Ms Victoria Napier
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23 September 2024

TERRESTRIAL BIODIVERSITY COMPLIANCE STATEMENT – TERMS OF REFERENCE

ENVIRONMENTAL AUTHORISATION FOR THE CONSTRUCTION AND OPERATION OF ATTENUATION DAMS AND POLLUTION CONTROL DAMS AS ASSOCIATED INFRASTRUCTURE FOR THE APPROVED 60-YEAR ASH DISPOSAL FACILITY (ADF) AND ASSOCIATED INFRASTRUCTURE FOR THE KUSILE POWER STATION NEAR EMALAHLENI IN THE VICTOR KHANYE LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

1. Background to the Project

The Kusile Power Station (hereinafter referred to as "Kusile"), situated approximately 34km west of eMalahleni in South Africa's Mpumalanga Province, is one of the largest coal-fired power stations operated by Eskom Holdings SOC Limited (hereinafter referred to as "Eskom"). As a coal-fired power station, Kusile generates substantial volumes of ash as a byproduct of burning coal. The existing ash/gypsum co-disposal facility was designed to handle this waste; however, studies have shown that it will not suffice for the full operational lifespan of the power station. Thus, in 2014 Eskom initiated various authorisation applications for a new 60-year Ash Disposal Facility (ADF) to manage the expected volume of ash over the design life of the power station. The following environmental authorisations are applicable to the approved 60-year ADF and associated infrastructure project at Kusile:

- Integrated Environmental Authorisation (IEA) issued on 17 July 2015 by the (then) Department of Environmental Affairs (DEA) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended [NEMA] and the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), as amended [NEMWA].
- Water Use License (WUL) issued on 23 September 2021 by the Department of Water and Sanitation (DWS) in terms of the National Water Act, 1998 (Act No. 36 of 1998) [NWA].
- Detailed designs for Phase 1 of the ADF compiled by the Zitholele Joint Venture (JV) project team were submitted in 2018, and subsequently approved by the Department of Forestry, Fisheries and the Environment (DFFE) on 09 June 2021 as an approved concept. This approval included comments from National DWS dated 20 April 2021.

In February 2022, EPCM Bonisana (hereinafter referred to as "EPCM") was appointed by Eskom to undertake a review of the 2018 basic and detailed engineering design for Phase 1 of the ADF compiled by the Zitholele Joint Venture (JV) project team. Due to the reassessment of the original modelling assumptions and input values, the ADF footprint was significantly reduced which allowed for the entire ADF footprint to be shifted approximately 500m southwards, thus avoiding the diversion of the Klipfonteinspruit (approved within the current IEA and WUL). Further design optimisation to improve temporary diversion of upslope runoff of the Holfonteinspruit and its associated tributary during the construction of the ADF allowed for the reduction in the number of attenuation dams from 15 to only 5 larger attenuation dams.

It is important to note that the ADF and associated infrastructure project *has already been authorised in terms of NEMA*, NEMWA and the NWA; however, the larger attenuation dams, as well as a few of the Pollution Control Dams (PCDs), require EA by way of a Scoping and Environmental Impact Reporting (S&EIR) application as they trigger an ***additional*** Listed Activity in terms of Listing Notice 2 of the 2014 Environmental Impact Assessment (EIA) Regulations, as amended.

Thus, the focus of this EA application is limited to the dams only and not the greater ADF and its associated infrastructure, which is already authorised.

I, Ms Victoria Napier, am appointed by EPCM as the independent Environmental Assessment Practitioner (EAP), to undertake the required application for EA for the construction and operation of Attenuation Dams and PCDs as associated infrastructure for the approved 60-year Ash Disposal Facility and Associated Infrastructure for the Kusile Power Station near Emalahleni in the Victor Khanye Local Municipality, Mpumalanga Province; and, to conduct the requisite Environmental Impact Assessment (EIA) required for that decision-making.

2. Project Locality

The study area within which the ADF and its associated infrastructure are to be located is depicted in Figure 1. Kusile is located within the Victor Khanye Local Municipality (VKLM) and Nkangala District Municipality (NDM) on Farm Klipfontein 566 JR Portions 3, 7, 9, 10, 11, 19, 21, 25, 26, 30, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53 and 54. The ADF site is south of the Kusile Power station on open land that was under crop farming and animal grazing until relatively recently. The location co-ordinates of the centre of the ADF are 25° 57' 37.65"S and 28° 54′ 32.46"E. The ADF covers approximately 740 hectares.

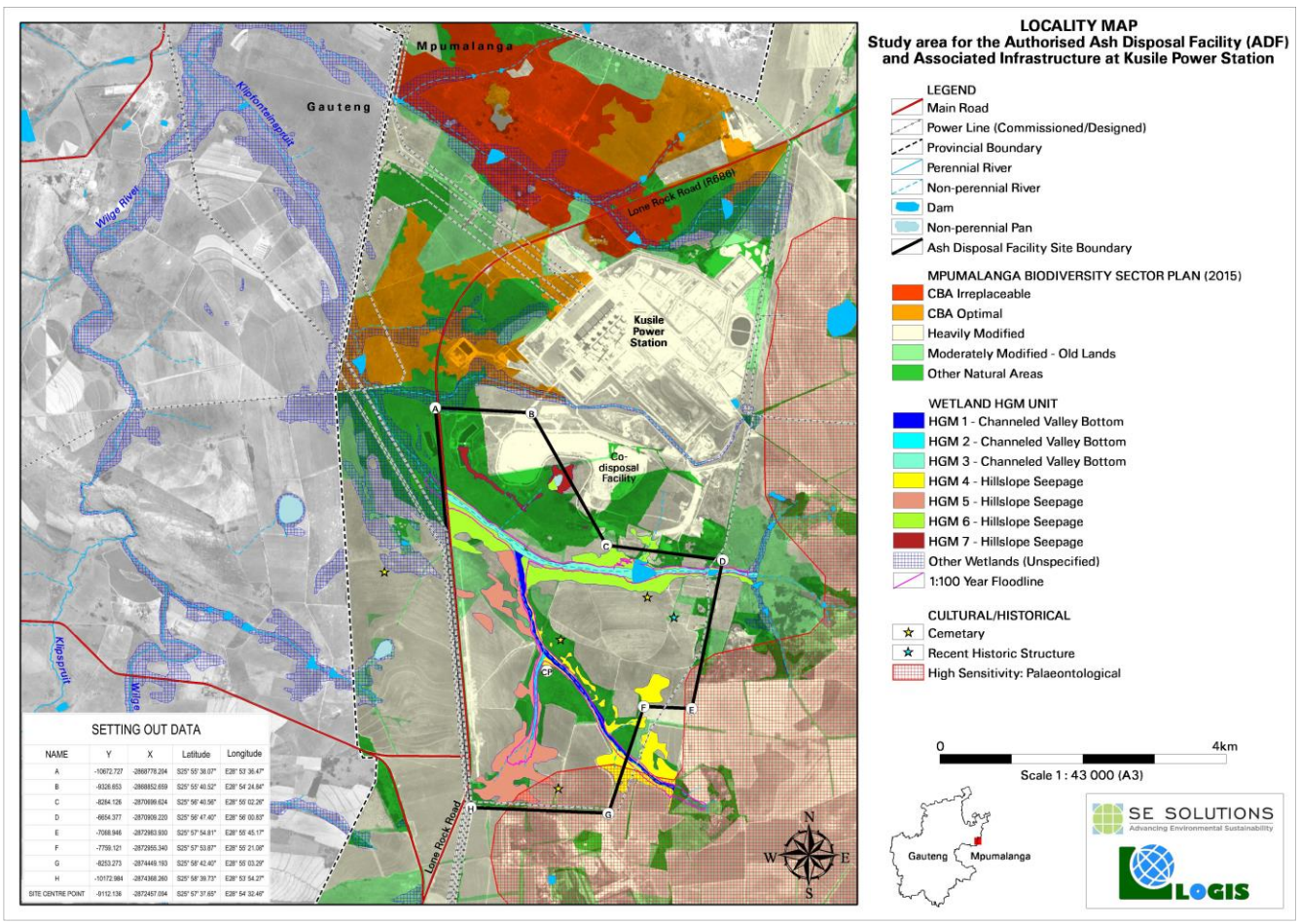

Figure 1: Locality Map for the study area within which the ADF and associated infrastructure will be located.

3. Applicable Existing Assessments

Based on the 2014 Mpumalanga Biodiversity Sector Plan's (MBSP) Terrestrial Critical Biodiversity Areas (CBAs) data, the majority of the study area is regarded as heavily modified (i.e. cultivated lands based on the landcover layer), moderately modified – old lands with some other natural areas associated with the wetland/ non-perennial streams on site (Figure 2). The MBSP provides the following category descriptions:

- Modified: Areas that have undergone a significant and often irreparable degree of transformation that has led to a near-complete loss of biodiversity and ecological functioning. Common agents of modification include mining, arable agriculture and infrastructure development.
- Modified - Old Lands: Areas that have been altered by cultivation and other activities within the last 80 years and subsequently abandoned. The biodiversity and ecological functioning in such areas is compromised but may still play a role in the provision of ecosystem services.
- Other Natural Areas: Areas that have not been selected to meet biodiversity conservation targets, yet they are likely to provide habitat for flora and fauna species and a range of ecosystem services.

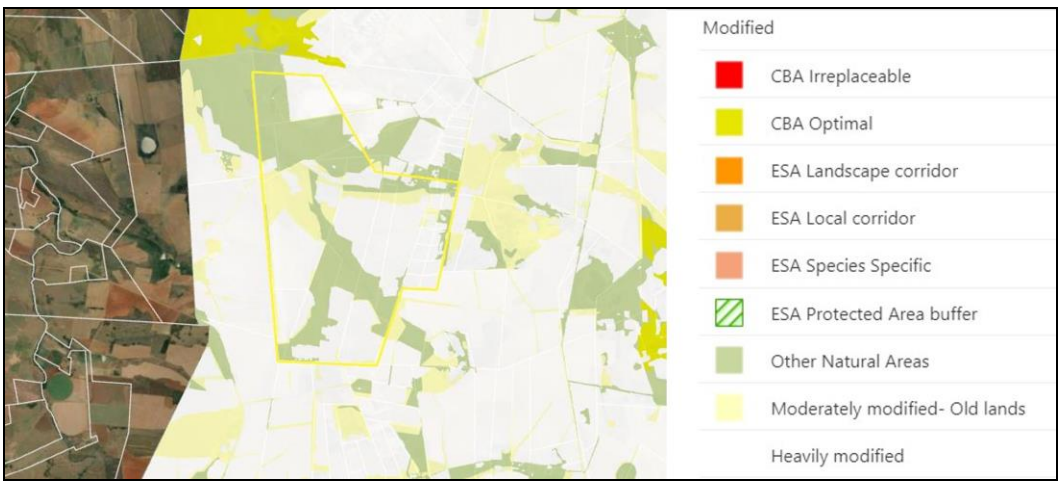

Figure 2: 2014 Mpumalanga Biodiversity Sector Plan Terrestrial Critical Biodiversity Areas (CBAs) layer (SANBI BGIS accessed September 2024).

The following specialist investigations have been undertaken and are applicable in terms of providing the relevant site-specific context and background to the receiving environment of the study area:

- Golder Associates, 2014: Terrestrial Ecosystems Assessment of proposed ash dump sites at Kusile Power Station (note that Site Alternative A corresponds to the authorised ADF study area).
    - No endemic, Red Data or protected species were recorded in the cultivated lands and the probability of such species occurring in this vegetation community is considered low.
    - Although many areas comprising Dry mixed Grassland are negatively impacted by overgrazing, within the context of the broader landscape matrix, this vegetation community provides valuable and important natural grassland habitat. The ecological integrity of this vegetation community ranges from medium in disturbed areas (dominated by Hyparrhenia hirta) to high in less disturbed areas. Two protected flora species (Boophane disticha and Hypoxis species) were recorded in the Dry mixed grassland and the suitability of this vegetation community as habitat for other Red Data and/or protected species is considered high. Accordingly, the conservation importance of areas of this vegetation community is also high.
    - Areas characterised by the moist grass and sedge vegetation community play a critical ecological role in the purification and supply of water and are thus highly valuable hydrological features. Moreover, they also provide important breeding, feeding and dispersal habitat for a variety of fauna, some of which may be Red Data and protected fauna, as well as a threatened flora species such as inter alia Eucomis

autumnalis and members of the genus Gladiolus, all potentially occur in this vegetation community. The ecological integrity of this vegetation community is therefore considered high and accordingly, the conservation importance of these areas is considered high.

- Twenty-five Red Data and/or protected plant species have historically been recorded in the general vicinity in which the study area is located according to the SANBI SIBIS database and data received from the Mpumalanga Tourism and Parks Agency. These are primarily from the families MESEMBRYANTHEMACEAE (5 species), IRIDACEAE (4 species), ORCHIDACEAE (4 species). All have a high probability of occurring in the study area. Plant species of conservation importance recorded in the study area include Boophane disticha, Crinum bulbispermum, Hypoxis sp. and Gladiolus sp.
- Red Data and protected mammals:
  - Two Red Data/protected mammal species, namely the Aardvark and Cape clawless otter have been recorded in the study area. The Aardvark and Cape clawless Otter are Protected in terms of Schedule 2 of the Mpumalanga Nature Conservation Act, 1997 (Act No. 10 of 1997) [MNCA].
  - Twenty-one Red Data and/or protected mammal species potentially occur in the study area.
- Birds:
  - All of the birds identified are common and widespread species, typically associated with grassland and wetland habitats on the Highveld.
  - An additional 15 Red data/protected species may occur in the study area.
- Herpetofauna
  - All recorded reptile and amphibian species are common and not restricted in terms range or habitat.
  - According to Schedule 2 of the MNCA, all species of reptile excluding both monitor species and all snakes, are listed as Protected. This notwithstanding, the Spotted Harlequin snake (Homoroselaps lacteus) which may potentially occur in the study area, has been categorized by provincial authorities as Near-threatened, while two other species which may also occur in the study area, the Breyer's long-tailed seps (Tetradactylus breyeri) and the Striped Harlequin snake (Homoroselaps dorsalis), are listed by the IUCN as Vulnerable and Near Threatened, respectively. The probability that these species occur in the study area is considered moderate.
  - In terms of amphibians, the Giant bullfrog (Pyxicephalus adspersus) is the only listed amphibian that may potentially occur in the study area. According to Schedule 2 of the Mpumalanga Nature Conservation Act (No 10 of 1997) this species is Protected, while the NEMBA TOPS List (2007) and IUCN categorise it as Near Threatened. The probability of Giant bullfrog (Pyxicephalus adspersus) occurring in the Moist grass and sedge vegetation community in the study area is considered high.
- Arthropoda
  - All taxa recorded were common and widespread species.
  - The Marsh sylph (Metisella meninx) has a high probability of occurring in the study area. This species is listed as Vulnerable according to Henning et al. (2009) and favours wetland and marsh habitats on the Highveld. Within the study area this species potentially occurs in undisturbed sites comprising the Moist grass and sedge vegetation community.
  - Other arthropods of conservation importance that potentially occur in the study area include members of the CTENIZIDAE (trapdoor spiders) and THERAPHOSIDAE families (Baboon spiders). These spiders usually live in burrows or silk-lined retreats, none of which were observed in the study area. That said, on-site habitat is suitable for these species and the probability that they are present is considered moderate.

        - Scorpions of conservation importance: Opistacanthus Validus and Opistophthalmus glabrifrons were not recorded in the study area, the probability that they are present is also considered high, particularly in areas of Rocky scarp.
- Kimopax, 2023: Ecological Survey, Search and Rescue of Plant Species and Avifauna Assessment for the construction of the 60-year Ash Disposal Facility at Kusile Power Station, Ogies, Mpumalanga.
    - The vegetation within the area had been largely disturbed by previous land uses for agricultural practices, thus the areas of grassland within the project area have been altered from the natural state and are dominated by Themeda triandra, Eragrostis curvula and Sporobolus africanus.
    - Species of Helichrysum and Hypoxis hemerocallidea were identified throughout the project area.
    - Species of Cyperus esculentus and Juncus effusus were identified within the moist areas associated with the non-perennial streams and wetlands.
    - The overall plant diversity within the project area was considered low.
    - No Red Data plant species were recorded within the project area.
    - Hypoxis hemerocallidea (African Potato) with medicinal value was the only plant species of conservation concern identified and listed as Declining.
    - Avifauna: No threatened species (Red Data species) were recorded within the project area during the survey.
    - The ecological sensitivity of the study area was rated as Low.
    - Assessment of impacts associated with the loss of floral and faunal habitat and ecological structure, and the direct loss of fauna, was rated as Low negative significance.
    - The impact of the spread of alien invasive plant species was rated as Low negative significance.

4. Scope of Works: Terrestrial Biodiversity Compliance Statement

Draft and submit a Terrestrial Biodiversity Compliance Statement that meets the requirements of the gazetted Protocol for the Specialist Assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity (GGN R. 320 of 20 March 2020, as amended), as both the MBSP as well as the past assessments confirm that the site sensitivity is low in terms of terrestrial biodiversity. The need for a Compliance Statement is to specifically also address the requirements for a:

- Terrestrial Plant Species Compliance Statement – as the DFFE Screening Tool Report has identified a "medium sensitivity" for terrestrial plant species. The following sensitive species have been flagged. Note that Ms Napier has already requested and received the names of the sensitive species identified by unique numbers from SANBI.

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Sensitive species 1252
Medium	Sensitive species 601
Medium	Ophioglossum gracillimum
Medium	Sensitive species 691
Medium	Pachycarpus suaveolens
Medium	Brachycorythis conica subsp. transvaalensis

- Terrestrial Animal Species Compliance Statement (the specialist is to confirm the motivation for a compliance statement rather than a full assessment report) – as the DFFE Screening Tool Report has identified a "high sensitivity" for terrestrial animal species. The following species have been flagged:

Sensitivity	Feature(s)
High	Aves-Tyto capensis
High	Aves-Circus ranivorus
Medium	Aves-Tyto capensis
Medium	Aves-Circus ranivorus
Medium	Aves-Hydroprogne caspia
Medium	Aves-Eupodotis senegalensis
Medium	Mammalia-Chrysospalax villosus
Medium	Mammalia-Crocidura maquassiensis
Medium	Mammalia-Dasymys robertsii
Medium	Mammalia-Hydrictis maculicollis
Medium	Mammalia-Ourebia ourebi ourebi
Medium	Invertebrate-Clonia uvarovi

All site photographs (if a site visit is deemed necessary) as well as maps generated must be submitted together with the draft and final report. The complete shapefile dataset for each map must be provided in zipped file format for future use and to assist in compiling the overall site sensitivity map for the NEMA EA application documentation.

The appointed specialist will be required to sign the attached Declaration of Independence. A scanned in copy of the signed and commissioned declaration should suffice for submission to DFFE.

5. Study Timeframes

The proposal addressing this scope of works should be submitted no later than 14:00 on Friday, 27 September. The deadline for the draft report is Friday, 01 November 2024. The draft report will be reviewed on Monday, 04 November and returned with comments and edits in track changes for finalisation and submission by Friday, 08 November 2024.

Kindly address your budget proposal to:
Ms Megan Hardwick
EPCM Holdings
50 Bushbuck Lane,
Monument Park,
Pretoria,
0105
Email: meganh@epcmholdings.com

Should you require any additional information and/or clarification around the scope of works, please do not hesitate to contact the undersigned.

Yours sincerely,

** Electronically signed*

Vici Napier
EAP: Project Manager
Cell: 078 278 2898 / Email: vici.napier@outlook.com

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23 September 2024

NOISE IMPACT ASSESSMENT / STATEMENT – TERMS OF REFERENCE

ENVIRONMENTAL AUTHORISATION FOR THE CONSTRUCTION AND OPERATION OF ATTENUATION DAMS AND POLLUTION CONTROL DAMS AS ASSOCIATED INFRASTRUCTURE FOR THE APPROVED 60-YEAR ASH DISPOSAL FACILITY (ADF) AND ASSOCIATED INFRASTRUCTURE FOR THE KUSILE POWER STATION NEAR EMALAHLENI IN THE VICTOR KHANYE LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

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The Kusile Power Station (hereinafter referred to as "Kusile"), situated approximately 34km west of eMalahleni in South Africa's Mpumalanga Province, is one of the largest coal-fired power stations operated by Eskom Holdings SOC Limited (hereinafter referred to as "Eskom"). As a coal-fired power station, Kusile generates substantial volumes of ash as a byproduct of burning coal. The existing ash/gypsum co-disposal facility was designed to handle this waste; however, studies have shown that it will not suffice for the full operational lifespan of the power station. Thus, in 2014 Eskom initiated various authorisation applications for a new 60-year Ash Disposal Facility (ADF) to manage the expected volume of ash over the design life of the power station. The following environmental authorisations are applicable to the approved 60-year ADF and associated infrastructure project at Kusile:

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In February 2022, EPCM Bonisana (hereinafter referred to as "EPCM") was appointed by Eskom to undertake a review of the 2018 basic and detailed engineering design for Phase 1 of the ADF compiled by the Zitholele Joint Venture (JV) project team. Due to the reassessment of the original modelling assumptions and input values, the ADF footprint was significantly reduced which allowed for the entire ADF footprint to be shifted approximately 500m southwards, thus avoiding the diversion of the Klipfonteinspruit (approved within the current IEA and WUL). Further design optimisation to improve temporary diversion of upslope runoff of the Holfonteinspruit and its associated tributary during the construction of the ADF allowed for the reduction in the number of attenuation dams from 15 to only 5 larger attenuation dams.

It is important to note that the ADF and associated infrastructure project *has already been authorised in terms of NEMA*, NEMWA and the NWA; however, the larger attenuation dams, as well as a few of the Pollution Control Dams (PCDs), require EA by way of a Scoping and Environmental Impact Reporting (S&EIR) application as they trigger an ***additional*** Listed Activity in terms of Listing Notice 2 of the 2014 Environmental Impact Assessment (EIA) Regulations, as amended.

Thus, the focus of this EA application is limited to the dams only and not the greater ADF and its associated infrastructure, which is already authorised.

I, Ms Victoria Napier, am appointed by EPCM as the independent Environmental Assessment Practitioner (EAP), to undertake the required application for EA for the construction and operation of Attenuation Dams and PCDs as associated infrastructure for the approved 60-year Ash Disposal Facility and Associated Infrastructure for the Kusile Power Station near Emalahleni in the Victor Khanye Local Municipality, Mpumalanga Province; and, to conduct the requisite Environmental Impact Assessment (EIA) required for that decision-making.

2. Project Locality

The study area within which the ADF and its associated infrastructure are to be located is depicted in Figure 1. Kusile is located within the Victor Khanye Local Municipality (VKLM) and Nkangala District Municipality (NDM) on Farm Klipfontein 566 JR Portions 3, 7, 9, 10, 11, 19, 21, 25, 26, 30, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53 and 54. The ADF site is south of the Kusile Power station on open land that was under crop farming and animal grazing until relatively recently. The location co-ordinates of the centre of the ADF are 25° 57' 37.65"S and 28° 54′ 32.46"E. The ADF covers approximately 740 hectares.

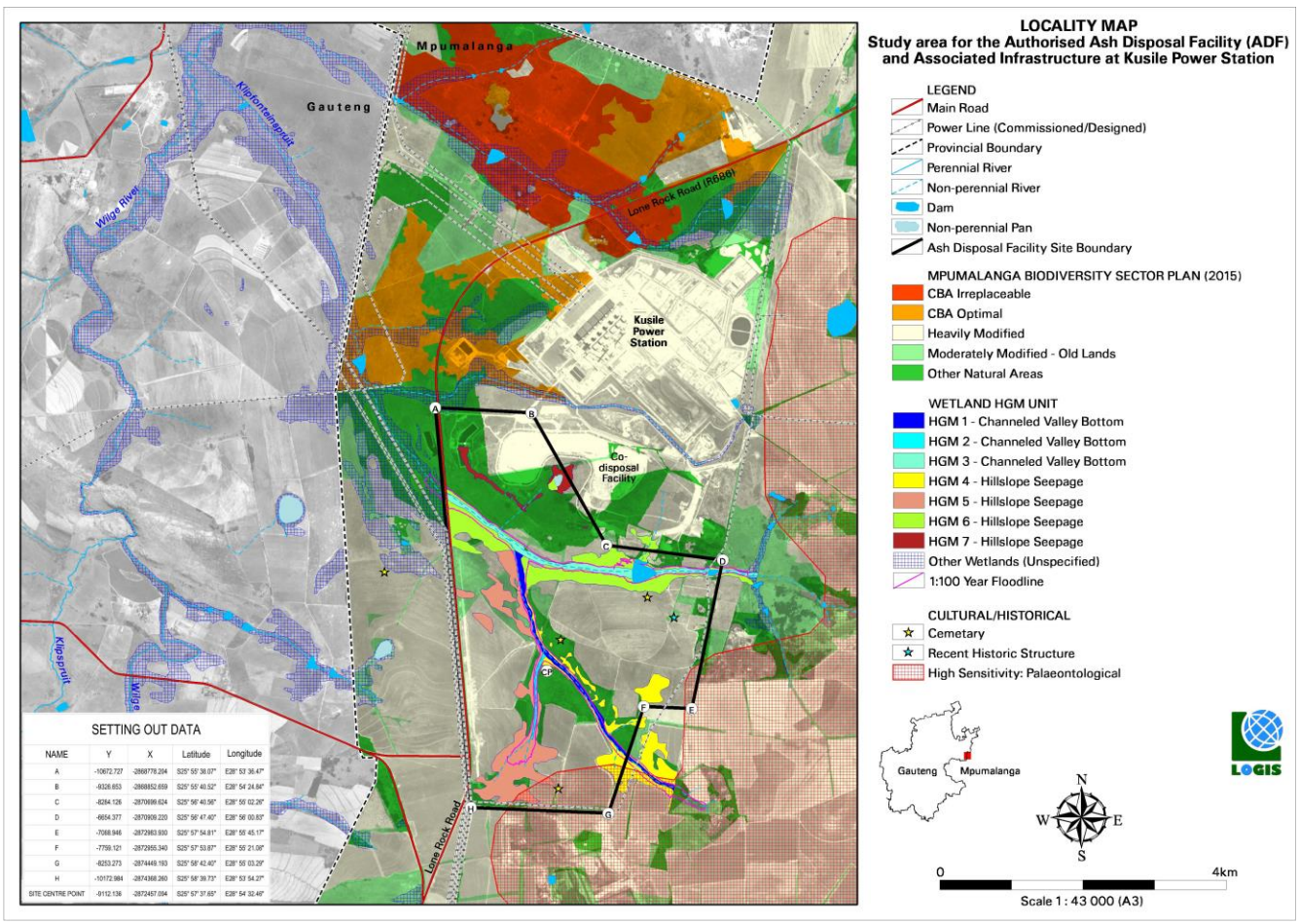

Figure 1: Locality Map for the study area within which the ADF and associated infrastructure will be located.

3. Applicable Existing Assessments

The following specialist investigations have been undertaken and are applicable in terms of providing the relevant site-specific context and background:

- Airshed Planning Professionals (Pty) Ltd, 2014: Environmental Noise Impact Evaluation of the Proposed 60 Year Ash Disposal Facility at Kusile Power Station (Report No.: 12ZIT09-2 Rev. 1).

4. Scope of Works: Noise Impact Assessment/ Compliance Statement

Draft and submit a Noise Impact Assessment or Compliance Statement that meets the requirements of the gazetted Protocol for the Specialist Assessment and minimum report content requirements for noise impacts (GGN R. 320 of 20 March 2020, as amended). The need for this specialist investigation is to:

- Either update or confirm the existing Noise Impact Assessment undertaken in 2014; and,
- Specifically assess the potential impact of noise on sensitive receptors for the required blasting to take place during the construction phase (specifically associated with the construction of the PCDs).

All site photographs (if a site visit is deemed necessary) as well as maps generated must be submitted together with the draft and final report. The complete shapefile dataset for each map must be provided in zipped file format for future use and to assist in compiling the overall site sensitivity map for the NEMA EA application documentation.

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09 October 2024

GROUNDWATER ASSESSMENT– TERMS OF REFERENCE

ENVIRONMENTAL AUTHORISATION FOR THE CONSTRUCTION AND OPERATION OF ATTENUATION DAMS AND POLLUTION CONTROL DAMS AS ASSOCIATED INFRASTRUCTURE FOR THE APPROVED 60-YEAR ASH DISPOSAL FACILITY (ADF) AND ASSOCIATED INFRASTRUCTURE FOR THE KUSILE POWER STATION NEAR EMALAHLENI IN THE VICTOR KHANYE LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

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It is important to note that the ADF and associated infrastructure project *has already been authorised in terms of NEMA*, NEMWA and the NWA; however, the larger attenuation dams, as well as a few of the Pollution Control Dams (PCDs), require EA by way of a Scoping and Environmental Impact Reporting (S&EIR) application as they trigger an ***additional*** Listed Activity in terms of Listing Notice 2 of the 2014 Environmental Impact Assessment (EIA) Regulations, as amended.

Thus, the focus of this NEMA EA application is limited to the dams only and not the greater ADF and its associated infrastructure, which is already authorised. With regards to the WUL issued, Section 21 (j) was omitted from the original application and therefore Eskom are required to submit a new WULA for the authorisation of the Section 21 (j) water use associated with the construction of the ADF and associated infrastructure project.

Section 21 (j) - Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

I, Ms Victoria Napier, am appointed by EPCM as the independent Environmental Assessment Practitioner (EAP), to undertake the required application for EA for the construction and operation of Attenuation Dams and PCDs as associated infrastructure as well as the WULA for the removal and discharge of water found underground for the construction of the approved 60-year Ash Disposal Facility and Associated Infrastructure for the Kusile Power Station near Emalahleni in the Victor Khanye Local Municipality, Mpumalanga Province; and, to conduct the requisite Environmental Impact Assessment (EIA) required for that decision-making.

2. Project Locality

The study area within which the ADF and its associated infrastructure are to be located is depicted in Figure 1. Kusile is located within the Victor Khanye Local Municipality (VKLM) and Nkangala District Municipality (NDM) on Farm Klipfontein 566 JR Portions 3, 7, 9, 10, 11, 19, 21, 25, 26, 30, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53 and 54. The ADF site is south of the Kusile Power station on open land that was under crop farming and animal grazing until relatively recently. The location co-ordinates of the centre of the ADF are 25° 57' 37.65"S and 28° 54’ 32.46"E. The ADF covers approximately 740 hectares.

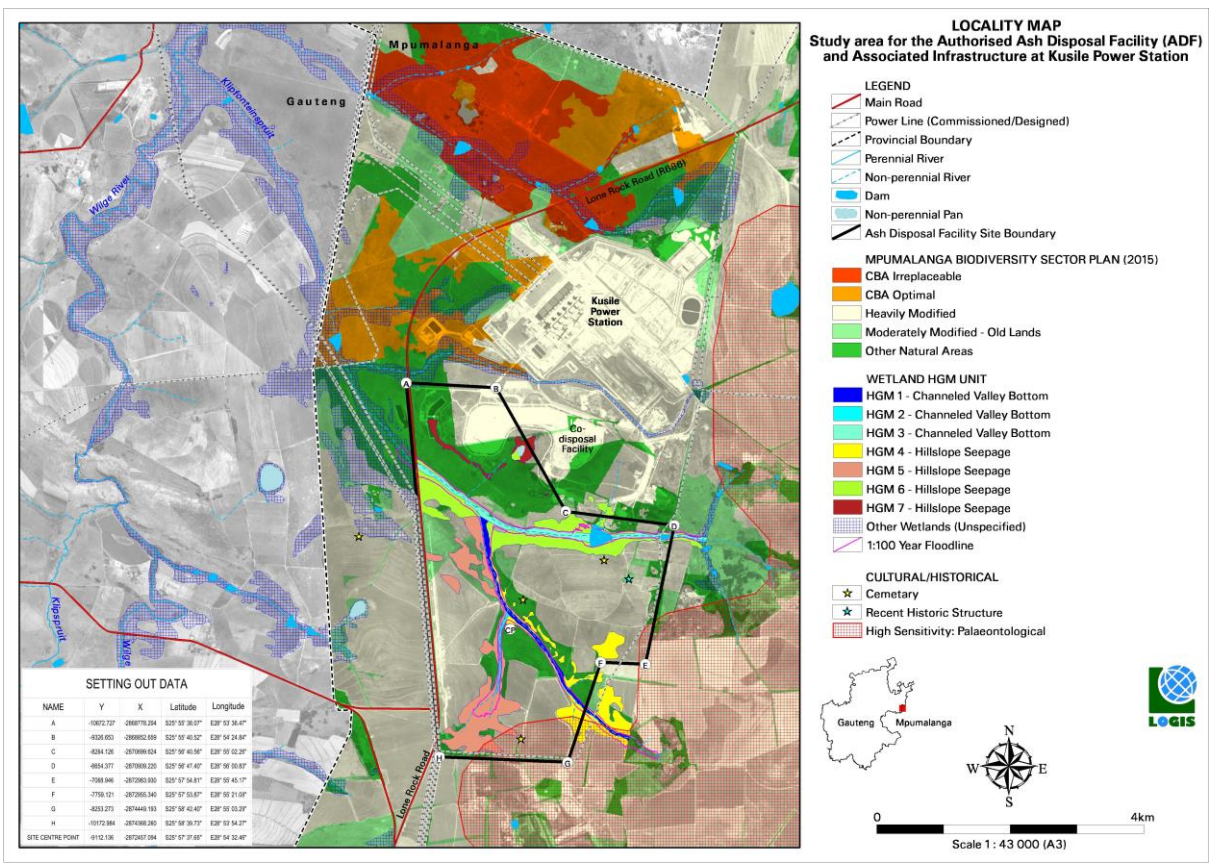

Figure 1: Locality Map for the study area within which the ADF and associated infrastructure will be located.

3. Applicable Existing Assessments

The following specialist investigations have been undertaken and are applicable in terms of providing the relevant site-specific context and background to the receiving environment of the study area:

Aqua Earth Consulting, 2014: Bio-physical Study: Groundwater Assessment (note that Site Alternative A corresponds to the authorised ADF study area).

The study area is located on top of a semiconfined to unconfined shallow, secondary (weathered and fractured) aquifer. Aqua Earth Consulting's field investigations suggest that the groundwater bearing features are located at depth between 4m and 24m below ground level (bgl), with an average of 15m bgl. At such depths, the groundwater is predominantly flowing through weathered shale (upper), the contact between the upper shale and underlining sandstone, fractures and joints developed locally along the fresh shale bedding planes. However, the groundwater flow may also be occurring through the shale brecciated joints, and in the contact zones between different lithologies (sandstone, shale, silstone and rhyolite). The depths to the static groundwater levels range between 2m to 14m bgl, with an average of 6m bgl. Groundwater is expected to drain from the east of the catchment (B20F) boundary, towards the west at the Wilge River, and toward the north-west at the Klipfonteinspruit. The upstream boundary of the study area coincides with the New Largo coal mining (underground and opencast) area where the underlying in aquifer is in contact with the artificial underground mining related aquifer. Groundwater elevations surrounding the site range from 1440 to 1540m above mean sea level. The saturated thickness of the aquifer varies spatially to an average of approximately 30m. No preferential flow was identified in the area during investigation. The potential rainfall recharge in the area was calculated to average 31 % of the mean annual rainfall. This results in an annual rainfall recharge to the shallow aquifer, of 196.85mm.

Groundwater in the area is generally unpolluted water qualities which generally falls into the SANS-2006 recommended operational limit for all the constituents measured. Slightly alkaline water was measured at the South-East of the study area. This alkaline water could be associated to polluted groundwater. As result of pollution, fluoride and iron concentrations are above the SANS class 2 maximum allowable limit. The source of pollution may be related to the historical underground coal mine activities in the New Largo but was not proved by the investigations.

The water supply potential (yield), quality, and local importance of the aquifer system for the study area, were considered for the aquifer classification. The Parson's classification scheme (1995) and the revised one (1998) were used for the classification. Based on these South African classification schemes, the aquifer systems associated with the study area is considered to be a "minor aquifer systems" (Management classification point 2), and its vulnerability is classified as medium (Vulnerability classification point 2). This classification resulted in a Groundwater Quality Management (GQM) Index of "6", indicating a Medium level of groundwater protection is required for the aquifers present at the ADF study area.

EPCM, 2024: Consolidated Geotechnical Report for the 60 Year Ash Disposal Facility.

The water table on-site is relatively shallow and saturated conditions can be expected in low-lying areas. Groundwater seepage was recorded in various test pits over the site, at depths varying from 0,7m to about 3,5m, which is generally the depth of weathered rock upper surface. The presence of ferruginisation in portions of the site is indicative of seasonal fluctuations in ground water seepage levels. The seasonal flow in the water courses varies, but even in winter 2023 at a site inspection, there was water flowing at a depth ranging from 0,5m to 1m. Groundwater flow is found to generally follow surface topography.

4. Scope of Works: Groundwater Assessment

Draft and submit a detailed Groundwater Assessment that meets the requirements of the relevant DWS best practice guidelines or gazetted notices for specialist studies in support of Water Use License Applications (WULAs). The main purpose of the Groundwater Assessment is to assess the impacts associated with the dewatering of water found underground for the construction phase of the proposed ADF and associated infrastructure – specifically addressing Section 21 (j) of the NWA – on the water resources within the area, specifically:

- On-site wetlands (e.g. hillslope seeps);
- On-site Klipfonteinspruit and Holfonteinspruit (and associated western tributary) (i.e. channel valley bottom wetlands/ non-perennial rivers);
- Downstream impacts, especially with regards to the sensitive Wilge River; and,
- Groundwater resource.

The groundwater assessment should include the following, as a minimum (specialist to advise regarding full scope of works based on DWS requirements):

- The method and results of the geohydrological investigation which was conducted (use existing, recent studies where relevant and applicable);
- The method and results of the geophysical investigation which was conducted (use existing, recent studies where relevant and applicable);
- A description of the aquifer system, as well as the major/minor aquifer (use existing, recent studies where relevant and applicable);
- A description of the geohydrology at the site, including the structural geological feature (use existing, recent studies where relevant and applicable);
- The current status of groundwater quality at the site (use existing, recent studies or monitoring data, where relevant and applicable);
- The groundwater pollution potential of the water uses (limited to Section 21 (j) at this stage);
- The method and results of the groundwater model which was conducted;
- The possible impact of the water uses on down-gradient resources (as listed above, as a minimum – utilising the provided Impact Assessment Methodology attached);
- Assessment of downstream impacts on the water resources and users must include appropriate and effective mitigation measures (especially associated within the discharge/ release of water found underground back into the receiving environment), where applicable;
- A detailed monitoring program for the removal of water found underground as well as the "discharge" of this clean water back into the receiving environment;
- The method and results of the hydrocensus, which must be conducted within a 5km radius of the outer boundaries of site (use existing, recent hydrocensus (not older than 5yrs) where available);
- A statement on whether the assessment completed is sufficient or whether a more intensive groundwater investigation is required. Should a more intensive groundwater investigation be required, this must be conducted and submitted;
- Identification of the surrounding groundwater users which are potentially impacted upon by the water uses (limited to Section 21 (j) at this stage); and,
- Critical issues identified during the geohydrological investigation.

All site photographs (if a site visit is deemed necessary) as well as maps/ graphics generated must be submitted together with the draft and final report. The complete shapefile dataset for maps/ graphics must be provided in zipped file format for future use and to assist in compiling the overall site sensitivity map for the NEMA EA and NWA WUL applications.

The appointed specialist will be required to sign the attached Declaration of Independence. A scanned in copy of the signed and commissioned declaration should suffice for submission to DFFE.

5. Study Timeframes

The proposal addressing this scope of works should be submitted no later than 14:00 on Friday, 25 October. The deadline for the draft report is Friday, 13 December 2024 (kindly confirm if this is manageable?). The draft report will be reviewed and returned with comments and edits in track changes for finalisation and submission by end January 2025.

Kindly address your budget proposal to:

Ms Megan Hardwick
EPCM Holdings
50 Bushbuck Lane,
Monument Park,
Pretoria,
0105
Email: meganh@epcmholdings.com

Should you require any additional information and/or clarification around the scope of works, please do not hesitate to contact the undersigned.

Yours sincerely,

** Electronically signed*

Vici Napier
EAP: Project Manager
Cell: 078 278 2898 / Email: vici.napier@outlook.com

1.1 APPROACH TO ASCRIBING SIGNIFICANCE FOR DECISION-MAKING

The best way of expressing the cost-benefit implications for decision-making is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood) 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. A practical example is the consequence of a parachute not opening, which is potentially death, but the likelihood of such an event happening is so low that parachutists are prepared to take that risk. 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. 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.

1.1.1 Consequence

The ascription of significance for decision-making becomes then relatively simple. It requires the consequences to be ranked (Table 1) and a likelihood to be defined of that consequence occurring. It should be noted that 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 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. Note that the EAP has defined the consequence descriptors, specialists are required to select the appropriate descriptor when ascribing significance to various impacts. This will allow for efficient comparing of significance across specialist assessments to allow for an integrated assessment of the project as a whole.

Table 1: Ranking of consequence

Environmental Costs	**Inherent Risk**
Human health – morbidity/mortality. Loss of species	High
Reduced faunal populations, loss of livelihoods, individual economic loss	Moderate-high
Reduction 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 Benefits	**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

1.1.2 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 key point here is that

likelihood of the consequence occurring must *de facto* take into account the good international industry best practice that is 'intrinsically built-in' to activities or methods. For example: an electricity transformer will never be constructed without bunding and stones to contain any oil spills due to potential failure of the transformer. To highlight bunding as a specific mitigation measure to reduce the consequence of a spill is simply inappropriate. Likelihood descriptors that can be used to characterise the likelihood of the costs and benefits occurring are presented in the table below.

Table 2: Likelihood descriptors and definitions

Likelihood Descriptors	Definition
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

1.1.3 Residual risk

The residual risk is then determined as a function of the consequence together with the likelihood of that consequence. The residual risk categories are shown in Table 3 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 4. Additional mitigation to manage (and potentially further reduce) and monitor the residual risk may also be defined. All mitigation is then prescribed in the Environmental Management Programme (EMPr). What is important is that the residual risk is what decision-makers must accept if they decide to authorise the proposed activity even if that residual risk is 'high'. The residual risk cannot and will not be artificially reduced within the assessment to 'low' to facilitate decision-making.

Table 3: 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 4: Implications for decision-making of the different residual risk categories shown in Table 3.

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

1.1.4 A note on cumulative impacts

Impacts cannot be assessed in isolation and an integrated approach requires that cumulative impacts will be included in the assessment of individual impacts. The nature of the impact will be described in such a way as to detail the potential cumulative impact of the activity, if there is indeed a cumulative impact. For example, dust and air emissions cannot be assessed in isolation of the potential cumulative impact of increased emissions into the atmosphere. Similarly, if water quality is improved within the

immediate surroundings of the proposed activities, this will most certainly have a ripple effect/ cumulative impact on the greater water quality in the area.

Once all the impacts have been assessed and significance ratings allocated, the EAP will assess the project on a holistic basis to determine the overall project impact on the receiving environment. This will be a function of the individual impacts as well as the cumulative nature of combining all those impacts within a single context/ project.

1.1.5 Describing the impact

The EIA Regulations also require, in addition to consequence, likelihood and significance (as described above), that the nature, extent, duration, reversibility and irreplaceable loss of a resource also be highlighted for identified impacts. These additional impact attributes are defined as follows:

1.1.5.1 Nature of the impact

The nature of an impact refers to a description of the inherent features, characteristics and/or qualities of the impact.

1.1.5.2 Scale/extent of the impact

Extent refers to the impact footprint or stated differently the spatial area over which the impact would manifest. Note that if a species were to be lost then the extent would be global because that species would be lost to the world.

Table 5: Listing of descriptors and associated definitions to determine the extent of an impact

Extent Descriptors	Definitions
Site	The impact footprint remains within the cadastral boundary of the site
Local	The impact footprint extends beyond the cadastral boundary of the site, to include the immediately adjacent and surrounding areas
Regional	The impact footprint includes the greater surrounding area within which the site is located
National	The scale/ extent of the impact is applicable to the Republic of South Africa
Global	The scale / extent of the impact is global (or world-wide)

1.1.5.3 Duration of the impact

Duration is the period of time for which the impact would be manifest. Importantly the concept of reversibility is reflected in the duration scoring. In other words, the longer the impact endures the less likely is the ***reversibility*** of the impact.

Table 6: Listing of descriptors and associated definitions to determine the duration of an impact.

Duration Descriptors	Definitions
Construction period only	The impact endures for only as long as the construction period of the proposed activity. This implies the impact is fully reversible. Like noise and dust.
Short term	The impact continues to manifest for a period of between 3 – 10 years. The impact is reversible.
Medium term	The impact continues to manifest for a period of 10-30 years. The impact is reversible with relevant and applicable mitigation and management actions.
Long term	The impact continues for a period in excess of 30 years. However, the impact is still reversible with relevant and applicable mitigation and management actions.
Permanent	The impact will continue indefinitely and is irreversible.

1.1.5.4 Irreplaceable loss of resources

Irreplaceable loss of resources refers to the degree to which the impact will result in the loss of a resource that is impossible to replace.

Table 7: Listing of descriptors and associated definitions to determine the irreplaceable loss of resources due to an impact.

Extent Descriptors	Definitions
High	The impact is most likely to or will result in the irreplaceable loss of a resource/s.
Medium	The impact may result in the irreplaceable loss of a resource/s, however applicable mitigation or management interventions may prevent complete loss or provide a suitable substitute/"offset".
Low	The impact will not result in the irreplaceable loss of a resource/s.

1.1.6 An example of the assessment of the significance of impacts

The following serves to highlight, by way of an example, how the significance of the impact will be presented, taking into account the methodology provided above.

Example: Operational Phase: Atmospheric Emissions:
Atmospheric emissions as a result of the proposed project were modelled to determine the impact on ambient air quality, with a view to understanding the human health and environmental risks posed by such emissions as illustrated in the impact map for this aspect (Figure 1).

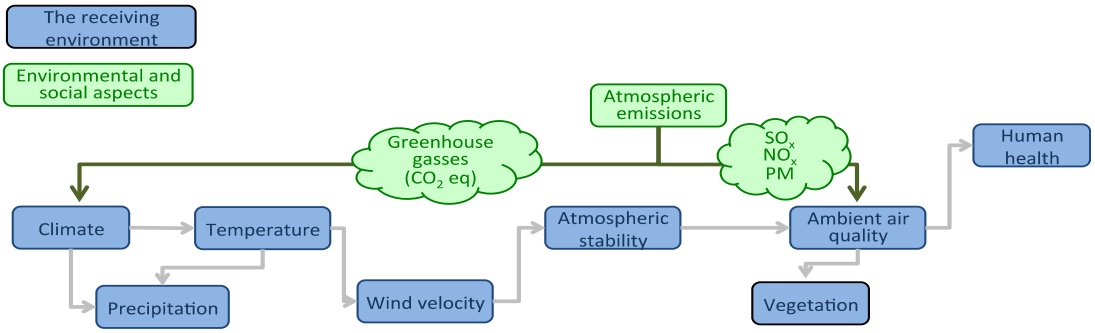

Figure 1: Example: Systems depiction of the components of the receiving environment that would be affected by atmospheric emissions from the proposed project.

The inherent risk of human health effects is high, but the likelihood of these manifesting as a result of atmospheric emissions from the proposed project is highly unlikely implying an impact significance of 'low'. Similarly, the inherent risk of vegetation damage and habitat loss as a result of atmospheric emissions from the proposed project is moderate-high, but the risk of that consequence manifesting is considered highly unlikely, resulting in an impact significance of low.

Table 8: Example: Impact significance for possible adverse human health risks as a result of atmospheric emissions from the proposed project.

Activity	Power Generation by way of Combined Cycle Gas Turbine (CCGT) technology
Environmental/ Social Aspect	Atmospheric Emissions (NO_x and PM)
Nature of the Impact	Adverse human health effects brought about by a change (deterioration) in the ambient air quality from atmospheric emissions of the power plant.
Consequence Inherent risk	High
Extent/ Scale	Regional
Duration & Reversibility	Long-term & reversible
Irreplaceable loss of a resource	Low
Causes of impacts / Event	**Likelihood of the consequence:**
Emissions of NOx result in ambient concentrations that exceed defined health based limits (i.e. NAAQS)	Definite both on and off-site for short term averaging periods, but very limited in extent within the project footprint for longer term averaging periods. Highly unlikely for the sensitive receptors identified given the prevailing wind direction and the distance of the proposed project to the residential areas.
Emissions of PM (TSP, PM_{30}, PM_{10}, $PM_{2.5}$) result in ambient	Definite both on and off-site for short term averaging periods, but limited to within the project footprint for longer term averaging periods. Also likely that the predicted

concentrations that exceed defined health based limits (i.e. NAAQS)	concentrations in the Hills area are exaggerated by the modelling, which treats hills and ridges as transparent. Highly unlikely for the sensitive receptor given the prevailing wind direction and the distance of the proposed project to the residential areas.
Presence of communities within the 'exposure area/ zone' that may be exposed to ambient concentrations that exceed health based limits (i.e. NAAQS)	Highly unlikely given that there are no communities within a 10 km radius of the proposed project, and as such there would be no exposure to ambient concentrations that exceed health based limits (i.e. NAAQS).
Residual risk	Low
Extrinsic/ additional mitigation measures	None required.
Residual risk after mitigation	Low

Table 9: Example: Impact significance for possible damage to vegetation and reduced habitat risks as a result of atmospheric emissions from the proposed project.

Activity	Power Generation by way of Combined Cycle Gas Turbine (CCGT) technology
Environmental/ Social Aspect	Atmospheric Emissions (NOx and PM)
Nature of the Impact	Damage to vegetation and reduced habitat brought about by a change (deterioration) in the ambient air quality from atmospheric emissions of the power plant.
Consequence Inherent risk	Moderate - High
Extent/ Scale	Regional
Duration & Reversibility	Long-term & reversible
Irreplaceable loss of a resource	Low
Causes of impacts / Event	**Likelihood of the consequence:**
Emissions of NOx result in ambient concentrations that exceed defined environmental damage based limits	Unlikely as vegetation damage would typically only occur with longer term exposure to elevated pollution concentrations which is not predicted by the dispersion model.
Emissions of PM (TSP, PM30, PM10, PM2.5) result in ambient concentrations that exceed defined environmental damage based limits	Unlikely as vegetation damage would typically only occur with longer term exposure to elevated pollution concentrations which is not predicted by the dispersion model.
Presence of sensitive vegetation/ habitat that may be exposed to ambient concentrations that exceed defined environmental damage based limits	Highly unlikely given the generally small, longer term averaging period ambient concentrations even over the immediate project area. No sensitive vegetation/ habitat exists within the broader study area.
Residual risk	Low
Extrinsic/ additional mitigation measures	None required.
Residual risk after mitigation	Low