



**GLENCORE OPERATIONS SOUTH AFRICA (PTY) LTD - LION
SMELTER, A GLENCORE MERAFAE VENTURE**

ENVIRONMENTAL MANAGEMENT PROGRAM (EMPR)

IN RELATION TO THE ENVIRONMENTAL AUTHORISATION APPLICATION
BY MEANS OF A
BASIC ASSESSMENT (BA) PROCESS AND INTENTION TO AMEND THE
EXISTING AIR EMISSIONS LICENCE (AEL)

GLENCORE

APRIL 2022

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GLENCORE-MERAPE JV – LION SMELTER: ECF ENVIRONMENTAL MANAGEMENT PROGRAM (EMPR)

Glencore Operations South Africa (Pty) Ltd. – Lion Smelter

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TO	DESCRIPTION	DATE	COMMENTS/CHANGES
Kennedy Owuor	Draft report rev 00	5 April 2022	Confirm associated structures and infrastructures of the proposed facility on page 2; correct the submittal of monthly compliance inspection on page 23 as discussed; and remove the roles of community liaison officer on page 24, as this position does not form part of the current structure.
Frans Engelbrecht			
Hendrik Strumpfer	Draft report rev 01	25 April 2022	

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EXCECUTIVE SUMMARY

The Lion Smelter, a Glencore Merafe Venture Operation, appointed Netzero (Pty) Ltd as an independent Environmental Assessment Practitioner (EAP) in terms of Regulation 12 of the EIA regulations, to complete the necessary environmental applications associated to the proposed development.

Glencore Operations South Africa (Pty) Ltd has entered into an energy conversion service agreement with Swedish Stirling, which involves the proposed construction and commissioning of a standalone energy conversion facility located on the Lion Smelter complex premises. The proposed facility (hereafter referred to as Lion ECF or the proposed development), will convert the thermal energy from the excess furnace gas produced by Lion Smelter Complex into electrical energy in the Swedish Stirling's proprietary power generation technology (PWR BLOK 400-F units). The electric energy will then be fed back into the electrical supply of the Lion Smelter.

This document has been developed in line with Appendix 4 of the Environmental Impact Regulations (GN. R 982 GG 38282 dated 4 December 2014, as amended by GN 326 GG 40772 dated 7 April 2017, GN 706 GG 41766 dated 13 July 2018, GN 599 GG 43358 dated 29 May 2020, and GN 517 GG 44701 dated 11 June 2021).

This document is the Draft Environmental Management Programme (EMPr), subject to the approval from the relevant competent authority. Upon the issuance of the Environmental Authorisation (EA), this document will be considered as the EMPr for implementation.

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ACRONYMS AND ABBREVIATIONS

AEL	Air Emissions Licence
AQMP	Air Quality Management Plan
BA	Basic Assessment
BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
COTO	Committee of Transport Officials
DARDLEA	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs
DFFE	Department of Forestry, Fisheries, and the Environment
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECF	Energy Conversion Facility
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EMS	Environmental Management System
EN	Endangered
ESA	Ecological Support Area
FEPA	Freshwater Ecological Priority Area
FGTM	Fetakgomo Greater Tubatse Local Municipality
GIS	Geographic Information System
HIA	Heritage Impact Assessment
HoEA	Holder of the Environmental Authorisation (EA) or Air Emissions Licence (AEL)
I&AP	Interested and Affected Parties
LDEDET	Limpopo Department of Economic Development, Environment and Tourism
MAE	Mean Annual Evaporation
MAP	Mean Annual Precipitation
MS	Method Statement
MW	Mega Watt
NEMA	National Environmental Management Act, Act no. 107 of 1998
NEMAQA	National Environmental Management Air Quality Act, Act no. 39 of 2004
NEMBA	National Environmental Management: Biodiversity Act, Act no. 10 of 2004
NEMPA	National Environmental Management: Protected Areas Act, Act no. 57 of 2003
NHRA	National Heritage Resources Act, Act no. 25 of 1999
OEMF	Olifants Environmental Management Framework
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SCE	Sekhukhuneland Centre of Endemism
SEZ	Special Economic Zone
SSVR	Site Sensitivity Verification Report
STA	Site Traffic Impact Assessment
TIA	Traffic Impact Assessment
VIA	Visual Impact Assessment
WMA	Water Management Agency

DEFINITION OF TERMS USED

AUDIT	Systematic independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled.
BIODIVERSITY	Means the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.
CLOSURE	Means to take out of active service permanently or to dismantle partly or wholly, or permanent shutdown of a facility to the extent that it cannot be recommissioned
CONFORMITY	Fulfilment of a requirement.
EFFECTIVENESS	Extent to which planned activities are realized and planned results achieved.
ENVIRONMENTAL ASPECT	Element of an organization’s activities or products or services that can interact with the environment
ENVIRONMENTAL CONTROL OFFICER (ECO)	The ECO as referred to in this document, is a person legally appointed to monitor compliance with the EMPr and EA. This person can be appointed by either the holder of the EA or the Operator.
ENVIRONMENTAL IMPACT	Any change to the environment, whether adverse or beneficial, wholly, or partially resulting from an organization’s environmental aspects.
ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)	Part of the management system used to manage environmental aspects, fulfil compliance obligations, and address risks and opportunities.
HOLDER OF THE EA	The HoEA is the legal holder of the EA and AEL. In the case of this EMPr, the HoEA is Glencore Operations South Africa (Pty) Ltd – Lion Smelter, a Glencore Merafe Venture.
INDEPENDENT	In relation to an EAP, a specialist or the person responsible for the preparation of an environmental audit report, means- (a) that such EAP, specialist or person has no business, financial, personal or other interest in the activity or application in respect of which that EAP, specialist or person is appointed in terms of these Regulations; or (b) that there are no circumstances that may compromise the objectivity of that EAP, specialist or person in performing such work; excluding- (i) normal remuneration for a specialist permanently employed by the EAP; or (ii) fair remuneration for work performed in connection with that activity, application or environmental audit.
METHOD STATEMENT	A MS is a document that is required in terms of the EMPr, where a specific management plan is required. The MS must address the requirements as highlighted section 5.1.6.
MEASUREMENT	The activity of delivering data to a method to define objectively a quantitative or qualitative measure and capturing a situation without any references to the significance
MONITORING	A continuous inspection or observation of process performance or process output for a special purpose through a defined scope and maintaining records of those observations.
OPERATOR	The energy service agreement between Glencore Operations South Africa (Pty) Ltd (HoEA) and Swedish Stirling involves the proposed construction and commissioning of the ECF project. Therefore, for the purpose of this document, when referring to the Operator, it refers to Swedish Stirling’s energy service agreement.
SIGNIFICANT IMPACT	Means an impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.
TOP MANAGEMENT	Persons or group of people who directs and control an organization at the highest level.

1 INTRODUCTION

The Lion Smelter, a Glencore Merafe Venture Operation, appointed Netzero (Pty) Ltd as an independent Environmental Assessment Practitioner (EAP) in terms of Regulation 12 of the EIA regulations, to complete the required Basic Assessment (BA) Process in order obtain the required Environmental Authorisation (EA) associated with the proposed development.

This Environmental Management Program (EMPr) has been developed in compliance with section 24 N of the National Environmental Management Act (NEMA, Act. No. 107 of 1998), Appendix 4 and 5 of the 2014 EIA regulations (GNR 982 GG 38282 of 4 December 2014, as amended).

The purpose of this document is to provide a baseline Environmental Management Programme (EMPr) to essentially form part of the Lion Smelter's Environmental Management System (EMS). The information provided describes guidelines, operating procedures and rehabilitation/pollution control requirements which will be a legal binding document which the holder of the authorisation, upon granting the Environmental Authorisation (EA), will be held accountable for implementation.

The recommendations and procedures stipulated in the EMPr are based on the findings discussed in the Basic Assessment Report (BAR). It is therefore essential that this document be carefully studied, understood, implemented, and adhered to at all times.

The EMPr should be considered as a "living" document, to be reviewed and amended as deemed necessary.

The reasons for review and/or amendments may be the following:

- Failure to identify certain risk or impacts during the initial Basic Assessment (BA) process; and
- The inability of the EMPr and/or specific mitigation measures to sufficiently provide for the avoidance, management, and mitigation of environmental impacts associated with the undertaking of authorised activities.

In the event that additional activities not specified in the Basic Assessment Report (BAR) and EMPr is to take place, the impacts associated to these activities should be assessed according to the requirements stipulated by GN R. 982. Therefore, this EMPr is only applicable to the listed authorising activities as specified in [section 2.6](#) of this document.

2 PROJECT BACKGROUND INFORMATION

2.1 SCOPE OF THE PROPOSED ACTIVITY

Glencore Operations South Africa (Pty) Ltd has entered into an energy conversion service agreement with Swedish Stirling, which involves the proposed construction and commissioning of a standalone energy conversion facility located on the Lion Smelter complex premises. The proposed facility (hereafter referred to as Lion ECF), will convert the thermal energy from the excess furnace gas produced by Lion Smelter Complex into electrical energy in the Swedish Stirling's proprietary power generation technology (PWR BLOK 400-F units). The electric energy will then be fed back into the electrical supply of the Lion Smelter.

The following associated structures and infrastructures will form part of the proposed facility:

- 26 Containerised power generating module (referred to as a PWR BLOK Unit or PBU) with 14 engines and all necessary ancillaries;
- Containerised Gas Conditioner (CGC), which conditions the incoming gas prior to being fed to the PWR BLOK;
- A cooling plant interconnected with the PWR BLOK module providing the necessary cooling for the 14 PCU's;
- A main substation;
- A backup generator (10 kW);
- N₂ bulk storage facility;
- Offices, ablution facilities, and kitchen;
- Hazardous chemical storage area;
- Waste storage area;
- Covered parking; and
- Storm water management infrastructures.

Figure 3 illustrates the process flow of the proposed facility.



Figure 1: Image of the PBU (source: <https://swedishstirling.com>)



Figure 2: Example of similar project (source: <https://swedishstirling.com>)

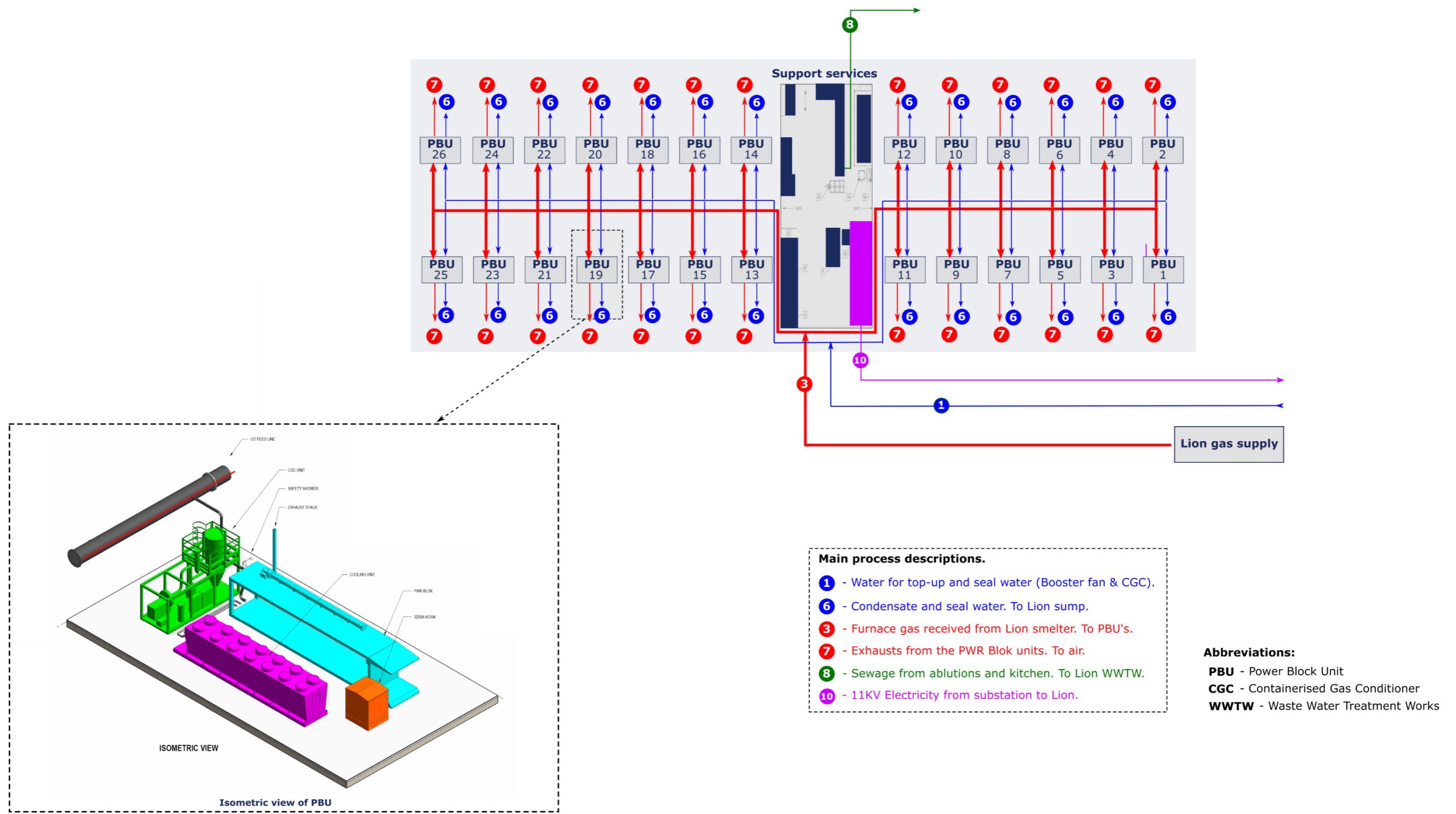


Figure 3: Process flow diagram

2.2 PROJECT LOCATION

The Lion Smelter site falls within the Fetakgomo – Greater Tubatse Local Municipality (FGTM) which is located within the Greater Sekhukhune District Municipality of the Limpopo Province of the Republic of South Africa. The Lion ECF will be located within the Lion Smelter premises, farm Xtrata 630 KT, with the following central coordinates: 24°49'15.69"S, 30° 6'35.76"E (WGS84).

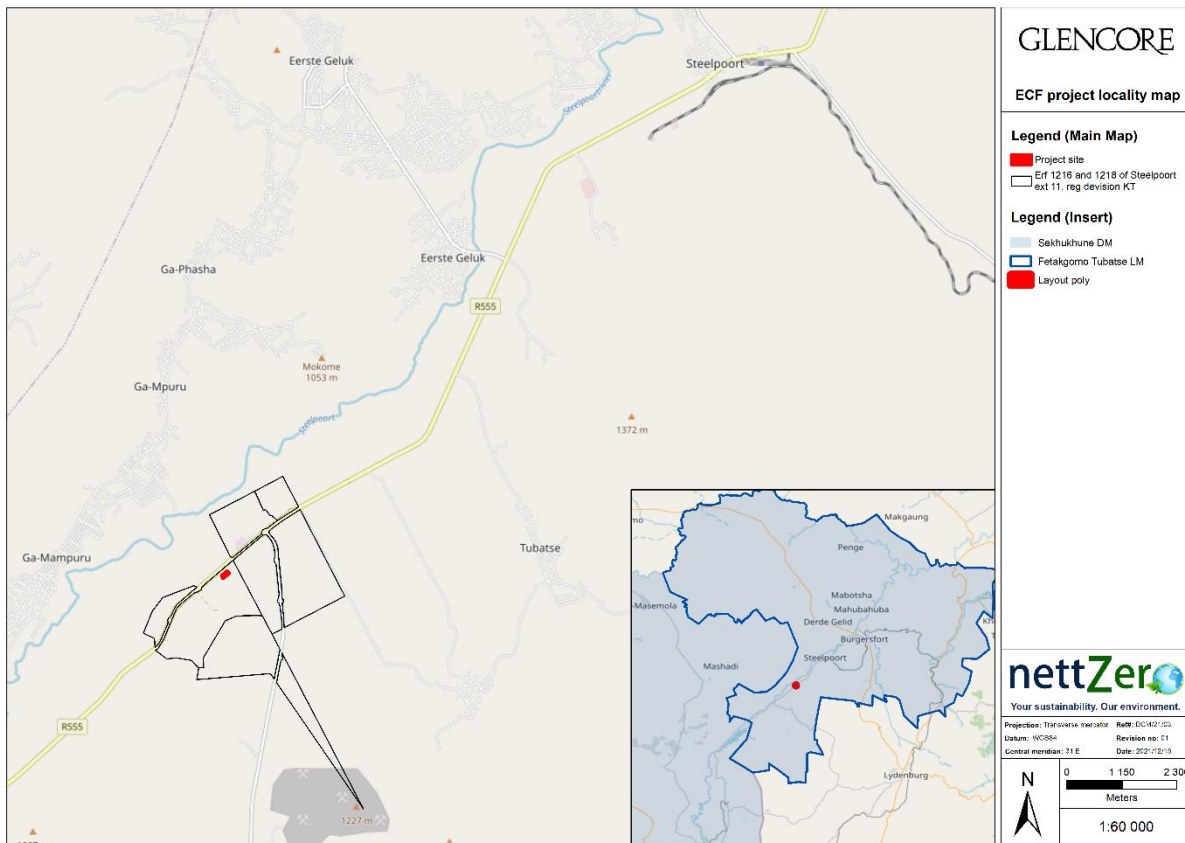


Figure 4: Locality map of the proposed development

See Appendix B the detailed Site Layout Plan and Locality Map.

2.3 DIRECTLY AFFECTED PROPERTIES

Table 1 provides information related to the direct affected properties.

Table 1: Directly Affected Properties

FARM/AREA	PORTIONS/HOLDINGS	ERF.	PROPERTY DESCRIPTION	PROPERTY SIZE (HA)	DEED OF TRANSFER	OWNER DETAILS
Farm Xtrata	630 KT	1220	1220, Steelpoort Extension 11 Township, Registration Division KT	172.3772	T46395/2012, Pretoria	Glencore Operations South Africa (Pty) Ltd 1997/017998/07 P.O. Box 218, Steelpoort, 1133. 013 230 5000
21 DIGIT SURVEYOR GENERAL CODE:				TOKT0010000012200000		

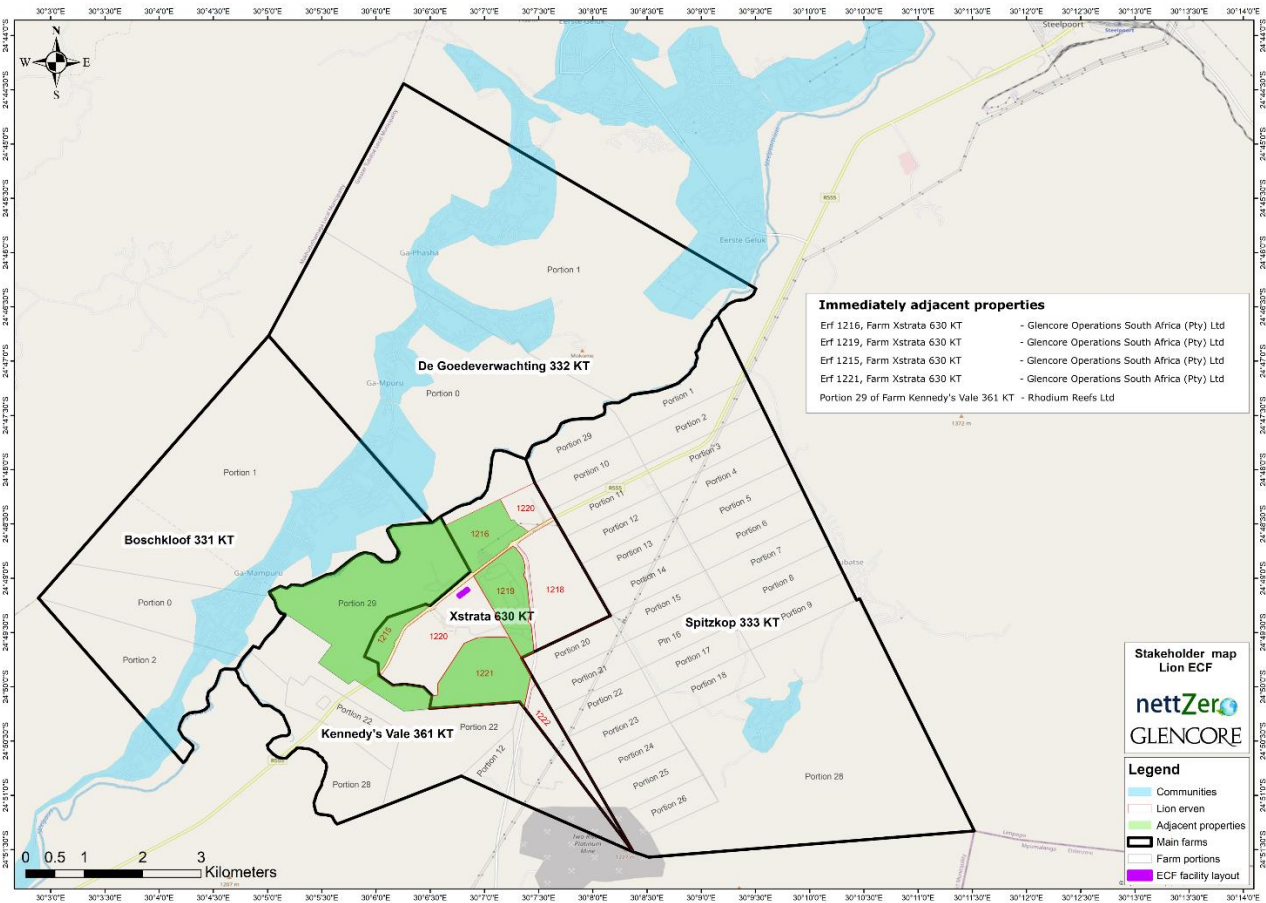


Figure 5: Map of the location of the proposed development in relation to the properties as consolidated

As per Figure 5 and Figure 6, the proposed development is situated erf 1220 of Farm Xstrata 630 KT, prior to the consolidation known as Ptn. 8 and 27 of Farm Kennedy's Vale 361 KT.

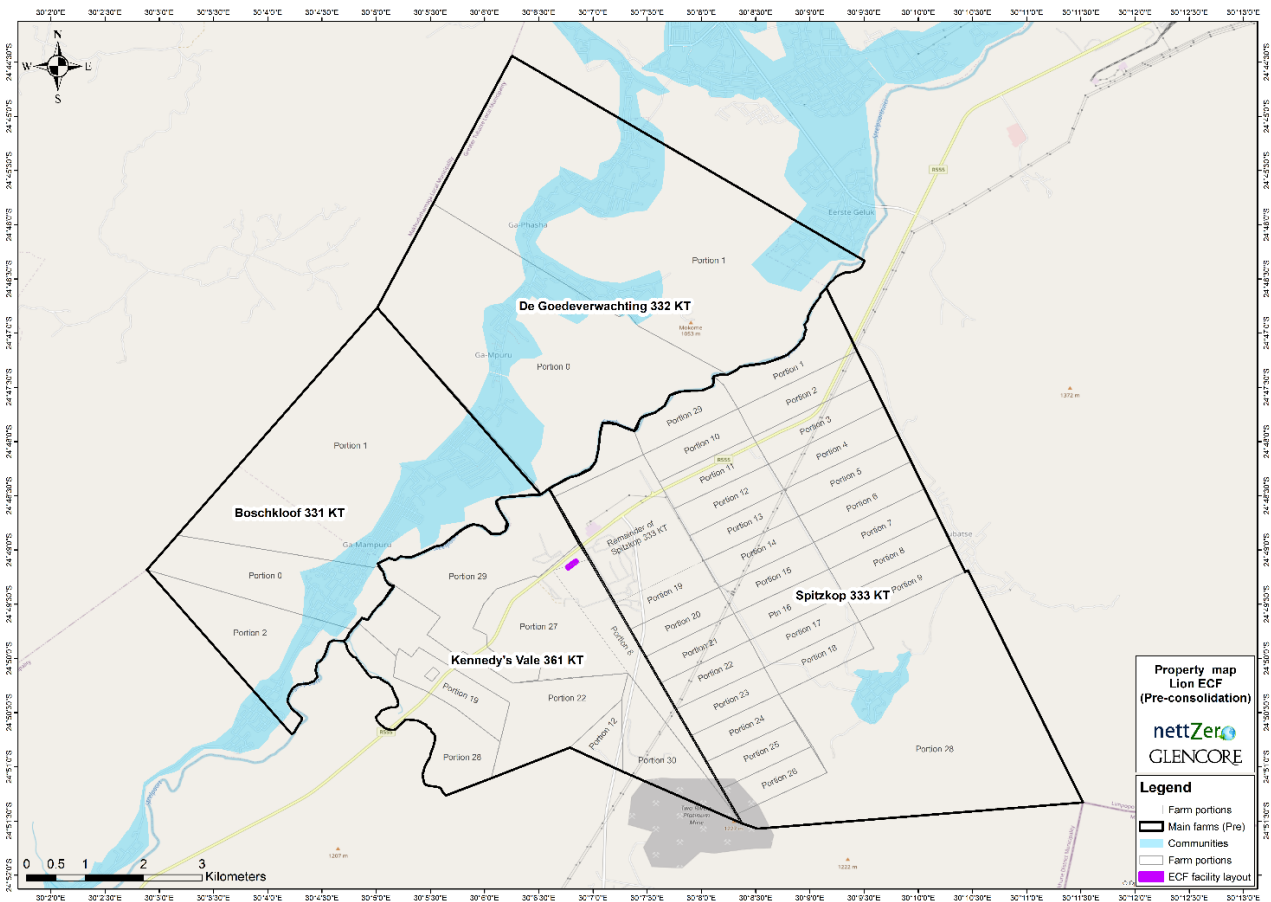


Figure 6: Map of the location of the proposed development in relation to the properties as known prior to consolidation

2.4 FINAL SITE LAYOUT PLAN

Following the Basic Assessment (BA) process conducted, including the assessment of alternatives (see section 5 of the Basic Assessment Report (BAR)), the final site layout is provided in Appendix B.

2.5 LISTED ACTIVITIES

Table 2 provides the confirmed listed activities as part of the Basic Assessment Process (BA) and Air Emissions Licence (AEL) application.

Table 2: Listed activities associated with the proposed ECF project

ACTIVITY DESCRIPTION	RELEVANT LEGISLATION	LISTED ACTIVITIES
<p>Construction, and operation and ¹ Closure of the Energy Conversion Facility (PWR BLOK 400-F Units)</p>	<p>GNR 983 GG 38282 dated 4 December 2014 (as amended by GN 327 GG 4077 dated 7 April 2017, GN 706 GG 41766 dated 13 July 2018, and GN 517 GG 44701 dated 11 June 2021) – Environmental Impact Assessment Regulations, Listing Notice 1</p>	<p>Activity 2 - The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where— (i) the electricity output is more than 10 megawatts but less than 20 megawatts; or (ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.</p> <p>Activity 34 - The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent or pollution, excluding— (i) where the facility, infrastructure, process or activity is included in the list of waste management activities published in terms of</p>

¹ As the period for which the EA is 45 years, for the purpose of this application, activity 31 of Listing notice 1 has been excluded as part of this EMPr.

ACTIVITY DESCRIPTION	RELEVANT LEGISLATION	LISTED ACTIVITIES
		section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (ii) the expansion of existing facilities or infrastructure for the treatment of effluent, wastewater, polluted water or sewage where the capacity will be increased by less than 15 000 cubic metres per day; or (iii) the expansion is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will be increased by 50 cubic meters or less per day.
	GNR 985 GG 38282 dated 4 December 2014 (as amended by GN 324 GG 4077 dated 7 April 2017, GN 706 GG 41766 dated 13 July 2018, and GN 517 GG 44701 dated 11 June 2021) – Environmental Impact Assessment Regulations, Listing Notice 3	Activity 12 - The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. e. Limpopo i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; or iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.
Operation of the Energy Conversion Facility (PWR BLOK 400-F Units)	GN 893 GG 37054 dated 22 November 2013 (as amended by GN 551 GG 38863 dated 12 June 2015, GN 1207 GG 42013 dated 31 October 2018, GN 687 GG 42427 dated 22 May 2019, and GN 421 GG 43174 dated 27 March 2020) – List of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage	Sub-category 1.5: Reciprocating Engines – Liquid and gas fuel stationary engines used for electricity generation. (All installations with design capacity equal to or greater than 10 MW heat input per unit, based on the lower calorific value of the fuel used)

3 EAP DETAILS AND EXPERIENCE SUMMARY

Nettzero (Pty) Ltd, designated Mrs. Anandi Alers (EAP registration no. 2019/1514) as the lead EAP to manage the application process on behalf of the Lion Smelter.

Table 3: Details of the appointed EAP

EAP:	Anandi Alers
EAP REGISTRATION:	2019/1514
CONSULTING COMPANY:	Nettzero (Pty) Ltd
CONTACT NUMBER:	+27 72 604 0455
FAX NUMBER:	+27 86 673 0945
EMAIL:	Anandi.alers@nettzero.co.za

3.1 SUMMARY OF EAP QUALIFICATION

Mrs. Anandi Alers completed a Master of Science degree in Environmental Management and Geography in 2015 at the North West University (Potchefstroom) under the guidance of Prof. Luke Sandham.

She holds a Bachelor of Science Honours degree in environmental sciences, specialising in Environmental Management and Geography, and a Bachelor of Science degree in Tourism, Zoology, and Geography.

3.2 SUMMARY OF EAP'S PAST EXPERIENCE

Mrs Anandi Alers has extensive knowledge of the South African EIA process and holds a Master of Science degree in Environmental Management on the subject of EIA follow-up. Her practical experience includes, but is not limited to the following:

- Environmental Management of a number of construction, mining, and industry related projects;
- Environmental auditing of a number of projects against the approved EMP's and EA (Environmental Authorisations);
- The development and management of an ISO 14001 EMS (Environmental Management Systems) on a number of construction, mining and industry related projects;
- Development and implementation of policies and procedures managing environmental impacts; and
- Managing applications for a number of permits and licences (EA's, WML's, and WUL's).

3.3 APPOINTED SPECIALISTS

Nettzero has appointed the following independent specialist on behalf of the Lion Smelter, to conduct the required assessments as part of the BA process (Table 4):

Table 4: List of appointed independent specialist

NAME	DESIGNATION	PROF. REG. /ACCREDITATION	YEARS EXPERIENCE	QUALIFICATIONS
AGRICULTURAL IMPACT ASSESSMENT – LAND MATTERS ENVIRONMENTAL CONSULTING (PTY) LTD				
Rowena Harrison	Soil Scientist	SACNASP Reg. No. 400715/15	> 12 years	PhD Candidate - Soil Science (University of Free State and the University of Burgundy, France)
LANDSCAPE/VISUAL IMPACT ASSESSMENT - LOGIS				
Lourens du Plessis	Visual Impact Assessment Specialist	GISc Practitioner registered with the South African Geomatics Council (SAGC). Membership no. PGP0147	> 29 years	BA (Geography)
ARCHAEOLOGICAL, CULTURAL HERITAGE AND PALAEOLOGY IMPACT ASSESSMENT – BEYOND HERITAGE				
Jaco van der Walt	Air quality specialist	Accredited CRM Archaeologist with SAHRA Accredited CRM Archaeologist with AMAFA	> 20 years	Phd (Archaeology)(in progress) MA (Archaeology) BA. Hon. (Archaeology) BA (Archaeology)
TERRESTRIAL BIODIVERSITY, PLANT AND ANIMAL SPECIES IMPACT ASSESSMENT – THE BIODIVERSITY COMPANY				
Andrew Husted	Ecologist and Aquatic Scientist	SACNASP Reg. No. 400213/11	> 12 years	M.Sc in Aquatic Health

Lusanda Matee	Ecologist	SACNASP Reg. No. 11927/2018	> 4 years	B.Sc Honours, and MSc in Biological Sciences from the University of KwaZulu-Natal.
AQUATIC BIODIVERSITY IMPACT ASSESSMENT – THE BIODIVERSITY COMPANY				
Christian Fry	Aquatic Scientist	SACNASP Reg. No. 119082	> 8 years	M.Sc in Aquatic Health
Dale Kindler	Aquatic Scientist	SACNASP Reg. No. 114743	> 9 years	M.Sc in Aquatic Health
HYDROLOGY - GCS				
Hendrik Botha	Geohydrologist	SACNASP Reg. No. 400139/17	> 8 years	B.Sc. Chemistry and Geology B.Sc. Hon. Hydrology M.Sc. Geohydrology and Hydrology
NOISE IMPACT ASSESSMENT - DBACOUSTICS				
Barend van der Merwe	Environmental Noise Specialist	Member of the South African Acoustics Institute (SAAI)	> 20 years	M.Sc
TRAFFIC IMPACT ASSESSMENT - SIYAZI				
Paul van der Westhuizen	Road Engineer			
HEALTH IMPACT ASSESSMENT – INFOTOX (PTY) LTD				
Dr. Willie van Niekerk	Health Scientist	QEP (Qualified Environmental Professional), IPEP, USA, 1996. SACNASP Reg. No. 400284/04	> 20 years	BSc (Chemistry), Potchefstroom, 1965. Hons BSc (Chemistry), Potchefstroom, 1966. MSc (Chemistry), Potchefstroom, 1967. PhD (Chemistry), UNISA, 1973.
SOCIO-ECONOMIC ASSESSMENT – BATHO EARTH				
Ingrid Snyman	Social Scientist		> 20 years	B A (Political Science) University of Pretoria B A (Hons) Anthropology University of Pretoria
AIR QUALITY – ENVIRONGAKA (PTY) LTD				
Jan Potgieter	Chemical Engineer	ECSA Reg. No. 20040140	> 15 years	Degree in Chemical Engineering

4 IMPACT MANAGEMENT APPROACH

During the Basic Assessment (BA) process, a number of impacts and risks were identified and assessed.

For the purposed of the EMPr, these identified impacts and risks will not be discussed in detail, therefore, this EMPr must be read in conjunction with the Basic Assessment Report (BAR) developed by the EAP and submitted as part of the application process for Environmental Authorisation (EA).

The following sections will provide the general approach taken by the EAP in the development of the EMPr.

4.1 LEGISLATION AND OTHER REQUIREMENTS

The requirement of the development and provisioning of minimum contents of an EMPr and Closure Plan, is regulated by the 2014 EIA regulations promulgated in terms of NEMA. Apart from NEMA, South Africa has an extensive list of other environmental and sustainable development related legislation.

In addition to the South African legislation, a number of national and international standards and best practice guidelines have been published by various institutions to guide the development of environmental management programs.

For the purposed of this EMPr, the following legislative and other requirements was considered in its development:

4.1.1 EIA REGULATIONS

Appendix 4 of the 2014 EIA regulations lists the minimum report contents required in the EMPr when submitting it to the competent authority for consideration.

Table 5 provides a checklist indicating the required content as per the regulations that has been considered during the development of the EMPr.

Table 5: Environmental Management Programme (EMPr) content checklist as per Appendix 4 of the EIA regulations

REGULATION REFERENCE	REQUIREMENT	REPORT REFERENCE	PAGE
1.	An EMPr must comply with section 24N of the Act and include— (a) details of— (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 3, page 8	
	(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 2.1, page 2	
	(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Section 2.4, page 7	
	(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including— (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Section 5.2, page 28, and Table 8 to Table 20.	
	(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to—(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 5.2, page 28, and Table 8 to Table 20.	

	(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5.3, page 56, Table 21
	(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5.3, page 56, Table 21
	(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 5.3, page 56, Table 21
	(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 5.3, page 56, Table 21
	(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 5.3, page 56, Table 21
	(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 6, page 61
	(m) an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 7, page 62
	(n) any specific information that may be required by the competent authority.	Section 8, page 64
2.	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	N/A

As per Regulation 19 of the EIA regulations, a Closure Plan is required where the application for an EA relates to the closure of a facility.

In terms of Listing Notice 1, activity 31 (closure of existing facilities, structures, or infrastructure) was excluded as part of the application for the required EA.

As per section 9.4 of the BAR (submitted as part of the application for EA), the period for which the EA is required is specified as at least **45 years**. Therefore, at the time of submitting the application for EA, the Closure Plan requirements as per Appendix 5 of the 2014 EIA regulations, was generally incorporated as “best practice principles” into this EMPr.

Table 6 provides a checklist indicating the required content as per the regulations that has been considered as “best practice principles”(see section 5.4) during the development of this document.

Table 6: Closure Report content checklist as per Appendix 5 of the EIA regulations

REGULATION REFERENCE	REQUIREMENT	REPORT PAGE REFERENCE
1	A closure plan must include— (a) details of— (i) the EAP who prepared the closure plan; and (ii) the expertise of that EAP;	Section 3, page 8.
	(b) closure objectives;	Section 5.2, page 28.
	(c) proposed mechanisms for monitoring compliance with and performance assessment against the closure plan and reporting thereon;	Section 5.2, page 28.
	(d) measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity and associated closure to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development, including a handover report, where applicable;	Section 5.2, page 28, and Table 8 to Table 20.
	(e) information on any proposed avoidance, management and mitigation measures that will be taken to address the environmental impacts resulting from the undertaking of the closure activity;	Section 5.2, page 28, and Table 8 to Table 20.
	(f) a description of the manner in which it intends to— (i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation during closure; (ii) remedy the cause of pollution or degradation and migration of pollutants during closure; (iii) comply with any prescribed environmental management standards or practices; and (iv) comply with any applicable provisions of the Act regarding closure	Section 5.2, page 28, and Table 8 to Table 20.
	(g) time periods within which the measures contemplated in the closure plan must be implemented;	Section 5.2, page 28, and Table 8 to Table 20.
	(h) the process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of closure;	Section 5.2, page 28, and Table 8 to Table 20.
	(i) details of all public participation processes conducted in terms of regulation 41 of the Regulations, including— (i) copies of any representations and comments received from registered	See BAR section 8.

	interested and affected parties; (ii) a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; (iii) the minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants; (iv) where applicable, an indication of the amendments made to the plan as a result of public participation processes conducted in terms of regulation 41 of these Regulations; and (j) where applicable, details of any financial provision for the rehabilitation, closure and on-going post Closure management of negative environmental impacts.	
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4.1.2 OTHER ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

During the development of the BAR, several relevant legislative requirements have been identified (see section 3 of the BAR submitted for authorisation). Throughout the development of management measures all current legislative and other requirements associated to the ECF project were considered and highlighted and forms part of the impact management actions identified in Table 8.

4.1.3 STANDARDS AND BEST PRACTICE GUIDELINES

4.1.3.1 Environmental Management System (EMS)

Globally, there are a number of tools or guideline documents available to assist or describe environmental management. The purpose of an EMPr is to describe the process of managing the identified potential environmental impacts or risks identified during the BA process throughout the entire life cycle (from planning and design, to implementation, operation, and Closure) of the proposed ECF project.

During the development of this EMPr the EAP took an integrated environmental management approach by adopting, in addition to the legislative requirements, the principles set out in the internationally recognised ISO 14001 Environmental Management System (EMS) standard.

The ISO 14001 EMS rationale is essentially based on the Deming Cycle which is a simplified continuous improvement model consisting of four main iterative steps.

These steps are described as follows:

- Plan – Establish objectives and processes necessary to deliver results in accordance with the developed organisational environmental policy.
- Do – Implement the process.
- Check – Monitor and measure processes against environmental policy, objectives, legal and other requirements and report the results.
- Act – Take action to continually improve environmental performance.

Continual improvement is achieved by periodically monitoring and reviewing the EMPr, subsequently implementing corrective actions when required. Therefore, this document should be considered as a living document which should be continuously updated and possibly improved.

4.2 SPECIALIST RECOMENDATIONS

During the BA process, the appointed specialists, as highlighted in section 3.3 of this document, conducted the required assessments in line with the published ²protocols.

The recommendations made by each specialist are addressed by developing the appropriate mitigation measure as part of the impact management actions identified in Table 8.

To summarise, Table 7, provides with the specialist recommendation.

² GN. 320 (GG 38282 dated 20 March 2020) and GN. 1150 (GG 4855 dated 30 October 2020): Procedure for the assessment and minimum criteria for reporting on identified environmental themes in terms of section 24(5)(a) and (h) and 44 of NEMA when applying for environmental authorisation.

Table 7: Summary of impact assessment outcome and specialist recommendation

ENVIRONMENTAL ASPECT	IMPACT ASSESSMENT OUTCOME	SUMMARY OF IMPACTS		SPECIALIST RECOMMENDATION
		POSITIVE	NEGATIVE	
AIR QUALITY & CLIMATE	Based on the modelled outcome, the contribution of the proposed development to exceeding the legislative air quality standards, is overall considered to be low .		From the AQIA, it is concluded that the proposed development is “ unlikely ” to impact negatively on the surrounding environment.	<p>It is recommended that Site Management review the existing air quality / pollution management plan with consideration of the phased impact/risk assessment provided in and the possible management measures / actions for the air quality management plan as provided in Appendix P. These measures includes but are not limited to the following:</p> <ul style="list-style-type: none"> • Maintaining measures to minimise the release of abnormal emissions (raw gas and tapping/casting fugitives) to an absolute minimum since the impact thereof is potentially significant; • Apply / perform efficient dust suppression techniques; • Limiting vehicle movement and associated diesel consumption as far as possible; • Manage speed of onsite vehicles to slow speeds, e.g. ≤20km/h; • Perform adequate re-vegetation of potential areas; • Capture and reduce as much fugitive emissions as is practicable; <p>In addition to existing monitoring requirements, it is recommended to increase the existing Dust Fallout Monitoring network to include the following monitoring areas:</p> <ul style="list-style-type: none"> • East of the proposed TSF1 and TSF2 location; • Far northeast perimeter of site, on the property on the opposite side off the R555 than the smelter; • Northern perimeter of the same last mentioned property; and • Western perimeter of the same last mentioned property.
TERRESTRIAL BIODIVERSITY	<p>Medium to low sensitivity for the Plant and Animal Species.</p> <p>Low sensitivity Terrestrial Biodiversity.</p>	Implementation of the proposed rehabilitation measures may enhance the current state of the ecology as the project is located on a previously disturbed area.	The proposed development is situated within an ecology considered to be endangered.	<p>A number of generic management outcome measures were provided, and includes, but are not limited to, the following:</p> <ul style="list-style-type: none"> • Spatial footprint to be kept to a minimum during construction; • Disturbance to indigenous vegetation to be kept to an absolute minimum; • Existing access routes and walking ways should be utilised and the development of new roads to be avoided; • Provincial protected species must be marked for rescue and relocation, or removal (where permit application would apply) before any vegetation removal commences; • It is recommended that the supervisor of the vegetation clearing contractors receive adequate training as to the presence, identity, and management of species of conservation importance, and that a botanical specialist/ECO (Environmental Control Officer) be

				<p>appointed during vegetation clearing to conduct monthly on-site audits of the vegetation clearing process;</p> <ul style="list-style-type: none"> • Employees and contractors should be made aware of the presence of, and rules regarding fauna through suitable induction training and on-site signage; • Alien and invasive plant (AIP) species should be managed using the existing mine AIP management plan. Removal AIPs should preferably commence during the pre-construction phase and continue throughout the construction and operational phases. AIPs should be cleared within the project area before any vegetation clearing activities commence, thereby ensuring that no AIP propagules are spread, or soils contaminated with AIP seeds during the construction phase; and the existing mine AIP Management/ Control Plan should be implemented by a qualified professional. No chemical control of AIPs to occur without a certified professional; and • No dumping of litter, rubble or cleared vegetation on site should be allowed.
AQUATIC BIODIVERSITY	Low sensitivity related to Aquatic Biodiversity.	By implementing the management and monitoring measures identified in the developed EMPr, may potentially enhance the aquatic biodiversity status by implementing a rehabilitation schedule.	The proposed development is situated well outside the determined 32 m buffer from the identified wetland and natural drainage system (situated southwest from development). Should storm water not be managed as per the conceptual storm water management plan, activities may potentially lead to sedimentation and siltation of the natural system.	<p>The following, but not limited to, management outcomes are recommended:</p> <ul style="list-style-type: none"> • Due to the nature of the aquatic systems associated with the project area and low risk to the downstream receiving environments, additional aquatic assessments are not required should adequate buffers be implemented and project footprint not change; • An adaptive rehabilitation plan needs to be implemented from the onset of the project. This must be compiled with input from independent ecological specialists. Additionally, a rehabilitation plan is recommended for existing modifications within the drainage line, including implementing adequate erosion control, removal of tyres and the removal of concrete from the instream zone. These should be replaced by drought tolerant indigenous vegetation suited for erosion control; and • An infrastructure monitoring and service plan must be compiled and implemented during the operational phase. This will include the monitoring of all stormwater discharge points, energy dissipation structures, and stability of watercourses in the project footprint.

<p>SOIL & AGRICULTURAL</p>	<p>The site is classified as having a <i>low</i> agricultural potential.</p>	<p>Implementation of the proposed rehabilitation measures may enhance the current state of the ecology as the project is located on a previously disturbed area.</p>	<p>If not managed correctly, fertile soil may be lost during construction and Closure activities.</p> <p>The lack of implementing a spill prevention and emergency preparedness plan may lead to potentially contaminating soil recourses.</p>	<p>Mitigation measures should be aimed at limiting the impact of soil erosion as well as soil contamination during the construction phase.</p>
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<p>WATER RESOURCES</p>	<p>The risk assessment for both construction and post-construction phases of the project is considered <i>low</i>, with mostly reversible and manageable impacts.</p>	<p>By implementing the management and monitoring measures identified in the developed EMPr, may potentially enhance the aquatic biodiversity status by implementing a rehabilitation schedule.</p>	<p>The proposed development is situated well outside the determined 32 m buffer from the identified wetland and natural drainage system (situated southwest from development). Should storm water not be managed as per the conceptual storm water management plan, activities may potentially lead to sedimentation and siltation of the natural system.</p>	<p>The following, but not limited to, management outcomes are recommended:</p> <ul style="list-style-type: none"> • Ensure that stormwater discharge at least adheres to the National Water Act, Government Gazette No. 20526, 8 October 1999. Wastewater limit values applicable to discharge of wastewater into a water resource. • All building wastes generated during construction on site (this is temporary waste i.e. building rubble, garden refuse, used oil and paint containers etc.) must be stored in designated areas that are isolated from drainage lines / known flooding areas. Waste storage facilities should be covered to prevent dust and litter from leaving the containment area and rainwater accumulation. • There is some potential for erosion. Measures should be taken to ensure that this is minimized where possible. • It is proposed that water quality monitoring be implemented as discussed in Section 4.8 (Appendix K) to monitor the impact of the development on the receiving environment as a result of stormwater discharge.
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<p>TOPOGRAPHY AND VISUAL</p>	<p>The post mitigation significance of the visual impacts is expected to be <i>low</i>.</p>	<p>Upon closure of the proposed development, the already disturbed landscape will be shaped and rehabilitated to a suitable land-use.</p>	<p>Locating the proposed development within close proximity to sensitive receptors poses a risk of the overall sense of place to the surrounding community.</p>	<p>The following mitigation is however possible:</p> <ul style="list-style-type: none"> • It is recommended that vegetation cover (i.e. either natural or planted) immediately adjacent to the development footprint (and especially in between the ECF and the R555 road) be maintained, both during construction and operation of the proposed facility. This will minimise the visual impact resulting from areas denuded of vegetation and shield the facility from observers travelling along the R555. • Existing roads should be utilised wherever possible. New roads should be planned taking due cognisance of the topography to limit cut and fill requirements. The construction/upgrade of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems. • In terms of onsite ancillary buildings and structures, it is recommended that it be planned so that clearing of vegetation is minimised where possible. This implies consolidating this infrastructure as much as possible and making use of already disturbed areas rather than undisturbed sites wherever possible. • Mitigation of lighting impacts includes the pro-active design, planning and specification of lighting for the facility. The correct specification and placement of lighting and light fixtures for the proposed ECF and ancillary infrastructure will go far to contain rather than spread the light. Mitigation measures include the following: <ul style="list-style-type: none"> ○ Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself); ○ Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights; ○ Making use of minimum lumen or wattage in fixtures; ○ Making use of down-lighters, or shielded fixtures; ○ Making use of Low Pressure Sodium lighting or other types of low impact lighting. ○ Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. • Mitigation of visual impacts associated with the construction phase, albeit temporary, would entail proper planning, management and rehabilitation of the construction site. Recommended mitigation measures include the following: <ul style="list-style-type: none"> ○ Ensure that vegetation adjacent to the development footprint (if present) is not unnecessarily cleared or removed during the construction period. ○ Reduce the construction period through careful logistical planning and productive implementation of resources wherever possible. ○ Plan the placement of laydown areas and any potential temporary construction camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
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				<ul style="list-style-type: none"> ○ Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. ○ Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities. ○ Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent). ○ Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting wherever possible. ○ Rehabilitate all disturbed areas (if present/if required) immediately after the completion of construction works. • During operation, the maintenance of the ECF and ancillary structures and infrastructure will ensure that the facility does not degrade, therefore avoiding aggravating the visual impact. • Roads must be maintained to forego erosion and to suppress dust, and rehabilitated areas must be monitored for rehabilitation failure. Remedial actions must be implemented as and when required. • Once the facility has exhausted its life span, the main facility and all associated infrastructure not required for the post rehabilitation use of the site should be removed and all disturbed areas appropriately rehabilitated, unless a new authorisation is granted for the plant to continue a new cycle. An ecologist should be consulted to give input into rehabilitation specifications. • All rehabilitated areas should be monitored for at least a year following Closure, and remedial actions implemented as and when required. • Secondary impacts anticipated as a result of the proposed ECF (i.e. visual character and sense of place) are not possible to mitigate. • Where sensitive visual receptors (if present) are likely to be affected it is recommended that the developer enter into negotiations with the property owners regarding the potential screening of visual impacts at the receptor site. This may entail the planting of vegetation, trees or the construction of screens. Ultimately, visual screening is most effective when placed at the receptor itself.
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<p>NOISE</p>	<p>The potential noise impact from the proposed ECP Project will be low with all the mitigatory measures in place.</p>	<p>The large variations in the meteorological conditions and the geographical relations between the proposed ECF activities and the noise sensitive receptors allow for the decrease in the noise as it propagates from the existing Lion Smelter.</p>	<p>Increased noise levels at potentially sensitive receptors exceeding criteria of the Noise Control Regulations legislation (NCR) and SANS guidelines.</p>	<p>The following mitigation measures must be implemented to ensure the potential impact are managed:</p> <ul style="list-style-type: none"> • Equipment and/or machinery which will be used must comply with the manufacturer’s specifications on acceptable noise levels and any noise sources above 85.0dBA to be acoustically screened off. • Construction activities may only take place during daytime periods and provided that the prevailing ambient noise level along the mine boundaries will not be exceeded. • Environmental noise monitoring on a monthly basis. • Equipment and/or machinery which radiate noise levels above 85.0dBA to be acoustically screened off. • Noise monitoring at the residential areas and the mine boundaries to be done monthly for a year after which the frequency can change to a quarterly basis; • Actively manage the process and the noise management plan must be used to ensure compliance to the noise regulations and/or standards. The levels to be evaluated in terms of the threshold noise levels of 70.0dBA along the boundaries of the property; • Machinery with low noise levels which complies with the manufacturer’s specifications to be used; and • Activities to take place during daytime period only.
<p>HERITAGE AND PALAEOLOGY</p>	<p>Impacts of the project on heritage resources is expected to be low during all phases of the development.</p>	<p>No features of significance observed at the preferred location.</p>	<p>The following mitigation measures must be implemented to ensure the potential impact on heritage resources are managed:</p> <ul style="list-style-type: none"> • Implement a chance find procedure in case of uncovering any heritage finds or graves; and • Frequent visual monitoring of construction activities by the appointed Environmental Control Officer (ECO). 	
<p>HEALTH AND SAFETY</p>	<p>The respiratory and cardiovascular related health effects associated with the determined pollutants associated with the proposed development has been determined to be low.</p>	<p>The potential health related impacts associated with the continuing of the proposed development has been determined to be insignificant.</p>	<p>Implementation of the recommendations of the air quality specialist.</p>	

<p>SOCIO-ECONOMIC</p>	<p>A <i>low</i> site sensitivity from a socio-economic perspective with the anticipated negative impacts mitigated and positive impacts enhanced.</p>	<p>Socio-economic intrusion, population change, and change in the sense of place.</p>	<p>Job opportunities and skills development opportunities throughout the entire life cycle.</p>	<p>The following measures are recommended:</p> <ul style="list-style-type: none"> • Reduce dust and noise during construction; • Implement and adhere to the Air Quality Management Plan; • Maintain infrastructure and services; • Enhance local employment opportunities as far as possible to ensure benefits for targeted groups; • Ensure transparent communication with regards to the procurement; • Ensure efficient and transparent management of the project; • Transfer of skills and capacity building during operational phase; • Local labour receives preference where possible; • Procurement and recruitment processes are transparent and clearly communicated; • Minimise negative visual impacts related to the project ; • No unauthorised access to the site/facility; • Limit dependency on the grid while lowering operational costs; • Implementation of project and environmental management will lessen carbon emissions; • Positive long-term impacts in reaching the reduction in total emissions footprint; • Positive long-term impacts on local and regional economy as a result of continuation of the life of the smelter with subsequent indirect employment opportunities and downstream economic opportunities; • Minimise intrusion impacts associated with Closure; and • EMPr compliance. <p>A further key requirement would be a transparent and comprehensive communication and participation process. A framework must be developed that would allow for meaningful engagements (consultation and participation) with the affected parties on an iterative basis, as well as the active participation of community representatives in the planning processes.</p>
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<p>TRAFFIC MANAGEMENT</p>	<p>The potential traffic impact from the proposed ECP Project will be low with all the mitigatory measures in place.</p>	<p>Improvements of the current road intersection to improve road safety.</p>	<p>Increased pressure on local roads during construction activities.</p>	<p>The intersection of Road R555 and Existing Smelter Access Road is an existing intersection and is currently provides access to maintenance activities at the existing Lion Smelter only. The smelter mainly gains access from Road D212 and therefore improvements to the intersection of Road R555 and Existing Smelter Access Road (Point A) without the proposed project is not justified, and due to the latest regulations and traffic engineering practice, improvements from a road safety perspective is required should the ECF project continue.</p> <p>These improvements include the following:</p> <ul style="list-style-type: none"> • East of the intersection on Road R555: A 60 meters Left-Turn Deceleration Lane and Free-Flow traffic control. • South of the intersection on the existing Smelter access: Stop for approaching traffic control. • West of the intersection on Road R555: A 60 meter Dedicated Right-Turn Lane. <p>The following recommendations are made in terms of other traffic engineering related matters with regards to the existing roads network, due to the Proposed Project:</p> <ul style="list-style-type: none"> • Provide reflective road studs at strategic points (LED if possible) to ensure the safe operation of the relevant intersections under investigation at night-time and during power outages. • Provide required road traffic signs for the relevant intersection. • Provide relevant road markings at relevant intersection under investigation (highway paint recommended). • Provide workers with training on road safety. • Road safety and awareness campaigns should be run at the proposed project. <p>In addition to the above recommendations, a formal application for intersection upgrading should be submitted to the South African National Roads Agency SOC Ltd (SANRAL) for approval purposes before any work is conducted within the road reserve of Road R555.</p>
<p>WASTE MANAGEMENT</p>	<p>Impacts associated with waste management can be effectively managed to a low significance.</p>	<p>Effective waste management through the implementation of the developed EMPr.</p>	<p>Potential pressure on existing municipal infrastructure during construction and Closure phase of the proposed development.</p>	<p>The following recommendations should be implemented:</p> <ul style="list-style-type: none"> • A Waste Management Plan to be developed and implemented in line with the existing management plan associated with the Lion Smelter operation; • Ensure the effective design of the PBU & CGC' condensate effluent management system according to waste stream classification; and • Prioritising the implementation of the waste management hierarchy, disposal being the last option.

4.3 MITIGATION HIERARCHY

Section 2 (4) (a) (i) of NEMA sets out the hierarchy for mitigating impacts and risks. During the BA process and the development of the mitigation measures as part of this EMP, the following mitigation hierarchy was followed:

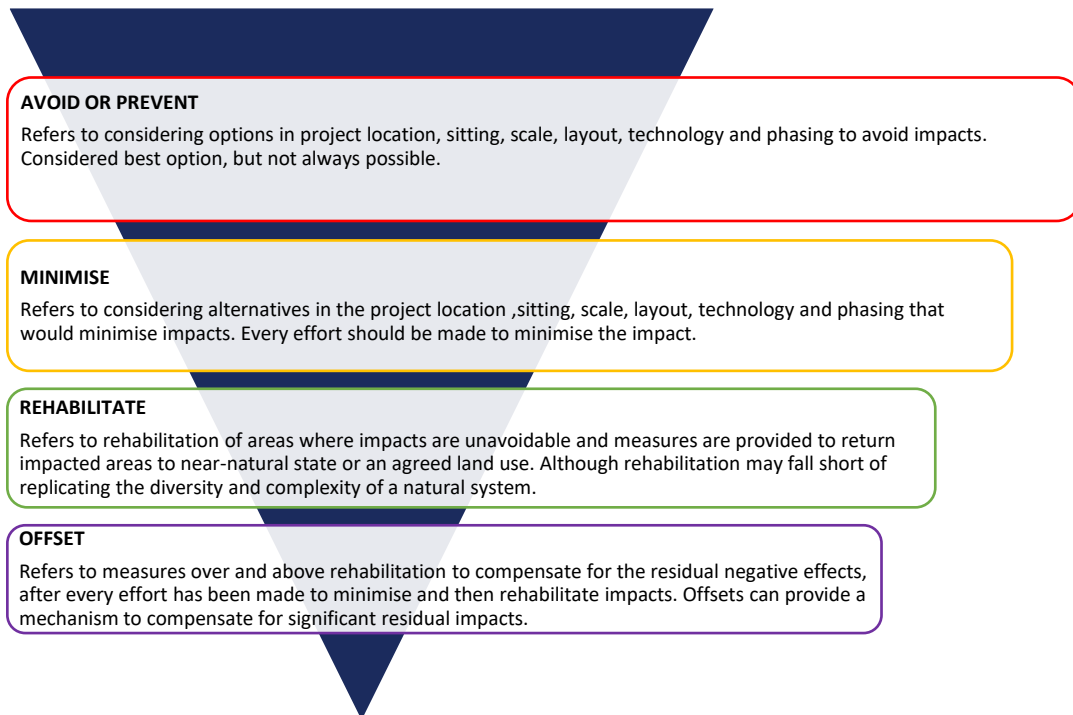


Figure 7: Mitigation hierarchy considered during the impact assessment process and the development of the EMP

4.4 SETTING OF IMPACT MANAGEMENT OBJECTIVES

Impact management objectives and targets was determined to assist in ensuring the actions identified are achieving the required outcome related to the identified mitigation type. This provided the EAP guidance in identifying monitoring requirements set out in Table 21.

5 IMPACT MANAGEMENT OUTCOMES

5.1 ROLES AND RESPONSIBILITIES

5.1.1 HOLDER OF THE AUTHORISATION

The holder of the EA (HoEA), Glencore Operations South Africa (Pty) Ltd – Lion Smelter, a Glencore Merafe Venture, are responsible for the following:

- Ensuring compliance with the EA and EMP throughout the entire life cycle of the ECF project;
- Ensuring that the Operator, and all contractors, sub-contractors or service providers appointed by the Operator, complies with the requirements stipulated in the EA and EMP, inclusive of the Closure Plan, as well as all other relevant regulations and legislation;
- Ensure that the requirements specified in the EA and EMP are included in the energy service agreement associated with the ECF project; and

- Obtain the required EA associated with the closure (as defined by the regulations) of the ECF project.

5.1.2 OPERATOR

The energy service agreement between Glencore Operations South Africa (Pty) Ltd (HoEA) and Swedish Stirling involves the proposed construction and commissioning of the ECF project. Therefore, for the purpose of this document, when referring to the Operator, it refers to Swedish Stirling's energy service agreement.

Top management of the Operator must demonstrate leadership and commitment with respect to the adherence with the requirements specified in this EMPr by:

- Taking accountability for the effective implementation of the conditions of the EMPr and established EMS;
- Ensuring the determined environmental objectives specified in the EMPr are implemented and compatible with the strategic direction and the context of the ECF project;
- Ensuring the integration of the EMPr requirements into the ECF project's business processes;
- Ensuring that the resources needed for the successful implementation of the EMPr are readily available;
- Communicating the importance of effective environmental management and of conforming to the requirements set in the EMPr;
- Ensuring that the EMPr achieves its intended outcomes;
- Directing and supporting persons to contribute to the effectiveness of the developed EMPr;
- Promoting continual improvement; and
- Supporting other relevant management roles to demonstrate their leadership as it applies to their areas of responsibility.

In addition to the above, the Operator must ensure that all contractors, sub-contractor and service providers appointed:

- Are informed of the requirements specified in the EMPr relevant to their appointment;
- Adhere to the relevant requirements specified in the EMPr; and
- Provides method statements for activities that may have a potential impact on the environment and communities.

5.1.3 ENVIRONMENTAL CONTROL OFFICER

Before the commencement of any activities, a suitably qualified and experience Environmental Control Officer (ECO) must be appointed.

The ECO's responsibility must include, but are not limited to, the following:

- Conducting regular site inspections;
- Submit a quarterly compliance report during the construction phase and quarterly during the operational phase to the competent authority indicating performance against the measures specified in the EA and EMPr
- Attend regular site meetings discussing findings from site inspections or any other concerns related to the environment and associated impacts;
- Pre-empt problems and suggest mitigation measures that arise during the site inspections;
- Be available to advice on incidental issues that arise;

- Attending quarterly Community and Stakeholder forum reporting the status of environmental performance (reporting incidents and performance of implementing the EMPr, and EA conditions);
- Conduct an annual internal compliance audit, assessing the effective implementation of the conditions of the EMPr and compliance thereof must also be submitted to the competent authority. An action plan indicating how the shortcomings and or non-conformities will be addressed must accompany the internal audit report.
- Liaising with the relevant competent authorities on the compliance status with the EA and EMPr (including the reporting of incidents in terms of section 30 of NEMA and section 20 of NWA);
- Reviewing and approving all required management plans or method statements that is relevant to environmental management activities; and
- Ensure effective record keeping associated with the EMS.

A copy of the appointment letter and acceptance of responsibility must be submitted to the relevant competent authority.

5.1.4 COMMUNITY REPRESENTATIVE

Before the commencement of any activities, a suitably qualified and experience Community Representative (CR) must be appointed.

The CR's responsibility must include, but are not limited to, the following:

- Develop and implement a grievance mechanism procedure identifying the required process for the I&AP, members of the public and all employees (permanent or contracted) to lodge a complaint during the construction, operational, and Closure phases of the facility. This procedure to be in line with the South African Labour Law. Formal records of complaints must be maintained for at least 5 years;
- Develop and implement a communications or engagement plan, to ensure all affected I&AP are made aware of each project phase;
- Coordinate and facilitate the required quarterly Community and Stakeholder forum; and
- Record and track progress on complaints received.

5.1.5 CONTRACTORS, SUB-CONTRACTORS AND SERVICE PROVIDERS

All contractor, sub-contractors and service providers appointed by the Operator, must:

- Adhere to the conditions of the EA and EMPr relevant to their appointment;
- Ensure that all employees are made aware of the requirements and records of communication are kept; and
- Provide detailed method statements for approval prior to the commencement of any activities.

5.1.6 METHOD STATEMENTS

Method statements (MS) must be provided on aspects of the project deemed or identified to have a significant impact on the environment and/or which may not be covered in sufficient detail in the EMPr/or where a specific management plan is required in the EMPr.

The need thereof will be agreed by the HoEA, the Operator and ECO or if specified in the EMPr. A MS is a 'starting point' for understanding the nature of the intended actions to be carried out and allows for all

parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

Changes to, and adaptations of MS can be implemented with the prior consent of all parties.

A MS describes the scope of the intended work in a step-by-step description in order for the HoEA, Operator, and ECO to understand the intentions in order to assist in devising any mitigation measures, which would minimize the environmental impact during these tasks.

The format of the MS should clearly indicate the following:

- What - a brief description of the work to be undertaken;
- How - a detailed description of the process of work, methods and materials;
- Where - a description/sketch map of the locality of work (if applicable); and
- When - the sequencing of actions with due commencement dates and completion date estimates.
- Who – The person responsible for undertaking the works described in the Method Statement;
- Why – a description of why the activity is required.

All MS are to be approved by the ECO in agreement with the HoEA and Operator.

5.2 IMPACT MANAGEMENT ACTIONS

5.2.1 GENERAL MANAGEMENT MEASURES

Table 8: General management measures to be implemented for each phase of the development

GENERAL MANAGEMENT MEASURES																				
PRE-CONSTRUCTION PHASE	<ol style="list-style-type: none"> The final site layout should consider all sensitivities verified in the Site Sensitivity Verification Report (SSVR). All planning and pre-construction activities to take place under the supervision of a suitably qualified and experienced environmental representative. A pre-construction site walkabout must be conducted by the ECO and Operator, recording the pre-construction land-use and status. An Environmental Control Officer (ECO), with appropriate experience and qualifications in the implementation of environmental management specifications, must be appointed prior to the commencement of any authorised activities. Once appointed the name and contact details of the ECO must be submitted to LEDET. Utilise existing infrastructure where possible, e.g., existing storm water management infrastructure and existing access roads to minimize environmental impacts. The holder of an environmental authorisation (HoEA) has the responsibility to notify the competent authority of any alienation, transfer and, change of ownership rights in the property on which the activity is to take place. Fourteen (14) days written notice must be given to LEDET that the activity will commence. The notification must include a date on which the activity will commence as well as the reference number. 																			
CONSTRUCTION & OPERATIONAL PHASE	<ol style="list-style-type: none"> The Operator must ensure that a suitable Environmental Management System are developed and maintained throughout the entire life cycle of the development. A copy of the EA and approved EMP must be readily available on-site or located in a designated location. All records related to compliance with the conditions of the EA and EMP must be kept for at least 5 years. All environmental incidents must be recorded and reported as per the Guidelines on the administration of incidents (published in 2019 or the latest version) as described in section 30 of the NEMA. Records of all incidents must be kept for the entire duration of the proposed development. Upon the completion of construction, an external independent auditor must be appointed to audit compliance with conditions applicable with the construction phase. All non-conformances must be addressed before commencing with the operational phase. All areas disturbed during the construction phase must be suitably rehabilitated before the commencement of operational activities. These areas to be rehabilitated to the satisfaction of the ECO. The HoEA must notify the competent authority of the expected date of commencing with the operational phase. The I&AP must be informed of the commencement of each phase at least one month prior to activities. 																			
CLOSURE PHASE	<p>A standalone detailed Closure Plan, complying with relevant regulations, must be developed and submitted as part of the process for obtaining the required Environmental Authorisation (EA) at least 12 months prior to the ³closure of the ECF project.</p> <p>The following general objectives must be considered when developing the required Closure Plan:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ASPECT</th> <th style="text-align: center;">OBJECTIVE</th> <th style="text-align: center;">PERFORMANCE INDICATOR</th> <th style="text-align: center;">MONITORING MECHANISM</th> </tr> </thead> <tbody> <tr> <td>Physical stability</td> <td>To remove and/or stabilise surface infrastructure.</td> <td> <ul style="list-style-type: none"> All rehabilitated disturbed areas that have the potential for wind and/or water erosion will be provided with a suitable vegetation cover to combat these aspects/forces; Where localised material deficits occur, voids will be backfilled and shaped as pan like or naturally undulating structures so that beneficial land uses can be implemented; and Monitoring is undertaken to demonstrate the success of the closure and rehabilitation measures implemented. </td> <td rowspan="4"> <ul style="list-style-type: none"> Auditing and reporting as specified in section 6. Implementation of the monitoring programme (Table 21). </td> </tr> <tr> <td>Environmental quality</td> <td>To ensure that local environmental quality is not adversely affected by possible physical impacts and contamination which may be arising from the rehabilitated areas.</td> <td> <ul style="list-style-type: none"> No environmental risks will remain post-closure. Environmental impacts will be investigated and addressed at source. If not addressed at the source, the required intervention/mitigation measures will be implemented, preferably during operations, to limit the intervention required at closure; and Ongoing monitoring will be undertaken to ensure the quality of the surface and groundwater remains within pre-mining quality ranges or at such quality that it suitably protects receptors. </td> </tr> <tr> <td>Land capability/land-use</td> <td>To re-instate suitable land capabilities over the rehabilitated portions.</td> <td> <ul style="list-style-type: none"> Where possible, land capability will be reinstated to match the pre-development land capabilities; A functional post-development landscape is achieved inline with Industrial 2 zoning; Invasive vegetation species will be eradicated to further enable achievement of the desired land capability on rehabilitated areas, and functioning of riparian zones; and Landforms are mostly free draining to maximise the surface water return into the catchment to reduce recharge and ensure connectivity of wetlands and functioning of riparian zones. </td> </tr> <tr> <td>Biodiversity</td> <td>To encourage, where appropriate (for example in corridors), the re-establishment of native vegetation on the rehabilitated areas such that the potentially affected terrestrial</td> <td> <ul style="list-style-type: none"> ⁴Self-sustaining vegetation communities are established; and Invasive species that could threaten the reinstatement of the desired vegetation communities are actively eradicated. </td> </tr> </tbody> </table>			ASPECT	OBJECTIVE	PERFORMANCE INDICATOR	MONITORING MECHANISM	Physical stability	To remove and/or stabilise surface infrastructure.	<ul style="list-style-type: none"> All rehabilitated disturbed areas that have the potential for wind and/or water erosion will be provided with a suitable vegetation cover to combat these aspects/forces; Where localised material deficits occur, voids will be backfilled and shaped as pan like or naturally undulating structures so that beneficial land uses can be implemented; and Monitoring is undertaken to demonstrate the success of the closure and rehabilitation measures implemented. 	<ul style="list-style-type: none"> Auditing and reporting as specified in section 6. 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³ The definition of closure in terms of this document means to take out of active service permanently or to dismantle partly or wholly, or permanent shutdown of a facility to the extent that it cannot be recommissioned.

⁴ Able to continue in a healthy state, i.e. pre-development land capability, without interventions such as herbicide, water, and fertilizer applications, etc.

		and or aquatic biodiversity is largely re-instated over time.		
	Social	To ensure that the infrastructure transfers (if any), and measures and/or contributions made towards the long-term socio-economic benefit of the local communities are sustainable.	<ul style="list-style-type: none"> • The local communities are adequately informed about closure (next land use planning, scheduled closure and re-skilling initiatives linked to the next land use, where possible); • Obsolete/dormant infrastructure that could be beneficially reused is identified and re-used; and • Communities scheduled to benefit are empowered to take over and maintain relinquished infrastructure for their ongoing benefit. 	

5.2.2 AIR QUALITY & CLIMATE CHANGE MANAGEMENT MEASURES

Table 9: Air quality and climate change management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
<p>Design capacity</p> <p>Site footprint & location</p> <p>Site clearing: - Laydown area (temporary and permanent) - Offices and parking -Substation</p> <p>Removal of topsoil and stockpiling</p> <p>Material stockpiling</p> <p>Backfilling and levelling</p> <p>Importing of material to site</p> <p>Movement of construction</p>	<p>Air quality</p> <p>Release of fugitive dust emissions</p> <p>GHG emission (from stack)</p> <p>Electricity usage</p> <p>Release of fugitive dust emissions</p>	<p>Degradation of air quality</p> <p>Contribution to climate change</p> <p>Increase of carbon footprint</p>	<p>Construction, Operational, and Closure</p>	<p>Control</p>	<p>Pre-construction measures:</p> <ol style="list-style-type: none"> The existing Air Emissions Licence (AEL) to be amended to include the additional activity in terms of GN 893 GG 37054 dated 22 November 2013 (as amended) associated with the proposed development: Sub-category 1.5 Reciprocating Engines. A notice of the outcome of the amendment of the existing Air Emissions Licence (AEL) to be provided to LEDED. Designing team must consider the final specialist recommendations made to reduce and manage the emissions associated with the proposed facility. <p>Construction measures: Control through dust & emission management:</p> <ol style="list-style-type: none"> Take all reasonable measures to minimise the generation of fugitive dust as a result of construction activities to the satisfaction of the ECO. Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be revegetated or stabilised as soon as is practically possible. Develop and implement a dust suppression schedule. Biodegradable and environmentally friendly flocculent (approved by the ECO) may be used as dust suppressant. Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present. During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level. Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind. Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO. Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas. For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust. The loading, transfer and discharge of materials should take place with a minimum height of fall and be shielded against the wind. During earth-moving works, pre-water areas to be disturbed. Plan earth moving works so that they are completed just prior to the time they are needed. Switch off engines whilst not in use. Establish a maintenance schedule to ensure proper maintenance of the trucks & mobile equipment. Conduct regular maintenance and quality checks (engines/tyres) for all heavy mobile equipment/trucks 	<ol style="list-style-type: none"> Adherence with conditions set in the amended AEL. Limiting the occurrences of abnormal emissions. Ensuring compliance with the National Dust Control regulations. Managing the contribution of the ECF project to the overall air quality of the surrounding environment. 	<ol style="list-style-type: none"> Limiting the exceedance of emissions standards set by the amended AEL. Immediately reporting any abnormal emissions to the applicable competent authority and immediate affected communities. Recording all abnormal emissions and investigating the root cause. Implementing preventative measures that caused reported abnormal emissions. No complaints from site staff, surrounding landowners and communities. Adherence with legal required dust fallout levels. 	<ol style="list-style-type: none"> Development and implementation of a Dust management plan. Ensuring compliance with the National Environmental Management: Air Quality Act (NEMAQA), No. 39 of 2004 as amended by Act no 20 of 2014. Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009). Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013). Ensuring compliance with the amended AEL. 	<p>Entire life cycle</p>

plant and equipment										
Foundation excavation										
Operation of PBU & CGC										
Operation of main substation & back-up generator										
Site offices, ablution facilities & kitchen										
Removal of mobile PBU & CGC										
Demolishing sub-station										
Movement of demolishing equipment										
Placement of topsoil & revegetation										
Rehabilitation of disturbed areas										

Operational measures:

Control through *dust & emission management*:

1. Take all reasonable measures to minimise the generation of dust on unpaved roads being used during the operational phase.
2. Develop and implement a dust suppression schedule for all unpaved surfaces.
3. Biodegradable and environmentally friendly flocculent (approved by the ECO) may be used as dust suppressant.
4. Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas.
5. Reduce/minimise vehicle movement and associated diesel consumption as far as practicable.
6. The usage of the back-up generator must be limited where possible. A maintenance schedule for the generator must be developed and implemented.
7. Electricity usage of the offices, ablution facilities and stores must be monitored. Ensure that all unnecessary electrical equipment are switched off at the end of each shift.

Avoid through *incident management and emergency preparedness*:

1. Report all abnormal emissions within 24 hours to the competent authority and the immediate surrounding community.
2. A record to be kept of all abnormal emissions experienced. An investigation must be conducted to find the root cause of the event.
3. Preventative measures following the investigation into the abnormal emissions must be implemented by the operational team and implementation thereof must be followed-up by the appointed ECO.
4. Should the abnormal emissions exceed a period of 48 hours, an incident in terms of section 30 of NEMA must be reported to the relevant competent authority (refer to the procedure as per the incident guidelines).

Control through *adherence with minimum emissions standards*:

1. In the event that the operational capacity, be expanded to a maximum capacity output of 20 MW (i.e. increasing the number of PBU & CGC units as provided in the preferred site layout plan), the dispersion model must be updated and revised to include any additional emission points. This must be submitted to the relevant authority for approval prior to commencement of expansion activities.
2. Conditions as set out in the amended AEL must be adhered to at all times.
3. Implementation of adequate abatement and mitigation technology to improve the control efficiency of Air Pollution Control Equipment (APCE).
4. Minimising the release of uncontrolled emissions to an absolute minimum.

Closure measures:

Control through *dust & emission management*:

1. Take all reasonable measures to minimise the generation of fugitive dust as a result of Closure activities to the satisfaction of the ECO.
2. Develop and implement a dust suppression schedule.
3. Biodegradable and environmentally friendly flocculent (approved by the ECO) may be used as dust suppressant.
4. Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas.
5. Establish a maintenance schedule to ensure proper maintenance of the trucks & mobile equipment.
6. Conduct regular maintenance and quality checks (engines/tyres) for all heavy mobile equipment/trucks.

5.2.3 TERRESTRIAL BIODIVERSITY MANAGEMENT MEASURES

Table 10: Terrestrial biodiversity management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
<p>Site footprint & location</p> <p>Site clearing:</p> <ul style="list-style-type: none"> - Laydown area (temporary and permanent) - Offices and parking -Substation <p>Removal of topsoil and stockpiling</p> <p>Material Stockpiling</p> <p>Backfilling and levelling</p> <p>Importing of material to site</p> <p>Temporary hazardous substance storage</p> <p>Access control & security fencing</p>	<p>Terrestrial Ecology; Fauna & Flora</p> <p>Disturbance to terrestrial biodiversity</p> <p>Influx of alien species</p> <p>Increased fire risk</p> <p>Accidental field fires caused by lack of fire breaks</p> <p>Limiting faunal movement</p> <p>Temporary increase of site footprint</p> <p>Re-establishment vegetation</p>	<p>Degradation of terrestrial biodiversity</p> <p>Loss of fauna and flora species</p> <p>Vegetation and habitat loss</p> <p>Uncontrollable presence of alien & invasive species</p> <p>Disturbance to natural vegetation to re establish</p> <p>Disruption of faunal patterns</p> <p>Loss of human life</p> <p>Loss of animal life</p>	<p>Construction, Operational, and Closure</p>	<p>Avoid, Control, and Remedy</p>	<p>Pre-construction measures:</p> <ol style="list-style-type: none"> 1. Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. 2. Before the commencement of construction activities, the area for development should be clearly demarcated to restrict activities within the development footprint. 3. Prior to any construction activities, the ECO (if suitably qualified) or appointed specialist (preferably SACNASP registered specialising in the field of ecology), must conduct a site inspection recording all potential protected or endangered fauna and flora species. A detailed register should be kept of these species indicating at least its location, condition and potential of relocation. 4. Provincially protected (including species of conservational concern) must be marked for rescue and relocation, or removal (where permit application would then apply) before any vegetation removal commences. 5. Obtain any additional environmental permits required from LEDA for the protected plant species that need to be translocated through the search and rescue exercise. 6. Alien invasive species, in particular category 1b species that were identified within the study area (Appendix I), should be removed from the development footprint and immediate surrounds, prior to construction or soil disturbances. By removing these species, the spread of seeds will be prevented into disturbed soils which could thus have a positive impact on the surrounding natural vegetation. No chemical control may be used without the supervision of a certified professional (Pest Control Operator). 7. Prior to commencement of construction all supervisors of the vegetation clearing, and construction contractors must receive adequate training as to the presence, identity, and management of species of conservation importance. 	<ol style="list-style-type: none"> 1. Avoid the unnecessary expansion of the proposed development footprint. 2. Obtaining any other licences, permits or authorisations as required by provincial or national legislation for the removal of protected species. 3. Develop a plant species search and rescue management plan. 4. Maintain and implement the existing ion Smelter's alien invasive eradication and control management plan. 5. Prevent any veldt fires or chemical fires. 6. Effective vegetation management along the perimeter of the development footprint. 7. Maintaining the required firebreak throughout the operational phase. 8. Continuous management of alien and invasive species within the development footprint. 9. Conservation of fauna and Flora species. 	<ol style="list-style-type: none"> 1. No activities outside of the preferred site layout plan (Appendix B). 2. No non-compliances recorded in terms of the required environmental authorisations or licences. 3. No unauthorised removal of protected species. 4. Contain and control the spreading of alien and invasive species within the development footprint. 5. No veldt fires or chemical fires originating from the proposed development. 6. No areas left unvegetated post-closure. 7. Contain and control the spreading of alien and invasive species within the development footprint. 	<ol style="list-style-type: none"> 1. Develop and implement a pre-construction management plan. Apply for permits to remove protected species (provincial and national) 2. Obtaining any other licences, permits or authorisations as required by provincial or national legislation for the removal of protected species. 3. Develop a plant species search and rescue management plan. 4. Maintain and implement the existing ion Smelter's alien invasive eradication and control management plan. 	<p>Entire life cycle</p>

<p>Hazardous substance storage & Nitrogen bulk storage</p> <p>Removal of mobile PBU & CGC</p> <p>Placement of topsoil & revegetation</p> <p>Rehabilitation of disturbed areas</p> <p>Demolishing of hazardous storage facility</p>				<p>Construction measures:</p> <p>Control through <i>search and rescue</i>:</p> <ol style="list-style-type: none"> Search and rescue of all protected plant identified to be affected by the development, must take place. Records of all species collected for relocation must be kept. An area should be identified to re-instate protected and indigenous species. If feasible an onsite nursery should be established and maintained relocating identified species that could withstand rigorous transplant. These species typically include geophytes, succulents, and herb species. Ensure the relevant permits for the removal, destruction, transplanting, or seed collection are obtained from the relevant authorities before commencing with search and rescue activities. All rescued species should be transplanted immediately or bagged (or succulents left to first air-dry before planting) and kept in the horticulturists or a designated on-site nursery and should be returned to site or land portion once all construction is completed and rehabilitation of disturbed areas is required. Timelines involving permit applications need to be considered, taking cognisance of the seasonal requirements to execute surveys as well as required time of the completion, submission, and approval of permit applications by relevant authorities. It is emphasised that no activity may commence that will adversely affect protected plant species, prior to the approval of all permitting requirements. Suitable surveys that geolocate and identify all protected and conservation important plants with the approved development footprint need to be commissioned during an appropriate time of the year that allows for accurate identification of all affected species, typically during the austral summer period. This will form the basis of the permit applications. It is not recommended that all protected trees be transplanted, only individuals that will allow for successful excavation and relocation. Rather, seeds can be harvested, and seedlings be grown to be used for rehabilitation purposes. <p>Control through <i>vegetation management</i>:</p> <ol style="list-style-type: none"> A method for clearance of vegetation must be compiled and approved by the ECO, clearly identifying the phases of site clearance. Ensure all relevant personnel are trained on the requirements. Minimize vegetation clearance. The project infrastructure footprint and associated area of disturbance should be minimised as far as practically possible. The clearing of vegetation and disturbance of soils should be done considering the potential for subsequent erosion. Cleared vegetation and debris that has not been utilized must be collected and disposed of at a suitable waste disposal site. Under no circumstances may it be burned on site. Collection of branches, wood (dead or alive), shrubs or any vegetation for fire making purposes is strictly prohibited. To minimise the impact of increased runoff and sediment transport into adjacent watercourses, vegetation clearing and soil stripping should be concentrated in the dry season. Avoid clearing the entire site, instead only clear areas required for foundations. Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area. Areas having to be stripped of topsoil for construction purposes must be kept to a minimum and only stripped when work is about to take place (retaining as much vegetation as possible, including patches and strips). Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. No painting or marking of rocks or vegetation (in remaining or adjacent natural habitat) to identify locality or other information will be allowed, as it will disfigure the natural setting. Marking should be done by steel stakes with tags, if required. All temporary markings will be removed upon completion. <p>Control through <i>alien invasive species management</i>:</p> <ol style="list-style-type: none"> Alien invasive species must be managed as per the Lion Smelter’s existing management plan. Use of herbicides and handpicking/ slashing to control alien invasive plants in development footprint. Manual removal is preferred to chemical control, particularly in the moist grassland. Disposal of alien plants must be done in a manner that cannot propagate. No alien plant should be allowed develop to a point of producing seed. Awareness training on the identification of weeds and alien species to employees responsible for the management of these species. Alien vegetation growing on topsoil stockpiles must be removed immediately in a manner as to prevent regrowth. All disturbed areas to be monitored on a regular basis for exotic or invasive plant species and weeds. Chemical removal shall be used in accordance with the manufacturer’s specification for weeds where mechanical eradication/control are no longer effective. The type of chemical to be utilised must be determined in consultation with an herbicide consultant and the ECO. Those exotic/invasive plant or weed which cannot be eradicated by means of herbicides, needs to be manually removed from site. The herbicide consultant must have a Pest Control Operators licence. Control the type of material imported to site to ensure that soil contamination, in terms of weed and alien invasive plants does not occur. 	<ol style="list-style-type: none"> Effectively re-vegetate all disturbed areas as a result of the proposed development. Ensure the effective management of alien invasive species post-closure. 	<ol style="list-style-type: none"> Habitat reinstatement of fauna and flora species disturbed by the proposed development. 	
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				<p>Remedy through <i>concurrent rehabilitation</i>:</p> <ol style="list-style-type: none"> 1. A vegetation reinstatement plan should be implemented at the start of construction. 2. Grass species to be sown in the prepared soils must be selected by a suitably experienced and qualified specialist, ensuring the selection of indigenous seed mix. Revegetation should take place successively to re-establish vegetation as soon as possible after construction in a specific area. 3. Colonisation of the disturbed areas by plants species from the surrounding natural vegetation must be monitored to ensure that vegetation cover is sufficient within one growing season. If not, then the areas need to be rehabilitated with a grass seed mix containing species that naturally occur within the study area. 4. Under no circumstances should exotic and invasive plants be used for landscaping or rehabilitation purposes. 5. After construction clear any temporarily impacted areas of all foreign materials, re-apply and/or loosen topsoil and landscape to surrounding level. 6. Species that was collected during search and rescue must be planted in areas dedicated for re-vegetation. The remaining species may be donated and planted in conservation areas as identified in the municipal spatial development plan. <p>Avoid loss of <i>Fauna</i> through <i>conservation</i>:</p> <ol style="list-style-type: none"> 1. The killing of any animal species is strictly prohibited. 2. The perimeter of the security fence must be inspected regularly for any traps or trapped animals. 3. Should any animal nests or breeding sites be exposed during construction activities, a suitably qualified and experienced specialist must be contacted for removal. 4. The feeding of any animal species must not be promoted. 5. Should any animal species pose a nuisance or danger to the employees during construction activities, the local conservation body must be contacted for advice on control. Euthanizing of problematic animals must only be considered as last resort. <p>Avoid loss of <i>Fauna, Flora and Human Life</i> through <i>hazardous substance management</i>:</p> <ol style="list-style-type: none"> 1. Hazardous substances used during construction activities to be stored within a temporary mobile bund area with a secondary containment tray. 2. Mobile bunded areas to be designed to contain at least 110% of the storing capacity. 3. All spills (minor and major) must be cleaned and remediated to the satisfaction of the appointed ECO or the competent authority within 24 hours. 4. Any spillages on site to be excavated to the visible depth of impact and disposed of for removal to a registered hazardous waste disposal site. Alternative in-situ remediation techniques may be used. 5. On site spill kits or absorbent materials must be readily available. These kits must include materials to absorb, breakdown, and where possible encapsulate minor material spillages. 6. Hazardous substance stores must be provided with the relevant safety signage indicating the hazards associated with the content. 7. All containers must be clearly labelled as to the content. The usage of food and drink containers for decanting hazardous substances are strictly prohibited. 8. Mixing of reactive substances must be always avoided. 9. A register of all hazardous substance must be kept and maintained indicating the maximum volume of each substance stored at any given time. The material safety data sheet (MSDS) must be readily available in the event of accidental release or handling accident. 10. Fire fighting equipment must be available and inspected on a regular basis. 11. Access to the hazardous substance stores must be controlled. 12. All staff handling hazardous substances must be trained. 13. Emergency contact details of the trained fire fighter is readily available at the store. 				
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				<p>Operational measures:</p> <p>Control through <i>awareness</i>:</p> <ol style="list-style-type: none"> 1. All operational staff should be made aware of species that are protected or is a specie of conservational importance. 2. Protected species that was not removed during construction must be clearly demarcated and protected during the operational phase. <p>Control through <i>vegetation management</i>:</p> <ol style="list-style-type: none"> 1. Vegetation surrounding the perimeter of the site fence must be always maintained allowing the visibility for inspections of the fence. 2. Should the area on the outside of the perimeter fence also serve as a fire break, the area should be kept clear of vegetation for at least 2 meters (or suitably for emergency fire fighting vehicles to access). 3. Method of clearance may not cause pollution or soil erosion. 4. No cleared vegetation may be left on site and must be removed and disposed off as agreed with the ECO. 5. No stripping or grading of vegetated areas for maintenance purposes without the consent of the ECO. Should stripping or grading be required, a method statement for such activities must be approved by the ECO prior to the commencement of such activities. These areas must be first inspected to ensure no species of conservational importance are present. <p>Control through <i>alien invasive species management</i>:</p> <ol style="list-style-type: none"> 1. Alien invasive species must continue to be managed as per the Lion Smelter’s existing management plan. The management plan must specify the methods that must be used and be clearly communicated to the staff responsible for ensuring implementation. 2. The effective implementation of the management plan must be monitored by the appointed ECO. 3. Should alien invasive species continue to be problematic, the management plan must be revised by a suitably qualified and experienced specialist. <p>Avoid loss of <i>Fauna</i> through <i>conservation</i>:</p> <ol style="list-style-type: none"> 1. The killing of any animal species is strictly prohibited. 2. The perimeter of the security fence must be inspected regularly for any traps or trapped animals. 3. The feeding of any animal species must not be promoted. 4. Should any animal species pose a nuisance or danger to the employees during operational activities, the local conservation body must be contacted for advice on control. Euthanizing of problematic animals must only be considered as last resort. 5. The operator of the facility must ensure that there is at least one trained staff member to handle and remove any snakes observed on site. The contact detail of the responsible person must be readily available and clearly on display. <p>Avoid loss of <i>Fauna, Flora and Human Life</i> through <i>hazardous substance management</i>:</p> <ol style="list-style-type: none"> 1. The hazardous substance store and bulk Nitrogen bulk storage facility must be designed, by a suitably qualified and experienced civil engineer, and constructed according to the applicable SANS standards. 2. All spills (minor and major) must be cleaned and remediated to the satisfaction of the appointed ECO or the competent authority within 24 hours. 3. Any secondary containment facilities or sumps associated with the hazardous substance’s stores must be inspected and maintained on a regular basis. 4. On site spill kits or absorbent materials must be readily available. These kits must include materials to absorb, breakdown, and where possible encapsulate minor material spillages. 5. Hazardous substance stores must be provided with the relevant safety signage indicating the hazards associated with the content. 6. All containers must be clearly labelled as to the content. The usage of food and drink containers for decanting hazardous substances are strictly prohibited. 7. Mixing of reactive substances must be always avoided. 8. A register of all hazardous substance must be kept and maintained indicating the maximum volume of each substance stored at any given time. The material safety data sheet (MSDS) must be readily available in the event of accidental release or handling accident. 9. Firefighting equipment must be available and inspected on a regular basis. 10. Access to the hazardous substance stores must be controlled. 11. All staff handling hazardous substances must be trained. 12. Emergency contact details of the trained fire fighter is readily available at the store. <p>Should the ECF project capacity be expanded, and additional construction activities be required, all measures as identified during the construction phase must be implemented.</p>				
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				<p>Closure measures:</p> <p>Remedy through <i>rehabilitation</i>:</p> <ol style="list-style-type: none"> 1. Landscape and re-vegetate all areas following demolition as soon as possible to limit erosion potential. 2. Species to be reinstated must be selected by a suitably qualified and experienced specialist. 3. All rehabilitation activities must be inspected on a regular basis by the ECO. The ECO to keep records of inspections and report its progress to the relevant authorities. 4. Should poor re-vegetation be observed, interventions must be taken. Intervention measures must be identified by a suitably qualified and experienced specialist and implementation must be monitored by the ECO. 5. Should rehabilitation activities require authorisation, the required approval must be obtained prior to commencing with any rehabilitation activities. <p>Control through <i>alien invasive species management</i>:</p> <ol style="list-style-type: none"> 1. Alien invasive species must continue to be managed as per the Lion Smelter’s existing management plan. 2. Rehabilitated areas must be inspected regularly by the ECO identifying the presence of alien invasive species. 3. No removed alien invasive species must be left on site. Appropriate disposal methods must be approved by the ECO. <p>Avoid loss of <i>Fauna, Flora and Human Life</i> through <i>hazardous substance management</i>:</p> <ol style="list-style-type: none"> 1. Hazardous substances used during Closure activities to be stored within a temporary mobile bund area with a secondary containment tray. 2. Measures identified during the construction phase also applies during the Closure phase. 				
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5.2.4 AQUATIC BIODIVERSITY MANAGEMENT MEASURES

Table 11: Aquatic biodiversity management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
<p>Site footprint & location</p> <p>Site clearing:</p> <ul style="list-style-type: none"> - Laydown area (temporary and permanent) - Offices and parking -Substation <p>Vehicular activity on roads</p>	Wetland & Aquatic ecology	Disturbance of aquatic biodiversity Sedimentation and siltation of watercourses	Construction, Operational and Closure	Avoid and Control	<p>Pre-construction measures:</p> <ol style="list-style-type: none"> 1. All future development to take into consideration the 32 m riparian development buffer (southwest of the proposed development) identified by the aquatic specialist (Appendix J). 2. Prior to construction activities, a site inspection must be conducted by the ECO to identify potential drainage lines feeding into the said riparian zone. 	<ol style="list-style-type: none"> 1. Avoid development within 32 m from the identified riparian zone. 2. Avoid or minimise the degradation of water quality of watercourses due to sedimentation and siltation. 3. Remedy the possible effects of alteration to natural drainage lines. 4. Avoid the destruction of wetlands. 5. Avoid the release of pollutants into the aquatic environment. 6. Wastewater is appropriately managed. 7. Erosion is prevented. 	<ol style="list-style-type: none"> 1. Ensure water quality results falls within the regulated Resource Quality Objectives for the Olifants catchment. 2. Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels. 3. No incidents related to the pollution of rivers and streams. 4. No visible signs of erosion formations such as dongas or rills. 5. Erosion control measures 	<ol style="list-style-type: none"> 1. Ensure compliance with the National Water Act (NWA), Act 36 of 1996 and related regulations. 2. Implementation of a storm water management plan. 	Entire life cycle of project

<p>Placement of topsoil & revegetation</p> <p>Rehabilitation of disturbed areas</p> <p>Storm water management</p>				<p>Construction measures:</p> <p>Control through storm water management and erosion control:</p> <ol style="list-style-type: none"> No construction activities to be allowed within the defined 32 m riparian development buffer (southwest of the proposed development) identified by the aquatic specialist (Appendix J). Prior to the commencement of construction activities, the riparian development zone must be clearly demarcated by the placement of visible notice boards at strategic easily visible from existing access roads. All supervisory construction staff should be made aware of the riparian development zone, and it must be clearly indicated on final construction drawings. No unauthorised road drainage crossings are allowed. If unavoidable, all crossings must be designed by a suitable qualified engineer and mitigation measures must be implemented. Following the construction of storm water management infrastructure, the ECO must on a regular basis monitor and inspect all storm water discharge points, energy dissipation structures and the stability of the identified drainage lines and nearby watercourse. Records of these inspections to be kept. <p>Avoid through effluent and runoff management:</p> <ol style="list-style-type: none"> Mixing of concrete must under no circumstances take place within the drainage lines. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished. Avoid stockpiling materials within proximity to drainage lines. If unavoidable ensure measure are implemented to prevent erosion or sedimentation. <p>Operational measures:</p> <p>Control through awareness:</p> <ol style="list-style-type: none"> All supervisory operational staff should be made aware of the riparian development zone, and it must be clearly indicated on final construction drawings. During the operational phase, the notice boards demarcating the riparian development zones must be maintained. <p>Control through storm water management and erosion control:</p> <ol style="list-style-type: none"> The ECO must on a regular basis monitor and inspect all storm water discharge points, energy dissipation structures and the stability of the identified drainage lines and nearby watercourse. Records of these inspections to be kept. <p>Avoid through incident management and emergency preparedness:</p> <ol style="list-style-type: none"> All potentially contaminated effluent from the operational area must be managed appropriately and not be allowed to enter the natural environment. Clean and dirty areas should be clearly defined in the final storm water management plan. All hazardous substances stores or facilities must be designed in an appropriate manner (as specified by applicable standards or legislation) by a suitable qualified engineer to manage the potential spillages into the natural environment. Secondary accidental spill containment facilities associated with the PBU and CGC, should be considered and designed based on a risk based investigation by a team of suitably qualified specialists and engineers. <p>Should the ECF project capacity be expanded, and additional construction activities be required, all measures as identified during the construction phase must be implemented.</p>		<p>implemented in high-risk areas.</p> <ol style="list-style-type: none"> No signs of degradation of diversion channels or drainage systems. No evidence of pollutants released into streams and rivers. No evidence of hydrocarbon and hazardous spills. Immediate removal and remediation of all spills. 		
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				<p>Closure measures:</p> <p>Control through <i>storm water management and erosion control</i>:</p> <ol style="list-style-type: none"> 1. No Closure activities to be allowed within the defined 32 m riparian development buffer (southwest of the proposed development) identified by the aquatic specialist (Appendix J). 2. All supervisory Closure staff should be made aware of the riparian development zone, and it must be clearly indicated on as build drawings. 3. No unauthorised road drainage crossings are allowed. If unavoidable, all crossings must be designed by a suitable qualified engineer and mitigation measures must be implemented. 4. The demolition schedule must ensure, if feasible, that the infrastructure associated with the management of storm water from the ECF facility, is removed last. 5. Upon the demolishing activities of the storm water management infrastructure, measures must be implemented to ensure erosion formation and sedimentation to the natural environment are limited. Temporary storm water management infrastructures should be placed and maintained until such time as to vegetation has been sufficiently re-instated. The ECO must inspect these areas on a regular basis and report on its effectiveness. Records of these inspections to be kept. 6. Avoid stockpiling of demolition waste within proximity to drainage lines. If unavoidable ensure measure are implemented to prevent erosion or sedimentation. <p>Remedy through <i>rehabilitation</i>:</p> <ol style="list-style-type: none"> 1. Landscape and re-vegetate all areas following demolition as soon as possible to limit erosion potential. 2. In the unlikely event that construction activities and operational activities impacted the riparian zone (as identified in Appendix J), a detailed method of rehabilitation must be developed by a suitably experienced and qualified aquatic specialist. 3. All rehabilitation activities must be inspected on a regular basis by the ECO. The ECO to keep records of inspections and report its progress to the relevant authorities. 4. Should rehabilitation activities require authorisation, the required approval must be obtained prior to commencing with any rehabilitation activities 				
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5.2.5 SOIL AND AGRICULTURE MANAGEMENT MEASURES

Table 12: Soil and agricultural management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
<p>Site footprint & location</p> <p>Removal of topsoil and stockpiling</p> <p>Backfilling and levelling</p> <p>Material stockpiling</p> <p>Foundation excavation</p> <p>Movement of construction</p>	<p>Availability of arable land for agriculture</p> <p>Disturbance to land</p> <p>Hydrocarbon contamination caused by spillages</p> <p>Soil contamination</p> <p>Accidental spills</p> <p>Placement of infertile soil</p>	<p>Loss of agricultural land</p> <p>Loss of arable land</p> <p>Degradation of soil quality</p> <p>Loss of crop generating land</p> <p>Loss of fertile soil</p> <p>Contamination</p>	Construction, Operational, and Closure	Avoid, Control, and Remedy	<p>Pre-construction measures:</p> <ol style="list-style-type: none"> The final site layout should consider all sensitivities verified in the Site Sensitivity Verification Report (SSVR). A site clearance schedule must be developed to ensure that no unvegetated areas are left exposed for an extended period. Site clearance to be kept to a minimum. An area to be identified prior to the commencement of construction for the stockpiling of topsoil. A calculation of required topsoil required for rehabilitation to be determined prior to the commencement of activities. The area demarcated for the stockpiling of topsoil should be sufficiently sized. Measures to prevent erosion and manage storm water of these stockpiles must be considered prior to stripping of topsoil. 	<ol style="list-style-type: none"> Soil conservation throughout the construction phase of the proposed development. Adequate protection of soil resources and remediation if degradation cannot be avoided. To prevent any erosion and to provide adequate erosion control measures where required. 	<ol style="list-style-type: none"> No visible signs of erosion formations such as dongas or rills. Sedimentation loads (measured in Total Dissolved Solids) of streams and rivers not to exceed the regulated Resource Water Quality Objectives for the Vaal catchment. Erosion control measures implemented in high-risk areas. No mixing of fertile soils with sub soils during construction. 	<ol style="list-style-type: none"> Ensure compliance with the Conservation of Agricultural Resources Act (CARA), Act 43 of 1983. Development of a soil conservation management plan. Development of a soil conservation management plan. Development of a storm water management plan. Development and implementation of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages. 	Entire life cycle of project

<p>plant and equipment</p> <p>Temporary service bay</p> <p>Concrete work</p> <p>Operation of main substation & back-up generator</p> <p>Hazardous substance storage & No bulk storage</p> <p>Removal of PBU & CGC</p> <p>Demolishing of hazardous storage facility</p> <p>Demolishing of sub station</p> <p>Movement of demolishing equipment</p> <p>Placement of topsoil & revegetation</p>		<p>of soil</p> <p>Hydrocarbon contamination</p>			<p>Construction measures:</p> <p>Control through soil conservation and management:</p> <ol style="list-style-type: none"> All areas to be stripped firstly of topsoil and fertile soils and stockpiled in a designated area. Do not mix sub-soil with topsoil and fertile soils. Topsoil and fertile soil to be protected from contamination (i.e. hydrocarbons or infertile material). Topsoil and fertile soil stockpiles to be protected from weathering conditions such as covering the stockpiles with indigenous, non-invasive vegetation. Avoid stockpiling topsoil and fertile soil stockpiles within drainage lines or within the 1:10 year flood lines. Implement storm water control measures on topsoil and fertile soil stockpiles. Exposed areas to be re-vegetated with indigenous or non-invasive species or protected from erosion. Rehabilitation of areas after the completion of works to take place as soon as possible. Avoid overexposing un-vegetated areas as far as possible. <p>Avoid through incident management and emergency preparedness:</p> <ol style="list-style-type: none"> Any hazardous substances spills or spilling of contaminated effluent on natural ground must be contained and cleaned to the satisfaction of the ECO immediately. In-situ remediation of contaminated soil is the preferred option. <p>Avoid through storm water management and erosion control:</p> <ol style="list-style-type: none"> Soil conservation measures to be implemented on stockpiles to prevent erosion. This could include the use of erosion control fabric or non-invasive grass seeding. All areas susceptible to erosion must be identified and protection measures be implemented. Retain natural trees, shrubbery, and grass species where possible. In areas within proximity to wetlands, rivers and streams, sedimentation control measures to be implemented, specifically when excavations or disturbances takes place within riverbanks, or the riverbed. Formation of erosion channels (“dongas”) to be prevented by applying soil erosion control and bank stabilisation procedures as specified by a qualified environmental specialist. Erosion formation beyond rills must be avoided. Erosion damages to be repaired as soon as possible and no later than the target set by the ECO. Where berms are installed on severe slopes the outflow shall be suitably stone pitched to prevent erosion from starting on berms. Wherever possible, access routes should avoid crossing drainage lines and riparian zones. Drainage lines should not be altered and should be level with the surrounding land once subsistence has occurred. Run-off from roads must be managed in a way to avoid erosion and prevent pollution. Topsoil or potentially fertile soils captured in storm water management infrastructures i.e. settlement ponds or storm water sumps, if not contaminated, may be used to repair eroded areas during construction activities. <p>Operational measures:</p> <p>Control through soil conservation and management:</p> <ol style="list-style-type: none"> Areas left exposed post-construction to be re-vegetated with indigenous or non-invasive species or protected from erosion. Rehabilitation areas must be inspected on a regular basis for signs of erosion formation. Avoid overexposing un-vegetated areas as far as possible. <p>Avoid through storm water management and erosion control:</p> <ol style="list-style-type: none"> All areas susceptible to erosion must be identified and protection measures be implemented. Retain natural trees, shrubbery, and grass species where possible during the operational phase, except where removal forms part of maintenance activities. Formation of erosion channels (“dongas”) to be prevented by applying soil erosion control and bank stabilisation procedures as specified by a qualified and experienced specialist. Erosion formation beyond rills must be avoided. Erosion damages to be repaired as soon as possible and no later than the target set by the ECO. Where berms are installed on severe slopes the outflow shall be suitably stone pitched to prevent erosion from starting on berms. Run-off from roads must be managed in a way to avoid erosion and prevent pollution. <p>Should the ECF project capacity be expanded, and additional construction activities be required, all measures as identified during the construction phase must be implemented.</p>			<p>6. Development of a soil conservation management plan.</p>
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					<p>Closure measures:</p> <p>Remedy through <i>rehabilitation</i>:</p> <ol style="list-style-type: none"> Landscape and re-vegetate all areas following demolition as soon as possible to limit erosion potential. All imported topsoil to be used during rehabilitation activities must be kept free invasive species. Before the placement of stockpiled topsoil (during construction and or operational activities), samples should be taken to test fertility. Where required, topsoil must be treated by adding the required nutrients to enhance fertility. If, upon completion of demolition, the ECO suspects contaminated land, an assessment of contamination will be required before the commencement of any placement of topsoil. The beforementioned assessment must be aligned with applicable legislation (i.e. Part 8 of NEMWA). Remediation actions must be implemented, and progress thereof be monitored and reported by the ECO. <p>Control through <i>storm water management and erosion control</i>:</p> <ol style="list-style-type: none"> Following the placement of topsoil, temporary storm water management infrastructures should be placed and maintained until such time as to vegetation has been sufficiently re-instated. The ECO must inspect these areas on a regular basis and report on its effectiveness. Records of these inspections to be kept. <p>Avoid through <i>incident management and emergency preparedness</i>:</p> <ol style="list-style-type: none"> In the event of spilling any contaminated substances or hazardous substance during demolition activities, the spill must be contained and cleaned immediately. In-situ remediation of contaminated soil is the preferred option. 				
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5.2.6 WATER RESOURCE MANAGEMENT MEASURES

Table 13: Water resource management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
					<p>Pre-construction measures:</p> <ol style="list-style-type: none"> The conceptual storm water management plan provided in Appendix K must be considered in the final detailed design before commencing of any construction activities. Construction planning should prioritise the implementation measures to be taken, i.e. constructing of storm water infrastructure around the perimeter of the site, to prevent sedimentation and erosion during construction activities. 				

Site footprint & location		Degradation of natural water resources	Construction, Operational, and Closure	Avoid, Control, and Remedy	<p>Construction measures: Control through storm water management and erosion control:</p> <ol style="list-style-type: none"> 1. Avoid stockpiling material within 32 m of drainage lines or in the 1:10 year flood line. A 100 m stream buffer to be maintained to reduce flood risk and preserve natural vegetation as far as possible. 3. Ensure erosion control measures or sediment control measures on stockpiles or in stockpile areas. 4. Clean and dirty water should be managed separately as guided by GN704. Deflect any unpolluted water/runoff away from any dirty areas i.e. stockpile areas, mining areas, workshops, lay down areas etc. 5. Measures must be put in place to attenuate water from infrastructure areas and reduce runoff. 6. During construction through drainage lines, most of the flow must be allowed to pass down the stream. In stream diversions should be used rather than the construction of new channels. 7. If drainage patterns will be altered, the natural flow to be diverted. 8. Any diversions should be designed in such a manner as to avoid erosion formation or pollution through siltation and sedimentation. 9. Channels and drainage systems required to divert the flow of drainage lines to be designed by a civil engineer, taking into consideration the peak volumes and flow. 10. Measures to avoid or prevent erosion must be incorporated into the designs of the infrastructure associated with the river crossings. 11. During construction through drainage lines, most of the flow must be allowed to pass down the stream. In stream diversions should be used rather than the construction of new channels. 12. Avoid unnecessary cutting roads through river, stream banks as this may lead to erosion causing siltation of streams and downstream dams. 13. Topsoil stockpiles must be appropriately protected using for example silt fences or sandbag barriers. 14. Do not allow surface water or storm water to be concentrated, or to flow down slopes without erosion protection measures being in place. 15. All cleared areas and sumps are to be monitored for erosion daily, any erosion forming is to be remediated with immediate effect. <p>Avoid through incident management and emergency preparedness:</p> <ol style="list-style-type: none"> 1. Any spill which may contaminate water must be treated according to the approved spill management procedure. 2. Contain oil or fuel spills in water using an approved oil absorbent fibre. 3. Should contaminated water due to spillages or other unforeseen circumstances enter identified wetland or watercourse, a wetland/aquatic specialist must be consulted regarding implementation of suitable mitigation and/or rehabilitation measures. 4. Wastewater as well as spilled fuel collected within bunded areas and refuelling areas shall be disposed of or treated as hazardous waste. 5. Fuel to be stored in above ground storage tanks or sealed containers. 6. Hazardous substances to be stored within a bund area with a sump drainage. 7. Bunded areas, where required, to be designed to contain at least 110% of the storing capacity. 8. All spills (minor and major) must be cleaned and remediated to the satisfaction of the appointed ECO or the competent authority within 24 hours. 9. Any spillages on site to be excavated to the visible depth of impact and disposed of for removal to a registered hazardous waste disposal site. Alternative in-situ remediation techniques may be used. 10. On site spill kits or absorbent materials must be readily available. These kits must include materials to absorb, breakdown, and where possible encapsulate minor material spillages. 11. Where possible and practical all maintenance of vehicles and equipment shall take place off site. Should emergency repairs be necessary, drip trays or tarpaulins must be utilised to ensure the collection of any hydrocarbons. 12. All vehicles, plant, and equipment must be inspected daily. Records to be made available for these inspections. 13. Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment (where possible leaks may occur) when not in use. 14. All vehicles, plant, and equipment must be well maintained to minimise the risk of fuel and oil leakages. 15. Leaking equipment shall be removed and repaired immediately from site to facility designated for repairs. <p>Avoid through effluent and runoff management:</p> <ol style="list-style-type: none"> 1. Prevent the discharge of water containing polluting matter or visible suspended materials directly into drainage lines or streams. 2. Construct containment berms to act as silt traps/settling facilities to contain dirty runoff from exposed areas. 3. No potentially contaminated water is permitted to enter natural drainage lines. 4. If offsite servicing and maintenance of construction vehicles and equipment is not feasibly, temporary workshops and washing areas shall be bunded. 5. Temporary wash bays, service areas, and fuel storage areas may not be located within the 1:100-year flood line or horizontal distance of 100 m (whichever is greater) of a watercourse or drainage line. 6. No environmentally harmful detergents may be used. 7. Refuelling of construction equipment shall take place in such a manner as to prevent spillage. 8. All temporary bunded areas to be constructed in a way as to avoid seepage to the surrounding environment as well as be able to contain its content to a capacity of 110%. 9. Water from temporary wash bays, service areas and fuel storage areas must be discharged into oil separators and sumps. The effectiveness of the oil separators and sumps must be monitored. 10. Oils collected in this manner should be retained in a safe holding tank and removed from site by a specialist oil recycling company or disposal at approved waste disposal sites. 11. No drainage from fuel storage areas to be permitted. 12. Never hose oil or fuel spills into storm water drain or sewer, or into the surrounding natural environment. 13. When using chemical toilets for employees during construction of the ablution facilities, all spills must be cleaned immediately. Do not locate chemical toilets within 100 m from any drainage lines. 	<ol style="list-style-type: none"> 1. Ensuring effective storm water management activities takes place during all phases of the development. 2. Avoid development within 32 m from the identified riparian zone. 3. Avoid or minimise the degradation of water quality of watercourses due to sedimentation and siltation. 4. Remedy the possible effects of alteration to natural drainage lines. 5. Avoid the destruction of wetlands. 6. Avoid the release of pollutants into the aquatic environment. 7. Wastewater is appropriately managed. 8. Erosion is prevented. 	<ol style="list-style-type: none"> 1. Ensure water quality results falls within the regulated Resource Water Quality Objectives for the Olifants catchment. 2. Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels. 3. No incidents related to the pollution of rivers and streams. 4. No visible signs of erosion formations such as dongas or rills. 5. Erosion control measures implemented in high-risk areas. 6. No signs of degradation of diversion channels or drainage systems. 7. No evidence of pollutants released into streams and rivers. 8. No evidence of hydrocarbon and hazardous spills. 9. Immediate removal and remediation of all spills. 	<ol style="list-style-type: none"> 1. Ensure compliance with the National Water Act (NWA), Act 36 of 1996 and related regulations. 2. Implementation of a storm water management plan. 	Entire Life cycle of project		
Site clearing	Water resources	Increased erosion formation									
Removal of topsoil and stockpiling	Erosion & sedimentation	Increased sedimentation into natural environment									
Material stockpiling	Uncontrolled storm water	Degradation of aquatic environment									
Backfilling and levelling	Water resource contamination caused by sedimentation and siltation	Contamination of surface water resources									
Concrete work	Hydrocarbon contamination	Wastage of water									
Importing of material on site	Water usage	Degradation of water resource quality									
Movement of construction plant and equipment	PBU condensate effluent	Degradation of soil quality									
Temporary service bay	Erosion and Sedimentation	Disturbance to aquatic species patterns									
Operation of PBU & CGC	Contamination of water resources	Increased erosion formation									
Water storage and Domestic use	Deposition of foreign material	Effect of downstream users									
Storm water management	Alteration of drainage systems										
Placement of topsoil & revegetation	Rehabilitation of disturbed areas										

				<p>Operational measures:</p> <p>Control through storm water management and erosion control:</p> <ol style="list-style-type: none"> Maintain and upgrade, if required, the SWMP and associated infrastructures. The effectiveness of the SWMP must be evaluated at least biennially by a suitably experienced and qualified independent person. A report must be provided indicating suitability and recommendations for improvement. Channels and drainage systems required to divert the flow of drainage lines to be inspected regularly ensuring no blockages or built up of debris or sediment. Do not allow surface water or storm water to be concentrated, or to flow down slopes without erosion protection measures being in place. All previously disturbed areas during construction activities are to be monitored for erosion regularly or until such time as the area has been adequately rehabilitated. Any erosion forming is to be remediated with immediate effect. <p>Water conservation through monitoring:</p> <ol style="list-style-type: none"> Domestic water use must be monitored and recorded. Domestic water pipelines and taps must be inspected for leaks on a regular basis. Leaks must be repaired immediately. <p>Avoid through incident management and emergency preparedness:</p> <ol style="list-style-type: none"> All environmental incidences must be recorded and reported as per the Guidelines on the administration of incidents (published in 2019 or the latest version) as described in section 30 of the NEMA. Records of all incidents must be kept for the entire duration of the proposed development. Permanent hazardous substances stores must be designed and constructed according to the relevant legislation and standards. Spill kits must be readily available and inspected regularly to ensure all the content has been replaced following incidents. All secondary accidental spill containment facilities constructed must be always maintained. Potentially contaminated effluent must not be allowed to be released into the defined “clean” area as per the SWMP. Secondary accidental spill containment facilities must be inspected on a regular basis and records of these inspections must be maintained. Pipelines transporting the PBU condensate effluent must be inspected regularly. Leaks must be contained and repaired immediately. <p>Avoid through effluent and runoff management:</p> <ol style="list-style-type: none"> “Dirty” runoff as defined by the SWMP must not be allowed to enter the natural environment. The PBU condensate sump must be suitably designed and bunded as per the classification of the waste stream. All accidental overflows or release of the PBU condensate must be contained and cleaned to the satisfaction of the ECO immediately. Effluent from the secondary accidental spill containment facilities associated with the PBU and CGC, must not be allowed to discharge or overflow. All spills must be cleaned to the satisfaction of the ECO immediately. <p>Should the ECF project capacity be expanded, and additional construction activities be required, all measures as identified during the construction phase must be implemented.</p>				
				<p>Closure measures:</p> <p>Control through storm water management and erosion control:</p> <ol style="list-style-type: none"> Upon the demolishing activities of the storm water management infrastructure, measures must be implemented to ensure erosion formation and sedimentation to the natural environment are limited. Temporary storm water management infrastructures should be placed and maintained until such time as to vegetation has been sufficiently re-instated. The ECO must inspect these areas on a regular basis and report on its effectiveness. Records of these inspections to be kept. <p>Avoid through effluent and runoff management:</p> <ol style="list-style-type: none"> All potentially contaminated water within all bunded areas and areas identified as “dirty” area as per the SWMP must be removed before the commencement of demolishing facilities by a suitable service provider to a facility capable of managing the waste effluent stream. When using chemical toilets for employees during closure or Closure of the ablution facilities, all spills must be cleaned immediately. Do not locate chemical toilets within 100 m from any drainage lines. <p>Remedy through rehabilitation:</p> <ol style="list-style-type: none"> All drainage lines impacted on during the construction and operational phase must be rehabilitated. A detailed method of rehabilitation must be developed and approved by the ECO. All rehabilitation activities must be inspected on a regular basis by the ECO. The ECO to keep records of inspections and report its progress to the relevant authorities. <p>Should rehabilitation activities require authorisation, the required approval must be obtained prior to commencing with any rehabilitation activities.</p>				

5.2.7 TOPOGRAPHY AND VISUAL MANAGEMENT MEASURES

Table 14: Topography and visual management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
<p>Site footprint & location</p> <p>Site clearing - Laydown area (temporary and permanent) -Offices and parking -Substation</p> <p>Removal of topsoil and stockpiling</p> <p>Backfilling and levelling</p> <p>All operational activities</p> <p>Rehabilitation of disturbed areas</p>	<p>Topography and visual environment</p> <p>Visual disturbance on sensitive visual receptors</p> <p>Topography and visual alteration</p> <p>Sense of place of the region</p> <p>Effects of glare and sky glow</p> <p>Lighting impacts</p> <p>Creating unnatural landscape post-Closure</p> <p>Visual and topography disturbances</p> <p>Alteration to natural drainage systems</p>	<p>Visual disturbance on sensitive visual receptors</p> <p>Topography and visual alteration</p> <p>Sense of place of the region</p> <p>Effects of glare and sky glow</p> <p>Visual and topography disturbances</p> <p>Alteration to natural drainage systems</p>	<p>Construction, Operational, and Closure</p> <p>Control & Remedy</p>	<p>Pre-construction measures:</p> <ol style="list-style-type: none"> Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible. Retain and maintain natural vegetation (if present) immediately adjacent to the development footprint. Investigate the potential to screen affected receptor sites (if applicable and located within 0.5km of the facility) with planted vegetation cover. Make use of existing roads wherever possible and plan the layout and construction of roads and infrastructure with due cognisance of the topography to limit cut and fill requirements. Plan all roads, ancillary buildings and ancillary infrastructure in such a way that clearing of vegetation is minimised. Consolidate infrastructure and make use of already disturbed sites rather than undisturbed areas. Consult a lighting engineer in the design and planning of lighting to ensure the correct specification and placement of lighting and light fixtures for the ECF and the ancillary infrastructure. <p>Construction measures: Control through management:</p> <ol style="list-style-type: none"> Ensure that vegetation cover adjacent to the development footprint (if present) is not unnecessarily removed during the construction phase. Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible. Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities. Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent). Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts. Rehabilitate all disturbed areas (if present/if required) immediately after the completion of construction works. <p>Operational measures: Control through maintenance:</p> <ol style="list-style-type: none"> If specific sensitive visual receptors are identified during operation, investigate screening at the receptor site. Maintain the general appearance of the facility as a whole, including the ECF and the ancillary structures. Maintain roads and servitudes to forego erosion and to suppress dust. Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). Limit mounting heights of lighting fixtures, or alternatively use footlights or bollard level lights. Make use of minimum lumen or wattage in fixtures. Make use of down-lighters, or shielded fixtures. Make use of Low-Pressure Sodium lighting or other types of low impact lighting. Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. <p>Should the ECF project capacity be expanded, and additional construction activities be required, all measures as identified during the construction phase must be implemented.</p>	<p>1. The mitigation and possible negation of visual impacts associated with the planning of the proposed ECF.</p>	<p>1. Minimal exposure (limited or no complaints from I&APs) of ancillary infrastructure and lighting at night to observers on or near the site (i.e. within 0.5km) and within the region.</p> <p>2. Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation present within the environment) with no evidence of degradation or erosion.</p> <p>3. Well maintained and neat facility with intact vegetation on and in the vicinity of the facility.</p>	<p>1. Adherence to finalised approved layout plan and alternatives.</p>	<p>Entire life cycle of project</p>	

					<p>Closure measures:</p> <p>Remedy through rehabilitation:</p> <ol style="list-style-type: none"> Once the facility has exhausted its life span, the main facility and all associated infrastructure not required for the post rehabilitation use of the site should be removed and all disturbed areas appropriately rehabilitated, unless a new authorisation is granted for the plant to continue a new cycle. Monitor rehabilitated areas quarterly for at least a year following Closure and implement remedial action as and when required. 				
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5.2.8 NOISE MANAGEMENT MEASURES

Table 15: Noise management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
<p>Site footprint & location</p> <p>Site clearing - Laydown area (temporary and permanent) -Offices and parking -Substation</p> <p>Removal of topsoil and stockpiling</p> <p>Foundation excavation</p> <p>Backfilling and levelling</p> <p>Movement of construction plant and equipment</p> <p>Operation of PBU & CGC</p> <p>Operation of main substation &</p>	<p>Surrounding noise quality</p> <p>Noise generation</p>	<p>Noise pollution</p> <p>Disturbing character of sound.</p> <p>Hearing loss of employees and surrounding community</p> <p>Disturbance of faunal patterns</p>	<p>Construction, Operational, and Closure</p>	<p>Control</p>	<p>Pre-construction measures:</p> <ol style="list-style-type: none"> The final site layout and placement of the PBC and CGC should take into consideration sensitive noise receptors identified in Appendix L. <p>Construction measures:</p> <p>Control through management of environmental noise:</p> <ol style="list-style-type: none"> Equipment and/or machinery which will be used must comply with the manufacturer’s specifications on acceptable noise levels and any noise sources above 85.0dBA to be acoustically screened off. Construction activities may only take place during daytime periods and provided that the prevailing ambient noise level along the mine boundaries will not be exceeded. Environmental noise monitoring to take place on a monthly basis during the construction phase. <p>Operational measures:</p> <p>Control through management of environmental noise:</p> <ol style="list-style-type: none"> Equipment and/or machinery which radiate noise levels above 85.0dBA to be acoustically screened off. Noise monitoring at the residential areas and the north-western boundaries of the ECF to be done monthly for a year after which the frequency can change to a quarterly basis if the prevailing ambient noise level is in line with the 70.0dBA threshold value. Actively manage the process ensure compliance to the noise regulations and/or standards (70.0dBA). <p>Should the ECF project capacity be expanded, and additional construction activities be required, all measures as identified during the construction phase must be implemented.</p>	<ol style="list-style-type: none"> Ensure effective noise control measures are implemented throughout the life cycle of the proposed development. 	<ol style="list-style-type: none"> Not exceeding the 70.0 dBA threshold. No noise complaints received from surrounding community members. 	<ol style="list-style-type: none"> Compliance with Noise Control Regulations promulgated under the Environment Conservation Act, (Act No. 73 of 1989), Government Gazette No. 15423, 14 January 1994 	<p>Entire life cycle of project</p>

back-up generator								
Removal of mobile PBU & CGC								
Demolishing activities				<p>Closure measures: Control through <i>management of environmental noise</i>:</p> <ol style="list-style-type: none"> 1. Demolition activities to take place during daytime period only. 2. Machinery with low noise levels which complies with the manufacturer’s specifications to be used. 				
Movement of demolishing equipment								

5.2.9 HERITAGE & PALAEOLOGY MANAGEMENT MEASURES

Table 16: Heritage and palaeontology management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
<p>Site footprint & location</p> <p>Site clearing - Laydown area (temporary and permanent) -Offices and parking -Substation</p> <p>Foundation excavation</p>	<p>Loss of heritage resources</p> <p>Disturbance to heritage & cultural resources</p>	<p>Loss of important historical & cultural sites</p> <p>Disturbance of graves</p>	Construction	Avoid	<p><u>Pre-construction measures:</u></p> <ol style="list-style-type: none"> All heritage features identified in Appendix H must be clearly demarcated during a pre-construction site inspection. The appointed ECO must form part of the site inspection identifying these features and record its status and condition. If during the initial site inspection possible heritage features not identified Appendix H are found, the site layout plan must be updated accordingly before commencement of construction. Prior to the commencement of construction, a suitably qualified archaeologist must be appointed to lead the further surface sampling and excavation in the event of identifying features not listed in Appendix H. Appropriate permits for the surface sampling and excavation must be obtained by the appointed archaeologist as required in the National Heritage Resources Act (Act 25 of 1999). All finds must be recorded on the archaeological record of the area. 	<ol style="list-style-type: none"> Identification of all possible sites of archaeological value and graves prior to the commencement of authorised work. 	<ol style="list-style-type: none"> Evidence of records should further discoveries be identified during construction. 	<ol style="list-style-type: none"> Ensure compliance with the National Heritage Resources Act (NHRA), No. 25 of 1999. 	Entire life cycle of project

				<p>Construction measures:</p> <p>Avoid through <i>management and conservation</i>:</p> <ol style="list-style-type: none"> 1. If human remains are uncovered during authorised activities or archaeological work, the excavations affecting the burial must be stopped. 2. SAHRA should then be consulted and depending on the situation, the remains are either covered and left in situ, exposed (but not removed) and studies in situ, or fully excavated and studied with the consent and participation of the interested parties. 3. It is, therefore, advisable that if it is foreseen that any archaeological research will uncover human remains an agreement with the interested and affected parties and a permit for burials be obtained beforehand. 4. A suitable accredited archaeologist must be appointed on a watching brief to monitor the excavation of any grave sites. 5. At the onset of construction, all graves that might be affected should be clearly demarcated and if possible, fenced off to protect them from any accidental damage, whether they are earmarked for relocation, or not. 6. Should the decision be taken to propose the relocation of the affected graves, a suitably accredited and experienced service provider must be appointed to undertake relocation. 7. Relocation of grave relocation is dependent on permission for the action by the close relatives and interested and affected parties from the community, and the requirement is that the developer must assist this community to fulfil their cultural and religious requirements during the process. 8. No archaeological artifacts or infrastructures may be destructed or removed from site without the required permissions. 9. If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager and finally to the ECO. 10. It is the responsibility of the senior on-site manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. 11. The senior on-site manager will inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA. <p>A register with GPS locations of each feature as identified in the Heritage Impact Assessment (Appendix H) to be kept on site. All employees, including contractors, to be made aware of these sites. The register to include pictures and must be inspected quarterly.</p>				
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5.2.10 HEALTH AND SAFETY MANAGEMENT MEASURES

Table 17: Health and safety management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
<p>Employment of workers</p> <p>All construction, operational and demolishing activities</p>	Health & safety of surrounding community and employees	Degradation of overall health of surrounding community and employees	Construction, Operational, and Closure	Avoid	<p>Pre-application or pre-construction measures:</p> <ol style="list-style-type: none"> 1. Implement the recommended abatement facilities as per the approved design and or recommendations of the Air Quality Impact Assessment (Appendix P). 2. A Health, Safety, Environmental, and Quality (HSEQ) Management Plan must be developed. 3. Ensure compliance to the relevant Occupational Health and safety act and regulations. 4. A health and safety representatives to be appointed. 5. All employees must be medically screened before commencement of work to ensure employees are fit for work. <p>Construction measures:</p> <p>Avoid through <i>emission management</i>:</p> <ol style="list-style-type: none"> 1. All measures as recommended by the air quality specialist (Appendix P) must be implemented. <p>Control through <i>management of health and safety aspect related to employees</i>:</p> <ol style="list-style-type: none"> 1. All employees or sub-contractors entering site must be inducted to ensure the awareness of the HSEQ Management plan. 2. Regular inspections and observations of on-site activities shall take place. 3. All incidents to be reported, recorded, investigated, and mitigated. 4. Where required, adequate safety requirements for all areas to be clearly indicated. 5. Employees or sub-contractors must be informed as to what required PPE is applicable in working sections. 6. All site personnel and sub-contractors to be fully always equipped with appropriate PPE. 7. Safety signs to be provided in areas considered as high-risk zones. 8. Adequate first aid services must be provided. 9. Ongoing health and safety awareness campaigns must be promoted. <p>Operational measures:</p> <p>Avoid through <i>emission management</i>:</p> <ol style="list-style-type: none"> 1. Ensure measure specified in Air Emissions Licence (AEL) are implemented. <p>Control through <i>management of health and safety aspect related to employees</i>:</p> <ol style="list-style-type: none"> 1. Continuous implementation of the HSEQ Management Plan. 2. Continuous awareness training of health risks associated with work. 	<ol style="list-style-type: none"> 1. Ensuring the health and safety of all personnel on site and the surrounding affected communities. 	<ol style="list-style-type: none"> 1. No injuries on duty (IOD's) on site. 2. No reported pedestrian accidents. 3. Increased awareness on health and safety issues amongst employees and surrounding affected communities. 4. Monitor the exposure of employees to communicable diseases (Malaria, Tuberculosis, Covid-19, HIV, Hepatitis B etc.). 5. Limit the exposure of employees and affected communities to noncommunicable diseases. 6. Limit the exposure of employees and affected communities to potential hazardous materials. 7. Limit the exposure of employees and affected communities to soil, water and 	<ol style="list-style-type: none"> 1. Develop and implement an appropriate occupational health and safety management plan (incl. community safety initiatives, OHSE awareness campaigns at schools, churches, and social events). 2. Develop and implement a HSEQ management plan 	Entire life cycle of project

					<p>Closure measures:</p> <p>Control through <i>management of health and safety aspect related to employees:</i></p> <p>1. All construction and operational management measures applies.</p>		<p>sanitation related diseases.</p> <p>8. Prevent the spread of sexually transmitted infections under employees and surrounding communities.</p> <p>9. Universal access or awareness training to the importance of safe and nutritious food (if food is provided to employees).</p> <p>10. Prevent and treat substance abuse by continuous awareness training and providing support to employees requiring treatment.</p> <p>11. Reduce mortality from non-communicable diseases and promote mental health.</p>	
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5.2.11 SOCIO-ECONOMIC MANAGEMENT MEASURES

Table 18: Socio-economic management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
Employment of workers and procurement of materials and services	Socio-economic	Socio-economic intrusions Job opportunities and economic impacts Population change Sense of place	Construction, Operational, and Closure	Control & Remedy	<p>Pre-construction measures:</p> <ol style="list-style-type: none"> 1. A workers' code of conduct must be established as part of the contractual conditions for the companies responsible for the civil works and construction activities. 2. Permanent and temporary employees, sub-contractors and contractors must understand, and be informed of the requirements of the EMPr and Air Quality Management Plan in order to adhere to these, including the socio-economic aspects. 3. Access roads and entrances to the site should be carefully planned to limit any intrusion impacts, noise and dust pollution, as well as to limit any risks of accidents. 4. Project Proponent and the Employment Procurement and Construction (EPC) contractor should maximise the use of local labour, especially for the semi-skilled to unskilled employment categories as this would limit possible conflict arising between locals and the outside workforce. 5. Put a contractor management plan (including direct service providers) in place to ensure that the local employment and procurement targets of the operations are met. 6. Develop a Skills Development Policy for the employees at the ECF and implement accordingly 7. Develop a database of SMME's for the procurement of goods and services that could potentially be outsourced to the local communities. 8. A communication framework to be developed to communicate and disclose job opportunities and contractor opportunities, as well as the local recruitment process. 9. The local labour procurement strategy should be clearly communicated within the local community well in advance of the construction phase. 10. Landowners surrounding the construction areas and community representatives should be informed of the construction schedules and activities. 	<ol style="list-style-type: none"> 1. Limit socio-economic intrusions. 2. Enhance job opportunities and local procurement. 3. Limit negative impacts associated with population change. 4. Minimise impacts on local community safety. 5. Limit dependency on the grid while lowering operational costs. 6. Positive long-term impacts on local and regional economy as a result of continuation of the life of the smelter with 	<ol style="list-style-type: none"> 1. Minimum community complaints related to traffic and road infrastructure. 2. No speeding of project related vehicles on local roads. 3. No increase in road accidents. 4. No increase in potholes on road surfaces in local area. 5. Limited complaints from local community related to nuisance factors. 	<ol style="list-style-type: none"> 1. Adherence with the approved EMPr. 2. Adherence with the developed Safety, Health Environmental and Quality system. 3. Adherence with the developed procurement and employment policy. 	Entire life cycle of project

		<p>Community safety Risks</p> <p>Resource efficiency and community health</p> <p>Loss of permanent jobs</p>		<p>Construction measures:</p> <p>Control through <i>management of socio-economic intrusions:</i></p> <ol style="list-style-type: none"> 1. Establish a forum, including representatives from the project proponent and local key stakeholders (if not already established for mining and smelter operations) to meet quarterly to discuss socio-economic issues and project implementation/management. 2. The stakeholders (through a forum) should be kept informed of the construction schedules and activities. 3. A Complaints Register, where complaints can be lodged, must be accessible and available to all concerned. Complaints to be addressed and closed out within a 14-day time period. Alternatively, an Action Plan to address complaints must be developed within a 14-day time period. If necessary, adjustments to project design and other components should be made on an ongoing basis. 4. Traffic calming measures, upgrading of lanes and/or traffic signals (road safety) in the vicinity of the site entrance from the R555 could be required during the construction phase to accommodate the localised increased traffic patterns and to warn motorists of vehicles turning into or entering/exiting the site. 5. If loading and off-loading areas for passengers of public transport are constructed, it should adhere to all relevant traffic related safety requirements. 6. Pedestrian walkways along a section of the entrance to the site might be required if loading and off-loading of passengers making use of public transport do not take place within the site area/parking area. 7. Project vehicles must meet safety standards and must adhere to speed levels and general traffic safety measures. 8. Consider public transport of construction workers to and from the site on a daily basis. 9. As far as possible, source general construction material and goods locally to limit transportation of these over long distances. 10. Implement regular safety briefings, road signage as well as speed control measures. <p>Control through <i>management of job opportunities and consideration of economic impacts:</i></p> <ol style="list-style-type: none"> 2. Provide up-skilling opportunities for unskilled and semi-skilled local workers during the construction phase. 3. Explore possible placement of local construction workers in mining operations following the completion of construction activities. 4. The local procurement plan must adhere to standardised procurement requirements and should ensure continued potential positive impact on local businesses already established in the area or region. <p>Control through <i>management of population change:</i></p> <ol style="list-style-type: none"> 1. Where new job opportunities open up, employment of locals (within unskilled and semi-skilled positions) already residing in the municipal area must receive priority as this would enhance positive socio-economic impacts and avoid possible conflict arising between locals and the outside workforce. 2. Worker conduct to be monitored for on-site construction workers and permanent employees. 3. Contractors to ensure that workers outside the local area reside in suitable facilities and not establish informal houses. 4. No uncontrolled and unmanaged informal vending stations should be allowed close to site. <p>Control through <i>management of community safety:</i></p> <ol style="list-style-type: none"> 1. The facility must be fenced and access to the area must be controlled to avoid unauthorised entry. 2. Ensure that sufficient safety and security measures are in place. 3. Construction activities should be kept to normal working hours e.g. from 7 am until 5 pm during weekdays. 4. Employ permanent security personnel. 5. Adhere to the Occupational Health and Safety Act (Act 85 of 1993) through the development of an Occupational Health and Safety Plan. 6. Develop and Implement an Occupational Health and Safety, Community Security and Emergency Preparedness and Response Plan. 7. A Fire/Emergency Management Plan should be developed and implemented. 8. No employee, contractor or subcontractor must be permitted to operate machinery, vehicles or equipment without undergoing the necessary training. 9. Permanent employees, contractors, sub-contractors and labourers must be trained in health and safety policies, environmental awareness and emergency preparedness. 10. Regularly review the functionality and efficiency of these plans in conjunction with the local emergency teams, management, community representatives and neighbouring landowners. 11. Appropriate fire-fighting equipment should be on site and employees should be appropriately trained for fire fighting. 12. All vehicles should be in a good condition and adhere to the road worthy standards. 13. Implement regular site safety briefings. 14. Entrance to the site from the R555 must be clearly indicated and local access road must be maintained. 15. Transgressions to be dealt with through verbal instructions, then written communication and contract notices (in the case of serious transgressions). <p>Operational measures:</p> <ol style="list-style-type: none"> 1. All management activities identified during pre-construction and construction phase must be implemented throughout the duration of the operation. <p>Should the ECF project capacity be expanded, and additional construction activities be required, all measures as identified during the construction phase must be implemented.</p>	<p>subsequent employment opportunities and downstream opportunities.</p> <p>indirect and economic</p>	<ol style="list-style-type: none"> 6. Air quality levels to meet relevant standards and implementation of Air Quality Management Plan. 7. Noise levels within limits as specified in noise standards. 8. No community protests directed at the project. 9. Meet provincial employment and procurement targets. 10. Local labour (low skilled) forms a considerable percentage (where lower skills apply) of labour force. 11. Local procurement is implemented where feasible and available. 12. Zero accidents or safety incidents. 13. EMPr compliance. 14. SHEQ compliance. 15. Capacity building and skills training over the operational period of the facility. 16. Employees with portable skills. 17. No complaints with regards to intrusion impacts during Closure phase . 		
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					<p>Closure measures:</p> <p>Remedy through management of loss of permanent employment opportunities:</p> <ol style="list-style-type: none"> 1. Project proponent (operator) to assist employees, prior to the Closure and after closure of the facility to be marketable for other positions. This would include undergoing a portable skills development programme in advance of the proposed retrenchment dates. 2. Retrenchments to be phased over a period of time as the facility prepares for Closure. 3. Provide assistance to employees to source jobs in similar sectors within the municipal area and beyond. 4. All management activities identified during the construction phase applies during the Closure phase. 				
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5.2.12 TRAFFIC MANAGEMENT MEASURES

Table 19: Traffic management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
<p>Site footprint & location</p> <p>Movement of construction plant and equipment</p> <p>Installation of PBC & CGC</p> <p>Transporting of material on public roads</p> <p>Movement of demolishing equipment</p>	<p>Influx of traffic</p> <p>Temporary increase of abnormal vehicle traffic</p> <p>Pressure on transport infrastructure</p>	<p>Increased pressure on local roads</p> <p>Degradation of road infrastructure</p>	Construction, Operational, and Closure	Control	<p>Pre-application or pre-construction measures:</p> <ol style="list-style-type: none"> 1. The final site layout should take into consideration all access alternatives. In the event of selecting a new intersection of Road R555, an application for approval from SANRAL will be required. This will require additional land survey of Road R555 for 500 meters in both directions from the proposed point location in order to confirm intersection sight distances. 2. Any new access intersections would need to be at least 640 meter from the existing Smelter access road (as identified in Appendix M). 3. Implement the required improvements as specified in Appendix M before the commencement of any activities. <p>Construction measures:</p> <ol style="list-style-type: none"> 1. All road storm water control mechanisms to be maintained. 2. Clean and repair any damages caused by the haul vehicles to public or private roads. 3. All incidents related to traffic resulting from the authorised activities should be documented and kept in the safety records. 4. Allow for safe pedestrian crossings where necessary. 5. Traffic calming measures must be implemented in consultation with the provincial traffic department. 6. Warning signs must be placed on and around the site as per the Occupational, Health and Safety Act requirements. 7. Clearly indicate which activities are to be taken place within which areas of the site using demarcation and/or signage. 8. Traffic warning signage must be erected where applicable, along transport routes and access roads. 9. All access roads shall be properly marked. 10. Markers shall show the direction of travel. 11. Roads not being used shall be marked with a “No Entry” sign. 12. Position security lighting so that it does not pose a nuisance to residential properties or tourist facilities or a danger to road users. 13. Warning barricading should be placed around open excavations and should be suitable for varying weather conditions. 14. Road safety training to be provided to residents of the local community and all employees (including contractors). <p>Operational measures:</p> <ol style="list-style-type: none"> 1. Provide workers with training on road safety. 2. Road safety and awareness campaigns should be run at the proposed project. <p>Closure measures:</p> <p>All construction and operational measures are applicable during the closure phase.</p>	<ol style="list-style-type: none"> 1. Effective management of traffic during the entire life cycle of the proposed development. 	<ol style="list-style-type: none"> 1. No road accidents related to the proposed development. 2. No complaints from surrounding landowners or road users. 	<ol style="list-style-type: none"> 1. Ensure compliance with standards set by SANRAL. 2. Develop and implement a traffic management plan. 	Entire life cycle of project

5.2.13 WASTE MANAGEMENT MEASURES

Table 20: Waste management measures

ACTIVITIES	ASPECT	POTENTIAL IMPACT	PHASE	MITIGATION TYPE	MANAGEMENT ACTION	ENVIRONMENTAL STANDARD TO BE ACHIEVED		COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
						OBJECTIVE	TARGET		
<p>Temporary office & sanitation</p> <p>Construction waste management</p> <p>Temporary service bay</p> <p>Site offices, ablution facilities & kitchen</p> <p>Operation of PBU & CGC</p> <p>Demolishing activities</p>	<p>Waste generation</p> <p>Soil contamination</p> <p>Contamination of water resources</p> <p>Effluent from chemical toilets</p> <p>Wastewater effluent</p> <p>Office and kitchen waste</p> <p>PBU condensate effluent</p> <p>Sewage effluent</p> <p>Building rubble generation</p> <p>Hazardous waste generation</p>	<p>Increased pressure of municipal service delivery</p> <p>Littering and illegal dumping</p> <p>Degradation of soil quality</p> <p>Loss of fertile soil</p> <p>Degradation of water resource quality</p> <p>Degradation of aquatic environment</p> <p>Illegal dumping</p> <p>Littering</p> <p>Soil contamination</p> <p>Sewage spills</p>	<p>Construction, Operational, and Closure</p> <p>Avoid & Control</p>	<p>Construction measures:</p> <p>Avoid through <i>construction waste management and monitoring</i>:</p> <ol style="list-style-type: none"> Waste to be managed as per the existing Lion Smelter’s waste management plan. The construction contractors must provide the ECO with a method statement indicating how the waste management plan will be implemented during construction. Bins (sufficient number and capacity) to store general and hazardous waste produced daily shall be provided at the construction site. The bins are to be animal proof, sealed bins that cannot leak leachate material and waterproof preventing rainwater from entering them. Bins shall be emptied on a weekly basis or if there is a nauseous smell coming from them or vectors are breeding within them. An integrated waste management approach shall be used, based on the principles of waste minimisation, reduction, re-use and recycling of materials. No waste material or litter shall be burnt or buried on site. All solid waste shall be disposed of offsite at an approved municipal landfill site. No wastewater shall be disposed of directly into watercourses unless the water quality meets the DWS general discharge limits. All hazardous waste is to be stored in a hazardous waste container (sealed, leak proof, waterproof container) clearly labelled. The hazardous waste is to be collected and transported to a registered hazardous waste facility. Weekly checks are to be done to see if all registers are up to date. All chemical toilets are to be serviced weekly by a registered service provided. In the event of a spill, the contamination must be contained and cleaned immediately to the satisfaction of the ECO. The Service provider for chemical toilet is to ensure that when servicing the toilets, it is done in a manner as to prevent any spills from occurring. Medical waste as a result of a first aid incident must be disposed of in a manner as to not cause harm to employees. A suitable service provider must be appointed to manage medical waste. <p>Avoid through <i>incident management and emergency preparedness</i>:</p> <ol style="list-style-type: none"> Any hazardous substances spills or spilling of contaminated effluent on natural ground or surface area must be contained and cleaned to the satisfaction of the ECO immediately. Material used to clean-up spills is hazardous waste and must be treated accordingly. <p>Control through <i>record keeping</i>:</p> <ol style="list-style-type: none"> All waste manifestos are to be kept on site and up to date. The volume of waste generated during construction must be recorded. Safe disposal certificates for all waste streams must be kept and audited by the ECO. The ECO must ensure that waste disposal takes place at a registered landfill according to waste type. Records to be kept for at least 5 years. 	<ol style="list-style-type: none"> Promoting the reduction, re-use, or recycle of waste where prevention is not possible. Disposal of waste to local waste disposal sites is limited. 	<ol style="list-style-type: none"> No littering. No unpleasant odours. Marked and sealable bins observed. Evidence of waste disposal certificates. 	<ol style="list-style-type: none"> Compliance with the National Environmental Management: Waste Act, act no 59 of 2008 and associated regulations. 	<p>Entire life cycle of project</p>	

				<p>Operational measures:</p> <p>Avoid through <i>operational waste management and monitoring</i>:</p> <ol style="list-style-type: none"> 1. Waste to be managed as per the existing Lion Smelter’s waste management plan. The operator to provide a method statement indicating compliance with the existing waste management plan. This method statement must be approved by the ECO. All requirements stated for the construction phase remains valid. 2. Bins shall be emptied on a weekly basis or if there is a nauseous smell coming from them or vectors are breeding within them. 3. Hazardous waste generated because of spills or maintenance activities must be stored in a designated area for safe disposal. The waste receptacle must be covered to prevent rainwater from entering and stored in an impermeable bunded area. 4. No littering shall be tolerated. 5. PBU condensate effluent must be managed as per the waste stream classification. The ECO must ensure that reclassification of the waste stream takes place every 5 years as per the applicable regulations in terms of NEMWA. 6. Sewage from the ablution facilities and kitchen must tie into the existing sewage system associated with the Lion Smelter. <p>Control through <i>record keeping</i>:</p> <ol style="list-style-type: none"> 1. All waste manifestos are to be kept on site and up to date. 2. The volume of waste generated during operations must be recorded. 3. Safe disposal certificates for all waste streams must be kept and audited by the ECO. The ECO must ensure that waste disposal takes place at a registered landfill according to waste type. 4. Records to be kept for at least 5 years. <p>Closure measures:</p> <p>Avoid through <i>Closure waste management and monitoring</i>:</p> <ol style="list-style-type: none"> 1. Continuous management of waste as per the existing Lion Smelter’s waste management plan. All requirements stated for construction and operation remains valid during the Closure phase. 2. Building rubble as a result of demolition must be quantified and approval for disposal to the municipal landfill must be obtained. Alternative measures to manage (reuse or disposal) of building rubble must be approved by the ECO prior to implementation. 3. Contaminated rubble as a result of the demolition of hazardous substances stores and containment bunds to be treated as hazardous waste. 4. All demolition waste must be removed from site before the commencement of rehabilitation measures. <p>Control through <i>record keeping</i>:</p> <ol style="list-style-type: none"> 1. Safe disposal records of all demolition waste must be kept for at least 5 years from disposal. 				
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5.3 MONITORING PROGRAM

Table 21 provides the functional requirement for monitoring the identified impact management actions as specified in section 5.2. In addition to these monitoring requirements, listed activities must be monitored frequently to ensure compliance with the conditions specified in the EA and EMPr. Records of all monitoring activities must be kept by the ECO for at least 5 years.

Table 21: Functional requirements for monitoring the identified impact management actions

MONITORING METHOD	MONITORING MECHANISM	MONITORING FREQUENCY	IMPLEMENTATION RESPONSIBILITY
AIR QUALITY & CLIMATE			
<p>Ensure the development and implementation of an Air Quality Management Plan (AQMP). The plan must at least address the following:</p> <ul style="list-style-type: none"> • Methods of complying with legislative requirements (ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009) and the National Dust Control regulations (GNR 897 of November 2013); • Methods of controlling dust generation; and • Identifying sensitive receptors and monitoring points. <p>In addition to the existing monitoring requirements of the existing Lion Operation, the existing Dust Fallout (DFO) Monitoring network are to include the following monitoring areas:</p> <ul style="list-style-type: none"> • East of the proposed TSF1 and TSF2 location; • Far northeast perimeter of the site, on the property on the opposite side of the R555; • Northern perimeter of the same last-mentioned property; and • Western perimeter of the same last-mentioned property. <p>Noxious fume monitoring to take place at the following areas:</p> <ul style="list-style-type: none"> • Sensitive receptor(s) located near the development area, and assess against relevant air quality standards; and • On-site of the proposed development area to assess compliance with occupational exposure. 	<ol style="list-style-type: none"> 1. Provision of MS/AQMP. 2. Visual inspections. 3. Reporting. 4. Record keeping. 	<ol style="list-style-type: none"> 1. Review of AQMP as or when required. 2. Monthly monitoring of compliance with the NEMAQA regulations. Including the required DFO, PM₁₀, PM_{2.5}, and noxious fume monitoring. 3. Frequent visual inspections. 4. Reporting and recording emissions related incidents. 5. Annual reporting on the online NAEIS systems. 6. Monitoring records of uncontrolled emissions including date, time, duration and production capacity at the time. 	<p>Operator</p> <p>ECO</p> <p>Appointed specialist</p>

TERRESTRIAL BIODIVERSITY			
<p>A Plant Search and Rescue Management Plan (PS&RMP) must be developed and address at least the following:</p> <ul style="list-style-type: none"> • Recommendations made in the Terrestrial Biodiversity assessment attached as Appendix I; • Address requirements issued on the plant species permit obtained; • Method of quantification and record keeping of search and rescued plants; and • Method of reinstating vegetation and ensuring rehabilitation objective is reached. <p>An Alien Eradication and Control Management Plan (AE&CMP) must be developed and address at least the following:</p> <ul style="list-style-type: none"> • Identification of areas prone to alien species in accordance with the applicable regulations and Appendix I; • Reference to recommendations made in Appendix I; • Frequency of monitoring and inspection requirements of areas prone to establishment; • Eradication methods; and • Addressing legal requirements. 	<ol style="list-style-type: none"> 1. Provision of MS for PS&RMP/AE&CMP . 2. Visual inspections. 3. Reporting. 4. Record keeping. 	<ol style="list-style-type: none"> 1. Frequent quantification review of search and rescued species. 2. Annual review or frequency as stipulated by the permit of plant removal permits. 3. Review of AE&CMP as or when required. 4. Weekly inspection of site for the visible signs of alien species establishment. 	<p>ECO</p> <p>Appointed specialist</p>
AQUATIC BIODIVERSITY			
<p>A Storm Water Monitoring Protocol (SWMP) must be developed and implemented throughout the entire life cycle of the ECP project. This SWMP must address at least the following:</p> <ul style="list-style-type: none"> • Method of routine inspections and record keeping; and • Method of monitoring water quality ensuring it complies with all relevant legislation requirements. 	<ol style="list-style-type: none"> 1. Provision of MS for SWMP. 2. Visual inspections. 3. Reporting. 4. Record keeping. 	<ol style="list-style-type: none"> 1. Review of SWMP as or when required. 2. Routine inspection and servicing of all grease traps and slit traps. At least monthly during the wet season and every second month during the dry season. 3. Routine inspection of storm water management infrastructures (at least once a month). 4. Water samples are to be collected during rainfall events at all outfalls. Samples be taken during the rainfall event and 2 to 3 days after the event ceases. 	<p>ECO</p> <p>Operator</p> <p>Appointed specialist</p>
SOIL & AGRICULTURAL			
<p>A Soil Conservation Management Plan (SCMP) must be developed and address at least the following:</p> <ul style="list-style-type: none"> • Specify mitigation measures that will be implemented to prevent contamination of topsoil's and fertile soils; • Identify measures to be implemented preventing the loss of topsoil and fertile soils; • Record keeping of available topsoil and fertile soil for use during the rehabilitation phase of an activity; and 	<ol style="list-style-type: none"> 1. Provision of MS for SCMP/HSMP. 2. Visual inspections. 3. Reporting. 4. Record keeping. 	<ol style="list-style-type: none"> 1. Review of SCMP as or when required. 2. Frequent quantification of available fertile soil for rehabilitation. 3. Review of storm water management plan as or when required. 4. Review of vehicle/plan/equipment maintenance plan as or when required. 	<p>ECO</p> <p>Operator</p>

<ul style="list-style-type: none"> Monitoring requirements <p>Regular inspections of areas prone to hydrocarbon spills and contamination must be inspected on a regular basis.</p> <p>Contamination the affected environment will require remediation actions.</p> <p>Soil contamination</p> <p>After completion of remediation actions, it is recommended that samples be taken to ensure the soil quality comply with the rehabilitation objectives.</p> <p>Water contamination</p> <p>Water samples should be taken to ensure compliance with legal thresholds.</p>		<ol style="list-style-type: none"> Daily inspections of vehicles/plant/equipment. Weekly inspections of spill prevention equipment. Annual review of the Emergency Preparedness and Response Plan or review after occurrence of emergency incident. Weekly inspections of hazardous substances storage facilities. Review of Hazardous Substances Management plan (HSMP) as or when required. 	
WATER RESOURCES			
<p>A Storm Water Monitoring Protocol (SWMP) must be developed and implemented throughout the entire life cycle of the ECP project. This SWMP must address at least the following:</p> <ul style="list-style-type: none"> Method of routine inspections and record keeping; and Method of monitoring water quality ensuring it complies with all relevant legislation requirements. <p>Monitor and record water usage.</p> <p>The operational water balances must be monitored and reviewed on a frequent basis.</p>	<ol style="list-style-type: none"> Provision of MS for SWMP. Visual inspections. Reporting. Record keeping. 	<ol style="list-style-type: none"> Review of SWMP as or when required. Routine inspection and servicing of all grease traps and slit traps. At least monthly during the wet season and every second month during the dry season. Routine inspection of storm water management infrastructures (at least once a month). Water samples are to be collected during rainfall events at all outfalls. Samples be taken during the rainfall event and 2 to 3 days after the event ceases. 	<p>ECO</p> <p>Operator</p> <p>Appointed specialist</p>
TOPOGRAPHY & VISUAL			
<p>Records to be kept of pre-construction topography. Alteration to be monitored and managed in accordance with the closure objectives.</p> <p>Visual monitoring and supervision of vegetation clearing during construction (by contractor as part of construction contract).</p> <p>Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).</p>	<ol style="list-style-type: none"> Monitoring of closure objectives. Visual inspections. Reporting. Record keeping. 	<ol style="list-style-type: none"> Quarterly inspection of rehabilitated areas for at least a year following the end of construction. Quarterly inspections of rehabilitated areas post closure for at least two years. 	<p>ECO</p> <p>Operator</p> <p>Appointed specialist</p>
NOISE			

<p>A noise survey must be conducted on a monthly basis, recording the following:</p> <ul style="list-style-type: none"> Leq – values of each measuring point in dBA; Spectrum analysis of the results; Any physical characteristics in and next to the measuring points which may change the noise regime of the area; and Any other details such as the instrument, competent person etc. will be compiled and made available. <p>The noise survey to be conducted at the following noise monitoring locations:</p> <table border="1" data-bbox="165 491 1169 775"> <thead> <tr> <th>POSITION</th> <th>LATITUDE</th> <th>LONGITUDE</th> <th>REMARKS</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>24° 48.736'S</td> <td>30° 7.288'E</td> <td>Northern corner of Smelter property</td> </tr> <tr> <td>2</td> <td>24° 49.093'S</td> <td>30° 7.390'E</td> <td>Eastern Smelter property boundary</td> </tr> <tr> <td>3</td> <td>24° 49.570'S</td> <td>30° 7.436'E</td> <td>South-eastern Smelter property boundary</td> </tr> <tr> <td>4</td> <td>24° 49.199'S</td> <td>30° 6.541'E</td> <td>North-west of Smelter, across R555</td> </tr> <tr> <td>5</td> <td>24° 49.080'S</td> <td>30° 6.692'E</td> <td>North-west of Smelter, across R556</td> </tr> <tr> <td>6</td> <td>24° 48.911'S</td> <td>30° 7.002'E</td> <td>North-western Smelter property boundary</td> </tr> <tr> <td>7</td> <td>24° 48.694'S</td> <td>30° 6.634'E</td> <td>690m north-west of Smelter property boundary</td> </tr> <tr> <td>8</td> <td>24° 49.449'S</td> <td>30° 6.681'E</td> <td>At the parking area for the Administration offices</td> </tr> </tbody> </table> <p>All complaints as a result of noise must be recorded in a complaint register.</p>	POSITION	LATITUDE	LONGITUDE	REMARKS	1	24° 48.736'S	30° 7.288'E	Northern corner of Smelter property	2	24° 49.093'S	30° 7.390'E	Eastern Smelter property boundary	3	24° 49.570'S	30° 7.436'E	South-eastern Smelter property boundary	4	24° 49.199'S	30° 6.541'E	North-west of Smelter, across R555	5	24° 49.080'S	30° 6.692'E	North-west of Smelter, across R556	6	24° 48.911'S	30° 7.002'E	North-western Smelter property boundary	7	24° 48.694'S	30° 6.634'E	690m north-west of Smelter property boundary	8	24° 49.449'S	30° 6.681'E	At the parking area for the Administration offices	<ol style="list-style-type: none"> Monthly noise sampling. Reporting. Record keeping. 	<ol style="list-style-type: none"> Recording of complaints. Review of vehicle/plan/equipment maintenance plan as or when required. Frequent inspections of vehicles/plant/equipment. Conducting monthly noise survey. 	<p>ECO</p> <p>Operator</p> <p>Appointed specialist</p>
POSITION	LATITUDE	LONGITUDE	REMARKS																																				
1	24° 48.736'S	30° 7.288'E	Northern corner of Smelter property																																				
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HERITAGE & PALAEOLOGY																																							
<p>A register (with GPS coordinates) to be kept of all identified sites/sites discovered during construction activities. This register to be updated with photographic evidence recording the state of the features on a quarterly basis.</p>	<ol style="list-style-type: none"> Record keeping. Visual inspections. 	<ol style="list-style-type: none"> Quarterly inspections of identified sites to ensure no disturbance. 	<p>ECO</p>																																				
HEALTH & SAFETY																																							
<p>Develop and implement a Health, Safety, Environment, and Quality Management Plan.</p>	<ol style="list-style-type: none"> Record keeping. Visual inspections. 	<ol style="list-style-type: none"> Daily inspection of the health and safety conditions as per the HSEQ management plan. 	<p>HSEQ Officer</p>																																				
SOCIO-ECONOMIC																																							
<p>A Social Management Plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> Measures taken by I parties to ensure compliance with management measures specified in the EMPr; Specify the method to be implemented to communicate information to the stakeholders and affected communities; and Provide for a grievance procedure to manage all complaints received. 	<ol style="list-style-type: none"> Record keeping. Update of I&AP register. 	<ol style="list-style-type: none"> Conducting quarterly stakeholder meetings. 	<p>Operator</p> <p>CLO</p>																																				
TRAFFIC																																							

<p>A Traffic Management Plan (TMP) must be development and implemented. This plan must address at least the following:</p> <ul style="list-style-type: none"> • Schedule of inspection access roads and public intersections; • A road maintenance schedule; and • Access route and traffic direction management. 	<ol style="list-style-type: none"> 1. Provision of MS for SWMP. 2. Record keeping. 3. Visual inspections. 	<ol style="list-style-type: none"> 1. Frequent inspections of access roads and public intersections (at least quarterly). 2. Frequent maintenance on access road (as required). 	<p>Operator</p>
<p>WASTE MANAGEMENT</p>			
<p>A Waste Management Plan (WMP) must be developed and address at least the following:</p> <ul style="list-style-type: none"> • Identification of possible waste streams both hazardous and general; • Description of method to re-use, reduce, recycle, or avoid waste generation; • Monitoring requirements; • Quantification of waste streams; • Description of mitigation measures; and • Compliance with applicable regulations. <p>On-going monitoring, reporting, and recording of all waste streams are required.</p>	<ol style="list-style-type: none"> 1. Record keeping. 2. Visual inspections. 	<ol style="list-style-type: none"> 1. Frequent inspection of on-site waste disposal facilities and sites. 2. Update of WMP when required. 3. Monthly recording of waste generation. 	<p>Operator ECO</p>

6 AUDITING AND REPORTING

6.1.1 INTERNAL AUDITING & REPORTING

The ECO must submit a **monthly** compliance report **during the construction phase** and **quarterly during the operational phase** to the competent authority containing at least the following:

- Performance against the measures specified in the EA and EMPr;
- Summary of the status of the monitoring programme (i.e. summary of monitoring results, complaints received, records of visual inspections, summary of waste generated ect.); and
- Construction/operational/Closure status.

An annual internal audit report must be conducted by the ECO and submitted to the competent authority reporting the following:

- Assessment of the effective implementation of the conditions of the EMPr and compliance status thereof;
- Assessment of the effectiveness of the monitoring programme and required changes; and
- Provisioning of an action plan addressing shortcomings and or non-conformities.

The outcome of the reports specified above must be presented during the quarterly stakeholder engagement meetings.

6.1.2 EXTERNAL AUDITING & REPORTING

Regulation 34 of the 2014 EIA regulations stipulates the requirements for auditing compliance with the EA, the EMPr, and the Closure Plan (if applicable).

It requires the HoEA, for the period during which the EA, EMPr, and Closure Plan are valid, to ensure compliance with all the conditions stipulated in these documents and that be audited. This audit report must then be submitted to the competent authority.

This audit report must adhere to the following conditions:

- Be prepared by an independent person with the relevant environmental auditing expertise;
- Provide verifiable findings, in a structured and systematic manner, on- (i) the level of performance against and compliance of an organization or project with the provisions of the requisite environmental authorisation or EMPr and, where applicable, the closure plan; and (ii) the ability of the measures contained in the EMPr, and where applicable the closure plan, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity;
- Contain the information set out in Appendix 7 of 2014 EIA regulations; and
- Be conducted and submitted to the competent authority at intervals as indicated in the environmental authorisation.

The purpose of this audit report is also defined in the regulations and is as follows:

- Determine the ability of the EMPr, and where applicable the closure plan, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the

- undertaking of the activity on an ongoing basis and to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and
- To determine the level of compliance with the provisions of environmental authorisation, EMPr and where applicable the closure plan.

In the event that findings of the environmental audit report indicate insufficient mitigation of environmental impacts of the activity or insufficient levels of compliance with the requirements, the HoEA must submit recommendations to amend the EMPr or closure plan in order to rectify the shortcomings identified in the audit report.

The recommendations must be subjected to a public participation process which process has been agreed to by the competent authority and was appropriate to bring the proposed amendment of the EMPr and, where applicable the closure plan, to the attention of potential and registered interested and affected parties, including organs of state which have jurisdiction in respect of any aspect of the relevant activity and the competent authority, for approval by the competent authority.

Within 7 days of the date of submission of an environmental audit report to the competent authority, the holder of an environmental authorisation must notify all potential and registered interested and affected parties of the submission of that report, and make such report immediately available:

- to anyone on request; and
- on a publicly accessible website, where the holder has such a website.

The environmental audit report must contain all information set out in Appendix 7.

The **independent audit** must take place on after **6 months of commencement of construction and following the completion of construction activities**, thereafter **every two years** during the **operational phase**, or as specified by the competent authority in the EA, to promote continual improvement.

In terms of the definition of the 2014 EIA regulations, **independent** in relation to the person responsible for the preparation of an environmental audit report, means:

- That such person has no business, financial, personal, or other interest in the activity and is appointed in terms of the regulations; or
- That there are no circumstances that may compromise the objectivity of the person performing such work excluding fair remuneration for work performed in connection with the environmental audit report.

The findings and recommendations must be communicated during the quarterly stakeholder engagement meetings.

7 ENVIRONMENTAL AWARENESS PLAN

General environmental awareness must be promoted among everyone working on the ECF project (including contractors, sub-contractors and service providers) to encourage the implementation of environmentally sound practices throughout its entire life cycle.

This will ensure that environmental incidents are minimised and environmental compliance maximised.

The purpose of an Environmental Awareness Plan is to outline the methodology that will be used to inform the employees of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid contamination or the degradation of the environment. The awareness plan is primarily a tool to introduce and describe the requirements of the range of environmental and social plans for the project during the life of the project. The environmental awareness plan ensures that training needs are identified and appropriate training is provided.

The environmental awareness plan should at least communicate the following:

- Importance of conformance with the environmental policy, procedures and other requirements of good environmental management;
- The significant environmental impacts and risks of an individual's work activities and the environmental benefits of improved performance;
- Individual's roles and responsibilities in achieving the aims and objectives of the environmental policy; and
- The potential consequences of not complying with environmental procedures.

In order for the environmental awareness policy to be effective, the issues raised through it need to be communicated through training sessions, meetings, consultations and progress reviews. The following are recommended minimum steps that can be taken to ensure communication is effective:

- The agendas of all company board meetings will have an item where issues environmental projects are discussed and feedback is given;
- Provide progress reports on the achievement of policy objectives and level of compliance with the approved EMPr and the closure plan;
- Ensure environmental issues are realised at monthly management executive committee meetings and at all relevant, mine wide meetings, at all levels; and
- Ensure environmental issues are discussed at all general liaison meetings with local communities and other I&APs.

All employees are required to undergo environmental awareness induction training upon appointment and records of such training must be obtained and recorded. Refresher induction training must periodically take place.

Regular topic discussion groups (at least once a week) communicating the following is recommended:

- Findings of environmental performance reports;
- Awareness raising campaigns discussing environmental topics; and
- Information of any environmental risk which may result from employee's work.

It is recommended that an awareness training schedule be developed. This schedule should at least indicate the following:

- Topic;
- Method of communicating i.e. through a workshop, training session, or meeting;
- Target group i.e. management, skilled or semi skilled labour, admin staff etc;
- Scheduled time; and

- Progress.

The following topics are recommended:

- Potential environmental risks;
- Legal requirements;
- EMS requirements;
- Environmental performance; and
- Environmental incidents addressing corrective and preventative measures to be implemented.

8 INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

At the time of finalising this EMPr, no specific information was required by the competent authority.