

FAUNAL ASSESSMENT REPORT

for the

**PROPOSED COAL MINE ON THE FARM DROOGENFONTEIN 241 IR
PORTIONS 26, 46 AND 47,
DELMAS,
MPUMALANGA.**

NOVEMBER 2013

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- Do not have any financial or vested interest in the undertaking and / or proceeding of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998);
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998);
- Will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not;
- As a registered member of the South African Council for Natural Scientific Professions, will undertake my profession in accordance with the Code of Conduct of the Council, as well as any other societies to which I am a member;
- Based on information provided to me by the project proponent, and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of my professional judgement.



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31 October 2013

TABLE OF CONTENTS

1. INTRODUCTION	6
1.1. Project Description	6
1.2. Terms of Reference	6
1.3. Deliverables	8
1.4. Assumptions and Limitations	8
2. METHODOLOGY	9
2.1. Desktop Analysis	9
2.2. Field Surveys	9
2.2.1. <i>Mammals</i>	9
2.2.2. <i>Herpetofauna</i>	9
2.2.3. <i>Avifauna</i>	10
2.3. Ecological Sensitivity: Conservation Importance and Ecological Function	10
3. FINDINGS	12
3.1. Fauna Habitat	12
3.1.1. <i>Agricultural Areas</i>	12
3.1.2. <i>Transformed Areas</i>	12
3.1.3. <i>Moist grassland and wetland areas</i>	13
3.2. Fauna Species	15
3.2.1. <i>Amphibians</i>	15
3.2.2. <i>Reptiles</i>	16
3.2.3. <i>Avifauna</i>	17
3.2.4. <i>Mammals</i>	17
3.2.5. <i>Invertebrates</i>	18
3.3. Ecological Importance and Sensitivity	19
3.3.1. <i>High Ecological Sensitivity: Wetlands and Moist Grassland / Seeps</i>	19
3.3.2. <i>Low Ecological Sensitivity – Agricultural Areas and Transformed areas</i>	19
4. IMPACT ASSESSMENT AND MITIGATION	20
4.1. Impact Assessment Methodology	20
4.2. Impact Assessment	22
4.3. Mitigating Measures	27
5. CONCLUSION AND RECOMMENDATIONS	28
6. REFERENCES	29

LIST OF FIGURES

Figure 1– Locality Map..... 7
Figure 2 – Hydrology Scan of the Study Area 11

LIST OF TABLES

Table 1– Amphibian species likely to occur within the quarter degree grid 2628BA 16
Table 2 – Impacts associated with the CONSTRUCTION / DEVELOPMENT phase..... 22
Table 3 – Impacts associated with the OPERATIONAL phase..... 24
Table 4 – Impacts associated with the CLOSURE phase..... 26

1. INTRODUCTION

1.1. Project Description

Classical Environmental Management Services (C.E.M.S.) has been appointed by Shangoni Management Services to provide an assessment of the fauna present and possibly occurring within the proposed coal mine on the Farm Droogenfontein, Portions 26, 46 and 47, Delmas, Mpumalanga Province.

Figure 1 shows the locality of the farm portions assessed for the proposed mining development. Portion 26 of the Farm Droogenfontein is approximately 130 ha and is located 15km south-west of Delmas while Portion 46 and 47 of the same farm are approximately 8 ha combined and situated 13km west of Delmas.

A desk top analysis followed by a site assessment undertaken by C. Kneidinger of Classical Environmental Management Services on 17 October 2013 was done in order to gain insight to the study area and its fauna components. This report represents the findings obtained with respect to various fauna assemblages within these areas.

1.2. Terms of Reference

The terms of reference for the current study were as follows:

- Identification of the types of fauna habitat, especially ecologically sensitive areas, within the study area and for 500m surrounding the study area boundary with reference to mammals, birds and herpetofauna (reptiles and amphibians);
- Assessment of the mammal, bird and herpetofauna species, with particular reference to endangered species, which could possibly occur on site;
- To identify potential impacts of the proposed development on the fauna, if any,
- To identify mitigation measures of the proposed development on the fauna;
- To provide a classification of each impact identified; and
- To provide recommendations of the best alternative to be used.

This report presents the findings obtained following an assessment of the fauna associated with the proposed development done on 17 October 2013.

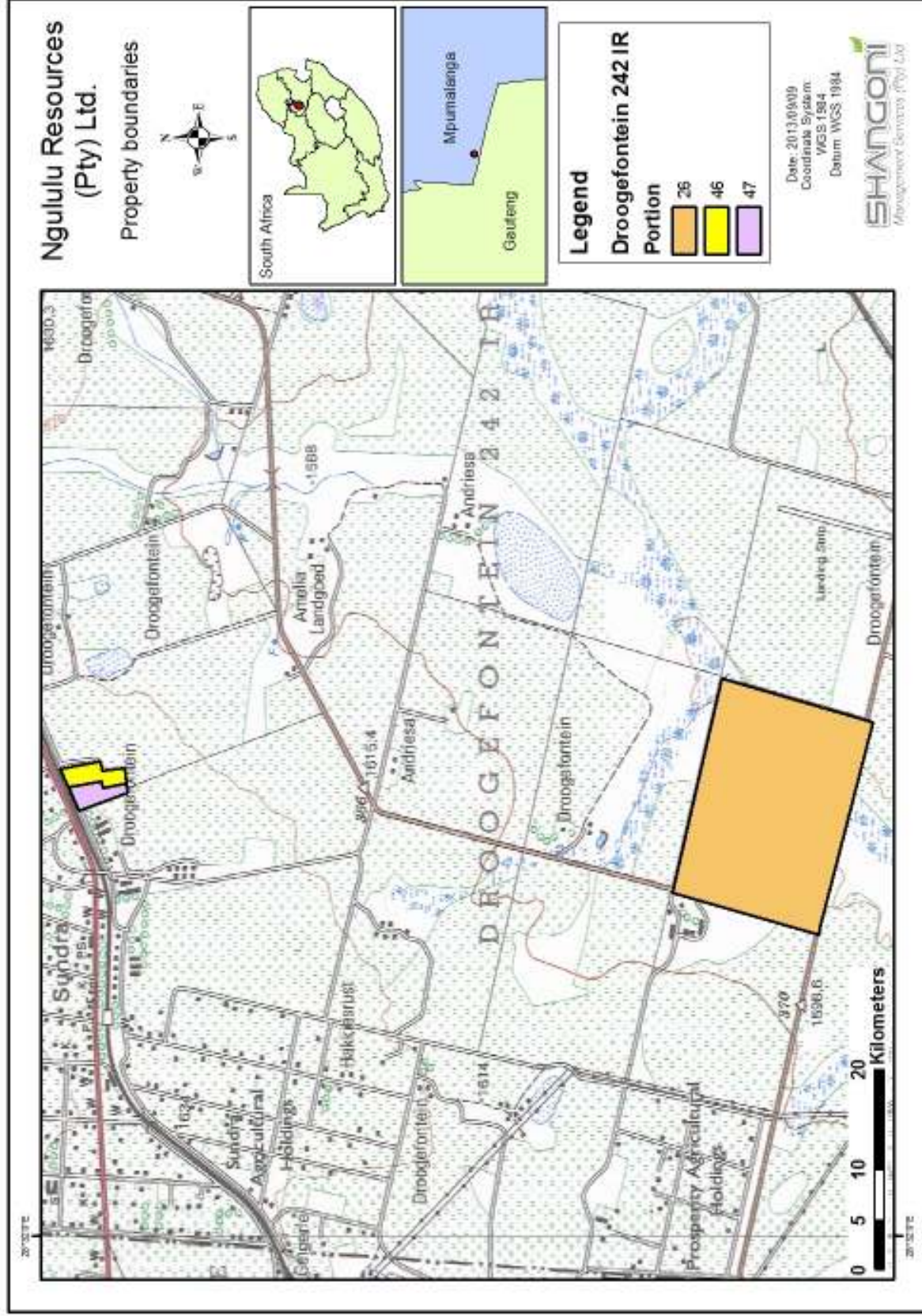


Figure 1– Locality Map

1.3. Deliverables

The current fauna report has the following deliverables:

- Report on the fauna species identified during the field survey, habitats present as well as an indication of suitable habitats on the study site that could support fauna species of conservation concern;
- Assessment of the impact that the proposed development could have on the fauna and flora on the study site as well as recommendations to limit or negate these perceived impacts.

1.4. Assumptions and Limitations

Faunal Assessments should be done across seasons or years to obtain an understanding of the community structures as well as the status of the endangered and vulnerable species in the area. Due to time constraints these long term studies are not feasible. This assessment includes only the winter / dry season sampled in 2013.

This Faunal Assessment was conducted mainly during the day. This resulted in less visual confirmations considering most faunal species are nocturnal in nature.

No mammal trapping was undertaken as this method of assessment only caters for mammal assemblages found during that survey period. Rather, vegetation on site and a desktop survey was utilised to provide information into the report with ground truthing exercises done to confirm conditions within the study area.

An invertebrate assessment was not undertaken as these are only representative of the species found during a particular survey period and extended assessments are not economically viable.

Every attempt has been made to use the latest information for each faunal grouping however some groupings only have data which are out of date and therefore are not as reliable.

2. METHODOLOGY

2.1. Desktop Analysis

The majority of mammals, reptiles and amphibians are nocturnal by nature and birds are highly mobile therefore the presence of suitable habitat was used to determine the status of these species through various field guides and atlas. The survey took into account the available habitat and the presence of possible sensitive habitats which was related to the identification of potential impacts resulting from the proposed development. The probability of occurrence of mammal, bird, reptile and amphibian species was based on their respective geographical area of occupancy and habitat suitability.

Mammals are named according to the Field Guide to Mammals of Southern Africa (Stuart and Stuart; 2001) and The Mammals of the Southern African Sub region (Skinners and Chimimba; 2005). Reptiles are named using The Field Guide to Snakes and Other Reptiles of Southern Africa (Branch, 1998) and amphibians through Frogs & Frogging in Southern Africa (Carruthers, 2001). Birds were identified using *Sasol Birds of Southern Africa* (Sinclair, I., Hockey, P. & Tarboton, W.;2002).

2.2. Field Surveys

During the field survey, the area was surveyed for the various fauna assemblages according to the methodology described below.

2.2.1. *Mammals*

A walk through of the site was done during the site survey whereby mammal species were identified by visual sightings as well as by means of spoor, droppings and roosting sights and available habitat. Mammals were identified using Field Guide to Mammals of Southern Africa (Stuart and Stuart; 2001) and The Mammals of the Southern African Sub region (Skinners and Chimimba; 2005).

2.2.2. *Herpetofauna*

Comprehensive amphibian surveys can only be undertaken by nocturnal surveys throughout the duration of the wet season. This was beyond the current scope of the assessment and the area was surveyed diurnally for possible habitat for amphibian species. A hydrology scan (Figure 2) was obtained to determine the presence of rivers and wetlands within the study area and these areas were surveyed for amphibian species. Based on available habitat observed during the field survey, amphibians were identified through a literature review, by use of the Frog Atlas (developed by the Animal Demography Unit, Cape Town University) and the field guide Frogs & Frogging in Southern Africa (Carruthers, 2001).

Reptiles were identified through a literature review and using *The Field Guide to Snakes and Other Reptiles of Southern Africa* (Branch, 1998) based on the habitat observed during the field survey.

2.2.3. *Avifauna*

Data regarding the distribution of bird species was obtained for the quarter degree grid using the information available from the South African Bird Atlas Project and the Mpumalanga Parks and Tourism Authority and isolated to species of conservation concern. Species of conservation concern were described using the Eskom Red Data Book of Birds of Southern Africa, Lesotho and Swaziland (Barnes, 2000). The avifauna assessment concentrated on identifying the possible occurrence of red data listed birds. Birds were identified using *Sasol Birds of Southern Africa* (Sinclair, I., Hockey, P. & Tarboton, W.;2002).

2.3. Ecological Sensitivity: Conservation Importance and Ecological Function

Three categories were used to describe ecological function (sensitivity) based on the resilience of the habitat type. Areas of high sensitivity cannot resist disturbances while areas of low sensitivity have a high resilience. Secondly, the degree of connectivity between different landscapes or habitat types also plays a role in ecological function. A habitat that has a high degree of connectivity is more sensitive than one with less connectivity. The three categories of ecological function are:

- High – Sensitive ecosystems with a low resilience towards disturbances or highly dynamic systems considered being stable and important for the maintenance of ecosystem integrity.
- Medium – These systems occur at disturbances of low-medium intensity and have some degree of connectivity with other ecological systems and
- Low – Degraded and highly disturbed systems with little ecological function.

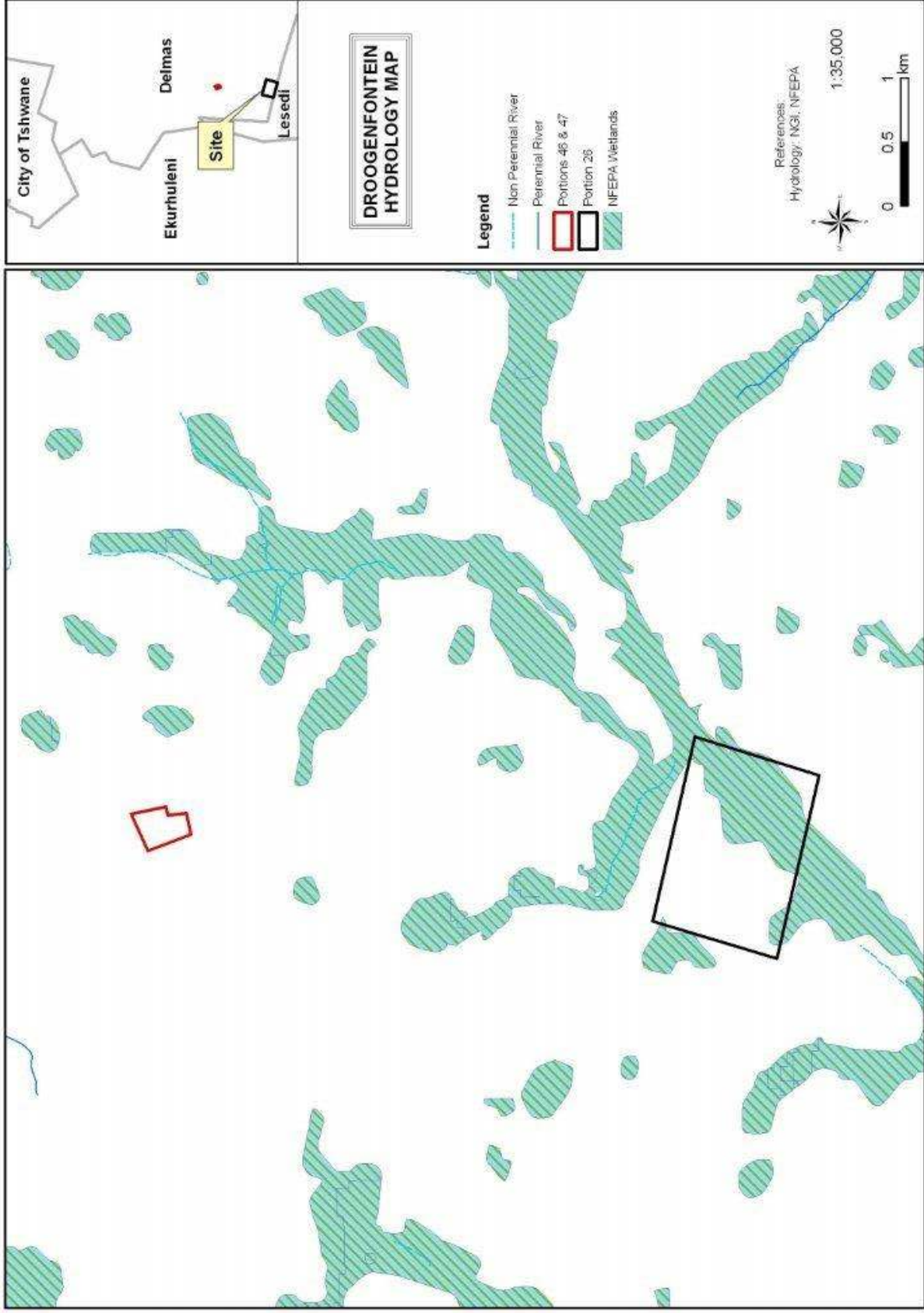


Figure 2 – Hydrology Scan of the Study Area

3. FINDINGS

3.1. Fauna Habitat

The following fauna habitats were identified within the study area:

3.1.1. *Agricultural Areas*

A large section of Portion 26 of the Farm Droogenfontein is utilized for the production of maize and is regularly ploughed.

3.1.2. *Transformed Areas*

Portion 46 and 47 are small holdings used for low level residential and agricultural purposes. The most transformed areas are comprised of housing (Photograph 1), a man-made dam on Portion 47 and transformed grassland used for grazing (Photograph 2).



Photograph 1 – Grazing area



Photograph 2 – Residential area on Portion 46

3.1.3. *Moist grassland and wetland areas*

The remainder of Portion 26 that is not utilized for maize production is comprised of a wetland area and associated moist grassland. These areas have been previously ploughed, likely during dry seasons, but are still considered important ecological areas (Photograph 3).



Photograph 3 – Wetland and associated moist grassland on Portion 26

3.2. Fauna Species

3.2.1. *Amphibians*

Comprehensive amphibian surveys and therefore a list of possible species can only be undertaken by nocturnal surveys throughout the duration of the wet season. This was beyond the current scope of the assessment and the area was surveyed diurnally for possible habitat for amphibian species based on the hydrology of the area (Figure 2). The species listed in Table 1 are likely to be present within the area (Quarter Degree 2628BA) and have been confirmed by the Mpumalanga Parks and Tourism Authority and the Frog Atlas. Extensive habitat transformation and high levels of human activities within a study area often results in low amphibian diversity as they are very sensitive to environmental stressors.

Portion 46 and 47 did not display wetland areas although a man-made dam is found on Portion 47 and a pan area is located in the vicinity of Portion 47. It is not expected for amphibian species to utilize Portion 46 and 47 considering the degraded and transformed nature of these portions and the lack of water resources.

On Portion 26, a large wetland area and associated moist grassland and seeps are present. However, this wetland area and associated grasslands have undergone previous disturbance in the form of ploughing and have therefore been transformed and possibly, in drier seasons, utilized for agriculture. Portion 26 has been significantly altered by agricultural practices in close proximity to the wetland areas and as such the anthropological impacts in the area are high. No species were confirmed during the survey period and it is not expected for the amphibian diversity to be significantly high. It is expected for the more common species to occur within the study area although in small populations. It is likely that mining practices will impact on the remaining amphibian populations and mitigation measures have been proposed as a minimum to reduce this impact.

Table 1– Amphibian species likely to occur within the quarter degree grid 2628BA

SCIENTIFIC NAME	CONSERVATION STATUS
Bufo gutturalis	Least Concern
Bufo rangeri	Least Concern
Cacosternum boettgeri	Least Concern
Kassina senegalensis	Least Concern
<i>Phrynobatrachus natalensis</i>	Least Concern
<i>Afrana angolensis</i>	Least Concern
<i>Afrana fuscigula</i>	Least Concern
<i>Schismaderma carens</i>	Least Concern
<i>Tomopterna cryptotis</i>	Least Concern
<i>Tomopterna natalensis</i>	Least Concern
<i>Xenopus laevis</i>	Least Concern

3.2.2. Reptiles

South Africa has a high diversity of reptile species, with more endemic reptile species than mammal species. Reptiles are generally shy and extremely sensitive to habitat destruction and transformation (Branch, 1998). As such a comprehensive species list specific to the study area could not be determined.

Reptiles are extremely secretive and difficult to observe during field surveys and therefore the identification of reptile species relied upon an assessment of the vegetation and surrounding areas to the site.

Considering the use of the portions as residential small holdings and agricultural areas, the resultant habitat destruction has caused the alteration of reptile assemblages occurring on and around the site. In addition, the lack of trees, stumps and rocky outcrops (for shelter/habitat) and termite/ant mounts (for foraging and roosting) within the study area further contributes to the lack of reptile assemblages. The site had also recently been burnt. Frequent burning of a site will impact the reptile species by reducing refuge areas and increasing predation as well as likely killing any species that cannot out run the flames.

It is not expected for arboreal reptiles to be present within the study areas although ground dwelling reptiles such as snakes may occur within the study area in small numbers. In addition, reptile species such as geckos and small lizards which have become accustomed to anthropogenic change are likely to occur especially on Portion 46 and 47.

The striped harlequin snake (*Homoroselaps dorsalis*) is classified as rare and of conservation concern but requires old termite mounds or scattered loose rocks according to its habitat requirements. As such, no suitable habitat exists for this species and it is not expected to occur within the study area. None of the reptile species likely to occur within the study area are considered to be of conservation concern.

3.2.3. *Avifauna*

The presence of bird species on and around the site relied upon a vegetation assessment, direct sightings, bird calls and the presence of nests. During the site survey, relatively few avifaunal species that are common and widespread were identified visually and there was a distinct lack of roosting sites. The assessment therefore relied heavily upon previous data available and the vegetation and geological features present on site. A list of bird species which may be present within the study area was obtained from the South African Bird Atlas Project, Quarter Degree Grid 2628BA.

Due to the high levels of human disturbances within the grassland and wetland areas, the site offers limited suitable habitat for any large terrestrial birds such as the secretary bird or large / small raptor species. Continuing pressure on wetlands and surrounding moist grassland habitat are largely responsible for the decline of the avifaunal species. Wetland areas are important as foraging and migratory corridors for avifauna species and as such these areas should be maintained.

By nature, birds are mobile fauna assemblages that are able to adapt and relocate rapidly. They are able to change their location rapidly and considering the transformed nature of the farm portions it is unlikely for the proposed mining development to have a significant negative impact on avifauna species of conservation concern. Mitigation measures identified should be implemented as a minimum to prevent any further disturbance to the wetland and associated areas. The wetlands and associated moist grassland and seeps will play an important role as microhabitat for avifauna species which may use the surrounding areas for foraging and roosting. These areas will also provide migratory corridors and flight paths for avifauna. As such, these areas should be maintained in as natural state as possible.

3.2.4. *Mammals*

The identification of possible mammal species present on the site relied upon assessment of the vegetation on site and supplemented by spoor or droppings. During the site assessment, signs of mammal presence were seen and included burrows, droppings and spoor.

Portion 46, 47 and 26 are capable of supporting opportunistic mammal species particularly small mammals (hares, mongoose, jackals, small buck) and rodents (mice and rats etc.) which will forage in the areas assessed and the surrounds. The transformed nature of the site is only suitable for opportunistic species due to the uniform habitat structure, limited diversity and constant anthropologic disturbance in the form of agriculture and housing.

A significant proportion of Portion 26 is comprised of wetlands and moist grassland areas which offer the most suitable habitat for natural mammal assemblages in terms of providing foraging habitat and shelter. Although previously disturbed, the wetlands and associated grasslands are considered a migratory corridor for small and large mammal species. No mammal species of conservation concern are considered to be present within the study area or surrounds.

The rough haired golden mole (*Chrysofalax villosus*) which is considered critically endangered has been recorded within the vicinity of the study area but is unlikely to occur within the area as it prefers using dry ground on the edges of marshes or vleis which is undisturbed. The study area, although likely to have been comprised of such areas has been altered and the effects of ploughing the wetland areas has rendered no suitable habitat for this species.

Should the mining development be approved, the mitigation measures proposed as a minimum will be very important to ensure the utilisation of the wetland area as a migratory path.

3.2.5. *Invertebrates*

No detailed assessment of invertebrate species was undertaken. The invertebrate assemblages are likely to be unnatural due to the agricultural practises on Portion 26 and the anthropological practises utilised and housing on Portion 46 and 7. In addition these species are mobile in nature and are not likely to be affected by the proposed development.

3.3. Ecological Importance and Sensitivity

The ecological sensitivity regarding fauna is described below.

3.3.1. *High Ecological Sensitivity: Wetlands and Moist Grassland / Seeps*

This habitat type was identified with a high ecological function and conservation importance based on the following characteristics:

- The wetlands and moist grassland are noteworthy movement corridors for terrestrial faunal species especially those with a preference for temperate conditions such as small rodent species and serve as important flight paths for many bird species and may be connected to other more suitable areas for foraging and roosting;
- These areas could provide suitable habitat for sensitive and non-sensitive fauna species including amphibians.
- The wetlands and moist grassland could provide breeding, foraging and roosting areas for a variety of fauna species.

3.3.2. *Low Ecological Sensitivity – Agricultural Areas and Transformed areas*

This habitat type was identified with a low ecological function and conservation importance based on the following characteristics:

- The agricultural and transformed areas are not expected to be utilised extensively by fauna assemblages. In addition they are uniform areas with very little cover and are disturbed regularly by anthropogenic sources;
- The high levels of transformation and cultivation disturbance has resulted in areas with no natural habitat which have a low ecological function; and
- Fauna assemblages are unlikely to utilise the area for foraging but are expected to utilise large ranges which includes the surrounding areas.

4. IMPACT ASSESSMENT AND MITIGATION

4.1. Impact Assessment Methodology

The impact assessment and mitigation phase identifies and assesses the significance of the impacts likely to arise during the construction and the operational phases of the proposed development, and provide mitigation necessary to limit the impact of the proposed development on the natural environment, specifically fauna. The significance rating system used for the environmental impact assessment is outlined below.

To determine the significance ranking, the following ranking should be applied to each identified impact:

SIGNIFICANCE RANKING MATRIX					
RANKING	MAGNITUDE	REVERSIBILITY	EXTENT	DURATION	PROBABILITY
5	Very high/ don't know	Irreversible	International	Permanent	Certain/ inevitable
4	High		National	Long term (impact ceases after operational life of asset)	Almost certain
3	Moderate	Reversibility with human intervention	Catchment	Medium term	Can occur
2	Low		Local	Short term	Unusual but possible
1	Minor	Completely reversible	Site bound	Immediate	Extremely remote
0	None		None		None

SIGNIFICANCE OF IMPACT = CONSEQUENCE (Magnitude + Duration + Extent + Reversibility) X PROBABILITY					
RANKING	65-100	64-36	35-16	15-5	1-4
SIGNIFICANCE	Very High	High	Moderate	Low	Minor

Where the following meaning applies:

- The **Magnitude** of the impact: This will be quantified as either:
 - Low: Will cause a low impact on the environment;
 - Moderate: Will result in the process continuing but in a controllable manner;
 - High: Will alter processes to the extent that they temporarily cease; and
 - Very High: Will result in complete destruction and permanent cessation of processes.
- The **Probability**: which shall describe the likelihood of impact occurring and is rated as follows:
 - Extremely remote: Which indicates that the impact will probably not happen;
 - Unusual but Possible: Distinct possibility of occurrence;
 - Can Occur: there is a possibility of occurrence;
 - Almost Certain: Most likely to occur; and
 - Certain/ Inevitable: Impact will occur despite any preventative measures put in place.
- The **duration (Exposure)**: wherein it will be indicated whether:
 - The impact will be of an immediate nature;
 - The impact will be of a short tem (Between 0-5 years);
 - The impact will be of medium term (between 5-15 years);
 - The impact will be long term (15 and more years); and
 - The impact will be permanent.
- **Reversibility/ Replace ability**: The degree at which the impact can be **reversible or the lost resource can be replaced**.

4.2. Impact Assessment

Impacts affecting the fauna within the study area have been separated into impacts which may occur during the construction phase, impacts which may occur during the operational phase and impacts which may occur during the operational phase.

Table 2 – Impacts associated with the CONSTRUCTION / DEVELOPMENT phase

IMPACT	SOURCE	EXTENT	DURATION	MAGNITUDE	REVERSIBILITY	PROBABILITY	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION
Loss of faunal habitat / Fragmentation	Clearing of Vegetation Communities will alter the current dynamics of fauna assemblages and result in a loss of habitat or fragmentation of habitat from similar areas. A fair amount of the agricultural and transformed land will be destroyed.	Local	Long Term	High	Reversible with Human Intervention	Almost Certain	High	High
Faunal disturbance	Artificial lighting – disruption of natural cycles especially nocturnal animals. Will also draw fauna species to it.	Local	Long Term	Moderate	Completely Reversible	Almost Certain	High	Moderate

IMPACT	SOURCE	EXTENT	DURATION	MAGNITUDE	REVERSIBILITY	PROBABILITY	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION
Faunal disturbance	High ambient noise levels will be present which will disturb the fauna assemblages and therefore they will no longer utilise the site or the surrounding area.	Local	Long Term	Moderate	Completely Reversible	Almost Certain	High	Moderate
Persecution/ Hunting	Personnel who are not fully educated with regards to fauna assemblages may hunt or persecute fauna for recreation or for food purposes.	Catchment	Long Term	Moderate	Completely Reversible	Can Occur	Moderate	Low
Water resources altered	Wetlands and moist grassland could be altered in structure or polluted.	Catchment	Long Term	High	Reversible with Human Intervention	Almost Certain	High	Moderate

Table 3 – Impacts associated with the OPERATIONAL phase

IMPACT	SOURCE	EXTENT	DURATION	MAGNITUDE	REVERSIBILITY	PROBABILITY	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION
Faunal disturbance	Artificial lighting – disruption of natural cycles especially nocturnal animals. Will also draw fauna species to it.	Local	Long Term	Moderate	Completely Reversible	Almost Certain	High	Moderate
Faunal disturbance	High ambient noise levels will be present which will disturb the fauna assemblages and therefore they will no longer utilise the site or the surrounding area.	Local	Long Term	Moderate	Completely Reversible	Almost Certain	High	Moderate
Persecution/ Hunting	Personnel who are not fully educated with regards to fauna assemblages may hunt or persecute fauna for recreation or for food purposes.	Catchment	Long Term	Moderate	Completely Reversible	Can Occur	Moderate	Low
Water resources altered	Wetlands and moist grassland could be altered in structure or polluted.	Catchment	Long Term	High	Reversible with Human Intervention	Almost Certain	High	Moderate

IMPACT	SOURCE	EXTENT	DURATION	MAGNITUDE	REVERSIBILITY	PROBABILITY	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION
Loss of faunal habitat / Fragmentation	<p>The operation of the mine is likely to cause the site to be fragmented from adjoining areas of similar structure and may interfere with the migration corridors comprised of the wetlands and moist grassland which forms a system in the area.</p> <p>Dumping may occur on the moist grassland or wetland areas.</p> <p>Deterioration of the wetland and moist grassland by pollution or sedimentation.</p>	Local	Long Term	High	Almost Certain	Reversible with Human Intervention	High	Moderate

Table 4 – Impacts associated with the CLOSURE phase

IMPACT	SOURCE	EXTENT	DURATION	MAGNITUDE	REVERSIBILITY	PROBABILITY	SIGNIFICANCE WITHOUT MITIGATION	SIGNIFICANCE WITH MITIGATION
Fauna habitat not rehabilitated	Lack of correct rehabilitation which will render the site with non-functional vegetation communities.	Local	Medium	Low	Reversible with Human Intervention	Almost Certain	Moderate	Low
Water resources altered	Wetlands and moist grassland could be altered in structure or polluted.	Catchment	Long Term	High	Reversible with Human Intervention	Almost Certain	High	Moderate

4.3. Mitigating Measures

1. Areas identified with high/ medium ecological sensitivity should be avoided during construction and operational activities. Where areas of high/ medium ecological sensitivity need to be disturbed, the necessary permits and mitigation measures recommended by the wetland and vegetation specialist should be implemented;
2. No natural watercourses, pans, or wetlands should be disturbed by the development at any time with a 500m buffer zone (marked during the construction phase) allowed for between the edge of any of the above mentioned features or an appropriate buffer zone as determined by a wetland specialist;
3. Construction and operational activities should be restricted to daylight hours to prevent any disturbance such as floodlights;
4. Should artificial lighting be required it must be restricted to areas under construction and not directed towards the wetland habitats and moist grassland;
5. Yellow sodium lights should be prescribed as they do not attract as many invertebrates at night and will not disturb the existing wildlife;
6. Fencing should be friendly to faunal species allowing for movement between areas. This can be achieved by applying culverts and an open mesh;
7. Personnel should be informed of the Animal Protection Act no. 71 of 1962 and encouraged not to harm any wildlife;
8. Personnel should undergo awareness training regarding fauna assemblages and the correct procedures to follow should fauna be found within the site. They should be encouraged not to harm any wildlife. They should also be informed of any policies and procedures applicable for fauna and the environment.
9. As much of the natural vegetation as possible should be left intact in order to maintain ecological corridors for the movement of faunal species;
10. Ecological corridors should include rivers and wetlands and the associated buffers as per the wetland assessment should remain undisturbed to provide the structural diversity required for safe movement of faunal species and provide migration corridors;
11. A management plan to prevent the personnel from harassing or poaching the faunal species should be developed and implemented;
12. The mining area should be rehabilitated and re-vegetated as soon as possible using an appropriate rehabilitation plan which incorporates indigenous plant species; and
13. Should the faunal species need to be removed from the study area, a faunal capture and relocation plan should be developed and implemented.

5. CONCLUSION AND RECOMMENDATIONS

The proposed construction activities and operational activities will irreversibly change the habitat structure of the study site. Even with mitigation measures and rehabilitation, the habitat structure is likely to be different as the agricultural areas will be altered to mining practise and the fauna assemblages will therefore be changed as the use of the area for fauna species will change. These changes to the site or surrounding area will likely impact negatively on the fauna of the area due to habitat fragmentation, less loss of habitat, fauna persecution and fauna disturbance within the area and other associated aspects. This will lead to a decrease in species number and/or suppression of the faunal species concerned as well as a reduction in migration routes for faunal species. Although no species of conservation concern are likely to be encountered on site the presence of common fauna species should still be considered and strict measures should be taken to minimise the impacts of the development as far as possible by utilising the mitigation measures provided. It is recommended for the wetland areas to be preserved in accordance with a wetland assessment and that any sensitive flora areas also be maintained. These areas should be structured to be connective to one another to allow for fauna migration through the site.

6. REFERENCES

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