

**TJA NALEDI BARAGE SAND MINE
Fezile Dabi Municipal District
Free State Province**

DRAFT ECONOMIC IMPACT REPORT

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22 January 2019

NON-TECHNICAL SUMMARY

INTRODUCTION

This Economic Impact Assessment Report is one of the additional specialist studies requested by the Department of Mineral Resources (DMR) in 2018 for the Basic Assessment Report (BAR) process being conducted for the Tja Naledi Barrage Sand Mine, located along the banks of the Vaal River, on the northern boundary of the Ngwanthe Local Municipality in the Fezile Dabi Magisterial district, Free State Province. The original application was for a sand mining right only that included the development of the required Environmental Management Programme (EMPr), which was undertaken by Dorean Environmental in 2016. The BAR for the amendment of Tja Naledi's existing mining right (the current BAR process) is being undertaken by Greenmined and was initiated in 2017.

This amendment application is being conducted in order to add gravel to the existing sand mining right, as well as update the EMPr to include the processing (crushing and screening) activities for these expanded operations. The additional social and economic studies were requested by the DMR after the second draft of the BAR was reviewed by the public, during which many concerns about the public participation process and the social and economic impacts were raised by a large number of local Interested and Affected Parties (IAPs).

The objective of this Economic Impact Assessment is to identify and assess the potential beneficial and detrimental economic impacts of the proposed amendment to the existing Tja Naledi Barrage sand mining right. The significance of the impacts are rated, with and without mitigation, and some preliminary indications of potential and options on practical measures that could be implemented to avoid and minimise the detrimental impacts and enhance the benefits. The cumulative impacts of all three identified mines in the area are also assessed.

While it has not been possible to undertake a strategic economic assessment of suitable land use developments for this area (as requested by the local Federation for Sustainable Environment (FSE) during the assessment process), this Economic Impact Assessment has gone beyond the normal scope of assessing the positive economic impacts of the proposed mining amendment, and considered the negative economic impacts it (together with the other neighbouring mining developments) could have on other existing land uses and developments in the immediate vicinity of the mining development which is the subject of this assessment.

A variety of existing secondary data sources were used, together with some primary interview research with key local stakeholders in the property, tourism and agriculture sectors, to undertake this assessment.

DESCRIPTION OF PROPOSED MINING AMENDMENT

Tja Nalendi Beafase Investment Holdings (Pty) Ltd. (The Applicant), operating as Barrage Bulk Sand Mine (BBSM) currently holds a Mining Right and approved EMPr for Portion 4 of the farm Woodlands 407, situated within the in the Ngwathe Local Municipality in the Fezile Dabi Magisterial district, Free State Province. An Environmental Impact Assessment (EIA) was conducted in 2014 and the Mining Right awarded to the Applicant in 2016. Under the current mining right the Applicant is permitted to conduct strip mining of silica sand. The Applicant wishes to amend their mining right to include aggregate and the EMPr to include processing (crushing and screening).

NEED AND DESIRABILITY

The need and desirability of the mining right amendment application can be summarised as follows:

- The project site has high quality silica deposits which are located adjacent to, rather than in the current river course. This will minimize the potential for impacts on the Vaal River itself.
- The sources of natural gravel in South Africa are scarce and therefore necessitates the manufacturing of gravel from the processing of suitable rocks.
- The ease of extracting the sand and the location of the mine close to major urban centres (of demand) and good major road networks enhances the economic viability of the sand mining venture.
- The expansion of the mining right to include the production of gravel could improve the financial viability of this mining venture.
- The continued shrinkage and lack of growth in the mining and construction sectors, combined with increasing input costs, puts the economic viability of such mines into question.
- The lack of information on the number and type of sand mines in the locality and along the Vaal River, and consequently on the local supply and demand for sand and potential cumulative impacts, makes it difficult to assess whether the authorisation of this mining application should be allowed.
- The proposed mining amendment will not displace any existing agricultural activities on the woodlands farm, but it may impact negatively on neighbouring farms due to dust, safety, road and traffic impacts.
- The imposition of onerous environmental mitigation measures to minimize impacts on neighbouring economic and social activities will increase the costs for the mining venture and potentially undermine its economic viability.
- The location of the mine adjacent to two other sand mines (one of which is still under assessment) also poses a threat to the economic viability of the mine due to competition.
- The mine provides minor employment and empowerment benefits to people who are not living in the immediate area, and at the same time has potentially significant negative economic impacts on

other existing economic activities in the area immediately around the mine that could result in many more jobs being lost than being created.

DESCRIPTION OF THE LOCAL CONTEXT

As evident from the large number of IAPs registered for this environmental authorisation process, (i.e 1237 non-government IAPs registered and contributed to the Public review of the Draft, and 19 different government bodies/authorities were consulted). This is a consequence of a number of particular characteristics of the area:

1. A large number of existing eco-tourism businesses and residential areas along the banks of the Vaal River, onto which the mining property borders.
2. The introduction of industrial type developments in a largely quiet scenic rural area with numerous neighbouring residential and eco-tourism developments, and productive farms.
3. The location of the Tja Naledi mine adjacent to one other sand mine (Sweet Sensations) located immediately adjacent to a settlement and many eco-tourism developments, of which was only authorised and initiated in the last year or two, and another mine current under application (Pure Source).
4. The resent and obvious cumulative visual, dust, health, noise and traffic impacts on neighbouring residents and businesses as a consequence of the Sweet Sensations mine.
5. The location of the mine in an area which marks the boundary of three different local Municipalities, one in the Free State Province (Ngwathe Local Municipality, which forms part of the Fezile Dabi District Municipality), another in the Gauteng province (the Emfuleni Local Municipality within the Sedibeng District Municipality) and the third in the North West Province (JB Marks Local Municipality within the Dr Kenneth Kaunda District Municipality).

The following are the kinds of land uses and developments around the three above mentioned sand mines.

Vaaloewer Residential and Tourism Development

Vaaloewer is a residential development, and proclaimed town, that was first established in 1979 on a 600ha farm. It is located north west of just over 3,4 ha away from the Tja Naledsi mine, on the opposite bank of the Vaal River and falls within the Gauteng Province. It has over 900 residential sites and larger commercial sites along the river bank. An estimated 300 houses have been built in Vaaloewer with new building continuing at a rate of around 5 houses per year. There are still around 600 undeveloped vacant plots, 95 of which are listed on the Property 24 website for sale. Local informants indicated that about 50% of the houses are owned and occupied by permanent residents, many of whom are retired people. The other 50% are owned by people who live in the nearby cities and metropolises and use them as weekend and holiday houses. The

estimated (Municipal) value of the residential properties in this area was reported to be R450 million. Recently, the provincial government invested R8 million rand in the construction of a water extraction, purification and storage facility for the Vaaloewer residential area.

Eco-Tourism Developments along the Vaal River

Ecotourism is a major economic activity in the study area, particularly for the many small-holding properties along the banks of the Vaal River. The opportunities for water sports along the section of river adjacent to the Barrage mine were also enhanced in this area due to the Vaaloewer development and its construction of a weir (barrage) over the river just downstream of the settlement. This allowed the water to dam up behind the weir and make it possible for boating. There is a boat club at Vaaloewer with 210 members, 89 of whom were active in 2017 and 72 in 2018. The Goose Bay Canyon Boat Club has 20 boat garages that are hired out and 24 accommodation units that are privately owned. There are 11 different private eco-tourism lodges and resorts able to accommodate around 300 people within Vaaloewer and immediately adjacent to it. Some of these include popular conference and wedding venues. There are other tourism resorts both upstream and downstream of Vaaloewer. Visitors tend to come mostly on the weekends and over school holidays, and more in the summer than the winter. Weekend occupancy rates vary around 60-80%, with one wedding venue virtually 100% occupied. If we take the seasonal variation of visitors into account and calculate the annual turnover from all these businesses based on a 45% occupancy for weekend and holiday periods, this amounts to a conservative estimate of R10,5 million per annum. A 60% occupancy would amount to R14 million. The number of persons employed by these establishments is not known but conservatively estimated to be around 60 people.

Agriculture

Much of the land around the study area is used for agricultural production, both livestock farming and the cultivation of crops. These include the cultivation of grain crops and the intensive farming of cattle, sheep and chickens. There is also a large dairy farm in this area. It is considered to be a very good farming area that has quite reliable rainfall that is well spread through the growing season. The 2017/8 season was a record year for the farmers, and the current year is also looking promising so far. The close proximity of this area to the country's main urban centres also provides a large demand and easy access to markets for agricultural products. The Chairperson of the Parys Farmers Association, indicated that the farmers in this area are doing well with low debt levels. The average size of farms in this area is in the region of 800 to 1000 ha, but there are also very large farms up to 10 000ha.

IMPACTS AND CONCLUSIONS

A total of 10 economic impacts were identified (see Table 1 below). These were grouped into positive impacts associated with the Mine and negative impacts on other sectors associated with the mine. Because this is a

small mine and the proposed amendments are minor, three of the four positive impacts associated with the mine amendment are low and one is medium. These increase to medium and medium high benefits for the cumulative impact of all the mines.

The assessment found that the mine(s) are already having a considerable impact on the existing residential tourism and agricultural sectors and that these are likely to escalate substantially if the Pure Source and Tja Naledi mining right applications are approved. The six negative impacts of the Tja Naledi mine on other existing economic activities range from Medium to High. These will mostly increase to High in the case of the cumulative impacts of all the mines.

Table 1: Summary of Preliminary potential Social & Economic Impacts

| # | Impact | Rating Without Mitigation | Rating With Mitigation | Cumulative Impact Rating |
|--|--|---------------------------|------------------------|--------------------------|
| POSITIVE IMPACTS OF THE MINE | | | | |
| 1 | New jobs created | Low | N/A | Med High |
| 2 | Positive Direct and Indirect Economic Impacts | Med | N/A | Med High |
| 3 | Empowerment Benefit | Low | N/A | Medium |
| 4 | Supply of sand & gravel to the construction industry | Low | N/A | Medium |
| NEGATIVE IMPACTS OF THE MINE ON OTHER ECONOMIC ACTIVITIES | | | | |
| 5 | Existing tourism jobs lost | Med | Med | Med High |
| 6 | Negative indirect economic impacts associated with Tourism decline | Med High | Med | High |
| 7 | Empowerment loss – loss of school and STEM campus to area | Med | Med | High |
| 8 | Loss of Property Values | Med | Med | High |
| 9 | Traffic Impacts – increasing costs | High | Med | High |
| 10 | Agricultural Impacts | Med | Med | High |

Some potentially effective mitigation measures have been recommended as a means to minimize the negative visual, noise, dust and traffic impacts on existing economic activities and residents, but there are doubts about the potential of Tja Naledi and the other mines to effectively implement these. These doubts arise from uncertainty about the potential for DMR to be able to have the EMP for the Sweet Sensations Mine amended retrospectively, and the inadequate attention paid to the social and economic impacts of the current Pure Source mining application. In addition, it is clear from the market analysis that most sand mines are struggling to remain profitable, with increasing input costs and low prices due to high competition and low demand. This economic situation will make it difficult for the sand mines to comply with onerous environmental mitigation measures aimed at minimizing the visual, noise, dust and traffic impacts. Effective mitigation of many of the impacts will also require the cooperation of the key stakeholders.

RECOMMENDATIONS

It is recommended that the DMR carefully consider how they will ensure the effective management of the cumulative impacts of sand mining in this and other areas along the Vaal River. To do this, it will be necessary

to develop a regional perspective on the existing sand and gravel mines as well as the applications for mining rights, and develop a regulatory strategy that can manage the number of mines in each locality and the economic impacts on other economic activities. There have been calls by ASPASA (The Aggregate and Sand Producers Association of Southern Africa <https://aspasa.co.za/>) for special regulations for them (separate to those for large mines) which take into account their needs as small, marginal and dispersed quarries in rural areas. This seems like a good opportunity to collaborate to find a viable standard way to enable and at the same time effectively regulate the industry without putting them out of business. This may also serve to “level the playing field” between different sand mining companies and improve the management of negative social, health and economic impacts associated therewith.

With respect to the current applications by Tja Naledi and Pure Source, the economic impacts of these mines on existing economic activities and the marginal economic situation for these mines, suggests that it would not be appropriate to approve these mining applications at this stage. Alternatively, they could be approved subject to the mitigation measures recommended and included in their EMPs) if and **when** the mine’s business financials are proven to be viable (given the market context) and can cover the cost of the mitigation measures that are needed to minimise the visual, noise, dust and traffic impacts. This may encourage the mining companies to look for sand mining opportunities in areas where the visual, noise, dust and traffic impacts are likely to be of much lower significance.

REVISIONS TRACKING TABLE

This Report should be cited as follows: CES Environmental & Social Services, Jan 2018, Tja Naledi Barrage Sand Mine, *Draft Economic Specialist Study*, CES, Cape Town.



EOH Coastal and Environmental Services

Report Title: Tja Naledi Barrage Sand Mining Amendment Application, *Draft Specialist Scoping Phase Study*

Report Version: Draft 1

| Name | Responsibility | Date |
|--------------|----------------|------------|
| Maura Talbot | Author | 15/01/2019 |
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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---------------|---|
| ASPASA | Aggregate and Sand Producers Association of Southern Africa |
| CES | CES Environmental & Social Services |
| EA | Environmental Authorisation |
| EIA | Environmental Impact Assessment |
| EMF | Environmental Management Frameworks |
| EMPr | Environmental Management Programme |
| FSE | Federation for a Sustainable Environment |
| IAPs | Interested and Affected Parties |
| IDPs | Integrated Development Plan |
| LM | Local Municipality |
| NEMA | Environmental Management Act |
| PoS | Plan of Study |
| SDF | Spatial Development Frameworks |
| SEA | Strategic Environmental Assessment |
| SEIA | Socio-Economic Impact Assessment |
| ToR | Terms of Reference |

1. INTRODUCTION

1.1. BACKGROUND

This Socio Economic Impact Assessment (SEIA) Report is one of the additional specialist studies requested by the Department of Mineral Resources (DMR) in 2018 for the Basic Assessment Report (BAR) process being conducted for the Tja Naledi Barrage Sand Mine, located along the banks of the Vaal River, on the northern boundary of the Ngwanthe Local Municipality in the Fezile Dabi Magisterial district, Free State Province. The other is the Social Impact Assessment being undertaken by Enviroworks. The original mining right application was for a sand mining right only that included the development of the required Environmental Management Programme (EMPr), which was undertaken by Dorean Environmental in 2016. The BAR for the amendment of Tja Naledi's existing mining right (the current BAR process) is being undertaken by Greenmined and was initiated in 2017. This amendment application is being conducted in order to add gravel to the existing sand mining right, as well as update the EMPr to include the processing (crushing and screening) activities for these expanded operations. The additional social and economic studies were requested by the DMR after the second draft of the BAR was reviewed by the public, during which many concerns about the public participation process and the social and economic impacts were raised by a large number of local Interested and Affected Parties (IAPs).

1.2. PROJECT OVERVIEW

Tja Naledi Beafase Investment Holdings (Pty) Ltd. (The Applicant), operating as Barrage Bulk Sand Mine (BBSM) currently holds a Mining Right and approved EMPr for Portion 4 of the farm Woodlands 407, situated within the in the Ngwathe Local Municipality in the Fezile Dabi Magisterial district, Free State Province. An environmental impact assessment (EIA) was conducted in 2014 and the Mining Right awarded to the Applicant in 2016. Under the current mining right the Applicant is permitted to conduct strip mining of silica sand. The Applicant wishes to amend their mining right to include aggregate and the EMPr to include processing (crushing and screening).

1.3. OBJECTIVE OF THIS SOCIO-ECONOMIC IMPACT ASSESSMENT

The objective of this SEIA is to identify and assess the potential beneficial and detrimental economic impacts of the proposed amendment to the existing Tja Naledi Barrage sand mining right. The significance of the impacts are rated, with and without mitigation, and some preliminary indications of potential and options on practical measures that could be implemented to avoid and minimise the detrimental impacts and enhance the benefits. The cumulative impacts of all three mines in the area are also assessed.

There were specific requests by some of the IAPs earlier in the BAR process for this mining right amendment

application for the economic and social impacts to be further investigated and taken into consideration in the impact assessment and the authorisation processes. The box below provides an extract of a comment received from the CEO of the Federation for a Sustainable Environment (FSE) – questioning whether an adequate economic assessment had been undertaken and outlining what they believed was necessary in order to adequately assess the economic impacts of the existing and proposed mines and mining amendments.

This comment has been taken into consideration in undertaking this SEIA. However, what is expected in this submission from the FSE is far beyond the legally required scope for an economic specialist study which forms part of an environmental authorisation application for a specific development. What the FSE are asking for and expecting, is what would normally be incorporated into a Strategic Environmental Assessment and a Spatial Planning Framework development process at a municipal or regional level or for a particular economic sector or new technology. It is far too onerous to impose the commissioning of such a substantial strategic assessment on one small developer applying for authorisation. This is a task which the Local and District Municipalities are legally required to undertake as part of their planning processes, namely a Spatial Development Framework (SDF). Unfortunately, in the case of this Local Municipality they have not yet developed their SDF.

While it has not been possible to undertake a Strategic economic assessment of suitable land use developments for this area, this Economic Impact Assessment has gone beyond the normal scope of assessing the positive economic impacts of the proposed mining amendment, and considered the negative economic impacts it (together with the other neighbouring mining developments) could have on other existing land uses and developments in the immediate vicinity of the mining development which is the subject of this assessment.

Box 1: Extract from submission questioning whether an adequate Economic Impact Assessment was undertaken for the Tja Naledi Barrage Sand Mine amendment application, from the local Federation for a Sustainable Environment (FSE) – dated 20 Sept 2018.

In order to ripen our judgment, we kindly request:

1. Whether a full economic evaluation of the mining of sand and gravel compared with other reasonable/feasible alternative land uses, was undertaken showing that the mining of sand, gravel, etc. would be the optimum sustainable land use in the proposed area.
2. Whether the mining is the Best Practical Environmental Option in terms of the NEMA's principles and that there are no alternative deposits or reserves of sand and gravel that could be exploited in areas that are less sensitive.
3. An assessment of the opportunity costs, e.g.
 - a. Understanding the value of the foregone opportunities;
 - b. The achievement of the desired aim/goal for the specific area;
 - c. Optimising of positive impacts;
 - d. Minimising of negative impacts;

- e. Equitable distribution of impacts; and
 - f. The maintenance of ecological integrity and environmental quality
4. Whether a cost/benefit analysis has been undertaken, which ought to take into account the loss to the environment, the impact on sense of place, the impacts upon eco-tourism and tourism and an evaluation of the financial costs of these impacts.
 5. A detailed assessment and evaluation of the potential direct, indirect and cumulative impacts of sand mining in this area since this application is one of many.
 6. Whether mining in this area is the optimal land use and whether the significance of unavoidable impacts on biodiversity and current land use and sense of place are justified.

1.4. TERMS OF REFERENCE

The scope of work for the socio-economic impact assessment is as follows:

- Describe the methodology and data used to assess the socio-economic impacts of the proposed development
- Describe the local social environment, with particular reference to the communities that will be directly affected by the project.
- Determine the current land use of the development area and the areas outside of the development boundary that are likely to be affected.
- Describe and investigate possible economic effects of the proposed development on local economic activities and land uses.
- Consult with the relevant Stakeholders and Interested and Affected parties to identify issues, concerns, potential impacts and mitigation options.
- Assess the significance of potential economic impacts on the local populace and the surrounds, with and without mitigation.
- Identify, describe and assess potential mitigation measures that can avoid or minimise the detrimental impacts and optimise the benefits.
- Provide a reasoned opinion on the need, desirability, and acceptability of the proposed development and its alternatives, and whether it should be authorised, and under what conditions.

1.5. THE STUDY TEAM

A copy of the team member's CVs are included in Appendix 1 and a copy of a signed declaration by the specialist in Appendix 2.

Maura Talbot – Socio-Economic Specialist and Report Author

Maura is an experienced public facilitator and socio-economic and environmental consultant, researcher, and academic with over twenty years of experience working in South Africa and other African Countries. She has a Master of Arts Degree in Human Geography with distinction, and two BA Honours degrees, one in

Human Geography and another in Economics. Her research has had a strong policy and applied character and covered the fields of land reform, history of land use change in rural areas, rural development, community based natural resources management, integrated conservation and development projects, parks and neighbours projects, afforestation and fisheries development projects, and environmental, climate change and water/catchment management policy. As a senior socio-economic and environmental consultant for EOH Coastal and Environmental Services (CES) and other clients for 20 years she worked on a number of assessment projects, including Strategic Environmental Assessments (SEAs) related to mining developments, conservation, forestry and municipal spatial planning; Environmental Impact Assessments (EIAs) for roads, mines, biofuel estates, golf courses, conservation, tourism, and residential developments, facilitated stakeholder engagement processes for various EIA and SEA projects; qualitative and quantitative socio-economic surveys and monitoring; Social Impact Assessments (SIA), Resettlement Action Plans (as per IFC guidelines) and Economic Impact Assessments. These were for projects in South Africa, Madagascar, Mozambique, Malawi, Sierra Leone and Egypt. More recently, Maura undertook policy related research around incentive schemes for the restoration of catchment areas in the Eastern Cape Province of SA. This work explored carbon trading and water policies and the potential to use market mechanisms to facilitate social change. She also worked for five years as a lecturer in Environmental Science at Rhodes University and taught courses in Environmental Management, Socio-Ecological System Dynamics and Global Environmental Issues (including climate change science and policies). All of this work has allowed her to develop considerable skills in research, data analysis, writing, project design and proposal writing, project management, project evaluation, fund raising and stakeholder engagement. Developing her skills in compassionate communication and facilitating collaboration has become a particular interest for her in recent years.

Micheal Johnson - Mapping

Michael holds a BSc in Geoinformatics, a BSc (Hons) cum laude in Geoinformatics and an MSc in Geoinformatics from Stellenbosch University. Michael's Master's thesis examined the use of Remote Sensing and computer vision technologies for the extraction of near-shore ocean wave characteristic parameters. For the duration of his Master's, he was based at the CSIR in Stellenbosch. During this time, in addition to his Master's studies, he conducted work in collaboration with the CSIR Coastal Systems Research Group and provided GIS and Remote Sensing tutoring and technical assistance to the junior staff and fellow students. Michael graduated in March 2018 and has been working for CES since.

1.6. METHODOLOGY

This specialist economic assessment of the amendment to the Tja Naledi sand mining right, was largely a desk top study that relied on existing secondary and primary data. This secondary data was supplemented by existing literature on the study area and economy, as well as literature on national and regional policies,

and the sand industry nationally and internationally. In addition to this desk top review of existing information, additional data on local property markets, tourism and agricultural activities was sourced from key local informants such as estate agents, tourism business owners and farmers, and a review of the minutes of all the public meetings and stakeholder submissions made held as part of the BA process. The methodology adopted for the assessment of the significance of the impacts is the standard methodology applied for all EIA's in compliance with the requirements of NEMA. These are described in more detail in Chapter 8 of this report.

1.7. ASSUMPTIONS AND LIMITATIONS

- The proponent, Tja Naledi, and their engineers have provided accurate information on their existing mining activities and rights, and the proposed amendments.
- While there was specific economic data (ie employment, capital investments and operational incomes and costs) for the Tja Naledi Sand mine, similar project data was not available for the other neighbouring mines, or for the large number of neighbouring tourism and agricultural businesses. While an attempt was made to estimate the value of these other economic activities using a variety of data sources, there is far less certainty about the accuracy of these estimates.
- There is no reliable quantified data on population, employment and production for the specifically affected local areas and communities, as these form small parts of larger Wards and Municipalities. This made it difficult to make reliable assessments of economic impacts.
- Given the small size of the sand mine, it is not possible or appropriate to use input-output economic models to estimate the economic impact of the proposed mine amendment on the regional and national economy.

2. ADHERENCE TO THE NEMA EIA REQUIREMENTS FOR SPECIALIST STUDIES

The Environmental Impact Assessment (EIA) Regulations, promulgated in terms of the National Environmental Management Act (NEMA, Act no. 107 of 1998 as amended) dated 8th of December 2014, were amended on the 7th of April 2017. In terms of Appendix 6 of the Amended EIA Regulations (2014 and subsequent 2017 amendments), a Specialist Report must contain all the information necessary for a proper understanding of the nature of issues identified. The table below provides a list of all the information needed in a Specialist report and the right hand column of this table indicates the relevant sections of this Report that address these requirements.

| (1) A SPECIALIST REPORT PREPARED IN TERMS OF THE AMENDED NEMA EIA REGULATIONS (2014 AND SUBSEQUENT 2017 AMENDMENTS) MUST CONTAIN – | Relevant sections of this Report |
|--|--|
| (a) Details of- (i) The specialist who prepared the report; and (ii) The expertise of that specialist to compile a specialist report including a curriculum vitae; (b) A declaration that the specialist is independent in a form as may be specified by the competent authority; | <i>Chapter 1, Sections 1.5, & Appendix A</i> |
| (c) An indication of the scope of, and the purpose for which, the report was prepared; | <i>Chapter 1</i> |
| (cA) An indication of the quality and age of the base data used for the specialist report; | <i>Chapter 1</i> |
| (cB) A description of the existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change; | <i>Chapter 8</i> |
| (d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment; | <i>N/A</i> |
| (e) A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used; | <i>Chapter 1, Section 1,6</i> |
| (f) Details of an assessment of a specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure inclusive of a site plan identifying alternatives; | <i>Chapter 5</i> |
| (g) An identification of any areas to be avoided, including buffers; | <i>Not Applicable</i> |
| (h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers; | <i>Not Applicable</i> |
| (i) A description of any assumptions made and any uncertainties or gaps in knowledge; | <i>Chapter 1</i> |
| (j) A description of the findings and potential implications of such findings on the impact of the proposed activity or activities; | <i>Chapter 9</i> |
| (k) Any mitigation measures for inclusion in the EMPr; | <i>Chapter 8, Section 8.2.3</i> |
| (l) Any conditions for inclusion in the environmental authorisation; | <i>Section 8.2.3</i> |
| (m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation; | <i>Not Applicable</i> |
| (n) A reasoned opinion- (i) Whether the proposed activity, activities or portions thereof should be authorised; and (iA) Regarding the acceptability of the proposed activity or activities, and (ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan; | <i>See section 8.2.3 for recommended mitigation measures And 9.2 for general recommendations on authorisation.</i> |
| (o) A description of any consultation process that was undertaken during the course of preparing the specialist report; | <i>Chapter 1 Section 1.6 and Chapter 7</i> |
| (p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and | <i>Not applicable</i> |
| (q) Any other information requested by the competent authority. | <i>None at this stage.</i> |

International conventions, national plans and programmes as well as the relevant Integrated Development Plans (IDP), Spatial Development Frameworks (SDF), Environmental Management Frameworks (EMF) and Strategic Environmental Assessments (SEA) were taken into account in assessing the development in a spatial context. Trends in the South African and international sand markets have also been taken into consideration in this assessment of the need and desirability of the project.

3. NEED AND DESIRABILITY

The exponential growth of our populations and cities, along with the large investments government is making in the provision of housing, roads and other infrastructure, as well as private commercial investments in construction over the last few decades, has been dependent on the use of sand, which is a crucial ingredient in the production of concrete for construction. We literally live in sand.

The owner of the land also claims that they initiated mining on their property in order to avoid a situation where someone else obtained the rights to mine the sand on the farm and in the process undermine their potential to generate income from the property.

Naturally occurring good gravel aggregate suitable for use in making concrete (gravel) is very rare in South Africa in comparison to many other countries. Consequently, the supply of gravel in South Africa depends on the crushing of rocks and these rocks need to be sourced from quarries within 100km of the users in order to remain economically viable to exploit and sell.

Natural sand accumulates in rivers, on beaches, in dunes and in valleys between mountains and include alluvial/eluvial sands, aeolian/windblown sands and marine/beach sands. The silica (sand) mineral deposit that is being mined by Tja Naledi is an alluvial silica sand deposited by the Paleo-Vaal River over thousands of years prior to the meteorite impact in the Vredefort Dome area which changed the course of the river. The silica is of a very high quality and is sought after by mainly foundries and tile adhesive manufacturers. These silica deposits along the Vaal River are not uniform as the sand tends to accumulate in pockets as determined by the topography of the area next to the river. The alluvial silica pockets occur widely on the southern bank of the Vaal River and stretches from below the Vaal dam wall along the river's southern bank for hundreds of kilometres. The deposits are on average 5 meters deep and underlain by floor granites, sandstone, and alluvial gravel and in some instances coal. The silica is extremely pure, in the region of 98% and higher with some trace elements of iron.

Sand from rivers and the sea are sought after by the construction industry due to the angular and abrasive character of the sand grains that can more easily bind together and be used in concrete. Desert sands that have been shaped into round grains through long periods of wind erosion are not suitable for use in making concrete and building construction. Consequently, almost all the sand used in construction of buildings as well as many other industrial uses, in South Africa and globally, are derived from rivers and the coastline. It is also possible to manufacture sand through the mechanical crushing or milling of rock and gravel or to reuse old mine-dumps. However, this would be more expensive than mining natural sand and would not become economically viable unless the supply of natural sand had been depleted and prices had escalated sufficiently to make manufacture economically viable.

One of the advantages of mining the sand on this farm is that it will not affect the current Vaal River – in that it will not require dredging of sand out of the existing river or any removal of sand on the river banks.

The sand and aggregate industry comprises of some 573 registered operating quarries in South Africa. There are also a large number of illegal sand mining operations taking place along rivers on land under communal forms of tenure. Due to low profit margins and high transport (and input) costs, these mines are limited to supplying clients located within 100 km of the mine and the most profitable sand mining areas are those close to urban areas. This makes it very difficult to centralise sand mining and spatially limit the number of sand mines and suppliers.

The mining sector as a whole struggled to remain profitable in 2017 and 18. While the manufacturing and some other sectors of the SA economy began to grow again in the second half of 2018, this was not the case in the mining and construction sectors who continued to experience shrinkage/negative growth (8.8 and 4,7% respectively) (StatsSA <http://www.statssa.gov.za/?p=11817>). This was mainly due to commodity prices not improving strongly and domestic costs continuously rising. Input costs (petroleum, electricity, transport and storage) of mining and quarrying sector rose by 15.4% in 2017. A slowdown in government expenditure on infrastructure in 2016/7 may also have contributed. Mining sector has been shedding jobs since it last saw some positive growth in employment in 2012. Due to the small size of the sand mines and the use of earth moving machinery employment is low and only 1.6% of all mine employees in SA are employed in the sand and aggregate sector.

It is not known how many sand and gravel mines there are within this region and along the Vaal river course. Without this information it is difficult to determine the volume of sand being supplied to the market and whether there is an over or under supply. Generally, the supply of sand is governed by demand from the relative growth of the construction sector, the prices that can be obtained and the costs of mining. Given the current and recent poor economic growth performance in South Africa and rising costs, the demand for sand is likely to be relatively low and many mining companies are struggling to remain economically viable.

This macro and local economic context suggests that it may not be economically and environmentally appropriate to approve new sand mining developments until the economic fundamentals for these businesses have improved. The low and shrinking profit margins will also make it difficult for the mines to comply with onerous legal and environmental management requirements aimed at minimizing the negative environmental impacts on other neighbouring social and economic activities. This may also increase the level of illegal mining activities.

The need and desirability of the Tja Naledi sand and gravel mining amendment application can be summarised as follows:

- The project site has high quality silica deposits which are located adjacent to, rather than in the current river course. This will minimize the potential for impacts on the Vaal River itself.
- The sources of natural gravel in South Africa are scarce and therefore necessitates the manufacturing of gravel from the processing of suitable rocks.
- The ease of extracting the sand and the location of the mine close to major urban centres (of demand) and good major road networks enhances the economic viability of the sand mining venture.
- The expansion of the mining right to include the production of gravel could improve the financial viability of this mining venture.
- The continued shrinkage and lack of growth in the mining and construction sectors, combined with increasing input costs, puts the economic viability of such mines into question.
- The lack of information on the number and type of sand mines in the locality and along the Vaal River, and consequently on the local supply and demand for sand and potential cumulative impacts, makes it difficult to assess whether the authorisation of this mining application should be allowed.
- The proposed mining amendment will not displace any existing agricultural activities on the woodlands farm, but it may impact negatively on neighbouring farms due to dust, safety, road and traffic impacts.
- The imposition of onerous environmental mitigation measures to minimize impacts on neighbouring economic and social activities will increase the costs for the mining venture and potentially undermine its economic viability.
- The location of the mine adjacent to two other sand mines (one of which is still under assessment) also poses a threat to the economic viability of the mine due to competition.
- The mine provides minor employment and empowerment benefits to people who are not living in the immediate area, and at the same time has potentially significant negative economic impacts on other existing economic activities in the area immediately around the mine that could result in many more jobs being lost than being created.

4. RELEVANT LEGISLATION

4.1. INTRODUCTION

Section 4 of this socio-economic report provides an overview of the most significant policy documents of relevance to the proposed mining right amendment. The key documents reviewed included the following:

- The National Development Plan (2030)
- Department of Environmental Affairs & Development Planning: Guideline for Involving Social Assessment Specialists in EIA Processes (2007);
- Department of Mineral Resources Strategic Plan 2014/19
- Free State Provincial Spatial Development Plan 2014
- Fezile Dabi District Municipality: Integrated Development Plan 2017-2022
- Fezile Dabi District Municipality: Rural Development Plan 2016
- Ngwathe Local Municipality: Environmental Management Framework (2013)
- Ngwathe Spatial Development Framework 2015/2016
- Ngwathe Local Municipality: Draft Review IDP 2018/19
- Frank Vanclay: International Principles for Social Impact Assessment (2003)

4.2. SUMMARY OF REVIEWED DOCUMENTS

4.2.1. *The National Development Plan (2030)*

The National Development Plan (NDP) contains a plan aimed at eliminating poverty and reducing inequality by 2030 making this one of the guiding objectives of the NDP over the next 20 years. The NDP aims to address poverty and exclusion on the while simultaneously attempting to nurture economic growth by creating a virtuous cycle of expanding opportunities, building capabilities, poverty reduction, involving communities in their own development, all leading to rising living standards. The NDP identifies 9 key challenges and associated remedial plans. While all nine challenges/ plans are envisaged as part of an integrated whole, the highest priorities are regarded employment creation and improving the quality of national education. Expansion and acceleration of development which would result in increased employment opportunity is identified as a key intervention strategy.

4.2.2. *Department of Mineral Resources Strategic Plan 2014/19*

The Department of Mineral Resources (DMR) Strategic Plan was developed with the vision of a mining and minerals sector that is globally competitive, sustainable and meaningfully transformed. The plan envisions leading in the transformation of South Africa through economic growth and sustainable development by 2030. The DMR Strategic Plan considers relevant policies, legislation and other mandates for which the DMR is responsible and puts forward the strategic goals and objectives the DMR will aim to accomplish by 2019.

The DMR's strategic objectives are divided into four overarching programmes, namely Administration, Mine Health and Safety, Mineral Regulation and Mineral Policy and Regulation. Noted within in the four programmes are objectives that aim to facilitate projects for vulnerable groups, promote job creation through evaluation of social labour plans and to promote sustainable resource use and management.

4.2.3. Free State Provincial Spatial Development Framework 2014

The Free State Provincial Spatial Development Framework (PSDF) is a provincial spatial plan and strategic planning policy which addresses and adheres to all relevant policies and legislation. The PSDF aims to address the key challenges facing the Free State of needing to implement a 'developmental state' while ensuring global obligations to social, economic and environmental sustainability are achieved. The Free State PSDF supplements the Free State Growth Development Strategy (FSGDS). Together they provide a crucial tool for guiding the use of the provinces resources in a way that ensures the provinces development needs and priorities are met while remaining sustainable. Agriculture is a key economic driver within the Free State and areas of high agricultural potential need to be protected from non-agricultural activities and used appropriately. Where agricultural land is to be used for other activities, such as mining, the activities must result in meaningful benefit. With regards to industrial activities, the PSDF aims to ensure that any use of the provinces resources results in meaningful and lasting benefits for the people of the province and the environment. Furthermore, one of the prioritised strategies noted within the PSDF is the supporting of the life of existing mines and marketing new mining opportunities. Small-scale mining of sandstone, salt, clay and diamonds should be promoted where possible. Promoting sustainable tourism forms of part of the PSDF. Within Tourism Scenic Corridors, efficient tourism should be encouraged and environmentally-disruptive land-uses within these areas need be considered with caution.

4.2.4. Fezile Dabi District Municipality: Integrated Development Plan 2017-2022

The Fezile District Municipality Integrated Development Plan (IDP) is a strategic planning document which guides all the planning within the municipality. By combining economic, infrastructure, environmental and spatial plans sustainable development goals can be achieved. Noted within the IDP is that Fezile Dabi District Municipality (FDDM) is not considered a primary tourist destination, however the industry has been growing consistently within the district. The area is increasingly being favored as a weekend destination, with industries such as hunting and hospitality have grown rapidly. The Local Economic Development Strategy Report within the IDP states that the region's agricultural sector has been declining and it is thus important to support this sector, particularly in areas of high agricultural potential such as Mafube and Ngwathe Local Municipalities. Tourism and mining are also noted as potential areas for economic growth.

4.2.5. Fezile Dabi District Municipality: Rural Development Plan 2016

The overarching objective of the Fezile Dabi District Municipality (FDDM) Rural Development Plan (RDP) is to

see poverty within rural areas reduced through ensuring that factors driving rural development are optimally used to the advantage of the poor. Three strategic focus areas are identified, namely Food Security, Agricultural Development and Sustainable Livelihoods. A comprehensive overview of the status quo of the district is given and functional areas are demarcated and mapped, with a particular focus on agriculture. Rural development within the FDDM RDP should be directed towards eight development focus areas. The first three development areas are Agricultural Development, Mining promotion and beneficiation, and Tourism development and promotion.

4.2.6. Ngwathe Local Municipality: Draft Review Integrated Development Plan 2018/19

The Ngwathe Local Municipality (NLM) Integrated Development Plan (IDP) provides an overview of the current status of the municipality along with development strategies, objectives and planned programmes and projects. Tourism and hospitality opportunities along with agricultural development are identified as key components to the economic growth and sustainability of the municipality. Influential factors, that either currently or will impact the development include the road infrastructure, strategic location of the municipality, its tourism potential, the agricultural sector, AIDS, pollution of the Vaal, influx and competition with regard to international trade of agricultural products. The NLM Local Economic Development Strategy (LED) identifies tourism, agriculture and manufacturing as key economic drivers, due to the location of the municipality.

4.2.7. Ngwathe Local Municipality: Spatial Development Framework 2015/2016

The Spatial Development framework (SDF) classifies the area of the municipality according to Standard Planning Categories (SPCs), which include Core Conservation Areas, Natural Buffer Areas, Agricultural Areas, Urban Related Areas, Industrial Areas and Surface Infrastructure. Noted within the SDF is that the extraction of sand and aggregate, in urban areas, does not lend to a quality living environment and negatively affect residential areas. Furthermore it is noted that a substantial open cast gravel pit exists adjacent to the Parys/Sasolburg Road.

4.2.8. Ngwathe Local Municipality: Environmental Management Framework Status Quo Report (2013)

The Environmental Management Framework (EMF) Status Quo Report provides a spatial representation of the current biophysical environment of the municipality. The EMF Status Quo Report gives a clear indication of the key focus areas of economic potential within the municipality, namely tourism, agriculture and manufacturing.

4.2.9. Frank Vanclay: International Principles for Social Impact Assessment (2003)

This document is a statement of core values of the SIA community which is accompanied by a set of principles which can be used to guide SIA practice and the consideration of 'the social' in the EIA process. Social Impact

Assessment includes the processes of analysing, monitoring and managing both intended and unintended social consequences. These consequences can be both positive and negative and are the result of planned interventions (policies, plans and projects) and the resultant social change that is invoked by such interventions. The document emphasises on the importance of sustainable interactions between humans and the environment.

4.3. SUMMARY OF KEY FINDINGS

4.3.1. Policy and planning issues

The key documents reviewed can be found under Section 2 “policy and Planning Environment”. The National Development Plan (NDP) (2011) contains a plan aimed at eliminating poverty and reducing inequality by 2030 making this one of the guiding objectives of the NDP over the next 20 years. The Department of Mineral Resources Strategic Plan (DMRSP) (2014/19) was developed with the vision of a mining and minerals sector that is globally competitive, sustainable and meaningfully transformed. The Free State PSDF aims to address the key challenges facing the Free State of needing to implement a ‘developmental state’ while ensuring global obligations to social, economic and environmental sustainability are achieved. Within the Fezile District Municipality Integrated Development Plan (IDP) is a strategic planning document which guides all the planning within the municipality. Within the Ngwathe Local Municipality (NLM) Integrated Development Plan (IDP) an overview of the current status of the municipality along with development strategies, objectives and planned programmes and projects is provided. The Spatial Development framework (SDF) classifies the area of the municipality according to Standard Planning Categories (SPCs), which include Core Conservation Areas, Natural Buffer Areas, Agricultural Areas, Urban Related Areas, Industrial Areas and Surface Infrastructure.

Within the NDP and DMRSP job creation is noted as an important factor for future development. As shown by the Economic Impact Assessment Report (Appendix D), the proposed amendment will result in additional jobs, however negative impacts could result is a greater number of jobs being lost in other industries, should impacts not be effectively mitigated. Due to this, the proposed amendment is not supported by the NDP and DMRSP. If however negative impacts can be effectively mitigated and effective LED is pursued, then the proposed amendment may possibly align with the above mentioned planning documents.

The Free State PSDF supports the proposed amendment with regards to the amendment supporting the life of an existing mine and allowing for the small-scale mining of diamonds. The mine however, is situated within a tourism corridor, where efficient tourism should be encouraged and environmentally-disruptive land-uses considered with caution. Should mining continue in a lax way, not strictly adhering to the mining plan, the tourism potential of the area will be negatively affected by dust and noise. Should the proposed amendment be approved, it will further negatively impact the tourism potential of the area. Thus the amendment would

not be in line with the PDSF. If compliance with the mining plan is improved, nuisances could be mitigated to acceptable levels.

The Fezile Dabi District Municipality Integrated Development Plan (2017-2022) notes the importance of the growth of agricultural, tourism and mining industries. Ngwathe LM is noted to be an area of high agricultural potential. Within the Fezile Dabi DM Rural Development Plan agricultural development, mining promotion and tourism promotion are all noted as areas that should be focused with regards to rural development.

According to both the Ngwathe LM Integrated Development Plan (2018/19) and the Ngwathe Local Municipality Environmental Management Framework Status Quo Report (2013), agriculture, manufacturing and tourism are important economic factors for the area. Barrage Bulk Sand Mine is situated on land that has potential for both agricultural and tourism activities. As per the Ngwathe LM Spatial Development Framework (2015/2016), sand and gravel mining should not take place in urban areas. The SLP was perceived by I&APs to have a weak LED component and they felt that not enough was done in order to include input from the local communities. Furthermore, I&APs felt the number of extra jobs created by the proposed amendment is not significant.

According to the Fezile Dabi District Municipality Integrated Development Plan (2017-2022), Ngwathe Local Municipality Integrated Development Plan (2018/19) and the Ngwathe Local Municipality Environmental Management Framework Status Quo Report (2013), agriculture, manufacturing and tourism are important industries for the area. BBSM is thus situated on land that has potential for both agricultural and tourism activities. In summary, both the NDP and DMRSP both uphold job creation. While the mine will create additional employment, this is likely to be outweighed by knock-on negative economic impacts. The proposed amendment will likely to be profitable on a national scale, the benefits are unlikely to be experienced locally.

Mining, agriculture and tourism are noted as important factors for economic growth. The area concerned has potential for suitable for agricultural, mining and tourism activities. As the area is classified as tourism corridor in the PDSF, any land uses compromise the areas tourism integrity would be in contradiction to the PDSF. Current mining activities already compromise the tourism potential of the surrounding area (see Appendix D). As the area is classified as a tourism corridor, any impacts caused by the amendment that may further affect the surrounding sense of place will affect current and future tourism initiatives.

In light of this, the reviewed documentation does not support the proposed amendment as it currently stands. Current mining activities already compromise the tourism potential of the surrounding area. As the area is classified as a tourism corridor, any impacts caused by the amendment that may further affect the surrounding sense of place will affect current and future tourism initiatives. However, the sand mines are not

the only source of dust and noise as agricultural activities are also a culprit, particularly with regards to dust.

Should the mine contribute to meaningful LED and not comprise the ability of the surrounding landscape to realise its tourism potential, the proposed amendment may be considered to align to planning documents. Furthermore, mining operations would need to take place in a sustainable way, that leaves the land in suitable condition for either agricultural or tourism activities following closure of the mine. Mitigation measures should include strict working times, no processing on weekends and optimal placement of the processing plant with regards to noise.

5. PROJECT DESCRIPTION

5.1. INTRODUCTION AND PROJECT BACKGROUND

Tja Naledi Beafase Investment Holdings (Pty) Ltd. (The Applicant), operating as Barrage Bulk Sand Mine (BBSM) currently holds a Mining Right and approved EMPr for Portion 4 of the farm Woodlands 407, situated within the in the Ngwathe Local Municipality in the Fezile Dabi Magisterial district, Free State Province. An environmental impact assessment (EIA) was conducted in 2014 and the Mining Right awarded to the Applicant in 2016. Under the current mining right the Applicant is permitted to conduct strip mining of silica sand. The Applicant wishes to amend their mining right to include aggregate and to amend the EMPr to include processing (crushing and screening).

The farm portion is currently used for small-scale cultivated grazing, mixed farming and sand mining. Ongoing mining activities have been taking place on the farm since 1976. On the eastern side of the property there is an area previously used for sand mining. Current sand mining activities are situated at the center of the property on the northern side of the access road. The farm portion is predominantly surrounded by agricultural land, including activities such as cropping, beef cattle and livestock breeding.

There has been much contention with regards to the zoning of the property concerned. Portion 4 of the farm Woodlands 407 has been used for mining activities, of a varying nature, since 1976. Based on information received from the Applicant attorneys (see Appendix F), the farm has effectively never been zoned for any purposes, according the Ngwathe Local Municipality (NLM) Land Use Scheme. As the farm was used for mining purposes since 1976 it is accordingly classified as such in terms of Schedule 2 of Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA). Re-zoning is an issue that will need to be resolved between the Applicant and municipality prior to approval of the amendment.

5.2. CURRENT MINING METHOD

Currently BBSM is operated by SPH Kundalila (the Contractor) who are contracted by the Applicant. Only silica sand is mined on Portion 4 of the farm Woodlands 407 via a strip mining process. Strips of land are cleared with a bulldozer and then sand is loaded onto the trucks of customers with a front-end loader. On-site processing of sand is not allowed. Dust is suppressed using a water truck which sprays internal dirt roads. Current infrastructure and machinery allowed on the site for mining activities are one caravan (admin purposes), one front end loader, one tractor and one water trailer for dust suppression.

The current mining plan has not been strictly adhered to. This has included the use of infrastructure not included in the EMPr and failure to implement immediate concurrent rehabilitation. These deviances have been discussed with the Contractor and they are prepared to correct wrong actions. As there are different

types of commercially sought after sand available to be mined, it is difficult for the only one cell to be mined at a time. Furthermore, with the limited machinery it is difficult for the Contractor to conduct concurrent rehabilitation.

- In order to confirm working hours, from 8am to 4pm, are being adhered to, SPH should use their camera system and tracking system and compile reports that can be made available to the public.
- SPH need to inform clients of the need to use a tarpaulin to cover loads. SPH need to refuse to load sand on clients trucks should they not be in possession of a tarpaulin.
- Should a closure certificate for the historical mine not be received the rehabilitation thereof will need to form part of the current rehabilitation plan.
- The Contractor undertook to spray the entrance road up to the point where the vehicles turn, while this is expensive it will assist in dust suppression at the major point of loading of sand.
- A map needs to be created that clearly illustrates areas that will not be mined and areas that will, and SPH need to give their assurance that what is illustrated is final and will not be altered in the future. The direction of mining and rehabilitation also needs to be illustrated. This map will need to be made available to the public.
- The large alien trees should be left as they aid in suppression of impacts. At a later stage these can be replaced with indigenous trees.
- SPH need to establish a method of regular communication with the surrounding community, where they make available their reports and where issues can be discussed.
- In the event of having more front-end loaders, concurrent rehabilitation will be made easier. Furthermore, the mining process can be sped up which will shorten the life of the mine, thus shorten the negative impacts as a result of the mine and allowing it to either return to grazing land or be used for a nature based recreation.

5.3. LOCALITY

Barrage Bulk Sand Mine is situated on Portion 4 of the farm Woodlands 407, at the following co-ordinates:

- A. 26°45'17.62"S 27°36'23.60"E
- B. 26°45'15.81"S 27°37'23.58"E
- C. 26°45'23.53"S 27°37'53.44"E
- D. 26°45'52.42"S 27°37'38.48"E
- E. 26°46'5.48"S 27°37'40.79"E
- F. 26°46'24.86"S 27°37'29.26"E
- G. 26°45'54.36"S 27°35'59.29"E
- A. 26°45'17.62"S 27°36'23.60" E

Potion 4 is 437.8330ha in extent and is situated on the Vaal River, which borders the Gauteng Province. The property is situated approximately 22.65 km north east from Parys and 21 km north-west of Sasolburg in the Free State Province. Vaal Oewer residential area is situated approximately 3 km north of the property, within Gauteng. Portion 4 is surrounded predominantly surrounded by farming activities. A sand mine and game farm, owned by Goose Bay Developments, lies adjacent to the property's northern border. Sweet Sensations Sand Mine lies approximately 2.5 kilometres to the north-west of the property.

The mine is located on the boundary between three provinces and various local municipalities. Figure 5.1 and 52 indicate the locality relative to the boundaries of the provinces and local municipalities.

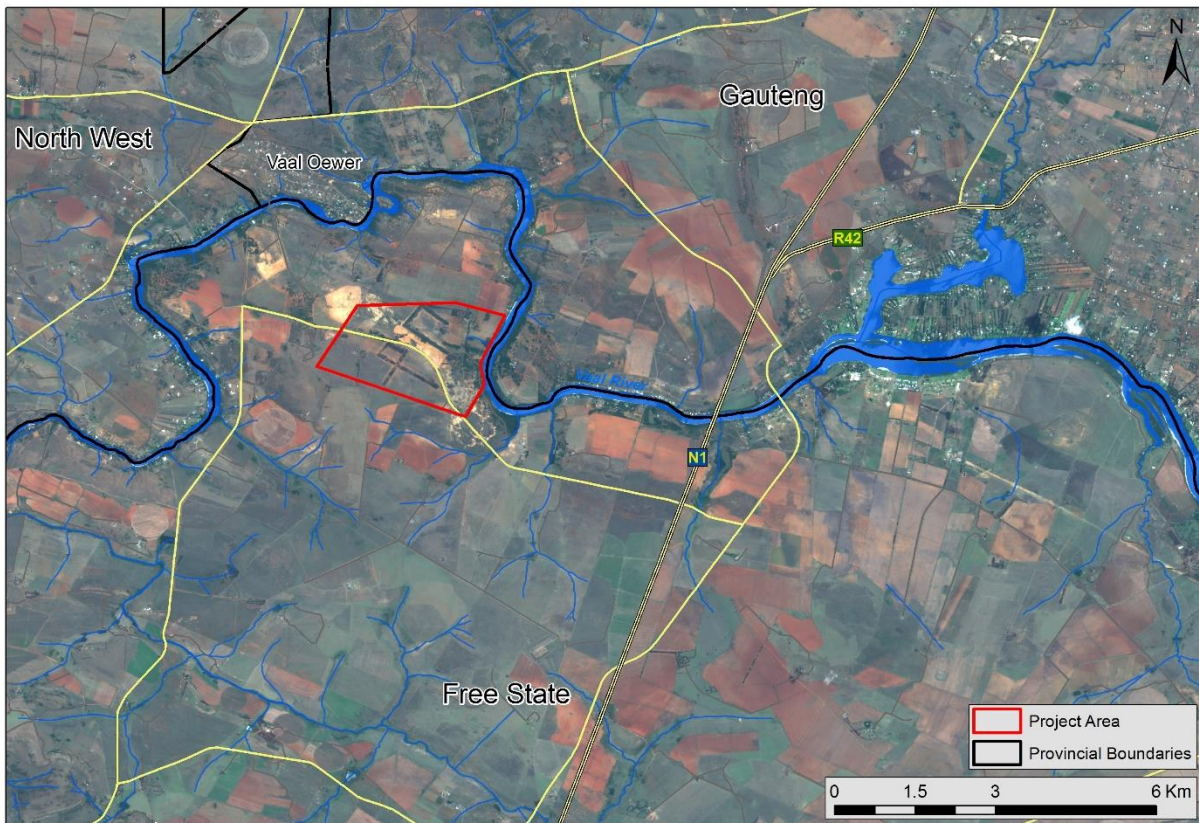


Figure 5.1: Location of the Tja Naledi Mine relative to the three provinces.

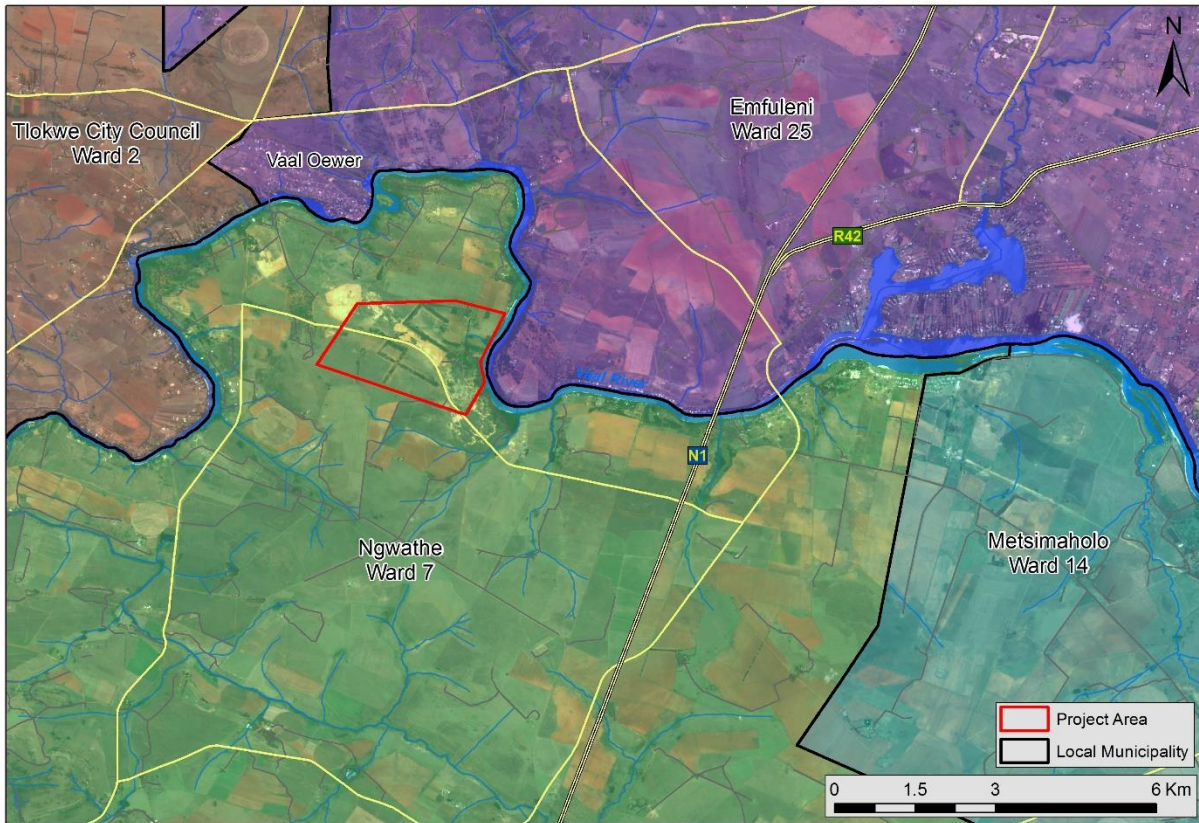


Figure 5.2: Location of the Tja Naledi Mine relative to the Local Municipalities and the relevant Wards in and around location of the mine.

5.4. EMPLOYMENT OPPORTUNITIES

5.4.1. Construction Phase

As the mine is already in existence and does not require major new constructions, the initial construction phase will run concurrently with the operation phase and will not involve any additional employment by the mine besides the 8 mine employees.

5.4.2. Operational Phase

During the operational phase the current estimates for the total number of mine and processing plant employees are 8 persons. Of these, all but two will be unskilled & semi-skilled positions.

5.4.3. Decommissioning Phase

The rehabilitation work will occur concurrently with the mining process, and no major deconstruction activities are expected. The tasks in this phase will continue to be undertaken by the 8 mine staff members.

5.5. ECONOMIC SPEND

5.5.1. Construction Phase

The initial capital costs of the development of the mine in year one will amount to an estimated R9 million with another R3,3 million spent on other start-up, licencing and tax costs. Thereafter another 6% of this cost will be spent on an annual basis (i.e R262 500 in 2nd year and increasing to R387 832 pa in year 10) to cover equipment maintenance & replacement costs). The bulk of this capital expenditure is for machinery, equipment and various technical services. The majority of this expenditure will go to South African contractors and suppliers.

Table 5.1: Estimated Income and expenditure for Barrage Sand Mine (Rm), over the 10 years of its life.

| | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y10 | TOTAL |
|-----------------------------|-------|-------|------|------|------|------|-------|-------|-------|-------|-------|
| REVENUE | R7,3 | R7,5 | R7,7 | R8,0 | R8,2 | R8,5 | R8,7 | R9,0 | R9,2 | R9,5 | R83,7 |
| TOTAL COSTS | R12,3 | R2,8 | R4,3 | R4,1 | R4,4 | R4,8 | R5,2 | R5,6 | R6,0 | R6,4 | R61,7 |
| PROFIT/LOSS | -R5,0 | R4,7 | R3,4 | R3,9 | R3,8 | R3,7 | R3,5 | R3,4 | R3,3 | R3,1 | R21,9 |
| TAX | -R1,4 | R1,0 | R9,6 | R0,9 | R0,9 | R0,8 | R8,0 | R7,6 | R7,1 | R0,7 | R6,1 |
| NET CASH FLOW | -R0,4 | R2,6 | R2,5 | R2,7 | R2,3 | R2,2 | R2,1 | R2,0 | R1,8 | R1,7 | R15,8 |
| DISCOUNTED CASH FLOW | -R3,6 | -R0,2 | R1,4 | R3,8 | R6,1 | R8,2 | R10,3 | R12,3 | R14,9 | R15,8 | |

5.5.2. Operational Phase

The Operational Phase of the mine will be 10 years with construction starting in year 1. The mine will produce 80,000 tons of sand and 20 000 tons of gravel per month. If sold at the expected current competitive price of R73 p/m³, this will amount to an annual income of R7,3 million in the first year increasing by 3-5% per annum. Over the 10 year life of the mine the revenue generated is estimated to be in the region of R83,7 million. The total annual operational expenditure of the mine will be R12,3 million in the first year, R2,8 in year 2 and thereafter rising gradually from R4,3 million to a total cost over the ten years of R61,7 million. There will be additional income taxes, VAT and royalty payments to Government and the land owners, amounting to R6,1 million over the 10 years that will also need to be paid. The expected profit on the mine over the whole period is around R15,8 million.

5.6. PROJECT ALTERNATIVES

As this application for authorisation is an amendment of the current mining right and EMPR, the assessment of alternative development options was not required or assessed. The applicant already has a mining right for this property and has been mining on a small scale since the 1970s. The owners of the farm were originally

farming it but began with mining as a means to maintain ownership and control of the land. This was an attempt by the land owners to prevent others from obtaining the mining rights on this land, and was linked to the legal separation of land ownership and mining rights. Consequently, although the land could be used for farming and ecotourism developments along the river bank, such alternative land uses would be vulnerable to the continued possibility of someone else obtaining the rights to mine the valuable sand and rock resources on this land. The existence of other mines adjacent to this property would heighten this possibility.

A different location:

The development of the mine on this farm is linked to the silica deposits in this area which are of very high quality and the existing mining right. The mine's proximity to major urban centres of demand in Gauteng and surrounds also makes this location economically viable. Consequently, alternative sites for the mine were not assessed as part of the EIA.

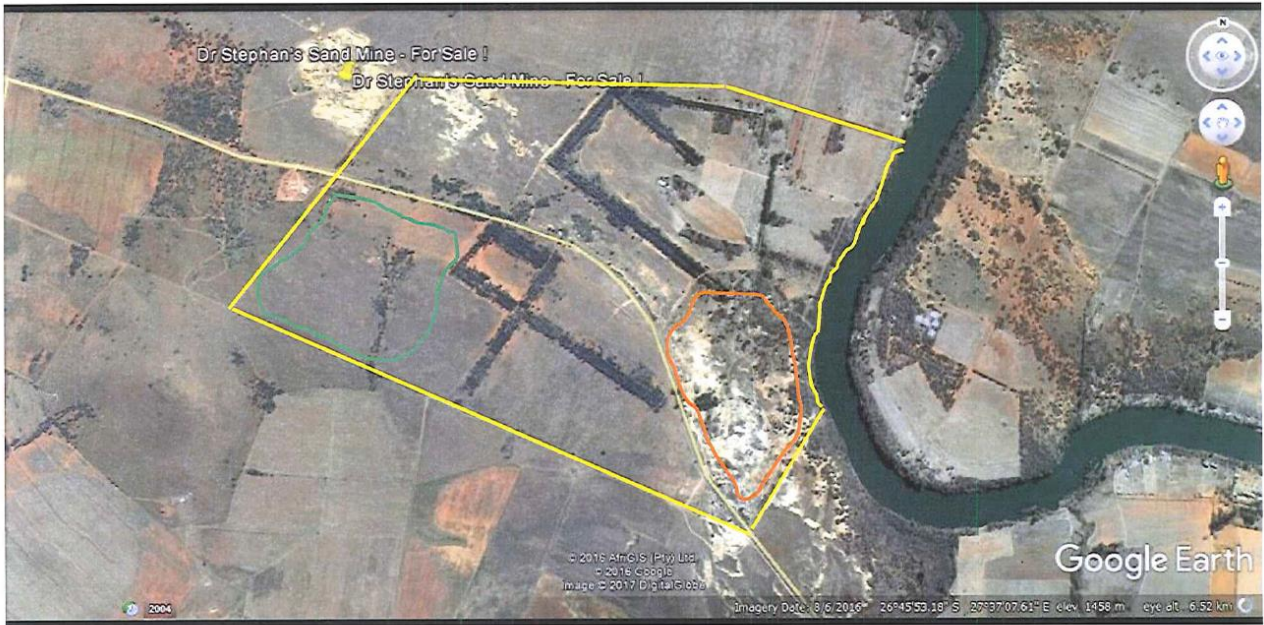
The "No-Go" Alternative: According to the EIA Regulations, the option of doing nothing - not proceeding with the proposed development (i.e. the No Go Option) must be assessed during the EIA.

If this mining application is not approved then the economic benefits to employees, service providers, customers and the government will be forfeited. On the other hand the dust, visual, noise and traffic impacts that may affect the health of the local community and the financial viability of other existing agricultural, residential and tourism land uses will be avoided. This assessment attempts to compare and assess these relative benefits and costs.

Incremental alternatives are modifications or variations to the design of a project that provide different options to reduce or minimise environmental impacts and maximise benefits. There are several incremental alternatives that can be considered, including the design or layout of the activity, technology to be used in the activity, and the operational aspects of the activity. These could assist in minimizing or avoiding potential negative impacts.

Design: Design alternatives can include different types of infrastructure and mining methods.

Layout of Mine: The layout of the mine is provided in Figure 5.3.



- Farm boundary
- Old quarry boundary
- Possible new gravel quarry

Figure 5.3 Tja Naledi Mine layout

6. DESCRIPTION OF THE ECONOMIC ENVIRONMENT

6.1. INTRODUCTION

As evident from the large number of IAPs registered for this environmental authorisation process, (i.e 1237 non-government IAPs registered and contributed to the Public review of the Draft, and 19 different government bodies/authorities were consulted). This is a consequence of three particular characteristics of the area:

1. A large number of existing eco-tourism businesses and residential areas along the banks of the Vaal River, onto which the mining property borders.
2. The introduction of industrial type developments in a largely quiet rural area with existing residential and productive farming and eco-tourism developments.
3. The location of the Tja Naledi mine adjacent to two or three other mines, two of which were only initiated in the last year or two.
4. The recent and obvious cumulative visual, dust, health, noise and traffic impacts on neighbouring residents and businesses as a consequence of the three/four mines in this area.
5. The location of the mine in an area which marks the boundary of three different local Municipalities, one in the Free State Province (Ngwathe Local Municipality, which forms part of the Fezile Dabi District Municipality), another in the Gauteng province (the Emfuleni Local Municipality within the Sedibeng District Municipality) and the third in the North West Province (JB Marks Local Municipality within the Dr Kenneth Kaunda District Municipality).

A general description of the demographic profile and social characteristics of the local environment is provided in the Social Impact Assessment and is not duplicated here. This section will therefore focus on providing a description of the local economy that draws on existing statistical information, secondary sources of information and interviews with key local informants involved in other land use activities in the locality. A brief description of each of the existing land use categories in the area is provided separately below.

6.2. VAALOEWER RESIDENTIAL DEVELOPMENT

Vaaloewer is a residential development, and proclaimed town, that was first established in 1979 on a 600ha farm. It is located north west of just over 3,4 ha away from the Tja Naledi mine, on the opposite bank of the Vaal River. This settlement falls within the Gauteng Province. It was initially developed as part of a proposal to for a casino hotel in the same location, with game farms on the other side of the river, where the application of a mining right by Pure Source is currently underway. Vaaloewer was developed as a relatively large residential area with over 900 residential sites and larger commercial sites along the river bank all of which were sold during the 1980s. However, the original casino developers did not succeed in obtaining the

licence for a casino (which was awarded to a site in Vanderbylpark), and Vaaloewer languished with a large number of properties for sale and no buyers for many years. When the Casino was lost, the developers then proposed to convert the Casino area into a golf course estate and hotel but were not able to obtain the water use and environmental authorisations for these proposals. Subsequently, these portions of the farmland were subdivided and sold off as 35 separate residential plots and one portion was sold to a neighbouring farmer for development as an eco-tourism resort.

n estimated 300 houses have been built in Vaaloewer with new building continuing at a rate of around 5 houses per year. There are still around 600 undeveloped vacant plots, 95 of which are listed on the Property 24 website for sale. Local informants indicated that about 50% of the houses are owned and occupied by permanent residents, many of whom are retired people. The other 50% are owned by people who live in the nearby cities and metropolises and use them as weekend and holiday houses. An examination of the age profile of buyers and sellers of houses on the Property 24 site, indicates that just over 50% of the property owners are over the age of 50. However, an examination of the age of recent buyers indicates that the market is now dominated by buyers under the age of 50, half of which are under the age of 36.

The lack of schools in the area is an obstacle to the entry of younger couples with families as permanent residents, but not as holiday home buyers. The racial and national characteristics of the property owners was characterised as mixed by local estate agents who were consulted. An examination of the Property24 listings indicated that there are currently 100 houses on the market in the Vaaloewer area and 7 commercial properties along the river (all tourism related). The estimated (Municipal) value of the residential properties in this area was reported to be R450 million.

Recently, the provincial government invested R8 million rand in the construction of a water extraction, purification and storage facility for the Vaaloewer residential area. This water is sourced from the Vaal River, which has recently experienced some serious pollution events that have destroyed the fish populations and presented a significant health hazard to local residents and visitors.

Employment: there is one formal labourer's settlement with 14 houses within Vaaloewer, and one other informal settlement across the road from Vaaloewer which has around 130 structures which accommodate unskilled and semi-skilled people working in Vaaloewer. Assuming a household size of 3,5 persons that amounts to around 500 persons.



Figure 6.1: Aerial view of Vaaloewer eco-tourism settlement.

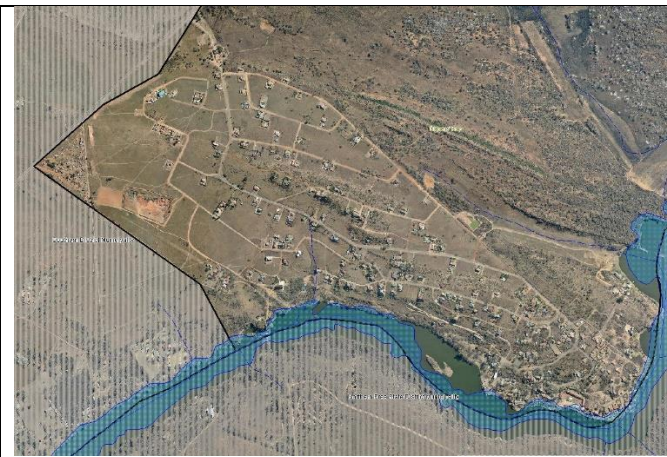


Figure 6.2: Map and aerial photo of Vaaloewer Settlement



Figure 6.3: Photo of boat jetties at the Vaaloewer Boat Club, on the Vaal River.



Figure 6.4: Photo of tourism resorts at Vaaloewer on the banks of the Vaal River.

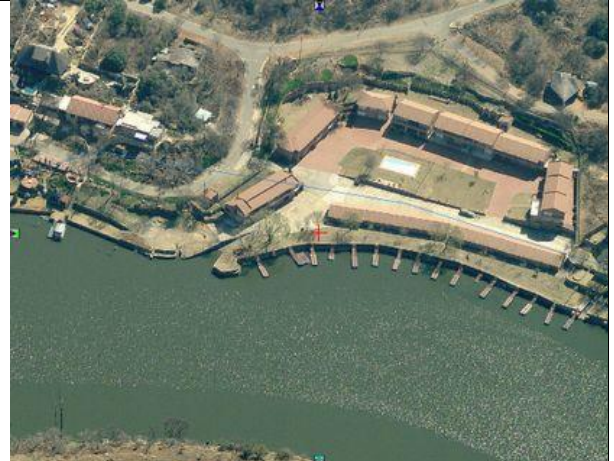


Figure 6.5: Aerial view of the Vaaloewer Boat Club on the banks of the Vaal River.



Figure 6.6: Entrance to Vaaloewer.



Figure 6.7: Visitors and residents enjoying the scenic environment on one of the Vaaloewer properties.



Figure 6.8: Boating activities and water sports at Vaaloewer.



Figure 6.9: Popular fishing activities on the banks of the river, Vaaloewer.

After the initial speculative buying in Vaaloewer when it was developed, the prices of property languished for many years and began to increase again in the early 2000s. The international financial crisis in 2007/8 resulted in a crash in property prices and began to recover again from 2013 onwards. However, the prices have dropped again over the last 2-3 years. Estate agents believed this was due to the broader economic depression in South Africa and the difficulty of accessing mortgages and the lack of money to buy holiday houses. One local estate agent reported that the price of vacant plots ranges from R95 000 to R450 000, while for houses the range from R180 to R700 000. However, other local agents indicated that a number of properties had sold for much lower than their asking prices in the last year, and that a number of properties had recently come on the market because of the visual, dust, and noise impacts from the mines across the

river. There is also not a large rental market in Vaalower and the impacts mentioned above are resulting in the departure of tenants. This agent, who lives in the area, indicated the dust is not just a visual impact, but 80% of the time the dust is blown towards Vaalower from the mines and results in pollution of the air and the deposition of dust on their properties, particularly those close to the edge of the river.

6.3. ECOTOURISM DEVELOPMENTS

Ecotourism is a major economic activity in the study area, particularly for the many small-holding properties along the banks of the Vaal River. The opportunities for water sports along the section of river adjacent to the Barrage mine were also enhanced in this area due to the Vaaloewer development and its construction of a weir (barrage) over the river just downstream of the settlement. This allowed the water to dam up behind the weir and make it possible for boating. There is a boat club at Vaaloewer with 210 members, 89 of whom were active in 2017 and 72 in 2018. The Goose Bay Canyon Boat Club has 20 boat garages that are hired out and 24 accommodation units that are privately owned. The cost of running the club is currently just under R700 000 which is financed from membership fees. These funds are used to maintain the river and club facilities such as slipway, jetties (16), swimming pool, ablution and picnic lawn area. The club employs 4 full time staff members to undertake this work. There is also a general riverfront area within Vaaloewer that has been set aside for all residents to use for fishing, picnics and general recreation. Again, the upkeep of this area is paid for by 130 local property owners who are members of the association that employ two labourers to maintain the area.

In addition, to these more public and collective facilities, there are also 11 different private eco-tourism lodges and resorts able to accommodate around 300 people within Vaaloewer and immediately adjacent to it. The map provided in figure 6.10 indicates the location of most of these. Some of these include popular conference and wedding venues. There are other tourism resorts both upstream and downstream of Vaaloewer. Visitors tend to come mostly on the weekends and over school holidays, and more in the summer than the winter. Weekend occupancy rates vary around 60-80%, with one wedding venue virtually 100% occupied. If we take the seasonal variation of visitors into account and calculate the annual turnover from all these businesses based on a 45% occupancy for weekend and holiday periods, this amounts to a conservative estimate of R10,5 million per annum. A 60% occupancy would amount to R14 million. The number of persons employed by these establishments is not known but conservatively estimated to be around 60 people.

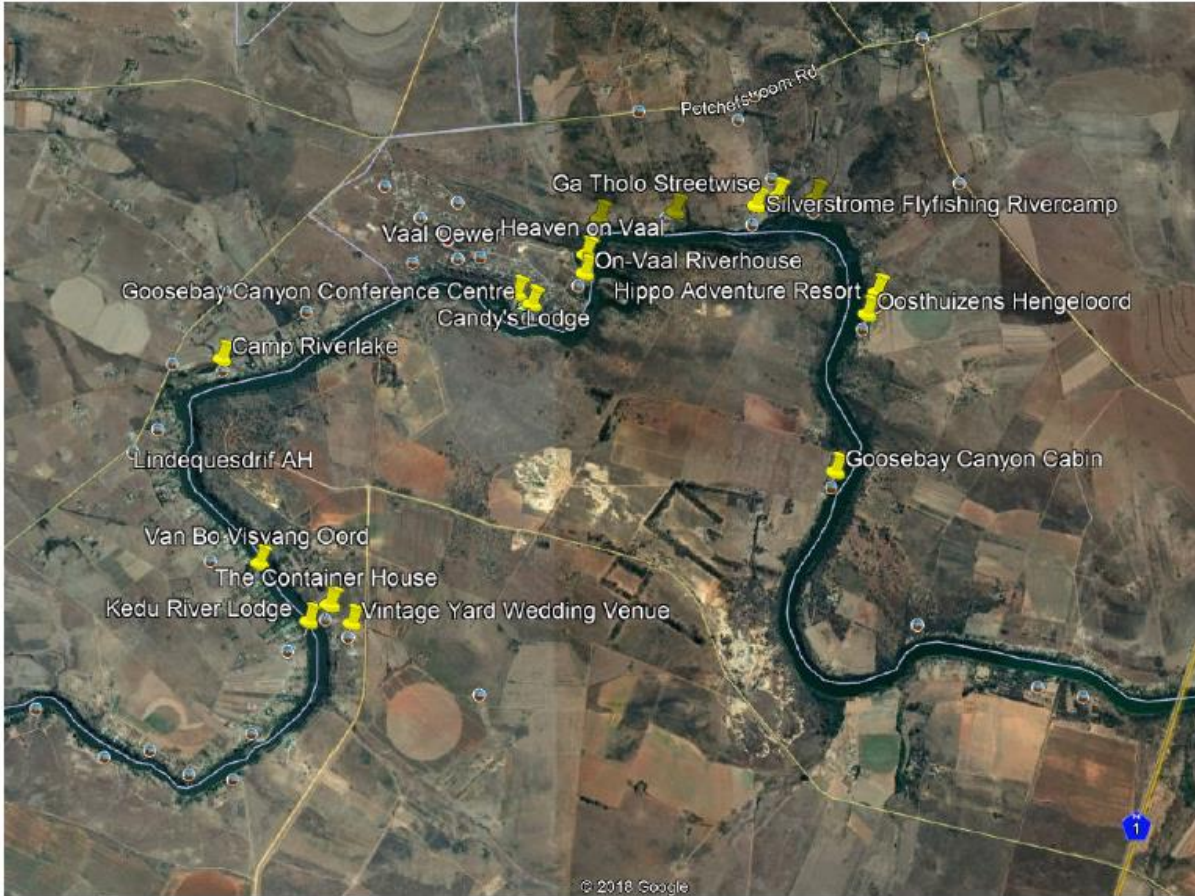


Figure 6.10: Tourism establishments within 2km of the project site boundaries

6.4. AGRICULTURE

Much of the land around the study area is used for agricultural production, both livestock farming and the cultivation of crops. These include the cultivation of grain crops and the intensive farming of cattle, sheep and chickens. There is also a large dairy farm in this area. It is considered to be a very good farming area that has quite reliable rainfall that is well spread through the growing season. The 2017/8 season was a record year for the farmers, and the current year is also looking promising so far. The close proximity of this area to the country's main urban centres also provides a large demand and easy access to markets for agricultural products. The Chairperson of the Parys Farmers Association, indicated that the farmers in this area are doing well with low debt levels. The average size of farms in this area is in the region of 800 to 1000 ha, but there are also very large farms up to 10 000ha. As in other parts of the country, there has been a trend towards fewer farmers and increasing large farms. It is not easy to buy farm land in this area. Farms rarely come on the market and when they do are usually bought up by the larger farmers. This follows the national agricultural trends indicating that success in commercial farming depends on harnessing economies of scale and efficiency, and diversification. All of which reduces the farmer's risks to the many natural, market and socio political factors that can affect the viability of farming and over which the farmer has no control. Game farming is also prevalent in this region but appears to be limited to the rocky outcrop areas that are less

suitable for commercial crop and livestock production.

6.5. IMMEDIATE NEIGHBOUR ACROSS THE VAAL RIVER FROM TJA NALEDI SAND MINE

Directly across the Vaal River from the Tja Naledi Barrage Sand Mine and the neighbouring proposed Pure Source mine, is a 550ha farm with 3,5km of river frontage (one of the largest river frontage properties in the area). This farm is located in the Gauteng Province and has been lived on and farmed by the owners for 15 years. The economic activities undertaken on the farm include: running one of the largest horse stud farms in South Africa, cattle farming and producing cut flowers under tunnels that are linked to their Event Coordination and Wedding Florist business, renting out some of the five houses on the property and running an agricultural consulting business. Their total annual turnover is in the region of three million rand. They have employed 10-15 people annually over the last five years. These employees and their families (about 50 people) live on the farm.

In the long-term they had plans to further develop the property as a wedding venue and lodge. In addition, over the last few years, the owners have been approached by the Department of Education and other organisations wanting to expand and develop the Ramosukula School located adjacent to them. This school is exceptional in that it achieved a 100% pass rate under the previous Principal Mr Kobede, and was earmarked to become a SMART school. The Gauteng Department of Education approached them a few years ago to buy some of their land to enable an expansion of the school at a cost of R100 million. Subsequently, the bureaucratic red tape within the department has stalled this project, but stimulated the planning of another private school and STEM Campus (Science Technology Engineering and Mathematics) initiative that would be developed on the Richardson farm adjacent to the Ramosukula school. This proposed private educational development is being developed and advanced by the Charlotte Maxeke Institute and the design has evolved from the idea of a private girls school to a first of its kind Education Campus including a Hotel School with Boutique hotel and Lodge, a Technical Training College, an Agricultural training facility and a "Peoples Auditorium" to host guest speakers. There are other parties wanting to align with this initiative and create a flight school. Large companies in the area like Sasol, Mittal and Omnia are being approached to be involved either through their corporate responsibility programmes or to offer internships or employment to graduates. The idea is to incorporate Ramosukula School into the project to share facilities as well as give pupils opportunities to be enrolled into one of the training facilities. We are working on a number of funding and financing models for this project which will be totally unique in South Africa. The idea is to use the revenue from the tourist activities, ie hotel, lodge and conference facilities to fund the education and training components. The projected cost of developing this facility is in the region of R400 to R500 million.

Unfortunately, the introduction of new mines (Sweet Sensations and Pure Source) and the expansion of the existing Tja Naledsi mine across the river from the Richardson's farm, together with the experience of the

dust and noise pollution from the mines during the last year has resulted in the developers of this educational facility having to consider finding an alternative site for the development. This represents a potential significant loss of a valuable economic and social development for this area. The owners of this property report that they are being impacted by the sand mines in the following ways:

- Visual impact – elevated property (one of the highest in the area) with a direct line of site to the mines across the river
- Noise – disturbing to work – hooters and vehicles – also had problems with the mines
- Dust – wind blows the dust towards them and poses a health risk to themselves and the horses (silicosis).
- Traffic safety – one of the roads used by the mines clients from Gauteng runs past their farm. They are witnessing much higher traffic volumes, speeding and a deterioration in the quality of the road.

As a consequence of these impacts, they have lost the tenants they had in one of their houses. There is also the probable loss of the educational institutional development described above. The dust and noise also threatens their own health and business activities, as well as the health and profitability of their horse stud farming activities.

7. STAKEHOLDER AND COMMUNITY ISSUES & CONCERNS

The Stakeholders and Interested Parties for this proposed amendment, and their comments are discussed in the Social Impact Assessment (SIA) undertaken by Enviroworks. This economic study and the SIA were commissioned by Greenmind in response to a request from the DMR and as a consequence of considerable concerns raised by over 1000 registered IAPs during the review of the initial draft environmental assessments of the proposed Tja Naledi Barrage Sand Mine amendment application. These studies were requested in order to enquire more deeply into the social and economic impacts of the proposed mining amendment that had not been adequately assessed in the previous draft versions of the BAR.

It is clear from the comments received from IAPs that their concerns were not just about the Tja Naledi mining amendment application, but with the cumulative effect of all the new and proposed sand mines in the area. There was also much local anger about the lack of adequate public participation and a variety of illegal activities that the mining developers were alleged to have engaged in.

There were specific requests by some of the IAPs for the economic and social impacts to be further investigated and taken into consideration in the impact assessment and the authorisation processes. The box below provides an extract of a comment received from the CEO of the Federation for a Sustainable Environment - questioning whether an adequate economic assessment had been undertaken and outlining what they believed was necessary in order to adequately assess the economic impacts of the existing and proposed mines and mining amendments.

8. ASSESSMENT OF ECONOMIC IMPACTS

8.1. IMPACT/RISK ASSESSMENT METHODOLOGY

The same impact assessment methodology as that used in the SIA has been applied in this economic impact assessment (see table below). This is a method that assesses the significance rating of each impact of the proposed development using a matrix of criteria derived from Plomp (2004) and adapted to some extent to fit this process, that adhere to the requirements of the NEMA legislation. However, some modifications were applied to ensure that the application of this method did not result in any biases that would favour mining over the existing land uses/developments due to the spatial scale or probability. Due to the local nature of most of the economic impacts, and the location of the proposed development on the boundary between two provinces and three municipalities, it was deemed inappropriate and potentially distorting to apply the usual spatial scales as outlined below. To avoid this all the impacts were given the same local rating. In addition, it was found to be biased to give the known certainty of the positive economic impacts of the mining ventures a higher probability score than the more difficult to measure negative impacts on the other existing land uses and developments. To avoid this bias the probability of the more difficult to quantify negative impacts (without mitigation) were given the same probability as the positive impacts (without mitigation). However, the probability ratings were applied as normal for the 'with mitigation' scenarios in order to take the uncertainties of their effectiveness into consideration. The significance of each activity is rated without mitigation measures and with mitigation measures for both construction and operational phases of the development.

Table 8.1: Impact Assessment Methodology

| Impact Assessment Methodology | |
|---|---|
| For each potential impact, the EXTENT (Spatial scale), MAGNITUDE (degree of the impact), DURATION (time scale), PROBABILITY (occurrence), will be assessed by the EAP as well as the Specialists. The assessment of the above criteria will be used to determine the significance of each impact, with and without the implementation of the proposed mitigation measures. The scale to be used to assess these variables and to define the rating categories are tabulated in Table 4 and Table 5 below. | |
| Table 1: Evaluation components, ranking scales and descriptions (criteria). | |
| Evaluation component | Ranking scale and description (criteria) |
| MAGNITUDE of NEGATIVE IMPACT (at the indicated spatial scale) | <p>Very high: Bio-physical and/or social functions and/or processes might be <i>severely</i> altered.</p> <p>High: Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered.</p> <p>Medium: Bio-physical and/or social functions and/or processes might be <i>notably</i> altered.</p> <p>Low : Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered.</p> <p>Very Low: Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered.</p> <p>Zero: Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p> |
| MAGNITUDE of | <p>Very high (positive): Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced.</p> <p>High (positive): Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced.</p> |

| | |
|---|---|
| POSITIVE IMPACT (at the indicated spatial scale) | <p>Medium (positive): Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced.</p> <p>Low (positive): Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced.</p> <p>Very Low (positive): Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced.</p> <p>Zero (positive): Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p> |
| DURATION | <p>Permanent</p> <p>Long term: Impact ceases after operational phase/life of the activity > 10 years.</p> <p>Medium term: Impact might occur during the operational phase/life of the activity – 10 years.</p> <p>Short term: Less than one year.</p> <p>Immediate: Less than 1 month.</p> |
| EXTENT (or spatial scale/influence of impact) | <p>International: Beyond National boundaries.</p> <p>National: Beyond Provincial boundaries and within National boundaries.</p> <p>Regional: Beyond 5 km of the proposed development and within Provincial boundaries.</p> <p>Local: Within 5 km of the proposed development.</p> <p>Site-specific: On site or within 100 m of the site boundary.</p> |
| FREQUENCY of occurrence of impact | <p>Continuous: Impact will occur continuously throughout the lifetime of the activity.</p> <p>Very Frequent: Impact will occur a few times a week to daily.</p> <p>Frequent: Impact will occur a few times a month.</p> <p>Occasional: Impact will occur once or twice a year.</p> <p>Very Rare: Impact will occur once or twice a decade.</p> |
| PROBABILITY (of occurrence) | <p>Definite: >95% chance of the potential impact occurring.</p> <p>High probability: 75% - 95% chance of the potential impact occurring.</p> <p>Medium probability: 25% - 75% chance of the potential impact occurring</p> <p>Low probability: 5% - 25% chance of the potential impact occurring.</p> <p>Improbable: <5% chance of the potential impact occurring.</p> |
| Evaluation component | Ranking scale and description (criteria) |
| CUMULATIVE impacts | <p>High: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p>Medium: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p>Low: The activity is localised and might have a negligible cumulative impact.</p> <p>None: No cumulative impact on the environment.</p> |

Table 2: Definition of significance ratings (positive and negative).

Once the evaluation components have been ranked for each potential impact, the significance of each potential impact will be assessed and assigned a significance rating, as per Table 5 below.

| Environmental Significance | Description |
|----------------------------|---|
| Very high (VH) | An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options. |
| High (H) | An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options. |
| Medium-high (MH) | If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked. |
| Medium (M) | If left unmanaged, an impact of moderate significance could influence a |

| | | | |
|--|---------------------|--|--|
| | | decision about whether or not to proceed with a proposed project. | |
| | Low (L) | An impact of Low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation. | |
| | Positive impact (+) | A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project. | |

8.2. IMPACT ASSESSMENT

Refer to Section 8.2.2 below for an assessment of the economic impacts associated with the revision/amendment of the mining right. The assessment process requires that the potential fatal flaws regarding the activity must be assessed and mitigation measures proposed to minimise the negative impact on the economy while enhancing the positive impacts associated with the development.

8.2.1. Assessment of Alternatives

The alternative land use development options for the affected farm and alternative layouts for the mine were not assessed in this study. This study did however compare the economic benefits of the mining development to the potential economic losses for other land use development activities existing in the affected locality.

8.2.2. Description of Impact of sand mining on other neighbouring economic activities and residents/visitors.

While the sand mine will provide some economic benefits, it will also have negative economic impacts on other existing land uses and businesses neighbouring the mine(s). These are largely tourism and agricultural activities/businesses. The tourism industry in this area is significant with many tourism resorts and residences, including the settlement of Vaaloewer, having been built along the river banks. This area is very popular as a weekend retreat for residents of the large urban centres of Gauteng to the north who have an easy 30-70 km drive to this area. They are attracted to this area as a result of its quiet rural and natural character and the opportunity for fishing and other water sports in and on the river. It has also become a popular wedding venue area.

Figures 8.1 & 8.2 provide vivid examples of the dust pollution events in the last year or two that have been linked to the mines. This dust is not just a visual impact, but also represents a health risk for neighbours in cases where the wind blows the dust towards and onto them. This is reported to be the case for the mine's immediate neighbours on the east side of the Vaal river from the mine, and also for the residents of Vaaloewer. Local residents reported considerable deposition of dust on properties along the banks of the Vaal River in Vaaloewer that have all subsequently been put on the market. Horses are also prone to silicosis and there is concern that the dust may affect the large horse stud directly across the river from the mine on

the Richardson property.



Figure 8.1: Dust from the mining areas during 2018. Photo taken from Vaaloewer.



Figure 8.2: Dust impact in mining area during windy period.

While the hills and slopes along the river may screen the visual impact of the mine for some neighbours, this is not the case for people with properties on more elevated sites in Vaaloewer and other properties along

the opposite bank of the river. In the Tja Naledi mine case this applies most directly to the Richardson property directly across the river from the mine. This property looks onto both the Tja Naledi mine and the neighbouring Pure Source mine. There are many residential and tourism properties that look directly on to the mine area. Their view (of the river and natural environment) will be changed and spoilt by the visibility of the cleared land, the stock piles of soil and sand, machinery and dust. As their views are a primary asset of all these properties, the demand for and price of these properties will likely to be negatively affected for the whole mining period (in this case 10-30 years) and afterwards unless effective rehabilitation is undertaken. The impact on property values already appears to be happening, particularly for elevated properties and those who have a direct view of the mining activities. It is possible that the poor economic situation nationally over the last few years has contributed to a drop in property prices in this area, along with some severe water pollution events from upstream areas, but the news of the mines and dust issues is reported by the local estate agents to be affecting demand and prices significantly at the moment. This is obviously a perception issue and a fearful reaction, and could potentially be managed, but the existence of many other properties all along the banks of the Vaal River, would also make it possible for potential buyers to find properties in places where there are no mines.

The noise impacts derive from the sound of the vehicles driving around the mine site and along the roads. In addition, the peeping noises from the trucks and machines when they are reversing is reported to be a particular problem. There will also be noise from the mechanical screening processes for the sand and gravel. These noises are new in this area and represent a significant disturbance and irritation to neighbours who have invested in homes and businesses in this area and the visitors who come to the area due to its quiet rural character.

Traffic along the rural service roads to the mines is reported to have increased substantially as a result of the mines. The traffic safety issues have to do with two factors:

- Deterioration of the road due to the increased volume of traffic and increased weight of vehicles using the roads to collect sand from the mines
- The poor condition of many of the vehicles coming to collect sand and non-adherence to safe driving practices and traffic regulations.

As a result of these problems, the local property owners have been engaging with the Department of Roads and working together to repair the road. The residents and the Minister of Roads (who visited the area to congratulate the residents on working with the department to maintain the roads) also called on the traffic authorities to enforce the traffic regulations. A first road block set up by the traffic authorities in mid-December 2018 resulted in 7 vehicles being impounded for not meeting the required road safety and licensing standards. It is alleged by local residents that a wide variety of vehicles from small to large come to

collect sand directly from the mines, and many of them are not roadworthy and break down along the service roads, obstructing traffic and causing a traffic hazard, sometimes for days. These vehicles do not belong to the mines but to the clients who come to purchase sand. Some local residents and visitors are alleged to have been driven off the road by the sand collection vehicles who have refused to move out of the middle of the road. In an effort to address this situation the local residents collaborated to clear the road verges and effectively widen the roads. This was not before a number of clients who had booked wedding events at the Vintage Yard venue close to the Sweet Sensations mine, had cancelled their bookings. Each cancellation results in a loss of R100 000 or more in business.

Effect on Agriculture

The neighbouring farmers are also affected by the mines through the road and traffic safety impacts primarily, but also through health and potential productivity impacts on orchards and crops from the dust. Health impacts on horses, cattle and other livestock may also emerge. The increased traffic in the area also poses a security risk for the farms.

8.2.3. Potential Mitigation Measures and Challenges

In order to avoid or minimise the negative impacts of the Tja Naledi mine on other economic activities in the area, the following mitigation strategies are recommended for inclusion in the EMP and subsequent implementation (see middle column of table below). However, not all of these mitigation measures are within the control of the mine and will require effective cooperation with others or enforcement by other parties (see right hand column of table below). In addition to these specific mitigation measures for this application, the DMR is advised to not consider issuing any mining rights/permits in areas where the local municipalities have not yet developed their Spatial Development Frameworks though the legally required public engagement processes, and where these SDFs have not factored in the mining potential within the municipal area.

With regard to the mitigation of the cumulative impacts, this will depend on whether the DMR is able to apply the recommended mitigation measures to all the mines in the area. This may be difficult as the EMP of the Sweet Sensations Mine has already been approved and does not include all of these mitigation measures. It appears that the environmental assessment for that mine identified and assessed **no** negative economic and social impacts on other sectors in the locality. The Pure Source mining application is currently underway, and it is not known whether similar socio-economic impacts and mitigation measures have been identified and proposed. The initial socio-economic scoping report for the Pure Source mine did not profile the significant visual, dust, noise and traffic impacts. If the other neighbouring mines are not legally required by DMR to implement effective mitigation measures to minimize the visual, noise, dust and traffic impacts, then it will not be possible to mitigate the cumulative impacts, even if they are imposed on Tja Naledi.

Table 8.2: Potential Mitigation Measures and Challenges

| Impact | Mitigation Recommendation | Challenges and Effectiveness |
|---------------|---|--|
| Visual Impact | <ul style="list-style-type: none"> ○ Limiting the mining activities to a small area at any particular time and rehabilitating and revegetating these areas as soon as mining has been completed. ○ Planting trees and bushes that will obscure and reduce the visual impacts for neighbours. This could also be used as part of the rehabilitation process. This could create future economic benefits for the land owners by providing an alternative post-mining land use option. This may also require authorisation from DWS as the planting of trees, depending on the scale, may be considered a water use that requires authorisation. ○ Apply a buffer zone that excludes mining along the river banks and slopes immediately above them that are visible to neighbours, as well as along any public roads. The exact width of these buffer zones would need to be determined through an objective expert assessment. ○ Designing and managing the night time lighting on the mine to minimize visual intrusion for neighbours. | <ul style="list-style-type: none"> ○ This may prove difficult if different mineral resources are being mined and the distribution of the minerals varies. ○ This will certainly help and may eliminate the visual impact for many neighbours, but not for all neighbours, Those who live on elevated ridges or slopes and can see over or past the vegetation will still experience the visual intrusion. ○ There is also a possibility that the DWS will not award the water use authorisation for afforestation, and it may take quite some time to obtain such authorisation ○ A buffer zone that retains the natural bush and trees will be effective. Where the natural vegetation is grass only, trees and bushes may need to be planted to minimize the visual impacts. This may be problematic from a biodiversity and conservation perspective. ○ Lighting management is easy and an effective element of managing the visual intrusion. |
| Dust Impact | <ul style="list-style-type: none"> ○ Restricting the mines working hours to normal weekly working hours, that exclude any mining over the weekends when most tourism activities take place in this locality. ○ Planting trees and other vegetation around the mining area and facilities can be used to assist with the capture and reduction of | <ul style="list-style-type: none"> ○ ○ ○ ○ ○ See comments above re planting trees as mitigation. |

| Impact | Mitigation Recommendation | Challenges and Effectiveness |
|-----------------------|---|---|
| | <p>dust pollution. The recommendation re the planting of trees and other plants around the mining area and as part of the rehabilitation process is also relevant for dust management.</p> <ul style="list-style-type: none"> ○ Covering sand and soil stockpiles during windy periods. ○ Applying water to roads and stockpiles and unvegetated mined areas to reduce dust during windy periods. ○ Requiring their clients cover the sand loaded onto their vehicles while transporting it. | <ul style="list-style-type: none"> ○ This would only be viable for small stockpiles and with effective fasteners ○ This can be effective but depends on the availability and use of water, which is becoming scarcer. This mine only has access to borehole water. ○ Covering sand on vehicles would certainly assist but may be difficult to enforce as it is not a legal requirement and law enforcement is not adequate or effective. |
| Noise Impact | <ul style="list-style-type: none"> ○ Alteration of vehicles warning noises when reversing to reduce the sound levels ○ Restriction of mining activities to working hours and week days ○ The planting of vegetation for visual and dust mitigation may also assist with noise mitigation | <ul style="list-style-type: none"> ○ This is technically feasible but will need ongoing application as vehicles change. ○ These regulations are easy to apply and can reduce the disturbance factor. Given that most visitors only come over the weekends, this would go a long way to reducing the impact on tourism, but less so for the permanent residents. ○ Vegetation – see comment discussed above. |
| Traffic Safety Impact | <ul style="list-style-type: none"> ○ Traffic law enforcement. ○ Restricting the mines working hours (including times for the sale and collection of sand & gravel) to normal weekly working hours, that exclude the weekend. | <ul style="list-style-type: none"> ○ Traffic law enforcement is the responsibility of the Municipal Traffic Officials and is largely outside the control of the mines. Enforcement by the municipalities is not adequate or effective due to limited resources and will. The location of these mines in a relatively remote area on the boundaries of three different Municipalities and provinces also |

| Impact | Mitigation Recommendation | Challenges and Effectiveness |
|--------------------------|---|--|
| | <ul style="list-style-type: none"> ○ The mine(s) transporting the sand to a storage depot in an urban area next to tarred roads, and selling the sand and gravel to clients from that facility rather than from the rural mine site. | <p>presents challenges to effective law enforcement.</p> <ul style="list-style-type: none"> ○ The mine or one agent transporting the sand and gravel to an urban depot from where it is sold to clients is only really feasible if they can maintain a price advantage over sources of sand. Ideally, this is something they should do in collaboration with all the other sand mines in this area and would benefit from the economies of scale. |
| Road Safety & Efficiency | <ul style="list-style-type: none"> ○ The mine management cooperating with the Department of Roads and the other landowners and contributing financially or in kind to the erection of road traffic management signs and the maintenance of the roads use by the mine and its clients. ○ The mine transporting the sand to a storage depot in an urban area next to tarred roads, and selling the sand and gravel to its many clients from that facility rather than from the rural mine site. | <ul style="list-style-type: none"> ○ This has already started happening and needs to be maintained. It depends on the cooperation of all the parties. Changes in mining agents and economic circumstances will disrupt such relationships. ○ Depot – see comment discussed above. |

The visual, noise, dust, traffic and road impacts will be significant and have already begun to be experienced and felt during the last two years when sand mining activities began to scale up in this area due to the developments on the neighbouring Sweet Sensations and the Pure Source properties.

8.2.4. Supply of sand to Building Industry

Description

The mine will supply high quality sand and gravel to the regional construction, residential and manufacturing sectors, particularly those located in the growing urban areas within 100 km of the mine. Sand and gravel are essential ingredients in the production of concrete for buildings, roads/paths and other infrastructure, and are also used for landscaping, glass production and filtering systems. The supply of sand is therefore seen as a valuable economic benefit.

At the same time sand is widely distributed in the environment and is mined in a wide range of locations. There are also many sand deposits along the length of the Vaal river. Consequently, it is not known how scarce this resource is at present and whether there is sufficient need to justify mining activities that will impact negatively on the existing tourism and agricultural sectors. The continued poor negative economic growth performance of the mining and construction sectors since 2012, and the development of other sand mines in the area, also puts the economic viability and appropriateness of authorising such developments at this time, into question. The amendment of Tja Naledi's mining permit to include gravel production would improve the economic viability of this mining venture.

Application of impact to different phases of the project:

1. Construction Phase
2. Operational Phase

Mitigation measures – n/a

Impact: Supply of sand for construction sector.

| Criteria | Positive Impact | |
|---|-------------------|------------------|
| | Before Mitigation | After Mitigation |
| Magnitude | Very Low | N/A |
| Duration | Med | N/A |
| Extent | Local | N/A |
| Frequency | Continuous | N/A |
| Probability | Definite | N/A |
| Significance Rating | Low | N/A |
| Reversibility | n/a | |
| Irreplaceable loss of resources? | Yes | |
| Mitigation opportunity? | n/a | |
| Mitigation measures: | None | |

| Criteria | Positive Impact | |
|----------------------------|--|------------------|
| | Before Mitigation | After Mitigation |
| Cumulative impacts: | The Cumulative impact of all the mines is rated as Medium (68), due to a magnitude of 6, duration of 4 and probability of 4. | |

8.2.5. Employment Impacts

Description:

The mine(s) will have both positive and negative employment impacts. These are summarised in the impact table below.

Positive Impact

The construction and operation of the Tja Naledi mine, under the proposed amended mining permit, will apparently provide 3 additional direct employment opportunities to the current five employees. However, an examination of the mining application indicates that the financial resources to be spent on labour include a salary for one senior manager, one skilled employee, and relatively minor budget for 6 semi-skilled employees. Analysis of the salary information indicates that the semi-skilled jobs would amount to at most 2 months of work for each semi-skilled labourer per annum. These are therefore not full-time or permanent jobs, but occasional or part-time employees. In total they amount to one additional full time job, which makes a total of 3 employees. Consequently, there is only a minor increase in the number of persons employed on the mine as a result of the authorisation of the mining amendment application.

The current workers are transported to the mine on a daily basis from Cartonville about 60km away to the north west of the Mine. While Tja Naledi has indicated that they will source the additional employees locally, it is not clear where these could come from and how they would get to the mine each day. The nearest towns are Vanderbylpark 25km to the east and Parys about the same distance to the south west. The only other potential local settlements where unskilled labour could potentially be sources is Vaaloewer and this requires a round trip of 24 km via the boundary road and its bridge over the Vaal river. Able bodied adults living on the local farms are likely to be employed on the farms and not available for other work. Transport would need to be arranged for any additional persons employed on the mine who are not coming from the neighbouring farms. Consequently, this employment benefit will be very Low.

Cumulative Positive Impact

If we look at the cumulative employment impacts of the mines, then these 3 employees would need to be added to the reported 50 new jobs that may be created on the Pure source mine (which may also be an

inflated number) and the 2-3 jobs at the Sweet Sensations mine. The cumulative employment benefit of all three mines will therefore also be low.

Negative Impact

While the mine(s) will create new job opportunities, they will also potentially negatively affect existing jobs in the local tourism, residential and building sectors, as well as the farming sector. This will be the case if the negative visual, noise, dust and traffic impacts associated with this mine, and the neighbouring mines, result in economic losses and the shedding of jobs or work days for these other sectors. This already appears to be happening so is likely to occur. Assuming the mining developments result in a 50% drop in employment in the local tourist, building and residential sector (currently estimated to be between 100-200 in the immediate vicinity), this could potentially result in a loss of 50-100 existing jobs and is likely to result in the loss of jobs or working days for almost all the 150+ households living in the labourers settlements in and adjacent to Vaaloewer. It could be much more if mining completely undermines tourism ventures, or result in much more seasonal part-time employment. This negative impact is rated as Medium negative impact using the rating scales, but at a local level this will be experienced as a much higher negative impact.

Application of impact to different phases of the project:

1. Construction Phase
2. Operational Phase
3. Decommissioning Phase

Mitigation measures:

See mitigation measures proposed to minimize visual, noise, dust and traffic impacts.

Impact: Employment/Jobs

| Criteria | Positive Impact of Mining | | Negative Impact on Tourism & Agric. | |
|--------------------|---------------------------|------------------|-------------------------------------|------------------|
| | Before Mitigation | After Mitigation | Before Mitigation | After Mitigation |
| Magnitude | Very Low | N/A | Low | Very Low |
| Duration | Medium Term | N/A | Medium Term (3) | Medium Term (3) |
| Extent | Local | N/A | Local (2) | Local (2) |
| Frequency | Continuously | N/A | Continuously (5) | Continuously (5) |
| Probability | Definite | N/A | Medium (3) | Medium (3) |

| Criteria | Positive Impact of Mining | | Negative Impact on Tourism & Agric. | |
|---|--|------------------|--|------------------|
| | Before Mitigation | After Mitigation | Before Mitigation | After Mitigation |
| Significance Rating | Low + | N/A | Medium – | Medium High - |
| Reversibility | N/A | N/A | N/A | N/A |
| Irreplaceable loss of resources? | N/A | N/A | N/A | N/A |
| Mitigation opportunity? | No | No | Yes | Yes |
| Mitigation measures: | Not Applicable | | Explained above. | |
| Cumulative impacts: | Together with the other two neighbouring sand mines, the total estimated employment created will be in the region of 60-70 persons. This increases the magnitude of the impact to Moderate (6) and a long-term duration (4) producing a total impact significance of (75) Medium High +. | | The possibility of mitigating the cumulative impacts is highly doubtful due to the failure to identify the negative social and economic impacts and apply effective mitigation measures in the already authorised mine and the other application under assessment. | |

8.2.6. Direct and Indirect Economic Impacts

The mine(s) will have both positive and negative indirect impacts. These are summarised in the impact table below.

Positive Impact

The direct and indirect economic opportunities created as a result of the mine(s) occurs through their sales of sand and their purchase of goods and services and the purchase of goods and services by their employees. In this way, the mine will indirectly increase the amount of cash inflow to the economy and in doing so create economic opportunities for others. In addition, the payment of local and national taxes by the mine and its employees will contribute to the government revenues and increase the financial resources available for state investments in infrastructure and social services. In these ways the project will result in direct economic benefits at the local, provincial and national levels. Where these benefits are directed and distributed can

be managed through decision making about who to sell to and who to contract and buy goods and services from.

In the case of this mine, the developers will be spending R15,1 million in the first two years on capital, construction, installation and other technical, environmental, social and labour services. Thereafter they will spend R4,3 pa increasing gradually with inflation to R6,4 million in year 10. This amounts to a total cost of R61,7 million in expenditure. In addition, R6,1 million will be paid to government as taxes over the 10 years. Total annual income will start at R7.7 in year one and total R83,7 million over the 10-year life of the mine, generating a total profit of R21,9 million, which will be spent or invested.

The annual amount to be spent by the mine on labour is reported as R 331 068 in year one and increasing to R 513 595 by year 10. Of this 36% will be spent on a senior manager, 42% on one skilled employee, and 21% on 6 semi-skilled employees. However, this wage bill for the semi-skilled employees amounts to around R7500 pa on each employee, which using the minimum wage rate, would equate to about 2 months of work for each labourer. So, these are unlikely to be full time jobs, even though they are not listed as part-time or non-permanent employees. The amount of spending power of these employees will therefore be negligible in the broader economy.

The sand mined will be sold on the open market. Their current clients are largely from the building industry in the greater Gauteng and Free State regions. As Gauteng is the largest urban network and population in South Africa, the demand for sand is high and growing. It is also clear from the local observations that the sand is sold to many different clients coming to the mine to buy and take delivery of small and larger quantities of sand. So the mine site serves as the production facility as well as the retail outlet. While some of this sand may be sold locally for building operations, the bulk is destined for the main urban centres in the neighbouring province.

As the product will be sold regionally and the labour and technical services sourced regionally, there will be virtually no economic benefits from the mine for the local economy. The benefit will therefore go to the larger urban economies within the region. However, because the mine is relatively small, the significance of these economic benefits for the region are also likely to be negligible. There are also many other sand mines in the region and along the Vaal river, the non-authorisation of this mine will have no discernible\ impact on the supply of sand and gravel and the economy.

Application to different phases of the project:

1. Construction Phase
2. Operational Phase

3. Decommissioning Phase

Mitigation measures:

See mitigation measures proposed to minimize visual, noise, dust and traffic impacts.

Impact: Direct and Indirect Impacts

| Criteria | Positive Impact of Mining | | Negative Impact on Tourism & Agric. | |
|---|---|------------------|--|------------------|
| | Before Mitigation | After Mitigation | Before Mitigation | After Mitigation |
| Magnitude | Very low | N/A | Low | Low |
| Duration | Medium | N/A | Medium | Medium |
| Extent | Local | N/A | Local | Local |
| Frequency | Continuous | N/A | Continuous | Continuous |
| Probability | Definite | N/A | Definite | Med |
| Significance Rating | Med | N/A | Med High | Med |
| Reversibility | N/A | N/A | Yes | Yes |
| Irreplaceable loss of resources? | N/A | N/A | N/A | N/A |
| Mitigation opportunity? | No | | Yes | |
| Mitigation measures: | N/A | | See section above. | |
| Cumulative impacts: | Together with the other two neighbouring sand mines, the total estimated indirect benefits created will increase. This increases the magnitude slightly with a long-term duration producing a total impact significance of Medium High +. | | The possibility of mitigating the cumulative impacts is highly doubtful due to the failure to identify the negative social and economic impacts and apply effective mitigation measures in the already authorised mine and the other application under assessment. | |

8.2.7. Social & economic empowerment impacts

Description:

The proponent of the mine is commended for its stated intention to explore ways in which to contribute to local social development through rehabilitation, skills development and business development projects during the operational phase. However, this mine is very small and its potential contribution to uplift the lives of the poor local population is very limited, given the small number of employees, the low skills levels required and relatively small income generation capacity. Any empowerment benefits are also likely to accrue to people outside the locality, in the more distant urban centres.

As in the case of this mining application, and the Pure Source application, the negative impact they could have on the development of the proposed educational development on the other side of the Vaal river would result in the loss of this valuable social empowerment opportunity for this area. It may however still be developed elsewhere, but this would result in the empowerment benefits for the existing Ramosukula school and pupils being forfeited.

The main empowerment impacts from small scale sand mining arise out of the separation in South Africa between mining rights/permits and land ownership. Consequently, someone who is not the land owner can apply for and obtain a mining permit and then enter into a royalty deal with the land owners or buy the land from the land owner. The application of this legislation creates the potential for BEE enterprises to obtain mineral exploitation rights (and associated economic income generating opportunities) on land that is not owned by them. In South Africa this is considered a valuable economic redistribution opportunity that could assist with addressing historic economic inequalities between the racial groups. However, in the case of small mines such as the Tja Naledi development, which is co-owned by the land owner, the number of previously disadvantaged persons benefiting from such economic redistribution is small and temporary. As in this case, these beneficiaries also do not live in this area and do not experience the negative social impacts of the dust, noise and traffic associated with the mining, and consequently do not have the same personal or social motivation to manage these as local residents might.

Application to different phases of the project:

1. Construction Phase
2. Operational Phase
3. Decommissioning Phase

Mitigation Measures:

The loss of the empowerment impacts associated with tourism and the proposed school and STEM campus

to this area could only be avoided if the cumulative visual, dust, noise and traffic impacts are effectively mitigated. The possibility of effectively mitigating these cumulative impacts will be a challenge due to the failure to identify the negative social and economic impacts and apply effective mitigation measures in the already authorised sand mine in the area (Sweet Sensations) and the other (Pure Source) application under assessment. It is not known if DMR would have the legal authority to amend the previously approved EMPRs retrospectively. The lack of any Spatial Development Framework (SDF) for the Local Municipality (that takes into consideration the mining resources and opportunities within the Municipality and the interests and concerns of all the stakeholders, within and on the boundaries of the LM who may be affected) also contributes to the difficulty of managing the cumulative impacts.

Impact: Social Empowerment Impacts

| Criteria | Positive Impact | | Negative Impact | |
|---|---|------------------|---|------------------|
| | Before Mitigation | After Mitigation | Before Mitigation | After Mitigation |
| Magnitude | Very low | N/A | Med-High | Low |
| Duration | Long term | N/A | Long term | Long term |
| Extent | Local | N/A | Local | Local |
| Frequency | Continuous | N/A | Continuous | Continuous |
| Probability | Highly Probable | N/A | Highly Probable | Highly Probable |
| Significance Rating | Low | N/A | Med | Med |
| Reversibility | N/A | N/A | | |
| Irreplaceable loss of resources? | N/A | N/A | | |
| Mitigation opportunity? | No | | Yes | |
| Mitigation measures: | Explained below. | | | |
| Cumulative impacts: | Low magnitude, long-term duration, Significance Low + | | The possibility of mitigating the cumulative impacts is highly doubtful | |

| Criteria | Positive Impact | | Negative Impact | |
|----------|-------------------|------------------|--|------------------|
| | Before Mitigation | After Mitigation | Before Mitigation | After Mitigation |
| | | | due to the failure to identify the negative social and economic impacts and apply effective mitigation measures in the already authorised mine and the other application under assessment. | |

8.2.8. Loss of property values

Description:

The Tja Naledi Barrage Mine has been in operation on a small scale for more than ten years and has not had any discernible impact on tourism or property values in the area. Their application to amend their mining permit will also not increase the scale of their operations but will add the gravel and sand screening process which will have additional noise impacts. However, the significant increase in the visual, noise and dust impacts associated with the Sweet Sensations mine which was initiated within the last two years, has increased these impacts and made them much more evident. If the 450 ha Pure Source mining application is approved, then these impacts are likely to escalate significantly. Consequently, these impacts have been accumulating and will continue to do so if the Pure Source application is approved.

The increase and evidence of the visual, noise and dust impact in the last year or two is reported by the local estate agents to be having a noticeable impacts on prospective property buyers and on the selling price of properties. The estate agents also reported an increase in the number of properties being put on the market, particularly those that overlook the Sweet Sensations mine and who have been affected by the dust and noise. Although the poor economic conditions may be contributing to the drop in demand and prices, these same trends in property prices are not evident in the nearby cities (i.e Vanderbylpark). The properties in this area are mostly sought after as holiday, tourism or retirement properties because of the quiet and natural scenic and river location. The development of the mines adjacent to this area is likely to encourage those looking for such properties to seek property along other undeveloped sections of the Vaal river. If we assume a 30% drop in the price of properties in the Vaaloewer area, this could amount to a loss of R150 million in property values. Due to the low employment levels on the mines, they will not result in a change in the type of people looking for property in these areas. Consequently, they will have no compensatory effect on the demand for property in this area.

Whether these impacts and effects on the property market continue will depend on the outcomes of the mining application processes and effective mitigation of the cumulative impacts. The possibility of effectively

mitigating these cumulative impacts will be a challenge due to the failure to identify the negative social and economic impacts and apply effective mitigation measures in the already authorised sand mine in the area (Sweet Sensations) and the other (Pure Source) application under assessment. It is not known if DMR would have the legal authority to amend the previously approved EMPRs retrospectively. The lack of any Spatial Development Framework (SDF) for the Local Municipality (that takes into consideration the mining resources and opportunities within the Municipality and the interests and concerns of all the stakeholders, within and on the boundaries of the LM who may be affected) also contributes to the difficulty of managing the cumulative impacts. There is therefore a high probability that the negative impacts on the existing tourism, residential and farming properties in the area will continue and continue until the mining activities have been completed and the area effectively rehabilitated.

Application of impact to different phases of the project:

1. Construction Phase
2. Operational Phase
3. Decommissioning Phase

Mitigation measures:

See mitigation measures proposed to minimize visual, noise, dust and traffic impacts.

Impact: Loss of Property Values

| Criteria | Negative Impact | |
|---|-------------------|------------------|
| | Before Mitigation | After Mitigation |
| Magnitude | Med | Low-Med |
| Duration | Med | Med |
| Extent | Local | Local |
| Frequency | Continuous | Continuous |
| Probability | Medium | Medium |
| Significance Rating | Medium | Medium |
| Reversibility | Yes | Yes |
| Irreplaceable loss of resources? | n/a | n/a |

| Criteria | Negative Impact | |
|--------------------------------|--|------------------|
| | Before Mitigation | After Mitigation |
| Mitigation opportunity? | Yes, but these will be counteracted by the cumulative impacts. | |
| Mitigation measures: | See proposed measures to mitigate visual, dust, noise and traffic impacts. | |
| Cumulative impacts: | The Cumulative impact of all the mines is rated as High due to a high magnitude, medium duration and high probability. The possibility of mitigating the cumulative impacts is doubtful due to the failure to identify the negative social and economic impacts and apply effective mitigation measures in the already authorised mine and the other application under assessment. | |

8.2.9. Traffic Impacts

The initiation of the Sweet Sensations mine a year or so ago, and the mining at Tja Naledi, has resulted in an increase in traffic on the service roads for the mines. This is because the mine sites also function as the retail outlet for the sand produced. This is confirmed on the website for the Sweet Sensations mining company which advertises that sand can be purchased directly from the mine in all quantities, large or small. Consequently, local residents have reported a significant increase in the volume of traffic on these roads. In addition, the vehicles being used by clients (probably mostly building contractors) range from relatively small to large, and many of them are reported to be in poor condition (see previous description in section 8.2.2). This has also increased the incidences of reckless and inconsiderate driving and in vehicle breakdowns along the service roads and the safety risks associated with these. In some cases, the vehicles are reported to have not been removed for days.

As a result of this situation local residents and businesses using these roads have experienced increasing costs and risks that are affecting their financial health and viability of living and doing business in the areas serviced by the access roads used by the mines and their clients. These include the risk and costs associated with traffic accidents, and the increasing wear and tear on vehicles due to poor road conditions. In addition, the increasing traffic will increase the security risk for all residents.

This increase in heavy traffic has also resulted in considerable deterioration in the condition of the dirt service roads which escalates the costs of business and living for all those who use these roads. The lack of budget and capacity of the road authorities to maintain these roads, has also resulted in local residents and

businesses having to work together and repair the roads themselves at their own cost. While the mines have also been included in these arrangements, the costs to other neighbours has increased and will continue to do so if additional mining in this area is authorised.

Application of impact to different phases of the project:

1. Construction Phase
2. Operational Phase
3. Decommissioning Phase

Mitigation Measures:

- The mine management cooperating with the Department of Roads and the other landowners and contributing financially or in kind to the erection of road traffic management signs and the maintenance of the roads use by the mine and its clients.
- The mine transporting the sand to a storage depot in an urban area next to tarred roads, and selling the sand and gravel to its many clients from that facility rather than from the rural mine site.
- Effective traffic law enforcement

Challenges:

- Retailing of sand in urban areas will require new and innovative business arrangements and collaboration between the mines.
- Effective traffic law enforcement is the responsibility of the Municipal Traffic Officials and is largely outside the control of the mines. Enforcement by the municipalities is not adequate or effective due to limited resources and will. The location of these mines in a relatively remote area on the boundaries of three different Municipalities *and provinces* also presents challenges to effective law enforcement.

Impact: Traffic Impacts.

| Criteria | Negative Impact | |
|---|--|------------------|
| | Before Mitigation | After Mitigation |
| Magnitude | Med | Low-Med |
| Duration | Med | Med |
| Extent | Local | Local |
| Frequency | Continuous | Continuous |
| Probability | Definite | Medium |
| Significance Rating | High | Medium |
| Reversibility | Yes | Yes |
| Irreplaceable loss of resources? | Yes – lives | Yes - lives. |
| Mitigation opportunity? | Yes | |
| Mitigation measures: | This will require cooperation between all the stakeholders to maintain the roads and business arrangements to relocate the retailing of sand to more accessible outlets closer to urban areas. This would also assist in reducing the dust and noise impacts. | |
| Cumulative impacts: | The Cumulative impact of all the mines is rated as High, due to a high magnitude, long-term duration and definite probability. The possibility of mitigating the cumulative impacts is more challenging requiring cooperation between all the mines and the local affected parties but could result in a significant improvement if retailing is relocated to more accessible urban areas with good road networks. | |

8.2.10. Loss of Agricultural Incomes

The project area falls within a generally high potential agricultural area that has close proximity to markets and support services. However, there agricultural potential of the portion of the Woodlands farm where the Tja Naledi mine is operating is more limited due to the sandy soils and limited water entitlements (productive

use rights). Currently this land not utilised for agriculture. It is owned by absentee land owner and has been mined for many years on small scale. Consequently there will be no loss of agricultural production associated directly with the mine amendment application.

There will however, be increasing costs and risks that will affect the financial health and viability of neighbouring farmers, especially those who use the same access roads as the mines and their clients. These include the risk and costs associated with traffic accidents, and the increasing wear and tear on vehicles due to poor road conditions. Local farmers have also had to assist with the road maintenance due to the lack of budget and capacity of the Roads authorities. This has increased the financial burden on the farmers. In addition, the increasing traffic will increase the security risk for famers and their tenants and staff, as well as livestock theft risks. The dust impacts may also have impacts on crop productivity and the health of residents and livestock. The vulnerability of horses to silicosis from sand dust presents a significant threat to the large horse stud on the opposite site of the Vaal river from the Tja Naledi mine and the proposed Pure Source sand mine.

Application of impact to different phases of the project:

1. Construction Phase
2. Operational Phase
3. Decommissioning Phase

Mitigation measures:

See mitigation measures proposed to minimize noise, dust and traffic impacts.

Impact: Impact on neighbouring Agricultural businesses.

| Criteria | Negative Impact | |
|--------------------|-------------------|------------------|
| | Before Mitigation | After Mitigation |
| Magnitude | Medium | Low-Medium |
| Duration | Medium | Medium |
| Extent | Local | Local |
| Frequency | Continuous | Continuous |
| Probability | Medium | Medium |

| Criteria | Negative Impact | |
|----------------------------------|---|------------------|
| | Before Mitigation | After Mitigation |
| Significance Rating | Medium | Medium |
| Reversibility | Yes | Yes |
| Irreplaceable loss of resources? | n/a | n/a |
| Mitigation opportunity? | Yes, but these will be counteracted by the cumulative impacts which will be difficult to mitigate. | |
| Mitigation measures: | See proposed measures to mitigate dust, noise and traffic impacts. | |
| Cumulative impacts: | The Cumulative impact of all the mines is rated as High due to a high magnitude, long term duration and high probability. The possibility of mitigating the cumulative impacts is doubtful due to the failure to identify the negative social and economic impacts and apply effective mitigation measures in the already authorised mine and the other application under assessment. | |

Table 8.3: Summary of potential impacts and their significance

| # | Impact | Rating Without Mitigation | Rating With Mitigation | Cumulative Impact Rating |
|--|--|---------------------------|------------------------|--------------------------|
| POSITIVE IMPACTS OF THE MINE | | | | |
| 1 | New jobs created | Low | N/A | Med High |
| 2 | Positive Direct and Indirect Economic Impacts | Med | N/A | Med High |
| 3 | Empowerment Benefit | Low | N/A | Medium |
| 4 | Supply of sand & gravel to the construction industry | Low | N/A | Medium |
| NEGATIVE IMPACTS OF THE MINE ON OTHER ECONOMIC ACTIVITIES | | | | |
| 5 | Existing tourism jobs lost | Med | Med | Med High |
| 6 | Negative indirect economic impacts associated with Tourism decline | Med High | Med | High |
| 7 | Empowerment loss | Med | Med | High |
| 8 | Loss of Property Values | Med | Med | High |
| 9 | Traffic Impacts – increasing costs | High | Med | High |
| 10 | Agricultural Impacts | Med | Med | High |

9. CONCLUSIONS AND WAY FORWARD

9.1. CONCLUSIONS

A total of 10 economic impacts were identified. These were grouped into positive impacts associated with the Mine and negative impacts on other sectors associated with the mine. Because this is a small mine and the proposed amendments are minor, three of the four positive impacts associated with the mine amendment are low and one is medium. These increase to medium and medium high benefits for the cumulative impact of all the mines.

The assessment found that the mine(s) are already having a considerable impact on the existing residential tourism and agricultural sectors and that these are likely to escalate substantially if the Pure Source and Tja Naledi mining right applications are approved. The six negative impacts of the Tja Naledi mine on other existing economic activities range from Medium to High. These will mostly increase to High in the case of the cumulative impacts of all the mines.

Some potentially effective mitigation measures have been recommended as a means to minimize the negative visual, noise, dust and traffic impacts on existing economic activities and residents, but there are doubts about the potential of Tja Naledi and the other mines to effectively implement these. These doubts arise from uncertainty about the potential for DMR to be able to have the EMP for the Sweet Sensations Mine amended retrospectively, and the inadequate attention paid to the social and economic impacts of the current Pure Source mining application. In addition, it is clear from the market analysis that most sand mines are struggling to remain profitable, with increasing input costs and low prices due to high competition and low demand. This economic situation will make it difficult for the sand mines to comply with onerous environmental mitigation measures aimed at minimizing the visual, noise, dust and traffic impacts. Effective mitigation of many of the impacts will also require the cooperation of the key stakeholders.

9.2. RECOMMENDATIONS

Our recommendation is that DMR carefully consider how they will ensure the effective management of the cumulative impacts of sand mining in this and other areas along the Vaal River. To do this, it will be necessary to develop a regional perspective on the existing sand and gravel mines as well as the applications for mining rights, and develop a regulatory strategy that can manage the number of mines in each locality and the economic impacts on other economic activities. There have been calls by ASPASA (The Aggregate and Sand Producers Association of Southern Africa <https://aspasa.co.za/>) for special regulations for this sector (separate to those for large mines) which take into account their needs as small, marginal and dispersed quarries in rural areas. This seems like a good opportunity to collaborate to find a viable standard way to enable such developments and at the same time effectively regulate the industry without putting them out of business. This may also serve

to equalise the playing field between different sand mining companies and improve the management of negative social, health and economic impacts.

With respect to the current applications by Tja Naledi and Pure Source, the economic impacts of these mines on existing economic activities and the marginal economic situation for these mines, suggests that it would not be appropriate to approve these mining applications at this stage. Alternatively, they could be approved subject to the mitigation measures recommended and included in their EMPs, if and **when** the mine's business financials are proven to be viable (given the broader market context) and can cover the cost of the mitigation measures that are needed to minimise the visual, noise, dust and traffic impacts. This may encourage the mining companies to look for sand mining opportunities in areas where the visual, noise, dust and traffic impacts are minor.

10. REFERENCES

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<http://www.mineralscouncil.org.sa>
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<https://www.property24.com/vanderbijlpark/vaaloewer/property-trends/3628>
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<http://www.statssa.gov.za/publications/P0302/P03022018.pdf> [Accessed on 12/12/2018]

Stone Quarrying, Clay and Sandpits in South Africa 2017. Report ID: 5152823. 106 pages. Available at: <https://www.reportbuyer.com/product/5152823/stone-quarrying-clay-and-sandpits-in-south-africa-2017.html>

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11. APPENDIX 1 – TEAM CV

MAURA TALBOT

Curriculum Vitae



Maura Talbot

Principal Environmental Consultant and Socio-Economic Specialist
CES - Leaders in environmental and social advisory services
The Point, Suite 408, 4th Floor, 76 Regent Road, Sea Point
Cape Town | Western Cape | South Africa
tel: +27 (0)21 045 0900 | **fax:** +27 (0)46 622 6564
cell: +27 (0)72 386 0537 | **skype:** Maura.talbot2
m.talbot@cesnet.co.za | www.cesnet.co.za

| | |
|-------------------------------|--|
| Years with firm | 6 years full-time and 8 years as external sub-consultant |
| Nationality | South African / British / Irish |
| Professional body | Member of the South African Monitoring & Evaluation Association |
| Key areas of expertise | <ul style="list-style-type: none">➤ Social Impact Assessment➤ Economic Impact Assessment➤ Socio-Economic Research➤ Stakeholder Engagement➤ Resettlement Planning➤ International E&S Safeguards and Standards (IFC, AfDB, EIB, RSB etc)➤ Monitoring & Evaluation➤ Environmental Impact Assessment➤ Strategic Environmental Assessment➤ Environmental Management Training |

PROFILE

Maura is a skilled and experienced public facilitator and socio-economic and environmental consultant, researcher, and academic with over twenty years of experience working in South Africa and other African Countries. She has a Master of Arts Degree in Human Geography with distinction, and two BA Honours degrees, one in Human Geography and another in Economics. Her research has had a strong policy and applied character and covered the fields of land reform, history of land use change in rural areas, rural development, community based natural resources management, integrated conservation and development projects, parks and neighbours projects, afforestation and fisheries development projects, and environmental, climate change and water/catchment management policy. As a senior socio-economic and environmental consultant for Coastal and Environmental Services (CES) and other clients for 20 years she worked on a number of assessment projects, including Strategic Environmental Assessments (SEAs) related to mining developments, conservation, forestry and municipal spatial planning; Environmental and Social Impact Assessments (EIAs) for roads, mines, biofuel estates, golf courses, conservation, tourism, and residential developments), facilitated stakeholder engagement processes for various EIA and SEA projects; qualitative and quantitative socio-economic surveys and monitoring; Social Impact Assessments (SIA), Resettlement Action Plans (as per IFC guidelines) and Economic Impact Assessments. These were for projects in South Africa, Madagascar, Mozambique, Malawi, Sierra Leone and Egypt. More recently, Maura undertook policy related research around incentive schemes for the restoration of catchment areas in the Eastern Cape Province of SA. This work explored carbon trading and water policies and the potential to use market mechanisms to facilitate social change. She also worked for five years as a lecturer in Environmental Science at Rhodes University and taught courses in Environmental Management, Socio-Ecological System Dynamics and Global Environmental Issues (including climate change science and policies). All of this work has allowed her to develop considerable skills in research, data analysis, writing, project design and proposal writing, project management, project evaluation, fund raising and stakeholder engagement. Developing her skills in compassionate communication and facilitating collaboration has become a particular interest for her in recent years.

ACADEMIC QUALIFICATIONS

Rhodes University, Grahamstown, South Africa

- 2007 – BA Honours Degree in Economics
- 1992 – Master of Arts Degree (Human Geography) with Distinction.
Thesis: *A geographical study of agricultural change since the 1930's in Shixini Location, Willowvale/Gatyana District, Transkei.*
- 1989 – BA Honours Degree in Geography
- 1987 – Completed Geography 111 Major
- 1986 – BA Degree with majors in Economics and Sociology

RELEVANT SOCIO- ECONOMIC PROJECT EXPERIENCE

Resettlement Planning

- Corridor Sands Limited (Mozambique): Social Monitoring of Resettlement Process
- Kenmare Moma Powerline Project: (Mozambique)
- Coleske Resettlement Action Plan, Baviaanskloof Nature Reserve and World Heritage Site, EC, SA,
- Resettlement Action Plan for the proposed La Repose Tourist Resort, Alexandria, Eastern Cape, South Africa.
- MCA Powerline Resettlement Action Plan Implementation - Completion Audit.

Social Baseline Assessments and Surveys

- Coleske Area Study (Baviaanskloof Nature Reserve): Study of Rights and Entitlements, Socio-economic Survey and Survey of Natural Resource Use amongst former farmworkers living in the Nature Reserve.
- EFA 2005-6: Lake Malawi Artisanal Fisheries Development Project: Baseline Study of the Fisheries and Forestry sectors.
- EFA 2003 – Socio-Economic Survey for the development of the Malawian Aquaculture Master Plan. Project funded by JICA (the Japanese Overseas Development Organisation).
- EFA 2003 - Advisory consultant on the 'Environmental and Social Review of the Les Gambas De L'Ankarana (Ltd.) Prawn Farm at Ambilobe, Madagascar
- DIFID/CSIR Private Sector/ Community Forestry Partnerships Research Project.
- Researcher & Project Manager - Addo Elephant National Park Pilots Research Project – investigating mutually beneficial business partnership options with neighbouring poor communities.

Social Impact Assessments (SIA)

- **CES 2000 - Social Specialist for Kentani Mining Strategic Environmental Assessment (SEA) – Wildcoast, EC Province, SA.**
- SIA for the Wildcoast Toll Highway, EC, SA.
- SIA for the La Repose Tourist Resort, Alexandria, Eastern Cape, South Africa.
- SIA for the Dutch Jatropha Consortium's proposed Jatropha

Estate and Biofuel Production Facilities, Buzi District, Mozambique.

- SIA for the Grown Energy Biofuel Project in the Zambezi Province, Mozambique.
- SIA for the Peregrin Dunes Golf Estate, Kidds Beach.
- SIA for the proposed redevelopment of an informal settlements in the wetlands adjacent to Masiphumelele Settlement, Cape Town.
- Social & Economic Impact Assessment for the ARME Phosphate Mine, Saldanha Bay, SA.

Stakeholder Engagement & Collaboration Facilitation

- Knysna Toll Highway ESIA Public Participation Process
- ESIA Public Participation Process for the proposed ADDAX Biofuel Development in Sierra Leone.
- Great Fish River Reserve Parks and Neighbours Project - facilitated collaboration and cooperation between the Park and its poor rural neighbours in the former Ciskei African Reserve/Homeland.

Economic Impact Assessments

- El Burulus Heavy Mineral Sands Mine, Egypt.
- Addendum EIA for the Corridor Sands Mining Project, Mozambique.
- La Repose Tourist Resort, Alexandria, Eastern Cape, South Africa.
- Economic Impact Assessment for the Kalagadi Manganese Smelter in the Coega IDZ, Port Elizabeth, South Africa.
- Economic Impact Assessment for the Exaro Smelter in the Coega IDZ, Port Elizabeth, South Africa.
- Socio-Economic Impact Assessment for the Greater Addo Elephant National Park, Eastern Cape, South Africa. Commissioned by SANParks and the World Bank.
- Social & Economic Impact Assessment for the ARME Phosphate Mine, Saldanha Bay, SA.

Monitoring and Evaluation.

- Enviro Fish Africa (EFA) 2002 – Evaluation of the Border Zone Development Project's (BZDP) Aquaculture Project (1997-2002), Malawi.
- **CES 2001 - SEA and Socio-economic/Institutional Assessment for the Greater Addo Elephant National Park Programme. Developing a Monitoring Programme.**
- Eve Brand Pty Ltd – Langkloof – Mid-term Evaluation of their Job's Fund Sanddrift Farm Development & Empowerment Project, Joubertina, Eastern Cape.

Policy

**ENVIRON-
MENTAL
PROJECT
EXPERIENCE**

- Development of Guidelines for Environmental and Social Impact Assessments (ESIA) for the Round Table on Sustainable Biofuels. An initiative of the École Polytechnique Fédérale De Lausanne (EPFL) Energy Centre, Switzerland. ECOSAS – Bioenergy Policy – Sustainable Forestry Certification Policy Tool Development
- CSIR Natural Resources Unit – Sustainable Bioenergy Policy (SA)
- GIZ – Lead Research Consultant on the potential to develop Payments for Ecosystem Services (PES) schemes in South Africa.

Research

- Institution opportunities and constraints to the development of ecosystem services markets in South Africa, more commonly known as Payments/Rewards for Ecosystem Services (PES) and Markets for Ecosystem Services (MES). These are essentially incentive schemes to encourage a shift towards more sustainable uses of land and water by land holders and greater private sector investment in restoration activities.
- CSIR Natural Resources Unit – Sustainable Bioenergy Policy (SA)
- ECOSAS – Bioenergy Policy – Sustainable Forestry Certification Policy Tool Development
- Addo Elephant National Park Pilots Research Project – investigating mutually beneficial business partnership options with neighbouring poor communities.
- DIFID/CSIR Private Sector/ Community Forestry Partnerships Research Project.
- Socio-Economic Survey for the development of the Malawian Aquaculture Master Plan. Project funded by JICA (the Japanese Overseas Development Organisation).
- Lake Malawi Artisanal Fisheries Development Project: Baseline Study of the Fisheries and Forestry sectors.
- Land reform researcher and development worker with BRC for communities acquiring land under the land claims and land redistribution programmes.

Environmental Impact Assessments (EIA)

- Knysna N2 Toll Highway-Bypass. (Project Manager)
- Toliara Sands Mining Project – Madagascar (Natural Resource Use Survey and Economic Impact Assessment).
- Madiba Bay Leisure Park Development – Social Impact Assessment.
- Scoping Process for the Grown Energy Biofuel Project in the Zambezi Province, Mozambique.
- Scoping Process for the Dutch Jatropha Consortium's proposed Jatropha Estate, Mozambique.

**EMPLOYMENT
EXPERIENCE
(SEQUENTIAL
LISTING)**

- Scoping Process for the Environmental Impact Assessment of Cape Nature's Proposed Eradication of Alien Fish in parts of four rivers in the Cape Floristic Region. CES in association with Enviro Fish Africa, Grahamstown.
- Atlantic Sands EIA, Strandfontein, Cape Town, SA.
- CSIR Biogas Plant, CSIR Campus, Pretoria, Gauteng, SA.

Environmental Resource Valuations

- Socio-Economic Study for the Garden Route Initiative's Marine Protected Areas. CES in Association with Anchor Environmental for WWF.

Miscellaneous

- Tsitsi Catchment Land Use Development Option Planning, former Transkei, SA, for ASGISA-EC.

Prefeasibility Assessments

- Dimbi Diamond Mine, Central African Republic.
- Transport options for the Corridor Sands Mining Project, Mozambique.

State of the Environment Reporting (SOER)

- Limpopo Province Phase 2 SOER

Strategic Environmental Assessments (SEA)

- **Kentani Mining SEA – Wildcoast, EC Province, SA.**
- Ngqushwa Municipality – Spatial Planning, EC, SA
- Amahlati Municipality – EC, SA
- Dept of Water Affairs & Forestry's Water Management Area 12 – focused on Afforestation potential. EC, SA.

Principal Consultant, EOH Coastal & Environmental Services
1 June 2018 – Present

Freelance Environmental and Socio-Economic Consultant – Cape Town
May 2018 – Aug 2017

Senior Environmental Consultant, Chand Environmental Consultants, Plumstead, Cape Town (Maternity Leave Replacement)
1 March 2017 – July 2017

Sabatical and Freelance Environmental and Socio-Economic Consultant – Cape Town
Feb 2017 – Aug 2016

Landscape Mobiliser & Knowledge Broker, Living Lands NPO, Langkloof, Joubertina, Eastern Cape, SA.
Jan 2015 – July 2016

Organisational Management – Living Lands (Part Time)
Jan 2013 –

Dec 2014

PhD Research Student, School of Governance, Stellenbosch University – Transdisciplinary Doctoral Programme
Sept 2011 – Dec 2014

Freelance Researcher & Consultant, Grahamstown, Langkloof & Cape Town, South Africa) *May 2010-June 2012*

Senior & Principal Environmental and Socio-Economic Consultant
- Coastal & Environmental Services, Grahamstown, South Africa.
Jan 2005 – March 2010

Post-Graduate Student Research Supervisor – Dept. Environmental Science & Dept. of Economics, Rhodes University (Grahamstown, South Africa)
Feb 2001 – Dec 2010

- *Supervision of 3 Environmental Science Masters Students*
- *Supervision of 3 Economics Honours Students and 1 Economics Masters Student*

Lecturer (Part-Time) in Environmental Science, Dept. Environmental Science, Rhodes University (Grahamstown, South Africa). *April 1999 – Dec 2004*

Researcher (Part-Time), Dept. of Environmental Science, Rhodes University. *April 1999 – Dec 2004*

Academic Journal Copy Editing – NISC. *4 months in 2004*

Freelance Consultant, Grahamstown, Eastern Cape Prov. South Africa. *2000 – 2005*

Maternity Leave in Malawi
March 1997 – Oct 1998

Researcher & Project Manager – Institute of Social & Economic Research, Rhodes University, Grahamstown, SA. *Nov 1995 – Feb 1997*

Researcher & Development Worker – Border Rural Committee, Grahamstown & East London, SA. *Jan 1992 – Oct 1995*

PUBLICATIONS

Groundwork - Border Rural Committee Newsletter

- Putting the Poorest First: Rural Development, Groundwork Vol 1, No. 1, March 1993.
- Black Rural Communities Facing Strong Opposition to Communal Land Tenure, Vol 1, No. 1, March 1993.

- Settlement Patterns and Land Use: The Problems Communities Face When Moving onto New Land, Vol 1, No. 5, Sept 1993.
- New Land Tenure Legislation: How will it affect the rural trust areas' right to land?, Vol 1, No. 5, Sept 1993.
- Local Government Negotiating forum, Vol 1, No. 6, Oct 1993.
- Local Government in the Border Communities, Vol 1, No. 6, Oct 1993.

State farms for landless, Daily Dispatch, 5 May 1995.

2000: M.Andrew, E. Janse van Rensburg and C. Fabricius (2000) Three-way partnerships: Maximising the Value of Collaborative Research in Park-Neighbour Projects. Paper presented at the SANP's 'Towards Best Practice' Conference in May 2000.

2003: Land Use & Livelihoods. Programme for Land & Agrarian Studies (Plaas) Occasional Paper No. 8: Evaluating Land & Agrarian Reform In South Africa. University of the Western Cape, Cape Town.

2003: Land Use And Rural Livelihoods: Have They Been Enhanced Through Land Reform? Policy Brief No. 5, Debating Land Reform And Rural Development. Programme for Land And Agrarian Studies, University Of The Western Cape, Cape Town.

Andrew, M & Fox, R.C. (2004) 'Under-cultivation' and intensification in the Transkei: a case study of historical changes in the use of arable land in Nompas, Shixini. Development Southern Africa, Vol. 21, No. 4, pp 688-706.

Andrew, M & Van Vlaenderen H. (2010) Commercial Biofuel Land Deals and Environmental and Social Impact Assessments in Africa: Three Case studies in Mozambique and Sierra Leone. Institute for Poverty, Land and Agrarian Studies (PLAAS), Land Deal Politics Initiative (LDPI) Working Paper 1.

Talbot M & Van den Broeck D. 2016. Shifting from Individual to Collective Action: Living Land's Experience in the Baviaanskloof, South Africa. Book Chapter 8.3 in Land Restoration: Reclaiming Landscapes for a Sustainable Future. Edited by Chabay I, Frick M and Helgeson J. Published by Academic Press (Elsevier), Waltham, USA. P. 599.

MAURA TALBOT

Curriculum Vitae

COURSES

- 1993: Training Course: Participatory Rural Appraisal, organised by MIDNET, 19-26 April 1993, Bulwer, Natal.
- 1996: Training Workshop: Project Planning and Management. Run by CENCE at the University of Port Elizabeth in November 1996.
- 2008 (10-15 May) Centre for Environmental Economics and Policy in Africa. Biannual Research Workshop and Biofuels Modeling Training session. Cape Town. CEEPA is based at the University of Pretoria, Agricultural and Resource Economics Department.
- 2013 Non-Violent Communication – Introductory Course and Conflict Mediation, 6 days August, Cape Town, SA.
Landscape Functions and People: Landscape Leadership, Conflicts and Collaboration, 17 to 29 November 2014, Centre for People and Forests, Bangkok, Thailand.
- 2014 Presencing Institute Foundation Course – Collective Social Learning, March 2014 Cape Town, SA.
- 2014 Qualitative Data Analysis and Atlas.it Course, 2 weeks August 2014, Stellenbosch University, Sociology Dept., SA.
- 2015 Non-Violent Communication – Intermediary Course, 10 days, July, San Francisco, USA
- 2016 Getting Things Done – Time and task management Course, 2 days, Sept, Cape Town, SA.
- 2018 Monitoring And Evaluation Training Course, CDRA, Woodstock, Cape Town, 22-25 Oct 2018

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.



Maura Talbot

Date: 25 Oct 2018

CONTACT DETAILS

| | |
|------------------------|---|
| Name of Company | Coastal & Environmental Services |
| Designation | Environmental Consultant |
| Profession | Environmental Consultant |

| | |
|---------------|------------------------|
| E-mail | m.johnson@cesnet.co.za |
|---------------|------------------------|

| | |
|----------------------|---------------|
| Office number | 082 746 43610 |
|----------------------|---------------|

| | |
|--------------------|---------------|
| Nationality | South African |
|--------------------|---------------|

| | |
|-------------------------------|---|
| Key areas of expertise | <ul style="list-style-type: none">➤ Remote Sensing➤ Geographic Information Systems |
|-------------------------------|---|

PROFILE

Michael holds a BSc in Geoinformatics, a BSc (Hons) cum laude in Geoinformatics and an MSc in Geoinformatics from Stellenbosch University. Michael's Master's thesis examined the use of Remote Sensing and computer vision technologies for the extraction of near-shore ocean wave characteristic parameters. For the duration of his Master's, he was based at the CSIR in Stellenbosch. During this time, in addition to his Master's studies, he conducted work in collaboration with the CSIR Coastal Systems Research Group and provided GIS and Remote Sensing tutoring and technical assistance to the junior staff and fellow students. Michael graduated in March 2018 and has been working for CES since.

EMPLOYMENT EXPERIENCE

Consultant, Coastal and Environmental Services
May 2018 - present

Sub consultant, EOH Coastal and Environmental Services
April 2018 – May 2018

Student/Junior project researcher, CSIR
February 2016 – November 2018

Course tutor, Stellenbosch University
February 2016 – November 2018

ACADEMIC QUALIFICATIONS

Stellenbosch University, South Africa
MSc: Geoinformatics
2016- March 2018

Stellenbosch University, South Africa
BSc (Hons) cum laude: Geoinformatics
2015

Stellenbosch University, South Africa
BSc: Geoinformatics
2012-2014

COURSES

Rhodes University and CES, Grahamstown
EIA Short Course 2017

CONFERENCE PROCEEDINGS

1. **37th Symposium of Remote Sensing of the Environment**
Extracting near-shore ocean wave characteristic parameters
using remote sensing and computer vision technologies
March 2017
2. **Society of South African Geographers Student
Conference**
Deriving bathymetry from multispectral Landsat 8 imagery in
South Africa
September 2016
3. **CSIR NRE Science week**
Detection of coastal ocean wave characteristics from remotely
sensed imagery
April 2016

**CONSULTING
EXPERIENCE**

MCA Malawi Resettlement Action Plan. Malawi 2018.
-Audit of project affected person hardcopy files

Kenmare Pilivili Heavy Mineral Mine. Mozambique 2018.
- Icuria Dunensis distribution mapping and area calculations
- Estuary Mouth Dynamics Historical Mapping

Triton Minerals Ancuabe Graphite Mine. Mozambique 2018.
-Field guide for Species of Conservation Concern

Suni Resources Balama Central Graphite Mine. Mozambique 2018.
-Mapping for ESIA

King Cetshwayo Environmental Management Framework. 2018.
-Creating, updating and mapping Landcover

Buffalo City Metropolitan Municipality Invasive Alien Species Plan. 2018.
-Mapping of alien plant species using remote sensing

Swartland Municipality Invasive Alien Plant Species Plan, 2018.
-Mapping of alien plant species

Northcliff Nature Reserve, 2018.
-Environmental Management Plan

Wijnberg dam Expansion, 2018.
-Basic Assessment

Hope Village Children's Mission, 2018.
-Basic Assessment

SANBI Kwelera National Botanical Gardens
-Viewshed analysis for visual impact study

Bayview WEF, 2018.
-Visual Impact Assessment

Rietkloof WEF, 2018.
-Visual Impact Assessment

Plan 8 WEF, 2018.
-Visual Impact Assessment Amendment

Golden Valley 2 WEF, 2018.
- Visual Impact Assessment Amendment

MICHAEL JOHNSTON

Curriculum Vitae

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.



Michael Johnson

Date: 01 December 2018

12. APPENDIX 2 – SPECIALIST DECLARATION

I, Maura Talbot, declare that in undertaking this specialist Economic Impact Assessment for the Tja Naledi Barrage Sand Mining amendment application:

- I act as the independent specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Maura Talbot

Signature of the specialist:

CES Environmental and Social Advisory Services

Name of company (if applicable):

22 January 2019

Date: