	High
Hu	Moderate	High
Wa	Low	Low
Rg	Low	Low
Ka	Low	Low
Wb	Very low	Very low

The Av and Hu map units, which comprise deep, structureless, well drained soils, have a good potential for arable crop production. However, due to the sometimes erratic nature of the rainfall patterns, irrigation (even supplementary) would raise the potential to high, due to the favourable soil characteristics. The Wa map unit has a cemented subsoil layer, with often severely restricted rooting depth, while to Rg and Ka map units have high clay content soils and significant waterlogging hazard.

Climate

The study area is located in a typical Highveld climate with hot summers and cold winters. Rain mostly occurs in the summer months with rainstorms of high intensity but of short duration. The winter months are normally dry and about 85% of the annual rainfall occurs in summer. The average annual rainfall in the summer rainfall season areas of South Africa are between 601 and 800 mm. The average evaporation volumes per annum are between 1 601 and 1 800 mm. Rainfall averages and temperature statistics was obtained from the Springs Weather Station: No. 04767364.

Table 8: Rainfall and Temperature Statistics for the Region

Month	Rainfall Average (mm)	Number of days	Temperature (°C) Maximum	Temperature (°C) Minimum
January	114.5	11.9	26.1	13.8
February	100.1	9.9	26.2	13.5
March	83.4	9.4	24.8	11.4
April	40.7	5.8	22.8	7.0
May	19.1	2.9	20.2	2.5
June	6.7	1.3	18.3	-2.3
July	7.4	1.1	17.1	-1.9
August	8.2	1.4	20.3	1.5
September	23.9	3.2	25.2	6.3
October	66.4	8	24.9	9.8
November	107.4	11.5	24.5	11.8
December	110.1	12.6	25.3	12.9

The annual average number of thunderstorms in the Northern areas of South Africa, varies from approximately 75 to 100. These storms are often violent with severe lightning and strong (but short-lived) gusty south-westerly winds and are sometimes accompanied by hail.

Information regarding the mean average wind direction for this particular area was obtained from the Springs weather station using wind data from over 9 years from 1993 to 2002. The prevailing wind direction is from the east and south-east during the first half of the year and from the north-west during the latter part of the year.

Surface Water

No surface water is present on the property. The Blesbokspruit is located to the east of the existing Vlakfontein Quarry and flows into the Suikerbosrant River, and ultimately into the Vaal River. The study area is located within the C21E Quaternary catchment (Refer to Figure below) and the Vaal Major Water Management Area (WMA) (DWS, 2016).

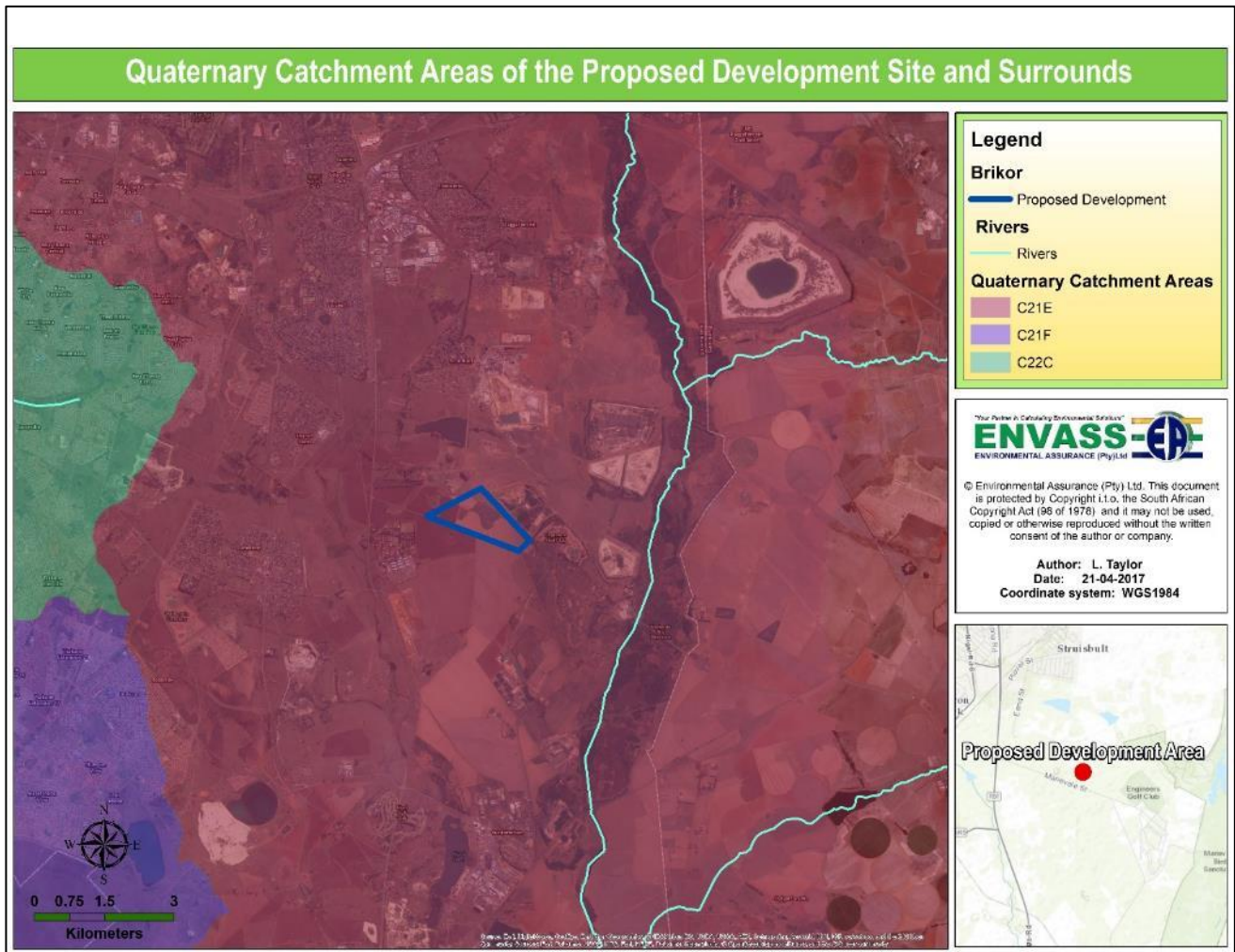


Figure 2: Quaternary Catchment Area of the Study Area

A wetland which forms part of the Marievale Bird Sanctuary lies approximately 1 km east from the planned mining area. Surface water will drain into this area from where it will flow to the Blesbokspruit and wetland area, which is located approximately 3 km east of the site. This wetland together with other small wetlands co-exists with the Blesbokspruit as a “network” or chain of wetlands available at the landscape level to wildlife. Seasonal fluctuations in water level and depth are largely masked by artificial water inputs. The topography of the immediate catchment is gradual, so increases in flow have resulted in a lateral expansion of the wetland (i.e. on the whole, it is wider/broader rather than deeper). Dry season flow is dominated by point source discharges. The Blesbokspruit is an important river in the Gauteng province since it drains a large area before joining the Suikerbosrand River that ultimately flows into the Vaal River. The latter is a major system providing water for a variety of uses (e.g. domestic, agriculture, industry and recreation).

Wetlands

The Blesbokspruit is located approximately 3,5 km east of the proposed mining area. The significance and biodiversity of this Wetland can be explained in terms of the fact that the wetland is a declared RAMSAR site. This renders the Wetland of international importance. South Africa has 19 sites designated as Wetlands of International Importance, with a surface area of 543 978 hectares (ha). The importance of wetlands from an international perspective are clear when taking into consideration that wading birds from as far away as the Russian tundra wintering in the wetlands of southern Africa, while some southern-breeding birds fly to other parts of the world as part of their life cycles.

Surface Water Quality

The water quality of the Blesbokspruit is not known at this stage. Brikor Limited implements a surface water quality monitoring programme conducted by Aquananzi Geoconsultants CC. Sampling takes place at a point of the quarry, adjacent to the Vlakfontein Mine, on the remaining extent of the Farm Vlakfontein 165 IR. The parameters analysed include pH, total dissolved solids, chemical oxygen demand, mercury and metals (ICP-OES Scan). The South African National Standard for Drinking Water (SANS241:2:2011, Edition 1) were used to specify the quality of the sampled water. The Standard describes a “Standard Limit” for each determinant; concentrations or qualities below these limits are considered to be acceptable for lifetime consumption, and is the recommended compliance limit. Where concentrations or qualities exceed the recommended limits; it is described as “Unacceptable” in terms of lifetime human consumption. Results of the latest water quality monitoring report by Aquananzi (January 2017), indicates that the water sampled is not within the recommended limits as indicated by SANS241:1:2011. The Sulphate concentration, Total Dissolved Solids and Chemical Oxygen Demand are above the recommended limit.

Regional Geohydrology

The regional aquifer type is described as a shallow intergranular and fractured aquifer, consisting predominantly out of carbonaceous rocks (sandstone), and a deeper karst type aquifer, consisting of carbonate rocks (dolomite). The borehole yield classification for the shallow aquifer is between 0.1 and 0-5l/s (low yielding boreholes) and for the deeper aquifer >5l/s (high yielding) (Hydrogeological Map Series of the RSA; Johannesburg 1999).

The average static water level is 12m and the average rainfall 686 mm/annum. Groundwater recharge is estimated at 35 mm/annum (South African Groundwater Decision Tool, DWAF). The groundwater associated with the Vryheid formation is generally of very good quality in terms of human consumption. The quaternary drainage region is C21E; for this region a general authorization for the taking of water of 75m³/hectare/annum is applicable (Aquananzi, 2010).

Groundwater Quality

Aquananzi Geoconsultants CC is conducting a quarterly groundwater monitoring programme. Samples from two boreholes are taken and analysed. These boreholes are located on the Remaining Extent of the Farm Vlakfontein 165 IR at the existing Brikor Vlakfontein Quarry. The parameters analysed include pH, total dissolved solids, chemical oxygen demand, Mercury and metals (ICP-OES Scan). The South African National Standard for Drinking Water (SANS241:2:2011, Edition 1) was used to specify the quality of the sampled water. The Standard describes a “Standard Limit” for each determinant; concentrations or qualities below these limits are considered to be acceptable for lifetime consumption, and is the recommended compliance limit. Where concentrations or qualities exceed the recommended limits; it is described as “Unacceptable” in terms of lifetime human consumption.

The latest results from November 2016 and January 2017 (Aquananzi, 2017) indicates that groundwater levels in both boreholes appear to be stabilising compared to previous results. Aquananzi, however, recommends continuous water level monitoring to determine whether water levels are indeed stabilising or if dewatering occurs.

Laboratory results indicated that the water sampled in both boreholes is not within the recommended limits as indicated by SANS241:1:2011. The Iron concentrations of both boreholes are above the recommended limit. The Nickel concentration in one borehole is also above the acceptable limit. It was clear that the water qualities of both boreholes are fluctuating over time. The sources of fluctuations are unknown. Should it be required to determine the exact cause of these fluctuations, additional monitoring boreholes should be drilled.

Biodiversity

The study area is located within the Grassland Biome, one of the nine biomes occurring within Southern Africa. The Grassland Biome is predominantly found on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling, but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level (SANBI, 2017). Grasslands (also known locally as Grassveld) are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. Trees are absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

There are two categories of grass plants: sweet grasses have a lower fibre content, maintain their nutrients in the leaves in winter and are therefore palatable to stock. Sour grasses have a higher fibre content and tend to withdraw their nutrients from the leaves during winter so that they are unpalatable to stock. At higher rainfall and on more acidic soils, sour grasses prevail, with 625 mm per year taken as the level at which unpalatable grasses predominate. C4 grasses dominate throughout the biome, except at the highest altitudes where C3 grasses become prominent.

Grass plants tolerate grazing, fire, and even mowing, while most produce new stems readily, using a wide variety of strategies. Overgrazing tends to increase the proportion of pioneer, creeping and annual grasses, and it is in the transition zones between sweet and sour grass dominance that careful management is required to maintain the abundance of sweet grasses. The Grassland Biome is the mainstay of dairy, beef and wool production in South Africa. Pastures may be augmented in wetter areas by the addition of legumes and sweet grasses.

The Grassland Biome is the cornerstone of the maize crop, and many grassland types have been converted to this crop. Sorghum, wheat and sunflowers are also farmed on a smaller scale.

Urbanization is a major additional influence on the loss of natural areas - the Witwatersrand is centred in this biome. The Grassland Biome is considered to have an extremely high biodiversity, second only to the Fynbos Biome. Rare plants are often found in the grasslands, especially in the escarpment area. These rare species are often endangered, comprising mainly endemic geophytes or dicotyledonous herbaceous plants. Very few

grasses are rare or endangered. The scenic splendour of the escarpment region attracts many tourists (SANBI, 2017).

The study area falls within the Mesic Highveld Grassland (Gm) bioregion and the vegetation type is Tsakane Clay Grassland (Mucina & Rutherford, 2006). Adjacent to the site to the north and east is the Andesite Mountain Bushveld and further north-east and East the Eastern Temperate Freshwater Wetlands. Tsakane Clay Grassland also occurs to the north-west, west and south of the study area (refer to Figure 3 below).

Vegetation communities occurring on the site include cultivated land and grassland. The exact type of grassland will be determined during the EIA phase. However, the grassland type on the adjacent property (The remainder of the Farm Vlakfontein 281 IR), include *Cynodon- Eragrostis* grassland, a sensitive vegetation community type. This type of grassland may also occur on the adjacent proposed mining area.

Fauna

The fauna of the study area is limited and associated with grasslands and cultivated lands. The EIA phase will determine the presence of any sensitive animal species.

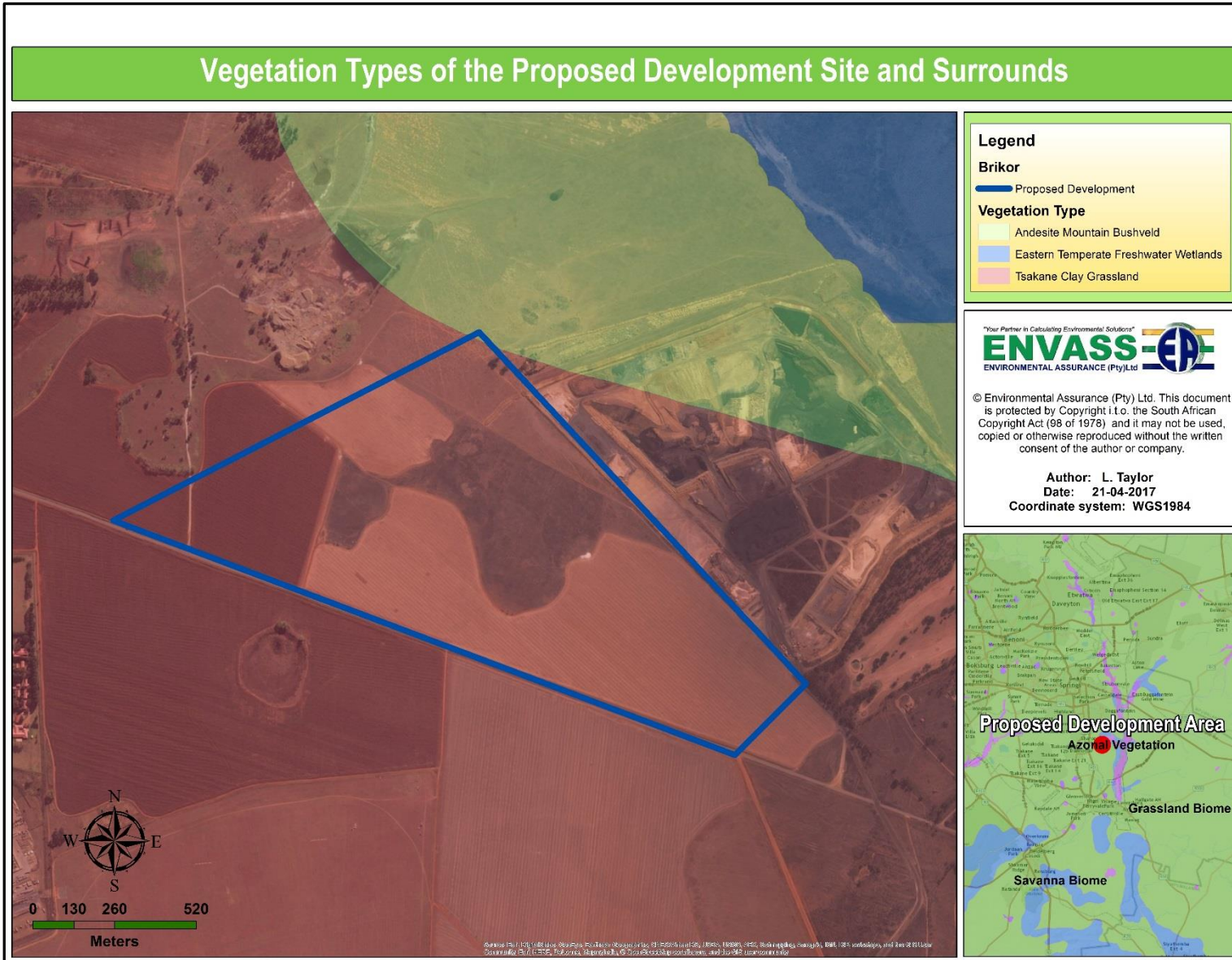


Figure 3: Vegetation Map of the Study Area

Cultural and Heritage

Information in this section was derived from the Cultural Heritage Impact Assessment of the Proposed Coal Mining on the Farm Grootfontein 165 IR, District Nigel, Ekurhuleni Metropolitan Municipality, Gauteng, Report by Coetzee, 2017

Archaeological remains can be defined as human-made objects, which reflect past ways of life, deposited on or in the ground. Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and they are valuable, finite, non-renewable and irreplaceable.

All archaeological remains, features, structures and artefacts older than 100 years and historic structures older than 60 years are protected by the relevant legislation, in this case Section 34 and 35 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). The Act makes an archaeological impact assessment as part of an EIA and EMPR mandatory (refer to Section 38). No archaeological artefact, assemblage or settlement (site) may be moved or destroyed without the necessary approval from the South African Heritage Resources Agency (SAHRA).

Human remains older than 60 years are protected by Section 36 of the NHRA. Human remains that are less than 60 years old are protected by the Regulations Relating to the Management of Human Remains (Government Notice Regulation 363 of 22 May 2013), made in terms of the National Health Act No. 61 of 2003 as well as local Ordinances and regulations.

No archaeological (Stone Age and Iron Age) and historical settlements, structures, features, assemblages or artefacts within the demarcated study area were observed by the specialist during the site visit in December 2016. However, Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place (cf. NHRA (Act No. 25 of 1999), Section 36 (6)).

Aesthetic Quality

It is important to bear in mind that determining a visual resource in absolute terms is not achievable. Evaluating a landscape's visual quality is both complex and challenging, as

many quality standards apply and it is largely subjective, with individuals basing evaluations on experiences, their social level and their cultural background. Furthermore, natural features are inherently variable. Climate, season, atmospheric conditions, region and sub-region all affect the attributes that comprise the landscape.

The main sources of visual impacts in the wider area is mining and industrial activities. The existing mining activities adjacent to the study area is the main source of visual impact in close proximity to the study area.

Visual Absorption Capacity (VAC) can be described as the ability of an area to absorb physical modifications. Factors affecting VAC include *inter alia*, vegetation, the built environment, existing infrastructure and topography. In terms of these factors the receiving environment is perceived to have a low to medium VAC.

The following have been identified as sensitive receptors in terms of visual impacts and impacts on the 'Sense of Place' of the study area and surrounding area:

- Visitors to the Marievale Bird Sanctuary Provincial Nature Reserve 2.5 km south-east of the study area;
- Travelers on the R51 provincial road adjacent to and 1 km west of the study area;
- Surrounding land users within 2 km from the study area;
- Residents of the Marievale and Vorsterskroon residential areas between 2 and 3 km south and south-west of the study area;
- Residents to the north in Vogelstruisbult, north-west in Sharonpark and Dunnotar to the west of the study area; and
- Residents of the town of Nigel within 5 km south-west of the study area.

Socio-Economic Environment

Demographics

Ekurhuleni houses 6% of the country's population and 26% of Gauteng's. It has a resident population of approximately 3 178 470 million people and 1 015 645 million households (Stats SA, 2011 Census). The municipality has an annual population growth rate of 2.47%. Between 2001 and 2011, the number of households in Ekurhuleni increased by 36.1%, a figure which was above the average national growth of 35.7%. This growth in population holds serious service delivery implications since it translates into increased demand for

municipal services. Figure 4 below shows the composition and size of the different population groups in Ekurhuleni. The municipality is home to 79% Africans, 16% Whites, 3 % Coloureds and 2% Indians.

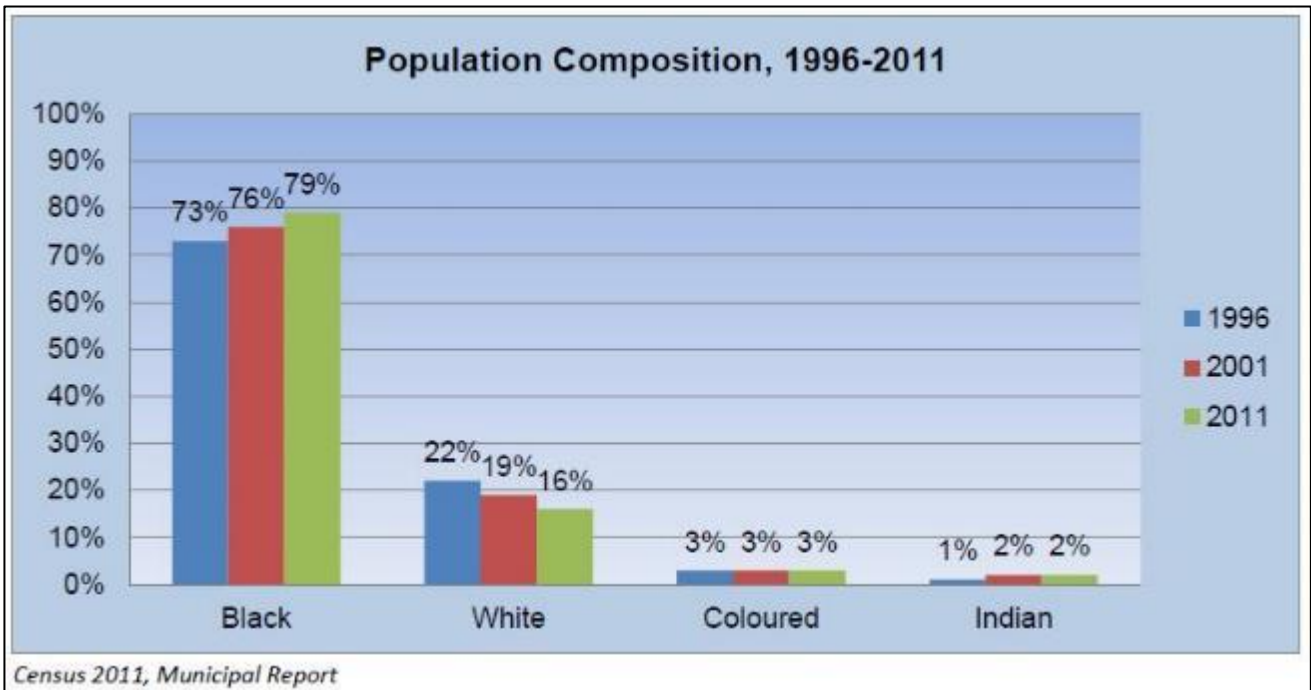


Figure 4: Population Composition

Ekurhuleni was expected to have a population of 3 485 697 at the end of 2016. Other projections based on the 2011 Census data indicate that by 2019 Ekurhuleni’s population will reach 3 875 681. Germiston and Boksburg are the fastest growing towns in the municipality. The general population increase in the municipality is attributed to migration by those in search of job opportunities.

From Figure 5 below it can be observed that a sizeable portion of the population group falls within the 0 to 4 years age group, which calls for more early childhood development facilities.

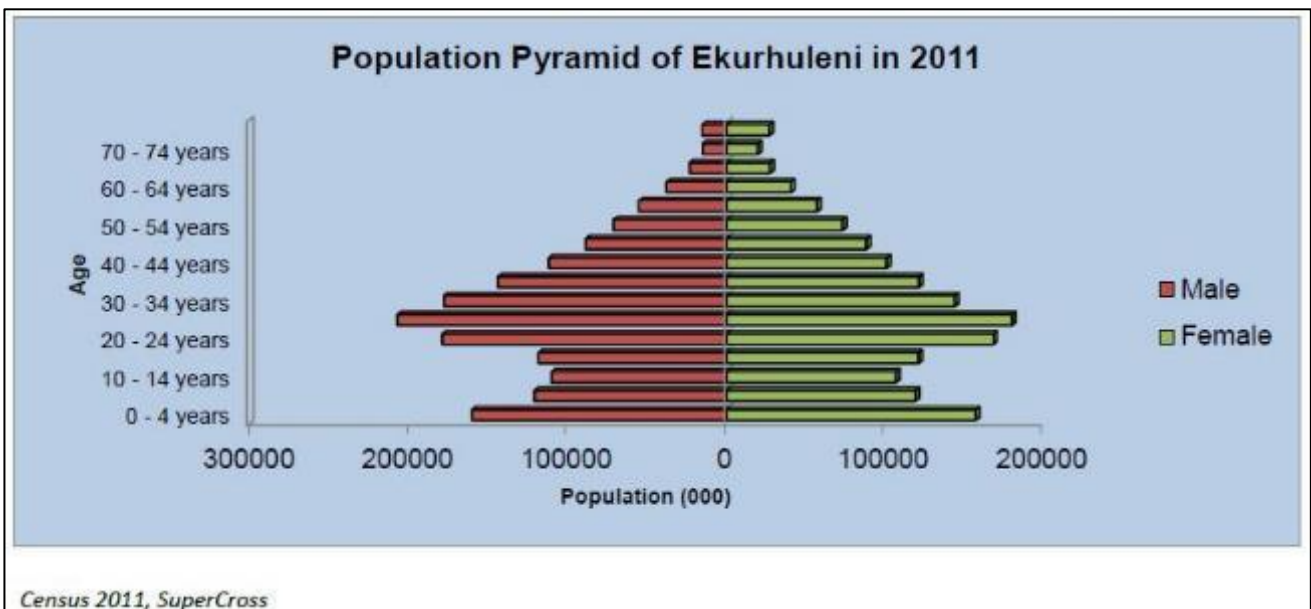


Figure 5: Age and Gender Distribution of the Ekurhuleni Metropolitan Municipality, 2011

Education levels in the municipality increased consistently over the last few decades and with the 2011 Census 35.9% of the population had a Grade 12 Certificate (Figure 6 below).

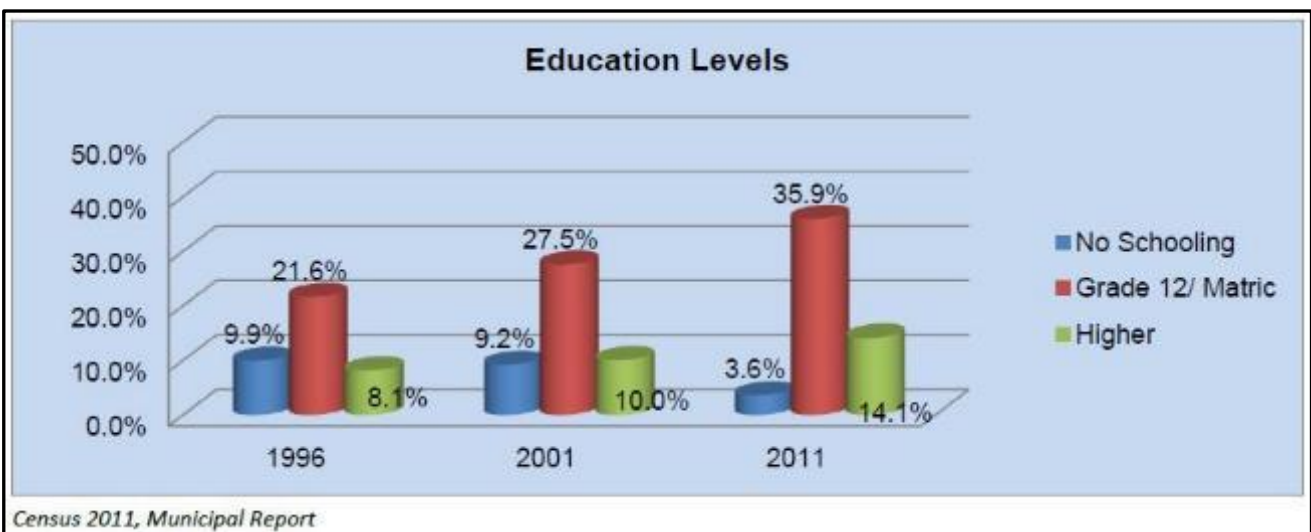


Figure 6: Education levels in the Ekurhuleni Metropolitan Municipality

The municipality's economy has evolved since its heydays as an economy founded on mining. Today, the municipality faces a problem of illegal mining in old mining areas. Ekurhuleni has the largest concentration of industrial activity in Southern and Sub-Saharan Africa. It is not a commercial and manufacturing hub of South Africa. The municipality's economic contribution to South Africa's GDP is 6%, and to Gauteng's economic output, 18%. Its contribution to national unemployment is 9%. The estimated average economic

growth between 1997 and 2012 was 3.1%. The GDP in Ekurhuleni is forecasted to reach 2.7% by 2016. Over the period between 2005 and 2013, the economy of Ekurhuleni registered a steady growth following a slump from 2009 (Figure 7). It is evident for the figure that the growth trend over this period was volatile, reaching both lows of -2.3% and highs of 6.1% over the 8 year period.

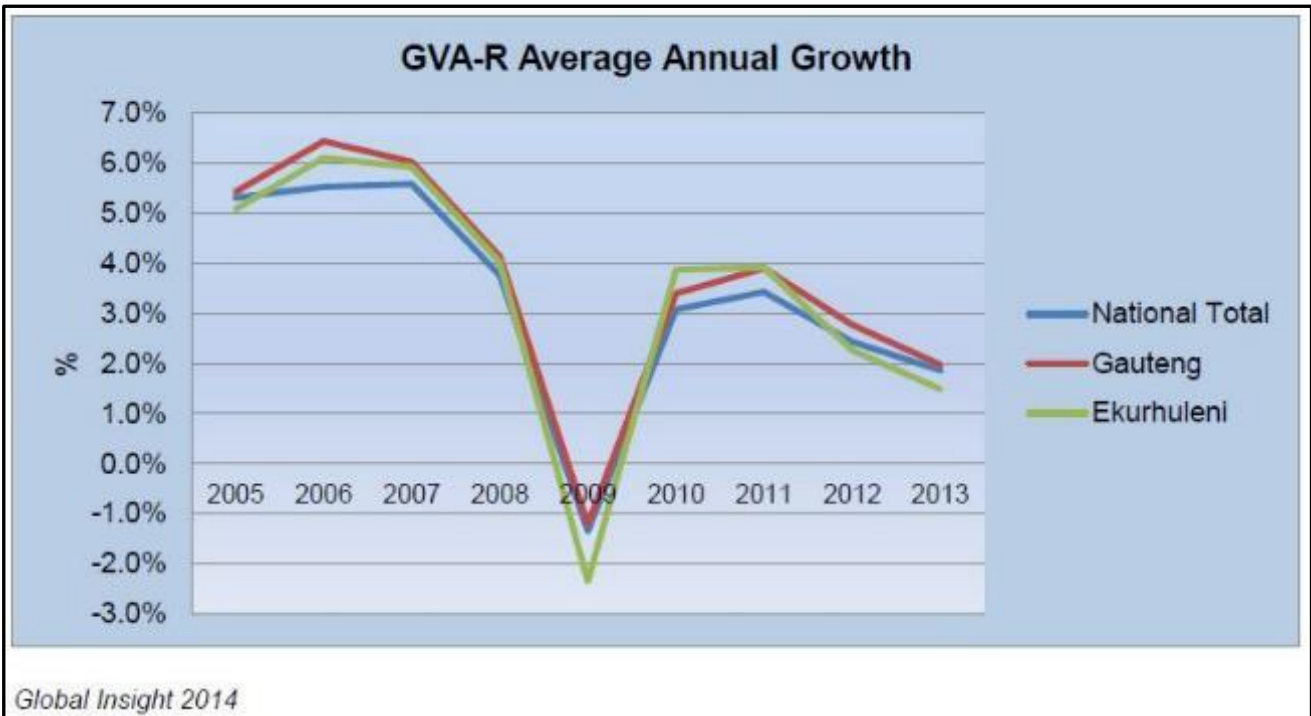


Figure 7: GVA-R Average Annual Growth of the Ekurhuleni Metropolitan Municipality

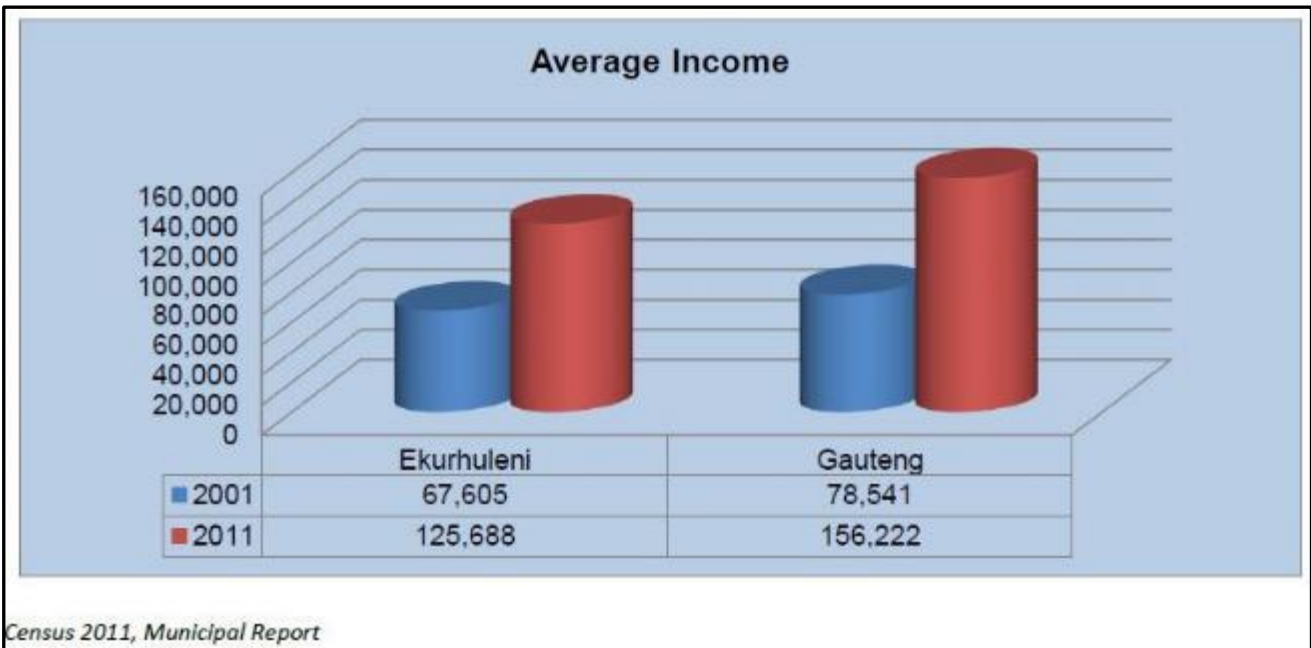


Figure 8: Average Income of households within the Ekurhuleni Metropolitan Municipality

In South Africa, high unemployment (25.4% in quarter three of 2014) coincides with low economic growth (1.4% in quarter three of 2014). The same conditions are evident in Ekurhuleni. The municipality has the highest unemployment rate in the Gauteng Province, compared to other metros. According to StatSA, unemployment in Ekurhuleni, currently stands at 28.8%. This is higher than the national rate and can be attributed, among other factors, to internal migration with individuals being attracted to Ekurhuleni in search of employment. 36.9% of the unemployed is youth. 72% of the population is economically active. Another factor contributing to unemployment in the municipality is the declining contribution of the manufacturing sector to the economy of the municipality. Ekurhuleni's manufacturing sector declined by 9.3% between 2004 and 2014. A closer look into manufacturing shows that the sub-sectors of fuel, petroleum, chemical, rubber, metal, machinery and household appliances suffered major declines during this period. However, manufacturing remains an important sector to Ekurhuleni's economy, specifically metal products, machinery and household appliances sub-sectors, which has been the main driver behind output (Figure 9).

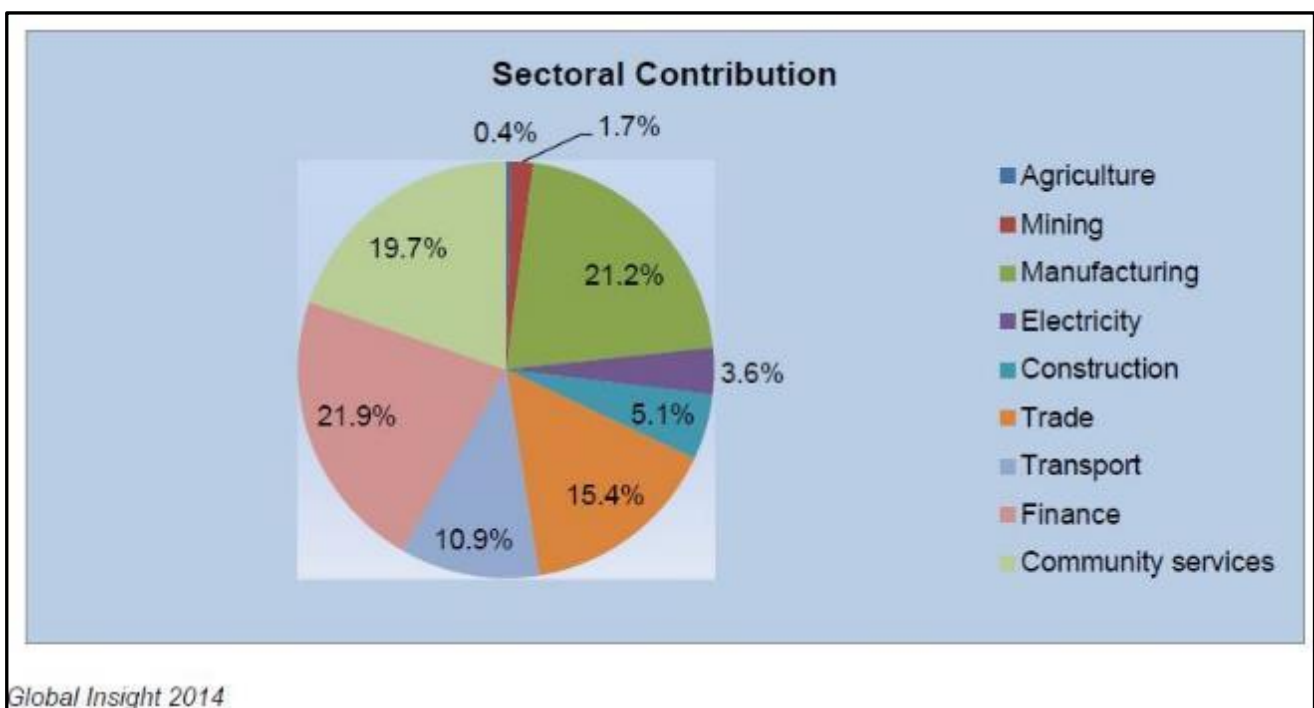


Figure 9: Economic Sectoral Contribution within the Ekurhuleni Metropolitan Municipality

(b) Description of the current land uses

The study area is characterised by open and flat areas consisting of natural grassland (Figure 10 below) and agricultural fields (Figure 11 below). The Vogelstruisbult Dam lies

approximately 1 km to the north. The existing Brikor Vlakfontein Quarry lies immediately east (Figure 14 and Figure 15 below) of the Military Golf Club, immediately south-east of the study area. The Marievale Bird Sanctuary is situated approximately 2,5 km to the south-east of the study area. The Dunnotar Military Base is located approximately 500 m to the west and the R51 Provincial road 1 km to the west running north to south. The areas immediately to the west and south-west of the study area are characterised by agricultural fields and land uses. The Brikor factory and offices are located 2 km to the south of the study area. There are also some old gold mining fields further to the north-east, east and south-east of the study area. The town of Springs is located 10 km north-west and the town of Heidelberg 20 km to the south-west.

Infrastructure in the general area on and around the site consists of several dirt roads that provide access to the area, as well as power lines, fences, and extensive agricultural fields (both used and dormant).



Figure 10: Natural grassland on the study area, view to the north-west from the eastern border of the study area



Figure 11: Agricultural fields on the study area, view to the south-west from the eastern border to the study area



Figure 12: View of the berm on the border of the existing Vlakfontein quarry and the study area to the north-west



Figure 13: View of the berm on the border of the existing Vlakfontein quarry and the study area to the south-east



Figure 14: General view of the mining activities at the existing Vlakfontein quarry from the eastern border of the study area



Figure 15: View inside the Vlakfontein Quarry adjacent to the study area

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

Environmental Features

At this stage no specialist studies have been conducted for the study area. Specialist studies are in the process of being completed and findings will be included into the Environmental Impact Report (EIR). From planning documents and observations made by the EAP during a site visit, some environmental features have been identified, which must be confirmed by the specialist studies.

- The study area is located within an area earmarked by the Gauteng Conservation Plan Version 3.3 as an Ecological Support Area (ESA) and Important Area and the potential of a seepage wetland (Figure 16).
- The study area is characterised by open and flat areas consisting of natural grassland (Figure 10) and agricultural fields (Figure 11);
- Infrastructure in the general area on and around the site consists of several dirt roads that provide access to the area, as well as power lines, fences, and extensive agricultural fields (both used and dormant).

(d) Environmental and current land use map

(Show all environmental, and current land use features)

Please refer to Figure 16 and Figure 17 below and Appendix 4

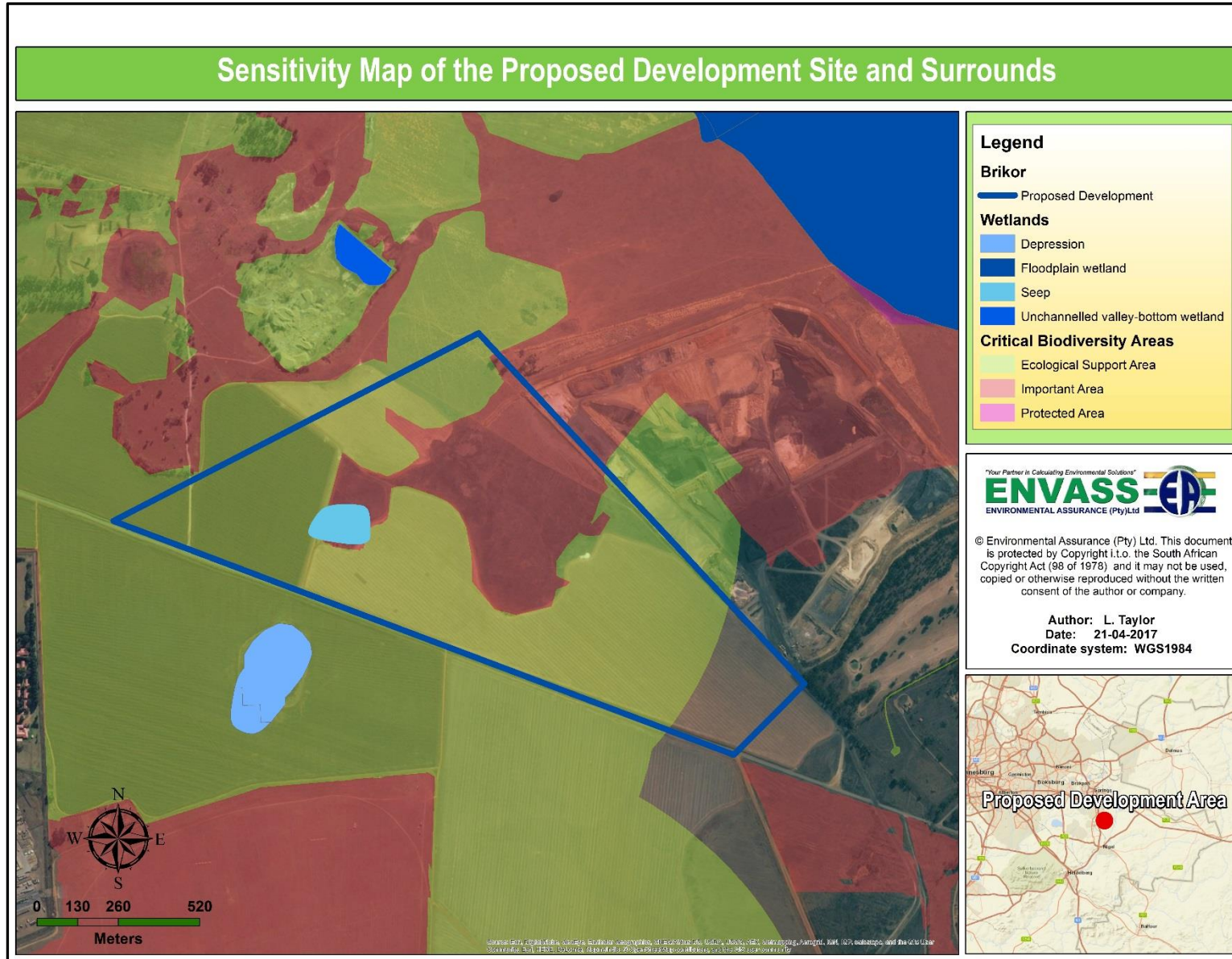


Figure 16: Preliminary Environmental Sensitivity Map of the Study Area

10. Impacts identified

(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)

Potential impacts that may be caused by the proposed development will be identified using input from the following:

- Views of I&APs;
- Existing information;
- Specialist investigations;
- Site visit with the project team; and
- Legislation.

The following potential major direct, indirect and cumulative impacts were identified:

- Land degradation;
- Contamination of soil by coal and hydrocarbons;
- Compaction of soils by vehicles and equipment;
- Erosion;
- Acid mine drainage;
- Blasting of coal;
- Altered landforms - topography;
- Limited loss of agricultural potential and land capability;
- Reduced crop growth;
- Contamination of ground- and surface water quality and decline in quantity;
- Impacts on biodiversity;
- Loss and displacement of fauna;
- Impacts on existing land use of the study and surrounding area;
- Deterioration of local roads used by heavy duty vehicles;
- Mudslides from stockpiles and overburden;
- Destruction or loss of heritage features including graves and other historical sites of importance that may be uncovered during excavations;

- Decreased aesthetic value and impact on “Sense of Place”;
- Poor air quality and decreased visibility due to dust pollution;
- Increased noise levels and impact on surrounding communities and the Marievale Bird Sanctuary;
- Waste generation;
- Increased demand on service infrastructure and resources;
- Slight increase in traffic and need for maintenance of road infrastructure;
- Health and safety impacts;
- Potential injury and loss of health and life of humans; and
- Altered Socio-Economic Environment (Positive or negative).

Table 9: Impacts during the construction phase – general impacts

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE CONSTRUCTION PHASE					
GENERAL IMPACTS					
	GEOLOGICAL AND SOILS	Contamination of soils through: <ul style="list-style-type: none"> - Indiscriminate disposal of construction waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles and other chemicals from construction activities e.g. paints. 	Low (-)	Possible	Short term
		Compaction of soil through vehicle and personnel movement and storage of materials, equipment and stockpiling.	Low (-)	Definite	Short term
		Reduced crop growth.	Medium (-)	Definite	Long term
	HYDROLOGICAL SURFACE WATER AND GROUND WATER	Stormwater, erosion and siltation impacts due to a lack of implementing temporary measures to manage stormwater run-off quantity and quality during the construction phase.	Medium (-)	Possible	Short term
		Contamination of stormwater and ground water, caused by: <ul style="list-style-type: none"> - Cement spillage and/or leakage;; - Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles; and - Spillage and/or leakage of other chemicals from construction activities e.g. paints. 	Low (-)	Possible	Short term
		Altered drainage patterns and stormwater runoff flows.	Medium (-)	Definite	Long term
	BIOLOGICAL FAUNA AND FLORA	Potential decrease in biodiversity on the study-and surrounding areas.	Low (-)	Probable	Long term
		Spreading of alien invasive species and bush encroachment of indigenous species.	Medium (-)	Probable	Short to medium term
		Impact on natural migratory routes and faunal dispersal patterns.	Low (-)	Definite	Long term

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ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE CONSTRUCTION PHASE					
GENERAL IMPACTS					
		Disturbance and loss of fauna through noise, light and dust pollution and hunting, trapping and killing of fauna.	Very Low (-)	Definite	Long term
	EXISTING LAND USE	Loss of land for other purposes e.g. cultivation.	Low (-)	Definite	Long term
	VISUAL	Visibility from sensitive receptors / visual scarring of the landscapes as a result of the construction activities.	Medium (-)	Definite	Short term
	NOISE AND LIGHTING	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of construction vehicles and equipment.	Medium (-)	Definite	Short term
		Added impact of security lighting on surrounding landowners and nocturnal animals.	Medium (-)	Definite	Short term
	AIR QUALITY	Increased dust pollution due to vegetation clearance and construction vehicle movement.	Medium (-)	Definite	Short term
		Windborne dust (soil), vehicle fumes and particulate matter PM10, altering air quality.	Medium (-)	Definite	Short term
	WASTE	Generation of additional general waste, litter and building rubble as well as hazardous material during the construction phase.	Medium (-)	Definite	Short term
	SERVICES	Need for services i.e. water, electricity and sewerage systems during the construction phase causing additional strain on natural resources and service infrastructure.	Very Low (-)	Unlikely	Short term
	TRAFFIC	The change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic.	Low (-)	Possible	Short term
		Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, busses and other heavy vehicles.	Low (-)	Possible	Short term
		Deterioration of local roads used by heavy duty vehicles and the need for maintenance of road infrastructure.	Low (-)	Probable	Short term

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE CONSTRUCTION PHASE					
GENERAL IMPACTS					
	HEALTH AND SAFETY	Possibility of construction activities and workers causing veld fires, which can potentially cause injury and or loss of life to construction workers and surrounding landowners, visitors and workers.	High (-)	Possible	Permanent
		Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.	Medium (-)	Definite	Short term
		Increased risk to public health and safety: Dangerous areas and construction activities poses health risks and possible loss of life to construction workers and visitors on the site.	High (-)	Possible	Permanent
		Trespassing (migration) of workers onto adjacent properties.	Medium (-)	Probable	Short term
	SOCIO-ECONOMIC	Potential creation of short term employment opportunities for the local communities during the construction phase.	Low (+)	Definite	Short term

Table 10: Impacts during the construction phase activity specific impacts

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE CONSTRUCTION PHASE					
ACTIVITY SPECIFIC IMPACTS					
Clearing of vegetation and topsoil and excavation for the access and haul roads, pollution control dam footprint and opencast areas.	GEOLOGICAL AND SOILS	Loss of topsoil	High (-)	Definite	Permanent
	BIOLOGICAL FAUNA AND FLORA	Potential loss of vegetation type, ecologically important species and species of conservation concern.	Very Low (-)	Definite	Permanent
Earthworks to excavate the pollution control dam and constructing the pollution control dam liner and walls.	GEOLOGICAL AND SOILS	Loss of topsoil.	Medium (-)	Definite	Permanent
	HEALTH AND SAFETY	Increased risk to public and worker safety: If not fenced off, the public and workers may fall into excavated areas and trenches.	High (-)	Possible	Permanent
	ARCHAEOLOGICAL/ HERITAGE RESOURCES	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks.	Low (-)	Unlikely	Permanent
Dust Suppression	GEOLOGICAL AND SOILS	Loss of topsoil.	Low (-)	Definite	Permanent
		Soil compaction.	Low (-)	Definite	Permanent
		Soil, ground and surface water pollution, should water not be of drinking water quality.	Low (-)	Definite	Permanent

Table 11: Impacts during the operational phase – general impacts

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE OPERATIONAL PHASE					
GENERAL IMPACTS					
	GEOLOGICAL AND SOILS	Soil erosion and soil compaction by heavy duty vehicles on site.	Medium (-)	Probable	Long term
		Contamination of soils through: <ul style="list-style-type: none"> - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles and other chemicals from operational and maintenance activities e.g. paints. 	Medium (-)	Possible	Long term
		Reduced crop growth.	Medium (-)	Definite	Long term
	HYDROLOGICAL SURFACE WATER AND GROUNDWATER	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase.	Medium (-)	Possible	Long term
		Contamination of stormwater runoff and ground water, caused by: <ul style="list-style-type: none"> - Sediment release; - Chemicals such as hydrocarbon-based fuels and oils, or lubricants spilled from vehicles; - Other chemicals from maintenance activities e.g. paints; and - Effluent discharges, due to a lack of stormwater management and system maintenance. 	Medium (-)	Possible	Long term
		Impacts of dewatering on the groundwater aquifer should water be abstracted from ground water during the operational phase.	Low (-)	Unlikely	Short to Medium term

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ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE OPERATIONAL PHASE					
GENERAL IMPACTS					
	BIOLOGICAL FAUNA AND FLORA	Disturbance and loss of fauna through noise, light and dust pollution and the hunting, trapping and killing of fauna.	Low (-)	Unlikely	Permanent
		Spreading of alien invasive species and bush encroachment of indigenous species.	Medium (-)	Possible	Long term
	EXISTING LAND USE	Possibility of mining activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.	High (-)	Possible	Long term to Permanent
	VISUAL	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the mining site and activities.	Medium (-)	Definite	Long term
		Visibility of solid domestic and operational waste.	Medium (-)	Definite	Long term
	NOISE, VIBRATION AND LIGHTING	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the mining activities.	High (-)	Definite	Long term
		Disturbance due to vibrations caused by vehicles.	Low (-)	Definite	Long term
		Impact of security lighting on surrounding landowners and animals.	Medium (-)	Definite	Long term
	AIR QUALITY	Increased dust pollution (soil and ore fines) due to vehicles on gravel roads and storage waste rock and overburden, as well as other mining activities.	High (-)	Definite	Long term
		Increased windborne dust (soil and ore fines), vehicle fumes and particulate matter PM10, altering air quality.	High (-)	Definite	Long term
	WASTE (INCLUDING HAZARDOUS WASTE)	Generation and disposal of additional general waste, litter and hazardous material during the operational phase and operational waste i.e. waste rock.	High (-)	Definite	Long term

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE OPERATIONAL PHASE					
GENERAL IMPACTS					
	SERVICES	Need for services e.g. water, electricity and sewerage systems, causing additional strain on natural resources and service infrastructure.	Low (-)	Unlikely	Long term
	TRAFFIC	The change in the traffic patterns as a result of increased traffic entering and exiting the operations on the surrounding traffic.	Low (-)	Unlikely	Long term
		Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars and heavy vehicles.	Medium (-)	Possible	Long term
		Deterioration of local roads used by heavy duty vehicles and the need for maintenance of road infrastructure.	Low (-)	Probable	Long term
	HEALTH AND SAFETY	Possibility of mining activities and workers causing veld fires, which can potentially cause injury and or loss of life to mine workers and surrounding landowners, visitors and workers.	Very High (-)	Possible	Long term to permanent
		Increased risk to public health and safety: Dangerous areas including the opencast areas poses health risks and possible loss of life to mine workers and visitors to the site.	Very High (-)	Possible	Long term to permanent
		Trespassing (migration) of workers onto adjacent properties.	High (-)	Probable	Long term
	SOCIO-ECONOMIC	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.	High (-)	Definite	Long term to permanent
		Employment provision.	Very High (+)	Definite	Long term
		Sourcing supplies from local residents and businesses, boosting the local economy for an extended period of time.	Medium (+)	Possible	Long term

Table 12: Impacts during the operational phase – activity specific impacts

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE OPERATIONAL PHASE					
ACTIVITY SPECIFIC IMPACTS					
Clearing of vegetation and topsoil by bulldozer/front-end-loader.	GEOLOGICAL AND SOILS	Loss of topsoil.	High (-)	Definite	Permanent
	BIOLOGICAL FAUNA AND FLORA	Potential loss of vegetation type, ecologically important species and species of conservation concern.	Very Low (-)	Definite	Permanent
Stockpiling of overburden in 2m high wind rows positioned for later rehabilitation.	GEOLOGICAL AND SOILS	Loss of topsoil.	High (-)	Definite	Permanent
		Soil compaction.	Medium (-)	Probable	Long term
		Altered land forms – topography.	Medium (-)	Definite	Long term
	HYDROLOGICAL SURFACE WATER AND GROUNDWATER	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase.	Medium (-)	Possible	Long term
HEALTH AND SAFETY	Mudslides.	High (-)	Possible	Long term	
Opencast mining using heavy duty earth moving equipment. After removal of overburden, benches are created by the effect of selective mining as well as by the limitation of the machinery regarding excavation depth. The maximum bench height is 3m. The low bench is served by a down ramp that is kept in close proximity	HYDROLOGICAL SURFACE WATER AND GROUNDWATER	Impacts of dewatering on the groundwater aquifer should water be abstracted from ground water during the operational phase.	Low (-)	Unlikely	Short to Medium term
		HEALTH AND SAFETY	Possibility of mining activities and workers causing veld fires, which can potentially cause injury and or loss of life to mine workers and surrounding landowners, visitors and workers.	Very High (-)	Possible
	HEALTH AND SAFETY	Increased risk to public health and safety: Dangerous areas including the opencast areas poses health risks and possible loss of life to mine workers and visitors to the site.	Very High (-)	Possible	Long term to permanent

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE OPERATIONAL PHASE					
ACTIVITY SPECIFIC IMPACTS					
to the working face. Excavator employed to remove clay. As and when coal is exposed after mining of clay, coal will be excavated in the same manner as the clay. As and when sand is exposed, sand will be excavated.					
Coal mining	GROUNDWATER	Acid mine drainage.	High (-)	Probable	Long term
	NOISE, VIBRATION, HEALTH AND SAFETY	Blasting of coal.	High (-)	Probable	Long term
Loading, hauling and transport by truck of the clay to a stockpile close to the brick making factory to be	GEOLOGICAL AND SOILS	Loss of topsoil.	High (-)	Definite	Permanent
		Soil erosion and soil compaction as a result of the movement of heavy duty vehicles on site.	Medium (-)	Probable	Long term

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ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE OPERATIONAL PHASE					
ACTIVITY SPECIFIC IMPACTS					
<p>used for the production of bricks. Raw coal will be transported to the Plant on the adjacent property where the coal will be washed and used as an energy resource. Sand will be transported to the Plant in close proximity for crushing, screening and washing to be sold off as building sand.</p>	HYDROLOGICAL SURFACE WATER AND GROUNDWATER	<p>Contamination of stormwater runoff and ground water, caused by:</p> <ul style="list-style-type: none"> - Sediment release; - Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles; - Other chemicals from maintenance activities e.g. paints; and - Effluent discharges, due to a lack of stormwater management and system maintenance. 	Medium (-)	Possible	Long term
	NOISE, VIBRATION	Disturbance due to vibrations caused by vehicles.	Low (-)	Definite	Long term
	TRAFFIC	Deterioration of local roads used by heavy duty vehicles and the need for maintenance of road infrastructure.	Medium (-)	Probable	Long term
<p>Deposition of waste rock onto waste rock dump at the adjacent Vlakfontein Quarry and storage, if any.</p>	GEOLOGICAL AND SOILS	Soil compaction.	Medium (-)	Probable	Long term
	HYDROLOGICAL SURFACE WATER AND GROUNDWATER	<p>Contamination of stormwater runoff and ground water and soils caused by:</p> <ul style="list-style-type: none"> - Seepage from WRD could cause a contamination plume affecting the underground water resources. 	Medium (-)	Possible	Short term
<p>Maintenance of the pollution control dam and stormwater management system.</p>	Refer to general impacts above.	-	-	-	-

Table 13: Impacts during the closure phase – general impacts

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE CLOSURE AND POST-CLOSURE PHASES					
GENERAL IMPACTS					
	GEOLOGICAL AND SOILS	Soil compaction by heavy duty vehicle movement.	Medium (-)	Possible	Long term
		Contamination of soils through: - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from heavy duty vehicles and other chemicals.	Medium (-)	Possible	Short term
		Reduced crop growth.	Medium (-)	Definite	Long term
	HYDROLOGICAL SURFACE WATER AND GROUNDWATER	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the closure phase.	Medium (-)	Possible	Long term
		Contamination of stormwater runoff and ground water, caused by: - Sediment release; - Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from heavy duty vehicles; - Effluent discharges, due to a lack of stormwater management.	Medium (-)	Possible	Short term
		Impacts of dewatering on the groundwater aquifer should water be abstracted from ground water during the closure phase.	Low (-)	Unlikely	Long term
	BIOLOGICAL FAUNA AND FLORA	Disturbance and loss of fauna through noise, light and dust pollution as well as hunting, trapping and killing of fauna.	Low (-)	Definite	Long term
		Spreading of alien invasive species and bush encroachment of indigenous species.	Medium (-)	Possible	Long term

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ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE CLOSURE AND POST-CLOSURE PHASES					
GENERAL IMPACTS					
	VISUAL	Visibility from sensitive receptors / visual scarring of the landscape as a result of the closure and rehabilitation activities.	Medium (-)	Definite	Long term
		Visibility of solid domestic and operational waste.	Medium (-)	Possible	Long term
	NOISE, VIBRATION AND LIGHTING	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of heavy duty vehicles and equipment.	High (-)	Definite	Long term
		Disturbance due to vibrations caused by heavy duty vehicles.	Low (-)	Probable	Long term
		Impact of security lighting on surrounding landowners and animals.	Medium (-)	Definite	Long term
	AIR QUALITY	Dust (soil and ore fines) pollution due to rehabilitation activities and heavy duty vehicles.	High (-)	Definite	Long term
		Windborne dust (soil and ore fines), vehicle fumes and particulate matter PM10 altering air quality.	High (-)	Definite	Long term
	SERVICES	Need for additional services i.e. water, electricity and sewerage systems during the closure phase, causing additional strain on natural resources and infrastructure.	Low (-)	Unlikely	Long term
	TRAFFIC	The change in the traffic patterns as a result of traffic entering and exiting the proposed mine on the surrounding road infrastructure and existing traffic.	Low (-)	Possible	Long term
		Nuisance, health and safety risks caused by increased traffic on an adjacent to the study area including cars and heavy vehicles.	Medium (-)	Possible	Long term
	HEALTH AND SAFETY	Possibility of closure activities and workers causing veld fires, which can potentially cause injury and or loss of life to workers and surrounding landowners and visitors.	Very High (-)	Possible	Long term to permanent

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE CLOSURE AND POST-CLOSURE PHASES					
GENERAL IMPACTS					
		Increased risk to public health and safety: Dangerous areas including the opencast areas poses health risks and possible loss of life to mine workers and visitors to the site.	Very High (-)	Possible	Long term to Permanent
		Trespassing (migration) of workers onto adjacent properties.	High (-)	Probable	Long term
	SOCIO-ECONOMIC	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.	High (-)	Definite	Long term to permanent
		Sourcing supplies from local residents and businesses, boosting the local economy for an extended period of time.	Medium (+)	Possible	Long term

Table 14: Closure and post-closure specific impacts

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
IMPACTS DURING THE CLOSURE AND POST-CLOSURE PHASES					
PHASE SPECIFIC IMPACTS					
	GEOLOGICAL AND SOILS	Soil erosion	High (-)	Definite	Long term
	HYDROLOGICAL SURFACE WATER AND GROUNDWATER	Seepage from quarry could cause a contamination plume, affecting the underground water resources.	High (-)	Probable	Long term
		Ground water pollution	High (-)	Probable	Long term
	GROUNDWATER	Acid Mine Drainage through coal seepage.	High (-)	Probable	Long term
	WASTE	Generation and disposal of additional hazardous operational waste i.e. waste rock.	Medium (-)	Definite	Long term

Table 15: Impacts as a result of not implementing the proposed development

ACTIVITY	ENVIRONMENTAL ASPECT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROBABILITY	DURATION
NO-GO ALTERNATIVE					
N/A	SOCIO-ECONOMIC	No provision of employment for local residents and skills transfer to unskilled and semi-skilled unemployed individuals.	Very high (-)	Definite	Permanent
		No development and upliftment of the surrounding communities and infrastructure.	Very high (-)	Definite	Permanent
		No development of the economic environment, by job provision and sourcing supplies for and from local residents and businesses.	Very high (-)	Definite	Permanent
		Positive: No additional negative impacts on the environment	High (+)	Definite	Permanent

iv) Methodology used in determining the significance of environmental impacts

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

A “significant impact” is defined as it is defined in the EIA Regulations (2014): “an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence”. The objective of this EIA methodology is to serve as framework for accurately evaluating impacts associated with current or proposed activities in the biophysical, social and socio-economical spheres. It aims to ensure that all legal requirements and environmental considerations are met in order to have a complete and integrated environmental framework for impact evaluations.

The process of determining impacts to be assessed is one of the most important parts of the environmental impact assessment process. It is of such high importance because the environmental impacts identified can and are often linked to the same impact stream. In this method all impacts on the biophysical environment are assessed in terms of the overall integrity of ecosystems, habitats, populations and individuals affected. For example, the removal of groundcover for the sloping or scraping of an embankment, can lead to higher amounts of water runoff which increases the rate of erosion. Further down in the river the amount of sediment increases because of the increased erosion. A number of fish species cannot endure the high amount of sediment and moves off. The habitat is thus changed or in the process of changing. Thus, one needs to understand that the root of the problem (removal of groundcover) is assessed in terms of the degree of change in the health of the environment and/or components in relation to their conservation value. Thus, if the impact of removal of groundcover of a definable system is high, and the conservation value is also high then the impact of removal of groundcover is highly significant.

Environmental Impact Assessment (EIA) Regulations, 2014 requirements

The Environmental Impact Assessment (EIA) 2014 Regulations promulgated in terms of Sections 24 (5), 24M and 44 of the National Environmental Management Act, 1998 (Act No.

107 of 1998) [as amended] (NEMA), requires that all identified potential impacts associated with the proposed project be assessed in terms of their overall potential significance on the natural, social and economic environments. The criteria identified in the EIA Regulations (2014) include the following:

- Nature of the impact;
- Extent of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Degree to which impact can be reversed;
- Degree to which impact may cause irreplaceable loss of resources;
- Degree to which the impact can be mitigated; and
- Cumulative impacts.

ENVASS has developed an impact assessment methodology (as defined below) whereby the Significance of a potential impact is determined through the assessment of the relevant temporal and spatial scales determined of the Extent, Magnitude and Duration criteria associated with a particular impact. This method does not explicitly define each of the criteria but rather combines them and results in an indication of the overall significance.

ENVASS Impact Assessment Methodology

(a) Nature of the impact

The NATURE of an impact can be defined as: “a *brief description of the impact being assessed, in terms of the proposed activity or project, including the socio-economic or environmental aspect affected by this impact*”.

(b) The status of the impact:

STATUS	Status	Description
	Positive	A benefit to the holistic environment
	Negative	A cost to the holistic environment
	Neutral	No cost or benefit to the holistic environment

(c) Magnitude of the impact

The MAGNITUDE of an impact can be defined as: “a brief description of the intensity or amplitude of the impact on socio-economic or environmental aspects”.

Determining the magnitude of an impact			
MAGNITUDE	Magnitude	Score	Description
Magnitude / intensity of impact (at the specified scale)	Zero	1	Natural and/or social functions and/or processes remain unaltered
	Very low	2	Natural and/or social functions and/or processes are negligibly altered
	Low	3	Natural and/or social functions and/or processes are slightly altered
	Medium	4	Natural and/or social functions and/or processes are notably altered
	High	5	Natural and/or social functions and/or processes severely altered

(d) Extent of the impact

The EXTENT of an impact can be defined as: “a brief description of the spatial influence of the impact or the area that will be affected by the impact”.

Determining the extent of an impact			
EXTENT	Extent	Score	Description
Extent or spatial influence of impact	Footprint	1	Only as far as the activity, such as footprint occurring within the total site area
	Site	2	Only the site and/or 500m radius from the site will be affected
	Local	3	Local area / district (neighbouring properties, transport routes and adjacent towns) is affected
	Region	4	Entire region / province is affected
	National	5	Country is affected

(e) Duration of the impact

The DURATION of an impact can be defined as: “a short description of the period of time the impact will have an effect on aspects”.

Determining the duration of an impact			
DURATION Duration of the impact	Extent	Score	Description
	Short term	1	Less than 2 years
	Short to medium term	2	2 – 5 years
	Medium term	3	6 – 25 years
	Long term	4	26 – 45 years
	Permanent	5	46 years or more

(f) Probability of the impact occurring

The PROBABILITY of an impact can be defined as: “the estimated chance of the impact happening”.

Determining the probability of an impact			
PROBABILITY	Probability	Score	Description
	Unlikely	1	Unlikely to occur (0 – 15% probability of impact occurring)
	Possible	2	May occur (15 – 40% chance of occurring)
	Probable	3	Likely to occur (40– 60% chance of occurring)
	Highly Probable	4	Between 60% and 85% sure that the impact will occur
	Definite	5	Will certainly occur (85 - 100% chance of occurring)

(g) Degree to which impact can be reversed

The REVERSIBILITY of an impact can be defined as: “the ability of an impact to be changed from a state of affecting aspects to a state of not affecting aspects”.

Determining the probability of an impact			
REVERSIBILITY	Reversibility	Score	Description
	Completely reversible	1	Will reverse with minimal rehabilitation & negligible residual affects
	Partly reversible	2	Impacts can be reversed through the implementation of mitigation measures
	Irreversible	3	Impacts are permanent and can't be reversed by the implementation of mitigation measures or rehabilitation is not viable

(h) Degree to which impact may cause irreplaceable loss of resources

The irreplaceability of an impact can be defined as “the amount of resources that can/can't be replaced”.

Irreplaceability = Magnitude + Extent + Duration + Reversibility

IRREPLACEABILITY	No loss	No loss of any resources
Irreplaceable loss of resources	Low	Marginal loss or resources
	Medium	Significant loss of resources
	High	Complete loss of resources

(i) Degree to which the impact can be mitigated

The degree to which an impact can be MITIGATED can be defined as: “the effect of mitigation measures on the impact and its degree of effectiveness”.

Determining the mitigation rating of an impact				
MITIGATION RATING	MITIGATED	High	Impact mitigated	100%
	Degree impact can be mitigated	Medium	Impact mitigated	>50%
		Low	Impact mitigated	<50%

(j) Confidence rating

CONFIDENCE in the assessment of an impact can be defined as the:” *level of certainty of the impact occurring*”.

Determining the confidence rating of an impact			
CONFIDENCE RATING	CONFIDENCE	Certain	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is <i>unlimited and sound</i>
		Sure	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is <i>reasonable and relatively sound</i>
		Unsure	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is <i>limited</i>

(k) Cumulative impacts

The effect of CUMULATIVE impacts can be described as:” the effect the combination of past, present and “reasonably foreseeable” future actions have on aspects”.

Determining the confidence rating of an impact			
CUMULATIVE RATING	CUMULATIVE EFFECTS	Low	<i>Minor</i> cumulative effects
		Medium	<i>Moderate</i> cumulative effects
		High	<i>Significant</i> cumulative effects

Significance of Impacts

The SIGNIFICANCE can be defined as:” *the combination of the duration and importance of the impact, in terms of physical and socio-economic extent, resulting in an indicative level of mitigation required*”.

The significance of an impact is determined as follows:

Significance = Irreversibility x Probability

Table 16: Significance Rating

Score	Significance	Description
0	Neutral	Zero magnitude with any combination of extent and duration.
1 to 20	Very low	Low magnitude with a site specific extent and short term duration; OR Very low magnitude with any combination of extent and duration except regional and long term duration.
21 to 40	Low	High magnitude with a site specific extent and short term duration; OR Low magnitude with any combination of extent and duration except site specific and short term duration or regional and long term duration; OR Medium magnitude with a site specific extent and short term duration; OR Very low magnitude with a site specific extent and long term duration.
41 to 60	Medium	High magnitude with a local extent and medium term duration; OR High magnitude with a regional extent and short term duration / a site specific extent and long term duration; OR High magnitude with a regional extent and short term duration / a site specific extent and long term duration; OR High magnitude with either a local extent and construction period duration or a site specific extent and medium term duration; OR Low magnitude with a regional extent and long term duration; OR Medium magnitude with any combination of extent and duration extent site specific and construction period or regional and long term.
61 to 80	High	High magnitude with a regional extent and long term duration; OR High magnitude with either a regional extent and medium term duration / a local extent and long term duration; OR Medium magnitude with a regional extent and long term duration.
81 to 100	Very high	High magnitude with a regional extent and long term duration; OR High magnitude with either a regional extent / long term duration.

v) 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)

Please refer to

Table 5 of this scoping report for an analysis of alternatives.

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

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

This section will be completed before the final scoping report is submitted and all concerns from I&APs have been responded to.

Table 17: Mitigation measures

Source activities / processes	Environmental Impact:	Stakeholder comment	Mitigation Measures

vii) The outcome of the site selection Matrix. Final Site Layout Plan

(Provide a final site layout plan as informed by the process of consultation with interested and affected parties)

Please refer to Appendix 4 for the site layout plan. Interested and Affected Parties will be consulted during a public meeting which will include discussions regarding the site layout and alternatives. Alternatives will be investigated during the EIA phase.

viii) Motivation where no alternative sites were considered

Not applicable to this application.

ix) Statement motivating the preferred site

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

Study Area:

The property on which the mining is proposed is located immediately to the west of the existing Brikor Vlakfontein Quarry. The location of the proposed mining quarry was chosen due to the prospecting indicating the available reserves on the property and feasibility studies indicating that it will be economically viable to mine there. Due to the location close to the existing quarry and factory, transport costs and impacts will be kept at a minimum. The vegetation on the study area have been relatively disturbed by agricultural activities and little natural vegetation remains on the property. It is however, possible that a wetland may occur on this property where mining is proposed. This must be confirmed during the EIA Phase.

Area to the east of the existing Vlakfontein Quarry:

The property adjoining the existing quarry to the east, is regarded as sensitive due to the possible presence of a large floodplain wetland (refer to Figure 16 of this report).

11. Plan of study for the Environmental Impact Assessment process

- i. Description of alternatives to be considered including the option of not going ahead with the activity.**

Please

refer

to

Table 5 for the alternatives analysis.

ii. Description of the aspects to be assessed as part of the environmental impact assessment process

(The EAP must undertake to assess the aspects affected by each individual mining activity whether listed or not, including activities such as blasting, Loading, hauling and transport, and mining activities such as Excavations, stockpiles, discard dumps or dams, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).

The following aspects will be assessed as part of the environmental assessment process:

- Topography;
- Geology and Soils;
- Geohydrology;
- Hydrology;
- Climate;
- Biodiversity;
- Socio-economic;
- Dust fallout;
- Ambient noise levels;
- Aesthetic quality (visual); and
- Archaeological aspects.

iii. Description of aspects to be assessed by specialists

Table 18: Description of aspects to be assessed by specialists

Aspect	Specialist Study	Specialist	Terms of Reference
Facilities – pollution control dam.	Conceptual and Final Design Report and Designs	Engineer (PrEng) – to be appointed	Conceptual and final designs and report including designs of the pollution control dam and stormwater management system and river and wetland crossings. The conceptual design report contains an assessment of alternative sites and layouts and a recommendation of the preferred layout. The final report and designs to include the designs of the preferred site and layout alternative.
Geo-hydrology	Geo-hydrological Study	Environmental Assurance	<p>The envisaged scope of work for the project comprise the following tasks:</p> <ul style="list-style-type: none"> • Desktop Review and Site Visit; • Hydrocensus Investigation; • Field Investigation (Optional): <ul style="list-style-type: none"> ○ Geophysical Investigation; ○ Hydrogeological Borehole Installation; ○ Aquifer Testing; • Groundwater Reserve Determination; • Hydrogeological Conceptual Model Development; • Impact Assessment for the Mining Activities; and • Report Compilation. <p><u>METHODOLOGY</u></p> <p>Desktop Review and Site Visit</p> <p>A detailed desktop review will be completed for the site during which all available public domain and client-supplied data and information will be reviewed and consolidated into a central database. The information to be reviewed will include, but will not be limited to, the following:</p>

Aspect	Specialist Study	Specialist	Terms of Reference
			<ul style="list-style-type: none"> • Relevant geological map sheets for the site; • 1:50 000 topographic maps; • Google Earth™ imagery; • Site exploration drilling boreholes; • Site geophysical information (if any); and • Mine site plans. <p>During the desktop study a site visit will be completed by the ENVASS hydrogeologist in order to allow to development a conceptual understanding of the site and verify the findings of the desktop review.</p> <p>Hydrocensus Investigation</p> <p>A hydrocensus survey will be conducted within a 5 km radius around the site to identify and collect information regarding sensitive groundwater receptors such as private farm abstraction boreholes, community water supply wells, springs and any potential pollution sources.</p> <p>The following information will be collected during the survey:</p> <ul style="list-style-type: none"> • GPS Coordinates; • Static Groundwater Levels; • Borehole or Well Depths; • Pumping Equipment (if any); • Casing Details; • Main Water Use; • Abstraction Volumes Estimates; • Owners Name and Contact Details; and • Photo Log (if possible) <p>Based on the hydrocensus data, groundwater contour maps will be generated and groundwater flow direction will be</p>

Aspect	Specialist Study	Specialist	Terms of Reference
			<p>determined. It is envisaged that six (6) water samples will be taken during the hydrocensus investigation to determine the baseline water quality.</p> <p>Field Investigation (Optional)</p> <p>Should it be deemed necessary, a field investigation will be conducted for the site with the objective of installing additional groundwater monitoring boreholes and determination of the aquifer parameters at the site.</p> <p>Geophysical Investigation</p> <p>Due to the presence of the intergranular and fractured bedrock aquifers, groundwater occurrences are mainly associated within weathered bedrock and geological structures, such as fractures, faults and contact zones. The Electromagnetic (EM) geophysical survey method would be suitable for identifying these weathered zones and geological structures.</p> <p>A total of 1500 metres of geophysical survey is budgeted for and will mainly focus on the siting of suitable drilling targets within the sites property boundaries.</p> <p>Electromagnetic Method</p> <p>The frequency domain electromagnetic (FDEM) data will be collected with a GEONICS EM 34-3 unit at 10-meter intervals. The EM unit operates in the following way: Variations in the subsurface conductivity depend on the nature of the underlying geological strata. The alternating current in the transmitter coil of the apparatus generates a pulsing primary magnetic field that induces an electrical current at depth. This induced current (“Eddy” currents) off the different geological strata produces a secondary EM field. The secondary EM field generated is measured at the receiver coil and read as an apparent conductivity. All drilling targets will be clearly marked in the field and GPS coordinates will be collected. Based on the interpretation of the geophysical investigation data, the most suitable targets will be identified for drilling.</p> <p>Hydrogeological Borehole Installation</p> <p>Based on the results of the geophysical survey a maximum of two (2) hydrogeological boreholes will be installed at the site. The boreholes will be installed using air percussion drilling methods with suitable drilling rigs and associated air compressor</p>

Aspect	Specialist Study	Specialist	Terms of Reference
			<p>units.</p> <p>The boreholes will be constructed using both slotted and solid uPVC casing and gravel pack to 2 m below surface, finished with a 2 m sanitary seal of bentonite-cement slurry and a concrete surface plinth with steel marker board.</p> <p>During drilling Envass will conduct drilling supervision, during which the following documentation will be completed:</p> <ul style="list-style-type: none"> • Daily site diaries which record the depth drilled and casing installed (signed by Envass and drilling contractor representatives); • Rig and Drilling Site checklists (to be completed per site); • Hydrogeological borehole logs (i.e. geology, water strike depth and yield, etc.); and • Any site incidents that may occur at the site. <p>Aquifer Testing</p> <p>The two (2) boreholes that were constructed during the borehole installation task will undergo aquifer testing as follows:</p> <ul style="list-style-type: none"> • A three (3) hour step discharge test, where water is removed from the borehole at 30% of the final blowout yield, 60% of the final blowout yield and 90% of the final blowout yield for one (1) hour at a time and the water level response measured and recorded; • An eight (8) hour constant discharge test, where water is removed from the borehole at a fixed rate, as determined during the step test, and the water level response measured and recorded; and • A recovery test where the water level recovery following the constant discharge test is measured until the water level is 95% of the original water level, or twenty four (24) hours have passed. <p>The results of the aquifer testing will be interpreted in order to determine the borehole sustainable yield, as well as aquifer characteristics such as transmissivity, electrical conductivity (EC) and temperature profiles will be completed at each of the boreholes before and after aquifer testing, in an effort to identify the major inflow zones at the borehole.</p>

Aspect	Specialist Study	Specialist	Terms of Reference
			<p>Groundwater Reserve Determination</p> <p>During the project a groundwater reserve determination will be completed for the site, using the desktop data as well as field investigation results available for the region. The groundwater reserve determination will be completed using the Groundwater Reserve Directed Measures (GRDM) methodology as approved by the Department of Water and Sanitation (DWS).</p> <p>The results of the reserve determination will be used to determine the groundwater resources available for abstraction, as well as for licensing applications.</p> <p>Hydrogeological Conceptual Model Development</p> <p>The results of the desktop review and site observations, as well as the monitoring results to date, will be used to develop a comprehensive conceptual hydrogeological model for the site. The conceptual model aimed to describe the topographic, hydrological, geological and hydrogeological environments and quantify their interactions. The regional and site-specific data obtained per environment will be consolidated into a central dataset where simplifications and concepts are applied in order for the system to be represented in the model environment (ASTM, 2010).</p> <p><u>Impact Assessment</u></p> <p>An impact assessment will be completed for the site, where the potential impacts, if any, of the proposed mining activities are quantified and assigned an environmental impact rating. The impact ratings will be assigned based on the desktop review, hydrocensus investigation and field investigation (if completed), as well as the results of either analytical modelling (Option A) or numerical groundwater modelling (Option B) of the mine inflows and contaminant plume migrations. The methodology for Option A and Option B as well as their associated deliverables are presented in the sections below,</p> <p>Option B – Numerical Groundwater Flow and Contaminant Transport Modelling</p> <p>A numerical groundwater flow model will be constructed for the site in order to simulate the current mining activities and planned mining expansion. The methodology for the numerical modelling was adapted from the “Standard guide for</p>

Aspect	Specialist Study	Specialist	Terms of Reference
			<p>application of a groundwater flow model to a site-specific problem” (ASTM, 2010) and is comprised of the following processes:</p> <p>Model Construction</p> <p>Model construction is the process of translating natural, real world entities from the conceptual model into mathematical entities (ASTM, 2010). The model construction process consists of the following fundamental concepts (ASTM, 2010):</p> <ul style="list-style-type: none"> • Dimensionality; • Discretization; • Boundary conditions; and • Initial conditions and Hydraulic properties. <p>Model Calibration</p> <p>Model calibration is the process of changing model parameters (e.g. transmissivity and recharge) to achieve a reasonable correlation between model results and real-world observations (ASTM, 2010). For the site model both steady-state and transient-state calibration will be performed. Parameters such as recharge, transmissivity and specific storage can be altered to a point where a reasonable correlation between calculated and observed hydraulic heads are achieved, while parameter values remained within a reasonable range. Mandle (2002) suggests the residual (i.e. the difference between calculated and observed values) should be less than 10% of the total variation of the observation data set within the model domain.</p> <p>The calibration confidence will depend on the amount of observation data that is available for the site, i.e. more data is directly related to a greater confidence. The confidence assigned to the model will be discussed with the client following the completion of the desktop study.</p> <p>Sensitivity Analysis</p> <p>A sensitivity analysis quantifies the uncertainty in a calibrated model by adjusting the model parameters and noting the</p>

Aspect	Specialist Study	Specialist	Terms of Reference
			<p>effect on model results (ASTM, 2010). For the site model parameters were modified by -10%; -25%; -50%; +10%; +25% and +50% with the effect on the model RMSE or a specific model outcome noted and represented graphically.</p> <p><i>Predictive Scenarios</i></p> <p>Due to the associated uncertainties and the non-uniqueness of groundwater flow models and their results, predictive scenarios are always performed using the conservative approach and should be treated as a tool to aid in the decision-making process (Mandle, 2002).</p> <p>The predictive scenarios for the site will be finalised following the initial stages of the project and discussions with the client regarding the appropriate scenarios to be completed for the site.</p> <p>Numerical modelling (Option B) would be able to quantify the potential pit groundwater inflows, dewatering cones and contaminant plumes, if any, far more accurately than the analytical modelling (Option A) and would be more beneficial to the project over the long term.</p> <p><u>Report Compilation</u></p> <p>A final report will be compiled for the site, which will include the results of all field investigations, as well as specific input to the water use license application and a detailed groundwater management plan for the site. The detailed groundwater management plan will be developed for the site, including the groundwater monitoring programme recommended for the site, dewatering management measures and a groundwater risk assessment.</p> <p>The groundwater management plan will be developed based on best practice guidelines, both local and international, and will align with the IFC guidelines for mine water management. The groundwater management plan will include both management and mitigation measures, as well as emergency response plans for the site.</p> <p><u>DELIVERABLES</u></p> <ul style="list-style-type: none"> • Site inspection and Desktop Review results;

Aspect	Specialist Study	Specialist	Terms of Reference
			<ul style="list-style-type: none"> • Hydro census results; • Field Investigation (Optional if required); • Groundwater Reserve Determination; • Either Analytical modelling and calculations of potential groundwater pit inflow OR Groundwater flow and transport modelling together with predictive modelling of various scenarios; and • Final report.
Aquatic environment	SASS biomonitoring, wetland delineation and assessment and aquatic assessment	Environmental Assurance	<p>Baseline wetland and aquatic information (if available) will be used to inform the basis of the report. Additional studies will also be conducted, these will include SASS5 (biomonitoring) up and downstream of the Blesbokspruit, as well as wetland and riparian delineation and assessment in order to provide a holistic description of the study area.</p> <p><u>SASS5 (biomonitoring)</u></p> <p>As part of quantifying the impact and to assess the diversity of biotopes and communities of macro invertebrates of the proposed mine, biomonitoring assessments will be conducted on a bi-annual basis. These studies will be done in accordance with the latest environmental legislation in order to determine the ecological baseline conditions for the applicable portion of the properties where the proposed development is envisaged to take place. In addition to determining baseline conditions, this study will determine the Present Ecological State (PES) of the study area, during the construction phase.</p> <p>Specific outcomes required from this baseline report will include the following:</p> <ul style="list-style-type: none"> • Habitat and community classification including description of ecological state of the property; • Seasonal variance in ecological baseline conditions; • Discuss the spatial significance of the property and provide recommendations for preventing and mitigating environmental impacts; • Monitor and assess freshwater macro-invertebrate communities using South African Scoring System method for upstream and downstream of the factory; • Assessment of the condition and availability of invertebrate habitats; • Assessment of the Riparian Vegetation by utilising the Riparian Vegetation Response Assessment Index

Aspect	Specialist Study	Specialist	Terms of Reference
			<p>(VEGRAI) and Index of Habitat Integrity or Invertebrate Habitat Assessment Systems (IHAS);</p> <ul style="list-style-type: none"> • Guidance on informing the client on the ecological viability of the proposed mining infrastructure; and • Determine Impacts on the Blesbokspruit. <p>The activities associated with the construction of the proposed mining expansion, <i>may</i> contribute to levels of ecological degradation that can vary in scale. ENVASS has expertise to distinguish between these types of impacts and perform biomonitoring assessments according to the South African Scoring System 5 (SASS5 method).</p> <p>In order to achieve the objectives of the report the following assessment procedure/methodology will be used:</p> <ul style="list-style-type: none"> • A desktop study will be conducted in order to gain background information on the physical habitat for the proposed development site and surrounding areas; including the utilisation of the SANBI BGIS interface; and • A field investigation will be conducted and include the use of South African Scoring System version 5.0 (SASS5) to determine the water quality of the investigated river. Both the invertebrate and vertebrate data are gathered in conjunction with <i>in situ</i> inorganic chemistry analyses and is used to provide a biologically integrated picture of water quality <p>Report writing will combine the above-mentioned methodologies to produce a detailed explanation of the state of the aquatic environment, derived from the data collected – from this report(s) a detailed synopsis of the area and associated recommendations can be derived and future management decisions made.</p> <p>The report will attempt to define the overall ecological impacts on the study area by assessing the resident aquatic fauna and flora within the associated riverine and wetland habitats – with specific focus on the impact(s) (if any) associated with the expansion of the mine. It will also provide a detailed summary of the findings and will assist in providing recommendations to management in order to minimise the impacts on the ecological resources of the area.</p> <p>The Bio-monitoring assessment will be performed to establish the baseline conditions of the study area. These assessments are ultimately required to ensure that the associated risks to the receiving environment are determined and monitored accordingly, as special and temporal interpretations are done.</p>

Aspect	Specialist Study	Specialist	Terms of Reference
			<p>The report(s) will be divided into the following sections:</p> <ul style="list-style-type: none"> • Location and description of the study area; • Description of the methods utilised to obtain results; • A synthesis of the results; and • Recommendations – including as to the specialist opinion which proposed option is the most feasible. <p><u>Wetland and Riparian delineation and classification</u></p> <p>Use will be made of 1:50 000 topographic maps, Google Earth images and geo-referenced historical imagery to generate digital base maps of the study area. A preliminary desktop delineation of suspected wetlands will be done by identifying wetness signatures from the digital base maps and drawing boundaries around these. All suspected wetland areas identified during the desktop assessment will then be further investigated in the field.</p> <p>Wetlands will be delineated in the field according to the delineation procedure as set out by the “<i>A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas</i>” document (DWAF, 2005). The study area will be sub-divided into transects and the soil profile will be examined for signs of wetness within 50 cm of the surface, using a hand augur along each transect. The wetland boundaries will then be determined based on the positions of augured holes that showed signs of wetness as well as the presence or absence of hydrophilic vegetation. In accordance with the above methodology, the following key indicators will be used to identify and classify the wetlands:</p> <ul style="list-style-type: none"> • Soil hydromorphy: the presence of grey and orange mottles indicating periods of alternating anaerobic and aerobic conditions. Wetlands are considered to be the result of an interaction between soil, water and vegetation, and the 50cm depth limit represents the rooting zone of herbaceous wetland vegetation. Hydromorphic characteristics within the top 50cm of the soil profile therefore indicate the presence of wetland habitat; • Vegetation: Certain plant species are good indicators of the temporary, seasonal and permanent wetland zone and terrestrial habitat; and • Topography is a good wetland indicator, particularly when delineating floodplain and channelled valley-bottom systems where the shape of the land indicates the likely extent of peak-flows.

Aspect	Specialist Study	Specialist	Terms of Reference																								
			<p>The wetlands will subsequently be classified according to their hydro-geomorphic determinants based on the most recent system as described by SANBI (2009). Notes will be made on the levels of degradation in the wetlands, based on field experience and a general understanding of the types of systems present.</p> <p><u>Wetland Assessment (Present Ecological State – PES)</u></p> <p>A PES and EIS analysis will be conducted for each hydro-geomorphic (HGM) wetland unit identified and delineated within the study area. This will be done in order to establish a baseline of the current state of the wetlands, and to provide an indication of the conservation value and sensitivity of the wetlands.</p> <p>The scoring system described in (DWAF, 1999a) will be applied for the determination of EIS. The technique outlined in WET-Health (Macfarlane, et al., 2008) will be used for determination of PES. The results of these assessments categorises the status of each wetland unit; descriptions of these categories are provided below.</p> <p>Table 2: Description of the PES categories</p> <table border="1"> <thead> <tr> <th data-bbox="801 807 1189 863">Mean*</th> <th data-bbox="1189 807 1346 863">Category</th> <th data-bbox="1346 807 2119 863">Explanation</th> </tr> </thead> <tbody> <tr> <td colspan="3" data-bbox="801 863 2119 919"><i>Within generally acceptable range</i></td> </tr> <tr> <td data-bbox="801 919 1189 975">>4</td> <td data-bbox="1189 919 1346 975">A</td> <td data-bbox="1346 919 2119 975">Unmodified, or approximates natural condition</td> </tr> <tr> <td data-bbox="801 975 1189 1066">>3 and ≤4</td> <td data-bbox="1189 975 1346 1066">B</td> <td data-bbox="1346 975 2119 1066">Largely natural with few modifications, but with some loss of natural habitats</td> </tr> <tr> <td data-bbox="801 1066 1189 1121">>2.5 and ≤3</td> <td data-bbox="1189 1066 1346 1121">C</td> <td data-bbox="1346 1066 2119 1121">Moderately modified, but with some loss of natural habitats</td> </tr> <tr> <td data-bbox="801 1121 1189 1211">≤2.5 and >1.5</td> <td data-bbox="1189 1121 1346 1211">D</td> <td data-bbox="1346 1121 2119 1211">Largely modified. A large loss of natural habitat and basic ecosystem function has occurred.</td> </tr> <tr> <td colspan="3" data-bbox="801 1211 2119 1267"><i>Outside generally acceptable range</i></td> </tr> <tr> <td data-bbox="801 1267 1189 1361">>0 and ≤1.5</td> <td data-bbox="1189 1267 1346 1361">E</td> <td data-bbox="1346 1267 2119 1361">Seriously modified. The losses of natural habitat and ecosystem functions are extensive.</td> </tr> </tbody> </table>	Mean*	Category	Explanation	<i>Within generally acceptable range</i>			>4	A	Unmodified, or approximates natural condition	>3 and ≤4	B	Largely natural with few modifications, but with some loss of natural habitats	>2.5 and ≤3	C	Moderately modified, but with some loss of natural habitats	≤2.5 and >1.5	D	Largely modified. A large loss of natural habitat and basic ecosystem function has occurred.	<i>Outside generally acceptable range</i>			>0 and ≤1.5	E	Seriously modified. The losses of natural habitat and ecosystem functions are extensive.
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Aspect	Specialist Study	Specialist	Terms of Reference	
			0	<div style="background-color: red; color: white; text-align: center; width: 20px; float: left; margin-right: 5px;">F</div> Critically modified. Modification has reached a critical level and the system has been modified completely with almost complete loss of natural habitat.
Table 2: Description of the EIS categories				
Ecological Importance and Sensitivity categories			Range of Median	Recommended Ecological Management Class
Very high				
Wetlands that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these floodplains is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers.			>3 and ≤4	A
High				
Floodplains that are considered to be ecologically important and sensitive. The biodiversity of these floodplains may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.			>2 and ≤3	B
Moderate				
Floodplains that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.			>1 and ≤2	C
Low/marginal				

Aspect	Specialist Study	Specialist	Terms of Reference
			<p>Floodplains that are not ecologically important and sensitive at any scale. The biodiversity of these floodplains is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.</p> <p style="text-align: right;">>0 and ≤1</p> <p style="text-align: right;">D</p>
Biodiversity	Ecological and Biodiversity Scan	Environmental Assurance (Pty) Ltd – Mr Hannes Badenhorst (Professionally Accredited River Health Practitioner with the Department of Water and Sanitation);	<p>The report will attempt to define the overall ecological impacts on the study area by assessing the resident fauna and flora within the associated habitat – with specific focus on the impact(s) (if any) associated with the mine and associated activities. A detailed summary of the findings will be provided, assisting in providing recommendations to management in order to minimise the impacts on the ecological resources of the area.</p> <p>The report will be divided into the following sections:</p> <ul style="list-style-type: none"> • Location and description of the study area; • Description of the methods utilised to obtain results; • A synthesis of the results; and • Recommendations. <p>In order to obtain the data summarised above the following methodologies will be utilised:</p> <p>Desktop assessment:</p> <p>A desktop study of the assessment area will be conducted utilising the SANBI BGIS interface. The Land Use Decision Support (LUDS) tool aim to assist environmental practitioners by providing them with a tool that extracts the most important biodiversity planning information for an area from national and regional spatial datasets. Deliberations and decision-making processes are thereby facilitated the possible impacts of development or land-use changes are assessed.</p> <p>The following datasets are accessible with this interface:</p> <p>National datasets;</p> <ul style="list-style-type: none"> • Listed threatened ecosystems; • Vegetation types;

Aspect	Specialist Study	Specialist	Terms of Reference
			<ul style="list-style-type: none"> • Indigenous forest patches; • Soil classes; • National Freshwater Ecosystem Priority Areas (NFEPA); <ul style="list-style-type: none"> ○ Wetlands; ○ Wetland clusters; ○ Rivers; and ○ River FEPAs (sub-quaternary catchments); • Formal protected areas; • Informal protected areas; and • Areas identified by the National Protected Area Expansion Strategy (NPAES). <p>In addition to this, various GIS databases and interfaces will be utilised to provide a detailed assessment of the study area – the layers include (amongst others): Mucina & Rutherford, NFEPA wetlands, Red data species list, NFEPA rivers, administrative municipal data, climate data, geology and soils, topographical, cadastral and land use data.</p> <p>Field assessment:</p> <p>A physical site inspection will be conducted to ascertain the ecological integrity of the study unit. This field assessment will be conducted in transects around the proposed development site and will focus on the following:</p> <p>Habitat and vegetation survey:</p> <p>Field surveys for existing habitat and vegetation will be conducted in the wet season to generate the ecological profile of the Study Area. Habitat maps will be produced based on updated aerial photos and field ground truthing. Representative areas of each habitat will be surveyed by direct observation on foot. Habitats to be affected by the proposed development will be identified and mitigation measures for these areas will be proposed for the loss of habitats (if any). Photographs of habitats (terrestrial and aquatic) and ecological features of special importance will be taken. Plant species and their relative abundance will be recorded with special attention to rare, protected and threatened species and other species of</p>

Aspect	Specialist Study	Specialist	Terms of Reference
			<p>conservation concern.</p> <p>Mammal Survey:</p> <p>Surveys of mammals will be conducted by active searching at natural stream, freshwater, woodlands and agricultural habitats during daytime and at night as well as <i>ad hoc</i> records of all sightings, tracks, and signs of mammals observed. Mammal surveys will be performed in line with herpetofauna survey in the wet season.</p> <p>Avifaunal Survey:</p> <p>Bird communities of various habitats within the Assessment Area will be surveyed using the walk over transect count method. All birds seen or heard at either sides of transects will be identified and counted. Signs showing breeding (e.g. nests, recently fledged juveniles) within the Assessment Area will be included. Bird species encountered away from transects but within the Assessment Area will also be recorded to produce a complete species list.</p> <p>Herpetofauna Survey:</p> <p>Surveys of herpetofauna within the Assessment Area will be conducted through active searching and by detection of the mating calls for frogs and toads at their potential breeding sites during daytime and at night. Surveyed areas will include the various habitats found on site. Daytime surveys for herpetofauna will be carried out in line with mammal and insect surveys in wet season.</p> <p>Entomological survey:</p> <p>Insects observed will be collected and identified in line with the above mentioned surveys. Red data lists will be consulted to see whether any endangered species possibly occur within the Assessment Area – should this be the case, the suitable habitat for these specie(s) will further be scrutinised.</p>

Scoping Report

Aspect	Specialist Study	Specialist	Terms of Reference
Archaeological	Phase 1 Archaeological impact assessment	Francois P Coetzee	<p>Phase 1 Heritage Assessment must be undertaken in order to assess the impacts and significance in terms of cultural and heritage and the proposed mitigation measures. The assessment shall be undertaken in accordance with the requirements of Section 38 (3) of the National Heritage Resources Act (Act 25 of 1999), including:</p> <ul style="list-style-type: none"> • Conducting a detailed desktop level investigation to identify all known archaeological, cultural and historical facilities on the property; • Undertake fieldwork to verify results of desktop investigation; • Undertake an assessment of the Aesthetic / Architectural compatibility of the proposed mine; • Document using GPS co-ordinates and maps all sites, objects and structures identified on the proposed site; • Undertake any required consultation with the relevant Department; and • Compile a report which would include: <ul style="list-style-type: none"> ➢ Identification of all possible archaeological, cultural and historic sites on the property; ➢ Evaluation of the potential impacts of construction, operation and decommissioning of the proposed mining activities on archaeological, cultural and historical resources, in terms of the scale of the impact (local, regional, national), magnitude of impact (low, medium, high) and the duration of the impact (construction, up to 10 years after construction, more than 10 years after construction); and ➢ Recommendations for mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.
Soils	Soil and land capability study	Environmental Assurance	<p>The report will describe the baseline soil and land capability of the farms that will likely be impacted on by the proposed activities within the mining areas, and will assess the impact associated with the proposed development. The investigation describe and map soils occurring on the Assessment Area and assess their agricultural potential.</p> <p>The assessment will include the following:</p> <ul style="list-style-type: none"> • Desktop study to establish broad baseline soil conditions, land capability and areas of environmental sensitivity in future mining areas; • Site visit to survey soil of the Assessment Area focussing on all streams, drainage lines and pans; • Description of soils including soil texture, depth, structure, moisture content, organic matter content, slope and land capability of the area; • Description and categories of soils using the South African Soil Classification Taxonomic System;

Aspect	Specialist Study	Specialist	Terms of Reference
			<ul style="list-style-type: none"> • Results of soil survey, including map of wetlands and zones of similar soil forms; • Identified potential impacts associated with mining activities. These impacts may include: <ul style="list-style-type: none"> ○ Loss of land capability and agricultural potential due to additional footprints of disturbance; ○ Increased potential for soil contamination; ○ Increased potential for soil erosion; and ○ Change to land uses in the area as a result of the mining operation. • Proposed soil management measures with regard to availability for rehabilitation; and • Mitigation measures for identified significant risks/impacts and measures to enhance positive opportunities/impacts of the project. <p>The topsoil and subsoil (0-300 mm) of the dominant soil forms will be sampled. A total of four (4) samples will be taken to determine the capacity of the soil. Samples will be analysed for indicators of acidity and salt pollution as well as fertility indicators as follows:</p> <ul style="list-style-type: none"> • Clay percentage; • pH (water); • Exchangeable cations Na, K, Ca, Mg (Amm.Acetate.); • Cation exchange capacity (CEC); and • Phosphorus (Bray1). (Non-affiliated Soil Analysis Work Committee, 1991).
Waste	Waste Classification	Environmental Assurance	<p><u>LEGAL CONTEXT</u></p> <p><u>National Environmental Management: Waste Act, 2008 (Act NO. 59 OF 2008) Regulations Regarding the Planning and Management of Residue Stockpiles And Residue Deposits From a Prospecting, Mining, Exploration or Production Operation</u> promulgated on 24 July 2015 now also regulates the management of mine residues and stockpiles. This regulation determines the following:</p> <p><i>The assessment of impacts and analyses of risks relating to the management of residue stockpiles and residue deposits</i></p> <p>3.(1) <i>The identification and assessment of environmental impacts arising from residue stockpiles and residue deposits must be done as part of the environmental impact assessment conducted in terms of the National Environmental</i></p>

Aspect	Specialist Study	Specialist	Terms of Reference
			<p><i>Management Act, 1 (Act No. 107 of 1998), if required.</i></p> <p>3.(2) <i>The management of residue stockpiles and residue deposits must be in accordance with any conditions set out and any identified measures in the environmental authorisation issued in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), an environmental management programme and a waste management licence issued in terms of the Act.</i></p> <p>3.(3) <i>A risk analysis must be conducted on the characteristics and the classification set out in regulation 4 and 5 must be used to determine the appropriate mitigation and management measures.</i></p> <p>3.(4) <i>The pollution control barrier system shall be defined by the-</i></p> <ul style="list-style-type: none"> a. <i>National Norms and Standards for the Assessment of Waste for Landfill Disposal, 2013; and</i> b. <i>National Norms and Standards for Disposal of Waste to Landfill, 2013.</i> <p><i>Classification of residue stockpiles and residue deposits</i></p> <p>5.(1) <i>Residue stockpile and residue deposit must be classified by a competent person.</i></p> <p>5.(2) <i>A risk analysis must be conducted on the deposits and documented on all residue stockpiles and residue</i></p> <p>5.(3) <i>The classification of residues and residue deposit must be undertaken on the basis of the-</i></p> <ul style="list-style-type: none"> a. <i>characteristics of the residue;</i> b. <i>location and dimensions of the deposit (height, surface area);</i> c. <i>importance and vulnerability of the environmental components that are at risk;</i> d. <i>spatial extent, duration and intensity of potential impacts; and</i> e. <i>Pollution control barrier system compliant with the commensurate norms and standard for disposal of waste to landfill.</i> <p><u>PROJECT METHODOLOGY AND TECHNICAL PROCESSES</u></p> <p>The waste classification will be conducted in the following three phases:</p> <p>(a) Phase 1: Sample Collection</p> <p>In order to conduct waste classification samples of the solid waste material will need to be collected. The sampling will be</p>

Aspect	Specialist Study	Specialist	Terms of Reference
			<p>conducted as follows:</p> <p>Samples for Waste Classification:</p> <ul style="list-style-type: none"> • Waste Rock Dump 1 Sample <p>The samples will be collected and delivered to accredited laboratory for analysis.</p> <p>(b) Phase 2: Sample Analysis</p> <p>The samples will be analysed in accordance with GNR 635: National Environmental Management: Waste Act: Norms and Standards for the assessment of waste for disposal on landfill. The results will be provided to ENVASS for interpretation and compilation of Classification Report.</p> <p>(c) Phase 3: Classification Report</p> <p>On receipt of the sampling results ENVASS will compile a classification report to be included as part of the EIA and IWULA application.</p>

iv. Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

A “significant impact” is defined as it is defined in the EIA Regulations (2014): “an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence”. The objective of this EIA methodology is to serve as framework for accurately evaluating impacts associated with current or proposed activities in the biophysical, social and socio-economical spheres. It aims to ensure that all legal requirements and environmental considerations are met in order to have a complete and integrated environmental framework for impact evaluations.

The process of determining impacts to be assessed is one of the most important parts of the environmental impact assessment process. It is of such high importance because the environmental impacts identified can and are often linked to the same impact stream. In this method all impacts on the biophysical environment are assessed in terms of the overall integrity of ecosystems, habitats, populations and individuals affected. For example, the removal of groundcover for the sloping or scraping of an embankment, can lead to higher amounts of water runoff which increases the rate of erosion. Further down in the river the amount of sediment increases because of the increased erosion. A number of fish species cannot endure the high amount of sediment and moves off. The habitat is thus changed or in the process of changing. Thus one needs to understand that the root of the problem (removal of groundcover) is assessed in terms of the degree of change in the health of the environment and/or components in relation to their conservation value. Thus if the impact of removal of groundcover of a definable system is high and the conservation value is also high then the impact of removal of groundcover is highly significant.

Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) requirements

The Environmental Impact Assessment (EIA) 2014 Regulations promulgated in terms of Sections 24 (5), 24M and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA), requires that all identified potential impacts associated with the proposed project be assessed in terms of their overall potential significance on the

natural, social and economic environments. The criteria identified in the EIA Regulations (2014) include the following:

- Nature of the impact;
- Extent of the impact;
- Duration of the impact
- Probability of the impact occurring;
- Degree to which impact can be reversed;
- Degree to which impact may cause irreplaceable loss of resources;
- Degree to which the impact can be mitigated; and
- Cumulative impacts.

ENVASS has developed an impact assessment methodology (as defined below) whereby the Significance of a potential impact is determined through the assessment of the relevant temporal and spatial scales determined of the Extent, Magnitude and Duration criteria associated with a particular impact. This method does not explicitly define each of the criteria but rather combines them and results in an indication of the overall significance.

v. The proposed method of assessing duration significance

The DURATION of an impact can be defined as: “a short description of the period of time the impact will have an effect on aspects”.

Determining the duration of an impact			
DURATION	Extent	Score	Description
Duration of the impact	Short term	1	Less than 2 years
	Short to medium term	2	2 – 5 years
	Medium term	3	6 – 25 years
	Long term	4	26 – 45 years
	Permanent	5	46 years or more

vi. The stages at which the competent authority will be consulted

The competent authority will be consulted during the following stages of the application:

- A pre-application meeting was held on 03 March 2017;
- With the submission of the application form;

- With the submission of a draft scoping report;
- With the official submission of the scoping report;
- With the submission of a draft Environmental Impact Assessment (EIA) report;
- With the official submission of the EIA report.

vii. Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

1. Steps to be taken to notify interested and affected parties

(These steps must include the steps that will be taken to ensure consultation with the affected parties identified in (h) (ii) herein)

All registered interested and affected parties will personally be notified via email or phone of the availability of the scoping report and EIA report including the venue and the period it will be available for.

f) NEXT PHASES OF THE PUBLIC PARTICIPATION PROCESS

1. Details of the engagement process to be followed

(Describe the process to be 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 and records of such consultation will be required in the EIA at a later stage)

Engagement with interested and affected parties during the EIA phase will involve the following:

- All stakeholders and registered I&APs will have the opportunity to review and comment on all the documents released in the EIA phase. The EIA / EMP report will be released for a period of 30 days for review and comment:
 - A hard copy of the report will be located at venue in the town of Nigel at the Brikor Limited Offices, close to the study area;
 - Hard copies and CDs of the report will be submitted to all relevant organs of state; and

- The EIA report will also be uploaded on the Environmental Assurance (Pty) Ltd website (www.envass.co.za/downloads).

2. Description of the information to be provided to Interested and Affected Parties

(Information to be provided must include the initial site plan and sufficient detail of the intended operation and the typical impacts of each activity, to enable them to assess what impact the activities will have on them or on the use of their land).

- The Environmental Impact Assessment Report will include *inter alia* findings of specialist studies and a full assessment of all impacts of the alternatives, including cumulative impacts;
- The Environmental Management Programme to be made available, and will include, *inter alia* mitigation, management and monitoring measures to prevent and mitigate negative impacts and enhance positive impacts that have been identified in the EIA; roles and responsibilities and an environmental awareness plan.

viii. Description of the tasks that will be undertaken during the environmental impact assessment process

- **Approach to the EIA**

An Environmental Impact Assessment (EIA) is a good planning tool. It identifies the environmental impacts of a proposed development and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.

The EIA for this project complies with the National Environmental Management Act (1998) (as amended) and the NEMA EIA Regulations (2014) (as amended) as promulgated by the Department of Environmental Affairs (DEA). The guiding principles of an EIA are listed below.

- **Guiding principles for an EIA**

The EIA must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and an open-door policy by the proponent. Technical information must be communicated to stakeholders in a way that is understood by them and that enables them to meaningfully

comment on the project.

There should be ongoing consultation with interested and affected parties representing all walks of life. Sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis. There should be opportunities for input by specialists and members of the public. Their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

- **Information gathering**

Early in the EIA process, the Environmental Assessment Practitioner (EAP) identified the information that would be required for the impact assessment and the relevant data were obtained. In addition, available information about the receiving environment was gathered from reliable sources, interested and affected parties, previous documented studies in the area and previous EIA Reports. The project team then visited the site to gain first-hand information and an understanding of the existing operations and the proposed project.

- **Specialist Assessments**

Based on the impacts identified during the Scoping Phase, the following specialist studies have been identified to be completed and form part of the EIA.

Conceptual and Final Design Report and Designs;

- Geo-hydrological Study;
- Aquatic Impact Assessment;
- Ecological and Biodiversity Scan;
- Soil and Land Capability Study;
- Waste Classification; and
- Archaeological impact assessment.

The main objective of the specialist studies is to provide independent scientifically sound information on issues of concern relating to the project proposal.

The findings of the various specialist studies undertaken will be incorporated into the EIA Report. Any impacts that have not been identified during the scoping phase that have been identified and assessed by specialists will also be included in the environmental impact assessment.

- **Legislative Framework**

The legal requirements will be described and assessed in more detail during the EIA phase.

- **Alternatives**

Current site alternatives and layouts and additional site and layout alternatives as identified by interested and affected parties, will further be assessed and a preferred alternative recommended.

- **Description and assessment of impacts identified during the scoping phase**

A comprehensive list of all impacts as identified by the EAP and the specialists, in consultation with interested and affected parties, will be provided within the EIA report and assessed as per the methodology described within this report and plan of study.

- **Environmental management programme**

An Environmental Management Programme containing mitigation, management and monitoring measures and specifying roles and responsibilities will be compiled with specialist input included.

- **Stakeholder engagement**

Registered interested and affected parties, including relevant organs of state, will be consulted with during the EIA phase. All their comments will be formally responded to and incorporated into the EIA and the EIA report that will be submitted to the competent authority.

(ix) Measures to avoid, reverse, mitigate, or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored

Table 19: Measures to avoid, reverse, mitigate or manage impacts and residual risk

ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
Construction Phase: Clearing of vegetation and topsoil and excavation for the access and haul roads, pollution control dam footprint and opencast areas. Earthworks to excavate the pollution control dam and constructing the pollution control dam liner and walls. Dust Suppression	Loss of topsoil High (-)	Prevent and reduce through management measures. Stripping of topsoil: <ul style="list-style-type: none"> • Clearing of mining areas to take place a maximum of one month prior to intended commencement of mining in the area; • Stripping of topsoil will not take place during rain or excessive wind; and • The top 30 cm of vegetation and topsoil is to be stripped from the area to be mined. Storage of topsoil / overburden: <ul style="list-style-type: none"> • Topsoil (top 30cm) is to be stored in predetermined topsoil berms, (+/- 5m outside the boundary of the specific area; • The topsoil berm must not be located in any area demarcated for future mining or haul roads; and • Topsoil stockpiles will be restricted to 1.5 to 2m in height. Maintenance and monitoring of topsoil stockpiles: <ul style="list-style-type: none"> • The mine should aim to use the stored topsoil as soon as possible during concurrent rehabilitation. 	Low (-)
	Contamination of soils Low (-)	Prevent and reduce and remedy through management measures. <ul style="list-style-type: none"> • All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; • All leaks will be cleaned up immediately using an absorbent material and spill kits, in the prescribed manner; and • The approved Integrated Water and Waste Management Plan to be implemented. 	Very Low (-)

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ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
		<u>Hydrocarbons and hazardous waste</u> <ul style="list-style-type: none"> All hazardous waste generated shall be kept separate and shall not be mixed with general waste; and All hazardous waste shall be stored within a sealed drum on an impermeable surfaced area within the central waste storage and transition area. 	
	Vehicle and personnel as well as storage of materials, equipment and stockpiling compaction and degradation impacts. Low (-)	Prevent and reduce and remedy through management measures. <ul style="list-style-type: none"> Activity should be limited to area of disturbance. Where required, the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants; and Soils compacted, should be deeply ripped at least to a depth of 300mm to loosen compacted layers and re-graded to even running levels. 	Low (-)
	Reduced crop growth Medium (-)	Remedy after the life of mine <ul style="list-style-type: none"> Rehabilitation should be done carefully with specialist guidelines in order to restore the land capability of the mining area, should it be economically feasible to do so. Further detailed mitigation measures will be provided by the specialist during the EIA Phase. 	Medium (-)
	Stormwater, erosion and siltation impacts Medium (-)	Prevent and reduce and remedy through management measures. <ul style="list-style-type: none"> The Site Manager (SM) should ensure that excessive quantities of sand, silt and silt-laden water do not enter the stormwater system; Appropriate measures, e.g. erection of silt traps, or drainage retention areas to prevent silt and sand entering drainage or watercourses should be taken; No wastewater may run freely into any of the surrounding naturally vegetated areas; The loss of topsoil must be minimised; Erosion and subsequent siltation must be limited; Any drainage channels shall be suitably designed to ensure that erosion does not occur; 	Low (-)

Scoping Report

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		<ul style="list-style-type: none"> All areas susceptible to erosion shall be protected and stabilisation measures implemented: Packing of sandbags, gabions, straw bales or brush to reduce the speed of water flow where water is scouring the topsoil and results in the formation of erosion gullies; Any surface runoff generated which has a high suspended solid content shall be collected at the point source in an appropriate containment facility, then be allowed to settle before discharge into the environment; and A stormwater management plan must be compiled, and should be approved by DWS, implemented and monitored. 	
	Contamination of stormwater runoff and ground water, caused by: Low (-)	<p>Prevent and reduce through management measures. In accordance with Government Notice 704 (GN 704), the onsite management should:</p> <ul style="list-style-type: none"> Keep clean and dirty water separated; Contain any dirty water within a system; and Prevent the contamination of clean water. <p>In order to achieve these objectives, the following stormwater management measures must be implemented on the site to ensure that that potential stormwater impacts are kept to a minimum:</p> <ul style="list-style-type: none"> Clean and dirty stormwater needs to be separated. Dirty stormwater may not be released into the environment and should be contained and treated on site; All temporary storm water infrastructure (if any) on-site shall be maintained and kept clean throughout the construction period; Immediate reporting of any polluting or potentially polluting incidents so that appropriate measures can be implemented; Fuel and oil spills shall be treated immediately by appropriate mop-up products. Several hydrocarbon absorption/remediation products (i.e. 	Very Low (-)

Scoping Report

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		Spill kits) must be placed throughout the site; <ul style="list-style-type: none"> • Use of bunds or traps to ensure full containment of hydrocarbon and other hazardous materials are mandatory; • Any contaminated material is disposed of in an appropriate manner and the potential risks associated with such spills are limited; • Stormwater leaving the site must in no way be contaminated; • Water used for dust suppression to be tested and comply with the water quality limits as set by Department of Water and Sanitation and relevant SABS Standard for the purpose intended. Increased runoff should be managed using berms and other suitable structures as required to ensure flow velocities are reduced; and <ul style="list-style-type: none"> • Removal of spills, rainwater and waste produced during clean-up of the bunds – shall be done in accordance to relevant specifications. 	
	Altered drainage patterns and stormwater runoff flows. Medium (-)	Control through management measures. A stormwater management plan including stormwater management measures during all phases of the proposed development will be compiled by a suitably qualified person. The plan is to include a detailed description of the stormwater management plan, incorporating appropriate maps.	Low (-)
	Potential decrease in biodiversity on the study and surrounding area. Low (-)	Reduce through management measures. <ul style="list-style-type: none"> • Only vegetation falling directly in demarcated access routes or project sites should be removed where necessary; No further vegetation clearance except for the removal of alien invasive species will be allowed; and • All remaining indigenous vegetation should be conserved wherever possible 	Low (-)
	Potential loss of vegetation type, ecologically important species and species of conservation concern. Very Low (-)	Prevent and reduce through management measures. <ul style="list-style-type: none"> • Only vegetation falling directly in demarcated access routes or project sites should be removed where necessary; No further vegetation clearance except for the removal of alien invasive species will be allowed; and • All remaining indigenous vegetation should be conserved wherever 	Very Low (-)

Scoping Report

ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
		possible.	
	Spreading of alien invasive species and bush encroachment of indigenous species. Medium (-)	Prevent and control through management measures. <ul style="list-style-type: none"> An alien vegetation management plan should be compiled and implemented; Regular removal of invasive alien species should be undertaken. This should extend right through to the closure phase of the project; and No spread of alien vegetation onto adjacent properties should be allowed. 	Very Low (-)
	Impact on natural migratory routes and faunal dispersal patterns. Very Low (-)	Reduce and control through management measures. <ul style="list-style-type: none"> Reduce the levels of disturbance on areas indicated by the Environmental Control Officer (ECO) as migratory routes, if any. 	Very Low (-)
	Disturbance and loss of fauna through noise, light and dust pollution and hunting, trapping and killing of fauna. Very Low (-)	Reduce through controlling measures. <ul style="list-style-type: none"> Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed; Any animals rescued or recovered will be relocated in suitable habitat away from the mining operations and associated infrastructure; Any lizards, snakes or monitors encountered should be allowed to escape to suitable habitat away from disturbance. No reptile should be intentionally killed, caught or collected during any phase of the project; and General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area. 	Very Low (-)
	Loss of land for other purposes e.g. cultivation. Low (-)	None	Low (-)
	Visibility from sensitive receptors / visual scarring of the landscape as a result of the	Reduce through controlling management measures. <ul style="list-style-type: none"> Housekeeping on site should be enforced. 	Low (-)

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	construction activities. Medium (-)		
	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of construction vehicles and equipment. Medium (-)	Reduce through controlling measures. <ul style="list-style-type: none"> • Vehicles will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible; • Heavy vehicle traffic should be routed away from noise sensitive areas, where possible; • Noise levels should be kept within acceptable limits. All noise and sounds generated should adhere to South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies; • With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the Site Manager (SM) should liaise with local residents and how best to minimise impacts, and the local population should be kept informed of the nature and duration of intended activities; • The SM should take measures to discourage labourers from loitering in the area and causing noise disturbance; • Noise impacts should be minimised by restricting the hours during which the offending activities are carried out and, where possible, by insulating machinery and/or enclosing areas of activity; • Regular monitoring of noise levels at various, pre-determined locations. This will serve as the core of noise mitigation as it will enable the determination of problem areas; • Personal Protective Equipment to all persons working in areas where high levels of noise can be expected; Signs where it is compulsory; • Proper design of the plant areas and machinery where measures are taken to prevent noise generation such as silencers, mufflers and 	Low (-)

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ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
		sound suppressing enclosures for parts/processes which can generate noise; and <ul style="list-style-type: none"> • Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise. 	
	Added impact of security lighting on surrounding landowners and nocturnal animals. Medium (-)	<ul style="list-style-type: none"> • Unnecessary lights should be switched off during the day and / or night to avoid light pollution; • If lighting is required, the lighting will be located in such a place and such a manner so as to minimise any impact on the surround community; and • Security lighting should be designed in such a way as to minimise emissions onto undisturbed areas on site and neighbouring properties. Light fittings should face downwards. 	Low (-)
	Increased dust pollution due to vegetation clearance and construction vehicles movement. Medium (-)	Reduce through controlling measures. <ul style="list-style-type: none"> • Dust suppression shall be implemented during dry periods and windy conditions; • All exposed surfaces should be minimised in terms of duration of exposure to wind and stormwater; • Excavation, handling and transportation of erodible materials shall be avoided under high wind conditions (excess of 35km/hr) / when visible dust plume is present; • Ensure that shortest routes are used for material transport; • Ensure that stockpile height is kept to a minimum and that any stockpiling occurs downwind of the stockpiles; • Minimise travel speed on paved roads; • Implement and actively monitor dust fallout generated in the 8 major wind directions on the borders of the site; and • Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed. 	Low (-)

Scoping Report

ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
	Windborne dust (soil), vehicle fumes and particulate matter PM10 altering air quality. Medium (-)	Reduce through controlling measures. <ul style="list-style-type: none"> • Dust suppression shall be implemented during dry periods and windy conditions; • All exposed surfaces should be minimised in terms of duration of exposure to wind and stormwater; • Excavation, handling and transportation of erodible materials shall be avoided under high wind conditions (excess of 35km/hr) / when visible dust plume is present; • Ensure that shortest routes are used for material transport; • Ensure that stockpile height is kept to a minimum and that any stockpiling occurs downwind of the stockpiles; • Minimise travel speed on paved roads; • Implement and actively monitor dust fallout generated in the 8 major wind directions on the borders of the site; and • Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed. 	Low (-)
	Potential dust pollution decreasing visibility on nearby routes. Medium (-)	Reduce through controlling measures. Refer to mitigation measures above.	Low (-)
	Generation of additional general waste, litter and building rubble and hazardous material during the construction phase. Medium (-)	Control through management measures. <ul style="list-style-type: none"> • The conditions of the Integrated Water Use License (IWUL) and the IWWMP must be implemented. • A central waste storage and transition area shall be established within the site camp; • The central waste storage and transition area shall be surfaced and demarcated appropriately; • Portable wheelie bins shall be placed throughout the site camp as well as at the remainder of the site and at all working areas in the field; • Wheelie bins shall be colour coded and labelled to identify the waste 	Low (-)

Scoping Report

ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
		stream for which it is intended; All portable wheelie bins and other containers shall be emptied at the central waste storage and transition area a minimum of once a week as to avoid waste build up; <ul style="list-style-type: none"> • The waste shall be removed (within 30 days) by a licensed waste service provider as shall be disposed of at a licensed waste landfill site and records of safe disposal (as required for hazardous wastes) shall be supplied to the Contractor. These records shall be kept on site by the ESM. • Wherever possible and practical, waste materials generated on site must be recycled; and • Waste specific (hazardous, timber, steel etc.) mitigation measures to be developed and included in the EMPR. 	
	Need for services i.e. water, electricity and sewerage systems during the construction phase causing additional strain on natural resources and service infrastructure. Very Low (-)	Reduce through controlling management measures. <ul style="list-style-type: none"> • Energy savings measures to be implemented at the mine, e.g.: <ul style="list-style-type: none"> ➢ No lights to be switched on unnecessarily. Only security lights to be switched on at night; • Energy saving bulbs to be installed; and • Water should be recycled as far as possible to avoid any additional water usage. 	Very Low (-)
	The change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic. Low (-)	Reduce through controlling management measures. <ul style="list-style-type: none"> • Where feasible heavy vehicles should not operate on public roads during peak hours; and • Mining will be limited to day light hours only; • Heavy vehicles should adhere to the speed limit of the road. 	Very Low (-)
	Deterioration of local roads used by heavy duty vehicles and the need for maintenance of road infrastructure. Low (-)	Reduce through controlling measures. <ul style="list-style-type: none"> • Dust suppression; • The mine should contribute to the regular maintenance of local roads. 	Very Low (-)

Scoping Report

ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, busses and other heavy vehicles. Low (-)	Prevent through controlling management measures. <ul style="list-style-type: none"> • Drivers will be enforced to keep to set speed limits. • Trucks will be in a road-worthy condition. • Roads and intersections will be signposted clearly. Only main roads should be used; • Where feasible vehicles should not operate on public roads during peak hours; • Vehicles should adhere to the speed limit of the road; • Heavy vehicles should always travel with their head lights switched on; • Heavy vehicles should not stop on the road to pick up hitchhikers – No stopping on the road approaching the mine will be allowed; • Single directional traffic shall be controlled through a stop-go system or any other appropriate traffic control method; • Brikor Limited shall be responsible for ensuring that suitable access is maintained for public traffic to all relevant businesses and properties; and • All traffic accommodation measures are to conform to the latest edition of the South African Road Signs Manual 	Very Low (-)
	Possibility of construction activities and workers causing veld fires, which can potentially cause injury and or loss of life to construction workers and surrounding landowners, visitors and workers. High (-)	Prevent through controlling management measures. <ul style="list-style-type: none"> • All workers will be sensitised to the risk of fire; • Smoking is only allowed in designated smoking areas and dispose of cigarette butts safely in sand buckets; • The Applicant shall ensure that the basic fire-fighting equipment is available on the site; • Extinguishers should be located outside hazardous materials and chemicals storage containers; Fire response and evacuation <ul style="list-style-type: none"> • An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the Applicant and conveyed to 	Very Low (-)

Scoping Report

ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
		all staff on the site; <ul style="list-style-type: none"> Identify major risks to minimise the environmental impacts e.g., air pollution and contaminated effluent runoff. 	
	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc. Medium (-)	Reduce through controlling management measures. Refer to the above mentioned mitigation measures for noise, dust and other environmental impacts.	Low (-)
	Increased risk to public health and safety: Dangerous areas and construction activities poses health risks and possible loss of life to construction workers and visitors to the site. If not fenced off, the public and workers may fall into excavated areas and trenches. High (-)	Prevent through controlling management measures. <ul style="list-style-type: none"> A health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996) should be drawn up and implemented to ensure worker safety; A health and safety control officer should monitor the implementation of the health and safety plan for the operational phase; Regular health and safety audits should be conducted and documented; and a record of health and safety incidents should be kept on site and made available for inspection; Any health and safety incidents should be reported to the Site Manager (SM) immediately; First aid facilities should be available on site at all times; Workers have the right to refuse work in unsafe conditions; Material stockpiles or stacks should be stable and well secured to avoid collapse and possible injury to site workers. Access to excavation sites must be controlled; Excavated areas should be temporarily fenced-off; and Excavations, such as pipeline excavations, will be backfilled and landscaped as soon as possible. 	Low (-)

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	Trespassing (migration) of workers onto adjacent properties. Medium (-)	Prevent through controlling management measures. <ul style="list-style-type: none"> A work session to be held with the Applicant to find a solution to the existing problem and to prevent an increase of the problem. 	Low (-) (if a suitable solution can be found).
	Potential creation of short term employment opportunities for the local communities, during the construction phase. Low (+)	<ul style="list-style-type: none"> Skills training to be in accordance with the approved Social and Labour Plan; Labourers should initially be sought locally and only regionally if skills are not available; and The approved Social and Labour Plan should be implemented. 	Low (+)
	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks. Low (-)	Prevent and control through management measures. <ul style="list-style-type: none"> Should culturally significant material or skeletal remains be exposed during development and construction phases, all activities must be suspended pending further investigation by a qualified archaeologist (Refer to the National Heritage and Resources Act, 25 of 1999 section 36 (6)). 	Very Low (-)
Operational Phase: Clearing of vegetation and topsoil by bulldozer/front-end-loader. Stockpiling of overburden in 2m high wind rows positioned for later rehabilitation.	Soil erosion and soil compaction by movement of heavy duty vehicles on site. Medium (-)	Reduce and remedy through controlling management measures. <ul style="list-style-type: none"> The approved stormwater management plan must be implemented; Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants; and Soils compacted, should be deeply ripped at least to a depth of 300mm to loosen compacted layers and re-graded to even running levels. 	Low (-)
Opencast mining using heavy duty earth moving equipment. After removal of overburden, benches are created by the effect of selective mining as well as by the limitation of the machinery regarding excavation depth. The maximum bench height	Contamination of soils by hydrocarbons from vehicles and equipment. Medium (-)	Prevent through controlling management measures. <ul style="list-style-type: none"> All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; All leaks will be cleaned up immediately using an absorbent material and spill kits, in the prescribed manner; and The approved Integrated Water and Waste Management Plan to be implemented. 	Low (-)

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is 3m. The low bench is served by a down ramp that is kept in close proximity to the working face. Excavator employed to remove clay. As and when coal is exposed after mining of clay, coal will be excavated in the same manner as the clay.		<u>Hydrocarbons and hazardous waste</u> <ul style="list-style-type: none"> All hazardous waste generated shall be kept separate and shall not be mixed with general waste; All hazardous waste shall be stored within a sealed drum on an impermeable surfaced area within the central waste storage and transition area; and Hydrocarbons to be stored within a bunded area at all times. 	
As and when sand is exposed, sand will be excavated.	Reduced crop growth. Medium (-)	<u>Remedy after the life of mine</u> <ul style="list-style-type: none"> Rehabilitation should be done carefully with reference to specialist guidelines in order to restore the land capability of the mining area, should it be economically feasible to do so. Further detailed mitigation measures will be provided by the specialist during the EIA Phase. 	Medium (-)
Loading, hauling and transport by truck of the clay to a stockpile close to the brick making factory to be used for the production of bricks.	Altered land forms – topography Medium (-)	<u>Remedy after the life of mine</u> <ul style="list-style-type: none"> Implementation, and monitoring of implementation of the rehabilitation plan. 	Low (-)
Raw coal will be transported to the Plant on the adjacent property where the coal will be washed and used as an energy resource. Sand will be transported to the Plant on the adjacent property for crushing, screening and washing and to be sold off as building sand. Deposition of waste rock onto waste rock dump at the adjacent Vlakfontein Quarry and storage, if	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase. Medium (-)	<u>Reduce and remedy through controlling management measures.</u> <ul style="list-style-type: none"> The Site Manager (SM) should ensure that excessive quantities of sand, silt and silt-laden water do not enter the stormwater system; Appropriate measures, e.g. erection of silt traps, or drainage retention areas to prevent silt and sand from entering drainage or watercourses, should be taken; No wastewater may run freely into any of the surrounding naturally vegetated areas; The loss of topsoil must be minimised; Erosion and subsequent siltation must be limited; Any drainage channels shall be suitably designed to ensure that erosion does not occur; All areas susceptible to erosion shall be protected and stabilisation 	Low (-)

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any. Maintenance of the pollution control dam and stormwater management system.		measures implemented; <ul style="list-style-type: none"> • Packing of sandbags, gabions, straw bales or brush to reduce the speed of water flow where water is scouring the topsoil and results in the formation of erosion gullies; • Any surface runoff generated which has a high suspended solid content shall be collected at the point source in an appropriate containment facility, then be allowed to settle before discharge into the environment; and • A stormwater management plan must be compiled; and should be approved by DWS and implemented. 	
	Contamination of stormwater runoff and ground water. Medium (-)	<p>Prevent through controlling management measures. In accordance with Government Notice 704 (GN 704), the onsite management should:</p> <ul style="list-style-type: none"> • Keep clean and dirty water separated; • Contain any dirty water within a system; and • Prevent the contamination of clean water. <p>In order to achieve these objectives, the following stormwater management measures must be implemented on the site to ensure that that potential stormwater impacts are kept to a minimum:</p> <ul style="list-style-type: none"> • Clean and dirty stormwater needs to be separated. Dirty stormwater may not be released into the environment and should be contained and treated on site; • The operation and maintenance of the stormwater and waste water containment facilities shall be done in accordance with the requirements of the Integrated Water Use License and Integrated Water and Waste Management Plan (IWWMP); • All temporary storm water infrastructure (if any) on-site shall be maintained and kept clean throughout the construction period; • Immediate reporting of any polluting or potentially polluting incidents so that appropriate measures can be implemented; 	Low (-)

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		<ul style="list-style-type: none"> • Fuel and oil spills shall be treated immediately by appropriate mop-up products. Several hydrocarbon absorption/remediation products (i.e. Spill kits) must be placed throughout the site; • Use of bunds or traps to ensure full containment of hydrocarbon and other hazardous materials are mandatory; • Any contaminated material is disposed of in an appropriate manner and the potential risks associated with such spills are limited; • Stormwater leaving the site must in no way be contaminated by any substance, whether such substance is a solid, liquid, vapour or gas or a combination thereof which is produced, used, stored, dumped or spilled on the premises; • All hazardous substances should be stored on impervious surfaces that allow for the containment of spills and leakages (e.g. bunded areas). Should spills occur, these should be reported to the Site Manager. • Liquid hazardous waste shall be contained and stored according to the prescribed measures; • Increased runoff should be managed using berms and other suitable structures as required to ensure flow velocities are reduced; and • Removal of spills, rainwater and waste produced during clean-up of the bunds – shall be done in accordance to relevant specifications. 	
	Acid Mine Drainage (AMD) in a watershed can be a consequence of mining coal or other mineral deposits. The acidity of coal mine drainage is caused primarily by the oxidation of the mineral pyrite, which is found in coal, coal overburden, and mine waste piles. The rate of pyrite oxidation depends on the following: reactive surface area of the pyrite, the oxygen concentration and pH of the water, the forms of pyrite,	Prevention and mitigation through control measures. <ul style="list-style-type: none"> • Groundwater monitoring; • Should AMD be detected, the neutralization of the contaminated area, utilising the appropriate chemicals will be undertaken; • No surface water to be allowed to flow out of the disturbed mining area, limiting possible surface water contamination. 	Low (-)

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	and the presence of Fe-oxidizing bacteria (<i>Thiobacillus ferroxidans</i>). Very high (-)		
	Impacts of dewatering on the groundwater aquifer should water be abstracted from ground water during the operational phase. Low(-)	Prevent through controlling management measures. <ul style="list-style-type: none"> Water should be recycled or obtained from Rand Water as far as possible to avoid any groundwater abstraction. 	Very Low
	Seepage from WRD could cause a contamination plume affecting the underground water resources. Medium (-)	Prevent through controlling management measures. <ul style="list-style-type: none"> Storage and classification of hazardous waste to be in accordance with the waste classification and management regulations GNR 634-635; Groundwater should be monitored on a quarterly basis to be able to detect any possible pollution caused by the WRD. Should water quality deteriorate, mitigation measures as specified by a specialist shall be implemented. 	Low (-)
	Disturbance and loss of fauna through noise, light and dust pollution and hunting, trapping and killing of fauna. Low (-)	Prevent or reduce through management measures. <ul style="list-style-type: none"> Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed; Any animals rescued or recovered will be relocated in suitable habitat away from the mining operations and associated infrastructure; Any lizards, snakes or monitors encountered should be allowed to escape to suitable habitat away from disturbance. No reptile should be intentionally killed, caught or collected during any phase of the project; and General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area. 	Very Low (-)
	Spreading of alien invasive species and bush encroachment of indigenous species.	Prevent and control through management measures. <ul style="list-style-type: none"> An alien vegetation management plan should be compiled and implemented; 	Low (-)

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	Medium (-)	<ul style="list-style-type: none"> Regular removal of invasive alien species should be undertaken. This should extend right through to the closure phase of the project; and No spread of alien vegetation onto adjacent properties should be allowed. 	
	Possibility of mining activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users. High (-)	Prevent and control through management measures. <ul style="list-style-type: none"> All workers will be sensitised to the risk of fire; Smoking is only allowed in designated smoking areas and dispose of cigarette butts safely in sand buckets; The Applicant shall ensure that the basic fire-fighting equipment is available on the site; and Extinguishers should be located outside hazardous materials and chemicals storage containers; Fire response and evacuation <ul style="list-style-type: none"> An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the Applicant and conveyed to all staff on the site; and Identify major risks to minimise the environmental impacts e.g. air pollution and contaminated effluent runoff. 	Very Low (-)
	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the mining site including the opencast areas. Medium (-)	Reduce through management measures. <ul style="list-style-type: none"> The structures need to be constructed in such a way that they are stable. The quarry face side slopes will be vegetated in order to blend in with the surrounding environment and reduce the visual impact. 	Low (-)
	Visibility of solid domestic and operational waste. Medium (-)	Reduce and control through management measures. <ul style="list-style-type: none"> Housekeeping principles on site should be enforced. 	Low (-)

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	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the mining operation. High (-)	Reduce and control through management measures. <ul style="list-style-type: none"> • Vehicles will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible; • Heavy vehicle traffic should be routed away from noise sensitive areas, where possible; • Noise levels should be kept within acceptable limits. All noise and sounds generated should adhere to South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies; • The Site Manager (SM) should take measures to discourage labourers from loitering in the area and causing noise disturbance; • Regular monitoring of noise levels at various, pre-determined locations. This will serve as the core of noise mitigation as it will enable the determination of problem areas; • Personal Protective Equipment to all persons working in areas where high levels of noise can be expected; Signs where it is compulsory; • Proper design of the plant areas and machinery where measures are taken to prevent noise generation such as silencers, mufflers and sound suppressing enclosures for parts/processes which can generate noise; and • Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise. 	Low (-)
	Blasting of coal may cause vibrations and noise nuisance as well as possible structural damage to surrounding buildings. High (-)	Mitigation through control and management measures. <ul style="list-style-type: none"> • Regular contact with neighbours is to be maintained by the operations management, and in the event of a complaint, the intensity of the vibrations caused by the blasting will be monitored, to ensure that vibrations are within acceptable standards. There are no immediate neighbours to the mine, the closest being the Marievale Golf Course Club House; and 	Low (-)

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		<ul style="list-style-type: none"> In the event that any complaints or comments are made regarding the blasting activities, the blasts will be monitored for ground vibration and air blast at three different monitoring points. 	
	Disturbance due to vibrations caused by vehicles. Low (-)	Reduce and control through management measures. <ul style="list-style-type: none"> All vehicles should be regularly serviced and maintained and kept in a good running condition; and Adequate planning practices should be implemented to avoid any unnecessary trips made by heavy vehicles. 	Very Low (-)
	Impact of security lighting on surrounding landowners and animals. Medium (-)	Reduce and control through management measures. <ul style="list-style-type: none"> Unnecessary lights should be switched off during the day and / or night to avoid light pollution; If lighting is required, the lighting will be located in such a place and such a manner so as to minimise any impact on the surround community; and Security lighting should be designed in such a way as to minimise emissions onto undisturbed areas on site and neighbouring properties. Light fittings should face downwards. 	Low (-)
	Increased dust pollution (soil and ore fines), vehicles on gravel roads, storage of overburden and waste rock, as well as other re-mining activities. High (-)	Reduce and control through management measures. <ul style="list-style-type: none"> Dust suppression shall be implemented during dry periods and windy conditions; Minimise travel speed by implementation of speed limits on paved roads; Implement and actively monitor dust fallout generated in the 8 major wind directions on the borders of the site; and Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed. 	Low (-)
	Increased windborne dust (soil and ore fines), vehicle fumes and particulate matter PM10 altering air quality.	Reduce and control through management measures. Refer to mitigation measures above.	Low (-)

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	High (-) Generation and disposal of additional general waste, litter and hazardous material during the operational phase and operational waste i.e. waste rock. High (-)	Reduce and control through management measures. <ul style="list-style-type: none"> • Mine management will compile and submit rehabilitation plans. After the plans are approved by the competent authority, they will be implemented. Monitoring and modelling of the groundwater will continue until a closure certificate is issued; • The closure strategy will be re-assessed to determine containment, treatment and/or re-use options through the monitoring and calibration of the groundwater model during the operational phase; and • Should monitoring results indicate potential decant or confirm the formation and movement of a pollution plume in the shallow aquifer, management, containment or treatment measures will be implemented to prevent impact on the receiving surface water and groundwater environment. 	Medium (-)
	Need for services e.g. water, electricity and sewerage systems, causing additional strain on natural resources and service infrastructure. Low (-)	Reduce and control through management measures. <ul style="list-style-type: none"> • Energy savings measures to be implemented at the mine, e.g.: <ul style="list-style-type: none"> ➢ No lights to be switched on unnecessarily. Only security lights to be switched on at night; • Energy saving bulbs to be installed; and • Water should be recycled as far as possible to avoid any additional water usage. 	Very Low
	The change in the traffic patterns as a result of increased traffic entering and exiting the operations on the surrounding road infrastructure and existing traffic. Low (-)	Reduce and control through management measures. <ul style="list-style-type: none"> • Where feasible heavy vehicles should not operate on public roads during peak hours; and • Heavy vehicles should adhere to the speed limit of the road. 	Very Low (-)
	Nuisance, health and safety risks caused by increased traffic on an adjacent to the study area including cars and heavy	Prevent through management measures. <ul style="list-style-type: none"> • Drivers will be enforced to keep to set speed limits. • Trucks will be in a road-worthy condition. 	Low (-)

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	vehicles. Medium (-)	<ul style="list-style-type: none"> Roads and intersections will be signposted clearly. Only main roads should be used; Where feasible vehicles should not operate on public roads during peak hours; Heavy vehicles should always travel with their head lights switched on; Heavy vehicles should not stop on the road to pick up hitchhikers – No stopping on the road approaching the mine will be allowed; Single directional traffic shall be controlled through a stop-go system or any other appropriate traffic control method; Brikor Limited shall be responsible for ensuring that suitable access is maintained for public traffic to all relevant businesses and properties; and All traffic accommodation measures are to conform to the latest edition of the South African Road Signs Manual 	
	Deterioration of local roads used by heavy duty vehicles and the need for maintenance of road infrastructure. Low (-)	Reduce through controlling measures. <ul style="list-style-type: none"> Dust suppression; The mine should contribute to the regular maintenance of local roads. 	Very Low (-)
	Possibility of construction activities and workers causing veld fires, which can potentially cause injury and or loss of life to construction workers and surrounding landowners, visitors and workers. High (-)	Prevent through controlling management measures. <ul style="list-style-type: none"> All workers will be sensitised to the risk of fire; Smoking is only allowed in designated smoking areas and dispose of cigarette butts safely in sand buckets; The Applicant shall ensure that the basic fire-fighting equipment is available on the site; Extinguishers should be located outside hazardous materials and chemicals storage containers; Fire response and evacuation <ul style="list-style-type: none"> An Emergency Plan (including Fire Protection, Response and 	Very Low (-)

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		Evacuation Plan) is to be prepared by the Applicant and conveyed to all staff on the site' Identify major risks to minimise the environmental impacts e.g., air pollution and contaminated effluent runoff.	
	Increased risk to public health and safety: Dangerous areas including the opencast mining areas poses health risks and possible loss of life to mine workers and visitors to the site. Very High (-)	Prevent through management measures. <ul style="list-style-type: none"> • A health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996) should be drawn up and implemented to ensure worker safety; • A health and safety control officer should monitor the implementation of the health and safety plan for the operational phase; • Regular health and safety audits should be conducted and documented; and a record of health and safety incidents should be kept on site and made available for inspection; • Any health and safety incidents should be reported to the Site Manager (SM) immediately; • First aid facilities should be available on site at all times; • Workers have the right to refuse work in unsafe conditions; and • Material stockpiles or stacks should be stable and well secured to avoid collapse and possible injury to site workers. 	Low (-)
	Trespassing (migration) of workers onto adjacent properties. High (-)	Prevent through management measures. <ul style="list-style-type: none"> • A work session to be held with the Applicant to find a solution to the existing problem and to prevent an increase of the problem. 	Low (-) (if a suitable solution can be found).
	A slow-moving and often destructive mass of mud flowing down a slope (stockpiles and overburden) could result if not managed properly. High (-)	Prevent and mitigate through control measures. <ul style="list-style-type: none"> • Stockpiles must be kept within the required height of not more than 2 m and must be protected from surface run-off by berms and inspected monthly; • A berm is to be constructed around the mining property and in the event of a mudslide taking place from stockpiles and overburden; it will be contained on site. Clay, stone and coal stockpiles are to be 	Low (-)

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		fenced off and will continually be removed for use at the brickmaking plant. The stockpiles therefore vary in size.	
	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc. High (-)	Reduce through management measures. Refer to the above mentioned mitigation measures for noise, dust and other environmental impacts.	Low (-)
	Employment provision. Very High (+)	Proceed with the proposed activity.	Very High (+)
	Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time. Medium (+)	None	Medium (+)
Closure and Post-Closure Phases	Due to the closure phase overlapping with the operational phase, all of the impacts described above will be applicable to the closure phase as well. Very Low – Very High (-)	Refer to the above mitigation measures for impacts during the operational phase.	Although it is expected that impacts can be mitigated to acceptable levels, there is still a low to medium overall risk for negative impacts on the bio-

Scoping Report

ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
	Soil erosion High (-)	Prevent, reduce and remedy through management measures. <ul style="list-style-type: none"> • The slopes of the opencast mining area and berms will be benched and vegetated as soon as possible. The slopes will be seeded with the recommended seed mix at the onset of the wet season to reduce erosion by wind or water; • The side slopes will be vegetated concurrent with its development. After closure, the surface of open areas, after being backfilled, will be topsoiled to a thickness of at least 300mm. The surface area will be re-vegetated with the recommended seed mix; • During decommissioning, the waste rock dump will be capped by placing of a 300 mm clay layer over shaped areas. This will reduce infiltration of surface water into the dump and will reduce shaping and closure costs of the dump at mine closure; and • Mine management will compile and submit rehabilitation plans. After the plans are approved by the competent authority, they will be implemented. 	physical and socio-economic environment. Low (-)
	Reduced crop growth. Medium (-)	Remedy after the life of mine <ul style="list-style-type: none"> • Rehabilitation should be done carefully with specialist guidelines in order to restore the land capability of the mining area, should it be economically feasible to do so. • Further detailed mitigation measures will be provided by the specialist during the EIA Phase. 	Low (-)
	Seepage from the quarry and WRDs could cause a contamination plume affecting the underground water resources. High (-)	Prevent through management measures. <ul style="list-style-type: none"> • Storage and classification of hazardous waste to be in accordance with the waste classification and management regulations GNR 634-635; • Groundwater should be monitored on a quarterly basis to be able to 	Low (-)

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ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
		detect any possible pollution caused by the WRDs and opencast mining. Should water quality deteriorate, mitigation measures as specified by a specialist shall be implemented.	
	Ground water pollution High (-)	Prevent through management measures. <ul style="list-style-type: none"> • Mine management will compile and submit rehabilitation plans. After the plans are approved by the competent authority, they will be implemented. Monitoring and modelling of the groundwater will continue until a closure certificate is issued; • The closure strategy will be re-assessed to determine containment, treatment and/or re-use options through the monitoring and calibration of the groundwater model during the operational phase; and • Should monitoring results indicate potential decant or confirm the formation and movement of a pollution plume in the shallow aquifer, management, containment or treatment measures will be implemented to prevent impact on the receiving surface water and groundwater environment. 	Low (-)
	Generation and disposal of additional hazardous operational waste i.e. waste rock. Medium (-)	Reduce and control through management measures. <ul style="list-style-type: none"> • Refer to the above mentioned mitigation measures. 	Low (-)
	Acid Mine Drainage (AMD) in a watershed can be a consequence of mining coal or other mineral deposits. The acidity of coal mine drainage is caused primarily by the oxidation of the mineral pyrite, which is found in coal, coal overburden, and mine waste piles. The rate of pyrite oxidation depends on the following: reactive surface area of the pyrite, the oxygen concentration	Prevention and mitigation through control measures. <ul style="list-style-type: none"> • Groundwater monitoring; • Should AMD be detected, the neutralization of the contaminated area, utilising the appropriate chemicals will be undertaken; No surface water to be allowed to flow out of the disturbed mining area, limiting possible surface water contamination.	Low (-)

Scoping Report

ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
	and pH of the water, the forms of pyrite, and the presence of Fe-oxidizing bacteria (<i>Thiobacillus ferrooxidans</i>). Very high (-)		

12. Other Information required by the competent Authority

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

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

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix 2.19.1 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

A Social and Labour Plan (SLP) have been developed for the Grootfontein Mine, which will be submitted with the EIA/EMP.

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

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

Not applicable to this application.

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

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

Not applicable to this application.

j) UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I, Corrie Retief herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report

Signature of the EAP

DATE:

k) UNDERTAKING REGARDING LEVEL OF AGREEMENT

I, Corrie Retief, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

Signature of the EAP

DATE:

-END-

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