Ikhephu
agricultural secondary co-operative

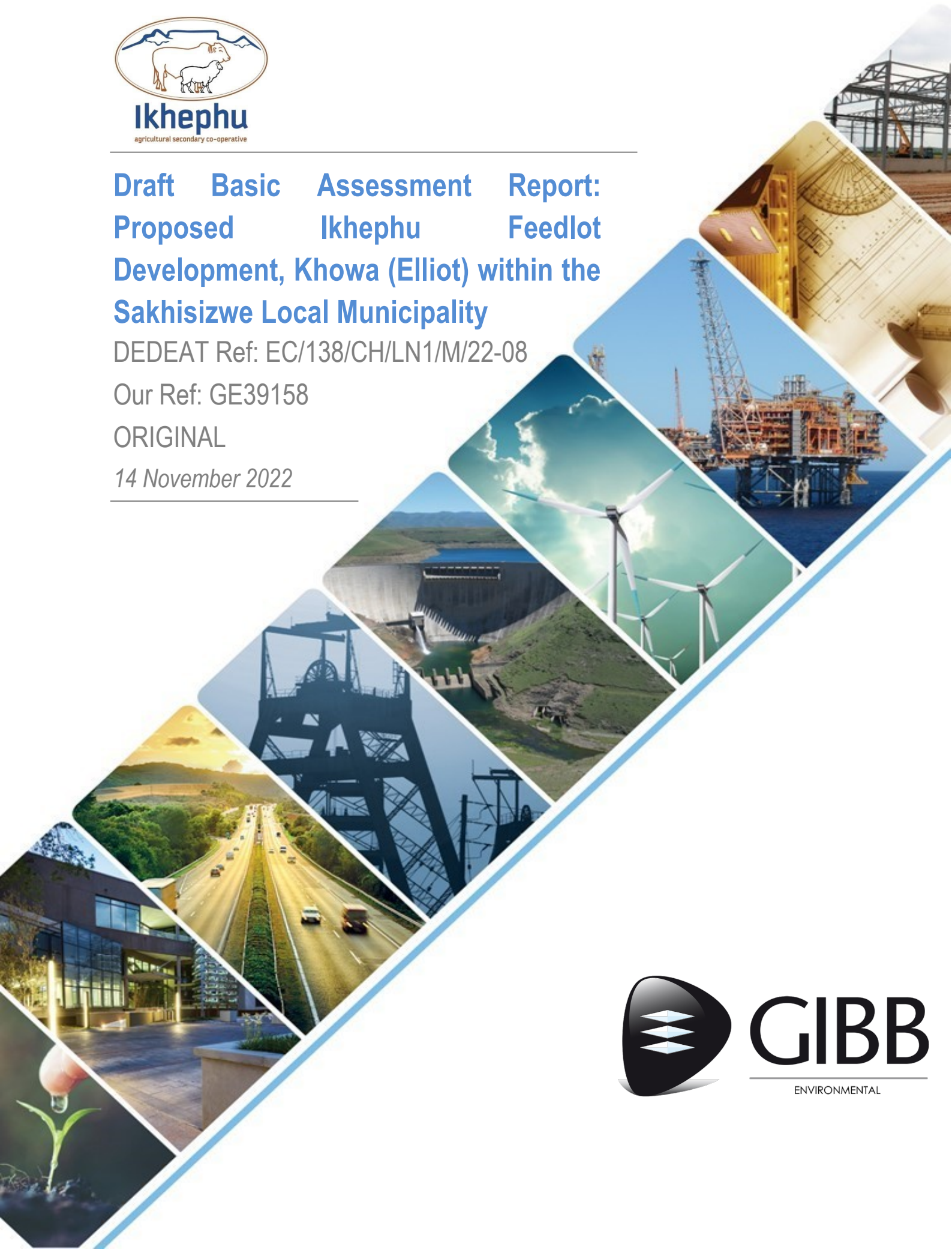
Draft Basic Assessment Report: Proposed Ikhephu Feedlot Development, Khowa (Elliot) within the Sakhisizwe Local Municipality

DEDEAT Ref: EC/138/CH/LN1/M/22-08

Our Ref: GE39158

ORIGINAL

14 November 2022



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Contact Information

Please contact the undermentioned should you require further information.

GIBB Environmental (Pty) Ltd	
Address:	East London 9 Pearce Street Berea, East London 5241 PO Box 19844 Tecoma, 5214
Website	www.gibbenvironental.co.za
Contact Person	Zikhona Wana Registered Environmental Assessment Practitioner (2019/555)
Contact number	+27 43 102 0249
Email	zwana@gibbenvironmental.co.za

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Abbreviations / Acronyms / Definitions

BA	Basic Assessment
BAR	Basic Assessment Report
BMPs	Best Management Practises
BPEO	Best Practice Environmental Option
CA	Competent Authority
CBA	Critical Biodiversity Areas
CH_4	Methane
CHDM	Chris Hani District Municipality
cm	Centimetre
CRR	Comments and Responses Report
COD	Chemical Oxygen Demand
CVBW	Channelled Valley Bottom Wetland
CVBW01	Delineated Channelled Valley Bottom Wetland 01
dB	Decibel
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
EC	Electrical Conductivity
ECPHRA	Eastern Cape Provincial Heritage Resources Agency
ECO	Environmental Control Officer
EIA Regulations	Environmental Impact Assessment Regulations, 2014 as amended
EME	Exempted Micro-Enterprise
EMPr	Environmental Management Programme
EN	Endangered
ESA	Ecological Support Areas
Eskom	Eskom Holdings SOC Limited
E. coli	Escherichia coli
EWT	Endangered Wildlife Trust

GHG	Greenhouse Gases
GIBB Environmental	GIBB Environmental (Pty) Ltd
ha	Hectare
H_2S	Hydrogen sulphide
IAP	Invasive Alien Plant
IEA	Integrated Environmental Authorisation
I&AP	Interested and Affected Party
km	Kilometre
LCC	Land Capability Class
LIA	Later Iron Age
LSA	Later Stone Age
l/s	Litre per second
m	Metre
m^2	Square metre
m^3	Cubic metre
mamsl	Metre above mean sea level
mbgl	Metre below ground level
mg/l	Milligram per litre
mm	Millimetre
Mya	Million Years Ago
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998), as amended
NEMBA	National Environmental Management Biodiversity Act, 2004 (Act 12 of 2004), as amended
NEMWA	National Environmental Management Waste Act, 2008 (Act 24 of 2008), as amended
NFEPA	National Freshwater Ecosystem Priority Area
NH_4	Ammonium
NHRA	National Heritage Resources Act, 1999 (Act 25 of 1999), as amended
NO_3	Nitrates
PHS	Provincial Heritage Site
PPE	Personal Protective Equipment
PPP	Public Participation Process
PO_4	Phosphate
RSA	Republic of South Africa
SAHRA	South African Heritage Resources Agency

SANS	South African National Standards
SCC	Species of Conservation Concern
Seep01	Delineated Seep wetland 01
SLM	Sakhisizwe Local Municipality
SMP	Stormwater Management Plan
SSV	Site Sensitivity Verification
StatsSA	Statistics South Africa
SuDS	Sustainable Drainage System
S&EIR	Scoping and Environmental Impact Reporting / Report
UV	Ultraviolet
UVB	Unchanneled valley bottom (wetland)
WML	Waste Management License
WUA	Water Use Authorisation
°C	Degrees Celsius

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BASIC ASSESSMENT REPORT

(For official use only)

File Reference Number:	
NEAS Number:	
Date Received:	

Basic Assessment Report (BAR) in terms of the Environmental Impact Assessment Regulations, 2014 as amended (EIA Regulations), promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA).

Kindly note that:

1. This **BAR** is a standard report that may be required by a competent authority (CA) in terms of the EIA Regulations and is meant to streamline applications. Please make sure that it is the report used by the particular CA for the activity that is being applied for.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
3. Where applicable **tick** the boxes that are applicable or **black out** the boxes that are not applicable in the report.
4. An incomplete report may be returned to the applicant for revision.
5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the CA for assessing the application, it may result in the rejection of the application as provided for in the EIA Regulations.
6. This report must be handed in at offices of the relevant CA as determined by each authority **unless indicated otherwise by the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (the Department)**.
7. No faxed or e-mailed reports will be accepted **unless indicated otherwise by the Department**.
8. The report must be compiled by an independent Environmental Assessment Practitioner (EAP). The EAP must satisfy Condition 11 below.
9. Unless protected by law, all information in the report will become public information on receipt by the CA. Any Interested and Affected Party (I&AP) should be provided with the information contained in this report on request, during any stage of the application process.
10. A CA may require that for specified types of activities in defined situations only parts of this report need to be completed.
11. EAP requirements:

11.1 The EAP must be registered in terms of S24H Regulations with the Registration Authority EAPASA[1] as from 8 August 2022.

11.2 S24H(14) states that only a person registered as an EAP may perform tasks in connection with an application for an Environmental Authorisation (EA) contemplated in:

11.2.1 Chapter 5 of the NEMA read with the EIA Regulations.

11.2.2 Section 24G of the NEMA.

[1] Environmental Assessment Practitioners Association South Africa

11.2.3 Chapter 5 of the National Environmental Management Waste Act, 2008 (Act No 59 of 2008), as amended (NEMWA) read with the EIA Regulations.

11.3 Tasks contemplated in Regulation 14 of the EIA Regulations may only be conducted by a registered EAP.

11.4 Regulations 20 of S24H Regulations indicates the offences and penalties as below:

11.4.1 A person is guilty of an offence if that person contravenes Regulation 14 of the EIA Regulations; or pretends to be a registered EAP or registered candidate EAP.

11.4.2 A person convicted of an offence in terms of Regulation 20(1) of the S24H Regulations is liable to the penalties contemplated in Section 49B(3) of the NEMA. Section 49B(3) of the NEMA states that a person convicted of an offence in terms of Section 49A(1)(h), (l), (m), (n), (o) or (p) is liable to a fine or to imprisonment for a period not exceeding one year, or to both a fine and such imprisonment.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	**YES**	~~NO~~

~~If YES, please complete form XX for each specialist thus appointed:~~

Any specialist reports must be contained in Appendix D. Refer to the said **Appendix D1 to D6**.

1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail

1.1 Introduction and Proposal

Ikhephu Co-Operative (hereinafter referred to as Ikhephu) proposes to develop a cattle feedlot in Khowa (Elliot), under the jurisdiction of Sakhisizwe Local (SLM) and Chris Hani District Municipality (CHDM). The development will fall on Erf 1 of Elliot owned by the SLM, about five kilometres (km) north of Khowa and along R58 leading to Barkly East (**Figure 1** and **Appendix G1,** below).

The Ikhephu Feedlot has an existing footprint developed by the CHDM, accessed through a gravel road with a boundary fence intact on all sides, however, the current site cannot be utilised to full capacity due to design issues. The Current Site measures about 33.3 hectare (ha) while the Alternative Site is approximately 38.4ha, of which only less than 20ha will be utilised for the proposed development. The land is relatively flat on the northern and western sides of the Alternative Site, occurring at an altitudinal range of 1 515 to 1 525 metres above mean sea level (mamsl), and slopes down towards the east and south side to an altitude of between 1 500 and 1 510 mamsl. The Current Site occurs at an average altitude of 1490 mamsl.

The existing facility infrastructure includes three-camp feedlot meant to house 450 animals, a steel storage structure utilised for feed storage and mixing, some water infrastructure (including a borehole), and incomplete offices (to be completed).

The proposed design will include:

- 2.3ha feedlot to house 1 500 head of cattle in camps not exceeding 150 head of cattle (15 square metres [m^2]/ animal) with feeding troughs and water reticulation;
- Load and offload facility (existing);
- Vehicle weigh bridge to be situated at the main entrance;

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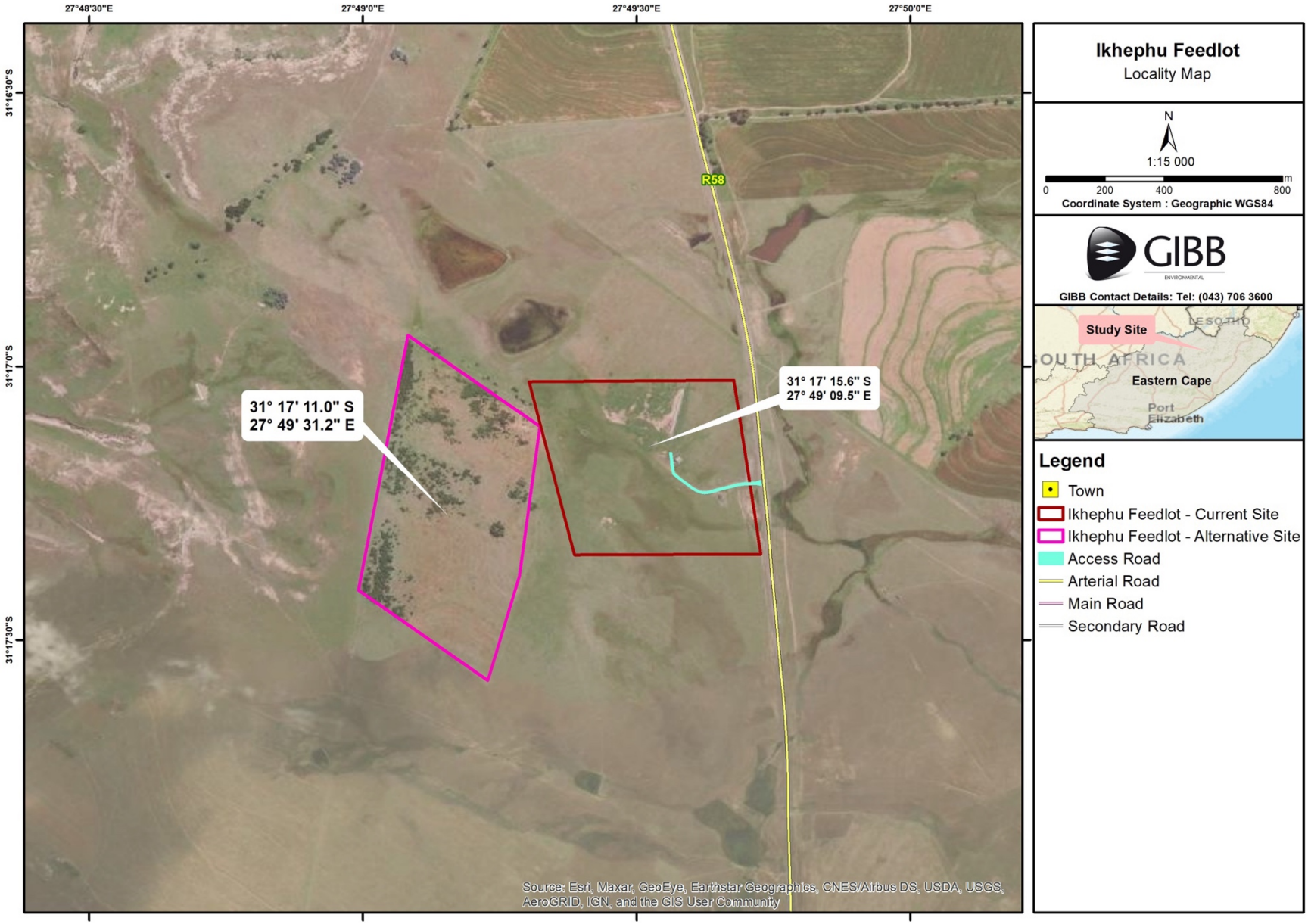

Figure 1: Locality of the current and alternative site

- Animal handling facility;
- Receiving and isolation pen;
- Water supply infrastructure (existing borehole);
- Feed storage and mixing shed (existing);
- Grain storage silo (2 x 30 ton) and hammer mill next to the existing feed storage and mixing shed;
- Vehicle storage/ workshop facility (18 x 40 metres [m] steel structure) to be situated near the existing feed storage and mixing shed facility;
- Office facilities (the existing incomplete structure is to be completed).

The design makes provision for the control of runoff water (stormwater cut-off embankments), waste lagoon, temporary storage of waste, disposal of solid waste (composting), toilets and facilities for labour force and internal roads.

Provision will be made for future expansion to 2 000 head of cattle in camps not exceeding 200 head of cattle (20m^2/ animal), this has been accounted for in the Integrated Environmental Authorisation (IEA) application and this BAR.

1.1.1 Stormwater Management

Stormwater cut off embankments are to be constructed along the entire western side of the feedlot to divert stormwater away from the feedlot so as to minimise stormwater coming into contact with the cattle dung and feed waste (contaminated stormwater). Further stormwater cut off embankments are to be installed on the eastern side of the feedlot to divert contaminated stormwater into the proposed 10 000 cubic metres (m^3) waste lagoon or storage dam. The contaminated stormwater in the storage dam will be utilised to irrigate arable lands/ pastures on site.

1.1.2 Water Supply

As alluded to above, a borehole exists within the Current Site. The registration status of the borehole is unknown, as per AGES Omega (2022) the borehole has a blow yield of 3.40 litres per second (l/s) and 0.80l/s sustainable yield.

Water supply for construction purposes will be sourced by the contractor either by using the water from the existing borehole, or carting water to site.

Water supply for operational purposes will be sourced from the existing borehole post testing. If the yield of the borehole is sufficient and should the registration of the borehole not be confirmed, the borehole will be registered with the regional Department of Water and Sanitation (DWS). Should the borehole not be found viable, a new borehole will need to be sited, drilled, and tested. The registration of existing borehole or establishment of a new one is not part of this application, nor the Water Use Authorisation (WUA) being undertaken by the EAP in conjunction with this application.

1.1.3 Wastewater and Sewer Management

The contractor will be responsible for sewer management during the construction phase, i.e., supply toilet facilities for construction personnel, which would be in the form of chemical toilets. These will be cleared from time to time as depicted in the Draft Environmental Management Programme (EMPr).

Sewer management during the operational phase will be through toilet facilities (French-drain septic tank) at the administration building that can be used by all personnel on site. A 6000 litre septic tank suited for use by 20 to 25 people will be installed within the Current Site, outside the delineated wetlands. The diameter of the tank will be 1 950 millimetres (mm), with a height of 2 080mm and length of 3 330mm. A 110mm diameter pipe of not more than 20m in length will convey the effluent from the toilets to the septic tank. French-drain septic tanks operate by settling of solids to the bottom, floating of scum to the top and the overflow of liquid through an outlet pipe into a distribution chamber, where it is directed into the septic field. The septic field is an effluent water disposal system, where the liquid is channelled through perforated pipes to different parts of a field of loose gravel.

1.1.4 Solid Waste Management

Solid waste from the construction site will be stockpiled in designated containers/ demarcated sites, whereafter it will be disposed of by the contractor at the municipal waste management facility.

During the operational phase solid waste to be generated will include feed waste stemming from the scraping of the feed pens (to remove the manure and excess feed, limit the amount of dust as well as moisture build-up on the surface at times when the weather is wetter). The concrete feedlot floor (pad), which will be provided with an interface layer to prevent groundwater contamination, will drain horizontally to the stormwater embankments. The pad will also be cleaned regularly to prevent contaminated runoff stemming from the pad to the open natural area immediately to the east and part of the north side of the feedlot. The cattle dung is to be heaped on a concrete area specifically developed to contain dung. The feed waste will be placed over a temporary dung heap (manure), below the feedlot and above the stormwater embankments and associated lagoon, from where it will be carted to the arable lands where it will be utilised as organic fertiliser. The feedlot design follows a plan that takes into account **Figure 2** for best management of contaminated stormwater.

1.1.5 Electrical Supply

There is an existing electrical supply point installed by Eskom Holdings SOC Limited (Eskom) on the Current Site, the operational activities will make use of this connection. Should more connections be required within the site, this will be the primary source.

Where possible, the contractor may negotiate to make use of the electricity during the construction phase. Alternatively, the contractor will need to provide their own electrical supply in the form of generators.

1.1.6 Site Access

Access to the Current Site already exists through a 350m long gravel road commencing from the R58 to the current offload facility. An existing 330m long track, to the north-western part of the Current Site, connects the Current Site to the Alternative Site. The track commences near the current offload facility, where the access road

terminates, to a second Current Site gate situated at the north-western corner. It is the intention of the developer to gravel the track to a width of 6m, thereafter develop a new 870m long by 6m wide gravel road within the Alternative Site.

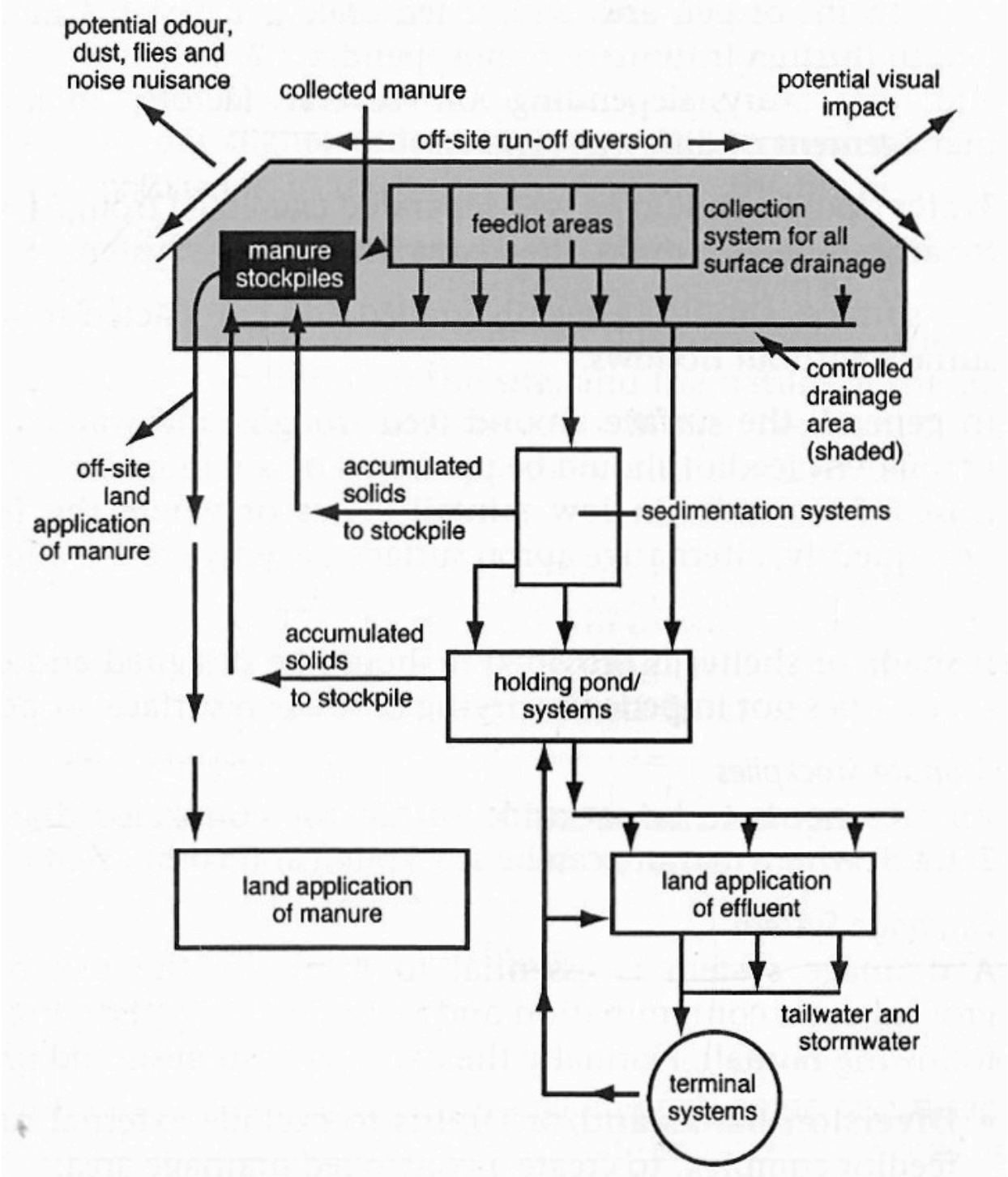

Figure 2: Master Plan for feedlots (source: Environmental Guidelines for Beef Cattle)

The infrastructure discussed above is shown in the proposed feedlot layout plan depicted in **Figure 3**, below.

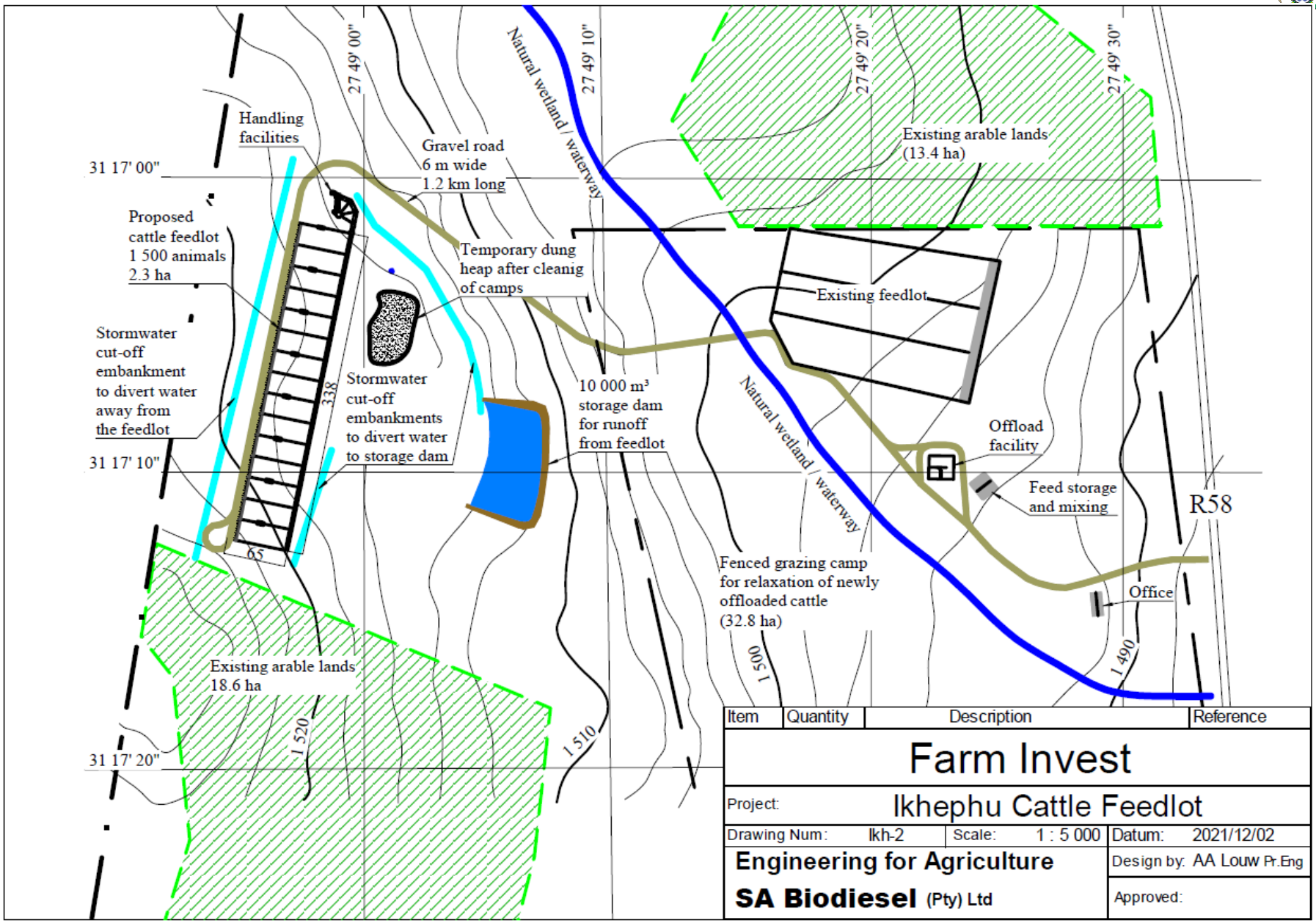

Figure 3: Proposed Feedlot Layout Plan

1.2 Property Ownership and Facility Management

The facility developed by the CHDM is yet to be formally handed over to the SLM, thus although the land is owned by the SLM the CHDM still bears responsibility regarding the facility. As such, consent was requested from both the SLM and CHDM regarding the proposed development.

1.3 Historical and Existing Landuses

According to Cossypha (2022), the Alternative Site has been cultivated and used for agriculture since at least 1985, i.e. 37 years or more. The agricultural practices on the Alternative Site appeared to have included terracing and cultivation (ploughed fields). The disturbance to the Alternative Site led to alien tree invasion (mainly Wattle *Acacia mearnsii*) along the northern and western fence lines.

The Current Site appeared to be mostly comprised of natural habitat (grassland and wetland) except for a cultivated or fallow field in the north-eastern section. The figure below puts into perspective the above historical landuse descriptors of the development site.

Figure 4: Historical landuse associated with the proposed development

According to the historical Google Earth satellite imagery, the existing facility was established in 2013. During this time the track to the Alternative Site, proposed to be gravelled, was established and excavations in the north-eastern corner of the Alternative Site appeared to have been made during the construction period.

Surrounding landuses are a mix of agricultural (cultivation and pastures), open grassland, watercourses (wetlands, streams and artificial dams) and a regional road (R58), refer to **Figure 5** below.

1.4 Receiving Environment

A Screening Report, for the Current and Alternative Site, were generated from the National Web-Based Environmental Screening Tool. The findings of the Screening Reports are as depicted in **Table 1** regarding sensitivity of the sites, the specialist studies identified based on the sensitivities before verification are listed thereafter.

As per Government Notice No. 320 and 1150 of 2020 enacted in terms of Section 24(5)(a) and (h) including Section 44 of the NEMA, prior to undertaking any specialist studies or assessments Site Sensitivity Verification (SSV) for each theme must be undertaken to confirm or dispute the findings of the Screening Report.

Table 1: Site Sensitivity

Theme	Current Site Sensitivity	Preferred Site Sensitivity
Agriculture	High	High
Animal Species	High	High
~~Aquatic Biodiversity~~	~~Very High~~	~~Low~~
Archaeological and Cultural Heritage	Low	Low
Civil Aviation	High	High
~~Defence~~	~~Low~~	~~Low~~
Palaeontology	Very High	Very High
Plant Species	Moderate	Moderate
Terrestrial Biodiversity	Very High	Very High

The specialist studies or assessments identified as per the Screening Reports prior to verification:

- Aquatic Biodiversity;
- Animal Species;
- Archaeological and Cultural Heritage;
- Hydrology;
- ~~Landscape / Visual~~;
- Palaeontology;
- Plant Species;
- ~~Socio-Economic~~; and
- Terrestrial Biodiversity.

SSVs were undertaken for the above listed themes, except for those struck through as these were waived by the Department during a virtual meeting held on 08 February 2022. Refer to **Appendix G4** for the SSV. The Landscape/ Visual and Socio-Economic Assessments were also waived by the Department during this meeting.

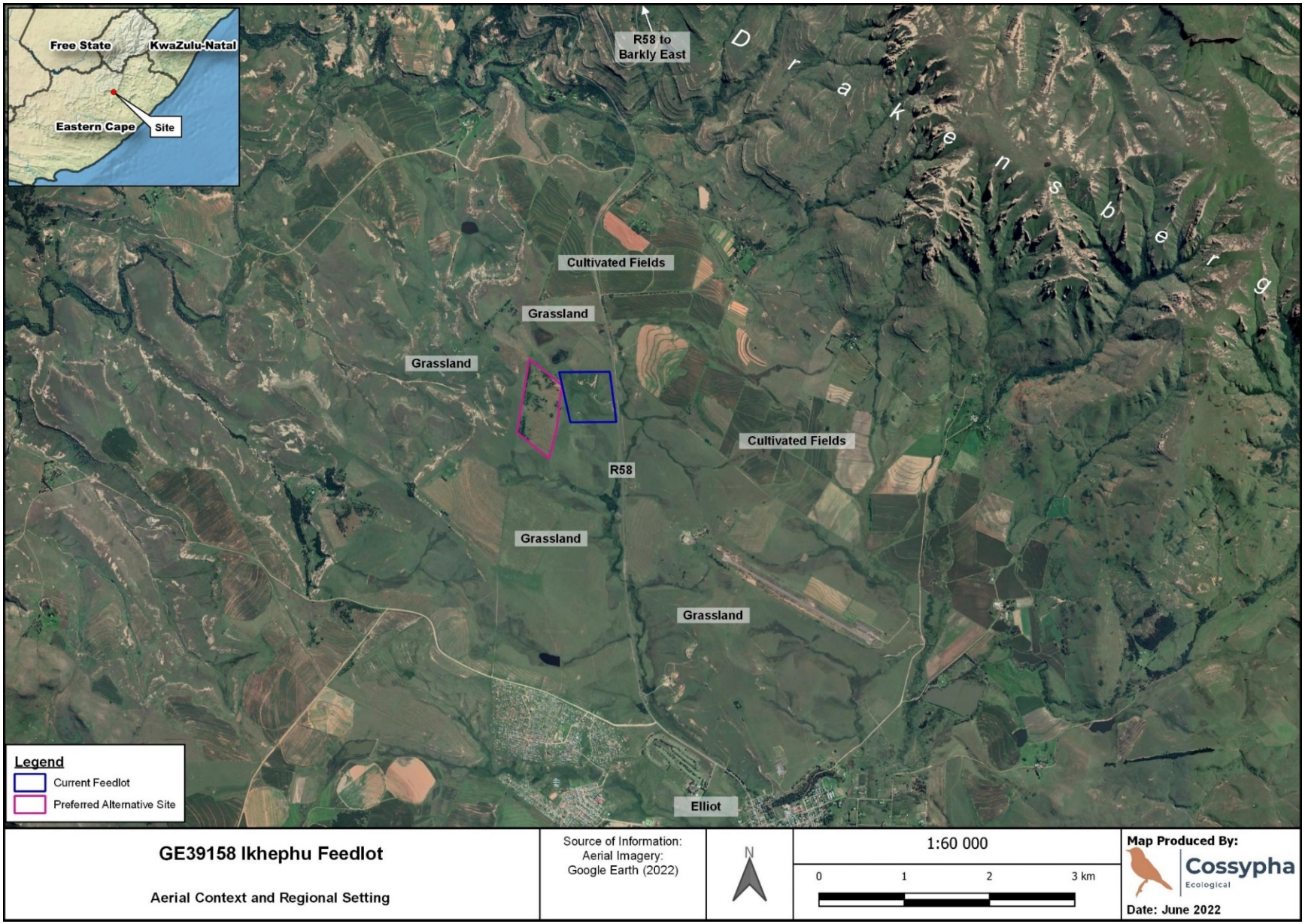

Figure 5: Existing landuse associated with the development area

1.4.1 Climate

The region experiences warm, rainy summers and cold, dry winters. The region receives an average of 890 millimetres (mm) of rain per year, with the highest rainfall occurring in February and the lowest falling in July. The region has a cool sub-montane temperature regime, with a mean annual temperature of 14.6°C. Maximum temperatures for the area reach around 28°C in summer and minimum temperatures can drop to 1°C in winter. Frost is frequent (Mucina and Rutherford, 2006).

1.4.2 Topography and Drainage

The proposed site drains by means of surface flow, primarily in an eastern direction and then in a southern direction towards the delineated wetlands in the south (refer to **Section 1.4.4** below). The wetlands flow towards Khowa into the Slang River. The groundwater recharge is approximately of 38.13mm per anum. An elevation profile was created showing a maximum slope angle of 1.97 degrees to the east, based on the topography and existing drainage it is expected that groundwater flow will mimic the surface water flow (AGES Omega, 2022).

1.4.3 Terrestrial Biodiversity (including Animal and Plant Species)

The study area is located within the Grassland Biome, in the Sub-Escarpment Grassland Bioregion. The sites fall within the Drakensberg Foothill Moist Grassland vegetation type (**Figure 6**, below), classified as Least Concern according to Cossypha (2022). To date, about 30% of the vegetation type has been transformed mainly for cultivation, plantations, and urban development, with alien plant infestations also becoming problematic (Cossypha, 2022).

Plant species characteristic of the Drakensberg Foothill Moist Grassland (when in good condition) include grasses such as *Diheteropogon filifolius*, *Elionurus muticus*, and *Sporobolus africanus*; herbs such as *Helichrysum simillimum* and *Berkheya rhapontica* sub species *aristosa*; and geophytic herbs such as *Oxalis depressa*, *Haemanthus humilis* subspecies *hirsutus*, and *Watsonia pillansii*, among others. Low shrubs and small trees would include Gnidia kraussiana, Searsia discolor, and *Protea roupelliae* sub species *Roupelliae* if existed.

According to the Eastern Cape Biodiversity Conservation Plan (2019), the Current Site is predominantly an Ecological Support Area 1 (ESA1), while the Alternative Site only has patches of ESA1 (**Figure 7**, below). The vegetation of the Alternative Site is currently covered with secondary vegetation, grasses (*Aristida bipartita*, *A. congesta* subsp. *congesta*, *Brachiaria serrata*, *Eragrostis chloromelas*, *E. curvula*, *E plana*, *Heteropogon contortus*, *Paspalum dilatatum*, *Sporobolus africanus*, and *S. pyramidalis*) and herbaceous species (*Berkheya rhapontica* subsp. *aristosa*, *Conyza pinnata*, *Helichrysum simillimum*, *Helichrysum nudifolium* var. *pilosellum*, *Lobelia erinus*, *Senecio asperulus*, *S. retrorsus*) including encroacher shrub (*Seriphium plumosum)* with low plant species diversity and indicative of disturbed soils and overgrazing (Cossypha, 2022). Alien trees (Wattle *Acacia mearnsii*), according to Cossypha (2022) have also invaded the Alternative Site, with dense concentrations in majority of the northern half and western sections with some bare soil to the north-eastern side coupled with invasive alien plant (IAP) species. The Alternative Site, therefore, no longer represents the Drakensberg Foothill Moist Grassland (natural vegetation type).

According to Cossypha (2022), very few observations of birds, mammals, amphibians, or reptiles were made on the proposed development site during the field visit.

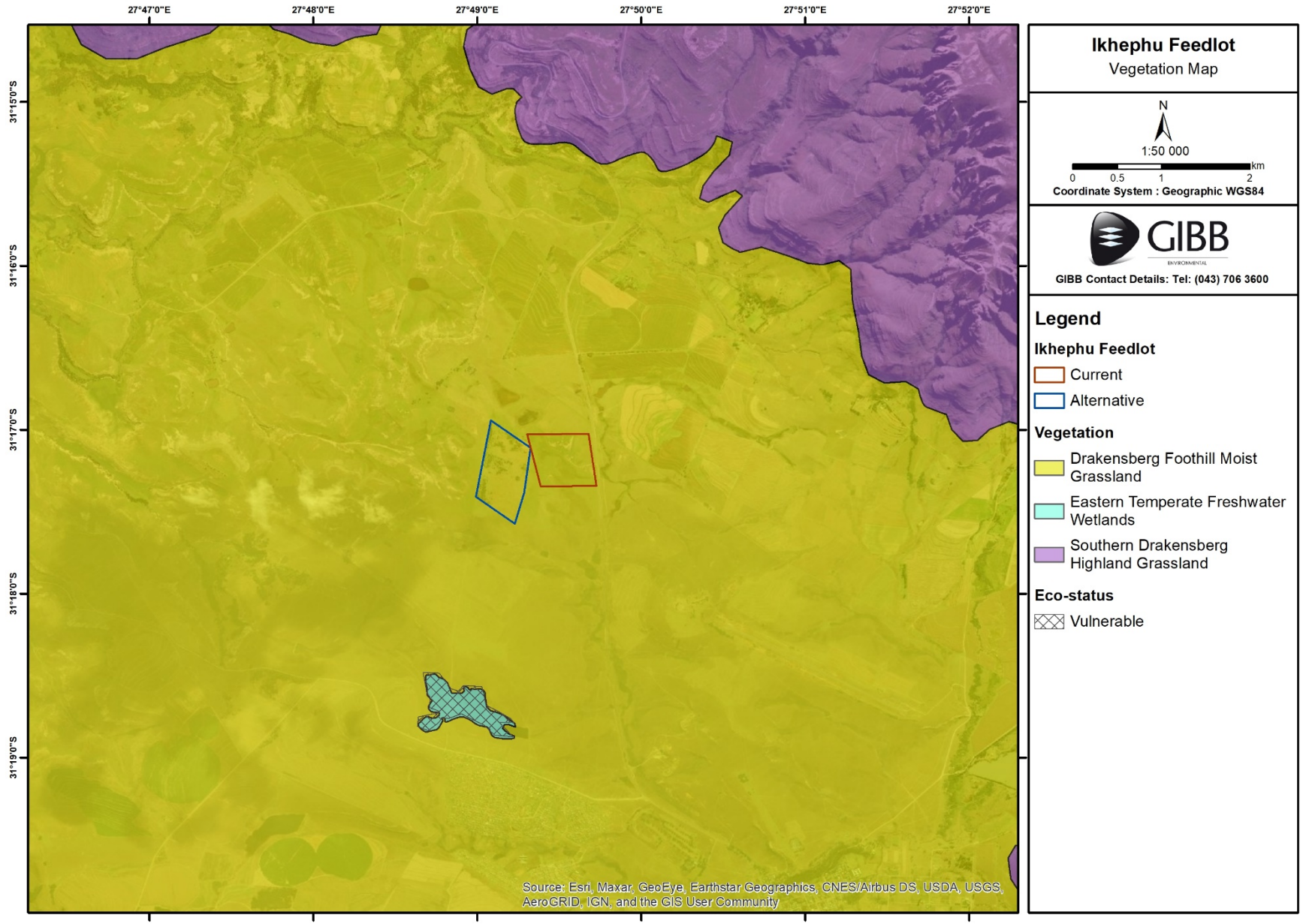

Figure 6: Vegetation type associated with the proposed development

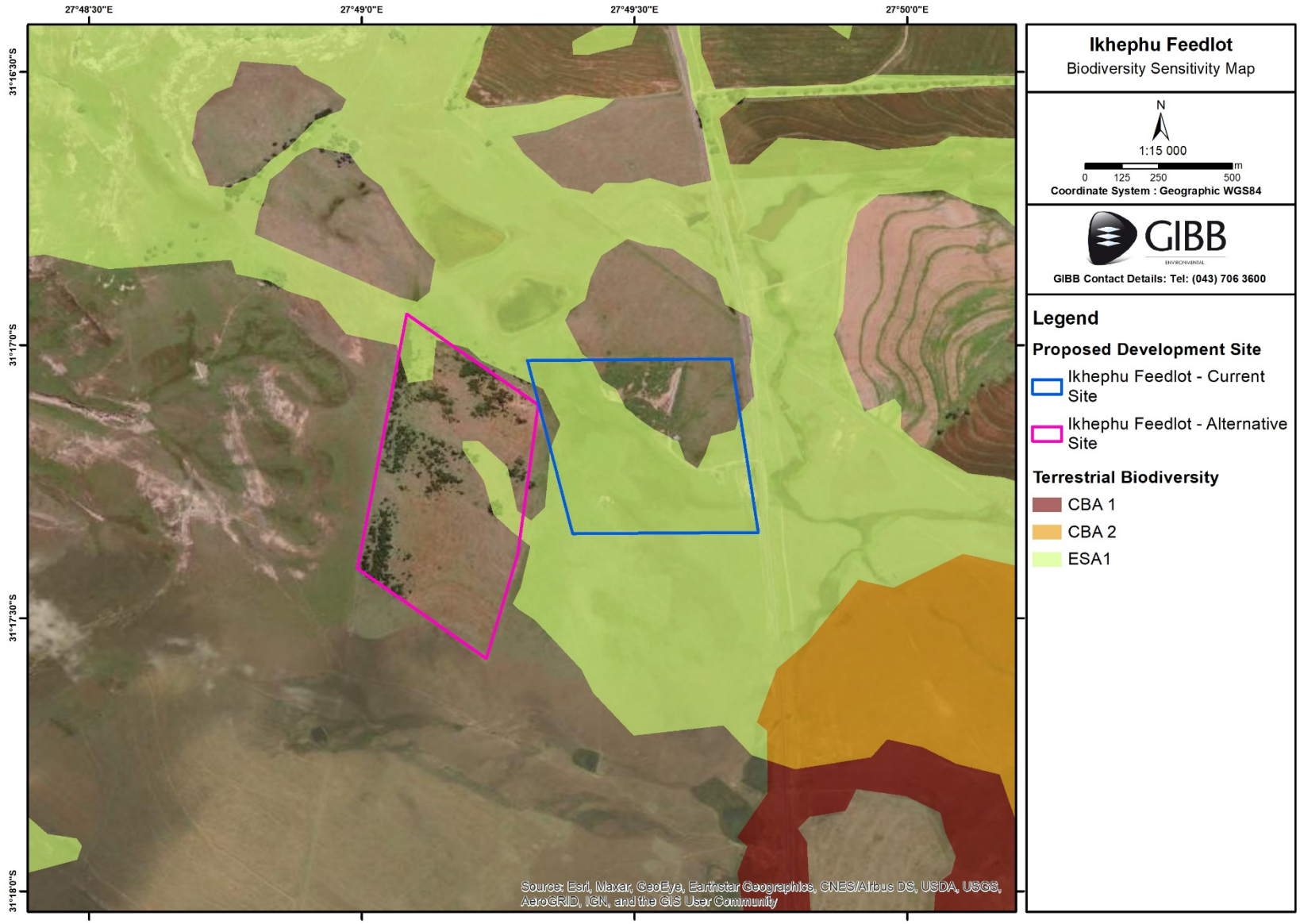

Figure 7: Terrestrial Ecological Support Area associated with the proposed development

Bird species recorded on the study site included generalist species such as Egyptian Goose, Laughing Dove, Red-eyed Dove, Cape Turtle Dove, Blacksmith Lapwing, Black- headed Heron, Hadeda Ibis, Common Fiscal, Pied Crow, and Cape Sparrow, and common grassland species such as African Stonechat, Zitting Cisticola, Southern Red Bishop, Long-tailed Widowbird, and African Quailfinch.

While no species of conservation concern (SCC), both fauna or flora, were recorded on the Alternative Site, a few bird SCC were observed in the areas surrounding the study site within better quality grassland and near the two farm dams situated to the north of the site. This included Secretarybird *Sagittarius serpentarius*, which is currently listed as Vulnerable both nationally and globally, Ludwig's Bustard *Neotis ludwigii*, which is currently listed as Endangered (EN) both nationally and globally, and Sensitive Species 2[2], also EN both nationally and globally.

In terms of regional biodiversity, the Alternative Site is small, largely in a modified state, and isolated from the surrounding vegetation due to the fence. It is therefore not considered a representative portion of the vegetation type or ecosystem and is not considered important for reaching biodiversity targets due to the small size.

The Very High terrestrial biodiversity, High animal species and Moderate plant species sensitivity are therefore disputed, the site inspection conducted by the Ecologist on the 23rd of March 2022 confirmed that the Alternative Site is in a modified state and highly disturbed in places. This indicated that the ecological sensitivity for terrestrial biodiversity (including flora and fauna) is Low. A Compliance Statement is appended to this document, refer to **Appendix D1**.

1.4.4 Aquatic Biodiversity (including Hydrology)

According to ETL (2021), the proposed development falls in the South-Eastern Uplands (16) Level 1 Ecoregion. Level 1 ecoregions are derived primarily from terrain and vegetation, along with altitude, rainfall, runoff variability, air temperature, geology, and soil. This region has the Swartkops, Gamtoos and Keurbooms Rivers flow through it. The proposed development falls within the Mzimvubu to Tsitsikamma Water Management Area in the quaternary catchment T11A. At a desktop level, the Current and Alternative Site constitute aquatic Critical Biodiversity Area 1 (CBA1), refer to **Figure 8** below.

An Unchanelled Valley Bottom (UVB01) and Seep (Seep01) wetlands were delineated on the Current Site (**Figure 9**, below), however, no wetland occurs within the Alternative Site. Additionally, no wetlands categorised as National Freshwater Ecosystem Priority Areas (NFEPA) occur on the study area (**Figure 10**, below). Only the gravelling (330m long by 6m wide) of the existing track is proposed to occur within UVB01 while no activities are anticipated to affect Seep01 either by the completion of existing or development of new infrastructure. As per ETL (2021) it was noted that the wetland systems on site (particularly UVB01) were significantly transformed by the creation of dams (Figure 9). Areas that were previously natural wetland systems and exhibited clear wetland characteristics were excavated and dammed to create water sources for agricultural use.

The vegetation associated with the wetlands was found to be transformed due to anthropogenic changes namely, farming, dirt and tar roads (ETL, 2021). Landuses which have an impact on the hydrology of the wetlands within the Current Site include the presence of alien vegetation and hardened surfaces.

[2] A SCC that is sensitive to the illegal harvesting trade. The actual name of the sensitive species may not appear in the final report or in any of the specialist reports released into the public domain.

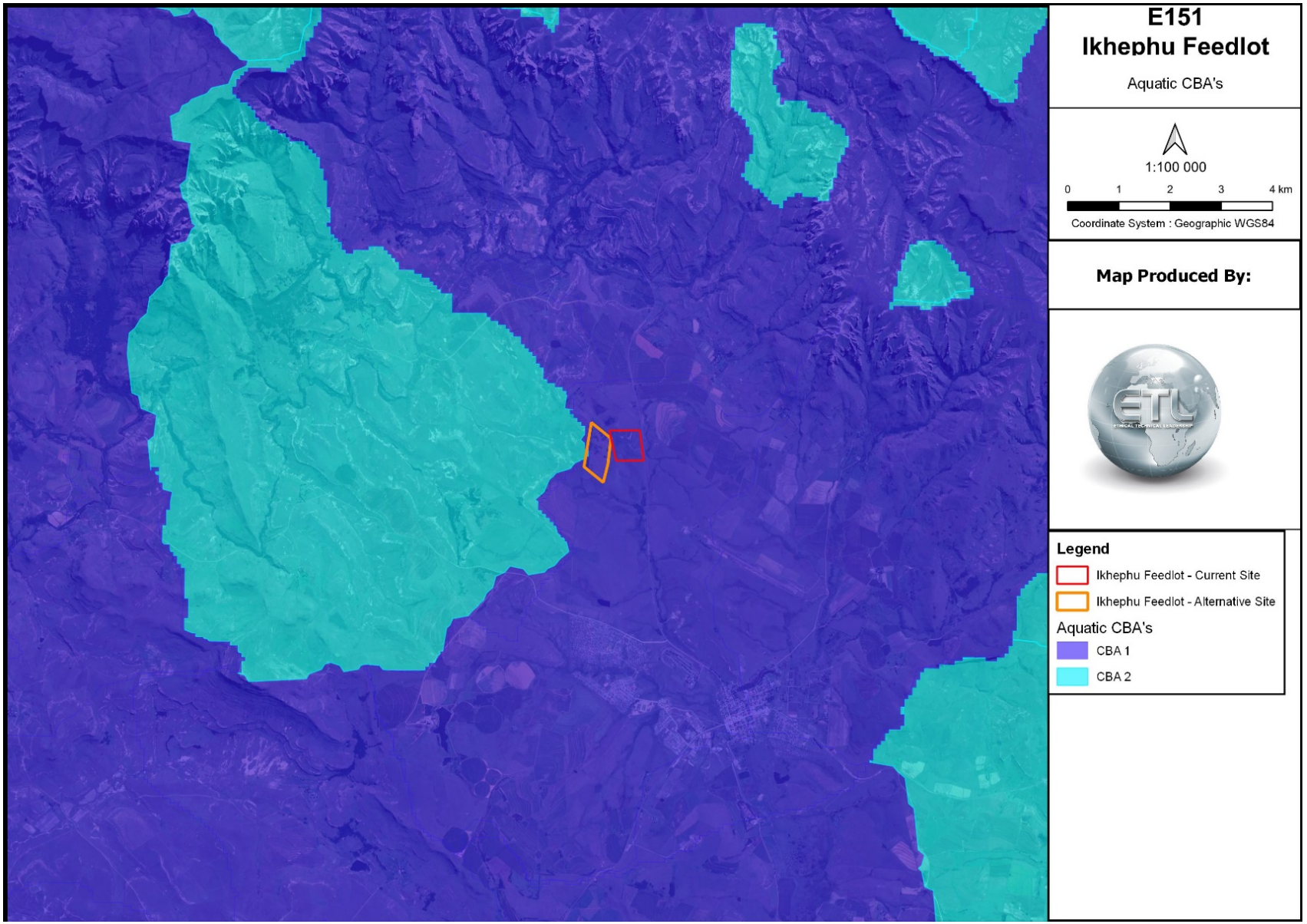

Figure 8: Aquatic Critical Biodiversity Area associated with the proposed development

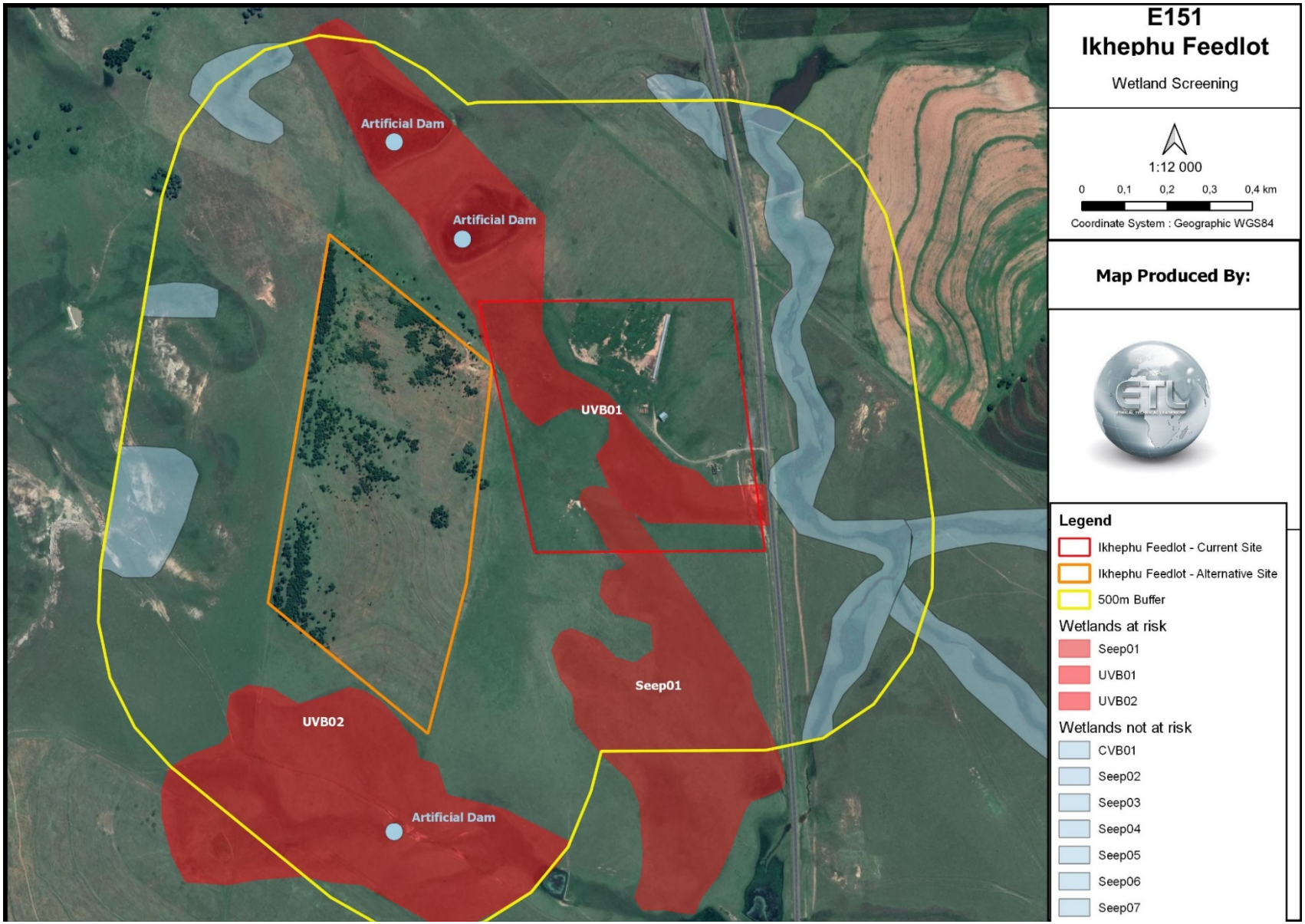

Figure 9: Delineated Wetlands

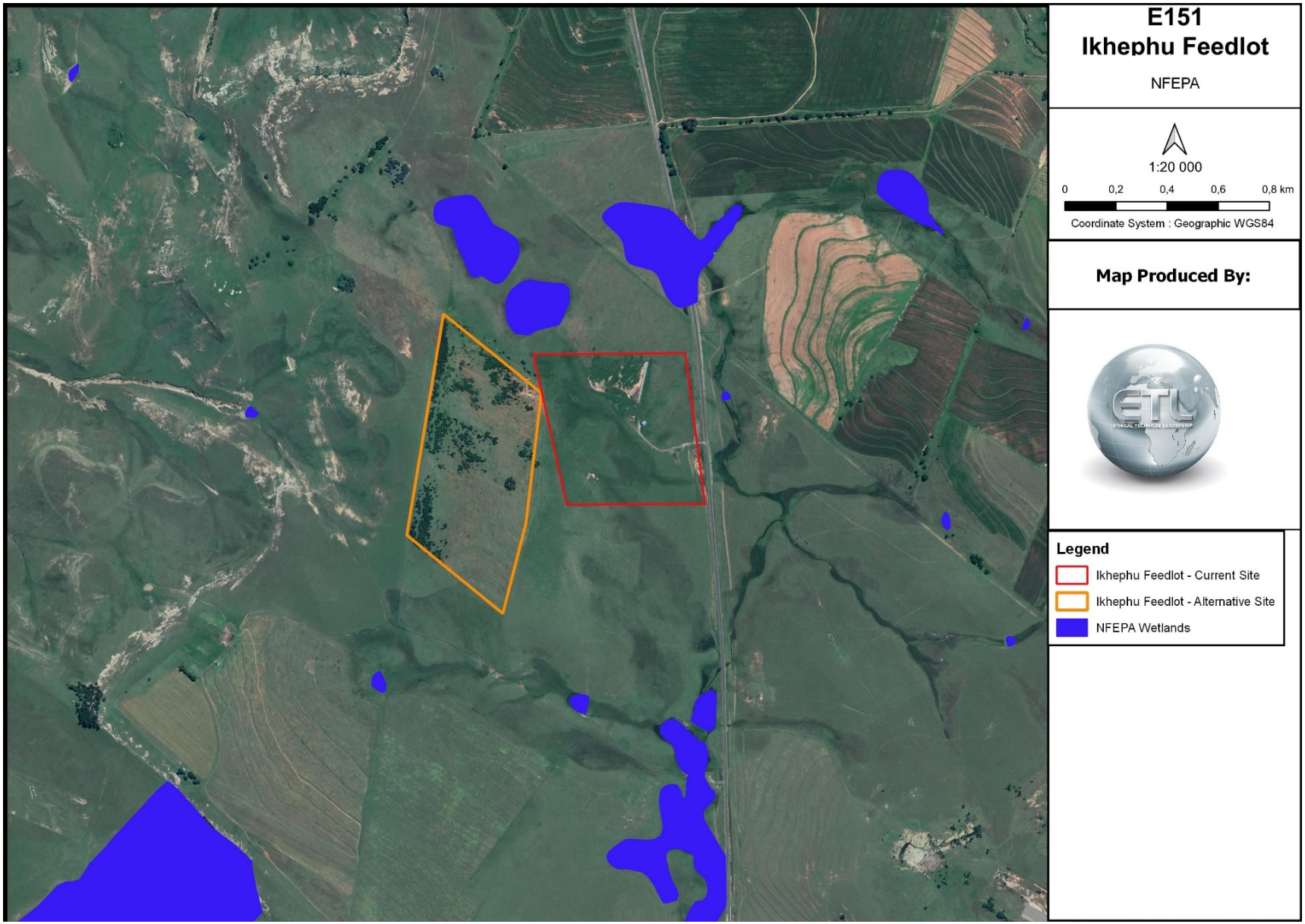

Figure 10: NFEPA wetlands outside the study site

As per ETL (2021), within the entire assessed area it was confirmed that the presence of alien vegetation within the wetlands and catchment was low to moderate. Alien vegetation has a negative impact on hydrology due to its ability to take up large quantities of water, and thus have a moderately-large impact in excessively depleting water sources.

Furthermore, the wetlands are impacted by impeding roads (including the track connecting the Current Site to the Alternative Site) and other surrounding infrastructure, which inhibits the natural diffuse flow at the surface of the wetlands.

The extent of hardened surfaces within the site additionally have had a high impact on the hydrology of the wetlands. It was determined, by the wetland specialist, that within the wetlands catchment there was a moderate percentage of hardened surfaces present in the form of roads and agriculture related infrastructure. Hardened surfaces increase the flow velocity during rainy events, lower the infiltration rate of stormwater, and thereby increase the surface runoff and occurrence of flood peaks. The impact of hardened surfaces can create areas of bare soil, which may lead to extensive erosion.

In addition to the above, the presence of artificial dams has led to the reduction of water flowing into the wetlands.

The dams located in the wetland's catchment have the ability of retaining water which is then subject to evaporation and delayed releases. The greater the combined surface area of the dams, the greater the area subjected to evaporation and therefore the greater the reduction of water inputs to the wetlands.

Most of the study area was determined to be transformed. The alterations to the vegetation occurred as a result of overgrazing. The biodiversity importance of the delineated wetlands was determined to be nonexistence or marginal, while the wetlands were determined to be moderately to largely modified.

The Ecological Importance and Sensitivity was considered low as this system was determined to have limited functionality and poor habitat quality for harbouring sensitive species of fauna. As per ETL (2021), the ecological services (mainly food for livestock) provided by both UVB01 and Seep01 were determined to be moderate to very low. The hydro functional importance of the wetlands was determined to be low due to its poor ability to attenuate floods, regulate stream flows, trap sediment, and assimilate phosphates (PO_4), nitrates (NO_3), toxicants and erosion control. Although these services are the foremost ecological services provided by the seep wetlands, it was determined to be low.

The Wetland Delineation, Functional, Impact and Risk Assessment report is attached under **Appendix D2**.

1.4.5 Archaeological and Cultural Heritage

The village of Khowa was first established in 1885 as the Slang River Settlement. In April 1894 the settlement was renamed Elliot, after Sir Henry George Elliot (1826–1912) the Chief Magistrate of the Transkei territories from 1891 to 1902, and the town became a municipality in 1911. In 2017 Elliot was renamed Khowa, signifying the mushrooms that grow in the area in summer. Locally, the town is commonly referred to by the double-barrel name of Elliot–Khowa.

According to ArchaeoMaps (2022) the overall study site terrain is characterised by a low presence of Earlier Stone Age, the Middle and Later Stone Age (LSA) are more ample including macro and micro-lithic LSA. The LSA lithic record is complemented by a shelter rock art site, testimony at least in part, to the rich rock art record typifying the southern Drakensberg. No Earlier or Middle Iron Age sites are reported on but the Later Iron Age (LIA) is well represented and constitute the dominant type site recorded, including LIA settlement sites in cases associated with cemeteries/ grave sites, and in other cases not as well as stand-alone LIA cemetery/ grave sites (ArchaeoMaps, 2022). The Colonial Period is fairly poorly represented, with a notably high propensity of trading post sites. A single proposed development from the greater terrain, by the amaHala community, represents a living heritage development. As per ArchaeoMaps (2022), no declared Provincial Heritage Sites (PHS) are recorded within a 5km radius of the study site, and with the nearest PHSs being situated some 40km from said site.

The current is characterised by recent Ikhephu feedlot development structures, none of which are older than 60 years or of any other heritage significance, and by implication not formally protected by the National Heritage Resources Act, 1999 (Act 25 of 1999) as amended (NHRA). Neither were any other protected heritage resources (aside from the khowa/ mushroom described below) identified within the Current Site (ArchaeoMaps, 2022).

According to ArchaeoMaps (2022), two archaeological and cultural heritage resources were recorded within the site. These constitute partial Colonial Period kraal mound remains and Living Heritage (khowa habitat). The kraal remains are of no scientific or heritage conservation significance and it is recommended that these remains be destroyed without having to apply for site destruction permit from the Eastern Cape Provincial Heritage Resources Authority (ECPHRA). The living heritage characterises not only the Current Site but also the Alternative Site, albeit most prominently so within the wooded tree clusters typical of the mosaic landscape associated with the northern portion of the Alternative Site. The presence of the khowa is of High Local Significance and it is recommended that as much of the wooded habitat, but no less than a third (≥6ha) of the northern portion of the Alternative Site, be conserved thereby ensuring in part and on site, and in perpetuation of future generations the conservation of the mushroom habitat within the development framework (ArchaeoMaps, 2022). Additionally, a Heritage Management Plant must be developed by the applicant to guide the management of the conserved living heritage within the Alternative Site.

Based on sub-surface evidence, in support of a general anthropogenic sterile sub-surface at the Alternative Site and Current Site, it is unlikely although not impossible, that sub-surface archaeological and cultural heritage resources will be encountered during the course of construction (ArchaeoMaps, 2022). The Archaeological and Cultural Heritage Impact Assessment is attached as **Appendix D3**.

1.4.6 Palaeontology

According to Banzai Environmental (2022), the western margin of the Alternative Site is mostly underlain by Jurassic dolerite while the eastern is underlain by the Late Triassic Molteno Formation (Stormberg Group, Karoo Supergroup) as well as a very small portion of Quaternary alluvium. On a desktop level the Palaeontological Sensitivity of Quaternary alluvium is Moderate, that of Jurassic dolerite is Zero as it is igneous in origin, while that of the Molteno Formation is Very High (**Figure 11**, below).

The Quaternary superficial deposits are the youngest geological deposits formed during the most recent geological period, approximately 2.6 million years ago (Mya).

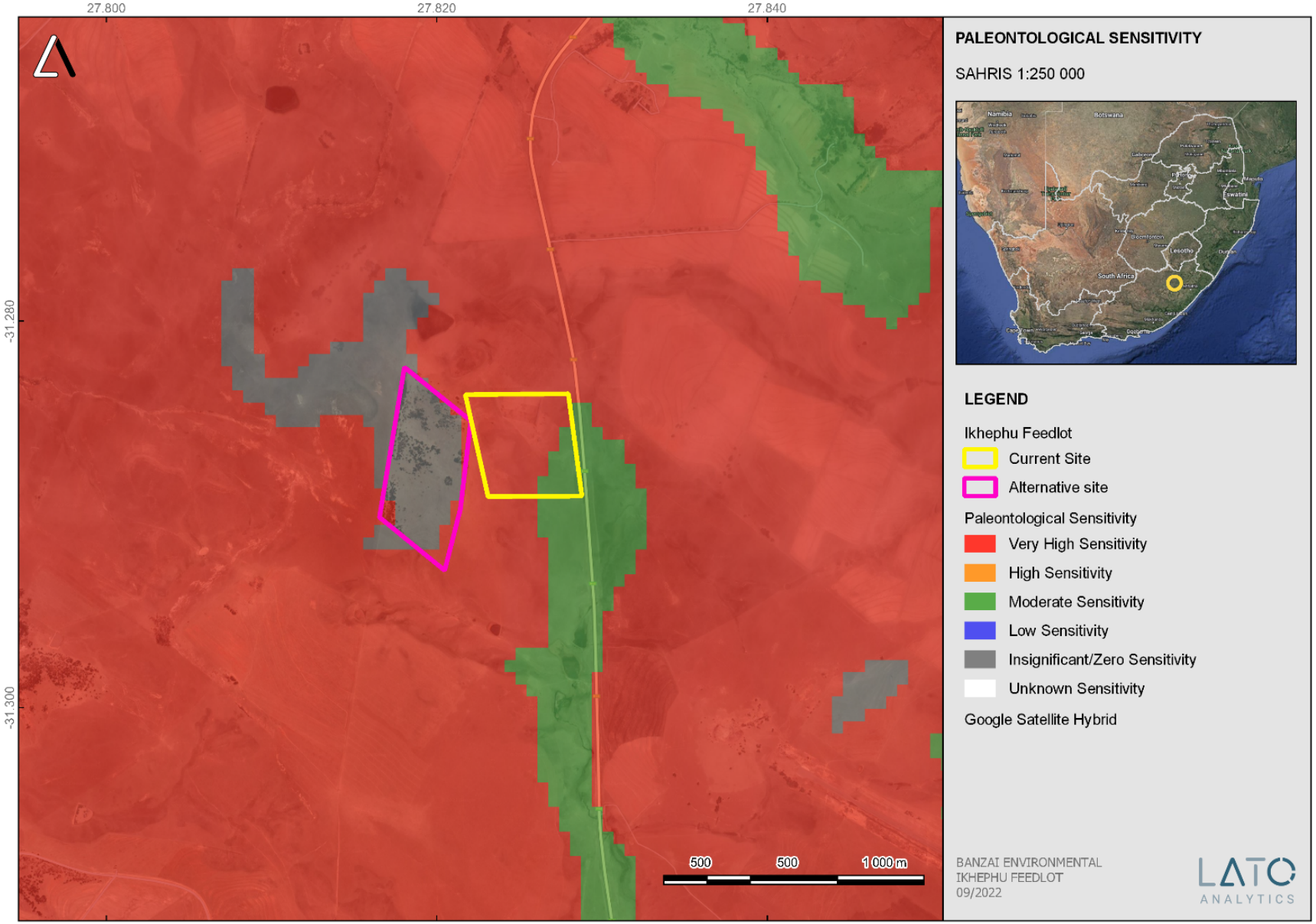

Figure 11: Palaeontological sensitivity associated with the study site

Most of the superficial deposits are unconsolidated sediments and consist of clay, gravel, sand, and silt that form relatively thin, discontinuous patches of sediments. These sediments comprise of channel, floodplain and stream deposits. Quaternary deposits are very important as palaeoclimatic changes are reflected in the different geological formations (Banzai Environmental, 2022).

During the climate fluctuations in the Cenozoic Era most geomorphologic features in southern Africa were formed, Banzai Environmental (2022) indicated that various warming and cooling events occurred in the Cenozoic but states that climatic changes during the Quaternary Period, specifically the last 1.8Mya, were the most drastic climate changes relative to all climate variations in the past. Climate variations that occurred in the Quaternary Period were both drier and wetter than the present and resulted in changes in river flow patterns, sedimentation processes and vegetation variation.

Quaternary fossil assemblages are generally rare and low in diversity and occur over a wide-range geographic area. These fossil assemblages may in some cases occur in extensive alluvial and colluvial deposits cut by dongas and resemble modern animals and may comprise of mammalian teeth, bones and horn corns, reptile skeletons and fragments of ostrich eggs. Microfossils, non-marine mollusc shells are also known from Quaternary deposits.

Plant material such as foliage, wood, pollens and peats are recovered as well as trace fossils like vertebrate tracks, burrows, termitaria (termite heaps/ mounds) and rhizoliths (root casts). The proposed development area is extensively intruded by dolerite dikes and sills of the Karoo Dolerite of the Karoo Igneous Province.

This Province in southern Africa is a classic continental flood basalt province that was formed during the Early Jurassic Period, occurs over a comprehensive area and comprises a widespread system well developed igneous bodies (dykes, sills) that invaded the sediments of the Main Karoo Basin.

Flood basalts do not typically form any visible volcanic structures, but with a series of outbursts form a suite of fissures of sub-horizontal lava flows that may vary in thickness.

The Karoo is an old flood basalt province and is preserved today as erosional remnants of a more extensive lava cap that covered much of southern Africa in the geological past. This Suite is entirely unfossiliferous (Banzai Environmental, 2022).

The Molteno Formation of the Stormberg Group is Late Triassic in age. In its most southern outcrop this formation is about 600m thick and can be divided into five members namely (oldest bottom to youngest top); Bamboesberg, Indwe, Mayaputi, Qiba and Tsomo Members (Banzai Environmental, 2022). This Formation becomes thinner and reaches 10m in the far north. The Molteno Formation consists of alternating coarse to medium grained sandstones and grey mudrocks. The characteristic “glittering” look of this Formation is caused by secondary quartz overgrowths. This Formation is known for well-preserved insect and plant fossils with coal seams in places.

The Bamboesberg Member is the basal member in the south while the Indwe Sandstone Member, is the only representative in the north. These Members overlay the Beaufort Group unconformably (Banzai Environmental, 2022). The Bamboesberg Member is about 130m thick and is a complex succession that becomes finer upwards in the succession and more erosively based. Medium to fine grained sandstone beds are present with thin, lenticular mudrock intercalations. The Indwe Sandstone Member is about 60m thick and consists of course (pebbly) to medium grained sandstones with an erosively based cobble and pebble bed at its base. The Mayaputi Member is thicker than 50m and is mostly an argillaceous unit while the more than 60m thick Qiba Member consists of fine- to medium-grained sandstone beds associated with thin mudrock partings. The Tsomo Member is about 300m thick and comprise of a recurring pattern of erosively based, coarse-grained to pebbly sandstones (up to 25m thick) grading upwards into mudrock units (up to 60m thick). The Molteno Formation is known from two sporadically developed coal seams present in the Tsomo Member comprising of thin, lenticular coal seams.

As per Banzai Environmental (2022), the Dicroidium Flora of Gondwana preserved in the Molteno Formation is known for the richest plant fossils in the world comprising of diverse vascular plant fossils, insect groups as well as dinosaur trackways. Other fossils include bivalves, conchostracans, fish as well as invertebrate trace fossils. This Formation is not known to contain vertebrate fossils.

A site-specific field survey of the development footprint was conducted on 10 September 2022 by a Palaeontologist, no fossiliferous outcrop was detected in the current or alternative site. The apparent rarity of fossil heritage in the study site footprint suggests that the impact of the development will be of a Low significance in palaeontological terms (Banzai Environmental, 2022). It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The Palaeontology Impact Assessment is attached as **Appendix D4**.

1.4.7 Agriculture

The current and alternative site are categorised as C4/C5 (moderately restricted growing season due to low temperatures and severe frost and/or moisture stress) in terms of Climatic Capability Class/ Category as per Mzansi Agriculture (2022). The climatic data indicates that the preferred site is suitable for both livestock and arable crops (Mansi Agriculture, 2022). The soil types occurring on the current and preferred site are Clovelly (greyish-brown topsoil over yellow-brown sands to friable non-striated clay typically to a depth of about 900mm, thus providing good moisture absorption and moisture holding qualities for crop production) and Kroonstad (topsoil comprising grey sandy loam to clay loam typically to a depth of approximately 300mm. Bleached grey sandy soils are found below as a result of sideways leaching on gentle slopes over long periods of time. This soil form is usually found in close proximity to wetlands, it may not be cultivated if the topsoil is less than 400mm in depth or is part of wetlands.).

The most important ecosystem service associated with the study area is a high and reliable rainfall. The soils with the current site are medium quality but the incidence of deep Clovelly soils on the alternative site is also a very important ecosystem service. The limiting factor is long cold nights during the late autumn, winter, and early spring. This results in having to plant a fast-growing maize variety which will give a marginally lower yield than long maturing varieties which in warmer climates can be planted in mid-September.

The Land Capability Class (LCC) of the current and preferred site were determined to be LCC VI (non-arable land that can be used only for long-term crops due to steepness, soil depth, etc.) and VII (soils limited to domestic livestock and wild game), respectively. According to Mansi Agriculture (2022), only soils complying with LCC I to III are readily acceptable for arable crop cultivation, LCC IV soils may be cultivated under certain stringent and well managed conditions. The study area, as mentioned above, falls outside of these classes suitable for crop production. An Agricultural Impact Assessment is attached as **Appendix D5**.

1.4.8 Civil Aviation

The proposed development site presents a High civil aviation sensitivity as per the Screening Report, this means a site situated within 15km of a civil aviation radar and/or between 8 and 15km from a major civil aviation aerodrome.

A desktop assessment and specific site investigation (28 February 2022) were undertaken for the current and alternative site. Although the site is situated approximately 2km northwest of the Elliot Airfield (**Figure 12**, below), the facility is defunct and impossible to see from site as hidden by hills. Functional airports are situated in about 85 (Mthatha) and 190km (East London), in a straight line, from the proposed site. Thus, the proposed project will have non or very low impact to civil aviation.

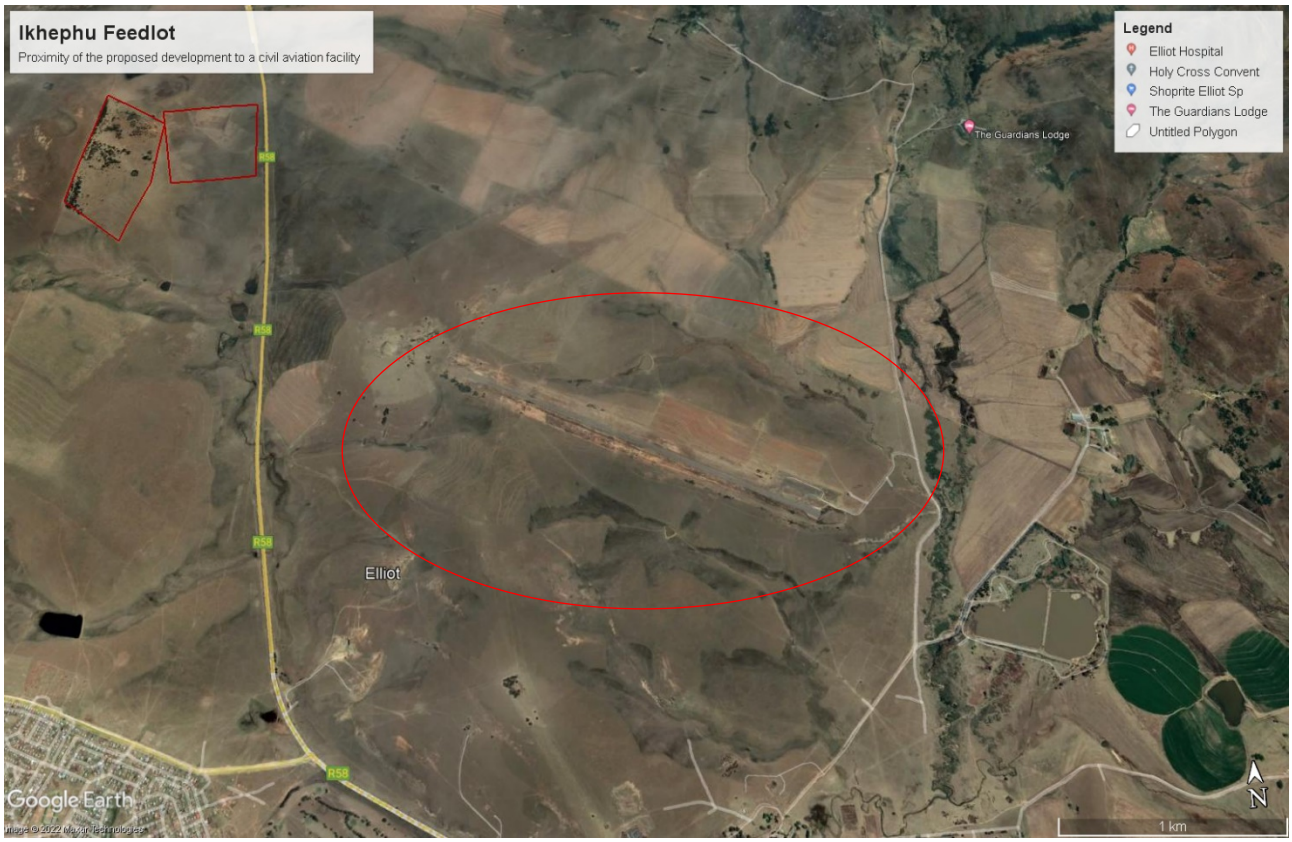

Figure 12: Proximity of the proposed site to the defunct Elliot Airfield

1.4.9 Geology and Geohydrology

The site is located within the Molteno Formation that consists of grey mudstone, shale, gritty sandstone and occasional coal seams (**Figure 13**, below). This Formation is part of the Karoo Supergroup. Various dolerite dykes surround the project area and a dolerite sill is located north of the project area that extends through the centre of the project area in a southern direction. The project area does not reflect any risk for the formation of sinkholes or subsidence caused by the presence of water-soluble rocks (for example: dolomite or limestone).

One production borehole drilled on 09 April 2014, tested ten days later and in operation was identified within the Current Site, the details of the drilling and testing information could be obtained from the drilling and testing company that conducted the borehole development (AGES Omega, 2022). These included a depth of 120 metres below ground level (mbgl), 4.93mbgl historical water level with a blow yield of 3.40l/s and 0.80l/s sustainable yield as per AGES Omega (2022). No water levels could be measured during the hydrocensus as no dip tubes were installed in the boreholes well as restricted access to the borehole.

Four springs were identified on the property, Spring 1 was sampled and the water was submitted for laboratory analyses. As per AGES Omega (2022), the water from this spring had elevated concentrations of Escherichia coli (E. coli) to an acute health risk (SANS[3] 241-2015) that makes the water not suitable for human consumption, unless treated.

In general, the water quality is good as almost all the constituents have concentrations below the SANS 241 limits with the exception of the turbidity and iron which were over the aesthetic limit, E.coli which was over the acute limit and the standard plate count, total coliforms and turbidity that was over the operational limit (AGES Omega, 2022). These are likely high, narrates AGES Omega (2022) due to stagnant water or water exposed to an abundance of organic matter during sampling. The slightly elevated iron concentration was most likely due to the iron rich geological formations on site, i.e., dolerite sheet and dyke that is present within the study area.

No other geosites from the Groundwater Resource Information Project, National Groundwater Information System or internal (AGES Omega) databases could be identified within 1.5km from the site.

Eight trial pits were dug and two dongas labelled (D1 and D2) to identify the underlying material as indicated in **Figure 14** below.

The study area is generally covered by transported material in the form of hillwash/ colluvium that is composed of sandy silt to clayey silt, the material exhibits a soft to firm consistency and intact soil structure extending to a depth between 0.4 and 1.1mbgl. The material is slightly ferruginised in localised portions of the site, characterised in the soil profile by the occurrence of scattered to abundant ferricrete nodules. The transported material is underlain by residual siltstone/ sandstone material that is composed of sandy clay to clayey sand with a firm to stiff consistency and micro-shattered soil structure. The material slightly ferruginised over the majority of the site, characterised in profile by the occurrence of scattered ferricrete nodules. The thickness of the material is variable over the site with a thickness up to 0.4 and in excess of 2.4m. Sedimentary bedrock in the form of siltstone/ sandstone was encountered in two of the eight test pits and observed in the cutting D2. The bedrock material is slightly weathered, fine grained, thinly jointed with a hard rock to very hard rock (hardness).

A portion of the site is covered by a highly weathered and thin dolerite sill intrusion, the material was only encountered in D1 and D2, that is not located in the footprint of the proposed feedlot. The residual dolerite is composed of sandy clay and exhibits a firm consistency and micro-shattered soil structure, with a thickness up to and possibly in excess of 1.0m. The material is slightly ferruginised with scattered ferricrete nodules occurring in profile. The dolerite bedrock material in D2, is highly to moderately weathered, fine grained, thickly jointed with a moderately hard rock to hard rock (hardness). Dolerite bedrock is only expected in localised portions.

The test pits were excavated to a depth between 1.25 and 2.5mbgl (mean 2.3mbgl) after which excavation was generally stopped due to water seepage or excavation refusal on sedimentary bedrock material. Excavation conditions can be summarised as soft excavation class (surface to 1mbgl), soft excavation with pockets of intermediate and hard rock (1 to 2mbgl), and intermediate excavation with localised portions of hard rock (2 to 3mbgl).

[3] South African National Standards

Province of the EASTERN CAPE ECONOMIC DEVELOPMENT, ENVIRONMENTAL AFFAIRS & TOURISM

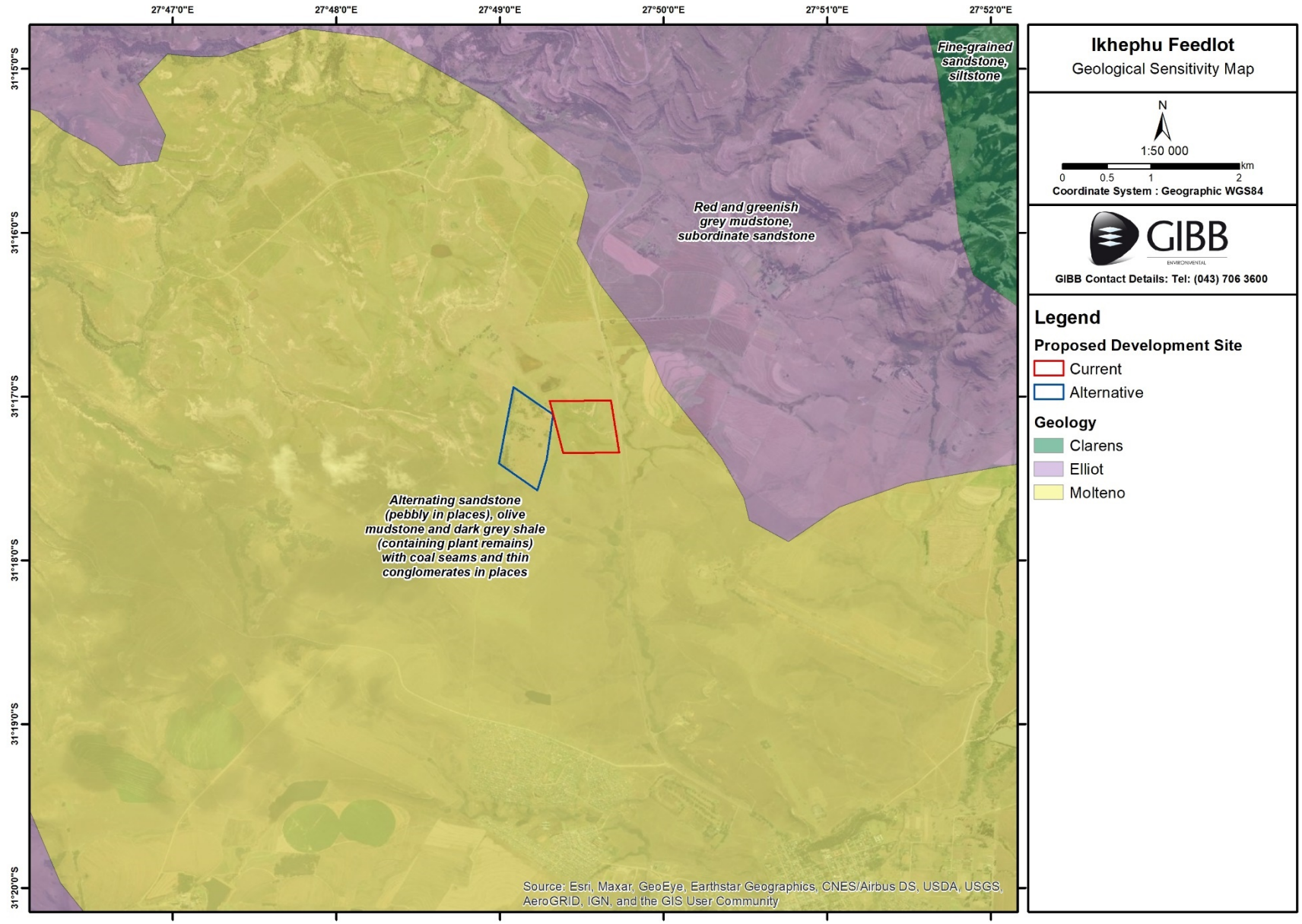

Figure 13: Geology of the proposed study area

Figure 14: Geohydrological test pits and dongas within the study area

The project area is underlain by argillaceous and arenaceous rocks in equal proportions. Groundwater occurrences are expected to be intergranular and in fractured zones with successful borehole yields of between 0.5 and 2l/s. The groundwater potential of the study area is considered moderate to high.

Strong to slight groundwater seepage was encountered in five of the eight excavated test pits at a depth between 1.1 and 2.35mbgl, mean 2mbgl.

The seepage occurred within the residual soil materials and expected as an elevated perched groundwater condition due to recent heavy and prolonged rainfall that occurred prior to the site investigation (AGES Omega, 2022). Pedogenic soil in the form of ferricrete nodules was encountered in seven of the eight test pits within the transported material but most prominently in the residual soil materials. The pedogenic soil material is indicative that the soils are not suitably drained, and that the seasonal occurrence of perched groundwater conditions is highly likely to occur over the study site, as observed during the investigation (AGES Omega, 2022).

According to AGES Omega (2022), the geophysical survey conducted indicated the presence of a prominent dolerite dyke in Profile 1 at around 275m and a dolerite sheet on Profile 2 up to 180m, this corresponded with the red soils noted on site. Fracturing was noted in the underlying siltstone at around 450m of Profile 1 and between 600 and 700m on Profile 2. The dolerite dyke can be regarded as a pathway for contaminants and should be targeted for monitoring borehole development.

The Transient Domenico Transport Model was used to illustrate the possible movement of contamination downstream of the proposed development. Two double ring infiltration tests were conducted. Based on the model's output, the initial assumed contaminant (e.g., NO_3) concentration of 1 000 milligrams per litre (mg/l) would decrease to 0mg/l after traveling from 0 to 700m that is well before the wetland locality (1 130m) over a 10 year period (AGES Omega, 2022).

Groundwater movement is unlikely to be homogeneous through siltstone, hillwash and sandstone. The transfer of contaminants through fractures associated with the dolerite dyke could be several orders of magnitude faster than the surrounding formations. Based on the on-site observations, it is likely that seepage from the liquid waste pit / lagoon would enter the perched aquifer if not lined. The assumption is also made that groundwater flow will be slow in the perched aquifer due to the low permeability of the hillwash. The contamination risk of the hard rock aquifer is expected to be moderate to low.

The Geohydrological Impact Assessment report is appended to this document (refer to **Appendix D6**).

1.4.10 Socio-Economic Environment

The following section provides information on the demographics, including population, level of education, the economic profile, the level of employment and service delivery for the SLM.

The SLM is the 155th most populous local municipality in the country, with a population of approximately 63 582 and a population density of approximately 27 people per square kilometre (StatsSA[4]). The population make up comprises black Africans (97.7%), white (1.1%), coloured and Asian (1%, combined) population groups. The gender distribution ratio is 51.8% females to 48.2% males. The population has a high working age population, 15 to 64 years, sitting at 57.5% followed by the young (0 to 14 years) and finally the elderly (65+) making up the rest.

[4] Statistics South Africa

The SLM population aged 20+ comprises 12.7% that have no form of schooling, 6.9% that have completed primary school, 35.2% with some secondary education, 14.1% that have finished grade 12, and 6.4% with some form of higher education.

16 151 households exist in the municipality with an average household size of 3.7 people per household, of these 79.1% and 17.9% have access to electricity for lighting and piped water inside the dwelling, respectively, and 51.9% are led by females. The settlement types under which these households exist include tribal or traditional area (51.5%), urban (43.3%) and farm area (5.2%).

The unemployment rate sits at 38.8% while that of youth (15 to 34 years) is approximately 48.6%. The ratio of the dependent population makes up about 73.8.

1.4.11 Visual

The current site already has an operational feedlot in place, the development of the feedlot within the alternative site will blend in with the existing infrastructure as such the potential visual impact of this project is minimal.

1.5 Legal Requirements

This chapter details the applicable legal provisions and the policy context for the Basic Assessment (BA) process. It provides a review of relevant legislation, regulations, and policy documents which are applicable to (or have implications for) the proposed establishment.

The authorisation process associated with this project is carried out in compliance with South Africa's environmental legislation. The legal framework applicable to this project is diverse, a summary of the key environmental legislation and relevant policies and/or guidelines is provided in the following sections.

One of the focus points of this section is on the provisions of the NEMA and NEMWA, the NEMA is the primary South African legislation governing the requirements for impact assessment. In the context of the proposed development, the provisions of NEMA and associated EIA Regulations including the NEMWA and Government Notice No. 921 of 2013, as amended (List of Waste Management Activities) are of fundamental relevance.

This section, and others to follow, also describe other legislation relevant to constitutional and administrative legal precepts in South African law as well as environmental legislation of specific relevance to waste management, water resources, archaeology, palaeontology, cultural heritage, biodiversity, and landuse planning, among others.

1.5.1 National Environmental Management Act, 1998 (Act 107 of 1998), as amended

The NEMA is the primary South African legislation governing the requirements for impact assessment. In the context of the proposed project, the provisions of NEMA and the associated EIA Regulations (regarding BA process) have reference.

The NEMA is the most significant single piece of legislation dealing with environmental management in the Republic of South Africa (RSA). The stated purpose of the NEMA is, amongst other things, "*to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state*".

The NEMA takes the form of "framework" legislation. It establishes a set of 18 principles which apply throughout the RSA to the actions of all organs of state that may significantly affect the environment. NEMA also contains provisions on the creation of environmental management plans and environmental implementation plans and

stipulates the respective organs of state responsible for doing so, as well as the content to be incorporated in such management and implementation plans[5].

Chapter 5 of the NEMA, entitled "Integrated Environmental Management" (EIM), establishes the impact assessment regime in the RSA. Since 3rd July 2006, the procedural and substantive requirements for undertaking impact assessments in South Africa have been regulated in terms of the provisions contained in Section 24 of the NEMA and the EIA Regulations.

The EIA Regulations prescribe the procedural and substantive requirements for the undertaking of impact assessments and the issue of authorisations. Activities identified in terms of Section 24(2)(a) and (d) of NEMA, which may not commence without authorisation from the CA and in respect of which the investigation, assessment and communication of the potential impact of such activities must thus follow the procedure as described in the EIA Regulations. The EIA Regulations identify lists of activities which have the potential to result in detrimental environmental impact and thus require authorisation, subject to either BA or Scoping and Environmental Impact Reporting (S&EIR).

The listed activities in terms of Listing Notice 1 and 3 are triggered by the proposed development and therefore the applicable impact assessment process followed is the BA. **Table *2*** below, provides the listed activities that are deemed applicable to the proposed development.

1.5.2 National Environmental Management Waste Act, 2008 (Act 59 of 2008) as amended

The NEMWA makes provisions for waste management in the RSA, the procedure for assessment is as per the EIA Regulations as discussed above. The List of Waste Management Activities comprises of a Schedule with three Categories, namely Category A, B and C. Activities listed under Category A and B trigger a Waste Management License (WML) by way of a BA and S&EIR, respectively, as per the procedure stipulated in the EIA Regulations. The activities listed in Category C require compliance with various standards. The proposed development only triggers activities listed in Category A and therefore a BA process is being followed.

No.	Activity Description	Project Relevance
A(1)	The storage of general waste in lagoons.	Stormwater cut off embankments are to be installed on the eastern side of the feedlot to divert contaminated stormwater into the proposed 10 000m^3 waste lagoon or storage dam.
A(9)	The disposal of inert waste to land in excess of 25 tons but not exceeding 25 000 tons.	The operational phase will generate solid waste including manure which may exceed 50 tons, this will be temporary stored prior to being carted to the arable lands where it will be utilised as organic fertiliser.
A(12)	The construction of a facility for a waste management activity listed in Category A.	The proposed development includes construction of a 10 000m^3 lagoon which will be utilised to contain stormwater contaminated by organic waste.

Since the proposed development triggers both an EA and WML which fall under the BA process, an IEA[6] is applicable in accordance with the EIA Regulations.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"Alternative", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

a) the property on which or location where it is proposed to undertake the activity;

[5] Chapter 3 of NEMA (Sections 11-16)
[6] The combination of EA and WML assessment.

Table 2: Triggered listed activities in terms of Listing Notice 1 and 2 of the EIA Regulations

No.	Activity Description	Project relevance
Listing Notice 1		
4(i)	*The development and related operation of facilities or infrastructure for the concentration of animals in densities that exceed 20m^2 per large stock unit and more than 500 units per facility.*	Although the proposed project involves the development of infrastructure for the concentration of animals in 15m^2 densities per large stock unit and 1 500 units, the facility will be developed to house animals in densities of 20m^2 per large stock unit and 2 000 units for future expansion.
12(ii)	*The development of infrastructure or structures with a physical footprint of 100m^2 or more where such development occurs within a watercourse; in front of a development setback; or, if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse.*	The gravelling of the existing track and installation of associated culverts including the development of a gravel road will exceed 100m^2 and will occur within (gravelling of track and installation of culverts) and in 32m (new gravel road) of a wetland.
19	*The infilling or deposition of any material of more than 10m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m^3 from a watercourse.*	The proposed development will include infilling or deposition of 10m^3 or more of material into a wetland as part of the track gravelling.
39(i)	*The expansion and related operation of facilities for the concentration of animals in densities that will exceed 20m^2 per large stock unit, where the expansion will constitute more than 500 additional units.*	Future expansion to 20m^2 per large stock unit and 500 additional units is proposed.
Listing Notice 3		
4(a)(ee)	*The development of a road wider than 4m with a reserve less than 13.5m in Eastern Cape, outside urban areas, in CBA as identified in systematic biodiversity plans adopted by the CA or in bioregional plans.*	The proposed gravelling of the existing track will exceed a width of 4m (with no or reserve less 13.5m) and will occur within aquatic CBA1 and 2.
12(a)(ii)	*The clearance of an area of 300m^2 or more of indigenous vegetation, in Eastern Cape, within CBA identified in bioregional plans.*	Indigenous vegetation exceeding 300m^2 will be cleared in preparation for the installation of the French-septic tank, gravelling of the existing track and installation of culverts, this will take place within aquatic CBA1.
14(ii)(a)(ff)	*The development of infrastructure or structures with a physical footprint of 10m^2 or more where such development occurs within a watercourse; in front of a development setback; or, if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse. In Eastern Cape, outside urban areas, in CBA as identified in systematic biodiversity plans adopted by the CA or in bioregional plans.*	The gravelling of the existing track and installation culverts including the development of a new gravel road will exceed 10m^2 and will occur within (gravelling of existing track and installation of culverts) and in 32m (new gravel road) of a wetland associated with aquatic CBA1.
18(a)(ee)	*The widening of a road by more than 4m or the lengthening of a road by more than 1 km, in Eastern Cape outside urban areas, in CBA as identified in systematic biodiversity plans adopted by the CA or in bioregional plans; areas on the watercourse side of the development setback line or within 100m from the edge of a watercourse where no such setback line has been determined; and a watercourse.*	The proposed gravelling of the existing track will exceed a width of 4m (with no or reserve less 13.5m) and will occur within a wetland associated with aquatic CBA1.

b) the type of activity to be undertaken;
c) the design or layout of the activity;
d) the technology to be used in the activity;
e) the operational aspects of the activity; and
f) the option of not implementing the activity.

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether the site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the CA may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Paragraphs 3 – 13 below should be completed for each alternative.

3. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

List alternative sites if applicable:

Alternative:	**Latitude (S):**		**Longitude (E):**	
Alternative S1[7] (preferred)	31°	17'11.0"	27°	49'31.2"
Alternative S2	31°	17'15.6"	27°	49'09.5"
~~Alternative S3~~	°	'	°	'

The below coordinates correspond with the existing track graveling and extension of the access road from the track to the alternative site:

Access road extension	**Latitude (S):**		**Longitude (E):**	
• Starting point of the road	31°	17'10.09"	27°	49'32.15"
• 250m from starting point	31°	17'4.77"	27°	49'25.19"
• 250m from the above point	31°	17'4.80"	27°	49'16.17"
• 250m from the above point	31°	17'7.19"	27°	49'10.93"
• End point of the road	31°	17'13.29"	27°	49'8.08"

In the case of linear activities:

~~**Alternative:**~~	~~**Latitude (S):**~~	~~**Longitude (E):**~~
~~Alternative S1 (preferred or only route alternative)~~		

[7] "Alternative S..." refers to site alternatives.

Alternative:	Latitude (S):		Longitude (E):	
• Starting point of the activity	°	'	°	'
• Middle point of the activity	°	'	°	'
• End point of the activity	°	'	°	'
Alternative S2 (if any)				
• Starting point of the activity	°	'	°	'
• Middle point of the activity	°	'	°	'
• End point of the activity	°	'	°	'
Alternative S3 (if any)				
• Starting point of the activity	°	'	°	'
• Middle point of the activity	°	'	°	'
• End point of the activity	°	'	°	'

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/ technology as well as alternative activities/ technologies (footprints):

Alternative:	Size of the activity:
Alternative A1[8] (preferred activity alternative)	40 000m^2
Alternative A2 (if any)	35 000m^2
Alternative A3 (if any)	m^2

or, for linear activities:

Alternative:	Length of the activity:
Alternative A1 (preferred activity alternative)	m
Alternative A2 (if any)	m
Alternative A3 (if any)	m

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	Size of the site/servitude:
Alternative A1 (preferred activity alternative)	384 000m^2
Alternative A2 (if any)	333 000m^2
Alternative A3 (if any)	m^2

5. SITE ACCESS

Does ready access to the site exist?	YES	NO
If NO, what is the distance over which a new access road will be built	m	

Describe the type of access road planned:

Access to the Current Site already exists through a 350m long gravel road commencing from the R58 to the current offload facility. An existing 330m long track, to the north-western part of the Current Site, connects the

[8] "Alternative A…" refers to activity, process, technology or other alternatives.

Current Site to the Alternative Site. The track commences near the current offload facility, where the access road terminates, to a second current site gate situated at the north-western corner. It is the intention of the developer to gravel the track to a width of 6m, thereafter develop a new 870m long by 6m wide gravel road within the alternative site.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site. Refer to **Figure 3** above and **Appendix A** below.

6. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document. Refer to the said appendix.

The site or route plans must indicate the following:

1.1 the scale of the plan which must be at least a scale of 1:500;
1.2 the property boundaries and numbers of all the properties within 50m of the site;
1.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
1.4 the exact position of each element of the application as well as any other structures on the site;
1.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, streetlights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
1.6 all trees and shrubs taller than 1.8m;
1.7 walls and fencing including details of the height and construction material;
1.8 servitudes indicating the purpose of the servitude;
1.9 sensitive environmental elements within 100m of the site or sites including (but not limited thereto):
- rivers;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or invested with alien species);

1.10 for gentle slopes the 1m contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
1.11 the positions from where photographs of the site were taken.

7. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B of this report (refer to the said appendix). It must be supplemented with additional photographs of relevant features on the site, if applicable.

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

9. ACTIVITY MOTIVATION

9.1 Socio-Economic Value of the Activity

What is the expected capital value of the activity on completion?	**R 23 231 646**	
What is the expected yearly income that will be generated by or as a result of the activity?	**R 62 043 688**	
Will the activity contribute to service infrastructure?	~~YES~~	**NO**
Is the activity a public amenity?	~~YES~~	**NO**
How many new employment opportunities will be created in the development phase of the activity?	**25**	
What is the expected value of the employment opportunities during the development phase?	**R 1 956 000**	
What percentage of this will accrue to previously disadvantaged individuals?	**95%**	
How many permanent new employment opportunities will be created during the operational phase of the activity?	**18**	
What is the expected current value of the employment opportunities during the first 10 years?	**R 23 478 858**	
What percentage of this will accrue to previously disadvantaged individuals?	**95%**	

9.2 Need and Desirability of the Activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

Livestock plays a vital economic and socio-cultural role in the everyday life of the people of South Africa. The livestock also plays a critical role in the intensification of agriculture and in the development of sustainable agricultural production systems. Livestock is an important source of income, and one of a farmer's few liquid and mobile assets that offer risk management options to reduce vulnerability, social networking instruments and social security capital.

Livestock provide the following benefits:

- Manure and draft power to enhance soil fertility;
- Transport to markets and power for post-harvest operations;
- Usage of common property grazing lands, which are especially vital to the welfare of the landless;
- Source of income diversification; and
- High-quality protein and energy to diets of the food and nutrition insecure, as well as essential micronutrients such as calcium, iron, zinc, retinal, thiamine, and vitamins A, B6 and B12, often lacking in cereal-based diets.

There is no doubt that the Eastern Cape Province has a great potential for livestock production. If properly developed, the livestock industry can contribute enormously towards enhancement of food production, economic development, and human welfare on an equitable, sustainable and environmentally sound basis. The sustainability of the livestock production systems depends, to a large extent, on how they are integrated with crop production systems. The livestock provides inputs to cropping including manure and draught power while the crops provide feed for livestock.

The beef industry is the second fastest growing commodity in agricultural sector following the broiler sector. This is driven by income growth and supported technological and structural change. In South Africa, stock farming is the only viable agricultural activity in a large part of the country. Approximately 80% of South African agricultural land is suitable for extensive grazing. Areas for grazing declined owing to expanding human

settlements and other activities such as mining, crops, forestry, and conservation. 80% of the total cattle heads are for beef cattle and the remaining 20% is for dairy cattle.

The South African feedlot industry is a flourishing industry that contributes approximately 75% to all beef produced in South Africa. The Eastern Cape only contributes 8% of the total beef production in South Africa due to low investment in feedlot operations in the province resulting in majority of local weaners transported and finished in other provinces.

South Africa does not only cater to the domestic market with regards to beef, but the international market as. The country was exports to Africa and Asia. Africa commanded the highest exports of beef from South Africa in the years 2007 to 2014. In 2015 and 2016, Asia outstripped Africa and took a lead in the share of beef exported by South Africa to the continents. The demand for beef in Asian countries continues to grow. In total Africa commanded 118 million kilograms (kg) of beef from South Africa which accounts for 67% and Asia was the second by 30 million kg during the past decade. Oceania commanded the lowest South African beef exports quantity during the period of analysis.

Indicate any benefits that the activity will have for society in general:

The proposed development will accrue the following benefits:

- Usage of common property grazing lands, which are especially vital to the welfare of the landless;
- Source of income diversification; and
- High-quality protein and energy to diets of the food and nutrition insecure, as well as essential micronutrients such as calcium, iron, zinc, retinal, thiamine, and vitamins A, B6 and B12, often lacking in cereal-based diets.

Indicate any benefits that the activity will have for the local communities where the activity will be located:

The beneficiaries including the local community will benefit from this project through economic development, employment generation and poverty reduction.

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy, or guideline:	Administering authority:	Date:
NEMA	The Department	1999
EIA Regulations	The Department	2017
NEMWA	The Department	2009
List of Waste Management Activities	The Department	2013
NHRA	ECPHRA	2000
National Water Act, 1998 (Act 36 of 1998), as amended	DWS	1999
Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983), as amended	Department of Agriculture	1984
National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004), as amended	The Department	2005

Title of legislation, policy, or guideline:	Administering authority:	Date:
National Environmental Management Air Quality Act, 2004 (Act 93 of 2004), as amended	The Department	2005
Occupational Health and Safety Act, 1993 (Act 85 of 1993), as amended	Department of Labour	1994
National Health Act, 2003 (Act 61 of 2003), as amended	Department of Health	2005
Noise Induced Hearing Loss Regulations, 2003	Department of Labour	2003
Government Notice No. 807, 2012, as amended	The Department	2012
SLM By-Laws ((Waste Management, Solid Waste, Water and Sanitation, Landuse)	SLM	Various
National Biodiversity Assessment, 2018	The Department	2019
SANS 10103:2003 (Noise Management)	-	2003
SANS 1929:2005 (Ambient Air Quality Management)	-	2005
Fertilisers, Farm Feeds, Seeds and Remedies Act, 1947 (Act 36 of 1947), as amended	Department of Agriculture	1948
Meat Safety Act, 2000 (Act 40 of 2000), as amended	Department of Agriculture	2000
Animal Health Act, 2002 (Act 7 of 2002), as amended	Department of Agriculture	2002
Animal Matters Act, 1993 (Act 42 of 1993), as amended	Department of Agriculture	1993
Animals Protect Act, 1962 (Act 71 of 1962), as amended	Department of Agriculture	1962

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11.1 Solid Waste Management

Will the activity produce solid construction waste during the construction/ initiation phase?	**YES** ~~NO~~
If yes, what estimated quantity will be produced per month?	1m^3

How will the construction solid waste be disposed of (describe)?

Solid waste generated during the construction phase will be the responsibility of the contractor, this waste will be stockpiled in designated containers/ demarcated sites whereafter it will be disposed of as below.

Where will the construction solid waste be disposed of (describe)?

The solid was associated with the construction phase will be disposed of by the contractor at the SLM waste management facility.

Will the activity produce solid waste during its operational phase?	**YES** ~~NO~~
If yes, what estimated quantity will be produced per month?	777m^3

How will the solid waste be disposed of (describe)?

During the operational phase solid waste to be generated will include manure which will be utilised to compost arable lands. Minimal general waste will also be produced as part of day-to-day operations, this will feed into the municipal stream.

In addition to the above, cattle medicine waste will be generated. Only medicine needed to complete one cycle (±110 days) of weaner calves in the feedlot will be kept on site at any given time. An unknown number of empty plastic and bottle medicine containers (and syringes) will be taken to a veterinary clinic within the Khowa area for management along with the veterinary practice waste of this nature.

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

The manure will be reused for composting on site while cattle medicine waste will be transported to a local veterinary clinic.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the CA to determine whether it is necessary to change to an application for S&EIR.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?	YES	**NO**

If yes, inform the CA and request a change to an application for S&EIR.

Is the activity that is being applied for a solid waste handling or treatment facility?	YES	**NO**

If yes, then the applicant should consult with the CA to determine whether it is necessary to change to an application for S&EIR.

11.2 Liquid Effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	**YES**	NO
If yes, what estimated quantity will be produced per month?	628m^3	
Will the activity produce any effluent that will be treated and/or disposed of on site?	**YES**	NO

If yes, the applicant should consult with the CA to determine whether it is necessary to change to an application for S&EIR. The listed activities have been scrutinised, all applicable Listed Activities fall within the ambits of a BA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	**NO**

If yes, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of wastewater, if any:

Minimal wastewater, including the French-drain, will be produced on site. Due to the nature of a French-drain, effluent emanating from this facility cannot be reused.

11.3 Emissions into the Atmosphere

Will the activity release emissions into the atmosphere?	**YES**	NO
If yes, is it controlled by any legislation of any sphere of government?	YES	**NO**

If yes, the applicant should consult with the CA to determine whether it is necessary to change to an application for S&EIR.

If no, describe the emissions in terms of type and concentration:

Emissions associated with methane (CH_4) and hydrogen sulphide (H_2S) gas and dust are common in a cattle feedlot. CH_4 is found in the cattle urine and dung while CH_4 gas stems from a combination of factors. Given off by its offensive smell, the H_2S gas is produced by the manure and liquid waste stored in the lagoons particularly after rainfall events and during hot days. Dust is mainly resultant from bare soil and dry manure, the dust associated with bare soil is usually found around pens mostly in the early evening when cattle are most active. Due to the openness of the site, it is not anticipated that dust will cause any visual issues.

11.4 Generation of Noise

Will the activity generate noise?	~~YES~~	**NO**
~~If yes, is it controlled by any legislation of any sphere of government?~~	~~YES~~	~~NO~~

~~If yes, the applicant should consult with the CA to determine whether it is necessary to change to an application for S&EIR.~~

If no, describe the noise in terms of type and level:

Noise will be generated by machinery during the construction phase. The noise levels will be well below the regulated limits. The measures to manage noise levels are discussed in the Draft EMPr.

Additionally, noise associated with cattle feedlot will be generated during the operational phase. This noise is not anticipated to be pronounced either and will be below the legislated limits.

12. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es)

~~municipal~~	~~water board~~	**groundwater**	~~river, stream, dam or lake~~	~~other~~	~~the activity will not use water~~

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month: +/- 1 084 285 litres

Does the activity require a water use permit from the DWS? **YES** ~~NO~~

If yes, please submit the necessary application to the DWS and attach proof thereof to this application if it has been submitted. The application has been initiated with the regional DWS, see proof in **Appendix G1**.

13. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

Electrical supply for the proposed development is already in existence, thus no measures have been included into the design.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

There is an existing electrical supply point installed by Eskom on the current site, the operational activities will make use of this connection. No alternative energy sources are planned by the applicant at this stage, however, it is uncertain if this will at some time in the future change as alternative energy sources become more available and affordable.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. ~~For linear activities (pipelines, etc.) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.~~

~~Section C Copy No. (e.g., A):~~

Paragraphs 1 - 6 below must be completed for each alternative.

2. Has a specialist been consulted to assist with the completion of this section? **YES** ~~NO~~
If YES, please complete specialist form for each specialist thus appointed:

All specialist reports must be contained in Appendix D. Refer to **Appendix D1 to D6** for specialist reports and forms.

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

~~**Alternative S3 (if any):**~~

~~Flat~~	~~1:50 – 1:20~~	~~1:20 – 1:15~~	~~1:15 – 1:10~~	~~1:10 – 1:7,5~~	~~1:7,5 – 1:5~~	~~Steeper than 1:5~~

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

~~2.1 Ridgeline~~
~~2.2 Plateau~~
~~2.3 Side slope of hill/mountain~~
~~2.4 Closed valley~~
~~2.5 Open valley~~
2.6 Plain
2.7 Undulating plain / low hills
~~2.8 Dune~~
~~2.9 Seafront~~

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:		**Alternative S2:**		~~Alternative S3:~~	
Shallow water table (less than 1.5m deep)	**YES**	~~NO~~	~~YES~~	**NO**	~~YES~~	~~NO~~
Dolomite, sinkhole or doline areas	~~YES~~	**NO**	~~YES~~	**NO**	~~YES~~	~~NO~~
Seasonally wet soils (often close to water bodies)	~~YES~~	**NO**	**YES**	~~NO~~	~~YES~~	~~NO~~
Unstable rocky slopes or steep slopes with loose soil	~~YES~~	**NO**	~~YES~~	**NO**	~~YES~~	~~NO~~
Dispersive soils (soils that dissolve in water)	~~YES~~	**NO**	~~YES~~	**NO**	~~YES~~	~~NO~~
Soils with high clay content (clay fraction more than 40%)	**YES**	~~NO~~	~~YES~~	**NO**	~~YES~~	~~NO~~
Any other unstable soil or geological feature	~~YES~~	**NO**	~~YES~~	**NO**	~~YES~~	~~NO~~

	Alternative S1:		Alternative S2:		Alternative S3:	
An area sensitive to erosion	~~YES~~	**NO**	~~YES~~	**NO**	~~YES~~	~~NO~~

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

~~4.1 Natural veld in good condition[E]~~
~~4.2 Natural veld with scattered aliens[E]~~
~~4.3 Natural veld with heavy alien infestation[E]~~
4.4 Veld dominated by alien species[E]
~~4.5 Gardens~~
~~4.6 Sport field~~
~~4.7 Cultivated land~~
~~4.8 Paved surface~~
4.9 Building or other structure
4.10 Bare soil

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

~~Natural veld in good condition[E]~~	~~Natural veld with scattered aliens[E]~~	~~Natural veld with heavy alien infestation[E]~~	**Veld dominated by alien species[E]**	~~Gardens~~
~~Sport field~~	~~Cultivated land~~	~~Paved surface~~	**Building or other structure**	**Bare soil**

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the EAP does not have the necessary expertise. An Ecologist was consulted to assess the Terrestrial Biodiversity (including Animal and Plant Species), refer to **Appendix D2**.

5. LANDUSE CHARACTER OF SURROUNDING AREA

Indicate landuses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

5.1 Natural area
~~5.2 Low density residential~~
~~5.3 Medium density residential~~
~~5.4 High density residential~~
~~5.5 Informal residential~~
~~5.6 Retail commercial & warehousing~~
~~5.7 Light industrial~~
~~5.8 Medium industrial[AN]~~
~~5.9 Heavy industrial[AN]~~

5.10 Power station
5.11 Office / consulting room
5.12 Military or police base / station / compound
5.13 Spoil heap or slimes dam[A]
5.14 Quarry, sand or borrow pit
5.15 Dam or reservoir
5.16 Hospital / medical centre
5.17 School
5.18 Tertiary education facility
5.19 Church
5.20 Old age home
5.21 Sewage treatment plant[A]
5.22 Train station or shunting yard[N]
5.23 Railway line[N]
5.24 Major road (4 lanes or more)[N]
5.25 Airport[N] (defunct airfield)
5.26 Harbour
5.27 Sport facilities
5.28 Golf course
5.29 Polo fields
5.30 Filling station[H]
5.31 Landfill or waste treatment site
5.32 Plantation
5.33 Agriculture
5.34 River, stream or wetland
5.35 Nature conservation area
5.36 Mountain, koppie or ridge
5.37 Museum
5.38 Historical building
5.39 Protected Area
5.40 Graveyard
5.41 Archaeological site
5.42 Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how will this impact / be impacted upon by the proposed activity.

It is not anticipated that the proposed development will have any effect on the defunct airfield, as discussed in Section A above, the airfield is made obscure from the site by hills.

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	
If YES, specify:	

If any of the boxes marked with an "[H]" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	
If YES, specify:	

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in Section 2 of the NHRA, including Archaeological or Palaeontological sites on or close (within 20m) to the site?	YES	**NO**
	Uncertain	

If YES, explain:	

~~If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.~~

Briefly explain the findings of the specialist:	According to ArchaeoMaps (2022), two archaeological and cultural heritage resources were recorded within the site. These constitute partial Colonial Period kraal mound remains and khowa habitat. The kraal remains are of no scientific or heritage conservation significance and it is recommended that these remains be destroyed without having to apply for site destruction permit from the ECPHRA. The living heritage characterises not only the current site but also the alternative site, albeit most prominently so within the wooded tree clusters typical of the mosaic landscape associated with the northern portion of the alternative site. The presence of the khowa is of High Local Significance and it is recommended that as much of the wooded habitat, but no less than a third (≥6ha) of the northern portion of the alternative site, be conserved thereby ensuring in part and on site, and in perpetuation of future generations the conservation of the mushroom habitat within the development framework (ArchaeoMaps, 2022). Additionally, a Heritage Management Plant must be developed by the applicant to guide the management of the conserved living heritage within the alternative site. A site-specific field survey of the development footprint was conducted on 10 September 2022 by a Palaeontologist, no fossiliferous outcrop was detected in the current or alternative site. The apparent rarity of fossil heritage in the study site footprint suggests that the impact of the development will be of a Low significance in palaeontological terms (Banzai Environmental, 2022). It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area.

Will any building or structure older than 60 years be affected in any way?	~~YES~~	**NO**
Is it necessary to apply for a permit in terms of the NHRA?	~~YES~~	**NO**

~~If yes, please submit, or make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.~~

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT

The person conducting a Public Participation Process (PPP) must take into account any guidelines applicable to public participation as contemplated in Section 24J of the NEMA and must give notice to all potential I&APs of the application which is subjected to public participation by:

a) fixing a notice board (of a size at least 60 centimetres [cm] by 42cm; and must display the required information in lettering and in a format as may be determined by the CA) at a place conspicuous to the public at the boundary or on the fence of:
   (i) the site where the activity to which the application relates is or is to be undertaken; and
   (ii) any alternative site mentioned in the application;
b) giving written notice to:
   (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
   (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;

(iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
(iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
(v) the municipality which has jurisdiction in the area;
(vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
(vii) any other party as required by the CA;

c) placing an advertisement in:
   (i) one local newspaper; or
   (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of the EIA Regulations;
d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in subregulation 54(c)(ii); and
e) using reasonable alternative methods, as agreed to by the CA, in those instances where a person is desiring of but unable to participate in the process due to:
   (i) illiteracy;
   (ii) disability; or
   (iii) any other disadvantage.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

a) indicate the details of the application which is subjected to public participation; and
b) state:
   (i) that the application has been submitted to the CA in terms of the EIA Regulations, as the case may be;
   (ii) whether BA or S&EIR procedures are being applied to the application, in the case of an application for EA;
   (iii) the nature and location of the activity to which the application relates;
   (iv) where further information on the application or activity can be obtained; and
   (v) the manner in which and the person to whom representations in respect of the application may be made.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the CA in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA Regulations.

Advertisements and notices must make provision for all alternatives.

4. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later

stage that should have been addressed may cause the CA to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

5. COMMENTS AND RESPONSES REPORT

The practitioner must record all comments and respond to each comment of the public before the application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA Regulations and be attached to this application. The Comments and Responses Report (CRR) must be attached under Appendix E.

6. AUTHORITY PARTICIPATION

Authorities are key I&APs in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least 30 (thirty) calendar days before the submission of the application.

List of authorities informed:

The Department ECPHRA SAHRA DWS Eastern Cape Department of Rural Development and Agrarian Reform SLM CHDM Eskom South African Civil Aviation Authority

List of authorities from whom comments have been received:

This is a Draft BAR currently out for review, no comments have been received as yet.

7. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for linear activities, or where deviation from the public participation requirements may be appropriate, the person conducting the PPP may deviate from the requirements of that subregulation to the extent and in the manner as may be agreed to by the CA.

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application at least 30 (thirty) calendar days before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?	**YES**	~~NO~~

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

The SLM and CHDH which are jointly responsible for the property have consented to the impact assessment, the consent letter is included in this report (refer to **Appendix G3**).

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations and should take applicable official guidelines into account. The issues raised by I&APs should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by I&APs.

This will be included post PPP should any issues be raised by I&APs.

Response from the practitioner to the issues raised by the I&APs (a full response must be given in the CRR that must be attached to this report):

Responses to comments received within the legislated PPP period will be addressed in this part post PPP.

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

List the potential direct, indirect and cumulative property/ activity/ design/ technology/ operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site / activity/ technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

Alternative (preferred alternative)

The list is provided below.

3. CLIMATE CHANGE ASSESSMENT

Climate change issues must be considered as part of the BA process. EAP must determine:

a) The potential impact of climate change on society and the economy, whether the impact is negative or positive, considering that society needs to be at the centre of the proposed development;
b) The potential alternatives of the proposed development, alternatives that will have less impact on climate change (environment and generation of waste included), the society and economy;
c) whether, and to what extent, the proposed development will result in the release of greenhouse gas emissions;
d) whether the proposed development is necessary to achieve long term decarbonisation goals;
e) the impact of the development on social, economic, natural and built environment that are crucial for climate change, adaptation and resilience;
f) the projected impact of climate change on proposed development; and surrounding environment, and implications for the development;
g) Explanation of how the impacts are likely to be exacerbated or minimised as result of climate change and what measures are likely to be implemented to accommodate and manage (adapt to) the anticipated worst scenario where applicable;
h) whether, and to what extent, the impacts identified in (a) -(g) can be mitigated.

4. ENVIRONMENTAL IMPACT STATEMENT

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

Current Site
Refer below.
Alternative Site (preferred alternative)
Refer below.
No-go Alternative (compulsory)
Refer below.

4.1 Impact Assessment Methodology

GIBB Environmental has utilised its own Impact Assessment Methodology, in detailed in this **Section 4.1**, to assess the potential impacts identified as per **Section 4.2** (below) and listed in **Section 4.3** (below).

4.1.1 Objective and Purpose of the Impact Assessment Process

The BA process is primarily concerned with the identification of the Best Practice Environmental Option (BPEO), as well as its subsequent authorisation and implementation. The BPEO is defined in the NEMA as:
"…the option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long terms as well as the short term".

Identification of the BPEO therefore requires the weighing of alternative development options and their respective impacts against one another. In accordance with the provisions of Appendix 3 of the EIA Regulations, such comparison is achieved through an assessment, scoring, and ranking of alternatives and their impacts according to the following variables:

- Nature of the impact;
- Extent of the impact;
- Duration of the impact;
- Probability / likelihood of the impact; and
- Consequence of the impact.

These scores are then used to gauge the significance of the impact, both pre-mitigation and post mitigation.

Following on from this process, it is necessary to identify residual impacts, being those which may occur even with the implementation of recommended mitigation measures. These residual impacts are of interest to I&APs and the CA responsible for making a decision on IEA, as they are the "cost to society" referred to in the definition of the BPEO provided above, being the impacts which will occur in the short term (linked to the construction phase) and persist in the long term (linked to the operational phase of the development). If these "costs" (or residual impacts) are too high, then a proposed development will not be acceptable to society and the CA will not issue IEA. It is therefore necessary to assess the significance of residual impacts too.

4.1.2 Impact Assessment Criteria

Definitions/ explanations of the various criteria and terminology utilised in the undertaking of the impact assessment are set out in **Table 3**, below.

4.1.3 Rating Scales for Impact Assessment

Once the potential impacts for each of the main project phases (construction and operation) and each of the alternatives (including the no-go alternative) were identified, these were scored using the rating scales and formulae for each of the identified criteria, as listed **Table 4**, below. This was done in accordance with the requirements of the EIA Regulations and the criteria drawn from the Integrated Environmental Management Information Series 5: Impact Significance, published by the DEAT[9] (2002).

The assignment of ratings has been undertaken based on the specialist assessments undertaken specifically for this project, as well as the past experience of the impact assessment team.

4.1.4 Determining Residual Risk

As described previously, the impact assessment process allows for the identification of residual environmental impacts, defined as those which may occur even after the implementation of the recommended mitigation measures. Such impacts can be negative or positive. The residual impacts are the actual "cost" and / or "benefit" of a proposed development and may occur in the short term (if linked to the construction phase) or the long term (if linked to the operational phase).

To facilitate decision-making on IEA, it is necessary therefore to assess and weigh-up these residual costs and benefits. If the cost of a proposed development is too high, and is not outweighed by the benefits associated with the development, then such development will not be acceptable to society and the CA should not issue IEA.

The methodology for determining residual impacts / risks is described in the sections to follow.

4.1.5 Ascribing Significance for Decision-Making

The best way to describe the cost-benefit implications of residual impacts for the purposes of decision-making is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood)[10] of that event. Many risks are accepted or tolerated on a daily basis because even if the consequence of the event is serious, the likelihood that the event will occur is low. As a practical example, the consequence of a parachute not opening is, potentially, death, but the likelihood of such an event happening is so low that parachutists are prepared to take that risk and hurl themselves out of an airplane. The risk is low because the likelihood of the consequence is low even if the consequence is potentially severe.

It is also necessary to distinguish between the event itself (as the cause) and the consequence. Again, using the parachute example, the consequence of concern in the event that the parachute does not open is serious injury or death, but it does not necessarily follow that if a parachute does not open that the parachutist will die.

Various contingencies are provided to minimise the likelihood of the consequence (serious injury or death) in the event of the parachute not opening, such as a reserve parachute.

[9] Former National Department of Environmental Affairs and Tourism, now Department of Forestry, Fisheries and the Environment
[10] Because "probability" has a specific mathematical / empirical connotation, the term "likelihood" is preferred in a qualitative application and is accordingly the term used in assessing residual impacts.

Table 3: Explanation of the Impact Assessment Criteria

Criteria	Explanation
Nature	This is an evaluation of the type of effect the construction, operation and management of the proposed development would have on the affected environment. Will the impact change in the environment be positive, negative or neutral?
Duration (D)	The lifespan of the impact is indicated as temporary, short, medium and long term.
Extent (E)	This refers to the spatial scale at which the impact will occur. Extent of the impact is described as: footprint (affecting only the footprint of the development), site (limited to the site) and regional (limited to the immediate surroundings and closest towns to the site). Extent or scale refers to the actual physical footprint of the impact, not to the spatial significance. It is acknowledged that some impacts, even though they may be of small extent, are of very high importance, e.g. impacts on species of very restricted range. In order to avoid "double counting, specialists have been requested to indicate spatial significance under "intensity" or "impact on irreplaceable resources" but not under "extent" as well.
Impact on irreplaceable resources (IR)	This refers to the potential for an environmental resource to be replaced, should it be impacted. A resource could possibly be replaced by natural processes (e.g. by natural colonisation from surrounding areas), through artificial means (e.g. by reseeding disturbed areas or replanting rescued species) or by providing a substitute resource, in certain cases. In natural systems, providing substitute resources is usually not possible, but in social systems substitutes are often possible (e.g. by constructing new social facilities for those that are lost). Should it not be possible to replace a resource, the resource is essentially irreplaceable e.g. red data species that are restricted to a particular site or habitat of very limited extent.
Severity (Sev)	This is a relative evaluation within the context of all the activities and the other impacts within the framework of the project. Does the activity destroy the impacted environment, alter its functioning, or render it slightly altered? i.e. this is a question of the seriousness of the impact.
Consequence (Cons)	The consequence of the potential impacts is an indication of the implications of the impact and is a summation of the duration and extent of the impact, as well as the impact on irreplaceable resources, factoring in a consideration of the severity of such impacts. The formula used to calculate Consequence is: **Cons = (D + E + IR) x Sev**
Probability of occurrence (P)	The probability of the impact actually occurring based on professional experience of the specialist with environments of a similar nature to the site and/or with similar projects. It is important to distinguish between probability of the impact occurring and probability that the activity causing a potential impact will occur. Probability is defined as the probability of the impact occurring, not as the probability of the activities that may result in the impact.
Significance (Sig)	Impact significance is defined to be a combination of the consequence (as described above) and the probability of the impact occurring. The relationship between consequence and probability highlights that the impact significance must be evaluated in terms of the consequence of the impact, weighted by the likelihood of the impact actually occurring.

Criteria	Explanation
	In simple terms, if the consequence and probability of an impact is high, then the impact will have a high significance. The significance defines the level to which the impact will influence the proposed development and/or environment. It determines whether mitigation measures need to be identified and implemented and whether the impact is important for decision-making. The formula used to calculate Significance is: **Sig = Cons x P**
Degree of confidence in predictions (Conf)	Specialists and the EAP were required to provide an indication of the degree of confidence (low, medium or high) in the predictions made for each impact, based on the available information and their level of knowledge and expertise. Degree of confidence is not taken into account in the determination of consequence or probability.
Mitigation measures	Mitigation measures are designed to reduce the consequence or probability of an impact, or to reduce both consequence and probability. The significance of impacts has been assessed both with mitigation and without mitigation.

Table 4: Criteria and rating scales used in the assessment of potential impacts

Criteria	Rating Scale	Score	Description
Nature	Positive		An evaluation of the effect of the impact related to the proposed development.
	Negative		
Duration (D)	Temporary	1	The duration of the activity associated with the impact will last 0 - 6 months.
	Short term	2	The duration of the activity associated with the impact will last 6 - 18 months.
	Medium term	3	The duration of the activity associated with the impact will last 18 months - 5 years.
	Long term	4	The duration of the activity associated with the impact will last more than 5 years.
Extent (E)	Footprint	1	The impact only affects the area in which the proposed activity will occur.
	Site	2	The impact will affect only the development area.
	Local	3	The impact affects the development area and adjacent properties.
	Regional	4	The effect of the impact extends beyond municipal boundaries.
	National	5	The effect of the impact extends beyond more than 2 regional/ provincial boundaries.
	International	6	The effect of the impact extends beyond country borders.
Severity (Sev)	High negative	-3	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.
	Moderate negative	-2	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected

Criteria	Rating Scale	Score	Description
	Low negative	-1	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected
	Negligible	0	The impact on the natural, cultural and social functions and the processes of the environment is so slight as to be undetectable.
	Low positive	1	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved.
	Moderate positive	2	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected
	High positive	3	The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.
Potential impact on irreplaceable resources (IR)	No	0	No irreplaceable resources will be impacted.
	Yes	1	Irreplaceable resources will be impacted.
Consequence (Cons)	Extremely detrimental	-33 to -25	A combination of duration, extent and the potential for impact on irreplaceable resources, factoring in the severity of the impact. Consequence is calculated as: **Cons = (D + E + IR) x Sev**
	Highly detrimental	-24 to -19	
	Moderately detrimental	-18 to -13	
	Slightly detrimental	-12 to -7	
	Negligible	-6 to 6	
	Slightly beneficial	7 to 12	
	Moderately beneficial	13 to 18	
	Highly beneficial	19 to 24	
	Extremely beneficial	25 to 33	
Probability (P)	Unlikely	1	It is highly unlikely or less than 50 % likely that an impact will occur.
	Likely	2	It is between 50 and 75 % certain that the impact will occur.
	Definite	3	It is more than 75 % certain that the impact will occur or it is definite that the impact will occur.
Significance (Sig)	Very high negative	-99 to -73	The risk associated with an impact, calculated as a function of Consequence and Probability. Significance is calculated using the formula: **Sig = Cons x P**
	High negative	-72 to -55	
	Moderate negative	-54 to -37	
	Low negative	-36 to -19	
	Very low negative	-18 to 0	

Criteria	Rating Scale	Score	Description
	Very low positive	0 to 18	
	Low positive	19 to 36	
	Moderate positive	37 to 54	
	High positive	55 to 72	
	Very high positive	73 to 99	
Confidence	Low		Specialists and the EAP are required to provide an indication of the degree of confidence in the predictions made for each impact, based on the available information and their level of knowledge and expertise.
	Medium		
	High		

In risk terms this means distinguishing between the inherent risk (the risk that a parachutist will die if the parachute does not open) and the residual risk (the risk that the parachutist will die if the parachute does not open but with the contingency of a reserve parachute), i.e., the risk before and after mitigation.

4.1.6 Ranking of Consequence

The ascribing of significance for decision-making then becomes relatively simple: it requires the consequences to be ranked and the likelihood of that consequence to be defined. **Table 5** provides more detail on the scoring system utilised for consequence ranking.

Two important features should be noted in Table 5:

- The scoring doubles as the risk increases; and
- There is no equivalent 'high' score in respect of benefits as there is for the costs. This high negative score serves to give expression to the potential for a fatal flaw where a fatal flaw would be defined as an impact that cannot be mitigated effectively and where the associated risk / significance is accordingly untenable. Stated differently, the high score on the costs, which is not matched on the benefits side, highlights that such a fatal flaw cannot be 'traded off' by a benefit and would render the proposed project to be unacceptable.

Table 5: Ranking of Consequence

Environmental Cost	Inherent Risk
Human health – morbidity / mortality, loss of species	High
Material reductions in faunal populations, loss of livelihoods, individual economic loss	Moderate – high
Material reductions in environmental quality: air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate
Nuisance	Moderate – low
Negative change, with no other consequences	Low

Environmental Benefit	Inherent Benefit
Net improvement in human welfare	Moderate – high
Improved environmental quality: air, soil, water. Improved individual livelihoods	Moderate
Economic development	Moderate – low
Positive change, with no other consequences	Low

4.1.7 Categorisation of Likelihood

Although the principle is one of probability, the term 'likelihood' is used to give expression to a qualitative rather than quantitative assessment, because the term 'probability' tends to denote a mathematical/ empirical expression. A set of likelihood descriptors that can be used to characterize the likelihood of the costs and benefits occurring, is presented in the table below.

Table 6: Likelihood categories and definitions

Likelihood Descriptors	Definitions
Highly unlikely	The possibility of the consequence occurring is negligible
Unlikely but possible	The possibility of the consequence occurring is low but cannot be discounted entirely
Likely	The consequence may not occur but a balance of probability suggests it will
Highly likely	The consequence may still not occur but it is most likely that it will
Definite	The consequence will definitely occur

It is very important to recognise that the likelihood question is asked twice. The first time the question is asked is the likelihood of the cause and the second as to the likelihood of the consequence. In the tables that follow the likelihood is presented of the cause and then the likelihood of the consequence is presented. A high likelihood of a cause does not necessarily translate into a high likelihood of the consequence. As such the likelihood of the consequence is not a mathematical or statistical 'average' of the causes but rather a qualitative estimate in its own right.

4.1.8 Determination of Residual Risk

The residual risk is then determined by the consequence and the likelihood of that consequence. The residual risk categories are shown in **Table 7**, where consequence scoring is shown in the rows and likelihood in the columns. The implications for decision-making of the different residual risk categories are shown in **Table 8**.

Table 7: Residual Risk Categories

		Residual risk				
Consequence	High	Moderate	High	High	Fatally flawed	
	Moderate – high	Low	Moderate	High	High	High
	Moderate	Low	Moderate	Moderate	Moderate	Moderate
	Moderate – low	Low	Low	Low	Low	Moderate
	Low	Low	Low	Low	Low	Low
		Highly unlikely	Unlikely but possible	Likely	Highly likely	Definite
		Likelihood				

Table 8: Implications for decision-making of the different residual risk categories

Rating	Nature of implication for Decision – Making
Low	Project can be authorised with low risk of environmental degradation
Moderate	Project can be authorised but with conditions and routine inspections
High	Project can be authorised but with strict conditions and high levels of compliance and enforcement
Fatally Flawed	The project cannot be authorised

4.2 Impact Identification

A key part of the impact assessment process is the identification and consideration of the ways in which the project may interact (positively and negatively) with environmental, cultural heritage and socio-economic resources or receptors. The issues that were identified as potentially significant provided focus for more detailed specialist assessment as part of the impact assessment. These specialist assessments have, in turn, facilitated the identification of potential impacts (ecological, aquatic, cultural heritage, and socio-economic) associated with all phases of the proposed development, from design, through construction, to operation.

4.2.1 Description of Potential Impacts and their recommended Mitigation Measures

The following section details the potential impacts (both positive and negative) which have been identified for the proposed project. In completing this section, the broad definition "environment" as contained in the NEMA, has been applied:

"...the surroundings within which humans exist and that are made up of –

(i) The land, water and atmosphere of the earth;

(ii) Micro-organisms, plant and animal life;

(iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and
(iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being."

On the basis of this definition, therefore, in identifying the potential impacts of the proposed development, the EAP and the specialists have considered the biological, social, cultural and economic components that make up the environment.

The potential impacts on environmental resources arising from the proposed development include direct and indirect impacts. Potential impacts are also linked to the different stages of the project which are identified as construction and operation.

NOTE: as per this section of the BA, potential impacts have been identified and assessed for the different alternatives including the No-Go Alternative.

Measures for the avoidance, minimisation or mitigation of the identified potential impacts have also been recommended by the EAP and specialists.

The table below provides an overview of likely impacts arising from each of the key project activities and considers the likely interaction with socio-economic, cultural heritage and environmental resources and receptors.

4.3 Impact and Residual Risk Assessment

All potential impacts associated with the alternatives have been categorised according to the respective development phases during which they will occur, pre-construction, construction and operational. Potential impacts identified as being associated with the alternatives have been outlined and assessed in terms of their anticipated duration, extent, severity, probability and significance (as defined in **Table 3**, above), both prior and post mitigation measures being implemented, making use of the methodology described in this section, above.

Table 9: Potential interactions between project activities (all alternatives) and the receiving environment

Project Activity	Receptor / Resource									
	Surface & Groundwater	Flora	Fauna	Geology & Soils	Heritage & Visual	Waste Management	Traffic	Noise	Air Quality	Socio-Economic
Construction Phase										
Clearance of vegetation										
Establishment of temporary construction camp										
Establishment of access roads										
Delivery and storage of materials on site										
Excavation										
Stockpiling of material										
Generation of construction waste (general, hazardous and sewage)										

Project Activity	Receptor / Resource									
	Surface & Groundwater	Flora	Fauna	Geology & Soils	Heritage & Visual	Waste Management	Traffic	Noise	Air Quality	Socio-Economic
Construction and all associated structures and service infrastructure										
Post-Construction Phase										
Site rehabilitation										
Operational Phase										
Operation of the cattle feedlot										

Key: A red-shaded box indicates a potential negative interaction between the project and the resource / receptor, whilst a green-shaded box indicates a potential positive interaction. An orange-shaded box denotes an interaction that is both positive and negative.

4.3.1 Pre-Construction Phase

The biophysical impacts anticipated for the Pre-construction Phase will be minimal and negligible. The site setup and demarcations for the site will be done in conjunction with an appointed independent Environmental Control Officer (ECO).

Prior to the construction phase, preference should be given to sourcing local skilled and unskilled labour. Recruitment of labour should be guided by the intention to promote the employment of local labour by any appointed contractors.

4.3.2 Current Site Construction Phase

(a) Flora and Fauna

Table 10: Impact rating for the clearance of vegetation and potential loss of fauna habitat

POTENTIAL LOSS OF VEGETATION AND FAUNA HABITAT				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Clearance of vegetation, including remaining indigenous vegetation*			
INDIRECT IMPACT	*Destruction of habitat suitable for indigenous vegetation and fauna*			
CUMULATIVE IMPACT	*Reduced floral and faunal species diversity and richness*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-15*	*3*

POTENTIAL LOSS OF VEGETATION AND FAUNA HABITAT				
EXTENT	*2*	*The extent of the impact is rated as Site as it only affects the development area*		
SEVERITY	*-3*	*The severity of the impact is rated as High Negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected*	***Moderately detrimental***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-45***	***Moderate negative***		

PROPOSED MITIGATION MEASURES

- The construction footprint including service roads, construction camps, stock piles, etc. must stay out of all areas containing natural vegetation and areas marked highly sensitive (wetlands).
- If the sensitive areas cannot be avoided then the biodiversity must be recreated using species found typically in these areas. This must be guided by a suitably qualified botanist or horticulturalist.
- Prior to any removal of indigenous vegetation, a walk-through of the sensitive areas must be undertaken by a suitable qualified botanist or horticulturalist and any plants that can be relocated must be rescued and replanted in the newly created habitats. Any protected species that will be relocated will require a permit from the Department.
- All areas that need revegetating during or after construction must be planted only with indigenous grass species found in the immediate vicinity and not with the standard species mix commonly used in construction projects. A botanist or rehabilitation specialist must be consulted in this regard.
- An independent ECO must be appointed to oversee construction activities.
- As far as possible, construction should take place during the dry winter months to help minimise contamination of delineated watercourses and runoff from the construction site polluting downstream watercourses.
- An ecologically-sound Stormwater Management Plan (SMP) must be implemented during construction and appropriate water diversion systems put in place.
- During construction, erosion must not be allowed to develop on a large scale before effecting repairs.
- All areas susceptible to erosion must be protected and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.
- Surface water or stormwater must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being in place.
- Areas exposed to erosion during construction should be revegetated with species naturally occurring in the area. Natural trees, shrubbery and grass species must be retained wherever possible.
- Stormwater infrastructure must designed in such a way that it does not impact on or erode the surrounding natural areas, especially the delineated watercourses.
- Vehicles used during the construction phase must be parked in a designated area and containers should be used to hold any oil leaks.

POTENTIAL LOSS OF VEGETATION AND FAUNA HABITAT
• Formal solid waste management systems must be implemented and formal waste removal services provided. Recycling of solid waste must be encouraged. • Formal bulk water and sewer reticulation services must be installed. Fail safe measures must be included in the engineering design, including an Emergency / Risk Management Plan. • Dumping of solid waste and litter in natural areas by construction workers and cattle feedlot workers must be prohibited. This must be discouraged through education initiatives and the provision of ample waste disposal facilities. • If possible, electricity should be supplied via buried cables rather than overhead lines. • Should overhead lines be implemented, these should be routed alongside roads and must avoid crossing natural and open areas as far as possible. To avoid electrocution by larger species such as raptors, the vertical phase-earth clearance should be greater than 1.8m. All jumpers at transformers, T-offs and strain structures must be insulated. Only pole structures that are approved as "bird friendly" by Eskom's ENVIROTECH Forum should be used. Lines traversing open areas such as wetlands must be marked with anti-collision devices. This includes low voltage lines. Bird flight diverters on the earth wires must be installed as per specifications devised by the Endangered Wildlife Trust (EWT) / Eskom Partnership. • Surrounding natural vegetation must not be disturbed to minimise chances of invasion by IAP species. Emergence of IAP species should be monitored on a bi-annual basis by a suitably qualified botanist. • An IAP species Management and Monitoring Plan must be compiled by a suitably qualified botanist and implemented whereby all emergent IAP species are removed during construction. • During the construction phase, all IAP seedlings and saplings must be removed as they become evident for the duration of the construction phase. Manual / mechanical removal is preferred to chemical control. • All construction vehicles and equipment, as well as construction material must be free of plant material before coming on site. Equipment and vehicles must be thoroughly cleaned prior to access to the construction site. • No domesticated animals must be allowed on the construction site by construction and/or feedlot workers. • During construction, all food should be securely stored away to prevent attraction of faunal species and all rubbish should be disposed of away from the site. Bins located around the site should have tightly fitting lids to prevent raiding by faunal species. • Upward lighting should be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light. • Insects are attracted to brighter light that is emitted over a broad band of long wavelengths such as high-pressure sodium or mercury lamps. Such lighting must be avoided, and rather light that is emitted at one wavelength, contains no ultraviolet (UV) light and has a low attraction to insects, such as low-pressure sodium lamps, should be used. • If possible, construction should take place during daylight hours to avoid the need for artificial lighting and to reduce the impact of noise and vibrations on nocturnal animals. • Foot traffic by people and domestic animals in the surrounding natural areas must be kept to a minimum. Livestock grazing in the natural areas must be kept at a minimum and at sustainable levels. • The feedlot employees should be educated in the importance of looking after the natural environment and the sustainable utilisation of natural resources. This can be achieved through educational posters, for example. • Harvesting of fuel wood from indigenous species within the natural areas should be discouraged, and rather the wood of IAP species such as wattle be utilised. • Formal designs must include standard pollution control mechanisms and an appropriate stormwater drainage system. Any water released into the environment must be cleaned of all impurities. • No wild animal may under any circumstance be handled, removed, or be interfered with by construction workers or by operational phase staff.

POTENTIAL LOSS OF VEGETATION AND FAUNA HABITAT				
• During the construction and operational phases, no wild animal may under any circumstance be hunted, snared, captured, injured, or killed. This includes animals perceived to be vermin.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-8*	*3*
EXTENT	1	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-2	*The severity of the impact is rated as Moderate Negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly detrimental***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-24**	**Low negative**		
CONFIDENCE LEVEL				
Medium				

(b) Surface Water

Table 11: Impact ratings for surface water resources

SURFACE WATER IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Construction of structures and installation of service infrastructure within and/or in close proximity to wetlands*			
INDIRECT IMPACT	*Disturbance/ destruction of aquatic habitats*			
CUMULATIVE IMPACT	*Reduced floral and faunal species diversity and richness*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-18*	*3*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the*		

SURFACE WATER IMPACTS				
		development area and adjacent properties		
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected*	***Moderately detrimental***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-54***	***Moderate negative***		

PROPOSED MITIGATION MEASURES

- Vegetation clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, vegetation clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.
- Unnecessary removal of groundcover from slopes must be prevented, especially on steep slopes. Prior to the stripping, infilling, excavation and reshaping of any wetland within the development footprint/corridor, a search and rescue of indigenous vegetation must be undertaken prior to habitat destruction for use in rehabilitation. Arrangements must be made to store and/or relocate the relevant species into suitable onsite or offsite habitats or in a temporary nursery/storage area. This process should be led by the appointed ECO.
- Thereafter, topsoil and vegetation from areas to be excavated should be stripped and stored at the designated soil stockpile area outside of the wetland for use later in rehabilitation. Topsoil and subsoil to be stored separately.
- In cases where natural vegetation will be cleared as a result of the movement of people or stockpiling of building materials, revegetation should take place. Preceding revegetation efforts occurring in cleared and degraded areas, it is essential that all solid wastes are removed from these areas as well as their immediate surroundings. Following the removal of solid waste, a mixture of indigenous species should be introduced. The reestablishment of vegetation will enhance these systems' capability to maintain biodiversity, it will aid in reducing the velocity and quantity of runoff waters into wetlands, the retardation of water movement through a wetland which will in turn assist with trapping sediment and improving the overall quality of water. Where possible, vegetation should be cut to ground level rather than removing completely so as to assist with binding/stabilising the soil during land-clearing operations.
- No clearing of indigenous vegetation outside of the defined working servitudes is permitted for any reason (i.e., for firewood or medicinal use). No persons may remove, damage, deface, paint or disturb any flora (plants) outside of the demarcated construction areas, unless specifically authorised by the ECO in consultation with the resident engineer. Any indigenous vegetation suitable for rehabilitation should be stored appropriately for later use. Indigenous wetland vegetation removed from the construction footprint and suitable for rehabilitation activities must be carefully removed and stored in an appropriate facility for rehabilitation purposes.
- As a consequence of the proposed development, the wetland system will possibly encounter anthropogenic disturbances. Therefore, in order to manage and mitigate these threats faced by the wetland a suitable buffer should be determined. Therefore, during periods of construction there should be minimal human

SURFACE WATER IMPACTS

disturbances by minimising activities that would lead to excessive pollution and run off into the wetland such as no driving of vehicles on areas other than pre-existing roads, no movement of people on the site unless on designated footpaths, lavatory facilities should be set up and made use of outside of the wetland and its buffer, and rubbish disposal facilities should be made readily available outside of the wetland and its buffer for disposal of rubbish and should be emptied at regular intervals to prevent overflowing of trash. During the construction phase the recommended wetland buffer is 14m.

- During the construction phase all measures should be taken in order to prevent contamination of wetland areas by vehicles. Before commencement of the construction phase contractors must submit method statements detailing protocols to control potential pollution such as:
  - Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas;
  - These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall;
  - Storage of materials as described above may not be within the 1:100 floodline, watercourses or associated buffer areas;
  - In the case of pollution of any surface or groundwater, the Regional Representative of the DWS must be informed immediately and corrective action taken;
  - All equipment should be parked overnight and/or fuelled at least 500m from the watercourse;
  - Drip trays (minimum of 10cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised; and
  - Drip trays must be utilised during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total amount/ volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle.
- If any spills of diesel, petrol, oil, or corrosive fluid occur a spill kit should be kept on site to immediately address this. All vehicles and machinery should therefore be kept off site in a bunded, platformed location in order to avoid such contamination in the watercourses.
- All vehicles should only be allowed to stand overnight and refuelled only on impervious surfaces. Additionally, materials not to be stockpiled within the buffer area; all materials should strictly be kept 30m away from the watercourses on site.
- An appropriate Contingency-Spill Response Plan is to be compiled and stored on site, for implementation where necessary. Contractors are to be trained in spill response and familiar with spill plan. Contact details for a reputable company to handle large spill events (e.g., SpillTech) must be included in the spill plan and must be available on hand at the site during construction and business operation.
- No equipment laydown or storage areas must be located within 14m of any watercourse and/or within the 1:100 year floodline.
- Sedimentation and erosion control measures must be implemented to prevent slope destabilisation and increased sediment loads entering freshwater systems. Increased sediment loads can be identified by a change in the clarity of the water, or if vegetation is covered by layers of silt or other deposits. If the water appears more 'murky' or brown in colour than previously experienced, this could be as a result of an increase in sediment load within the watercourse. This can be double checked by the use of a turbidity meter.
- Exposed slopes are highly prone to erosion, so drainage control features such as earth dikes, perimeter dikes/ swales, and diversions can be used to intercept and convey runoff from above disturbed areas to suitable dispersal areas or drainage systems. This helps to reduce the sedimentation from exposed areas. Sediment traps should be utilised to detain sediments in stormwater runoff to protect receiving water bodies, and the surrounding area. Silt fences can be used by entrenching them into the ground and stretched between anchoring posts spaced at regular intervals along the lower side of a site. Sediment is filtered out as runoff flows through the fabric. Such fences should be used only where there is sheet. Gullies and other

SURFACE WATER IMPACTS

areas of active erosion should be stabilised (using catch water drains, raising headwalls or providing protective measures including grassing, stone pitching, concrete paving or gabions/ mattresses) and rehabilitated to minimise sediment entering the aquatic resource from these sources.
• Soil required for construction purposes must not be derived from the wetlands. Only approved borrow areas are to be used under the supervision of the ECO. Soil stockpiles must be established on flat ground at least 20m away from delineated watercourses. Erosion/ sediment control measures such as silt fences, low soil berms or wooden shutter boards must be placed around the stockpiles to limit sediment runoff from stockpiles. Subsoil and topsoil are to be stockpiled separately. Stockpiled soil must be replaced in the reverse order as to which it was removed (subsoil first followed by topsoil). Stockpiles of construction materials must be clearly separated from soil stockpiles in order to limit any contamination of soils. The stockpiles may only be placed within demarcated stockpile areas, which must fall within the demarcated construction area. The contractor shall, where possible, avoid stockpiling materials in vegetated areas that will not be cleared. Stockpiles shall be located outside of freshwater habitat. Stockpiled soils are to be kept free of weeds and are not to be compacted. The stockpiled soil must be kept moist using some form of spray irrigation on a regular basis as appropriate and according to weather conditions. If soil stockpiles are to be kept for more than 3 months, they must be hydro-seeded. The slope and height of stockpiles must be limited to 1.5 - 2m and are not to be sloped more than 1:2 to avoid collapse.
• To diminish the requirement to alter the flow of water away from the construction area when crossing watercourses, all construction activities within wet areas should preferably occur in the dry season/ winter (May to September). Construction within/ across watercourses should advance as quickly as practically possible in order to lessen the risk of surpassing the temporary diversion capacity. Diversions must be temporary in nature and no permanent walls, berms or dams should be installed within the watercourse. Following completion of the construction at the site, the diversions should be removed to restore natural flow patterns. Under no circumstances should the creation of a new channel be considered to divert flows away from the current channel position. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns.
• Options for temporary flow diversion when working within channels may include:
  ○ diversion of the entire watercourse through use of a bypass large diameter pipe; or the installation of removable coffer dams; and
  ○ use of removable sandbags.
• The topsoil layer must be stripped from the construction footprint and stockpiled separately from overburden (subsoil and rocky material). The thickness of the topsoil for harvesting must be obtaining from the Geotechnical Report and if not defined in the report, the top 30cm must be harvested. Stockpiled soil is to be kept free of weeds and not to be compacted. The slope and height of stockpiles must be limited to 1.5 to 2m to avoid soil compaction and destruction of soil microbes.
• Effective implementation of a Draft EMPr that outlines stringent measures to minimise erosion and manage runoff from disturbed areas.
• Management of wetland margins and buffer areas as “no-go” areas for all construction personnel and vehicles, unless engaged in specific activities related to the establishment or construction of these areas.
• Allowance for the rehabilitation of any conservation areas disturbed as a result of construction-associated activities.
• Allowance for short-term irrigation (but not from local groundwater) of landscaped channels, if necessary, until the development is complete and channelled flow is established. Note that irrigation should not be carried out using nutrient-enriched water (e.g., treated sewage effluent).
• Implementation of a strict waste management programme on the site, to prevent or address impacts associated with construction waste (e.g., litter, rubble etc.).

POST-MITIGATION

SURFACE WATER IMPACTS				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-5*	*3*
EXTENT	2	*The extent of the impact is rated as Site as it affects the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-15**	**Very low negative**		
CONFIDENCE LEVEL				
Medium				

(c) Groundwater

Table 12: Impact ratings for groundwater resources

GROUND WATER IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Contamination of groundwater resources*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	*Deteriorating groundwater quality in the localised area*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-5*	*2*
EXTENT	*2*	*The extent of the impact is rated as Site as it will affect only the development area*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***

GROUND WATER IMPACTS				
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-10***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• Plant material must be free of fuel leaks and must be parked in a solid surface area with containment of any leaks that might occur. • Dirty and clean stormwater must be separated on site, the dirty stormwater must be treated accordingly or be taken to a facility that deals with water of this quality. • Soil berms must be constructed to route surface water flow/ runoff from the proposed feedlot to a pond that is lined with an impervious lining to inhibit the contamination of groundwater. • The feedlot pad must be provided with an interface layer to prevent groundwater contamination during the operation phase. • The proposed feedlot and pond site should be moved to the south, not to overlay the dolerite dyke and thin dolerite sheet, as both have a high probability of acting as conduits for possible pollution to downstream springs and the existing borehole. • Dedicated monitoring boreholes must be developed both upgradient and downgradient of the facility which monitors the shallow perched, as well as deeper fractured aquifer. • Consider fencing off springs to protect them from animal activity.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-4*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it will affect only the area in which the activity will occur*		
SEVERITY	-1	*Low negative*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-4**	**Very low negative**		
CONFIDENCE LEVEL				
Medium				

(d) Geology and Soils

Table 13: Impact ratings for geology and soils

GEOLOGY AND SOILS IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Potential soil contamination. Stability and drainage potential issues*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**

GEOLOGY AND SOILS IMPACTS				
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-5*	*2*
EXTENT	*2*	*The extent of the impact is rated as Site as it only affects the area in which the proposed activity will occur*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-10***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• Plant material must be free of fuel leaks and must be parked in a solid surface area with containment of any leaks that might occur. • Dirty and clean stormwater must be separated on site, the dirty stormwater must be treated accordingly or be taken to a facility that deals with water of this quality. • Soil berms must be constructed to route surface water flow/ runoff from the proposed feedlot to a pond that is lined with an impervious lining to inhibit the contamination of soil. • The feedlot pad must be provided with an interface layer to prevent soil contamination during the operation phase. • The proposed feedlot and pond site should be moved to the south, not to overlay the dolerite dyke and thin dolerite sheet, as both have a high probability of acting as conduits for possible pollution to downstream springs and the existing borehole. • Consider fencing off springs to protect them from animal activity. • Dedicated monitoring boreholes must be developed both upgradient and downgradient of the facility which monitors the shallow perched, as well as deeper fractured aquifer.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-4*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social*	***Negligible***	***Unlikely***

GEOLOGY AND SOILS IMPACTS				
		functions and processes are minimally affected		
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-4**	**Very low negative**		
CONFIDENCE LEVEL				
Medium				

(e) Archaeological, Palaeontology and Cultural Heritage

Table 14: Impact ratings for heritage resources

HERITAGE IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Damage to or destruction of structures with heritage value*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-5*	*2*
EXTENT	*2*	*The extent of the activity is rated Site as the impact will affect only the development area*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-10***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• The living heritage within the current site may be destructed without any application to the ECPHRA. • Construction workers must be inducted on the possibility of encountering archaeological and/or palaeontological resources that may be accidentally exposed during subsurface clearance before the commencement of work on the site to ensure appropriate mitigation measures and that course of action is afforded to any chance finds. • The footprint impact of the proposed development should be kept to a minimal to limit the possibility of encountering chance finds.				

HERITAGE IMPACTS				
• Should chance archaeological and/or palaeontological materials or human remains be exposed during subsurface construction work on any section of the proposed development laydown sites, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimise disruption in construction scheduling while recovering archaeological, palaeontological and any affected cultural heritage data as stipulated by the NHRA Regulations. • Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-4*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the functions and processes are minimally altered*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-4**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(f) Traffic

Table 15: Impact ratings for traffic impacts

TRAFFIC IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Increased construction-related traffic and associated congestion*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months and as such is rated as Short Term*	*-10*	*2*

TRAFFIC IMPACTS				
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-20***	***Low negative***		
PROPOSED MITIGATION MEASURES				
• Measures for the optimisation of the amount of travel on the local road, thereby reducing impact, must be compiled and implemented. • Provision for the timeous notification of the affected community of any road closures required during the construction phase (whether temporary or permanent). • A requirement to identify alternate routes, to allow road users to avoid construction works. • Minimum standards/ requirements for the clear signposting of road closures (permanent and temporary), as well as alternate routes. • Any damage caused to existing road surfaces by construction vehicles or plant must be repaired at the applicant's cost.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-5*	*2*
EXTENT	3	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**-10**	**Very low negative**		

TRAFFIC IMPACTS
CONFIDENCE LEVEL
Medium

(g) Noise

Table 16: Impact ratings for noise impacts

NOISE IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Noise impacts due to engines of heavy vehicles and machinery on site and on surrounding roads*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	*Nuisance*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months such is rated as Long Term*	*-8*	*3*
EXTENT	*2*	*The extent of the impact is rated as Site as it will affect the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly detrimental***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-24***	***Low negative***		
PROPOSED MITIGATION MEASURES				
All construction processes must comply with the following standard best-practice: • All construction equipment utilised, and activities undertaken must be compliant with the Noise Control Regulations as detailed in the Legal Requirements above. • Restrict construction activities generating noise outputs of 85 decibels (dB) or more to the hours of 08h00 to 17h00 Mondays to Fridays. Should the Contractor need to do this work outside of these hours, the approval of the ECO must be obtained, and surrounding communities must be informed prior to the work taking place.				

NOISE IMPACTS				
• No amplified music shall be allowed on site. The use of audio equipment shall not be permitted unless the volume is kept sufficiently low so as to be unobtrusive. The Contractor shall not use sound amplification equipment on site, unless in emergency situations. • If excessive noise is expected on the boundary of the site, neighbouring occupied properties must be informed in writing and in advance of when the high noise levels will occur and for how long they will occur. • The Contractor must post signage indicating contact details of the Contractor and/or ECO on the site to allow for reporting of complaints.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-4*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it will affect only the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-8**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(h) Air Quality

Table 17: Impact ratings for dust impacts

DUST IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Potential air quality nuisance impacts affecting aesthetics, sense of place and well-being*			
INDIRECT IMPACT	*Reduced visibility on and around the site*			
CUMULATIVE IMPACT	*Possible aggravation of pre-existing health conditions such as asthma and allergies*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-10*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the*		

DUST IMPACTS				
		development area and adjacent properties		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-20***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• Dust minimisation and control measures must be implemented on the construction site at regular intervals. This could include irrigation (utilising a legal, non-potable water source) by water tankers. • The frequency of implementation of dust suppression measures should be increased when it is expected that high wind conditions will develop. • Areas in which construction has been completed must be rehabilitated and revegetated as soon as possible, and not await till the completion of all construction activities, to minimise the time that bare soil is exposed. • A Complaints Register must be made available on the site for the duration of construction. Any dust-related complaints must be efficiently and effectively dealt with. • Vegetation clearing for each aspect of development should only take place immediately prior to the commencement of construction activities for the relevant aspect, in order to minimise the amount of exposed soil on the site. • Stockpile height must be managed, and if stockpiles are to be retained on site for extended periods, these must be appropriately covered or vegetated so as to minimise wind erosion and dust generation.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-4*	*1*
EXTENT	2	*The extent of the impact is rated as Site as it only affects the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***

DUST IMPACTS				
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-4**	**Very low negative**		
CONFIDENCE LEVEL				
Medium				

(i) Visual

Table 18: Impact ratings for visual impacts

VISUAL IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Visual changes to the receiving environment as a result of construction activities, resulting in altered sense of place and aesthetics*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-5*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-10***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• Housekeeping on the construction site must be prioritised, to ensure that the area looks neat and tidy at all times. • The recommended dust suppression measures as detailed above and in the Draft EMPr must be implemented. • The construction period must be kept to a minimum period as practically possible.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6*	*-4*	*1*

VISUAL IMPACTS				
		to 18 months as such is rated as Short Term		
EXTENT	2	*The extent of the impact is rated as Site as it only affects the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-4**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(j) Waste Management

Table 19: Impact ratings for waste management

WASTE MANAGEMENT IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	• Generation of general solid wastes, hazardous wastes and sewage; • Improper storage, handling, treatment and disposal of wastes may give rise to environmental pollution and degradation.			
INDIRECT IMPACT	• Bad odour; • Attraction of pests; • Altered sense of place; • Nuisance/ health impacts.			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-8*	*2*
EXTENT	*2*	*The extent of the impact is rated as Site as it will affect only the development area*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and*	***Slightly detrimental***	***Likely***

WASTE MANAGEMENT IMPACTS				
		valued, important, sensitive or vulnerable systems or communities are negatively affected		
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-16***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• The Contractor must put into practice ways in which to implement the waste hierarchy on site by identifying ways on site to: o Avoid and reduce waste generation; o Re-use waste materials generated; o Recover waste that can be recovered; o Recycle waste that cannot be reused; and o As a last resort, treat and dispose of wastes. • This must be done by way of the preparation of a Waste Management Method Statement. • In order to reduce pressure on general waste landfill sites, it is recommended that, as far as possible, general solid wastes is separated and sorted into its recyclable components (glass, plastic, metal, paper). This will require the provision of separate waste bins within the site camp, and the removal of these wastes to appropriate recycling facilities. • The requirement to separate and sort general wastes should be included as part of the environmental induction and awareness programme. • All general waste bins on the site must be weather- and scavenger-proof. • Litter must be cleared from the site daily. • Hazardous wastes must be stored on an impermeable surface, in a bunded area. Such storage area must be clearly demarcated. • Should pest populations establish, steps must be taken to control these. • Wastes must be collected/ removed from site regularly to ensure that no overflow occurs. It is recommended that chemical ablution facilities be serviced once a week, by an authorised service provider. • Safe disposal slips must be maintained for all waste types generated on site and disposed of offsite.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-3*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it will affect only the area in which the proposed activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***

WASTE MANAGEMENT IMPACTS				
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-3**	**Very low negative**		
CONFIDENCE LEVEL				
Medium				

(k) Socio-Economic

Table 20: Impact ratings for socio-economic impacts

SOCIO-ECONOMIC IMPACTS				
PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Temporary employment creation			
INDIRECT IMPACT	Skills development and transfer			
CUMULATIVE IMPACT	Stimulation of economic activity (both in the formal and informal sectors)			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 and 18 months as such is rated as Short Term*	*12*	*2*
EXTENT	*4*	*The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries*		
SEVERITY	*2*	*The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected*	***Slightly beneficial***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***24***	***Low positive***		
PROPOSED MITIGATION MEASURES				
• As far as possible, labour for the construction phase must be sourced from the local community. • Contractors should be required to seek out and implement opportunities for skills development and transfer, as well as capacity building with local labour and EME contractors.				
POST-MITIGATION				

SOCIO-ECONOMIC IMPACTS				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*18*	*3*
EXTENT	4	*The extent of the impact is rated as Regional as the effects of the impact extends beyond local municipal boundaries*		
SEVERITY	3	*The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.*	***Moderately beneficial***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**54**	**Moderate positive**		
CONFIDENCE LEVEL				
Medium				

4.3.3 Alternative Site Construction Phase

(a) Flora and Fauna

Table 21: Impact rating for the clearance of vegetation and potential loss of fauna habitat

POTENTIAL LOSS OF VEGETATION AND FAUNA HABITAT				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Clearance of vegetation, including remaining indigenous vegetation*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-10*	*3*
EXTENT	*2*	*The extent of the impact is rated as Site as it only affects the development area*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is*	***Slightly detrimental***	***Definite***

POTENTIAL LOSS OF VEGETATION AND FAUNA HABITAT				
		altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected		
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-30***	***Low negative***		
PROPOSED MITIGATION MEASURES				
• The existing track gravelling must only be undertaken within the areas as authorised. • Post construction, natural vegetation and/or conditions must be recreated using species found typically in these areas. This must be guided by a suitably qualified botanist or horticulturalist. • Prior to any removal of indigenous vegetation, a walk-through of the sensitive areas must be undertaken by a suitable qualified botanist or horticulturalist and any plants that can be relocated must be rescued and replanted in the newly created habitats. Any protected species that will be relocated will require a permit from the Department. • All areas that need revegetating during or after construction must be planted only with indigenous grass species found in the immediate vicinity and not with the standard species mix commonly used in construction projects. A botanist or rehabilitation specialist must be consulted in this regard. • An independent ECO must be appointed to oversee construction activities. • As far as possible, the existing track gravelling must take place during the dry winter months to help minimise contamination of delineated watercourses and runoff from the construction site polluting downstream watercourses. • An ecologically-sound SMP must be implemented during construction and appropriate water diversion systems put in place. • During construction, erosion must not be allowed to develop on a large scale before effecting repairs. • All areas susceptible to erosion must be protected and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. • Surface water or stormwater must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being in place. • Areas exposed to erosion during construction should be revegetated with species naturally occurring in the area. Natural trees, shrubbery and grass species must be retained wherever possible. • The gravelling of the existing track must include passage of water underneath through implementation of stormwater infrastructure. • Stormwater infrastructure must be designed in such a way that it does not impact on or erode the surrounding natural areas, especially the delineated watercourses. • Vehicles used during the construction phase must be parked in a designated area and containers should be used to hold any oil leaks. • Formal solid waste management systems must be implemented and formal waste removal services provided. Recycling of solid waste must be encouraged. • Formal bulk water and sewer reticulation services must be installed. Fail safe measures must be included in the engineering design, including an Emergency/ Risk Management Plan.				

POTENTIAL LOSS OF VEGETATION AND FAUNA HABITAT
• Dumping of solid waste and litter in natural areas by construction workers and cattle feedlot workers must be prohibited. This must be discouraged through education initiatives and the provision of ample waste disposal facilities. • If possible, electricity should be supplied via buried cables rather than overhead lines. • Should overhead lines be implemented, these should be routed alongside roads and must avoid crossing natural and open areas as far as possible. To avoid electrocution by larger species such as raptors, the vertical phase-earth clearance should be greater than 1.8m. All jumpers at transformers, T-offs and strain structures must be insulated. Only pole structures that are approved as "bird friendly" by Eskom's ENVIROTECH Forum should be used. Lines traversing open areas such as wetlands must be marked with anti-collision devices. This includes low voltage lines. Bird flight diverters on the earth wires must be installed as per specifications devised by the EWT/ Eskom Partnership. • Surrounding natural vegetation must not be disturbed to minimise chances of invasion by IAP species. Emergence of IAP species should be monitored on a bi-annual basis by a suitably qualified botanist. • An IAP species Management and Monitoring Plan must be compiled by a suitably qualified botanist and implemented whereby all emergent IAP species are removed during construction. • During the construction phase, all IAP seedlings and saplings must be removed as they become evident for the duration of the construction phase. Manual / mechanical removal is preferred to chemical control. • All construction vehicles and equipment, as well as construction material must be free of plant material before coming on site. Equipment and vehicles must be thoroughly cleaned prior to access to the construction site. • No domesticated animals must be allowed on the construction site by construction and/or feedlot workers. • During construction, all food should be securely stored away to prevent attraction of faunal species and all rubbish should be disposed of away from the site. Bins located around the site should have tightly fitting lids to prevent raiding by faunal species. • Upward lighting should be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light. • Insects are attracted to brighter light that is emitted over a broad band of long wavelengths such as high-pressure sodium or mercury lamps. Such lighting must be avoided, and rather light that is emitted at one wavelength, contains no UV light and has a low attraction to insects, such as low-pressure sodium lamps, should be used. • If possible, construction should take place during daylight hours to avoid the need for artificial lighting and to reduce the impact of noise and vibrations on nocturnal animals. • Foot traffic by people and domestic animals in the surrounding natural areas must be kept to a minimum. Livestock grazing in the natural areas must be kept at a minimum and at sustainable levels. • The feedlot employees should be educated in the importance of looking after the natural environment and the sustainable utilisation of natural resources. This can be achieved through educational posters, for example. • Harvesting of fuel wood from indigenous species within the natural areas should be discouraged, and rather the wood of IAP species such as wattle be utilised. • Formal designs must include standard pollution control mechanisms and an appropriate stormwater drainage system. Any water released into the environment must be cleaned of all impurities. • No wild animal may under any circumstance be handled, removed, or be interfered with by construction workers or by operational phase staff. • During the construction and operational phases, no wild animal may under any circumstance be hunted, snared, captured, injured, or killed. This includes animals perceived to be vermin.
POST-MITIGATION

POTENTIAL LOSS OF VEGETATION AND FAUNA HABITAT				
DURATION	2	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-4*	*2*
EXTENT	1	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-8**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(b) Surface Water

Table 22: Impact ratings for surface water resources

SURFACE WATER IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Construction of structures and installation of service infrastructure within and/or in close proximity to wetlands*			
INDIRECT IMPACT	*Disturbance/ destruction of aquatic habitats*			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-10*	*3*
EXTENT	*2*	*The extent of the impact is rated as Site as it only affects the development area*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified*	***Slightly detrimental***	***Definite***

SURFACE WATER IMPACTS				
		way; and valued, important, sensitive or vulnerable systems or communities are negatively affected		
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-30***	***Low negative***		

PROPOSED MITIGATION MEASURES

- Vegetation clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, vegetation clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.
- Unnecessary removal of groundcover from slopes must be prevented, especially on steep slopes. Prior to the stripping, infilling, excavation and reshaping of any wetland within the development footprint/ corridor, a search and rescue of indigenous vegetation must be undertaken prior to habitat destruction for use in rehabilitation. Arrangements must be made to store and/or relocate the relevant species into suitable onsite or offsite habitats or in a temporary nursery/storage area. This process should be led by the appointed ECO.
- Thereafter, topsoil and vegetation from areas to be excavated should be stripped and stored at the designated soil stockpile area outside of the wetland for use later in rehabilitation. Topsoil and subsoil to be stored separately.
- In cases where natural vegetation will be cleared as a result of the movement of people or stockpiling of building materials, revegetation should take place. Preceding revegetation efforts occurring in cleared and degraded areas, it is essential that all solid wastes are removed from these areas as well as their immediate surroundings. Following the removal of solid waste, a mixture of indigenous species should be introduced. The reestablishment of vegetation will enhance these systems' capability to maintain biodiversity, it will aid in reducing the velocity and quantity of runoff waters into wetlands, the retardation of water movement through a wetland which will in turn assist with trapping sediment and improving the overall quality of water. Where possible, vegetation should be cut to ground level rather than removing completely so as to assist with binding/stabilising the soil during land-clearing operations.
- No clearing of indigenous vegetation outside of the defined working servitudes is permitted for any reason (i.e., for firewood or medicinal use). No persons may remove, damage, deface, paint or disturb any flora (plants) outside of the demarcated construction areas, unless specifically authorised by the ECO in consultation with the resident engineer. Any indigenous vegetation suitable for rehabilitation should be stored appropriately for later use. Indigenous wetland vegetation removed from the construction footprint and suitable for rehabilitation activities must be carefully removed and stored in an appropriate facility for rehabilitation purposes.
- As a consequence of the proposed development, the wetland system will possibly encounter anthropogenic disturbances. Therefore, in order to manage and mitigate these threats faced by the wetland a suitable buffer should be determined. Therefore, during periods of construction there should be minimal human disturbances by minimising activities that would lead to excessive pollution and run off into the wetland such as no driving of vehicles on areas other than pre-existing roads, no movement of people on the site unless on designated footpaths, lavatory facilities should be set up and made use of outside of the wetland and its buffer, and rubbish disposal facilities should be made readily available outside of the wetland and its buffer for disposal of rubbish and should be emptied at regular intervals to prevent overflowing of trash. During the construction phase the recommended wetland buffer is 14m.
- During the construction phase all measures should be taken in order to prevent contamination of wetland areas by vehicles. Before commencement of the construction phase contractors must submit method statements detailing protocols to control potential pollution such as:

SURFACE WATER IMPACTS

- Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas;
- These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall;
- Storage of materials as described above may not be within the 1:100 floodline, watercourses or associated buffer areas;
- In the case of pollution of any surface or groundwater, the Regional Representative of the DWS must be informed immediately and corrective action taken;
- All equipment should be parked overnight and/or fuelled at least 500m from the watercourse;
- Drip trays (minimum of 10cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised; and
- Drip trays must be utilised during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total amount/ volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle.

- If any spills of diesel, petrol, oil, or corrosive fluid occur a spill kit should be kept on site to immediately address this. All vehicles and machinery should therefore be kept off site in a bunded, platformed location in order to avoid such contamination in the watercourses.
- All vehicles should only be allowed to stand overnight and refuelled only on impervious surfaces. Additionally, materials not to be stockpiled within the buffer area; all materials should strictly be kept 30m away from the watercourses on site.
- An appropriate Contingency-Spill Response Plan is to be compiled and stored on site, for implementation where necessary. Contractors are to be trained in spill response and familiar with spill plan. Contact details for a reputable company to handle large spill events (e.g., SpillTech) must be included in the spill plan and must be available on hand at the site during construction and business operation.
- No equipment laydown or storage areas must be located within 14m of any watercourse and/or within the 1:100 year floodline.
- Sedimentation and erosion control measures must be implemented to prevent slope destabilisation and increased sediment loads entering freshwater systems. Increased sediment loads can be identified by a change in the clarity of the water, or if vegetation is covered by layers of silt or other deposits. If the water appears more 'murky' or brown in colour than previously experienced, this could be as a result of an increase in sediment load within the watercourse. This can be double checked by the use of a turbidity meter.
- Exposed slopes are highly prone to erosion, so drainage control features such as earth dikes, perimeter dikes/ swales, and diversions can be used to intercept and convey runoff from above disturbed areas to suitable dispersal areas or drainage systems. This helps to reduce the sedimentation from exposed areas. Sediment traps should be utilised to detain sediments in stormwater runoff to protect receiving water bodies, and the surrounding area. Silt fences can be used by entrenching them into the ground and stretched between anchoring posts spaced at regular intervals along the lower side of a site. Sediment is filtered out as runoff flows through the fabric. Such fences should be used only where there is sheet. Gullies and other areas of active erosion should be stabilised (using catch water drains, raising headwalls or providing protective measures including grassing, stone pitching, concrete paving or gabions/ mattresses) and rehabilitated to minimise sediment entering the aquatic resource from these sources.
- Soil required for construction purposes must not be derived from the wetlands. Only approved borrow areas are to be used under the supervision of the ECO. Soil stockpiles must be established on flat ground at least 20m away from delineated watercourses. Erosion/ sediment control measures such as silt fences, low soil berms or wooden shutter boards must be placed around the stockpiles to limit sediment runoff from stockpiles. Subsoil and topsoil are to be stockpiled separately. Stockpiled soil must be replaced in the reverse order as to which it was removed (subsoil first followed by topsoil). Stockpiles of construction

SURFACE WATER IMPACTS				
materials must be clearly separated from soil stockpiles in order to limit any contamination of soils. The stockpiles may only be placed within demarcated stockpile areas, which must fall within the demarcated construction area. The contractor shall, where possible, avoid stockpiling materials in vegetated areas that will not be cleared. Stockpiles shall be located outside of freshwater habitat. Stockpiled soils are to be kept free of weeds and are not to be compacted. The stockpiled soil must be kept moist using some form of spray irrigation on a regular basis as appropriate and according to weather conditions. If soil stockpiles are to be kept for more than 3 months, they must be hydro-seeded. The slope and height of stockpiles must be limited to 1.5 - 2m and are not to be sloped more than 1:2 to avoid collapse. • To diminish the requirement to alter the flow of water away from the construction area when crossing watercourses, all construction activities within wet areas should preferably occur in the dry season/ winter (May to September). Construction within/ across watercourses should advance as quickly as practically possible in order to lessen the risk of surpassing the temporary diversion capacity. Diversions must be temporary in nature and no permanent walls, berms or dams should be installed within the watercourse. Following completion of the construction at the site, the diversions should be removed to restore natural flow patterns. Under no circumstances should the creation of a new channel be considered to divert flows away from the current channel position. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns. • Options for temporary flow diversion when working within channels may include: o diversion of the entire watercourse through use of a bypass large diameter pipe; or the installation of removable coffer dams; and o use of removable sandbags. • The topsoil layer must be stripped from the construction footprint and stockpiled separately from overburden (subsoil and rocky material). The thickness of the topsoil for harvesting must be obtaining from the Geotechnical Report and if not defined in the report, the top 30cm must be harvested. Stockpiled soil is to be kept free of weeds and not to be compacted. The slope and height of stockpiles must be limited to 1.5 to 2m to avoid soil compaction and destruction of soil microbes. • Effective implementation of a Draft EMPr that outlines stringent measures to minimise erosion and manage runoff from disturbed areas. • Management of wetland margins and buffer areas as “no-go” areas for all construction personnel and vehicles, unless engaged in specific activities related to the establishment or construction of these areas. • Allowance for the rehabilitation of any conservation areas disturbed as a result of construction-associated activities. • Allowance for short-term irrigation (but not from local groundwater) of landscaped channels, if necessary, until the development is complete and channelled flow is established. Note that irrigation should not be carried out using nutrient-enriched water (e.g., treated sewage effluent). • Implementation of a strict waste management programme on the site, to prevent or address impacts associated with construction waste (e.g., litter, rubble etc.).				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-5*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it affects the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment*	***Negligible***	***Likely***

SURFACE WATER IMPACTS				
		in such a way that natural, cultural and social functions and processes are minimally affected		
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-10**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(c) Groundwater

Table 23: Impact ratings for groundwater resources

GROUND WATER IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Contamination of groundwater resources*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	*Deteriorating groundwater quality in the localised area*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-5*	*2*
EXTENT	*2*	*The extent of the impact is rated as Site as it will affect only the development area*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-10***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• Plant material must be free of fuel leaks and must be parked in a solid surface area with containment of any leaks that might occur. • Dirty and clean stormwater must be separated on site, the dirty stormwater must be treated accordingly or be taken to a facility that deals with water of this quality.				

GROUND WATER IMPACTS				
• Soil berms must be constructed to route surface water flow/ runoff from the proposed feedlot to a pond that is lined with an impervious lining to inhibit the contamination of groundwater. • The feedlot pad must be provided with an interface layer to prevent groundwater contamination during the operation phase. • The proposed feedlot and pond site should be moved to the south, not to overlay the dolerite dyke and thin dolerite sheet, as both have a high probability of acting as conduits for possible pollution to downstream springs and the existing borehole. • Dedicated monitoring boreholes must be developed both upgradient and downgradient of the facility which monitors the shallow perched, as well as deeper fractured aquifer. • Consider fencing off springs to protect them from animal activity.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-4*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it will affect only the area in which the activity will occur*		
SEVERITY	-1	*Low negative*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-4**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(d) Geology and Soils

Table 24: Impact ratings for geology and soils

GEOLOGY AND SOILS IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Potential soil contamination. Stability and drainage potential issues*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-5*	*2*
EXTENT	*2*	*The extent of the impact is rated as Site as it only affects the area in which the proposed activity will occur*		

GEOLOGY AND SOILS IMPACTS				
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-10***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• Plant material must be free of fuel leaks and must be parked in a solid surface area with containment of any leaks that might occur. • Dirty and clean stormwater must be separated on site, the dirty stormwater must be treated accordingly or be taken to a facility that deals with water of this quality. • Soil berms must be constructed to route surface water flow/ runoff from the proposed feedlot to a pond that is lined with an impervious lining to inhibit the contamination of the soil. • The feedlot pad must be provided with an interface layer to prevent soil contamination during the operation phase. • The proposed feedlot and pond site should be moved to the south, not to overlay the dolerite dyke and thin dolerite sheet, as both have a high probability of acting as conduits for possible pollution to downstream springs and the existing borehole. • Dedicated monitoring boreholes must be developed both upgradient and downgradient of the facility which monitors the shallow perched, as well as deeper fractured aquifer. • Consider fencing off springs to protect them from animal activity.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-4*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-4**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(e) Archaeological, Palaeontology and Cultural Heritage

Table 25: Impact ratings for heritage resources

HERITAGE IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Damage to or destruction of structures with heritage value*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-15*	*2*
EXTENT	*2*	*The extent of the activity is rated Site as the impact will affect only the development area*		
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.*	***Moderately detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-30***	***Low negative***		
PROPOSED MITIGATION MEASURES				
• The Colonial Period kraal mound remains found on site are of no scientific or heritage conservation significance and it is recommended that these remains be destroyed without having to apply for site destruction permit to the ECPHRA. • The presence of the khowa is of High Local Significance and it is recommended that as much of the wooded habitat, but no less than a third (≥6ha) of the northern portion of the alternative site, be conserved thereby ensuring in part and on site, and in perpetuation of future generations the conservation of the mushroom habitat within the development framework. • Additionally, a Heritage Management Plant must be developed by the applicant to guide the management of the conserved living heritage within the alternative site. • Construction workers must be inducted on the possibility of encountering archaeological and/or palaeontological resources that may be accidentally exposed during subsurface clearance before the commencement of work on the site to ensure appropriate mitigation measures and that course of action is afforded to any chance finds. • The footprint impact of the proposed development should be kept to a minimal to limit the possibility of encountering chance finds.				

HERITAGE IMPACTS				
• Should chance archaeological and/or palaeontological materials or human remains be exposed during subsurface construction work on any section of the proposed development laydown sites, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimise disruption in construction scheduling while recovering archaeological, palaeontological and any affected cultural heritage data as stipulated by the NHRA Regulations. • Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-4*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the functions and processes are minimally altered*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-4**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(f) Traffic

Table 26: Impact ratings for traffic impacts

IMPACTS ON TRAFFIC				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Increased construction-related traffic and associated congestion*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months and as such is rated as Short Term*	*-10*	*2*

IMPACTS ON TRAFFIC				
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-20***	***Low negative***		
PROPOSED MITIGATION MEASURES				
• Measures for the optimisation of the amount of travel on the local road, thereby reducing impact, must be compiled and implemented. • Provision for the timeous notification of the affected community of any road closures required during the construction phase (whether temporary or permanent). • A requirement to identify alternate routes, to allow road users to avoid construction works. • Minimum standards/ requirements for the clear signposting of road closures (permanent and temporary), as well as alternate routes. • Any damage caused to existing road surfaces by construction vehicles or plant must be repaired at the applicant's cost.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-4*	*2*
EXTENT	2	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**-8**	**Very low negative**		

IMPACTS ON TRAFFIC
CONFIDENCE LEVEL
Medium

(g) Noise

Table 27: Impact ratings for noise impacts

NOISE IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Noise impacts due to engines of heavy vehicles and machinery on site and on surrounding roads*			
INDIRECT IMPACT				
CUMULATIVE IMPACT	*Nuisance*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months such is rated as Long Term*	*-8*	*3*
EXTENT	*2*	*The extent of the impact is rated as Site as it will affect the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly detrimental***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-24***	***Low negative***		
PROPOSED MITIGATION MEASURES				
All construction processes must comply with the following standard best-practice: • All construction equipment utilised, and activities undertaken must be compliant with the Noise Control Regulations as detailed in the Legal Requirements above. • Restrict construction activities generating noise outputs of 85 dB or more to the hours of 08h00 to 17h00 Mondays to Fridays. Should the Contractor need to do this work outside of these hours, the approval of the ECO must be obtained, and surrounding communities must be informed prior to the work taking place. • No amplified music shall be allowed on site. The use of audio equipment shall not be permitted unless the volume is kept sufficiently low so as to be unobtrusive. The Contractor shall not use sound amplification equipment on site, unless in emergency situations.				

NOISE IMPACTS				
• If excessive noise is expected on the boundary of the site, neighbouring occupied properties must be informed in writing and in advance of when the high noise levels will occur and for how long they will occur. • The Contractor must post signage indicating contact details of the Contractor and/or ECO on the site to allow for reporting of complaints.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-4*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it will affect only the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-8**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(h) Air Quality

Table 28: Impact ratings for dust impacts

DUST IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Potential air quality nuisance impacts affecting aesthetics, sense of place and well-being*			
INDIRECT IMPACT	*Reduced visibility on and around the site*			
CUMULATIVE IMPACT	*Possible aggravation of pre-existing health conditions such as asthma and allergies*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-10*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		

DUST IMPACTS				
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-20***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• Dust minimisation and control measures must be implemented on the construction site at regular intervals. This could include irrigation (utilising a legal, non-potable water source) by water tankers. • The frequency of implementation of dust suppression measures should be increased when it is expected that high wind conditions will develop. • Areas in which construction has been completed must be rehabilitated and revegetated as soon as possible, and not await till the completion of all construction activities, to minimise the time that bare soil is exposed. • A Complaints Register must be made available on the site for the duration of construction. Any dust-related complaints must be efficiently and effectively dealt with. • Vegetation clearing for each aspect of development should only take place immediately prior to the commencement of construction activities for the relevant aspect, in order to minimise the amount of exposed soil on the site. • Stockpile height must be managed, and if stockpiles are to be retained on site for extended periods, these must be appropriately covered or vegetated so as to minimise wind erosion and dust generation.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-4*	*1*
EXTENT	2	*The extent of the impact is rated as Site as it only affects the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		

DUST IMPACTS				
SIGNIFICANCE	**-4**	**Very low negative**		
CONFIDENCE LEVEL				
Medium				

(i) Visual

Table 29: Impact ratings for visual impacts

VISUAL IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Visual changes to the receiving environment as a result of construction activities, resulting in altered sense of place and aesthetics*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-5*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-10***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• Housekeeping on the construction site must be prioritised, to ensure that the area looks neat and tidy at all times. • The recommended dust suppression measures as detailed above and in the Draft EMPr must be implemented. • The construction period must be kept to a minimum period as practically possible.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6 to 18 months as such is rated as Short Term*	*-4*	*1*

VISUAL IMPACTS				
EXTENT	2	*The extent of the impact is rated as Site as it only affects the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**-4**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(j) Waste Management

Table 30: Impact ratings for waste management

WASTE MANAGEMENT IMPACTS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	• Generation of general solid wastes, hazardous wastes and sewage; • Improper storage, handling, treatment and disposal of wastes may give rise to environmental pollution and degradation.			
INDIRECT IMPACT	• Bad odour; • Attraction of pests; • Altered sense of place; • Nuisance/ health impacts.			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-8*	*2*
EXTENT	*2*	*The extent of the impact is rated as Site as it will affect only the development area*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or*	***Slightly detrimental***	***Likely***

WASTE MANAGEMENT IMPACTS				
		communities are negatively affected		
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-16***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• The Contractor must put into practice ways in which to implement the waste hierarchy on site by identifying ways on site to: o Avoid and reduce waste generation; o Re-use waste materials generated; o Recover waste that can be recovered; o Recycle waste that cannot be reused; and o As a last resort, treat and dispose of wastes. • This must be done by way of the preparation of a Waste Management Method Statement. • In order to reduce pressure on general waste landfill sites, it is recommended that, as far as possible, general solid wastes is separated and sorted into its recyclable components (glass, plastic, metal, paper). This will require the provision of separate waste bins within the site camp, and the removal of these wastes to appropriate recycling facilities. • The requirement to separate and sort general wastes should be included as part of the environmental induction and awareness programme. • All general waste bins on the site must be weather- and scavenger-proof. • Litter must be cleared from the site daily. • Hazardous wastes must be stored on an impermeable surface, in a bunded area. Such storage area must be clearly demarcated. • Should pest populations establish, steps must be taken to control these. • Wastes must be collected/ removed from site regularly to ensure that no overflow occurs. It is recommended that chemical ablution facilities be serviced once a week, by an authorised service provider. • Safe disposal slips must be maintained for all waste types generated on site and disposed of offsite.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*-3*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it will affect only the area in which the proposed activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		

WASTE MANAGEMENT IMPACTS				
SIGNIFICANCE	**-3**	**Very low negative**		
CONFIDENCE LEVEL				
Medium				

(k) Socio-Economic

Table 31: Impact ratings for socio-economic impacts

SOCIO-ECONOMIC IMPACTS				
PROJECT PHASE	Construction Phase			
DIRECT IMPACT	Temporary employment creation			
INDIRECT IMPACT	Skills development and transfer			
CUMULATIVE IMPACT	Stimulation of economic activity (both in the formal and informal sectors)			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last for 6 and 18 months as such is rated as Short Term*	*12*	*2*
EXTENT	*4*	*The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries*		
SEVERITY	*2*	*The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected*	***Slightly beneficial***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***24***	***Low positive***		
PROPOSED MITIGATION MEASURES				
• As far as possible, labour for the construction phase must be sourced from the local community. • Contractors should be required to seek out and implement opportunities for skills development and transfer, as well as capacity building with local labour and EME contractors.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last for 6 to 18 months as such is rated as Short Term*	*18*	*3*

SOCIO-ECONOMIC IMPACTS				
EXTENT	4	*The extent of the impact is rated as Regional as the effects of the impact extends beyond local municipal boundaries*		
SEVERITY	3	*The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.*	***Moderately beneficial***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**54**	**Moderate positive**		
CONFIDENCE LEVEL				
Medium				

4.3.4 Current Site Operational Phase

(a) Flora and Fauna

Table 32: Impact ratings for the clearance of vegetation and loss of fauna

POTENTIAL LOSS OF VEGETATION AND ASSCOCIATED FAUNA HABITAT				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Vegetation and fauna disturbance due to routine operations and maintenance*			
INDIRECT IMPACT	*Destruction of habitat suitable for indigenous vegetation and fauna*			
CUMULATIVE IMPACT	*Reduction in diversity and richness of flora and fauna species*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-18*	*3*
EXTENT	*1*	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the natural, cultural or social functions and*	***Moderately detrimental***	***Definite***

POTENTIAL LOSS OF VEGETATION AND ASSCOCIATED FAUNA HABITAT				
		processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.		
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-54***	***Moderate negative***		

PROPOSED MITIGATION MEASURES

- A SMP must be compiled for the operational phase and stormwater infrastructure designed in such a way that it does not impact on or erode the surrounding natural areas, especially the wetlands.
- During the operational phase, the washing of cars within the surrounding natural areas, especially wetlands must be prohibited.
- Formal solid waste management systems must be implemented, and formal waste removal services provided. Recycling of solid waste should be encouraged.
- Dumping of solid waste and litter in natural areas by residents must be prohibited. Residents should be discouraged from doing so through education initiatives and the provision of ample waste disposal facilities.
- Surrounding natural vegetation must not be disturbed to minimise chances of invasion by IAP. Emergence of IAP species should be monitored on a bi-annual basis by a suitably qualified botanist.
- The IAP species Management and Monitoring Plan must also ensure that the re-emergence of IAP species is monitored continuously during the operational phase. This plan must include the immediate surroundings where natural vegetation prevails.
- During the operational phase, the site must be searched for IAP on a regular basis and all IAP seedlings and saplings removed as they become evident.
- Formalised waste disposal systems and services must be provided to avoid dumping of refuse into natural areas.
- Upward lighting should be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light.
- Insects are attracted to brighter light that is emitted over a broad band of long wavelengths such as high-pressure sodium or mercury lamps. Such lighting must be avoided, and rather light that is emitted at one wavelength, contains no UV light and has a low attraction to insects, such as low-pressure sodium lamps, should be used.
- The IAP Monitoring Programme must ensure that the re-emergence of IAP species is monitored and controlled at regular intervals during the operational phase within the development footprint and in the surrounding natural areas.
- Foot traffic by people and domestic animals in the surrounding natural areas must be kept to a minimum. Livestock grazing in the natural areas must be kept at a minimum and at sustainable levels.
- The feedlot employees should be educated in the importance of looking after the natural environment and the sustainable utilisation of natural resources. This can be achieved through educational posters, for example.
- Harvesting of fuel wood from indigenous species within the natural areas should be discouraged, and rather the wood of IAP species such as wattle be utilised.

POTENTIAL LOSS OF VEGETATION AND ASSCOCIATED FAUNA HABITAT				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-12*	*2*
EXTENT	1	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are negatively affected*	***Slightly detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-24**	**Low negative**		
CONFIDENCE LEVEL				
Medium				

(b) Surface Water

Table 33: Impact ratings for surface water resources

SURFACE WATER IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Maintenance of structures and service infrastructure within and/or in proximity to wetlands*			
INDIRECT IMPACT	*Disturbance/ destruction of aquatic habitats*			
CUMULATIVE IMPACT	*Reduced floral and faunal species diversity and richness*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-24*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		

SURFACE WATER IMPACTS				
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected*	***Highly detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-48***	***Moderate negative***		

PROPOSED MITIGATION MEASURES

- No further disturbances should be experienced by the wetland systems on site. The recommended wetland buffer during the operational phase is 14m. Ideally the wetlands should also be restricted from overgrazing by cattle.
- Exposed slopes are highly prone to erosion, so drainage control features such as earth dikes, perimeter dikes/ swales, and diversions can be used to intercept and convey runoff from above disturbed areas to suitable dispersal areas or drainage systems. This helps to reduce the sedimentation from exposed areas. Sediment traps should be utilised to detain sediments in stormwater runoff to protect receiving water bodies, and the surrounding area. Silt fences can be used by entrenching them into the ground and stretched between anchoring posts spaced at regular intervals along the lower side of a site. Sediment is filtered out as runoff flows through the fabric. Such fences should be used only where there is sheet. Gullies and other areas of active erosion should be stabilised (using catch water drains, raising headwalls or providing protective measures including grassing, stone pitching, concrete paving or gabions/ mattresses) and rehabilitated to minimise sediment entering the aquatic resource from these sources.
- The focus of the rehabilitation of wetlands is to ensure the reestablishment of what was the natural hydraulic regime as much as possible. Where the watercourse's hydraulic regime is improved, the vegetation will improve as well for the wetland habitat which can lead to the reintroduction of riparian specific species. It is, however, not possible to completely re-establish the natural hydrological regime at the catchment level as this is what is needed to improve the current state of the wetlands. The main function of rehabilitation efforts must aim to restore the natural function and improve the aesthetic nature of the wetlands.
- The careful control of the dispersion of IAP within a wetland is imperative due to their degradation causing properties. The key to controlling the dispersion of IAP is through early detection and removal. The removal and management of IAP is essential in maintaining the ecological integrity of a wetland as well as its ability to maintain biodiversity. An IAP Control Plan should be compiled and implemented. This includes details of removal as well as monitoring to ensure the IAP are kept in control throughout the life of the activity.
- IAP and weed control must take place within remaining wetland habitats and 20m buffer areas on site post onsite rehabilitation in accordance with an IAP Control and Management Programme aligned with the NEMBA Invasive Species Regulations. Initial control and follow-up maintenance to take place. Integrated control (combination of mechanical and chemical control) to be implemented, with specific controls to be tailored to the species of IAPs to be managed. Herbicide use to be controlled and herbicides or pesticides use to be restricted within delineated wetlands unless herbicides are non-toxic to watercourses and authorised for use in wetlands.

SURFACE WATER IMPACTS

- Stormwater management reduces the negative effects (erosion, increase sedimentation, contamination, etc.) of stormwater runoff. Management of stormwater comprises of controlling flooding, reducing erosion and improving water quality. This can be achieved by implementing measures known as Best Management Practices (BMPs). Such BMPs include the installation of a porous pavement, i.e. around administration office, which are interlocking tiles or bricks that allows stormwater runoff to infiltrate the pavement and thereafter enters the soil which removes fine grain pollutants and provides erosion control. In addition there are vegetative BMPs which include a number of landscaping practices. Grassed swales, or ditches, can be placed in areas requiring rehabilitation. This BMP helps lessen the peak runoff downstream through processes of infiltration and storage. Filter strips are designed to direct stormwater from impervious areas into a stone trench, which evenly distributes the runoff over a grass strip.
- Retention, detention, attenuation, sustainable and controlled release of stormwater runoff into watercourses is to be practiced in order to prevent erosion and/or sedimentation of wetlands. Sustainable Drainage Systems (SuDS) principles are to be implemented whereby the number of outlets to watercourses to reduce concentrated flows at high volumes and velocities are to be maximised, separate 'clean' and 'dirty' stormwater management systems are to be developed in accordance with DWS requirements and erosion control measures are to be determined by the engineers.
- Allowance for short-term irrigation (but not from local groundwater) of landscaped channels, if necessary, until the development is complete and channelled flow is established. Note that irrigation should not be carried out using nutrient-enriched water (e.g., treated sewage effluent).
- Nutrients, i.e., NO_3, PO_4, magnesium and calcium are produced through the cattle manure, these must be monitored in both the soils and surface water as they may result in pollution when in excess. Eutrophication in surface water bodies may be a sign of contamination.
- Heavy metals at feedlots include zinc, selenium, copper, cadmium, arsenic, iron and aluminium, these may contribute to soil and consequentially water contamination.
- A dry stockpile will not produce leachate, a thick black smelly tar-like substance, which contains toxic substances should not emerge at any point from the manure. Under no circumstances should the manure release runoff to the vegetated and/or rehabilitated areas, a connection embankment between the manure area and the stormwater embankment directing contaminated runoff to the lagoon must be utilised.
- The lagoon must be emptied regularly to prevent overspilling. Any incident of this nature must be reported, immediately, to the Department and regional DWS.
- Sludge accumulated at the bottom of the lagoon must be properly cleaned, scraped, and cleared.
- The lagoon must be routinely monitored for any leaching.
- Only approved pesticide products must be used to control intrusive pests (flies) and should be applied strictly as prescribed as these will bind to the manure and may form part of runoff. The use of protective clothing during application is mandatory. Secure storage of pesticides on site must also be provided.
- The effluent emanating from the French-drain must be monitored for any contaminants that may affect the quality of soil and groundwater.
- Water quality monitoring must be conducted on the surface water bodies situated at a lower hydrological gradient than the feedlot and French-drain.

POST-MITIGATION

DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-14*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it affects only the development*		

SURFACE WATER IMPACTS				
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the environment is altered but natural, cultural and social functions and processes are continue but in a modified manner, and valued, important, sensitive or vulnerable systems are negatively affected*	***Moderately detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-28**	**Low negative**		
CONFIDENCE LEVEL				
Medium				

(c) Groundwater

Table 34: Impact ratings for groundwater resources

GROUNDWATER IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Contamination of groundwater resources*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	*Deteriorating groundwater quality in the localised area*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last for more than 5 years and as such is rated as Long Term*	*-24*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it will affect the development area and adjacent properties*		
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.*	***Highly detrimental***	***Likely***

GROUNDWATER IMPACTS				
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-48***	***Moderate negative***		

PROPOSED MITIGATION MEASURES

- Dirty and clean stormwater must be separated on site, the dirty stormwater must be directed to the lagoon.
- Nutrients, i.e., NO_3, PO_4, magnesium and calcium are produced through the cattle manure, these must be monitored in both the soils and groundwater as they may result in pollution when in excess.
- Heavy metals at feedlots include zinc, selenium, copper, cadmium, arsenic, iron and aluminium, these may contribute to soil and consequentially water contamination.
- Temporary storage of manure in heaps must be kept to minimal. It must be noted that temporary storage , in terms of the List of Waste Management Activities, is defined as 90 days.
- A dry stockpile will not produce leachate, a thick black smelly tar-like substance, which contains toxic substances should not emerge at any point from the heap. Under no circumstances should the manure heap release runoff to the vegetated and/or rehabilitated areas, a connection embankment between the manure area and the stormwater embankment directing contaminated runoff to the lagoon must be utilised.
- The contained runoff in the lagoon should not be utilised for watering crops or the vegetated/ rehabilitated areas.
- The lagoon must be emptied regularly to prevent overspilling. Any incident of this nature must be reported, immediately, to the Department and regional DWS.
- Sludge accumulated at the bottom of the lagoon must be properly cleaned, scraped, and cleared.
- The lagoon must be routinely monitored for any leaching.
- Only approved pesticide products must be used to control intrusive pests (flies) and should be applied strictly as prescribed as these will bind to the manure and may form part of runoff. The use of protective clothing during application is mandatory. Secure storage of pesticides on site must also be provided.
- It is recommended to sample the existing borehole before the proposed feedlot is operational and once operational the borehole is to be sampled on a 6 monthly basis and the water samples sent to a reputable laboratory for analyses to determine if there is any contamination occurring.
- The monitoring borehole's water level should be measured and recorded monthly:
  - The levels measured are to be kept on record (database and backup) together with the date; and
  - The time-series groundwater levels are to be compared to precipitation (geohydrological) and water quality analysis regularly.
- Complete organic and inorganic as well as micro-biological analysis after development of monitoring boreholes. Baseline Indicator analyses to include pH, Electrical Conductivity (EC), PO_4, ammonium (NH_4), NO_3, Chemical Oxygen Demand (COD). If pollution or increasing trend is noted, do comprehensive analyses. Complete organic and inorganic as well as micro-biological analysis. This must take place once-off, on a monthly basis and finally bi-annually.
- The effluent emanating from the French-drain must be monitored for any contaminants that may affect the quality of soil and groundwater.

POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last for more than 5 years and as such is rated Long Term*	*-14*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it will affect only the development area*		

GROUNDWATER IMPACTS				
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Moderately detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-28**	**Low negative**		
CONFIDENCE LEVEL				
Medium				

(d) Geology and Soils

Table 35: Impact ratings for geology and soils

GEOLOGY AND SOILS IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Potential soil contamination. Stability and drainage potential issues*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	*Localised soil contamination*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last for more than 5 years and as such is rated as Long Term*	*-24*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it will affect the development area and adjacent properties*		
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.*	***Highly detrimental***	***Likely***

GEOLOGY AND SOILS IMPACTS				
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-48***	***Moderate negative***		

PROPOSED MITIGATION MEASURES

- Dirty and clean stormwater must be separated on site, the dirty stormwater must be directed to the lagoon.
- Nutrients, i.e., NO_3, PO_4, magnesium and calcium are produced through the cattle manure, these must be monitored in soils as they may result in pollution when in excess.
- Heavy metals at feedlots include zinc, selenium, copper, cadmium, arsenic, iron and aluminium, these may contribute to soil contamination.
- Temporary storage of manure in heaps must be kept to minimal.
- A dry stockpile will not produce leachate, a thick black smelly tar-like substance, which contains toxic substances should not emerge at any point from the heap. Under no circumstances should the manure heap release runoff to the vegetated and/or rehabilitated areas, a connection embankment between the heap area the stormwater embankment directing contaminated runoff to the lagoon must be utilised.
- The lagoon must be emptied regularly to prevent overspilling. Any incident of this nature must be reported, immediately, to the Department and regional DWS.
- Sludge accumulated at the bottom of the lagoon must be properly cleaned, scraped, and cleared.
- The lagoon must be routinely monitored for any leaching.
- Only approved pesticide products must be used to control intrusive pests (flies) and should be applied strictly as prescribed as these will bind to the manure and may form part of runoff. The use of protective clothing during application is mandatory. Secure storage of pesticides on site must also be provided.
- Water quality monitoring must be conducted on the surface and groundwater bodies situated at a lower hydrological gradient than the feedlot and French-drain.
- The effluent emanating from the French-drain must be monitored for any contaminants that may affect the quality of soil and groundwater.
- It is recommended to sample the existing borehole before the proposed feedlot is operational and once operational the borehole is to be sampled on a 6 monthly basis and the water samples sent to a reputable laboratory for analyses to determine if there is any contamination occurring.
- The monitoring borehole's water level should be measured and recorded monthly:
  - The levels measured are to be kept on record (database and backup) together with the date; and
  - The time-series groundwater levels are to be compared to precipitation (geohydrological) and water quality analysis regularly.
- Complete organic and inorganic as well as micro-biological analysis after development of monitoring boreholes. Baseline Indicator analyses to include pH, EC, PO_4, NH_4, NO_3, COD. If pollution or increasing trend is noted, do comprehensive analyses. Complete organic and inorganic as well as micro-biological analysis. This must take place once-off, on a monthly basis and finally bi-annually.

POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-14*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it will affect only the development area*		
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the*	***Moderately detrimental***	***Likely***

GEOLOGY AND SOILS IMPACTS				
		affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected		
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-28**	**Low negative**		
CONFIDENCE LEVEL				
Medium				

(e) Noise

Table 36: Impact ratings for noise impacts

NOISE IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Noise impacts due to day-to-day activities associated with a cattle feedlot*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	*Nuisance*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and such is rated as Long Term*	*-6*	*2*
EXTENT	*2*	*The extent of the impact is rated as Site as it will affect the development area and adjacent properties*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-12***	***Very low negative***		
PROPOSED MITIGATION MEASURES				
• A strict schedule must be followed within the feedlot. Cattle must be provided with the feed at the same time daily.				

NOISE IMPACTS				
• No amplified music shall be allowed on site. The use of audio equipment shall not be permitted unless the volume is kept sufficiently low so as to be unobtrusive. • If excessive noise is expected on the boundary of the site, neighbouring occupied properties must be informed in writing and in advance of when the high noise levels will occur and for how long they will last.				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-5*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it will affect the area where the activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**-5**	**Very low negative**		
CONFIDENCE LEVEL				
Medium				

(f) Air Quality

Table 37: Impact ratings for dust impacts

AIR QUALITY IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Potential air quality nuisance impacts affecting aesthetics, sense of place and well-being*			
INDIRECT IMPACT	*Reduced visibility on and around the site*			
CUMULATIVE IMPACT	*Possible aggravation of pre-existing health conditions such as asthma and allergies*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last for more than 5 years and as such is rated as Long Term*	*-21*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the*	***Highly detrimental***	***Likely***

AIR QUALITY IMPACTS				
		natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected		
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-42***	***Moderate negative***		
PROPOSED MITIGATION MEASURES				
• Dust minimisation and control measures must be implemented on site at regular intervals. This could include irrigation (utilising a legal, non-potable water source) by water tankers. • The frequency of implementation of dust suppression measures should be increased when it is expected that high wind conditions will develop. • The cattle urine keeps the pad moist, during dry periods regular sprinkling with water may be necessary. Sprinkling is also done to reduce the dust. • A dry stockpile will not produce leachate, a thick black smelly tar-like substance, which contains toxic substances should not emerge at any point from the manure heap. • Temporary storage of manure in heaps must be kept to minimal. • The application of chlorine in the lagoon may aid in containing air pollution within the lagoon, however, cattle feedlots use the additive *Rumensin* in their feed as it reduces some CH_4 gas emissions. • Water quality monitoring must be conducted on the surface water bodies situated at a lower hydrological gradient than the feedlot and septic tank.				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-12*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it only affects the development area*		
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly detrimental***	***Likely***

AIR QUALITY IMPACTS				
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**-24**	**Low negative**		
CONFIDENCE LEVEL				
Medium				

(g) Waste Management

Table 38: Impact ratings for waste management

WASTE MANAGEMENT IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	• Generation of general solid wastes, hazardous wastes and sewage; • Improper storage, handling, treatment and disposal of wastes may give rise to environmental pollution and degradation.			
INDIRECT IMPACT	• Increased pressure on licensed waste treatment and disposal facilities; • Bad odour; • Attraction of pests (flies); • Altered sense of place; • Nuisance/ health impacts.			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-14*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it will affect the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Moderately detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-28***	***Low negative***		

WASTE MANAGEMENT IMPACTS				
PROPOSED MITIGATION MEASURES				
• The property manager must put into practice ways in which to implement the waste hierarchy on site by identifying ways on site to: o Avoid and reduce waste generation; o Re-use waste materials; o Recycle waste; o Recover waste; and o As a last resort, treat and dispose of wastes. • All general waste bins on the site must be weather- and scavenger-proof. • In order to reduce pressure on general waste landfill sites, it is recommended that, as far as possible, general solid wastes be separated and sorted into its recyclable components (glass, plastic, metal, paper). This will require the provision of separate waste bins within the site, and the removal of these wastes to appropriate recycling facilities. • The requirement to separate and sort general wastes should be included as part of the environmental induction and awareness programme. • Litter must be cleared from the site daily. • Should pest populations establish, steps will need to be taken to control these. • Hazardous wastes must be stored on an impermeable surface, in a bunded area. Such storage area must be clearly demarcated • Wastes must be collected/ removed from site regularly to ensure that no overflow occurs. It is recommended that chemical ablution facilities be serviced once a week by an authorised service provider. • Safe disposal slips must be maintained for all waste types generated on site and disposed of offsite. • The lagoon must be emptied regularly to prevent overspilling. Any incident of this nature must be reported, immediately, to the Department and regional DWS. • Sludge accumulated at the bottom of the lagoon must be properly cleaned, scraped, and cleared. • The lagoon must be routinely monitored for any leaching. • Only approved pesticide products must be used to control intrusive pests (flies) and should be applied strictly as prescribed as these will bind to the manure and may form part of runoff. The use of protective clothing during application is mandatory. Secure storage of pesticides on site must also be provided. • Temporary storage of manure in heaps must be kept to minimal. • Plastic and glass bottles (used to contain cattle medicine) must be placed in separate containers that are sealed until they taken to the local veterinary clinic. Under no circumstances should this waste be disposed of with the general waste. • Carcass must be managed sufficiently: if to be buried on site, a hole must be dug (above the water table) and must be fenced off; or if to be disposed of in a different facility, waybill or deposit slips must be retained on site.				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-6*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it will affect only the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment*	***Negligible***	***Likely***

WASTE MANAGEMENT IMPACTS				
		in such a way that natural, cultural and social functions and processes are minimally affected		
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**-12**	**Very low negative**		
CONFIDENCE LEVEL				
Medium				

(h) Socio-Economic

Table 39: Impact ratings for socio-economic impacts

SOCIO-ECONOMIC IMPACTS				
PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Permanent employment creation, livelihood for the beneficiaries			
INDIRECT IMPACT	Skills development and transfer			
CUMULATIVE IMPACT	Stimulation of economic activity (both in the formal and informal sectors). Members of the local community are empowered with marketable skills, resulting in enhanced employability			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*14*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as the effects of the development area and adjacent properties*		
SEVERITY	*2*	*The severity of the impact is rated as Moderate positive as the affected environment is altered but social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected*	***Moderately beneficial***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***28***	***Low positive***		

SOCIO-ECONOMIC IMPACTS				
PROPOSED MITIGATION MEASURES				
• As far as possible, labour for the operational phase must be sourced from the local community. • Maintenance contractors should be required to seek out and implement opportunities for skills development and transfer, as well as capacity building with local labour and EME contractors. • An experienced person in managing cattle feedlots and handling cattle medicine must form part of the employee's team.				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*24*	*2*
EXTENT	4	*The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries*		
SEVERITY	3	*The severity of the impact is rated as High positive as the social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected*	***Highly beneficial***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**48**	**Moderate positive**		
CONFIDENCE LEVEL				
Medium				

4.3.5 Alternative Site Operational Phase

(a) Flora and Fauna

Table 40: Impact ratings for the clearance of vegetation and loss of fauna

POTENTIAL LOSS OF VEGETATION AND ASSCOCIATED FAUNA HABITAT				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Vegetation and fauna disturbance due to routine operations and maintenance*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more*	*-6*	*2*

POTENTIAL LOSS OF VEGETATION AND ASSCOCIATED FAUNA HABITAT				
		than 5 years and as such is rated as Long Term		
EXTENT	*1*	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Moderately detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-12***	***Very low negative***		

PROPOSED MITIGATION MEASURES

- A SMP must be compiled for the operational phase and stormwater infrastructure designed in such a way that it does not impact on or erode the surrounding natural areas, especially the wetlands.
- During the operational phase, the washing of cars within the surrounding natural areas, especially wetlands must be prohibited.
- Formal solid waste management systems must be implemented, and formal waste removal services provided. Recycling of solid waste should be encouraged.
- Dumping of solid waste and litter in natural areas by residents must be prohibited. Residents should be discouraged from doing so through education initiatives and the provision of ample waste disposal facilities.
- Surrounding natural vegetation must not be disturbed to minimise chances of invasion by IAP. Emergence of IAP species should be monitored on a bi-annual basis by a suitably qualified botanist.
- The IAP species Management and Monitoring Plan must also ensure that the re-emergence of IAP species is monitored continuously during the operational phase. This plan must include the immediate surroundings where natural vegetation prevails.
- During the operational phase, the site must be searched for IAP on a regular basis and all IAP seedlings and saplings removed as they become evident.
- Formalised waste disposal systems and services must be provided to avoid dumping of refuse into natural areas.
- Upward lighting should be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light.
- Insects are attracted to brighter light that is emitted over a broad band of long wavelengths such as high-pressure sodium or mercury lamps. Such lighting must be avoided, and rather light that is emitted at one wavelength, contains no UV light and has a low attraction to insects, such as low-pressure sodium lamps, should be used.
- The IAP Monitoring Programme must ensure that the re-emergence of IAP species is monitored and controlled at regular intervals during the operational phase within the development footprint and in the surrounding natural areas.

POTENTIAL LOSS OF VEGETATION AND ASSCOCIATED FAUNA HABITAT				
• Foot traffic by people and domestic animals in the surrounding natural areas must be kept to a minimum. Livestock grazing in the natural areas must be kept at a minimum and at sustainable levels. • The feedlot employees should be educated in the importance of looking after the natural environment and the sustainable utilisation of natural resources. This can be achieved through educational posters, for example. • Harvesting of fuel wood from indigenous species within the natural areas should be discouraged, and rather the wood of IAP species such as wattle be utilised.				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-6*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-6**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(b) Surface Water

Table 41: Impact ratings for surface water resources

SURFACE WATER IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Maintenance of structures and service infrastructure within and/or in proximity to wetlands*			
INDIRECT IMPACT	*Disturbance/ destruction of aquatic habitats*			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will*	*-16*	*2*

SURFACE WATER IMPACTS				
		last more than 5 years and as such is rated as Long Term		
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Moderately detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-32***	***Low negative***		

PROPOSED MITIGATION MEASURES

- No further disturbances should be experienced by the wetland systems on site. The recommended wetland buffer during the operational phase is 14m. Ideally the wetlands should also be restricted from overgrazing by cattle.
- Exposed slopes are highly prone to erosion, so drainage control features such as earth dikes, perimeter dikes/ swales, and diversions can be used to intercept and convey runoff from above disturbed areas to suitable dispersal areas or drainage systems. This helps to reduce the sedimentation from exposed areas. Sediment traps should be utilised to detain sediments in stormwater runoff to protect receiving water bodies, and the surrounding area. Silt fences can be used by entrenching them into the ground and stretched between anchoring posts spaced at regular intervals along the lower side of a site. Sediment is filtered out as runoff flows through the fabric. Such fences should be used only where there is sheet. Gullies and other areas of active erosion should be stabilised (using catch water drains, raising headwalls or providing protective measures including grassing, stone pitching, concrete paving or gabions/ mattresses) and rehabilitated to minimise sediment entering the aquatic resource from these sources.
- The focus of the rehabilitation of wetlands is to ensure the reestablishment of what was the natural hydraulic regime as much as possible. Where the watercourse's hydraulic regime is improved, the vegetation will improve as well for the wetland habitat which can lead to the reintroduction of riparian specific species. It is, however, not possible to completely re-establish the natural hydrological regime at the catchment level as this is what is needed to improve the current state of the wetlands. The main function of rehabilitation efforts must aim to restore the natural function and improve the aesthetic nature of the wetlands.
- The careful control of the dispersion of IAP within a wetland is imperative due to their degradation causing properties. The key to controlling the dispersion of IAP is through early detection and removal. The removal and management of IAP is essential in maintaining the ecological integrity of a wetland as well as its ability to maintain biodiversity. An IAP Control Plan should be compiled and implemented. This includes details of removal as well as monitoring to ensure the IAP are kept in control throughout the life of the activity.
- IAP and weed control must take place within remaining wetland habitats and 20m buffer areas on site post onsite rehabilitation in accordance with an IAP Control and Management Programme aligned with the NEMBA Invasive Species Regulations. Initial control and follow-up maintenance to take place. Integrated

SURFACE WATER IMPACTS				
control (combination of mechanical and chemical control) to be implemented, with specific controls to be tailored to the species of IAPs to be managed. Herbicide use to be controlled and herbicides or pesticides use to be restricted within delineated wetlands unless herbicides are non-toxic to watercourses and authorised for use in wetlands. • Stormwater management reduces the negative effects (erosion, increase sedimentation, contamination, etc.) of stormwater runoff. Management of stormwater comprises of controlling flooding, reducing erosion and improving water quality. This can be achieved by implementing measures known as BMPs. Such BMPs include the installation of a porous pavement, i.e. around the administration office, which are interlocking tiles or bricks that allows stormwater runoff to infiltrate the pavement and thereafter enters the soil which removes fine grain pollutants and provides erosion control. In addition there are vegetative BMPs which include a number of landscaping practices. Grassed swales, or ditches, can be placed in areas requiring rehabilitation. This BMP helps lessen the peak runoff downstream through processes of infiltration and storage. Filter strips are designed to direct stormwater from impervious areas into a stone trench, which evenly distributes the runoff over a grass strip. • Retention, detention, attenuation, sustainable and controlled release of stormwater runoff into watercourses is to be practiced in order to prevent erosion and/or sedimentation of wetlands. SuDS principles are to be implemented whereby the number of outlets to watercourses to reduce concentrated flows at high volumes and velocities are to be maximised, separate 'clean' and 'dirty' stormwater management systems are to be developed in accordance with DWS requirements and erosion control measures are to be determined by the engineers. • Allowance for short-term irrigation (but not from local groundwater) of landscaped channels, if necessary, until the development is complete and channelled flow is established. Note that irrigation should not be carried out using nutrient-enriched water (e.g., treated sewage effluent). • Nutrients, i.e., NO_3, PO_4, magnesium and calcium are produced through the cattle manure, these must be monitored in both the soils and surface water as they may result in pollution when in excess. Eutrophication in surface water bodies may be a sign of contamination. • Heavy metals at feedlots include zinc, selenium, copper, cadmium, arsenic, iron and aluminium, these may contribute to soil and consequentially water contamination. • A dry stockpile will not produce leachate, a thick black smelly tar-like substance, which contains toxic substances should not emerge at any point from the manure heap. Under no circumstances should the manure heap release runoff to the vegetated and/or rehabilitated areas, a connection embayment between the heap area the stormwater embayment directing contaminated runoff to the lagoon must be utilised. • The lagoon must be emptied regularly to prevent overspilling. Any incident of this nature must be reported, immediately, to the Department and regional DWS. • Sludge accumulated at the bottom of the lagoon must be properly cleaned, scraped, and cleared. • The lagoon must be routinely monitored for any leaching. • Only approved pesticide products must be used to control intrusive pests (flies) and should be applied strictly as prescribed as these will bind to the manure and may form part of runoff. The use of protective clothing during application is mandatory. Secure storage of pesticides on site must also be provided. • The effluent emanating from the French-drain must be monitored for any contaminants that may affect the quality of soil and groundwater. • Water quality monitoring must be conducted on the surface water bodies situated at a lower hydrological gradient than the feedlot and septic tank.				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-7*	*2*

SURFACE WATER IMPACTS				
EXTENT	2	*The extent of the impact is rated as Site as it affects only the development*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Slightly detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-14**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(c) Groundwater

Table 42: Impact ratings for groundwater resources

GROUNDWATER IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Contamination of groundwater resources*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	*Deteriorating groundwater quality in the localised area*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last for more than 5 years and as such is rated as Long Term*	*-24*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it will affect the development area and adjacent properties*		
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected*	***Highly detrimental***	***Likely***

GROUNDWATER IMPACTS				
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-48***	***Moderate negative***		
PROPOSED MITIGATION MEASURES				

• Dirty and clean stormwater must be separated on site, the dirty stormwater must be directed to the lagoon.
• Nutrients, i.e., NO_3, PO_4, magnesium and calcium are produced through the cattle manure, these must be monitored in both the soils and groundwater as they may result in pollution when in excess.
• Heavy metals at feedlots include zinc, selenium, copper, cadmium, arsenic, iron and aluminium, these may contribute to soil and consequentially water contamination.
• Temporary storage of manure in heaps must be kept to minimal.
• A dry stockpile will not produce leachate, a thick black smelly tar-like substance, which contains toxic substances should not emerge at any point from the heap. Under no circumstances should the manure heap release runoff to the vegetated and/or rehabilitated areas, a connection embankment between the heap area the stormwater embankment directing contaminated runoff to the lagoon must be utilised.
• The lagoon must be emptied regularly to prevent overspilling. Any incident of this nature must be reported, immediately, to the Department and regional DWS.
• Sludge accumulated at the bottom of the lagoon must be properly cleaned, scraped, and cleared.
• The lagoon must be routinely monitored for any leaching.
• Only approved pesticide products must be used to control intrusive pests (flies) and should be applied strictly as prescribed as these will bind to the manure and may form part of runoff. The use of protective clothing during application is mandatory. Secure storage of pesticides on site must also be provided.
• It is recommended to sample the existing borehole before the proposed feedlot is operational and once operational the borehole is to be sampled on a 6 monthly basis and the water samples sent to a reputable laboratory for analyses to determine if there is any contamination occurring.
• The monitoring borehole's water level should be measured and recorded monthly:
  ○ The levels measured are to be kept on record (database and backup) together with the date; and
  ○ The time-series groundwater levels are to be compared to precipitation (geohydrological) and water quality analysis regularly.
• Complete organic and inorganic as well as micro-biological analysis after development of monitoring boreholes. Baseline Indicator analyses to include pH, EC, PO_4, NH_4, NO_3, COD. If pollution or increasing trend is noted, do comprehensive analyses. Complete organic and inorganic as well as micro-biological analysis. This must take place once-off, on a monthly basis and finally bi-annually.
• The effluent emanating from the French-drain must be monitored for any contaminants that may affect the quality of soil and groundwater.
• Water quality monitoring must be conducted on the groundwater bodies situated at a lower hydrological gradient than the feedlot and French-drain.				

POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last for more than 5 years and as such is rated Long Term*	*-14*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it will affect only the development area*		
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as*	***Moderately detrimental***	***Likely***

GROUNDWATER IMPACTS				
		the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected		
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-28**	**Low negative**		
CONFIDENCE LEVEL				
High				

(d) Geology and Soils

Table 43: Impact ratings for geology and soils

GEOLOGY AND SOILS IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Potential soil contamination. Stability and drainage potential issues*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	*Localised soil contamination*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last for more than 5 years and as such is rated as Long Term*	*-21*	*2*
EXTENT	*2*	*The extent of the impact is rated as Site as it only affects the development area*		
SEVERITY	*-3*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Highly detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	***-42***	***Moderate negative***		

GEOLOGY AND SOILS IMPACTS				
PROPOSED MITIGATION MEASURES				

• Dirty and clean stormwater must be separated on site, the dirty stormwater must be directed to the lagoon.
• Nutrients, i.e., NO_3, PO_4, magnesium and calcium are produced through the cattle manure, these must be monitored in soils as they may result in pollution when in excess.
• Heavy metals at feedlots include zinc, selenium, copper, cadmium, arsenic, iron and aluminium, these may contribute to soil contamination.
• Temporary storage of manure in heaps must be kept to minimal.
• A dry stockpile will not produce leachate, a thick black smelly tar-like substance, which contains toxic substances should not emerge at any point from the heap. Under no circumstances should the manure heap release runoff to the vegetated and/or rehabilitated areas, a connection embayment between the heap area the stormwater embayment directing contaminated runoff to the lagoon must be utilised.
• The lagoon must be emptied regularly to prevent overspilling. Any incident of this nature must be reported, immediately, to the Department and regional DWS.
• Sludge accumulated at the bottom of the lagoon must be properly cleaned, scraped, and cleared.
• The lagoon must be routinely monitored for any leaching.
• Only approved pesticide products must be used to control intrusive pests (flies) and should be applied strictly as prescribed as these will bind to the manure and may form part of runoff. The use of protective clothing during application is mandatory. Secure storage of pesticides on site must also be provided.
• Water quality monitoring must be conducted on the surface and groundwater bodies situated at a lower hydrological gradient than the feedlot and French-drain.
• The effluent emanating from the French-drain must be monitored for any contaminants that may affect the quality of soil and groundwater.
• It is recommended to sample the existing borehole before the proposed feedlot is operational and once operational the borehole is to be sampled on a 6 monthly basis and the water samples sent to a reputable laboratory for analyses to determine if there is any contamination occurring.
• The monitoring borehole's water level should be measured and recorded monthly:
  ○ The levels measured are to be kept on record (database and backup) together with the date; and
  ○ The time-series groundwater levels are to be compared to precipitation (geohydrological) and water quality analysis regularly.
• Complete organic and inorganic as well as micro-biological analysis after development of monitoring boreholes. Baseline Indicator analyses to include pH, EC, PO_4, NH_4, NO_3, COD. If pollution or increasing trend is noted, do comprehensive analyses. Complete organic and inorganic as well as micro-biological analysis. This must take place once-off, on a monthly basis and finally bi-annually.				

POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-6*	*2*
EXTENT	1	*The extent of the impact is rated as Footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social*	***Negligible***	***Likely***

GEOLOGY AND SOILS IMPACTS				
		functions and processes are minimally affected		
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted*		
SIGNIFICANCE	**-12**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(e) Noise

Table 44: Impact ratings for noise impacts

NOISE IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Noise impacts due to day-to-day activities associated with a cattle feedlot*			
INDIRECT IMPACT	-			
CUMULATIVE IMPACT	*Nuisance*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and such is rated as Long Term*	*-6*	*2*
EXTENT	*2*	*The extent of the impact is rated as Site as it will affect the development area and adjacent properties*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-12***	***Low negative***		
PROPOSED MITIGATION MEASURES				
• A strict schedule must be followed within the feedlot. Cattle must be provided with the feed at the same time daily. • No amplified music shall be allowed on site. The use of audio equipment shall not be permitted unless the volume is kept sufficiently low so as to be unobtrusive. • If excessive noise is expected on the boundary of the site, neighbouring occupied properties must be informed in writing and in advance of when the high noise levels will occur and for how long they will last.				
POST-MITIGATION				

NOISE IMPACTS				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-5*	*1*
EXTENT	1	*The extent of the impact is rated as Footprint as it will affect the area where the activity will occur*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**-5**	**Very low negative**		
CONFIDENCE LEVEL				
High				

(f) Air Quality

Table 45: Impact ratings for dust impacts

AIR QUALITY IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Potential air quality nuisance impacts affecting aesthetics, sense of place and well-being*			
INDIRECT IMPACT	*Reduced visibility on and around the site*			
CUMULATIVE IMPACT	*Possible aggravation of pre-existing health conditions such as asthma and allergies*			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last for more than 5 years and as such is rated as Long Term*	*-21*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently*	***Highly detrimental***	***Likely***

AIR QUALITY IMPACTS				
		cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected		
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-42***	***Moderate negative***		
PROPOSED MITIGATION MEASURES				
• Dust minimisation and control measures must be implemented on site at regular intervals. This could include irrigation (utilising a legal, non-potable water source) by water tankers. • The frequency of implementation of dust suppression measures should be increased when it is expected that high wind conditions will develop. • The cattle urine keeps the pad moist, during dry periods regular sprinkling with water may be necessary. Sprinkling is also done to reduce the dust. • A dry stockpile will not produce leachate, a thick black smelly tar-like substance, which contains toxic substances should not emerge at any point from the manure heap. • Temporary storage of manure in heaps must be kept to minimal. • The application of chlorine in the lagoon may aid in containing air pollution within the lagoon, however, cattle feedlots use the additive *Rumensin* in their feed as it reduces some CH_4 gas emissions.				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-12*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it only affects the development area*		
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**-24**	**Low negative**		
CONFIDENCE LEVEL				
Medium				

(g) Waste Management

Table 46: Impact ratings for waste management

WASTE MANAGEMENT IMPACTS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	• Generation of general solid wastes, hazardous wastes and sewage; • Improper storage, handling, treatment and disposal of wastes may give rise to environmental pollution and degradation.			
INDIRECT IMPACT	• Increased pressure on licensed waste treatment and disposal facilities; • Bad odour; • Attraction of pests (flies); • Altered sense of place; • Nuisance/ health impacts.			
CUMULATIVE IMPACT	-			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-14*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it will affect the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Moderately detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***-28***	***Low negative***		
PROPOSED MITIGATION MEASURES				
• The property manager must put into practice ways in which to implement the waste hierarchy on site by identifying ways on site to: o Avoid and reduce waste generation; o Re-use waste materials; o Recycle waste; o Recover waste; and o As a last resort, treat and dispose of wastes. • All general waste bins on the site must be weather- and scavenger-proof.				

WASTE MANAGEMENT IMPACTS

- In order to reduce pressure on general waste landfill sites, it is recommended that, as far as possible, general solid wastes be separated and sorted into its recyclable components (glass, plastic, metal, paper). This will require the provision of separate waste bins within the site, and the removal of these wastes to appropriate recycling facilities.
- The requirement to separate and sort general wastes should be included as part of the environmental induction and awareness programme.
- Litter must be cleared from the site daily.
- Should pest populations establish, steps will need to be taken to control these.
- Hazardous wastes must be stored on an impermeable surface, in a bunded area. Such storage area must be clearly demarcated
- Wastes must be collected/ removed from site regularly to ensure that no overflow occurs. It is recommended that chemical ablution facilities be serviced once a week by an authorised service provider.
- Safe disposal slips must be maintained for all waste types generated on site and disposed of offsite.
- The lagoon must be emptied regularly to prevent overspilling. Any incident of this nature must be reported, immediately, to the Department and regional DWS.
- Sludge accumulated at the bottom of the lagoon must be properly cleaned, scraped, and cleared.
- The lagoon must be routinely monitored for any leaching.
- Only approved pesticide products must be used to control intrusive pests (flies) and should be applied strictly as prescribed as these will bind to the manure and may form part of runoff. The use of protective clothing during application is mandatory. Secure storage of pesticides on site must also be provided.
- Temporary storage of manure in heaps must be kept to minimal.
- Plastic and glass bottles (used to contain cattle medicine) must be placed in separate containers that are sealed until they transferred to the local veterinary clinic. Under no circumstances should this waste be disposed of with the general waste.
- Carcass must be managed sufficiently: if to be buried on site, a hole must be dug (above the water table) and must be fenced off; or if to be disposed of in a different facility, waybill or deposit slips must be retained on site.

POST-MITIGATION

DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-6*	*2*
EXTENT	2	*The extent of the impact is rated as Site as it will affect only the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Negligible***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**-12**	**Very low negative**		
CONFIDENCE LEVEL				

WASTE MANAGEMENT IMPACTS
Medium

(h) Socio-Economic

Table 47: Impact ratings for socio-economic impacts

SOCIO-ECONOMIC IMPACTS				
PROJECT PHASE	Operational Phase			
DIRECT IMPACT	Permanent employment creation, livelihood for the beneficiaries			
INDIRECT IMPACT	Skills development and transfer			
CUMULATIVE IMPACT	Stimulation of economic activity (both in the formal and informal sectors). Members of the local community are empowered with marketable skills, resulting in enhanced employability			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*14*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as the effects of the development area and adjacent properties*		
SEVERITY	*2*	*The severity of the impact is rated as Moderate positive as the affected environment is altered but social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected*	***Moderately beneficial***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	***28***	***Low positive***		
PROPOSED MITIGATION MEASURES				
• As far as possible, labour for the operational phase must be sourced from the local community. • Maintenance contractors should be required to seek out and implement opportunities for skills development and transfer, as well as capacity building with local labour and EME contractors. • An experienced person in managing cattle feedlots and handling cattle medicine must form part of the employee's team.				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will*	*24*	*2*

SOCIO-ECONOMIC IMPACTS				
		last more than 5 years and as such is rated as Long Term		
EXTENT	4	*The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries*		
SEVERITY	3	*The severity of the impact is rated as High positive as the social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected*	***Highly beneficial***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted*		
SIGNIFICANCE	**48**	**Moderate positive**		
CONFIDENCE LEVEL				
Medium				

4.4 Determination of Consequence and Residual Risk

4.4.1 Methodology for determining Residual Risk and Implications for Decision-making

In this report, as well as the various specialist studies, impacts were defined as a potential change to the environment as a result of the construction or operation of the proposed project. In the previous section, significance scores have been ascribed to each of these identified impacts, as the EIA Regulations require.

Following on from this determination of significance, an attempt has been made to identify and describe the collective implications of all the impacts presented, identified as the **Inherent Risk/ Consequence** of the project. Through this process of grouping impacts and identifying inherent risks/ consequences, it is possible to discern a distinction between the inherent risks/ consequences and their causes. The inherent risks/ consequences of development (and their associated causes) occur as either potential environmental costs (where the implications are negative) or as potential environmental benefits (where the implications are positive). Making use of the methodology and ranking systems described in the sections above, inherent risk/ consequence is then ranked, as per the ranking system set out in **Table 5**, above.

The EAP must then, bearing in mind the mitigation measures that are recommended for implementation, make a determination of the **Likelihood** of the consequences actually arising. The scale utilised for scoring Likelihood is set out in **Table 6**, above.

Utilising information on the consequences and likelihood of impacts, it is then possible to make a determination of the **Residual Risk** of the proposed development. Residual risk is, in effect the actual cost/ benefit that will be experienced when the project is implemented (construction and operation), following implementation of the recommended mitigation measures. The residual risk categories are set out in **Table 7**, above. The determination of Residual Risk provides important information for decision-makers, as it provides an insight into the expected actual/ real-feel costs or benefits of the proposed development, after implementation of mitigation measures. Such

information is vital for decision making: as per **Table 7** to **Table 8**, above, the Residual Risk of a project can facilitate the identification of the project as either:

- **Fatally Flawed** - and therefore requiring a refusal of authorisation;
- **High Risk** - requiring the application of strict conditions and high levels of compliance and enforcement oversight;
- **Medium Risk** - requiring conditions and routine inspections; or
- **Low Risk** - able to be authorised with low risk of IEA.

4.4.2 Inherent Risks/ Consequences and associated Causes (Costs & Benefits)

The following potential environmental costs have been identified on the proposed project:

- Biophysical reductions / deteriorations:
  - Reduction in terrestrial ecological functioning; and
  - Reduction in aquatic ecological functioning;
- Social Reductions / deteriorations:
  - Nuisance; and
  - Human health and safety risks.

The following potential benefits have been identified on the proposed project:

- Biophysical improvements:
  - Enhanced ecological connectivity;
- Social Improvements:
  - Enhanced human welfare.

The residual risks and implications for decision-making of each of these costs and benefits has been described in the sections to follow.

(a) Reductions in Terrestrial Ecological Functioning and Value

The proposed development presents an inherent risk of reduced terrestrial ecological functioning and value. The following causes of this risk have been identified through the BA process and associated specialist studies:

- Destruction of vegetation; and
- Habitat destruction and associated reduction in faunal diversity.

Utilising the ranking system set out in **Table 5**, above, reductions in terrestrial ecological functioning and value have been rated as having a ***Moderate to High*** (Current Site) and ***Moderate*** (Alternative Site) inherent risk/ consequence. Bearing in mind the proposed mitigation measures and utilising the ranking system provided in **Table 6**, above**,** it is deemed ***Definite*** (Current Site) and ***Likely*** (Alternative Site) that these identified causes will occur. The residual risk of reductions in terrestrial ecological functioning and value is accordingly rated (making use of the categorisations in **Table 7**, above) as ***High*** (Current Site) and ***Moderate*** (Alternative Site). The table below summarises this information.

Table 48: The residual risk of reduced terrestrial ecological functioning and value due to the various risk sources associated with the proposed project

Potential Environmental Cost	Reduced terrestrial ecological functioning and value	
	Current Site	Alternative Site
Inherent risk	**Moderate to High**	**Moderate**
Causes of risk	Likelihood of causes	Likelihood of causes

Potential Environmental Cost	Reduced terrestrial ecological functioning and value	
	Current Site	**Alternative Site**
Destruction of vegetation	Definite	Likely
Habitat destruction and associated reduction in faunal diversity	Definite	Likely
Likelihood of consequence	**Definite**	**Likely**
Residual risk	**HIGH**	**MODERATE**

As per **Table 8**, above, the implications for decision-making therefore are that **the Current Site can be authorised, subject to the imposition of strict conditions and with high levels of inspection for the minimisation of ecological impacts** while the **Alternative Site can be authorised with conditions and routine inspections.** Thus, from a terrestrial ecological perspective developing the Alternative Site will result in less risk than the Current Site.

(b) Reductions in Aquatic Ecological Functioning and Value

The proposed development presents an inherent risk of reduced aquatic ecological functioning and value, both on site and in aquatic systems located downstream of the site. The following causes of this risk have been identified through the BA process and associated specialist studies:

- Discharge of contaminated/ polluted stormwater;
- Discharge of sewer effluent;
- Increased volumes of stormwater discharge; and
- Habitat disturbance and associated reductions in floral and faunal diversity.

Utilising the ranking system set out in **Table 5**, above, reductions in aquatic ecological functioning and value have been rated as having a ***Moderate to High*** (Current Site) and ***Moderate*** (Alternative Site) inherent risk/ consequence. Bearing in mind the proposed mitigation measures and utilising the ranking system provided in **Table 6**, above, it is deemed ***Highly Likely*** (Current Site) and ***Likely*** (Alternative Site) that these identified causes will occur. The residual risk of reductions in aquatic ecological functioning and value is accordingly rated (making use of the categorisations in **Table 7**, above) as ***High*** (Current Site) and ***Moderate*** (Alternative Site). The table below summarises this information.

Table 49: Residual risk of reduced aquatic ecological functioning and value due to the various risk sources associated with the proposed project

Potential Environmental Cost	Reduced aquatic ecological functioning and value	
	Current Site	**Alternative Site**
Inherent risk	**Moderate to High**	**Moderate**
Causes of risk	Likelihood of causes	Likelihood of causes
Discharge of contaminated/ polluted stormwater	Highly likely	Likely
Discharge of sewer effluent	Highly likely	Likely
Increased volumes of stormwater discharge	Definite	Definite
Habitat disturbance and associated reductions in floral and faunal diversity	Highly likely	Likely
Likelihood of consequence	**Highly likely**	**Likely**
Residual risk	**HIGH**	**MODERATE**

As per **Table 8**, above, the implications for decision-making therefore are that **the Current Site can be authorised, subject to the imposition of strict conditions and with high levels of inspection for the minimisation of ecological impacts** while the **Alternative Site can be authorised with conditions and routine inspections.** Thus, from an aquatic ecological perspective developing the Alternative Site will result in less risk than the Current Site.

(c) Nuisance

The proposed development presents an inherent risk of nuisance. The following causes of this risk have been identified through the BA process and associated specialist studies:

- Noise;
- Aesthetic impacts;
- Environmental pollution, including dust, air pollution and generation of solid waste; and
- Traffic inconveniences.

Utilising the methodology set out in **Section 0**, nuisance has been rated as having a ***Moderate*** to ***Low*** inherent risk/ consequence. Bearing in mind the proposed mitigation measures, it is deemed ***Likely*** that these identified causes will occur. The residual risk of nuisance impacts is accordingly rated as ***Low***. The table below summarises this information.

Table 50: Residual risk of Nuisance due to risk sources associated with the proposed project

Potential Environmental Cost	Nuisance	
	Current Site	Alternative Site
Inherent risk	**Moderate to Low**	**Moderate to Low**
Causes of risk	Likelihood of causes	Likelihood of causes
Noise	Highly likely	Highly likely
Aesthetic impacts	Unlikely but possible	Unlikely but possible
Environmental pollution	Likely	Likely
Traffic inconveniences	Likely	Likely
Likelihood of consequence	**Likely**	**Likely**
Residual risk	**LOW**	**LOW**

The implications for decision-making therefore are that **the project can be authorised with low risk of** environmental **degradation as a result of nuisance impacts**.

(d) Human Health and Safety Concerns

The proposed development presents an inherent risk to human health and safety. The following causes of this risk have been identified through the BA process and associated specialist studies:

- Injury or death related to the use of machinery during the construction phase.

Utilising the methodology set out in **Section 0**, human health and safety impacts have been rated as having a ***Moderate*** to ***Low*** inherent risk/ consequence. Bearing in mind the proposed mitigation measures, it is deemed ***Unlikely, but Possible*** that these identified causes will occur. The residual risk of human health and safety impacts is accordingly rated as ***Low***. The table below summarises this information.

Table 51: Residual risk of Public Safety and Security impacts due to risk sources associated with the proposed project

Potential Environmental Cost	Human health and safety impacts	
	Current Site	**Alternative Site**
Inherent risk	**Moderate to Low**	**Moderate to Low**
Causes of risk	Likelihood of causes	Likelihood of causes
Use of machinery on site as part of construction activities	Unlikely but possible	Unlikely but possible
Likelihood of consequence	**Unlikely but possible**	**Unlikely but possible**
Residual risk	**LOW**	**LOW**

The implications for decision-making therefore are that **the project can be authorised with low risk of public safety and security impacts**.

(e) Enhanced Human Welfare

The proposed project will result in economic growth through the following:

- Temporary and permanent employment creation and associated decrease in unemployment; and
- Empowerment, skills development and transfer, and associated capacity building.

Utilising the methodology set out in **Section 0**, improved human welfare impacts have been rated as having a ***Moderate to Low*** inherent consequence. It is deemed ***Likely*** that the identified causes will occur. The residual consequence of human welfare opportunities is accordingly rated as ***Low***. The table below summarises this information.

Table 52: Residual benefit of Improved Human Welfare impacts due to benefit sources associated with the proposed project

Potential Environmental Benefit	Improved human welfare	
	Current Site	**Alternative Site**
Inherent benefit	**Moderate to Low**	**Moderate to Low**
Causes of benefit	Likelihood of causes	Likelihood of causes
Employment creation and associated decrease in unemployment	Likely	Likely
Empowerment, skills development and transfer, and associated capacity building	Likely	Likely
Likelihood of consequence	**Likely**	**Likely**
Residual benefit	**LOW**	**LOW**

The implications, in terms of Improved Human Welfare, for decision-making therefore are that the **project can be authorized with low risk of environmental degradation**.

4.5 Environmental Impact Summary

An impact summary of the identified and assessed potential impacts associated with the implementation of either alternative of the proposed activity, after the implementation of mitigation measures has been provided in **Table 53** below.

Table 53: All Alternatives

Impact	Current Site after mitigation	Alternative Site after Mitigation
Construction Phase		
Vegetation and faunal impacts	Low negative	Very low negative
Surface water impacts	Very low negative	Very low negative
Groundwater impacts	Very low negative	Very low negative
Geology and soils impacts	Very low negative	Very low negative
Archaeology, paleontology and cultural heritage impacts	Very low negative	Very low negative
Traffic impacts	Very low negative	Very low negative
Noise Impacts	Very low negative	Very low negative
Air quality impacts	Very low negative	Very low negative
Visual impacts	Very low negative	Very low negative
Waste management impacts	Very low negative	Very low negative
Socio-economic impacts	Moderate positive	Moderate positive
Operational Phase		
Vegetation and faunal impacts	Low negative	Very low negative
Surface water resource impacts	Low negative	Very low negative
Groundwater impacts	Low negative	Low negative
Geology and soils impacts	Low negative	Very low negative
Noise	Very low negative	Very low negative
Air quality impacts	Low negative	Low negative
Waste management impacts	Very low negative	Very low negative
Socio-economic impacts	Moderate positive	Moderate positive

4.6 Conclusion and Recommendations

This section provides a summary of the key findings of the BA process and a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives. This section also provides a reasoned opinion as to whether the activity should or should not be authorised and conditions that should be made in respect of that authorisation, as necessary.

4.6.1 Summary of the Key Findings of the BA

The findings of the specialist studies undertaken together with the broader BA process conclude that there are no fatal flaws that should prevent the project from proceeding. However, the following (**Table 54** below) key potential impacts have been identified which will require the application of site and activity specific mitigation measures. These mitigation measures are included in this report and within the Draft EMPr to ensure that they receive the necessary attention.

Based on the above table, the proposed development will have some contribution to local economic development. The negative impacts identified are not considered highly significant and with appropriate mitigation can be reduced to low or very low significance though negative. It is important to mention that the Alternative Site, preferred, occurs outside natural vegetation and delineated wetlands and therefore results in lesser significant impacts in comparison to the Current Site.

Table 54: Summary of the significance of identified potential impacts without and with mitigation measures

Impact	Significance (Current Site)		Significance (Alternative Site)	
	Without Mitigation	With Mitigation	Without mitigation	With Mitigation
Construction Phase				
Biophysical Environment				
Vegetation and fauna impacts	Moderate negative	Low negative	Low negative	Very low negative
Surface water impacts	Moderate negative	Very low negative	Low negative	Very low negative
Groundwater impacts	Very low negative	Very low negative	Very low negative	Very low negative
Geology and soils impacts	Very low negative	Very low negative	Low negative	Very low negative
Socio-Economic Environment				
Heritage impacts	Very low negative	Very low negative	Low negative	Very low negative
Traffic impacts	Low negative	Very low negative	Low negative	Very low negative
Noise impacts	Low negative	Very low negative	Low negative	Very low negative
Air quality impacts	Very low negative	Very low negative	Very low negative	Very low negative
Visual impacts	Very low negative	Very low negative	Very low negative	Very low negative
Waste management impacts	Very low negative	Very low negative	Very low negative	Very low negative
Socio-economic impacts	Low positive	Moderate positive	Low positive	Moderate positive
Operational Phase				
Biophysical Environment				
Vegetation and fauna impacts	Moderate negative	Low negative	Very low negative	Very low negative
Surface water impacts	Moderate negative	Low negative	Low negative	Very low negative
Groundwater impacts	Moderate negative	Low negative	Moderate negative	Low negative
Geology and soils impacts	Moderate negative	Low negative	Moderate negative	Very low negative
Socio-Economic Environment				
Noise impacts	Very low negative	Very low negative	Very low negative	Very low negative
Air quality impacts	Moderate negative	Low negative	Moderate negative	Low negative
Waste management impacts	Low negative	Very low negative	Low negative	Very low negative
Socio-economic impacts	Low positive	Moderate positive	Low positive	Moderate positive

These potential impacts assessed above can be grouped into six consequences and residual risks/ benefits as summarised in the tables below. This implies that should the Department authorise the project the Department chooses to accept the following residual risks/ benefits:

Table 55: Summary of Residual Risks and Benefits

Residual Risk	Current Site	Alternative Site
Reduced terrestrial ecological functioning and value	**HIGH**	**MODERATE**
Reduced aquatic ecological functioning and value	**HIGH**	**MODERATE**
Nuisance	**LOW**	**LOW**
Human health and public safety risks	**LOW**	**LOW**

Residual Benefit	Current Site	Alternative Site
Improvement of Human Welfare	**LOW**	**LOW**

Residual risks are predominantly rated to be ***Low*** to ***Moderate*** (Alternative Site) while that associated with the Current Site is rated to be ***Low*** to ***High***. On the basis of this, it is recommended that the Department authorise the Alternative Site for the undertaking of the above proposed activities, but with conditions and routine inspections.

4.6.2 EAP's Recommendation

In summary and based on this detailed assessment and the various specialist studies, it is the EAP's opinion that the Alternative Site (preferred site) for the proposed project can be authorised, with conditions and routine inspections stipulated in the IEA. This will ensure that all potential impacts are mitigated and monitored efficiently.

It is the conclusion that, with the implementation of the recommended mitigation measures listed above and in the Draft EMPr, all of the identified potential impacts can be mitigated to an acceptable level. Of these measures, the most important are:

- The proposed feedlot and lagoon footprint should be moved to the south within the Alternative Site, not to overlay the dolerite dyke and thin dolerite sheet, as both have a high probability of acting as conduits for possible pollution to downstream springs and the existing borehole; and
- The living heritage or the khowa habitat with High Local Significance is recommended for conservation, at least not less than a third (≥6ha) of the northern portion of the alternative site, thereby ensuring in part and on site, and in perpetuation of future generations the conservation of the mushroom habitat within the development framework. Additionally, a Heritage Management Plan must be developed by the applicant to guide the management of the conserved living heritage within the Alternative Site moving forward.

Having assessed all the potential impacts associated with the proposed development it is the opinion of the EAP that the IEA be granted, with the specific conditions of approval incorporating the mitigation measures suggested by the various specialist studies and the EAP.

SECTION E: RECOMMENDATIONS OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the EAP)?	**YES**	~~NO~~
Is an EMPr attached?	**YES**	~~NO~~

The EMPr must be attached as **Appendix F**. Refer to the said appendix.

~~If "NO", indicate the aspects that should be assessed further as part of a S&EIR process before a decision can be made (list the aspects that require further assessment):~~

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the CA in respect of the application:

Construction Phase:

- The existing track gravelling must only be undertaken as authorised.
- Post construction, natural vegetation and/or conditions must be recreated using species found typically in these areas. This must be guided by a suitably qualified botanist or horticulturalist.
- Prior to any removal of indigenous vegetation, a walk-through of the sensitive areas must be undertaken by a suitable qualified botanist or horticulturalist and any plants that can be relocated must be rescued and

replanted in the newly created habitats. Any protected species that will be relocated will require a permit from the Department.

- All areas that need revegetating during or after construction must be planted only with indigenous grass species found in the immediate vicinity and not with the standard species mix commonly used in construction projects. A botanist or rehabilitation specialist must be consulted in this regard.
- An independent ECO must be appointed to oversee construction activities.
- As far as possible, the existing track gravelling must take place during the dry winter months to help minimise contamination of delineated watercourses and runoff from the construction site polluting downstream watercourses.
- An ecologically-sound SMP must be implemented during construction and appropriate water diversion systems put in place.
- During construction, erosion must not be allowed to develop on a large scale before effecting repairs.
- All areas susceptible to erosion must be protected and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.
- Surface water or stormwater must not be allowed to concentrate, or flow down cut or fill slopes without erosion protection measures being in place.
- Areas exposed to erosion during construction should be revegetated with species naturally occurring in the area. Natural trees, shrubbery and grass species must be retained wherever possible.
- The gravelling of the existing track must include passage of water underneath through implementation of stormwater infrastructure.
- Stormwater infrastructure must be designed in such a way that it does not impact on or erode the surrounding natural areas, especially the delineated watercourses.
- Vehicles used during the construction phase must be parked in a designated area and containers should be used to hold any oil leaks.
- Formal solid waste management systems must be implemented and formal waste removal services provided. Recycling of solid waste must be encouraged.
- Formal bulk water and sewer reticulation services must be installed. Fail safe measures must be included in the engineering design, including an Emergency/ Risk Management Plan.
- Dumping of solid waste and litter in natural areas by construction workers and cattle feedlot workers must be prohibited. This must be discouraged through education initiatives and the provision of ample waste disposal facilities.
- If possible, further electricity supply should be via buried cables rather than overhead lines.
- Should overhead lines be implemented, these should be routed alongside roads and must avoid crossing natural and open areas as far as possible. To avoid electrocution by larger species such as raptors, the vertical phase-earth clearance should be greater than 1.8m. All jumpers at transformers, T-offs and strain structures must be insulated. Only pole structures that are approved as “bird friendly” by Eskom’s ENVIROTECH Forum should be used. Lines traversing open areas such as wetlands must be marked with anti-collision devices. This includes low voltage lines. Bird flight diverters on the earth wires must be installed as per specifications devised by the EWT/ Eskom Partnership.
- Surrounding natural vegetation must not be disturbed to minimise chances of invasion by IAP species. Emergence of IAP species should be monitored on a bi-annual basis by a suitably qualified botanist.
- An IAP species Management and Monitoring Plan must be compiled by a suitably qualified botanist and implemented whereby all emergent IAP species are removed during construction.
- During the construction phase, all IAP seedlings and saplings must be removed as they become evident for the duration of the construction phase. Manual / mechanical removal is preferred to chemical control.
- All construction vehicles and equipment, as well as construction material must be free of plant material before coming on site. Equipment and vehicles must be thoroughly cleaned prior to access to the construction site.
- No domesticated animals must be allowed on the construction site by construction and/or feedlot workers.

- During construction, all food should be securely stored away to prevent attraction of faunal species and all rubbish should be disposed of away from the site. Bins located around the site should have tightly fitting lids to prevent raiding by faunal species.
- Upward lighting should be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light.
- Insects are attracted to brighter light that is emitted over a broad band of long wavelengths such as high-pressure sodium or mercury lamps. Such lighting must be avoided, and rather light that is emitted at one wavelength, contains no UV light and has a low attraction to insects, such as low-pressure sodium lamps, should be used.
- If possible, construction should take place during daylight hours to avoid the need for artificial lighting and to reduce the impact of noise and vibrations on nocturnal animals.
- Foot traffic by people and domestic animals in the surrounding natural areas must be kept to a minimum. Livestock grazing in the natural areas must be kept at a minimum and at sustainable levels.
- The feedlot employees should be educated in the importance of looking after the natural environment and the sustainable utilisation of natural resources. This can be achieved through educational posters, for example
- Harvesting of fuel wood from indigenous species within the natural areas should be discouraged, and rather the wood of IAP species such as wattle be utilised.
- Formal designs must include standard pollution control mechanisms and an appropriate stormwater drainage system. Any water released into the environment must be cleaned of all impurities.
- No wild animal may under any circumstance be handled, removed, or be interfered with by construction workers or by operational phase staff.
- During the construction and operational phases, no wild animal may under any circumstance be hunted, snared, captured, injured, or killed. This includes animals perceived to be vermin.
- Vegetation clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, vegetation clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.
- Unnecessary removal of groundcover from slopes must be prevented, especially on steep slopes. Prior to the stripping, infilling, excavation and reshaping of any wetland within the development footprint/ corridor, a search and rescue of indigenous vegetation must be undertaken prior to habitat destruction for use in rehabilitation. Arrangements must be made to store and/or relocate the relevant species into suitable onsite or offsite habitats or in a temporary nursery/storage area. This process should be led by the appointed ECO.
- Thereafter, topsoil and vegetation from areas to be excavated should be stripped and stored at the designated soil stockpile area outside of the wetland for use later in rehabilitation. Topsoil and subsoil to be stored separately.
- In cases where natural vegetation will be cleared as a result of the movement of people or stockpiling of building materials, revegetation should take place. Preceding revegetation efforts occurring in cleared and degraded areas, it is essential that all solid wastes are removed from these areas as well as their immediate surroundings. Following the removal of solid waste, a mixture of indigenous species should be introduced. The reestablishment of vegetation will enhance these systems' capability to maintain biodiversity, it will aid in reducing the velocity and quantity of runoff waters into wetlands, the retardation of water movement through a wetland which will in turn assist with trapping sediment and improving the overall quality of water. Where possible, vegetation should be cut to ground level rather than removing completely so as to assist with binding/stabilising the soil during land-clearing operations.
- No clearing of indigenous vegetation outside of the defined working servitudes is permitted for any reason (i.e., for firewood or medicinal use). No persons may remove, damage, deface, paint or disturb any flora (plants) outside of the demarcated construction areas, unless specifically authorised by the ECO in consultation with the resident engineer. Any indigenous vegetation suitable for rehabilitation should be

stored appropriately for later use. Indigenous wetland vegetation removed from the construction footprint and suitable for rehabilitation activities must be carefully removed and stored in an appropriate facility for rehabilitation purposes.

- As a consequence of the proposed development, the wetland system will possibly encounter anthropogenic disturbances. Therefore, in order to manage and mitigate these threats faced by the wetland a suitable buffer should be determined. Therefore, during periods of construction there should be minimal human disturbances by minimising activities that would lead to excessive pollution and run off into the wetland such as no driving of vehicles on areas other than pre-existing roads, no movement of people on the site unless on designated footpaths, lavatory facilities should be set up and made use of outside of the wetland and its buffer, and rubbish disposal facilities should be made readily available outside of the wetland and its buffer for disposal of rubbish and should be emptied at regular intervals to prevent overflowing of trash. During the construction phase the recommended wetland buffer is 14m.
- During the construction phase all measures should be taken in order to prevent contamination of wetland areas by vehicles. Before commencement of the construction phase contractors must submit method statements detailing protocols to control potential pollution such as:
  - Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas;
  - These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall;
  - Storage of materials as described above may not be within the 1:100 floodline, watercourses or associated buffer areas;
  - In the case of pollution of any surface or groundwater, the Regional Representative of the DWS must be informed immediately and corrective action taken;
  - All equipment should be parked overnight and/or fuelled at least 500m from the watercourse;
  - Drip trays (minimum of 10cm deep) must be placed under all vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised; and
  - Drip trays must be utilised during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total amount/ volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle.
- If any spills of diesel, petrol, oil, or corrosive fluid occur a spill kit should be kept on site to immediately address this. All vehicles and machinery should therefore be kept off site in a bunded, platformed location in order to avoid such contamination in the watercourses.
- All vehicles should only be allowed to stand overnight and refuelled only on impervious surfaces. Additionally, materials not to be stockpiled within the buffer area; all materials should strictly be kept 30m away from the watercourses on site.
- An appropriate Contingency-Spill Response Plan is to be compiled and stored on site, for implementation where necessary. Contractors are to be trained in spill response and familiar with spill plan. Contact details for a reputable company to handle large spill events (e.g., SpillTech) must be included in the spill plan and must be available on hand at the site during construction and business operation.
- No equipment laydown or storage areas must be located within 14m of any watercourse and/or within the 1:100 year floodline.
- Sedimentation and erosion control measures must be implemented to prevent slope destabilisation and increased sediment loads entering freshwater systems. Increased sediment loads can be identified by a change in the clarity of the water, or if vegetation is covered by layers of silt or other deposits. If the water appears more 'murky' or brown in colour than previously experienced, this could be as a result of an increase in sediment load within the watercourse. This can be double checked by the use of a turbidity meter.
- Exposed slopes are highly prone to erosion, so drainage control features such as earth dikes, perimeter dikes/ swales, and diversions can be used to intercept and convey runoff from above disturbed areas to suitable dispersal areas or drainage systems. This helps to reduce the sedimentation from exposed areas. Sediment traps should be utilised to detain sediments in stormwater runoff to protect receiving water bodies,

and the surrounding area. Silt fences can be used by entrenching them into the ground and stretched between anchoring posts spaced at regular intervals along the lower side of a site. Sediment is filtered out as runoff flows through the fabric. Such fences should be used only where there is sheet. Gullies and other areas of active erosion should be stabilised (using catch water drains, raising headwalls or providing protective measures including grassing, stone pitching, concrete paving or gabions/ mattresses) and rehabilitated to minimise sediment entering the aquatic resource from these sources.

- Soil required for construction purposes must not be derived from the wetlands. Only approved borrow areas are to be used under the supervision of the ECO. Soil stockpiles must be established on flat ground at least 20m away from delineated watercourses. Erosion/ sediment control measures such as silt fences, low soil berms or wooden shutter boards must be placed around the stockpiles to limit sediment runoff from stockpiles. Subsoil and topsoil are to be stockpiled separately. Stockpiled soil must be replaced in the reverse order as to which it was removed (subsoil first followed by topsoil). Stockpiles of construction materials must be clearly separated from soil stockpiles in order to limit any contamination of soils. The stockpiles may only be placed within demarcated stockpile areas, which must fall within the demarcated construction area. The contractor shall, where possible, avoid stockpiling materials in vegetated areas that will not be cleared. Stockpiles shall be located outside of freshwater habitat. Stockpiled soils are to be kept free of weeds and are not to be compacted. The stockpiled soil must be kept moist using some form of spray irrigation on a regular basis as appropriate and according to weather conditions. If soil stockpiles are to be kept for more than three months, they must be hydro-seeded. The slope and height of stockpiles must be limited to 1.5 - 2m and are not to be sloped more than 1:2 to avoid collapse.
- To diminish the requirement to alter the flow of water away from the construction area when crossing watercourses, all construction activities within wet areas should preferably occur in the dry season/ winter (May to September). Construction within/ across watercourses should advance as quickly as practically possible in order to lessen the risk of surpassing the temporary diversion capacity. Diversions must be temporary in nature and no permanent walls, berms or dams should be installed within the watercourse. Following completion of the construction at the site, the diversions should be removed to restore natural flow patterns. Under no circumstances should the creation of a new channel be considered to divert flows away from the current channel position. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns.
- Options for temporary flow diversion when working within channels may include:
  - diversion of the entire watercourse through use of a bypass large diameter pipe; or the installation of removable coffer dams; and
  - use of removable sandbags.
- The topsoil layer must be stripped from the construction footprint and stockpiled separately from overburden (subsoil and rocky material). The thickness of the topsoil for harvesting must be obtaining from the Geotechnical Report and if not defined in the report, the top 30cm must be harvested. Stockpiled soil is to be kept free of weeds and not to be compacted. The slope and height of stockpiles must be limited to 1.5 to 2m to avoid soil compaction and destruction of soil microbes.
- Effective implementation of a Draft EMPr that outlines stringent measures to minimise erosion and manage runoff from disturbed areas.
- Management of wetland margins and buffer areas as “no-go” areas for all construction personnel and vehicles, unless engaged in specific activities related to the establishment or construction of these areas.
- Allowance for the rehabilitation of any conservation areas disturbed as a result of construction-associated activities.
- Allowance for short-term irrigation (but not from local groundwater) of landscaped channels, if necessary, until the development is complete and channelled flow is established. Note that irrigation should not be carried out using nutrient-enriched water (e.g., treated sewage effluent).
- Implementation of a strict waste management programme on the site, to prevent or address impacts associated with construction waste (e.g., litter, rubble etc.).

- Plant material must be free of fuel leaks and must be parked in a solid surface area with containment of any leaks that might occur.
- Dirty and clean stormwater must be separated on site, the dirty stormwater must be treated accordingly or be taken to a facility that deals with water of this quality.
- Soil berms must be constructed to route surface water flow/ runoff from the proposed feedlot to a pond that is lined with an impervious lining to inhibit the contamination of groundwater.
- The feedlot pad must be provided with an interface layer to prevent groundwater contamination during the operation phase.
- The proposed feedlot and pond site should be moved to the south, not to overlay the dolerite dyke and thin dolerite sheet, as both have a high probability of acting as conduits for possible pollution to downstream springs and the existing borehole.
- Dedicated monitoring boreholes must be developed both upgradient and downgradient of the facility which monitors the shallow perched, as well as deeper fractured aquifer.
- Consider fencing off springs to protect them from animal activity.
- Plant material must be free of fuel leaks and must be parked in a solid surface area with containment of any leaks that might occur.
- Dedicated monitoring boreholes must be developed both upgradient and downgradient of the facility which monitors the shallow perched, as well as deeper fractured aquifer.
- The Colonial Period kraal mound remains found on site are of no scientific or heritage conservation significance and it is recommended that these remains be destroyed without having to apply for site destruction permit to the ECPHRA
- The presence of the khowa is of High Local Significance and it is recommended that as much of the wooded habitat, but no less than a third (≥6ha) of the northern portion of the alternative site, be conserved thereby ensuring in part and on site, and in perpetuation of future generations the conservation of the mushroom habitat within the development framework.
- Additionally, a Heritage Management Plant must be developed by the applicant to guide the management of the conserved living heritage within the alternative site.
- Construction workers must be inducted on the possibility of encountering archaeological and/or palaeontological resources that may be accidentally exposed during subsurface clearance before the commencement of work on the site to ensure appropriate mitigation measures and that course of action is afforded to any chance finds.
- The footprint impact of the proposed development should be kept to a minimal to limit the possibility of encountering chance finds.
- Should chance archaeological and/or palaeontological materials or human remains be exposed during subsurface construction work on any section of the proposed development laydown sites, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimise disruption in construction scheduling while recovering archaeological, palaeontological and any affected cultural heritage data as stipulated by the NHRA Regulations.
- Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.
- Measures for the optimisation of the amount of travel on the local road, thereby reducing impact, must be compiled and implemented.
- Provision for the timeous notification of the affected community of any road closures required during the construction phase (whether temporary or permanent).
- A requirement to identify alternate routes, to allow road users to avoid construction works.

- Minimum standards/ requirements for the clear signposting of road closures (permanent and temporary), as well as alternate routes.
- Any damage caused to existing road surfaces by construction vehicles or plant must be repaired at the applicant's cost.
- All construction processes must comply with the following standard best-practice:
  - All construction equipment utilised, and activities undertaken must be compliant with the Noise Control Regulations as detailed in the Legal Requirements above.
  - Restrict construction activities generating noise outputs of 85 dB or more to the hours of 08h00 to 17h00 Mondays to Fridays. Should the Contractor need to do this work outside of these hours, the approval of the ECO must be obtained, and surrounding communities must be informed prior to the work taking place.
  - No amplified music shall be allowed on site. The use of audio equipment shall not be permitted unless the volume is kept sufficiently low so as to be unobtrusive. The Contractor shall not use sound amplification equipment on site, unless in emergency situations.
  - If excessive noise is expected on the boundary of the site, neighbouring occupied properties must be informed in writing and in advance of when the high noise levels will occur and for how long they will occur.
  - The Contractor must post signage indicating contact details of the Contractor and/or ECO on the site to allow for reporting of complaints.
- Dust minimisation and control measures must be implemented on the construction site at regular intervals. This could include irrigation (utilising a legal, non-potable water source) by water tankers.
- The frequency of implementation of dust suppression measures should be increased when it is expected that high wind conditions will develop.
- Areas in which construction has been completed must be rehabilitated and revegetated as soon as possible, and not await till the completion of all construction activities, to minimise the time that bare soil is exposed.
- A Complaints Register must be made available on the site for the duration of construction. Any dust-related complaints must be efficiently and effectively dealt with.
- Vegetation clearing for each aspect of development should only take place immediately prior to the commencement of construction activities for the relevant aspect, in order to minimise the amount of exposed soil on the site.
- Stockpile height must be managed, and if stockpiles are to be retained on site for extended periods, these must be appropriately covered or vegetated so as to minimise wind erosion and dust generation.
- Housekeeping on the construction site must be prioritised, to ensure that the area looks neat and tidy at all times.
- The recommended dust suppression measures as detailed above and in the Draft EMPr must be implemented.
- The construction period must be kept to a minimum period as practically possible.
- The Contractor must put into practice ways in which to implement the waste hierarchy on site by identifying ways on site to:
  - Avoid and reduce waste generation;
  - Re-use waste materials generated;
  - Recover waste that can be recovered;
  - Recycle waste that cannot be reused; and
  - As a last resort, treat and dispose of wastes.
- This must be done by way of the preparation of a Waste Management Method Statement.
- In order to reduce pressure on general waste landfill sites, it is recommended that, as far as possible, general solid wastes is separated and sorted into its recyclable components (glass, plastic, metal, paper). This will require the provision of separate waste bins within the site camp, and the removal of these wastes to appropriate recycling facilities.

- The requirement to separate and sort general wastes should be included as part of the environmental induction and awareness programme.
- All general waste bins on the site must be weather- and scavenger-proof.
- Litter must be cleared from the site daily.
- Hazardous wastes must be stored on an impermeable surface, in a bunded area. Such storage area must be clearly demarcated.
- Should pest populations establish, steps must be taken to control these.
- Wastes must be collected/ removed from site regularly to ensure that no overflow occurs. It is recommended that chemical ablution facilities be serviced once a week, by an authorised service provider.
- Safe disposal slips must be maintained for all waste types generated on site and disposed of offsite.
- As far as possible, labour for the construction phase must be sourced from the local community.
- Contractors should be required to seek out and implement opportunities for skills development and transfer, as well as capacity building with local labour and EME contractors.

Operational Phase:

- A SMP must be compiled for the operational phase and stormwater infrastructure designed in such a way that it does not impact on or erode the surrounding natural areas, especially the wetlands.
- During the operational phase, the washing of cars within the surrounding natural areas, especially wetlands must be prohibited.
- Formal solid waste management systems must be implemented, and formal waste removal services provided. Recycling of solid waste should be encouraged.
- Dumping of solid waste and litter in natural areas by residents must be prohibited. Residents should be discouraged from doing so through education initiatives and the provision of ample waste disposal facilities.
- Surrounding natural vegetation must not be disturbed to minimise chances of invasion by IAP. Emergence of IAP species should be monitored on a bi-annual basis by a suitably qualified botanist.
- The IAP species Management and Monitoring Plan must also ensure that the re-emergence of IAP species is monitored continuously during the operational phase. This plan must include the immediate surroundings where natural vegetation prevails.
- During the operational phase, the site must be searched for IAP on a regular basis and all IAP seedlings and saplings removed as they become evident.
- Formalised waste disposal systems and services must be provided to avoid dumping of refuse into natural areas.
- Upward lighting should be avoided to minimise light pollution. Light can be restricted by fitting shields that direct the light below the horizontal plane, at preferably an angle less than 70 degrees. Limiting the height of lighting columns and directing light at a low level reduces the ecological impact of the light.
- Insects are attracted to brighter light that is emitted over a broad band of long wavelengths such as high-pressure sodium or mercury lamps. Such lighting must be avoided, and rather light that is emitted at one wavelength, contains no UV light and has a low attraction to insects, such as low-pressure sodium lamps, should be used.
- The IAP Monitoring Programme must ensure that the re-emergence of IAP species is monitored and controlled at regular intervals during the operational phase within the development footprint and in the surrounding natural areas.
- Foot traffic by people and domestic animals in the surrounding natural areas must be kept to a minimum. Livestock grazing in the natural areas must be kept at a minimum and at sustainable levels.
- The feedlot employees should be educated in the importance of looking after the natural environment and the sustainable utilisation of natural resources. This can be achieved through educational posters, for example.
- Harvesting of fuel wood from indigenous species within the natural areas should be discouraged, and rather the wood of IAP species such as wattle be utilised.

- No further disturbances should be experienced by the wetland systems on site. The recommended wetland buffer during the operational phase is 14m. Ideally the wetlands should also be restricted from overgrazing by cattle.
- Exposed slopes are highly prone to erosion, so drainage control features such as earth dikes, perimeter dikes/ swales, and diversions can be used to intercept and convey runoff from above disturbed areas to suitable dispersal areas or drainage systems. This helps to reduce the sedimentation from exposed areas. Sediment traps should be utilised to detain sediments in stormwater runoff to protect receiving water bodies, and the surrounding area. Silt fences can be used by entrenching them into the ground and stretched between anchoring posts spaced at regular intervals along the lower side of a site. Sediment is filtered out as runoff flows through the fabric. Such fences should be used only where there is sheet. Gullies and other areas of active erosion should be stabilised (using catch water drains, raising headwalls or providing protective measures including grassing, stone pitching, concrete paving or gabions/ mattresses) and rehabilitated to minimise sediment entering the aquatic resource from these sources.
- The focus of the rehabilitation of wetlands is to ensure the reestablishment of what was the natural hydraulic regime as much as possible. Where the watercourse's hydraulic regime is improved, the vegetation will improve as well for the wetland habitat which can lead to the reintroduction of riparian specific species. It is, however, not possible to completely re-establish the natural hydrological regime at the catchment level as this is what is needed to improve the current state of the wetlands. The main function of rehabilitation efforts must aim to restore the natural function and improve the aesthetic nature of the wetlands.
- The careful control of the dispersion of IAP within a wetland is imperative due to their degradation causing properties. The key to controlling the dispersion of IAP is through early detection and removal. The removal and management of IAP is essential in maintaining the ecological integrity of a wetland as well as its ability to maintain biodiversity. An IAP Control Plan should be compiled and implemented. This includes details of removal as well as monitoring to ensure the IAP are kept in control throughout the life of the activity.
- IAP and weed control must take place within remaining wetland habitats and 20m buffer areas on site post onsite rehabilitation in accordance with an IAP Control and Management Programme aligned with the NEMBA Invasive Species Regulations. Initial control and follow-up maintenance to take place. Integrated control (combination of mechanical and chemical control) to be implemented, with specific controls to be tailored to the species of IAPs to be managed. Herbicide use to be controlled and herbicides or pesticides use to be restricted within delineated wetlands unless herbicides are non-toxic to watercourses and authorised for use in wetlands.
- Stormwater management reduces the negative effects (erosion, increase sedimentation, etc.) of stormwater runoff. Management of stormwater comprises of controlling flooding, reducing erosion and improving water quality. This can be achieved by implementing measures known as BMPs. Such BMPs include the installation of a porous pavement, i.e. around the administration office, which are interlocking tiles or bricks that allows stormwater runoff to infiltrate the pavement and thereafter enters the soil which removes fine grain pollutants and provides erosion control. In addition there are vegetative BMPs which include a number of landscaping practices. Grassed swales, or ditches, can be placed in areas requiring rehabilitation. This BMP helps lessen the peak runoff downstream through processes of infiltration and storage. Filter strips are designed to direct stormwater from impervious areas into a stone trench, which evenly distributes the runoff over a grass strip.
- Retention, detention, attenuation, sustainable and controlled release of stormwater runoff into watercourses is to be practiced in order to prevent erosion and/or sedimentation of wetlands. SuDS principles are to be implemented whereby the number of outlets to watercourses to reduce concentrated flows at high volumes and velocities are to be maximised, separate 'clean' and 'dirty' stormwater management systems are to be developed in accordance with DWS requirements and erosion control measures are to be determined by the engineers.
- Allowance for short-term irrigation (but not from local groundwater) of landscaped channels, if necessary, until the development is complete and channelled flow is established. Note that irrigation should not be carried out using nutrient-enriched water (e.g., treated sewage effluent).

- Nutrients, i.e., NO_3, PO_4, magnesium and calcium are produced through the cattle manure, these must be monitored in both the soils and surface water as they may result in pollution when in excess. Eutrophication in surface water bodies may be a sign of contamination.
- Heavy metals at feedlots include zinc, selenium, copper, cadmium, arsenic, iron and aluminium, these may contribute to soil and consequentially water contamination.
- A dry stockpile will not produce leachate, a thick black smelly tar-like substance, which contains toxic substances should not emerge at any point from the heap. Under no circumstances should the manure heap release runoff to the vegetated and/or rehabilitated areas, a connection embayment between the heap area the stormwater embayment directing contaminated runoff to the lagoon must be utilised.
- The lagoon must be emptied regularly to prevent overspilling. Any incident of this nature must be reported, immediately, to the Department and regional DWS.
- Sludge accumulated at the bottom of the lagoon must be properly cleaned, scraped, and cleared.
- The lagoon must be routinely monitored for any leaching.
- Only approved pesticide products must be used to control intrusive pests (flies) and should be applied strictly as prescribed as these will bind to the manure and may form part of runoff. The use of protective clothing during application is mandatory. Secure storage of pesticides on site must also be provided.
- The French-drain must be monitored for any contaminants.
- Water quality monitoring must be conducted on the surface and groundwater bodies situated at a lower hydrological gradient than the feedlot and septic tank.
- Dirty and clean stormwater must be separated on site, the dirty stormwater must be directed to the lagoon.
- It is recommended to sample the existing borehole before the proposed feedlot is operational and once operational the borehole is to be sampled on a 6 monthly basis and the water samples sent to a reputable laboratory for analyses to determine if there is any contamination occurring.
- The monitoring hole's water level should be measured and recorded monthly:
  - The levels measured are to be kept on record (database and backup) together with the date; and
  - The time-series groundwater levels are to be compared to precipitation (geohydrological) and water quality analysis regularly.
- Complete organic and inorganic as well as micro-biological analysis after development of monitoring boreholes. Baseline Indicator analyses to include pH, EC, PO_4, NH_4, NO_3, COD. If pollution or increasing trend is noted, do comprehensive analyses. Complete organic and inorganic as well as micro-biological analysis. This must take place once-off, on a monthly basis and finally bi-annually.
- A strict schedule must be followed within the feedlot. Cattle must be provided with the feed at the same time daily.
- No amplified music shall be allowed on site. The use of audio equipment shall not be permitted unless the volume is kept sufficiently low so as to be unobtrusive.
- If excessive noise is expected on the boundary of the site, neighbouring occupied properties must be informed in writing and in advance of when the high noise levels will occur and for how long they will last.
- Dust minimisation and control measures must be implemented on site at regular intervals. This could include irrigation (utilising a legal, non-potable water source) by water tankers.
- The frequency of implementation of dust suppression measures should be increased when it is expected that high wind conditions will develop.
- The cattle urine keeps the pad moist, during dry periods regular sprinkling with water may be necessary. Sprinkling is also done to reduce the dust.
- A dry stockpile will not produce leachate, a thick black smelly tar-like substance, which contains toxic substances should not emerge at any point from the heap.
- Temporary storage of manure in heaps must be kept to minimal.
- The application of chlorine in the lagoon may aid in containing air pollution within the lagoon, however, cattle feedlots use the additive *Rumensin* in their feed as it reduces some CH_4 gas emissions.

- The property manager must put into practice ways in which to implement the waste hierarchy on site by identifying ways on site to:
  - Avoid and reduce waste generation;
  - Re-use waste materials;
  - Recycle waste;
  - Recover waste; and
  - As a last resort, treat and dispose of wastes.
- All general waste bins on the site must be weather- and scavenger-proof.
- In order to reduce pressure on general waste landfill sites, it is recommended that, as far as possible, general solid wastes be separated and sorted into its recyclable components (glass, plastic, metal, paper). This will require the provision of separate waste bins within the site, and the removal of these wastes to appropriate recycling facilities.
- The requirement to separate and sort general wastes should be included as part of the environmental induction and awareness programme.
- Litter must be cleared from the site daily.
- Should pest populations establish, steps will need to be taken to control these.
- Hazardous wastes must be stored on an impermeable surface, in a bunded area. Such storage area must be clearly demarcated
- Wastes must be collected/ removed from site regularly to ensure that no overflow occurs. It is recommended that chemical ablution facilities be serviced once a week by an authorised service provider.
- Safe disposal slips must be maintained for all waste types generated on site and disposed of offsite.
- Plastic and glass bottles (used to contain cattle medicine) must be placed in separate containers that are sealed until they transported to the local veterinary clinic. Under no circumstances should this waste be disposed of with the general waste.
- Carcass must be managed sufficiently: if to be buried on site, a hole must be dug (above the water table) and must be fenced off; or if to be disposed of in a different facility, waybill or deposit slips must be retained on site.
- As far as possible, labour for the operational phase must be sourced from the local community.
- Maintenance contractors should be required to seek out and implement opportunities for skills development and transfer, as well as capacity building with local labour and EME contractors.
- An experienced person in managing cattle feedlots and handling cattle medicine must form part of the employee's team.

SECTION F: APPENDICES

The following appendixes must be attached as appropriate:

Appendix A: Site Plan

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix D1: Terrestrial Biodiversity (including Animal and Plant) SSV and Compliance Statement

Appendix D2: Wetland Delineation, Functional, Impact and Risk Impact Assessment report

Appendix D3: Archaeological and Cultural Heritage Assessment report

Appendix D4: Paleontological SSV and Assessment report

Appendix D5: Agricultural SSV and Assessment report

Appendix D6: Geohydrological Assessment report

Appendix E: CRR

Appendix F: EMPr

Appendix G: Other information

Appendix G1: Locality Map

Appendix G2: Proof of submission of Water Use Authorisation

Appendix G3: Landowner and Operator Consent Letter

Appendix G4: Site Sensitivity Verification

Appendix G5: Sensitivity Maps

Appendix G6: EAP Details, CV and EAPASA Certificate

Appendix A: Site Plan

Appendix B: Photographs

Appendix C: Facility illustration(s)

Refer to Appendix A, above

Appendix D: Specialist reports

Appendix D1: Compliance Statement on Terrestrial Biodiversity (including Animal and Plant Species) report

Appendix D2: Wetland Delineation, Functional, Impact and Risk Assessment report

Appendix D3: Archaeological and Cultural Heritage Impact Assessment report

Appendix D4: Palaeontology Impact Assessment report

Appendix D5: Agriculture (brief) Impact Assessment report

Appendix D6: Geohydrology Impact Assessment report

Appendix E: Comments and Responses Report

Appendix F: Environmental Management Programme

Appendix G: Other information

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