KONGIWE
ENVIRONMENTAL SCIENCE & ENGINEERING

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

THE DEVELOPMENT OF THE PROPOSED LESLIE 1 COAL MINING PROJECT, MPUMALANGA PROVINCE

12 September 2018

DMR Reference: MP 30/5/1/2/2/10207 MR

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH THE DEVELOPMENT OF THE PROPOSED LESLIE 1 COAL MINING PROJECT, MPUMALANGA PROVINCE.

DMR Reference Number: MP 30/5/1/2/2/10207 MR

Mining Right Application

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

Name of Applicant: Anglo Operations (Pty) Ltd

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File Reference Number SAMRAD: MP 30/5/1/2/2/10207 MR

Document prepared by: Kongiwe Environmental (Pty) Ltd

Final Environmental Management Programme Report Information

Project:	**Leslie 1 Mining Project**
Report Title:	The construction and operation of the Leslie 1 Coal Mining Project, Mpumalanga Province
DMR Reference No:	MP 30/5/1/2/2/10207 MR
Client:	Anglo Operations (Pty) Ltd
Project No:	GLEN#003
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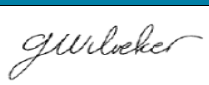
Verification	Capacity	Name	Signature	Date
By Author	Principal EAP	Gerlinde Wilreker		18 July 2018
Reviewed by:	Legal Review	Michael Hennessy		19 July 2018
Reviewed by:	Peer Review	Kim Haycock		27 July 2018
Authorised by:	Director	Bradly Thornton		20 July 2018

SECTION 1:

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT OVERVIEW

Important Notice

In terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), as amended (MPRDA), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of Regulation 16(3) (b) of the Environmental Impact Assessment Regulations 2017, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of Regulation 17 (1) (c) the Competent Authority must check whether the application has considered any minimum requirements applicable or instructions or guidance provided by the Competent Authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulations and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner (EAP) must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

Objective of the Environmental Impact Assessment Process

1) The objective of the environmental impact assessment process is to, through a consultative process–

a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
c) identify the location of the development footprint within the preferred site based of an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
d) determine the –
    I. nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    II. degree to which these impacts –
        - ❖ can be reversed;
        - ❖ may cause irreplaceable loss of resources; and
        - ❖ can be avoided, managed or mitigated;
e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
g) identify suitable measures to manage, avoid or mitigate identified impacts; and
h) identify residual risks that need to be managed and monitored.

Public Review Period for the Draft EIA/EMPr Report

Members of the public, local communities, and stakeholders were invited to comment on the Draft Environmental Impact Assessment and Environmental Management Programme Report (EIA/EMPr) which was made available for public review and comment from **03 August to 03 September 2018.** The Draft EIA/EMPr was also submitted to the Department of Mineral Resources (DMR) and was made available at the following locations.

Location	Physical address	Contact person
Hardcopies		
Lebohang Public Library	1095 Butana Tabula, Lebohang, 2265	Ms Rosina Mosako, Librarian (073) 324 5451 speed dial 16769
Leandra Public Library	8 Pretorius Street, Eendrag, 2266	Mr Natalie Potgieter, Librarian (072) 236 3357
Devon Public Library	399 Schuurman Street, Devon	Ms Nelia Nienaber Tel: 017 688 0028
Electronic Copies		
For a CD copy please contact the stakeholder engagement team (Sibongile Bambisa / Vanessa Viljoen) Tel: 010 140 6508		
Kongiwe Environmental website: http://www.kongiwe.co.za/publications-view/public-documents/		

Policy, Legislation and Conditional Requirements

The Department of Environmental Affairs (DEA) in consultation with the Department of Mineral Resources (DMR) identified the need for the alignment of Environmental Authorisations (EA) and promulgated a single environmental system under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) whereby the DMR has become the Competent Authority (CA) for the authorisation of mining-related projects under the Environmental Impact Assessment (EIA) Regulations of 2014, as amended in 2017. This has resulted in simultaneous decisions in terms of NEMA, the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) and other specific environmental management Acts.

As from 2 September 2014 the statutory dispensation regarding environmental management on mines changed with the implementation of the One Environmental System and the commencement of the National Environmental Management Laws Amendment Act (Act No. 25 of 2014) (NEMLAA). In line with the One Environmental System the Environmental Impact Assessment Regulations (EIA 2014 Regulations) were promulgated and came into force on 8 December 2014. The EIA 2014 Regulations have subsequently been amended on the 7th of April 2017.

This EIA report is prepared in support of the Environmental Authorisation application and Mining Right Application (MRA) will accordingly comply with the requirements of the EIA 2014 (as amended in 2017) Regulations read with the Regulations published in terms of the MPRDA (GNR 527 of 23 April 2004). The proposed Leslie 1 MRA process therefore requires Environmental Authorisation in terms of the NEMA and will follow a Scoping and EIA (S&EIA) process in terms of the EIA 2014 Regulations (as amended in 2017). The aforesaid regulations enforce a strict timeframe and require a decision by the Competent Authority, the DMR, within 300 days from submission of the Environmental Authorisation application.

The nature and extent of the project, as well as the potential environmental impacts associated with the construction, operation and decommissioning of a facility of this nature is assessed and presented in the Final EIA report. This EMPr has been compiled in terms of the provisions of Appendix 4 of the EIA 2014 Regulations, as amended in 2017, and the Directive set out in the template prescribed by the DMR. Table A-1 cross-references the various sections in this report with these requirements.

Table A-1: Structure of the EMPr in line with the Appendix 4 of the EIA 2014 Regulations (as amended).

No.	Regulation Requirement	Report Section	Page Number
(a)	**Details of -**	Section 1	1
(i)	The EAP who prepared the report and;		
(ii)	The expertise of the EAP, including a CV		
(b)	**A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;**	EMPr Section 2 EIA Chapter 3 and 8	3
(c)	**A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the**	Section 3	5 and 6

No.	Regulation Requirement	Report Section	Page Number
	environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers		
(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-**	Section 6 and Section 7	18 40
(i)	planning and design;	Section 6	18
(ii)	pre-construction activities;	Section 6	18
(iii)	construction activities;	Section 6	24
(iv)	rehabilitation of the environment after construction and where applicable post closure; and	Section 6	36
(v)	where relevant, operation activities;	Section 6	30
(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-**	Section 6	18
(i)	avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Section 6	18
(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 9	42
(g)	**the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);**	Section 10 and 11	49 52
(h)	**The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);**	Section 10 and 12	49 84
(i)	**an indication of the persons who will be responsible for the implementation of the impact management actions;**	Section 5	16
(j)	**the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;**	Section 10 and 11	49 52
(k)	**the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);**	Section 10 and 11	49 52
(l)	**a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;**	Section 10 and 11	49 52
(m)	**an environmental awareness plan describing the manner in which-**	Section 13	85
(i)	the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	Section 14 and 15	87 90
(ii)	risks must be dealt with to avoid pollution or the degradation of the environment; and	Section 14 and 15	87 90

No.	Regulation Requirement	Report Section	Page Number
(n)	**any specific information that may be required by the competent authority.**	Section 16	93

Kongiwe Environmental has compiled a table (refer to Table A-2 below) outlining the comments and conditional requirements as read within the acceptance of the Final Scoping Report dated 31 May 2018. The information below highlights key conditions to be addressed within the EIA report. Failure to abide by these conditions could render the MRA as being rejected by the Competent Authority.

Table A-2: Information requested by the DMR, as per the acceptance of the Final Scoping Report, 31 May 2018.

No.	DMR Information requirement	EAP Comments
a)	The Department has evaluated the submitted SR and Plan of the study for environmental Impact Assessment dated 10 May 2018 and is satisfied that the documents comply with the minimum requirements of Appendix 2(2) of the National Environmental Management Act, 1998 (as amended) (NEMA) Environmental Impact assessment (EIA) Regulations, 2014. The SR is hereby accepted by the Department in terms of Regulation 22(a) of the NEMA EIA Regulations, 2014.	Comment noted.
b)	You may proceed with the environmental impact assessment process in accordance with the tasks contemplated in the Plan of Study for environmental Impact assessment as required in terms of the NEMA EIA regulations, 2014.	Comment noted.
c)	Please ensure that comments from all relevant stakeholders are submitted to the Department with the Environmental Impact Assessment Report (EIAR). This includes but is not limited to the Provincial Heritage Resources Authority, Department of Agriculture, Forestry and Fisheries (DAFF), Department of Water and Sanitation (DWS), Mpumalanga Department of Public Works, Roads and Transport and the local municipality. Proof of correspondence with the various stakeholders must be included in the EIAR. Should you be unable to obtain comments, proof of the attempts that were made to obtain comments should be submitted to the Department.	Section 7 Appendix C Comments and Response Report
d)	It should be noted that the Department requires the following to be provided/included and form part of the final EIR and EMPr to be submitted. ❖ A map at an appropriate scale which superimposes the proposed activity(ies) and its associated infrastructures on the environmental sensitivities of the preferred site indicating any areas that should be	Figure 3-1 and Figure 3-2

No.	DMR Information requirement	EAP Comments
	avoided, including buffers; ❖ Details of financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts. ❖ Public Participation Process must be transparent, and all comments received during the process must be incorporated into the comments and response report of the final Environmental Impact Report. ❖ Proof of correspondence with the various stakeholders must be included in the EIAR. Should you be unable to obtain comments, proof of the attempts that were made to obtain comments should be submitted to the Department. ❖ All comments from interested and affected parties must be adequately addressed in the final environmental Impact Report. ❖ Further, it must be reiterated that, should an application for Environmental Authorisation be subjected to any permits or authorisations in terms of the provisions of any Specific Environmental Management Acts (SEMAs), proof of such application will be required ❖ Any other matters required in terms of Appendix 3 (3) and Appendix 4 (1) of the EIA Regulation 2014.	 EIA Section 11 EMPr Section 9 EIA Section 7 Appendix C EIA Section 7 Appendix C EIA Section 7 Appendix C Comment noted. IWUL application to be undertaken. EIA Section 10.8 Comment noted
e)	The applicant is hereby reminded to comply with the requirements of regulation 3 of the EIA regulations, 2014 with regards to the time and period allowed for complying with the requirements of the Regulations.	Comment noted.
f)	Please be ensure that the EIAR includes the A3 size locality map of the area and illustrates the exact location of the proposed development. The map must be of acceptable quality and as a minimum, have the following attributes , maps are related to one another, Co-ordinates, Legible legends, Indicate alternative, Scale and Vegetation types of the study area.	EIA
g)	Your attention is brought to Section 24F of the NEMA which stipulates "that no activity may commence prior to an environmental authorisation being granted by the competent authority".	Included as a condition in the EIA and EMPr

Executive Summary

Anglo Operations (Pty) Ltd (AOL) holds a Prospecting Right (PR) (PR No: MP 30/5/1/1/2/344 PR) over farms covering approximately 9 750 hectares (ha) in the Govan Mbeki Local Municipality (GMLM). AOL has lodged an application for a Mining Right (MRA) over the Project properties, as well as the relevant environmental authorisations (EAs) required to construct and operate the Project. Should the rights be awarded, they would thereafter be ceded to a Joint Venture (JV), namely Leslie Coal Mine (Pty) Ltd (Leslie Coal Mine).

Kongiwe, an independent and contemporary consulting company, has been appointed to conduct a Scoping and Environmental Impact Assessment (S&EIA) as part of a MRA. The S&EIA is aimed at critically evaluating the potential environmental, social and economic impacts of the proposed **Leslie 1 Coal Mining Project** (hereafter the Proposed Project). Based on surveys and studies done over the land currently held under the PR, five mining areas have been identified as containing sufficient coal resources and reserves. **The MRA and the EA have been submitted to the DMR on 28 March 2018.** The Draft EIA/EMPr was made available for public review on 03 August 2018, until 03 September 2018.

AOL proposes to develop an underground coal mining operation (approximately 9 750 ha), with minimal surface disturbance, near Leandra in the Mpumalanga Province. Five (5) mining areas have been identified. These mining areas will be discussed in greater detail in Chapter 2.

Extracted raw coal will be supplied directly to the local or export market, and/or to the nearest Eskom beneficiation plant or colliery at a rate of approximately 4 million tonnes per annum (mtpa) of Run of Mine (ROM) coal. It is anticipated that the mines will be active for a total mine life of at least 35 years[1], including rehabilitation and closure periods. Where possible, infrastructure will be shared between the mining areas. Where the sharing of infrastructure is not possible, ROM coal will be transported via various transport modes, including access/haul roads.

[1] Although the Mining Right application will be in respect of the maximum period of 30 years as set out in the Mineral and Petroleum Resources Development Act, 2002, applications for extension will be lodged when required.

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Abbreviations

Abbreviation/ Symbol	Description
AOL	Anglo Operations (Pty) Ltd
AMD	Acid Mine Drainage
CA	Competent Authority/Authorities
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DoH	Department of Health
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
ECO	Environmental Control Officer
EO	Environmental Officer
ha	Hectare
HSE	Health, Safety and Environmental
IWUL	Integrated Water Use Licence
LOM	Life of Mine
Ml	Megalitre
Mg/L	Milligrams per litre
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MRA	Mining Right Application
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMLAA	National Environmental Laws Amendment Act, 2014 (Act No. 25 of 2014)
NGO	Non-Government Organisation
ROM	Run-of-mine
SO_4	Sulphate

SECTION 2 :

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Details of the EAP

Kongiwe Environmental (Pty) Limited (Kongiwe) is a contemporary, problem-solving consultancy specialising in solving real-world environmental challenges. We pride ourselves in using the latest technology available to realise pragmatic solutions for our clients. The company was created with the essential intent: *'To solve environmental challenges for a world driven towards a sustainable future.'*

Based in Johannesburg, South Africa, our team of professional Environmental Scientists are highly trained in various environmental disciplines and have significant, hands-on experience in an array of projects across various industries. The company has extensive environmental and project management experience in multiple sectors, with significant experience in South Africa, as well as internationally. Kongiwe focuses on the integration of environmental studies and processes into larger engineering and mining projects. Moreover, Kongiwe provides clients with strategic environmental assessments and compliance advice, the identification of environmental management solutions and mitigation / risk minimising measures throughout the project lifecycle.

1.1. Contact Person and Corresponding Address

Details of the EAP who prepared the report are presented in Table 1-1:

Table 1-1: Details of Project EAP.

Name of Practitioner	Gerlinde Wilreker, Kongiwe Environmental (Pty) Ltd
Tel No	+27 (10) 140 6508
Fax No	083 476 6438
e-mail address	gwilreker@kongiwe.co.za

1.2. Expertise of the EAP

Gerlinde Wilreker has an M.Sc. in Environmental Management from the previous Rand Afrikaans University (RAU), now the University of Johannesburg, and is a registered Professional Natural Scientist (Environmental Management) (Registration No:400261/09). She has over twelve years' work experience, predominantly in the mining industry. Qualifications in Appendix A.

1.3. Summary of the EAP's Experience

Gerlinde Wilreker has over 12 years' work experience as an environmental consultant, predominantly in the mining industry. Her practical experience in the mining and construction industry has given her a depth of knowledge regarding project processes from pre-feasibility phase through to implementation. She is adept at working in different contexts, and problem-solving with her team to meet client needs. She has particular expertise in relation to Environmental Authorisation Processes in terms of the South African legal regime.

1.4. Additional Project Team Members

Team members that have been integral in the successful production of this EIA report are represented in Table 1-2 below.

Table 1-2: Kongiwe Team Members.

Team Member	Position in the Company	Project Role and Responsibilities
Bradly Thornton	Director	High-Level project management and report review
Ashleigh Blackwell	Environmental and Soil Specialist	Environmental reporting, Soil Specialist Reporting, Project management, public participation, report review
Nokuthula Ndala	GIS Consultant	GIS Mapping and Visual Assessment
Michael Hennessy	Environmental Legal Specialist	Legal review of report documentation
Sibongile Bambisa	Principal Stakeholder Engagement and Social Specialist	Stakeholder Engagement and all other Public Participation requirements
Vanessa Viljoen	Associate Social Consultant	Assistance with Stakeholder Engagement and all other Public Participation requirements
Stephen Horak	Associate Social Consultant	Assistance with Stakeholder Engagement and all other Public Participation requirements

2. Description of the Aspects of the Activity

The aspects are described in Section 3 of the EIA report.

3. Composite Map

The figures below illustrate the preferred Mine Area layouts, including associated structures and infrastructure.

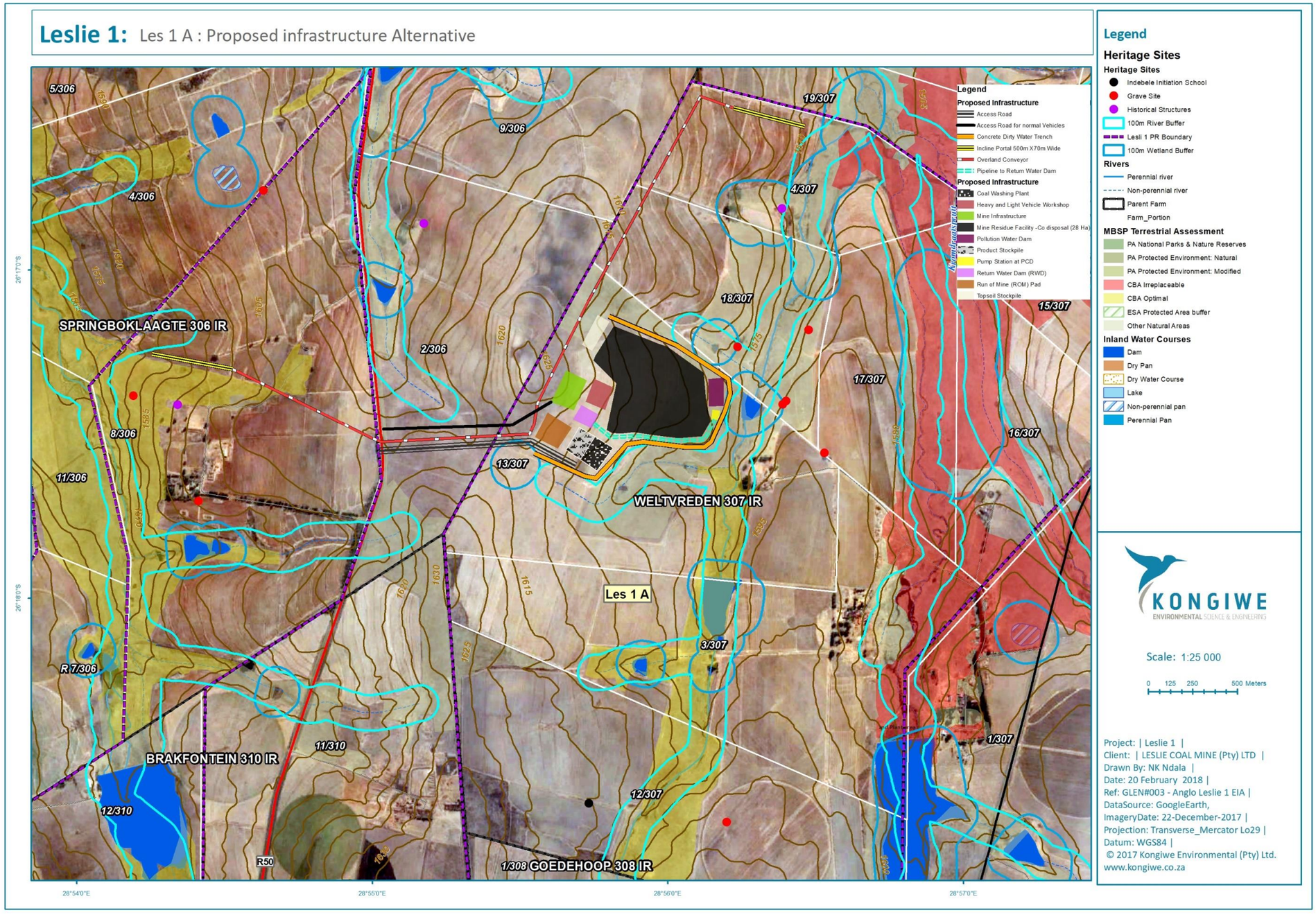

Figure 3-1: Project infrastructure proposed on Leslie 1A.

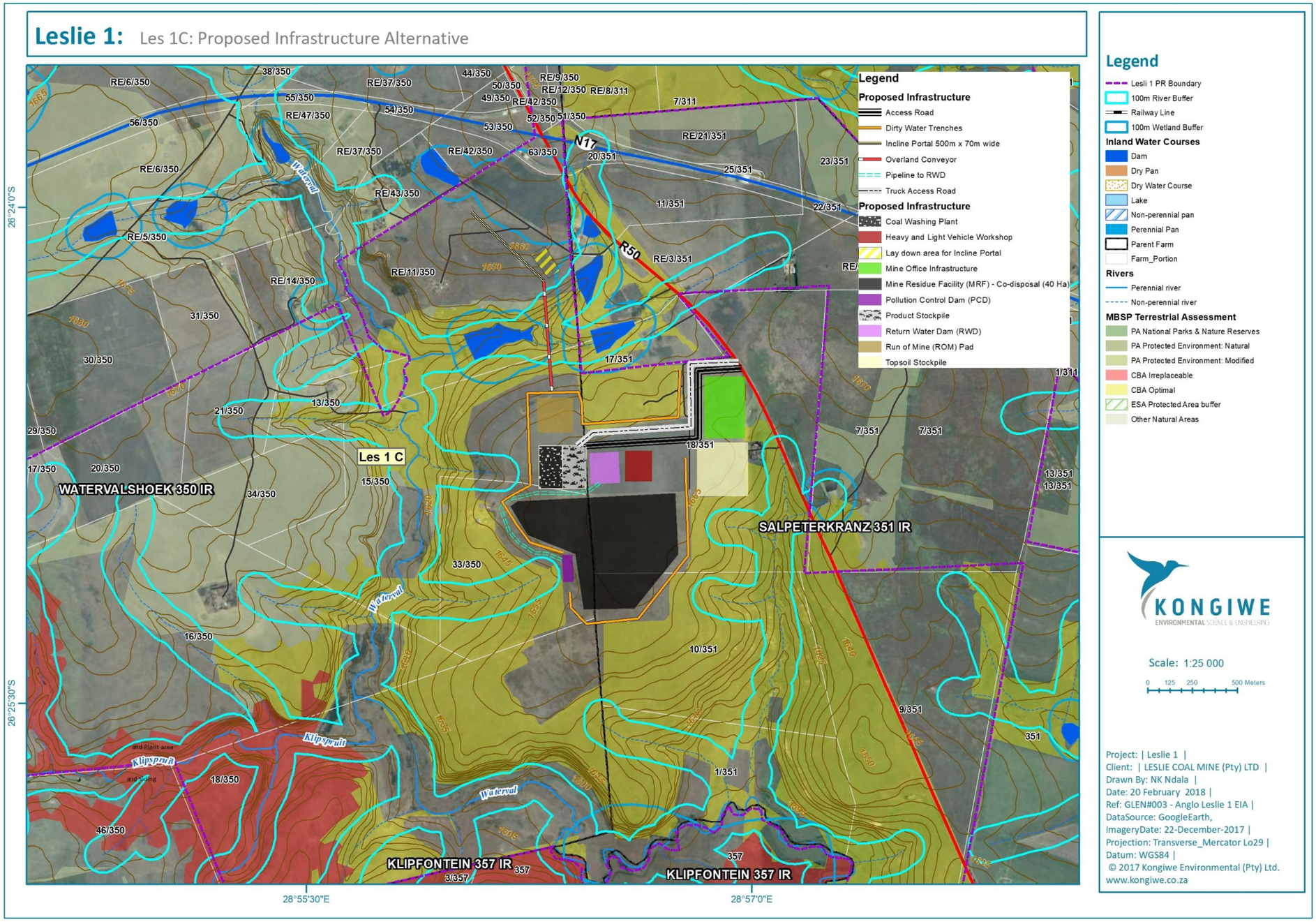

Figure 3-2: Project infrastructure proposed on Leslie 1C

4. Impact Management Objectives

An EMPr is defined as "an environmental management tool used to ensure that, undue or responsibly avoidable adverse impacts associated with the construction activities and the operational and decommissioning phase, are rehabilitated or mitigated". The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and to help achieve environmental policy goals. The purpose of this EMPr is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects caused by construction, operation and decommissioning phases. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the activity.

Due regard must be given to environmental protection during the entire Leslie 1 Project, and a number of environmental recommendations are made in this regard. These recommendations are aimed at ensuring that the contractor maintains adequate control over the Project to:

- Minimise the extent of an impact during the life of the Leslie 1 Project;
- Maintain a state of Environmental Quality following completion of the Leslie 1 Project;
- Ensure appropriate restoration of areas affected by the Leslie 1 Project; and
- Prevent long term environmental degradation.

The impact **management objectives** and outcomes for the Leslie 1 Project are as follows:

- To minimise the negative environmental impacts as far as feasible;
- To maximise the positive and minimise the negative socio-economic impacts;
- To capture, contain, treat and recycle all contaminated water arising from the mining operations on site and to prevent the discharge of contaminated water to the environment;
- To ensure that appropriate pollution control and other environmental protection measures are taken by the applicant, in accordance with all applicable laws and regulations;
- To minimise the safety and congestion impacts of traffic due to the mining operation by limiting coal trucking to daylight hours, strict enforcement of traffic regulations and road rules, avoiding trucking during peak hours and addressing road maintenance needs in cooperation with the road authorities;
- To soften the visual impact of the project by applying the recommended mitigation measures; and
- To maintain cordial relationships with local residents, authorities and other stakeholders via sustained open communication.

The impacts identified for the project are mostly medium in nature and occur during the construction and operational phases. With the proper implementation of the mitigation measures proposed, these impacts can be further reduced to avoid long term damage to the economical, ecological and social environment.

The management and mitigation measures identified within the EIA process are systematically addressed in this EMPr and ensure the minimisation of adverse environmental impacts to an acceptable level.

Leslie Coal Mine must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits and obligations emanating from relevant environmental legislation.

Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation (EA) (once issued), the stipulations in the EA shall supersede those of this EMPr, unless otherwise agreed by the Competent Authority (CA) in writing. Similarly, any provisions in the legislation overrule any provisions or interpretations within this EMPr. Moreover, this EMPr shall be binding on all parties involved in the operational phase and shall be enforceable at all levels of operational management.

This document must be adhered to and updated as relevant throughout the 30-year project life cycle.

4.1. Determination of Closure Objectives

The closure vision for the project is intended to inform the closure objectives. The objective is based on that which has been developed by Kongiwe Environmental (Pty) Ltd on behalf of Leslie Coal Mine.

Establish a safe, stable and non-polluting post mining landscape which is self-sustaining, through a collaboration with affected stakeholders, thus leaving a positive legacy for future generations.

The vision is underpinned by the objectives listed below:

- Adhere to all statutory and other legal requirements (National, Provincial and Local);
- Ensure that the negative environmental impacts have been mitigated as far as feasible;
- Ensure that any environmental pollution that has occurred during the Life of Mine(LOM) has been remediated as far as feasible;
- Implement progressive rehabilitation measures where possible to ensure protection of the local environment and reduce the rate of recharge to the portal to near natural conditions. This will reduce the risk of decant from the incline shafts and portal post closure.;
- Creating a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation;
- Focus on establishing a functional post-mining landscape;
- Utilise closure strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance; and
- Creating opportunities for alternative post-mining livelihoods by aligning to Integrated Development Plans, Spatial Development Frameworks and other developmental initiatives.

4.2. Process for Managing Environmental Damage

Roles and Responsibilities for managing the various aspects of the mining operation are detailed in Section 5. Refer to Section 6 for the measures proposed to manage any environmental damage. Section 15.5 details Environmental Incident Reporting.

An Environmental Emergency Response Plan defines the process to follow to respond rapidly and effectively to and manage emergency situations that may arise as a result of the Leslie 1 Project. This plan must be initiated when an emergency:

- Cannot be immediately brought under control.
- Has the potential to extend beyond site boundaries.
- Has the potential to significantly impact on the environment and/or community.
- Requires assistance from External Emergency Services.

4.2.1. Intent

The purpose of this plan is to define the emergency response structure and process of the Leslie 1 Project. The objectives of the plan are:

- To provide clear guidance in the management of emergencies that have the potential to impact on life, property, environment and community.
- Clearly define roles and responsibilities.
- For employees to be able to take prompt effective action to reduce the risk of injury, minimise environmental impact and property damage likely to result from possible emergencies.
- To specify the emergency communication process necessary to establish links with key site personnel.

The Emergency Preparedness and Response Code of Practice will be compiled in accordance with the Occupational Health and Safety OHSAS 18001, and the Mine Health and Safety Act, 1996 (Act No. 29 of 1996).

4.2.2. Planning

The emergency response strategy for the Leslie 1 Project should plan to provide an effective and appropriate response to the size and type of incident, accident or emergency. Essentially this means Leslie Coal Mine will provide a quick, effective and competent response to all emergency situations to minimise loss, maintain control and return to normal operations at the earliest possible convenience. Factors effecting the success of the emergency response strategy include:

- The type and scale of incident/accident will govern the type of response.

- The scale of the incident, accident or emergency will govern the resources required to bring under control.
- Communications after which an incident or emergency is first reported governs scale, type and resources required to maintain effective control and bring to resolution.

To facilitate the effective implementation of the procedures, copies of the Environmental Emergency Response Plan must be placed in accessible and visible locations around the site.

Figure 4-1 provides a general overview of a typical emergency response procedure.

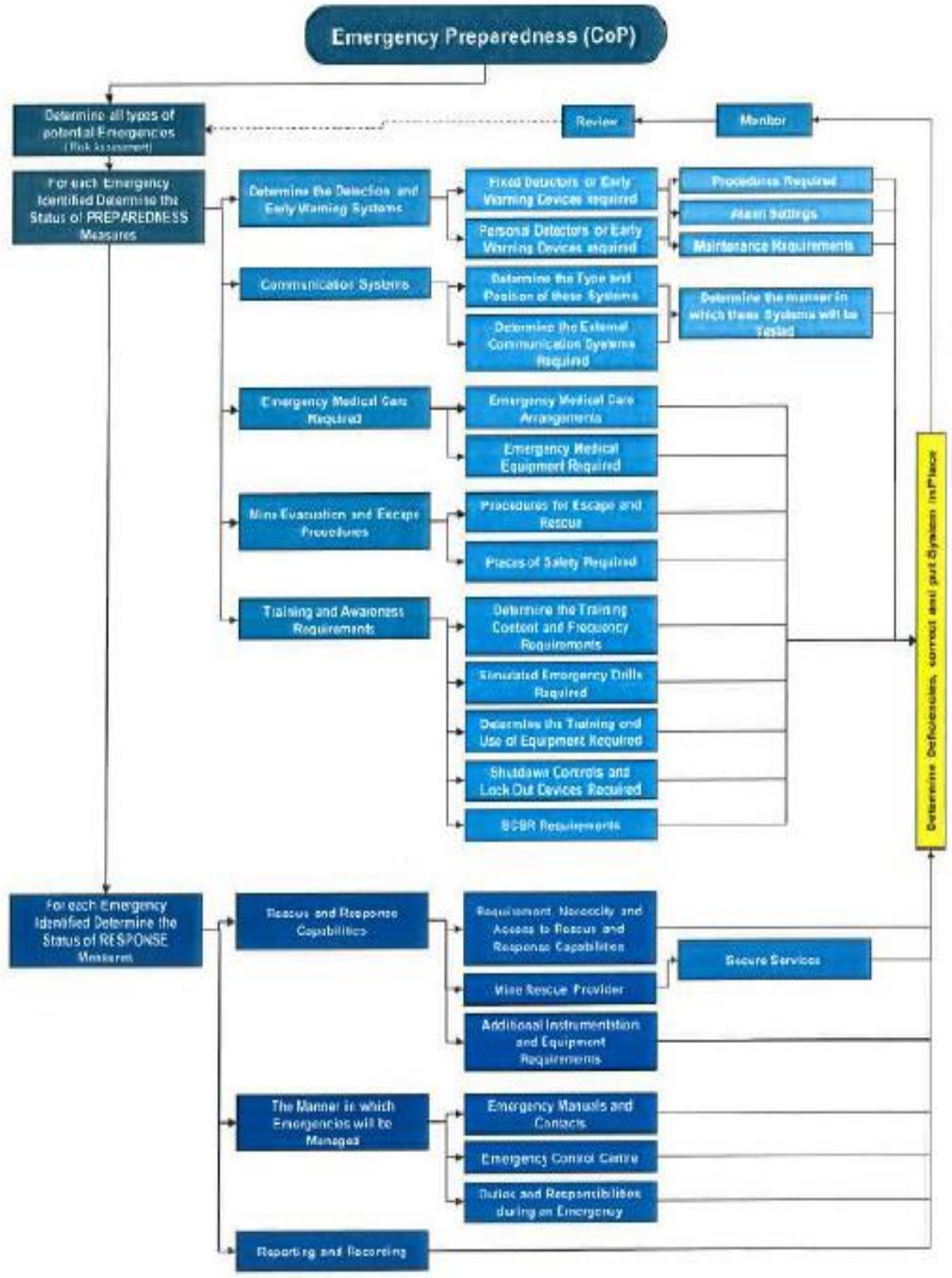

Figure 4-1: A typical emergency response procedure

4.3. Acid Mine Drainage (AMD)

4.3.1. Potential Risk of Acid Mine Drainage

A detailed Groundwater Specialist study has been undertaken to assess the potential of AMD risk post-closure and can be read in **Appendix D5 of the EIA.**

Decant from mining areas refers to the daylighting of mine void or underground water on surface, most often in the long-term. At mine closure, active mine dewatering ceases and groundwater levels start to recover. The likelihood of whether decant will take place, depends on the volume of water that enters the mining area. Inflow to the mining areas post closure will take place from two main sources, namely the recharge of rainwater and natural groundwater throughflow. If this combined volume is higher than natural rates, it is likely that the mining area would decant. If the inflow volume is less than or equal to natural rates, it is unlikely that decant would take place.

The rate of groundwater inflow to the mining areas will be determined by the flow gradients, the permeability of the rock formations intersected and the area over which groundwater seepage will take place. Post closure, initially the inflow to the underground workings will be fast, due to steep flow gradients towards the mining area. As the mines start to flood, the gradients will become shallower as groundwater levels rise, which will reduce the volume of groundwater inflow to near natural conditions.

Comparatively, the volume that groundwater inflow contributes post closure is lower than the volume of water added through recharged of rainwater. The rate of recharge to the mining areas is therefore the main driving force behind decant.

The groundwater study concluded that with the available dataset and mine plan, the risk of decant from the underground workings is **very low**. If no subsidence takes place, the rate of recharge to the underground workings will remain close to natural rates. Under these conditions, underground water levels are not expected to rise above natural trends, thus eliminating the risk of decant.

4.3.2. Steps taken to Investigate, Assess and Evaluate the Impacts of Acid Mine Drainage

To assess the impact of mining on groundwater quality, the result of studies completed for the adjacent Springboklaagte mine were used. These results were reported in G^2 (2013) and are summarised below.

A total of 53 coal and overburden samples were submitted for analysis as part of the G^2 (2013) study. The results of the study indicate that the dominant mineral in the samples is quartz, kaolinite and mica. Pyrite is present in trace amounts and is associated with the coal seams.

Static acid-base accounting tests were completed on the samples. The results indicate that there is a level of uncertainty on whether the overburden will not generate AMD. The coal seams and interburden, however, are likely to generate AMD.

Kinetic leach tests were furthermore undertaken as part of the study. The purpose of these tests is to identify the elements that would leach from the overburden, coal and intraburden material sampled and to further quantify the potential for acidification. The results indicate that there is insufficient neutralisation potential to prevent eventual acidification, but that the leachate would remain neutral for a long time. The leachate is expected to become more SO_4 dominant with time due to pyrite oxidation. Metals that may leach from the mining area at non-compliant concentrations include Al and Fe. The estimated underground SO_4 concentrations that will be assigned during modelling to the Leslie 1 underground workings are presented in Table 4-1.

The sulphate concentrations reported in Table 4-1 for discard material are not based on analysis of Springboklaagte material, but of observations made in the Witbank Coalfield for similar operations. Discard seepage quality depends on the pyrite content, which can vary significantly from mine to mine. G[2] (2013) reports that the percentage sulphur in discard material is typically 5 to 10 times higher that raw coal and for this reason, acidification of discard material is highly likely. Sulphate concentrations in leachate originating from discard material in the Witbank Coalfield are highly variable, and range between 5 000 and 15 000 mg/L. During the Springboklaagte study, it was assumed that during the operational phase, sulphate concentrations in discard will be around 3 000 mg/L and that this will increase to 10 000 mg/L post closure.

Table 4-1: Assumed Leslie 1 source term (after G[2], 2013)

Sulphate Concentrations	Short-Term Operational Conditions	Medium-Term Post-Closure Conditions (<25 years after closure)	Long-term Post-Closure Conditions (25 – 200 years after closure
Underground mining: 2 Seam	50 - 500	500 – 3 100	2 600 – 1 000
Underground mining: 4 Seam	50 - 500	500 – 3 300	3 300 – 1 000
Underground mining: 5 Seam	50 - 500	500 – 3 000	3 000 – 1 000
Discard material	50 - 500	500 – 3 000	3 000 – 1 000

For the purpose of simulations and in the absence of site specific-information, the maximum concentrations presented in Table 4-1 will be used during simulations. The results will thus represent a worst-case scenario and should be updated if site-specific geochemistry becomes available and/or if on-site groundwater monitoring information is available.

4.3.3. Engineering or Mine Design Solutions to be Implemented to Avoid or Remedy Acid Mine Drainage

During the operational phase, groundwater levels will be reversed towards the voids, thus preventing the migration of contaminated water off site.

The following solutions to be implemented are as follows:

- If water-bearing structures are intersected during mining that contribute significant volumes of seepage to the pits and underground workings, they must be characterised and quantified. The risk and timing of decant must be re-assessed taking this information into consideration.
- The co-disposal dumps will be classified as a Type 3 waste and the liner design must be in accordance to Class C landfill requirements, once a risk assessment has been undertaken;
- The final model must be prepared at least five years prior to mine closure to ensure that predictions of long-term impacts are undertaken with the highest possible level of confidence.
- Develop an effective rehabilitation and closure plan during the operational phase to ensure that mine closure can be successfully achieved. Groundwater quality impacts often intensify post closure when the dewatering stops and groundwater can free drain and follow the regional drainage direction;
- Surface and underground rehabilitation measures must be designed to minimise the risk of decant. To do so, incline and vertical shafts must be sealed upon mine closure.
- Take additional samples of mine residue deposits and kinetic leach tests analysis to improve the understanding of the source term used during contaminant transport modelling;
- Update the existing contaminant transport model with the additional information. This must be done to confirm the predictions in this study and to enable ample time within which to implement the correct remediation measure to minimise long-term liabilities associated with groundwater contamination.

4.3.4. Mitigation Measures to Remedy the Direct and Cumulative Impact of AMD

The following specific measures are recommended to minimise and/or eliminate the impacts on groundwater quality:

- If preferential flow paths to groundwater are identified during mining, it is recommended that these features are characterised and quantified. Such geological structures include water-bearing fractures, faults and contact zones. The conceptual model for the project area should be updated and numerical model simulations revised to include the impact of preferential flow paths on groundwater and potential pollution movement.
- A site-specific geochemical study must be completed prior to the commencement of any mining to assess the risk of AMD and to confirm the impacts on groundwater quality presented in this report.
- Once the geochemical information is available, the impact assessment presented in the EIA must be updated and amended, as necessary.
- A monitoring programme must be implemented to establish underground water quality during the life of operations. This information must be used to update the long-term impact of mining on groundwater quality presented in the EIA.
- Updated contaminant transport simulations must be undertaken once this information is available to improve the confidence levels in long-term predictions. These simulations must be completed

at least five years prior to mine closure to ensure that effective measures are developed to manage long-term impacts.

4.4. Water Use Requirements

4.4.1. Water Use Quantities

Process water will be sourced from boreholes, as well as from the underground workings for use in a closed mine water circuit. It is estimated that the operations will require 3 ML/d of water during mining and coal processing. Extraneous water pumped to surface from underground will be stored in pollution control dams. No water will be discharged from the mine. Potable water will be sourced from the local municipality or from groundwater.

The water usage strategy for the Leslie 1 Project was designed to operate as a closed water system and therefore most of the water on site will be captured and re-used where possible.

4.4.2. IWUL Application

An Integrated Water Use Licence (IWUL) is being undertaken for all the identified water uses and submitted to the Regional Department of Water and Sanitation (DWS). The following water uses are anticipated:

- 21(a) taking water from a water resource;
- 21(b) storing water, in the form of pollution control dams, return water dams and lean water dams;
- 21(c) impeding or diverting the flow of water in a watercourse, such as the mining through wetlands;
- 21(g) disposing of waste in a manner which may detrimentally impact on a water resource, such as discard dumps;
- 21(i) altering the bed, banks, course or characteristics of a watercourse, namely mining through wetlands;
- 21(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

The mine surface infrastructure has been planned to avoid wetlands and rivers.

5. Roles and Responsibilities

To ensure the success of the EMPr, it is important to assign definite roles and responsibilities. Compulsory adherence to the EMPr is required. The obligations of the EMPr create a legally binding document in terms of environmental legislation and civil law. It is important that Leslie Coal Mine, its contractors and sub-contractors ensure that all relevant aspects of the EMPr are communicated to all of their employees. It is the duty of Leslie Coal Mine, its contractors, sub-contractors and their employees to fulfil the project objectives with specific reference to the prevention and mitigation of impacts caused by the project development activities. It is the responsibility of the DMR to ensure that the development takes place in accordance with relevant legislation.

5.1. Government Departments

As the responsibility for the protection of our natural heritage lies with the government departments, they have the power to conduct site inspections to ensure that the development complies with all legislation, regulations and standards. They may enforce penalties where non-compliance occurs.

5.2. Mine/ Site Manager

The Mine/Site Manager will oversee all the activities. He/she will be responsible for the activities on site and see to the implementation of the EMPr. He/s he will establish a communication network between the different components conducting the work. All incidents and reports will be made to the Mine/Site Manager. Ultimate responsibility in terms of compliance to the EMPr lies with the Mine/Site Manager.

5.3. Contractors

Where contractors are used during the LOM, the on-site responsibility for environmental and social matters lies with the Contractor Engineer. They will be responsible for the day to day direction and management of their particular activities on the site throughout the life of the project.

5.4. Environmental Officer

An Environmental Officer (EO) or Health, Safety and Environmental (HSE) Officer will be appointed by the Mine/ Site Manager. It will be the responsibility of the EO/ SHEQ Officer to:

- Oversee that the day to day activities that will take place on site comply with the EMPr and the relevant legislation;
- To prepare a detailed communication strategy for liaison with I&APs, stakeholders and contractors;

- Manage and document forward and backward information flows between the Mine/ Site Manager, the Contractors, the I&APs and Leslie Coal Mine. This includes information pertaining to monitoring and evaluation;
- Assist Leslie Coal Mine upon request, with daily project communication with I&APs;
- Ensure meaningful participation with the I&APs, including capacity building exercises where the need is identified;
- Give induction and environmental awareness training;
- Ensure that a record keeping system is maintained; and
- Promote co-regulation, shared responsibility and a sense of ownership amongst all parties involved.

5.5. Environmental Control Officer

To ensure full compliance to the EMPr and in effect the legislation, Leslie Coal Mine must appoint an Environmental Control Officer (ECO).

The responsibilities of the ECO will be:

- To monitor the construction activities through monthly site inspections to ensure compliance to the EMPr;
- To assess the EMPr as to its effectiveness in mitigating and preventing impacts;
- To assess compliance to the EA;
- To advise the Mine/Site Manager, Resident Engineer, Contractors and EO with respect to the activities and their associated impact on the environment;
- To identify any non-compliances and to advise to the immediate action and remediation;
- To compile reports every two weeks and communicate the findings to the Project Manager and contractors;
- To write a monthly compliance report and submit it to the regulatory authority;
- To ensure monthly project meetings are undertaken with the contractors and the Mine Manager to discuss the findings made during the site visits;
- To ensure that the best environmental options are followed throughout;
- To ensure that a proper training, awareness and competence training programme is implemented; and
- To update, where necessary, the EMPr as new issues may arise.

6. Impact Mitigation per Phase

The management measures have been organised in the following project phases:

- Pre-Construction Phase;
- Construction Phase;
- Operational Phase;
- Closure and Decommissioning Phase; and
- Post-Closure Phase.

The tables in Section 6.2 provide the management measures recommended to manage the potential impacts rated during the different phases. In addition to the management measures provided the tables indicate the person responsible to ensure that these commitments are adhered to and implemented as well as specifying the priority of these commitments (either prior to a phase, during a phase and/ or ongoing).

The construction, operation, decommissioning and where applicable post-closure impacts associated with the Leslie 1 Project are discussed for the following environmental aspects:

- Soils, land use and land capability;
- Surface water;
- Groundwater;
- Biodiversity;
- Air quality;
- Noise;
- Blasting and vibration;
- Visual;
- Traffic;
- Heritage and palaeontology;
- Social ;
- Community health; and
- Climate change.

6.1. Pre-Construction Phase

Prior to initiating the Construction Phase, the following needs to be undertaken.

6.1.1. Soil, Land Capability and Land Use

- Compilation of a ***Soil Management and Monitoring Plan*** which must include the recommendations set out in the Soil Impact Assessment Report (Appendix D1).

- Compilation of an Erosion and Sediment Control Programme during the life of mine.

6.1.2. Biodiversity

- Compilation of a Mine Area and species-specific ***Biodiversity Monitoring and Action Plan*** to be implemented for the duration of the life of mine.
- Compilation of a plant ***Search and Rescue Plan*** for Species of Conservation Concern.
- Where encountered, ***permits*** for removal of protected plant species need to be obtained from the DAFF.
- Compilation of an ***Alien and Invasive Species Plan*** to be implemented for the duration of the life of mine.

6.1.3. Surface and Groundwater

- A site-specific geochemical study must be completed prior to the commencement of any mining to assess the risk of AMD and to confirm the impacts on groundwater quality.
- Detailed designs for surface infrastructure to be finalised and to avoid 1:100 year flood lines where possible.
- Design a ***Stormwater Management Plan*** taking surface water quality proposed designs into account. Refer to Section 11.3.1 for the proposed plan.
- Compilation of a ***Water Management Plan*** aimed at reducing and/or eliminating adverse impacts on the receptors identified. These include existing private groundwater users, wetlands, rivers and streams. The Water Management Plan is to include the compilation of a ***Water Quality Monitoring Programme.*** Refer to Section 11.3.2 for the proposed plan.
- Confirm the depth of private boreholes, as well as the pump installation depth of boreholes currently in use. Record the pre-mining safe yield and groundwater demand associated with each hydrocensus borehole identified, even those outside the zone of impact. It is important to record this information prior to mining to ensure that baseline information is available for each private borehole that is in use.
- A ***Spill Containment Plan*** is required to be in place prior to construction and operation.

6.1.4. Blasting

- Undertake a baseline structural survey within the blasting zone of influence.
- Prepare a ***Blast Management Plan***.

6.1.5. Heritage

- A ***Paleontological Study*** is to be undertaken at the portal sites.
- A ***Chance Find Procedure*** for heritage resources and artefacts needs to be in place.

- Implement design elements to exclude the burial grounds with a 50-metre buffer. If this is not possible, a detailed grave relocation process must be implemented as required under the NHRA and National Health Act regulations.
- A heritage practitioner should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.

6.1.6. Social & Health

The following need to be investigated, developed and implemented throughout the Project LOM:

- Compilation of a ***Stakeholder Engagement Plan*** to be implemented for the LOM.
- Compilation of an ***Emergency Preparedness and Response Plan*** to be implemented for the LOM.
- Compilation of a ***Community Development Programme*** to be implemented through the life of mine.
- The following conditions should be considered in the ***Social and Labour Plan*** to be implemented through the life of mine:
    - Establish targets for the employment and training;
    - Effective implementation of training and skills development initiatives;
    - If possible a training and skills development programme for the local workers should be initiated prior to the operational phase;
    - Adopt recruitment strategies that ensure local people are given employment preference;
    - Recruitment should be formalised and co-ordinated through the Department of Labour-avoid appointments at the gate of the mining operation;
    - The recruitment process has to be transparent and equitable;
    - Preference should be given to capable subcontractors who based within the local municipal area;
    - Align skills development to build capacity of SMMEs;
    - Measures recommended to maximise benefits from local employment, skills and economic development;
    - Ensure that there is stakeholder buy-in; and
    - Aligning LED projects with those of other development role-players, for example:
        - Food inflation management as part of social program.
- ***Employee Awareness Plans***, such as:
    - HIV/AIDS awareness. Develop an integrated HIV management program that considers both the workplace and the community but with different levels of intervention. The workplace should include a comprehensive program while the program directed at potentially affected communities (PAC) should have a focus on awareness and prevention activities. STIs must also be integrated.
    - TB awareness and the need to seek care.
    - Substance abuse awareness.

- Violence-prevention education programs, particularly focusing on gender violence and tribalism.

❖ Where feasible, investigate options to:

- Develop partnerships to support the community-based TB control programs in conjunction with the Department of Health (DoH) and any NGOs.
- Support information campaigns and community-based peer educator programs in both the workforce and community. Locally acceptable tools must be used and based on the finding of the KAP study. These must serve as indicators to monitor the impact of behaviour change and must have a gender focus. Community-based peer health educators will play a key role.
- Support equal employment opportunities for women and establish livelihood programs to reduce risk for opportunistic sexual encounters and empower women and young girls to earn their own income to be in a position to provide for themselves without having to resort to sexual transactions
- Support (financial or otherwise) NGO groups active in the area on gender-based sexual violence.
- Support the development and extension of any prevention of mother-to-child transmission programs currently running in the local communities –these can be any NGO or government programs –particularly important for education purposes.
- Support community-based condom distribution centres. These should be linked to other initiatives and not be run in isolation.
- Support education programs with a gender equity focus.
- Support cultural activities and sports, especially in schools.
- Identify and support vulnerable groups.
- Support graduate training programs for the youth in the community.
- Support health infrastructure in Project area.

6.1.7. Geotechnical Survey

❖ It must be noted that there is an overlap of the Lebogang Township, possible future extensions to Lebogang Township and a potential mixed-use development at Grootlaagte portion 7, with the MRA. It is deemed that prior to any mining in this area takes place, a land survey must be undertaken to determine surface features and infrastructure and then a geotechnical assessment be performed. These assessments must inform the LOM plan and the mine plan must be revised to ensure that these surface structures are secure and safe from any form of surface subsidence or distortion. The applicant must demonstrate competence to the DMR in the ability to undermine these areas, as well as abide by all legislation relating to underground mining. This EIA/EMPr and Mine Plan must then be updated with the survey findings.

6.1.8. Closure and Rehabilitation

- Compilation of a ***Closure & Rehabilitation Plan*** to be implemented for the duration of the LOM. This plan must make provision for continuous rehabilitation as well as the rehabilitation upon closure of the mine.

6.1.9. Permitting

Ensure all other required permits/licenses are obtained such as, but not limited to:

- Necessary permits from SANRAL need to be obtained for the mine to pass under the N17 highway.
- Ensure all necessary permits in terms of the National Water Act, Specific Environmental Management Acts and Gert Sibande District Municipality By-Laws.

6.1.10. Site Layout Plans & Design Drawings

- The detailed site layout plans and drawings must be finalised. These plans must show the no-go areas where no site clearance and activities may take place.
- The areas to be cleared must be kept to a minimum.

6.1.11. Contractors

- Contractors must be trained and given a copy of the EMPr and of the detailed site layout plans to ensure compliance with the requirements.
- Contractors must have a plan in place to implement the management measures set out in the EMPr.
- The EO/ECO is to supervise the contractors to ensure that management measures are being adhered to.

6.1.12. Overlapping Mineral Rights

- Pan African Resources (PAR) has submitted an application for prospecting rights for gold and Platinum Group Metals (PGM) overlapping with the proposed Leslie 1A and 1B areas, furthermore, they also have an existing mineral right for gold and PGMs which overlays with the proposed Leslie 1 C, D and E areas. It must be noted that the MPRDA allows for the overlap of mineral rights for different mineral resources over the same area, and thus the overlapping rights of the Leslie 1 Project and PAR's prospecting and mining activities is not a fatal flaw. This is further demonstrated by the successful mining of coal and gold simultaneously over the same areas in the Evander area over a period of the last 80 years. It is the view of the EAP that the DMR must instruct applicant and PAR to set up a working forum prior to the commencement of any mining activity where there are overlapping rights to ensure that there is understanding between the parties as to where

surface infrastructure is to be placed, who is mining where and when, where intersecting boreholes are, and management of water and environmental liabilities between the parties.

6.2. Construction Phase

Table 6-1: Construction Phase Mitigation Measures

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
1.	**Site Clearance**						
1.1	Surface water Quality	Vegetation removal as a result of site clearance.	The removal of vegetation will expose soils to water erosion that may lead to a deterioration in water quality of surrounding surface water in terms of increased TSS and turbidity	❖ Beside the areas ear-marked for site clearance, no other areas may be cleared of vegetation. ❖ Clearance of vegetation must be limited as far as possible. ❖ Temporary erosion control measures that reduce flow velocity (e.g. runoff berms) should be implemented around construction areas. ❖ Implement the surface water and stormwater management plans to minimise the volume of dirty water produced thereby reducing the probability of contamination of surface water. ❖ Water quality sampling must be implemented upstream and downstream of construction sites.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Construction
1.2	Groundwater quantity	Vegetation removal as a result of site clearance.	Establishment of hard surface areas during infrastructure and road construction reduces recharge to the shallow weathered aquifers due to increased runoff.	❖ Implement the Water Management Plan to minimise the volume of dirty water produced thereby reducing the probability of contamination of groundwater from infiltration of dirty surface water. ❖ Keep hard surfaces to a minimum to allow for groundwater recharge.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Construction
1.3	Biodiversity	Vegetation removal as a result of site clearance.	❖ Loss of vegetation from the infrastructure site resulting in the loss of genetic diversity. ❖ Loss of seed source. ❖ Loss of the carbon sink ecosystem service. ❖ Loss of habitat for faunal species	❖ No vehicles or construction activities are allowed in the no-go areas as delineated in the detailed site layout plan. ❖ Beside the areas ear-marked for site clearance, no other areas may be cleared of vegetation. Fence off the mining area and surface infrastructure areas. ❖ Where possible, the removal of vegetation must take place in a phased approach to limit the amount of bare soil exposed to the elements. ❖ Where vegetation clearing within the site is not required, this vegetation should be kept intact. ❖ The Search and Rescue Plan must be implemented to remove all plant species that have the potential to survive the relocation. These plants must be planted on a designated area (or nursery) for use during any continuous rehabilitation that may take place during the operational phase of the mine. ❖ Where possible, seeds should be stored for use during the potential continuous rehabilitation process that should be implemented during the operational phase of mine.	Site or Local	❖ MTPA Guidelines for Biodiversity Assessment ❖ National Biodiversity Assessment (NBA) ❖ Mpumalanga Biodiversity Sector Plan ❖ Mpumalanga Conservation Plan ❖ NFA and DAFF	Ongoing Prior to site clearance During construction

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
				❖ Staff must be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during the construction process. The intentional killing of any animals including snakes, lizards, birds is strictly prohibited. ❖ No fires are allowed on site.			
1.4	Biodiversity	Vegetation removal as a result of site clearance.	❖ Establishment of Alien Invasive Plants	❖ Monitor for the establishment of alien Invasive plants in disturbed areas. ❖ Implement the Alien and Invasive Species Plan.	Site to local extent	❖ MTPA Guidelines for Biodiversity Assessment ❖ National Biodiversity Assessment (NBA) ❖ Mpumalanga Biodiversity Sector Plan ❖ Mpumalanga Conservation Plan ❖ NFA and DAFF	Ongoing during construction and operation
1.5	Air Quality	❖ Site clearance	PM2.5 and PM10	❖ Beside the areas ear-marked for site clearance, no other areas may be cleared of vegetation.	Site to local extent	❖ National Standards for Ambient Air Quality for PM10 and for PM2.5 ❖ National Dust Control Regulations.	Ongoing during construction and operation
1.6	Noise	Site clearance	Increased total noise levels in the area, changing existing ambient sound levels at receptors	❖ Only undertake construction activities during the day. ❖ Ensure that equipment is fitted with the correct and appropriate noise-abatement measures. ❖ Eliminate the use of equipment that generates an impulsive noise when operating within 1,000m of potential receptors.	Site to local extent	❖ SANS 10328; Methods for environmental noise impact assessments. ❖ SANS 10103; The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	Ongoing during construction and operation
1.7	Visual	❖ Site clearance	❖ Loss of vegetation / Loss of visual screening ❖ Dust generated from site clearance	❖ Only clear the areas designated in the detailed site layout plan. ❖ Do not clear past designated areas. ❖ Retain natural vegetation outside of clearance zone	Site or Local	-	Ongoing during construction and operation
1.8	Heritage	❖ Site clearance	❖ Destruction of heritage sites	❖ Demarcate sites with a 50-meter buffer and avoid them. If this is not possible a detailed grave relocation process must be implemented as required under the NHRA and National Health Act regulations	Site or Local	NHRA and NHA	Prior to the construction
2.	**Stripping and Stockpiling of Topsoil**						
2.1	Soil	Stripping of topsoil and stockpiling it.	❖ Disturbance of in situ horizon organisation ❖ Loss of soil fertility through impacts on nutrient cycles due to stripping and stockpiling of topsoil	❖ Implement the Soil Monitoring and Management Plan. ❖ Do not place soil stockpiles in riverine areas. ❖ Keep the surface disturbance footprint as small as possible. ❖ Ensure topsoil stockpiles are revegetated as soon as possible.	Site or Local	CARA	Construction

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
2.2	Noise	Numerous simultaneous construction activities during the day.	Increased total noise levels in the area, changing existing ambient sound levels at receptors.	❖ Only undertake topsoil stripping and stockpiling during the day. ❖ Ensure that equipment is fitted with the correct and appropriate noise-abatement measures. Where possible avoid reverse hooters and use less noise intensive reverse warning devices. ❖ Eliminate the use of equipment that generates an impulsive noise when operating within 1,000m of potential receptors.	Site or Local	❖ SANS 10328; Methods for environmental noise impact assessments. ❖ SANS 10103; The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	Construction
2.3	Visual	Soil stripping and topsoil stockpiling	❖ Loss of vegetation / Loss of visual screening	❖ Vegetate and maintain stockpiles to the recommended minimum height.	Site or Local	-	
3.	**Access and Site Roads**						
3.1	Soil	Vehicle traffic	Soil compaction	❖ The project footprint should be kept as small as possible. ❖ Traffic must be restricted to site roads only. ❖ Topsoil stripping and stockpiling should not be conducted during wet periods. ❖ Soil moisture should be below a pre-determined level.	Site	CARA	Ongoing and during construction and operation
3.2	Air Quality Visual	Vehicle traffic	$PM_{2.5}$ and PM_{10}	❖ Implement dust suppression (water or chemical) on dirt roads ❖ Ensure access roads are tarred. ❖ Vehicles to adhere to speed limit on access and dirt roads.	Site to local	❖ National Standards for Ambient Air Quality for PM_{10} and for $PM_{2.5}$ ❖ National Dust Control Regulations.	Ongoing and during construction and operation
3.3	Noise	Numerous simultaneous construction activities during the day	Increased total noise levels in the area, changing existing ambient sound levels at receptors	❖ Only undertake construction during the day. ❖ Ensure that equipment is fitted with the correct and appropriate noise-abatement measures. ❖ Eliminate the use of equipment that generates an impulsive noise when operating within 1,000m of potential receptors.	Site to local extent	❖ SANS 10328; Methods for environmental noise impact assessments. ❖ SANS 10103; The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	Ongoing and during construction and operation
4.	**Construction of Infrastructure**						
4.1	Surface water Quality	Creation of impermeable areas	Lay down of impermeable areas is likely to result in increased velocity in surface water runoff, that may lead to erosion and consequent increase in TSS of surface water resources	❖ Implement the Water Management Plan. ❖ Measures (energy dissipaters, detention dams, swales, etc.) that reduce flow velocity from impermeable areas should be implemented. ❖ Impermeable areas must not be constructed unnecessarily. ❖ Water quality sampling must be implemented upstream and downstream of construction sites. Specific parameters that should be monitored include TSS and turbidity. They should be kept within the baseline water quality range.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Construction
4.2	Surface water Quality	Topography changes as a result of infrastructure construction	Changes in the topography are likely to result in an alteration in surface water drainage patterns leading to erosion	❖ Implement the Water Management Plan. ❖ Stormwater management measures must be constructed around all surface infrastructure areas.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations	Construction

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
			and a consequent increase in TSS of surface water resources	❖ Water quality sampling must be implemented upstream and downstream of construction sites. Specific parameters that should be monitored include TSS and turbidity. They should be kept within the baseline water quality range.		❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	
4.3	Groundwater quantity	Infrastructure development	Establishment of hard surface areas during infrastructure and road construction reduces recharge to the shallow weathered aquifers due to increased runoff.	❖ Implement the Water Management Plan to minimise the volume of dirty water produced thereby reducing the probability of contamination of groundwater from infiltration of dirty surface water. ❖ Where feasible, collect surface water runoff for use on site to reduce the need to pump water from boreholes or the municipal supply. This water can be used for e.g. watering of gardens, wash bays and dust suppression.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Construction
4.4	Groundwater quantity	Construction of decline shaft	Site clearing or excavation below the water table depth will have a potential impact on the groundwater quantity and quality.	❖ The decline shafts must be sealed / grouted to minimise inflow of groundwater and negative impacts associated with cone of dewatering. ❖ Ensure that there are no geological structures that act as preferred groundwater flow paths in the decline areas.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Construction
4.5	Groundwater Quality	Mine development	❖ Portal will expose the shallow, weathered aquifer and may allow contaminants to enter the groundwater environment; likely after rainfall. ❖ Deterioration in groundwater quality due to the increased suspended solids seeping in from cut plus pyrite starting to react due to exposure to oxygen and water.	❖ The incline shafts must be sealed / grouted to minimise inflow of groundwater and negative impacts associated with cone of dewatering. ❖ Ensure that there are no geological structures that act as preferred groundwater flow paths in the decline areas.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Construction
4.6	Biodiversity	Mine Development	❖ Wetland deterioration	❖ Use of vehicles and machinery within the instream and riparian habitat is prohibited. ❖ Avoid crossings over riffle/rapid habitats where possible. Where crossings are required, slow deep/shallow habitats should be favoured. ❖ The crossing points must be stabilised to reduce the resulting erosion and downstream sedimentation. ❖ Structures must not be damaged by floods exceeding the magnitude of those which may occur on average once in every 50 years;	Site or Local	❖ MTPA Guidelines for Biodiversity Assessment ❖ National Biodiversity Assessment (NBA) ❖ Mpumalanga Biodiversity Sector Plan ❖ Mpumalanga Conservation Plan ❖ NFA and DAFF ❖ 2016 National Wetland Offset Guidelines	Construction

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
				❖ The crossing points should be unobtrusive (outside riparian and instream habitat) to prevent the obstruction and subsequent habitat modification of downstream portions. ❖ Soils adjacent to the river that have been compacted must be loosened to allow for germination; ❖ Stockpiling of removed soil and sand must be done outside the 1:100 floodline or delineated riparian habitat (whichever is greater).			
4.7	Air Quality	Vehicle traffic	$PM_{2.5}$ and PM_{10}	❖ Implement dust suppression (water or chemical) on dirt roads ❖ Ensure access roads are tarred. ❖ Vehicles to adhere to speed limit on access and dirt roads.	Site to local	❖ National Standards for Ambient Air Quality for PM_{10} and for $PM_{2.5}$ ❖ National Dust Control Regulations.	Ongoing and during construction and operation
4.8	❖ Noise ❖ Social	Numerous simultaneous construction activities during the day	Increased total noise levels in the area, changing existing ambient sound levels at receptors	❖ Only undertake construction activities during the day. ❖ Ensure that equipment is fitted with the correct and appropriate noise-abatement measures. ❖ Eliminate the use of equipment that generates an impulsive noise when operating within 1,000m of potential receptors.	Site to local extent	❖ SANS 10328; Methods for environmental noise impact assessments. ❖ SANS 10103; The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	Ongoing During construction and operation
4.9	❖ Blasting ❖ Social	Blasting for portal construction.	❖ Ground vibration Impact ❖ Air blast Impact ❖ Fly rock impacts	❖ Ensure blasting does not take place in foggy conditions or at night. ❖ Blast design must consider the actual blasting and the ground vibration levels to be adhered too. ❖ Only apply electronic initiation systems to facilitate single hole firing. ❖ Design for smaller diameter blast holes that will use fewer explosives per blasthole. ❖ Stemming control and audit, ❖ Use proper stemming materials. ❖ Notify surrounding communities timeously of the date and time of blasting activities. ❖ Road closure and for roads and evacuations within 500m of the blasting zone. ❖ Implement monitoring programme.	Site or Local	❖ Mine Health and Safety Act, 1996 (Act No. 29 of 1996) Regulations ❖ United States Bureau of Mines (USBM) criteria for safe blasting for ground vibration and the recommendations on air blast	During blasts
4.10	Visual	Construction of surface infrastructure	Visual intrusion to the scenic view	❖ Use material with colours that will visually blend with the natural environment. ❖ Screen construction sites with mesh fence covers.	Site or Local	-	Ongoing
5	**Construction Camp, Workshops**						
5.1	❖ Soil ❖ Surface water	❖ Trucks and equipment on site	❖ Soil pollution ❖ Surface water pollution	❖ Spill kits must be present on site.	Site	SANS 10131:2004	Ongoing

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
	❖ Groundwater ❖ Health	❖ Chemical storage ❖ Waste generation	❖ Groundwater pollution ❖ Health impacts as a result of pollution	❖ Drip trays must be placed under vehicles and equipment parked overnight. ❖ Portable generators must be placed on drip trays at all times. Large generators to be placed in impermeable bunded areas or self-bunded. Bunded areas must confirm to SANS Standards. ❖ Use biodegradable hydraulic fluids where possible. ❖ Sumps for the collection of hydraulic fluids must be lined. ❖ No waste may be disposed at the site . Waste should be segregated and recycled, and non-recyclable waste and hazardous waste is to be disposed of at a registered landfill site. ❖ Hazardous chemicals must be stored in an impermeable, fit-for purpose, bunded area. Bunded areas must confirm to SANS Standards. ❖ Hazardous chemical spills must be cleaned up immediately. ❖ Contaminated soils must be recovered and treated. ❖ Ensure that there are sufficient chemical toilets on site and that these are emptied on a regular basis by a licensed contractor.			
5.2	Noise	❖ Construction camp ❖ Workshops	❖ Noise impacts	❖ Only undertake construction activities during the day. ❖ Ensure that equipment is fitted with the correct and appropriate noise-abatement measures. ❖ Eliminate the use of equipment that generates an impulsive noise when operating within 1,000m of potential receptors.	Site to local extent	❖ SANS 10328; Methods for environmental noise impact assessments. ❖ SANS 10103; The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	Ongoing during construction
6	**Social & Health**						
6.1	Employment	Procurement	Employment opportunities	❖ Implement the Social and Labour Plan.	Site and Local	Social and Labour Plan	Ongoing
6.2	Social	Construction activities	Community Complaints	❖ Have a complaints register available at the entrance to site. ❖ Record and follow up on complaints received.	Site and Local	-	Ongoing
6.3	Health	Construction activities	Community health impacts	❖ Implement health programmes and identified community initiatives.	Site and Local	-	Ongoing

6.3. Operational Phase

Table 6-2: Operational Phase Mitigation Measures

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
1	Mining operations						
1.1	Surface water quality	Mining operation surface activities	Surface water pollution	❖ Implement the Stormwater Management Plan to separate clean and dirty water and to capture dirty water and prevent dirty water from leaving the site. ❖ Ensure that dirty stormwater channels are lined with concrete. ❖ The PCDs and Return Water Dams must be lined with the appropriate HDPE liner. ❖ Where clean stormwater enters river systems, sediment and debris trapping, as well as energy dissipation control measures must be put in place. ❖ Dirty stormwater is to be collected and re-used in the process. ❖ Maintain the stormwater facilities. ❖ Surface water monitoring to continue as per the Water Monitoring Plan.	Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing
1.2	Surface water quantity	Seepage into underground voids and subsidence	Loss of surface water quantity	❖ Where possible, do not mine under watercourses. ❖ No high extraction mining (pillar mining) to be undertaken.	Site or Local	-	Ongoing
1.3	Groundwater Quantity	Mine dewatering	❖ Underground mining will create a cone of depression with a hydraulic gradient towards the mine. This will have an impact on groundwater levels. ❖ The cone of depression will affect many boreholes with levels dropping by 10m plus.	❖ The decline shafts must be sealed / grouted to minimise inflow of groundwater. ❖ Mined out area should be sealed/grouted to prevent water ingress into the voids. ❖ Should it be found that the dewatering activities do impact on private boreholes, it is recommended that the mine should supply equal/better quality water to affected parties that rely on groundwater.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing
1.4	Groundwater quality	❖ Mining activities	❖ Sulphate plumes	❖ A site-specific geochemical study must be completed prior to the commencement of any mining to assess the risk of acid mine drainage and to confirm the impacts on groundwater quality. ❖ A monitoring programme must be implemented to establish underground water quality during the life of operations. This information must be used to update the long-term impact of mining on groundwater quality presented in this report. ❖ Updated contaminant transport simulations must be undertaken once this information is available to improve the confidence levels in long-term predictions. These simulations must be completed at least five years prior to mine closure to ensure that effective measures are developed to manage long-term impacts.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
2	**Soil Stockpiles**						
2.1	Soil	❖ Topsoil stockpiling	❖ Loss of soil fertility through impacts on nutrient cycles due to stripping and stockpiling of topsoil ❖ Soil erosion.	❖ Implement the Soil Monitoring and Management Plan. ❖ Ensure topsoil stockpiles are revegetated. Where vegetation does not establish, seeding with indigenous grass species is recommended. ❖ Where erosion takes place, this should be remediated as quickly as possible.	Site or Local	CARA	Ongoing
2.2	Biodiversity / Vegetation	❖ Alien vegetation encroachment	❖ Alien vegetation encroachment	❖ Implement the Alien Vegetation Management Plan. ❖ Remove alien vegetation on a regular basis to prevent encroachment and seed bank in the stockpiles.	Site or Local	❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Regulations, 2013 ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016	Ongoing
3	**Overburden/Waste Rock Stockpiles**						
3.1	Surface Water	❖ Waste rock dump	❖ Surface water contamination	❖ Implement the Water Management Plan.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing
3.3	**Conveyors**						
3.1	Surface Water	❖ Conveyors for coal transportation	❖ Coal spills from conveyors	❖ Conveyor belts are to be enclosed as much as possible. ❖ Clean up coal spills on a regular basis.	Site or Local	-	Ongoing
3.2	❖ Air quality ❖ Visual	❖ Conveyors for coal transportation	❖ $PM_{2.5}$ and PM_{10}	❖ Conveyor belts are to be enclosed as much as possible. ❖ Minimise conveyor transfer points. ❖ Implement dust suppression at transfer points.	Site or Local	❖ National Standards for Ambient Air Quality for PM_{10} and for $PM_{2.5}$ ❖ National Dust Control Regulations.	Ongoing
4	**Plant Infrastructure (Crushing & Screening Plant, Wash Plant, ROM stockpile, Product Stockpile)**						
4.1	Soil	Dust from coal stockpiles and transporting of coal cause soil pollution and acidification.	❖ Soil chemical pollution	❖ Use topsoil stockpiles as berms along the road and around the infrastructure areas to prevent pollution spreading into surrounding areas. ❖ Ensure ROM stockpile area	Site or Local	-	Ongoing
4.2	Soil	Areas that remain unvegetated during operations are at risk of soil erosion	❖ Soil erosion	❖ Use geo-textiles and contours to prevent and minimise soil erosion from exposed surfaces.	Site or Local	-	Ongoing

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
				❖ Monitor for soil erosion and manage as soon as possible if soil erosion is observed.			
4.3	Surface water quantity	Implementation of a WMP (closed system) around the plant area and dumps	❖ Loss of contributing catchment area to stream flows	❖ Implement the Water Management Plan to separate clean and dirty water and to capture dirty water and prevent dirty water from leaving the site. ❖ Manage surface water run-off around the coal loading and storage facilities to prevent dirty water from leaving the site. ❖ Re-use water collected for operational activities.	Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing
4.4	Surface water quality	❖ Processing activities ❖ Hydrocarbon spills	❖ Surface water quality impact	❖ Implement the Water Management Plan to separate clean and dirty water and to capture dirty water and prevent dirty water from leaving the site. ❖ Clean up spills as soon as possible. ❖ Water quality monitoring upstream and downstream of mining activities.	Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing
4.5	Ground water Quality	❖ ROM stockpiles	❖ Groundwater pollution	❖ The floor of the coal stockpile should be well-prepared flat surface. This would be designed for the ease of operation and coal recovery, but also to prevent seepage to the groundwater by incorporating clay into the liner. ❖ The coal should be stored for less than 2 months and thus the time required for seepage to occur will be minimal. ❖ The coal should be compacted and the potential for the coal stockyard to generate acid will be greatly reduce. ❖ Install seepage collectors underneath the stockyards and monitor the quality of the collected water.	Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing
4.6	Air quality	❖ Materials handling	❖ PM2.5 and PM10	❖ Minimise the use of temporary product piles. ❖ Minimise product drop height where feasible. ❖ Where feasible, place windbreaks to shield stockpiles from the dominant wind direction. ❖ Where feasible enclose facilities. ❖ Implement dust suppression technologies at transfer points.	Regional	❖ National Standards for Ambient Air Quality for PM10 and for PM2.5 ❖ National Dust Control Regulations.	Ongoing
4.7	Air quality	❖ Processing activities (crusher, screener and wash plant)	❖ PM2.5 and PM10	❖ Implement dust suppression technologies at the crusher and screener. ❖ Implement dust suppression at transfer points.	Regional	❖ National Standards for Ambient Air Quality for PM10 and for PM2.5	Ongoing

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
						❖ National Dust Control Regulations.	
4.8	Air quality	❖ ROM and product stockpiles	❖ Spontaneous combustion	❖ Coarse reject (discard) – Problem material should be placed in layers and compacted using a roller, particularly on the edges of the dump, so that the infiltration of oxygen is minimal. The total layer thickness should be no greater than 5 m and each layer should be covered by a 1 m thick layer of inert (non-carbonaceous) material. The final landform should be such that erosion and runoff is minimised and new areas of discard coal are not exposed to the atmosphere. ❖ Product (coal) – Product stockpiles should not be left longer than the incipient heating period. ❖ Periodic compaction of the pile to decrease air permeation into the stockpile and ventilation through the stockpile. ❖ Minimising the angle of the slopes of the stockpile (to 20-25° instead of >45°), particularly in the prevailing wind direction. ❖ Reducing air flow through the coal pile by the use of natural or artificial wind barriers around the perimeter of the stockpile. ❖ Reducing air flow through the coal pile by covering it with an inert material. Spraying the surfaces of longer-term stockpiles, particularly of product coal, with a thin (bituminous) coating to exclude air can be a further safeguard against spontaneous combustion. ❖ Introduce a controlled method of stacking and reclamation.	Regional	-	Ongoing
4.9	Noise	❖ Processing activities (crusher, screener and wash plant)	❖ Increased total noise levels in the area, changing existing ambient sound levels at receptors	❖ Ensure equipment is maintained and installed with noise abatement technology. ❖ Placement of stockpiles and residue deposits to assist as acoustical screens. ❖ Minimise night-time operational activities within close proximity from identified receptors.	Site or Local	❖ SANS 10328; Methods for environmental noise impact assessments. ❖ SANS 10103; The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	Ongoing
5.	**Workshops and Mine Office Infrastructure**						
5.1	Surface Water	❖ Workshop and office operational activities ❖ Chemical storage facilities	❖ The potential incorrect disposal of hazardous wastes, workshop effluent, as well as spills and leaks at the maintenance workshops.	❖ Implement the Stormwater Management Plan to separate clean and dirty water and to capture dirty water and prevent dirty water from leaving the site. ❖ Spill kits must be present on site. ❖ Drip trays must be placed under vehicles and equipment parked overnight.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources	Ongoing

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
			❖ The potential incorrect disposal of domestic waste at the offices and ablutions.	❖ Portable generators must be placed on drip trays at all times. Large generators to be in impermeable bunded areas or self-bunded. ❖ Use biodegradable hydraulic fluids where possible. ❖ Sumps for the collection of hydraulic fluids must be lined. ❖ No waste may be disposed at the site. Waste should be segregated and recycled, and non-recyclable waste and hazardous waste is to be disposed of at a registered landfill site. ❖ Hazardous chemicals and waste must be stored in an impermeable, fit-for purpose, bunded area. ❖ Hazardous chemical spills must be cleaned up immediately.		(GN R704 of 12 February 2010)	
5.2	Noise	❖ Processing activities (crusher, screener and wash plant)	❖ Increased total noise levels in the area, changing existing ambient sound levels at receptors	❖ Ensure equipment is maintained and installed with noise abatement technology. ❖ Placement of stockpiles and residue deposits to assist as acoustical screens. ❖ Minimise night-time operational activities within close proximity from identified receptors.	Site or Local	❖ SANS 10328; Methods for environmental noise impact assessments. ❖ SANS 10103; The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	Ongoing
6.	**Co-disposal Facility**						
6.1	Surface Water Quality	❖ Surface water runoff	❖ Surface water contamination	❖ Implement the Water Management Plan to separate clean and dirty water and to capture dirty water and prevent dirty water from leaving the site. ❖ Water quality monitoring upstream and downstream of the co-disposal facility.	Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing
6.2	Groundwater Quality	❖ Seepage from co-disposal.	❖ Groundwater contamination	❖ Ensure co-disposal facility is lined with appropriate HDPE liner and properly maintained. ❖ Monitor groundwater quality around the co-disposal facility. ❖ Manage the co-disposal shape to control the ease with which water can run off from the facility. ❖ Investigate the option of a lime cover to neutralise acidity. ❖ Vegetation of the facility and covering it with soil to minimise rainfall infiltration and mobilisation of dissolved metals.	Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
6.3	❖ Air Quality ❖ Visual	❖ Co-disposal facility	❖ $PM_{2.5}$ and PM_{10} ❖ Visual intrusion	❖ Concurrently rehabilitate the co-disposal facility.	Site or Local	❖ National Standards for Ambient Air Quality for PM_{10} and for $PM_{2.5}$ ❖ National Dust Control Regulations.	Ongoing
7	**Clean/Dirty Water System (PCDs, Return water dams, stormwater channels)**						
7.1	Surface Water	❖ Stormwater system	❖ Surface water contamination	❖ Implement the Water Management Plan to separate clean and dirty water and to capture dirty water and prevent dirty water from leaving the site. ❖ Ensure dirty water channels are concrete lined. ❖ Monitor and maintain surface water infrastructure. ❖ Monitor surface water quality as per the surface water monitoring plan.	Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing
7.2	Groundwater Quality	❖ Mine water contamination	❖ Seepage from dirty water storage facilities	❖ Ensure dirty water storage facilities are lined with appropriate HDPE liner and properly maintained. ❖ Monitor and maintain surface water infrastructure. ❖ Monitor groundwater quality around the dirty water storage facilities as per the groundwater monitoring plan.	Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Ongoing
8	**Access and Site roads**						
8.1	Soil	❖ Daily traffic on haul roads especially trucking of coal from site	❖ Soil compaction	❖ Restrict traffic to the demarcated areas and existing haul roads.	Site or Local	CARA-	Ongoing
8.2	❖ Air quality ❖ Visual	❖ Vehicles on access and haul roads	❖ $PM_{2.5}$ and PM_{10}	❖ Either chemical or wet suppression on haul roads. ❖ Ensure access roads are tarred and maintained. ❖ Coal dust build-up on access roads must be swept up on a regular basis. ❖ Use of conveyor belts for on-site transport of coal. ❖ Coal transport vehicles to use tarpaulins for off-site transportation of coal. ❖ Vehicles to adhere to the speed limit on access and haul roads.	Site or Local	❖ National Standards for Ambient Air Quality for PM_{10} and for $PM_{2.5}$ ❖ National Dust Control Regulations.	Ongoing
8.3	Traffic	❖ Vehicles on access and haul roads	❖ Road degradation.	❖ Vehicles to adhere to the speed limit on access and haul roads. ❖ Maintain access and site roads, and site access intersections. ❖ Ensure site access is properly signposted and correct traffic signs are in place. ❖ Ensure coal transport vehicles are not over-loaded.	Site or Local	National Road Traffic Act. No. 93 Of 1996, and Regulations	Ongoing

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
9	**Social & Health**						
9.1	Employment	❖ Procurement	❖ Employment opportunities	❖ Implement the Social and Labour Plan.	Site and Local	Social and Labour Plan	Ongoing
9.2	Social	❖ Construction activities	❖ Community Complaints	❖ Have a complaints register available at the entrance to site. ❖ Record and follow up on complaints received.	Site and Local	-	Ongoing
9.3	Health	❖ Construction activities	❖ Community health impacts	❖ Implement health programmes and identified community initiatives.	Site and Local	-	Ongoing

6.4. Closure and Decommissioning Phase

Table 6-3: Closure and Decommissioning Phase Mitigation Measures

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
1	**Dismantling and removal of surface infrastructure and site rehabilitation**						
1.1	Soil	Removal of surface infrastructure	❖ Soil compaction ❖ Soil chemical pollution ❖ Soil erosion	❖ Implement the Soil Monitoring and Management Plan. ❖ Restrict traffic to areas where decommissioning is taking place as well as existing haul roads ❖ Check vehicles and equipment for oil and fuel leaks and inspect site for possible spillages. Clean up hydrocarbon spills. ❖ Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (sloped) to approximate the pre-project aspect and contours. ❖ The previous infrastructure footprint area must be ripped a number of times to reduce soil compaction. ❖ The area must then be covered with topsoil material from the stockpiles. ❖ Revegetate earthworks and exposed areas with an indigenous grass mix. ❖ Monitor for soil erosion.	Site or Local	CARA	Closure and Decommissioning
1.2	Surface water quality	Removal of surface infrastructure	Surface water pollution	❖ Rehabilitated areas must be free-draining to prevent ponding of surface water. ❖ Retain surface water management structures around the co-disposal facility. ❖ Surface water monitoring to continue as per the Water Monitoring Plan.	Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Closure and Decommissioning
1.3	Groundwater quality	Seepage of surface water through remaining waste facilities.	Groundwater pollution	❖ Effective rehabilitation of these areas must aim to reduce the rate of recharge of rainwater as far as possible.	Site or Local	❖ DWAF Best Practice Guidelines	Closure and Decommissioning

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
				❖ Ensure co-disposal dump is rehabilitated to minimise water infiltration and to be free-draining. ❖ No ponding must be allowed over rehabilitated areas. ❖ Based on the findings of the updated groundwater simulations, implement the long-term water management measures. ❖ Monitor groundwater quality.		❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	
1.4	Groundwater quality	Filling of voids with groundwater	Groundwater pollution	❖ Monitor the water table recovery and ensure that it is maintained below the regional water level so that the contamination plume is always directed towards the mine and decant is avoided. ❖ Abstracted water (if required) must be treated on site and re-used or released into the river if the quality is acceptable for release. ❖ Monitor groundwater quality.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Closure and Decommissioning
1.4	Biodiversity	Dismantling and removal of surface infrastructure	❖ Alien vegetation encroachment	❖ Compacted areas must be ripped (perpendicularly) to a depth of 300mm and a seed mix must be applied to rehabilitated and bare areas. ❖ No grazing must be permitted to allow for the recovery of the area, until such time that vegetation has re-established. ❖ Monitor for alien vegetation encroachment on rehabilitated areas. ❖ Removal of alien invasive vegetation.	Site or Local	❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Regulations, 2013 ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016	Closure and Decommissioning
1.5	❖ Air quality ❖ Visual	❖ Vehicles on access and haul roads	❖ PM2.5 and PM10	❖ Either chemical or wet suppression on site roads. ❖ Ensure access roads are tarred and maintained. ❖ Vehicles to adhere to the speed limit on access and haul roads.	Site or Local	❖ National Standards for Ambient Air Quality for PM10 and for PM2.5 ❖ National Dust Control Regulations.	Ongoing
1.6	Noise	❖ Dismantling and removal of surface infrastructure	❖ Increased total noise levels in the area, changing existing ambient sound levels at receptors	❖ Ensure equipment is maintained and installed with noise abatement technology. ❖ Only undertake rehabilitation activities during daylight hours.	Site or Local	❖ SANS 10328; Methods for environmental noise impact assessments. ❖ SANS 10103; The measurement and rating of environmental noise with respect to land use, health,	Ongoing

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
						annoyance and to speech communication.	
1.7	Visual	❖ Dismantling and removal of surface infrastructure	❖ Loss of natural slope and topography ❖ Landform stability	❖ All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site. ❖ Sealing and backfilling of portals. ❖ Rehabilitate cleared areas. ❖ Ensure that rehabilitated areas are free draining and follow natural drainage lines. ❖ Monitor rehabilitated areas for vegetation re-establishment, Alien Invasive Plants, and soil erosion.	Site or Local		Closure and Decommissioning
1.8	Social	❖ Mine closure	❖ Job loss	❖ Implement the closure part of the Social and Labour Plan	Site or Local	Social and Labour Plan	Closure and Decommissioning

6.5. Post- Closure Phase

Table 6-4: Post Closure Mitigation Measures

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
1	**Rehabilitated areas**						
1.1	❖ Soil ❖ Biodiversity	Rehabilitated areas	Soil erosion	❖ Monitoring of vegetation re-establishment and erosion. ❖ In the event that vegetation has not re-established, and erosion gullies have developed, remedial action should be taken.	Site or Local		5 years after closure
1.2	❖ Surface water quality	Rehabilitated areas	Surface water pollution	❖ Monitoring of vegetation re-establishment and erosion. ❖ In the event that vegetation has not re-established, and erosion gullies have developed, remedial action should be taken.	Site or Local		5 years after closure
2	**Remaining surface water management facilities and waste facilities**						
2.1	Surface water quality	❖ Rehabilitated areas ❖ Remaining surface water facilities	❖ Surface water pollution	❖ Monitor and maintain surface water management structures. ❖ Monitor surface water quality. ❖ Monitor for decant.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Until a closure certificate is issued by the DMR
2.2	Groundwater quality	❖ Remaining waste management facilities	❖ Ground water pollution	❖ Monitor groundwater as per the groundwater monitoring plan. ❖ If a pollution plume forms, grout curtains or scavenger wells could intercept seepage moving towards a sensitive receptor.	Site or Local	❖ DWAF Best Practice Guidelines	Until a closure certificate is issued by the DMR

Reference No.	Aspect	Activities	Impact	Mitigation Measures	Size and Scale of Disturbance Post-Mitigation	Compliance with Standards	Time Period for Implementation
				❖ Based on the findings of the updated groundwater simulations, implement the long-term water management measures. ❖ Monitor the water table recovery and ensure that it is maintained below the regional water level so that the contamination plume is always directed towards the mine and decant is avoided. ❖ Abstracted water (if required) must be treated on site and re-used or released into the river if the quality is acceptable for release.		❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	
2.3	Groundwater quality	❖ Filling of voids with groundwater	❖ Groundwater pollution	❖ Monitor the water table recovery and ensure that it is maintained below the regional water level so that the contamination plume is always directed towards the mine and decant is avoided. ❖ Abstracted water (if required) must be treated on site and re-used or released into the river if the quality is acceptable for release. ❖ Monitor groundwater quality.	Site or Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	Until a closure certificate is issued by the DMR

7. Impact Management Outcomes

The impact management actions are detailed in Section 6 of this report.

8. Impact Management Actions

The impact management actions are detailed in Section 6 of this report.

9. Financial Provision

Refer to the Rehabilitation, Decommissioning and Closure report in Appendix D17.

9.1. Closure Vision and Objectives

The closure vision for the Project is intended to inform the closure objectives. The closure objectives set as part of the mine closure planning process aims to ensure that the final land use is achieved and that the area is sustainable in the long-term from an environmental and social point of view. The objective is based on that which has been developed by Kongiwe Environmental on behalf of AOL.

Establish a safe, stable and non-polluting post mining landscape which is self-sustaining, through a collaboration with affected stakeholders, thus leaving a positive legacy for future generations.

It is expected that areas where infrastructure is located, will be areas that the current land use will be impacted upon. For these areas it is recommended that the mine rehabilitate the areas back to a useful post-mining land use (Figure 6 - 4), as these footprints are expected to be small in size.

As a result of the mine being an underground operation, the surface land use should not be significantly impacted upon, however subsidence could impact on land use if there is a collapse. It is recommended that ongoing monitoring is undertaken on the surface and modelling is undertaken to predict if subsidence would occur and the risk associated with such. In the event that subsidence does occur, rehabilitation of these areas needs to be undertaken. The level of rehabilitation would be dependent on the risk of collapse and the degree of subsidence. If subsidence is a high risk and occurs on site resulting in a drastic change in topography, these areas may need to be designated as no-go areas and these areas should be fenced off and appropriate signage erected.

Closure and rehabilitation is a continuous series of activities that begin with planning prior to the Project's design and construction, and end with achievement of long-term site stability and the establishment of a self-sustaining ecosystem. Not only will the implementation of this concept result in a more satisfactory environmental conclusion, but it will also reduce the financial burden of closure and rehabilitation The vision is underpinned by the objectives listed below:

- Adhere to all statutory and other legal requirements (National, Provincial and Local);
- Implement progressive rehabilitation measures where possible to ensure protection of the local environment;
- Creating a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation;

- Focus on establishing a functional post-mining landscape;
- Utilise closure strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance; and
- Creating opportunities for alternative post-mining livelihoods by aligning to Integrated Development Plans, Spatial Development Frameworks and other developmental initiatives.

Rehabilitation and closure objectives have been tailored to the project at hand. This Rehabilitation, Decommissioning and Mine Closure Plan aims to assist AOL in carrying out successful rehabilitation for the Leslie 1 Coal Mine.

9.2. Alternative Closure and Post Closure Options

The Leslie 1 Project, from a closure perspective, is complex even though the risks and impacts associated with the mining activity are well understood. It is expected that the current land use for the study area will continue during the operational phase and well into the post closure phase as the mining method is underground which allows farmers to utilise the surface during the LoM. Based on the Environmental Risk Assessment (Table 7 1), poor water quality emanating (decanting) post closure could be a concern and the potential formation of AMD. Therefore, alternatives would need to be considered during the operational LoM with respect to water treatment (both active and passive forms of treatment). In addition to this, there could be a risk of surface subsidence and damage to the natural environment that could occur post closure. Annual monitoring for subsidence and sinkholes followed by rehabilitation will be required and remedial action taken.

Requirements for the beneficial post-closure use of the land need to be clarified with affected parties.

The end land use(s) must be:

- Relevant to the environment;
- Achievable in the context of post-mining land capability;
- Acceptable to key stakeholders (as highlighted below); and
- Ecologically sustainable in the context of local and regional environment.

The end land use for the site must be agreed on in consultation with relevant stakeholder groups that will include the following, amongst others:

- Land owners;
- Government departments, e.g. Department of Water and Sanitation, Department of Environmental Affairs, etc.;
- Local government councillors;
- Non-government organisations; and

- Local communities.

Alternatives for final closure and rehabilitation have been assessed for both Leslie 1A and Leslie 1C footprint areas (Table 9-1). Due to the similarity of the proposed portals and development of incline portals at Leslie 1B, 1D and 1E, alternatives for closure have been considered; however, will need to be updated prior to the development of these portals and incline shafts.

Table 9-1:Alternative Closure Options

Aspect	Solution
Incline Portals	**Option 1:** Remove all structures and infrastructure associated with the underground access portals and back fill the entrance to the underground workings during the final back fill of the entrance pit with overburden. Shape the area to create a gently sloping, free-draining topography. Re-instate natural drainage lines to limit erosion and sediment build up within local river courses.
Mine Buildings	**Option 1:** Decommission, demolish and remove infrastructure that can be re-used or sold to defray costs. Reshape area, cover with growth medium and establish vegetation. **Option 2:** Leave buildings in place and secure future tenants.
Mine Plant	**Option 1:** Demolish, bury on site, cover with growth medium and establish vegetation. **Option 2:** Utilise certain infrastructures for future power generation activities.
Conveyor Belts	**Option 1:** Decommission, demolish and remove infrastructure that can be re-used or sold to defray costs. Reshape area, cover with growth medium and establish vegetation. **Option 2:** Retain infrastructure onsite for future mining operations within the area.
Water Treatment Infrastructure	**Option 1:** Decommission, demolish and remove infrastructure that can be re-used or sold to defray costs. Reshape area, cover with growth medium and establish vegetation. **Option 2:** Retain infrastructure onsite for future mining operations within the area.
Access Roads	**Option 1:** Decommission, demolish and remove infrastructure that can be re-used or sold to defray costs. Reshape area, cover with growth medium and establish vegetation. **Option 2:** Roads that can and will be used for rehabilitation/ monitoring or by other users post-closure should be left in situ provided this is agreed upon by all parties concerned.
Waste Stockpiles	**Option 1:** Shape stockpiles, cap and cover with growth medium and establish vegetation. **Option 2:** Backfill this material back into the pits concurrently during the mining operation, cover with growth medium and establish vegetation.

9.3. Preferred Closure Option

Based on the type of mining (underground mining) and the associated risk that could occur post closure, the following recommendations have been made as a result of the outcomes of the ERA conducted:

- Capture decanting mine water before it enters into surface water resources only if decant occurs and treat it and thereafter, if the quality is acceptable, re-introduce it into the streams. Further

consideration regarding post mining water management will need to be taken into consideration once confirmation of the quality and quantity of decant has been verified;
- Monitoring of groundwater water levels in the weathered and coal seam aquifers;
- If sinkholes from subsidence are formed after closure, they should be rehabilitated as soon as possible to minimise water and oxygen inflow from the atmosphere; and
- Update the numerical model and decant rates annually for the first five years with the monitoring data.

The following mitigation measures are proposed to minimise the risk of the contamination plume negatively impacting the natural environment:

- Groundwater will flow away from the mine footprint if the hydraulic head within the mine is higher than the surrounding elevation. Ensure (through dewatering or decant management) that the hydraulic head in the mine void is always lower than that of the regional head;
- Monitoring of groundwater water levels and mine inflow rates; and
- Update numerical model and decant rates annually as information becomes available.

The preferred closure option at this stage is to return the site to as close as possible to the pre-mining land use as a minimum, however this rehabilitation, decommissioning and mine closure plan will be updated and amended annually to comply with current legislation. During this process, changes in baseline information, legislation amendments, spatial developments and any other develops which may contribute to the closure of the mine will be incorporated to ensure that the plan remains current and implementable.

9.4. Closure and Post Closure Period

The post-mining landscape will have groundwater impacts due to decant being realised at some point as the underground mine voids fill up naturally with water once dewatering stops. Given the altered underground conditions, the water quality may be compromised. This could be a significant risk if decant does occur and the quality is poor. Verification of the quality and quantity of the decant needs to be confirmed during operation. To this effect, ongoing groundwater modelling associated with the Leslie 1 Coal Mine must be conducted every five years to better understand the groundwater regime and potential decant.

Once closure activities have been implemented, the mine will enter a five-year post closure monitoring period. During this time, erosion repair and vegetation establishment will be undertaken, and monitoring activities conducted. During this period, biological processes should have established, leading to vegetation covers being stable and sustainable and sufficient data would be collected to demonstrate that the closure is sustainable and that there is no unmitigated impacts to the receiving environment. Overall the relinquishment criteria and other statutory requirements would be achieved.

9.5. Closure Options Research

It is advised that during the operational phase, that periodic monitoring of both groundwater and surface water quality is undertaken and that this information is utilised to update the Numerical Groundwater Models, allowing trends to be determined. This will enable the mine to determine the best practicable options that could be considered for post closure treatment of water. In addition to this surface subsistence monitoring should be undertaken during the operational phase and predicative modelling should be undertaken to determine the risk of surface subsistence.

Ongoing research and investigations for closure options and current best practice will be focussed on during the LoM. The final rehabilitation, decommissioning and mine closure plan is a living document and will be reviewed and amended through the life of the project, any changes due to new research will be incorporated into these amendments.

9.6. Closure Assumptions

Information currently available may need to be supplemented during the operational phase of the Project. As additional information will be collected during operations and these assumptions will need to be reviewed and revised.

The assumptions used to prepare this report are the following:

- The closure period will commence once the last planned ton of coal has been extracted from the pits;
- The mine plan, design and layout have been adhered to;
- Vegetation establishment will be in line with a project specific Biodiversity Action Plan (BAP) that the Project is expected to develop to manage its impacts on biodiversity;
- Closure water quality compliance criteria will be governed by the Water Use Licence;
- Water management infrastructure developed for the operational phase will be retained for closure at the end of the life of the Project;
- There are limited opportunities for post closure infrastructure for community uses. Therefore, all buildings will be demolished;
- All demolition rubble is considered General Waste as per the definition of Demolition waste in Category B of Schedule 3 of the NEMWA and, based on the classification as ‘General Waste’, can therefore be incorporated into the backfill;
- A post closure land capability of grazing and wilderness will be established which implies that growth medium of a minimum of 300 mm on average, being placed as the last layer of earthworks in any rehabilitation activity;
- All hazardous and domestic waste will be transported offsite for disposal in licenced landfills;

- The roads constructed to access the site will be needed for post-closure monitoring and cannot be closed as part of normal closure actions; and
- The areas under consideration in this plan are slightly undulating and are not likely to be subject to significant erosion.

9.7. Proposed Post-Mining Land Use

It is proposed that before the mine enters the decommissioning phase of the Project, that it should establish a Closure Forum. This Closure Forum will encompass the following:

- Discuss and develop joint action plans and strategies with key stakeholders to achieve sustainable closure;
- Identification and analysis of problems and challenges impacting the operations during the closure phase of the Project;
- Accountability for the implementation of action plans and strategies;
- Review of current economic trends and programmes within the province to ensure that the strategies in place are best suited;
- Generating awareness around the decommissioning and closure of the project; and
- Alignment with the SLP.

Post closure land use is determined in consultation with stakeholders so that the use meets the requirements of all the participants. As the specific forum proposed for the discussion and planning of the post closure land use is yet to be established, for purposes of current planning and liability costing, the assumption is made that the land capability developed on the disturbed mine lease area, will be in accordance with best practice guidelines which recommend a growth medium cover of a minimum of 300 mm on average across the footprints rehabilitated.

9.8. Rehabilitation Plan

Refer to the Rehabilitation, Decommissioning and Mine Closure Plan attached as **Appendix D15 of the EIA.**

9.9. Rehabilitation Plan Compatibility

The rehabilitation plan has been compiled taking the closure objectives into account. This plan will be reviewed on an annual basis to ensure it remains aligned with the closure objectives, as these may change during the LOM.

9.10. Financial Provision Quantum

Refer to Chapter 12 of the EIA. Furthermore, refer to the Rehabilitation, Decommissioning and Closure report in Appendix D17.

9.11. Financial Provision Confirmation

Leslie 1 Coal Mine will provide for the closure liability associated with the project through the purchase of a Bank Guarantee as allowed by the Financial Provision for Prospecting, Exploration, Mining or Production Operations Regulations, with the Bank Guarantee provided to the DMR following authorisation of the project.

10. Compliance Monitoring Mechanism

Table 10-1 depicts the monitoring and management plan for the management measures and actions identified in the impact assessment. Where specific monitoring and management plans are required, these are detailed in Section 10.1

Table 10-1: Monitoring and Management Plan

Impact Management Action	Monitoring / Management Action	Monitoring Frequency	Roles and Responsibilities	Compliance Mechanism	Compliance Reporting Frequency
Groundwater					
Groundwater level	Depth to groundwater level	Quarterly (Apr, Jul, Oct, Jan)	Leslie 1 Project ECO	-	Quarterly
Water quality Monitoring	All existing private boreholes, mine monitoring boreholes (RPH-series boreholes) and proposed new boreholes	Quarterly (Apr, Jul, Oct, Jan)	Leslie 1 Project ECO	SANS: Drinking Water Standards (Recommended EAL)	Quarterly
Spring Water quantity Monitoring	Hydrocensus boreholes within the affected zone	Annually (April)	Leslie 1 Project ECO	SANS: Drinking Water Standards (Recommended EAL)	Annually
Rainfall monitoring	Rainfall	Daily at the site	Leslie 1 Project ECO	-	Monthly
Surface Water					
Surface water quality monitoring	Surface water sampling and laboratory analysis from 10cm below the	Quarterly prior to the commencement of construction	Leslie 1 Project ECO	DWS best practice guidelines	Quarterly

Impact Management Action	Monitoring / Management Action	Monitoring Frequency	Roles and Responsibilities	Compliance Mechanism	Compliance Reporting Frequency
	water surface	Monthly basis until post construction	Leslie 1 Project ECO	South African National Accreditation System (SANAS) accredited laboratory for analysis SANS: Drinking Water Standards (Recommended EAL)	Monthly
Air Quality					
Dust: /Wet suppression/ Chemical stabilization of unpaved roads	Visually	Daily	Leslie 1 Project Site manager Contractor ECO Contractor EO	Internal audit by Leslie Mine in house specialists	Quarterly
	Erection of meteorological stations	Prior to the commencement of mining	Leslie 1 Project Site manager	None	LOM
	Dust monitoring ($PM_{2.5}$ and PM_{10}) with dust buckets	Monthly during construction, operational and decommissioning phases	Leslie 1 Project EO	Internal audit by Leslie Mine in house specialists	Prior to the commencement of mining Quarterly during LOM
Noise					
Noise mitigation measures	Environmental noise monitoring with noise monitor within 2 000 m from mining	Shortly before and after commencement of operation for receptors 1000 m from mining activities	Leslie 1 Project EO	Internal audit by Leslie Mine in house specialists	Once off

Impact Management Action	Monitoring / Management Action	Monitoring Frequency	Roles and Responsibilities	Compliance Mechanism	Compliance Reporting Frequency
		Quarterly during operation	Leslie 1 Project EO	Internal audit by Leslie Mine in house specialists	Quarterly
Blasting					
Blast impact monitoring	Monitoring of structures at the monitoring positions as proposed. Monitoring positions are contained within the Blasting report	Shortly before commencement of operations	Leslie 1 Project EO	Internal audit by Leslie Mine in house specialists	Once off
		Yearly during operation	Leslie 1 Project EO	Internal audit by Leslie Mine in house specialists	yearly
Heritage					
Possible finds	Chance find procedure	Prior to site clearance	Leslie 1 Project EO Heritage Specialist	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	Monthly Checklist/Report

11. Specific Monitoring and Management Plans

11.1. Soil Monitoring

11.1.1. Monitoring Locations

Monitoring should be done everywhere within the impact zone of the construction and operational activities of the Leslie 1 project with special attention to the following areas:

- Where active earthworks are taking place;
- Topsoil stockpiles;
- Along established and new access roads to monitor compaction, pollution and erosion;
- At areas with high possibility of pollution like storage areas and parking areas and around temporary fuel depots;
- At the edges of development footprints; and
- Where land rehabilitation was done.

11.1.2. Monitoring Methodologies

11.1.2.1. Weather

Since soil moisture levels are critical during soil stripping operations to minimise compaction, the stripping must be suspended if significant rainfall occurs. It is therefore important to monitor the amount and intensity of precipitation. Prior to work commencing a weather forecast should be considered for potential rainfall interruptions.

11.1.2.2. Observations

Monitoring of the following activities should be done to ensure that best management practices are followed:

- Adhere topsoil stripping guidelines and have qualified supervision. This practice should be monitored daily.
- Minimise soil erosion through stockpile maintenance and rehabilitate finished areas following construction. Manage the physical, chemical and biological properties of stockpiled soils. Rehabilitate finished areas following construction. These practices should be monitored weekly by the ECO.
- During the construction and decommissioning phases contractors and employees must be monitored to stay within predetermined boundaries. This practice should be monitored daily by the ECO.
- Prevent soil contamination from spills of hazardous materials (daily monitoring). Ensure pollution sources are isolated through clean and dirty water separation (weekly monitoring).

11.1.3. Monitoring records

All monitoring records required under this management plan must be kept on file either by management of the construction site or the SHEQ Department for a period of not less than five years following measurement and copies of these be made available to the funding institutions of the project.

11.1.4. Response to short term episodes and cumulative impacts

The procedures to manage short term episodic events are:

- Significant rainfall:
  - Stripping of topsoil must be suspended; and
  - Where the soil profile has been disturbed it should be removed to base level.
- Accidental spill of hazardous material:
  - Contaminated soil should be placed in a sealed container and treated off-site; and
  - The cause of the spill should be remedied.
- Erosion of disturbed soils:
  - Cover bare soil with geotextiles until revegetation has stabilised the soil.

11.1.5. Analytical Parameters

It is recommended that annual soil monitoring be conducted for at least the first five years of the project lifecycle. The prescribed analytical parameters for soils below will ensure measurement and quantification of the following potential irregularities:

- Acidification (low pH) – increase solubility and mobility of heavy metals.
- Alkalinisation (high pH) – hydrolysis of sodium.
- Sodification (if sodium in the soil solution exceeds 15% of the total cation exchange capacity it causes dispersion anomalies which increase the erodibility of the soil).
- Salinisation (if soil electrical conductivity (EC) is higher than 450 mSm^{-1} it has a detrimental effect on plant growth).
- Eutrophication (excess nitrates and phosphorous in the soil solution).
- Toxicity (maximum concentrations of elements for environmental receptors.
- Erosion (gully formation and loss of sediment due to lack of erosion control measures and chemical pollution causing dispersion).
- Compaction (increase in bulk density >1.750 kg/m^3)

11.1.6. Inspections and Reporting

Visual inspections must be undertaken at fixed intervals by an ECO, trained and appointed by the site manager. Daily and weekly visual inspections will be carried out as part of the area monitoring of activities. As part of the visual inspection of the soil the nominated person will:

- Record all inspections of the routes around the site, the site entrance and the haul routes used on the site and any subsequent action on an observation sheet.
- Increase the frequency of site inspections when activities with a high potential to produce compaction, chemical pollution or erosion are being carried out, such as during construction, earthworks activities or during prolonged windy conditions or rain storms.

The soil chemical monitoring report should include measurements of the following elements and parameters:

- pH(H_2O) and pH(KCl).
- Cation exchange capacity (CEC) and exchangeable cations (K, Ca, Mg, Na).
- Phosphorus (Bray 1).
- Electrical conductivity (EC) and sulphate, nitrate and boron.
- Heavy metals (use different reagents for the determination of the different fractions).
- Lime requirement of soil.

11.1.7. Emergency action plan for unplanned events and low risks

There is a risk of accidental spillages of hazardous substances (hydrocarbons or oils) from vehicles or other activities during construction and operational phase. Contamination is the result of accidental leakage of oils and hydrocarbons from equipment used and it must be ensured that the requirements of the National Environmental Management Waste Act of 2008 are met for prevention of pollution.

11.1.7.1. Emergency Procedure

Hydrocarbon spills or leaks may possibly occur, therefore emergency procedures are needed to be put in place for remediation. The following emergency recommendations have been made:

- This procedure must be read in parallel with the EMP for the Leslie 1 Project;
- Contractors must ensure that all employees are aware of the procedure for dealing with spills and leaks on site;
- Ensure that the emergency spill equipment is available in the event of a spill incident;
- All machines are to be serviced in a designated concrete area, workshop area or at an offsite location;
- If a significant (> 5L) spill occurs, it is to be cleaned up immediately, reported to the appropriate authorities and recorded appropriately; and
- Contaminated soils must be disposed in a registered and licensed Waste Facility.

Table 11-1 outlines the mitigation measures to be adhered to in the case where a hazardous and/or hydrocarbon spillage and/or leak takes place on site.

Table 11-1: Unplanned events and low risks requiring mitigation for the Leslie 1 Project

Unplanned Event	Potential Impact	Mitigation Measure
Hydrocarbon leaks from vehicles and machinery or hazardous materials	Soil contamination	❖ Place drip trays where the leak is occurring if vehicles are leaking; and ❖ All vehicles are to be serviced in a correctly concrete area or at an off-site location. ❖ Machines must be parked within hard park areas and must be checked daily for fluid leaks.
Hazardous substance spillage from pipelines or waste storage	Soil contamination	❖ Prevent any spills from occurring; ❖ If a spill occurs, it is to be cleaned up (Drizit spill kit, Oil or Chemical spill kit) immediately, recorded and reported to the appropriate authorities; ❖ Pipelines must be checked regularly for leaks; ❖ Pipelines must be maintained according to a maintenance roster; and ❖ Emergency response plans should be in place, along with an incident reporting scheme.

11.2. Groundwater Monitoring

11.2.1. Groundwater Monitoring Objectives

It is recommended that the groundwater monitoring programme presented here is implemented as part of an Integrated Waste and Water Management Closure Plan for the project.

To prevent groundwater contamination, groundwater management procedures and practices will be implemented that are in line with accepted practices and in accordance with the requirements of the EMPr and Closure Plan for the project. It is recommended that the groundwater monitoring programme presented here is implemented as part of an Integrated Waste and Water Management Closure Plan for the project.

The key objectives of the Groundwater Monitoring Programme are therefore to:

- ❖ Develop improved practices and procedures for groundwater protection;
- ❖ Detect short and long-term trends;
- ❖ Recognise changes in groundwater and enable analysis of their causes;
- ❖ Measure impacts;
- ❖ Check the accuracy of predicted impacts;
- ❖ Develop improved monitoring systems; and
- ❖ Provide information on the impact of the discard facility on groundwater.

To improve the confidence in the results of the model calibration process, it is recommended that the groundwater model be verified with monitoring information. Monitoring of groundwater levels and rainfall will be required to verify the current simulation results. Groundwater monitoring will be undertaken to establish the extent of contamination in the shallow weathered and deeper fractured aquifers.

The numerical model constructed for this project must be updated on a regular basis as additional monitoring information becomes available, at least once every five years, or if the mining methods or operations change significantly. In this way, all impact predictions will proceed to the level of detail required for closure.

11.2.2. Monitoring Locations

All existing private boreholes must be included in the monitoring programme. If additional private boreholes are identified within the 3km radius identified above, these must also be included in the monitoring programme.

Dedicated monitoring boreholes must be drilled at all mining operations prior to the commencement of mining. The positions of these boreholes will depend on the outcome of a geophysical study that will be undertaken to identify preferential flow paths to groundwater. At each monitoring target, a cluster of one shallow and one deep monitoring borehole must be drilled. The deep borehole must be drilled first to confirm geological conditions. The depth of these boreholes must be at least 80m. Each deep monitoring borehole must be fitted with a seal at the depth of weathering to ensure that it targets only the fractured rock aquifer. The depth of the paired shallow borehole at each monitoring target must be drilled to the depth of weathering, which is on average 11m below surface. It is recommended that the following monitoring positions are considered as a minimum at each mining area:

- Down gradient of the discard dump;
- Down gradient of the plant area; and
- Boreholes targeting the weathered and fractured rock aquifers over the extent of the mining area. It is preferable to have a triangle of boreholes between the pollution sources identified and the rivers to determine groundwater flow gradients.

11.2.3. Monitoring Requirements

The parameters to be included during monitoring, as well as the proposed frequency of monitoring are presented in Table 11-2 below.

Table 11-2:Groundwater monitoring requirements

Monitoring Parameter	Element for Analysis	Monitoring Frequency
Depth to groundwater level	Groundwater level	Monthly

Monitoring Parameter	Element for Analysis	Monitoring Frequency
Water quality	All elements included during the fieldwork programme, but including the following specific elements: pH, EC, TDS, Hardness, Ca, Mg, N, K, Cl, SO_4, NO_3, NO_2, F, PO_4, Fe, Al, Mn	Quarterly
Spring flow	Actual spring flow rates, where possible. If not, record the visual condition of all springs listed above	Quarterly
Spring water quality	All elements included during the fieldwork programme, but including the following specific elements: pH, EC, TDS, Hardness, Ca, Mg, N, K, Cl, SO_4, NO_3, NO_2, F, PO_4, Fe, Al, Mn	Quarterly
Rainfall	Rain depth (mm)	Daily on site at each mine

All monitoring information must be entered into a spreadsheet for record keeping and analysis. Copies of the certificates of analyses must be kept on file at each mine for inspection. If a significant exceedance is recorded during the monitoring programme, the following actions should be taken:

- Log the exceedances in the incident reporting system.
- Report the exceedances to the Environmental and General Managers, as well as to the regulatory authority.
- Undertake an investigation to identify causes of the exceedances.
- Consult with any landowner or affected party that may be impacted by the exceedances to determine their concerns and to negotiate remedial actions.
- Implement the necessary remedial actions according to the outcome of the investigation and consultation with the affected parties.
- Track the incident until completion.

Regular monitoring reports must be prepared for internal use, as well as for submission to the authorities, as required by the operations' water use licenses. The length of post-closure monitoring must be negotiated with Government during the decommissioning phase. It is recommended that the monitoring programme be implemented for a minimum period of 2 years post closure to establish trends.

11.2.4. Groundwater Monitoring Reporting

Annual monitoring reports must be generated and submitted to the DWS. Monitoring reports must contain the following information:

- Monitoring borehole location map;
- Monitoring borehole geology and construction log;

- All coordinates of the groundwater sampling sites;
- Certificates of analysis must be included for quality assurance. Monitoring results will be compared to South African National Standards (SANS241);
- Time-series graphs for key indicator elements (pH, EC, TDS, F, NO_3, SO_4 and Fe);
- Trilinear or other analytical groundwater plots;
- A discussion regarding observed trends and potential groundwater contamination; and
- Recommendations regarding possible amendments or additions to the groundwater monitoring programme, based on trends and other information observed.

An annual groundwater monitoring programme audit must be carried out by an independent party.

11.2.5. Quality Assessment and Control

Quality assurance means:

- Developing a system of activities to ensure that measurements meet defined standards of quality with a stated level of confidence;
- Defining monitoring objectives, quality control procedures to be followed and quality assessment;
- To define data quality objectives, including accuracy, precision, completeness, representativeness and comparability; and
- Designing a network, selecting sampling sites, selecting instruments and designing the sampling system, as discussed above.

Quality control includes preparing record keeping for site operation and equipment maintenance, equipment calibration, site visit schedules and for data inspection, review, validation and usage. All monitoring equipment must be maintained as required, and calibration must be undertaken on a regular basis.

To ensure that the Groundwater Monitoring Strategy complies with the above, it is important that analytical laboratories used should be fully accredited for each type of analysis required, to ensure that accurate analytical methods are used.

While only one or two of the common major ions found in waters may be specified as key indicators, it is necessary to analyse for the full suite of common ions for quality control purposes and to detect discrete events and long-term trends in anion composition.

Special attention must be paid to sampling methods and to preservation and handling of samples prior to analysis. For natural waters (pH >5), all samples must be filtered in the field to <0.45 micron, as discussed above. pH and conductivity must be measured in the field.

Close attention must be given to siting, logging and construction of monitoring boreholes and assessment of their condition must be made quarterly.

The following sampling protocol is proposed:

- Sterilised plastic bottles, with a plastic cap and no liner within the cap are required for the sampling. Sample bottles should be marked clearly with the borehole name, date of sampling, water level depth and the sampler's name;
- Water levels should be measured prior to taking the sample, using a dip meter (mbgl);
- Each borehole to be sampled should be purged (to ensure sampling of the aquifer and not stagnant water in the casing) using a submersible pump or a clean disposable polyethylene bailer. At least three borehole volumes of water should be removed through purging; or through continuous water quality monitoring, until the electrical conductivity value stabilizes;
- The following field measurements should be recorded on a field form for each sampling point: pH, EC and temperature;
- Samples should be kept cool in a cooler box in the field and kept cool prior to being submitted to the laboratory; and
- The pH and EC meter used for field measurements should be calibrated daily using standard solutions obtained from the instrument supplier.

11.3. Surface Water Monitoring and Management

11.3.1. Stormwater Mangement

11.3.1.1. Clean and Dirty Areas

Clean and dirty area catchments were delineated from the 5 m spatial resolution Digital Elevation Model (DEM), to calculate the 1:50 year peak flows that would need to be controlled at the Mine. Clean areas include all areas upslope of the proposed Mine infrastructure, as well as the topsoil dumps. Dirty areas are those areas that are in contact with mining activities, and have a potential to contaminate surface water. Based on the surface infrastructure layout, the following areas were classified as dirty:

- Portal access to underground mining areas (shaft decline area);
- Waste dumps;
- Plant;
- RWD;
- PCD;
- Product stockpiles;
- MRF (co-disposal facilities);
- ROM stockpiles; and
- PCDs.

11.3.1.2. Proposed Stormwater Measures and Conceptual Designs

The proposed Stormwater Management Plans (SWMP) are indicated on Figure 11-1 and Figure 11-2. The SWMPs have been designed as a closed system (i.e. no discharge of dirty water to the environment). Stormwater measures proposed to separate clean and dirty water areas include channels (trenches) and

berms. Containment facilities for dirty water include the PCDs provided on the current infrastructure layout, as well as suggested dirty water collection sumps. Other measures such as culverts, silt traps, pit/decline sumps, perimeter and flood protection berms have also been recommended. These are discussed below.

Channels and Berms

It is proposed that the channels will be trapezoidal in shape, with side slopes ranging from 1:2 to 1:3, according to best practices. The channels have, as far as practicably possible, been positioned to use the natural slope to convey clean and dirty water. Should space be an issue, then rectangular channels can be considered.

The clean water channels will be unlined but vegetated with indigenous grass species. The excavated material from the channel will be placed on the downslope side, to form a separation berm between clean and dirty areas. The separation berm must also be vegetated with grass. All clean water channels will discharge water into the nearest downslope watercourse.

Runoff from dirty areas will report to a nearby dirty water channel that will be lined to prevent seepage, as required by GN704. It is proposed that all dirty channels are concrete lined, and that they discharge into the nearest downslope dirty water containment facility.

GN704 requires that the clean and dirty water systems are designed, constructed, maintained and operated so that they do not spill more than once in 50 years. Therefore, the proposed channels were sized to accommodate the 1:50 year peak flows.

Dirty Water Containment Facilities

All dirty water runoff will be contained, and will not be allowed to report to any clean areas. It is proposed that the PCDs will capture and contain upslope dirty water, via the proposed dirty water channels. The PCDs closest to the plant will also receive dirty water from the pit/decline sump, as well as from the dirty water collection sumps. The PCDs will be lined to prevent seepage, as required by GN704. The PCDs must be designed to have a capacity to manage operational water volumes and capture the 1:50 year flood event before spilling.

In areas where the topography does not allow dirty water to be conveyed to the PCD, dirty water collection sumps are proposed. Dirty water will be temporarily stored in these facilities, before being pumped to the PCD. It is proposed that these sumps will be similar in design to the PCDs.

A sump is proposed to be located at a low point within the pit/decline shafts. The purpose of this sump will be to collect runoff from the side walls, groundwater seepage, and at a later stage to also store water dewatered from the underground voids. Dirty water will be temporarily stored in the sump, before being pumped to the PCD.

It is recommended that the positions of the current PCDs is relooked, and that they are relocated to lowest possible positions below the infrastructure areas (outside of the floodlines and 100 m watercourse buffer), to prevent the unnecessary number of dirty water collection sumps that have been proposed.

All dams are to be sign posted as non-swimming, fenced off and locked, in order to prevent any uncontrolled access or usage of the facilities, as required by GN704. Permission would be required in order to gain access to the facility and will only be permitted for maintenance purposes and dam inspections.

Silt Traps and Oil/Water Separators

Silt traps are proposed at the channel entrance to all PCDs to capture and settle out silt. This will ensure that the required storage capacity is not limited by sediment. Sediment can be removed from the silt traps by front end loader. A lined area directly adjacent to the silt trap should be constructed, where removed sediment will be temporarily stored to dry out, and then transported to an appropriate disposal or rehabilitation facility.

Oil/water separators are devices used to remove small amounts of oil and other petroleum products from industrial wastewater and/or stormwater systems. Oil/water separators function based largely on the relatively low solubility of petroleum products in water and the difference between the specific gravity of water and the specific gravities of petroleum compounds. Oil/water separators are proposed at the following areas at the Mine:

- Workshops;
- Washbays; and
- Certain areas at the plant where oil and petroleum may occur in runoff.

Perimeter and Flood Protection Berms

A perimeter berm is proposed around the pit/decline shaft areas. This will prevent runoff from entering and flooding the area, and is a requirement in terms of Regulation 7(c) of GN704. Flood protection berms are proposed along areas that occur within the 1:100 year floodlines.

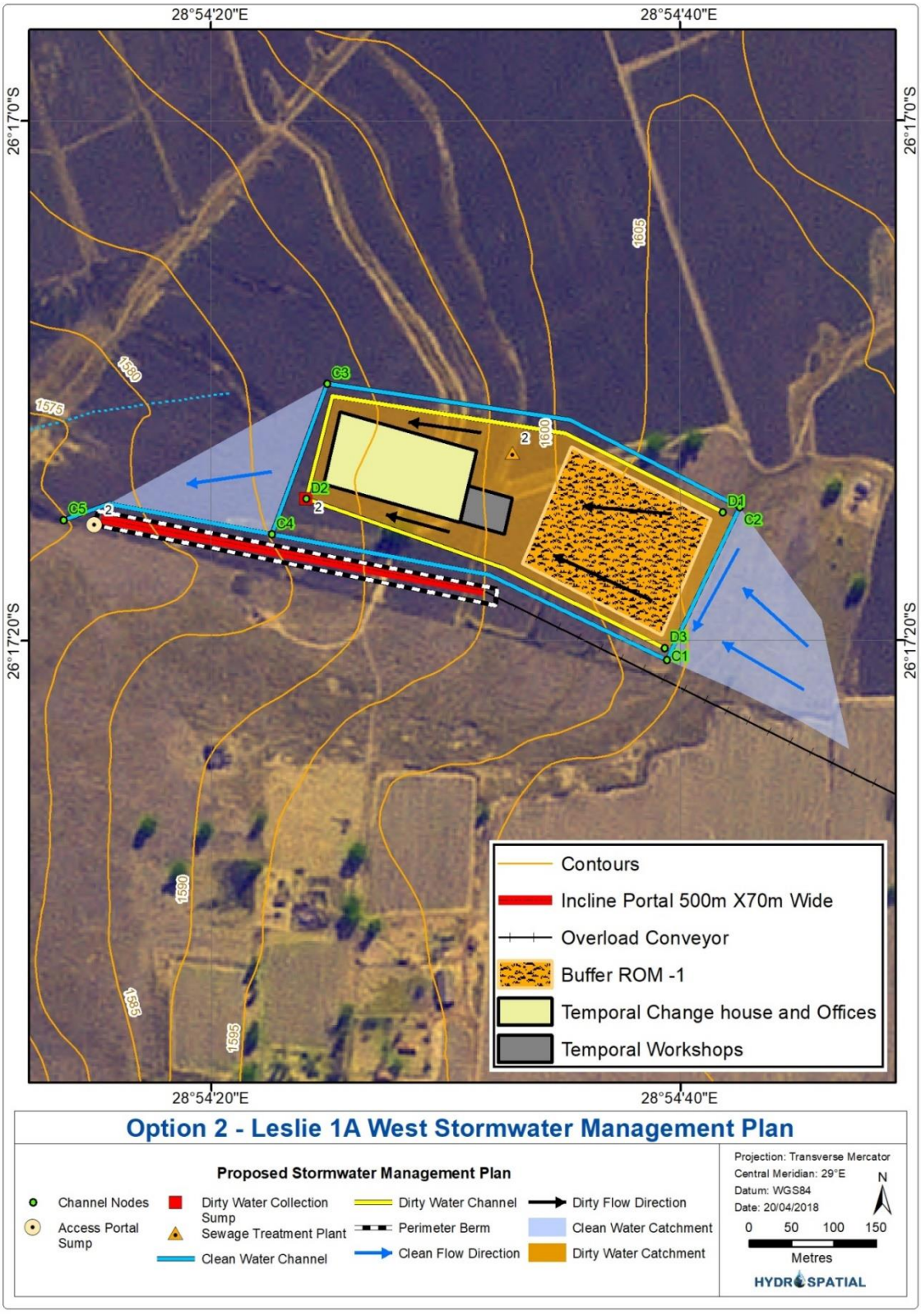

Figure 11-1: Proposed stormwater management plan for Leslie 1A West

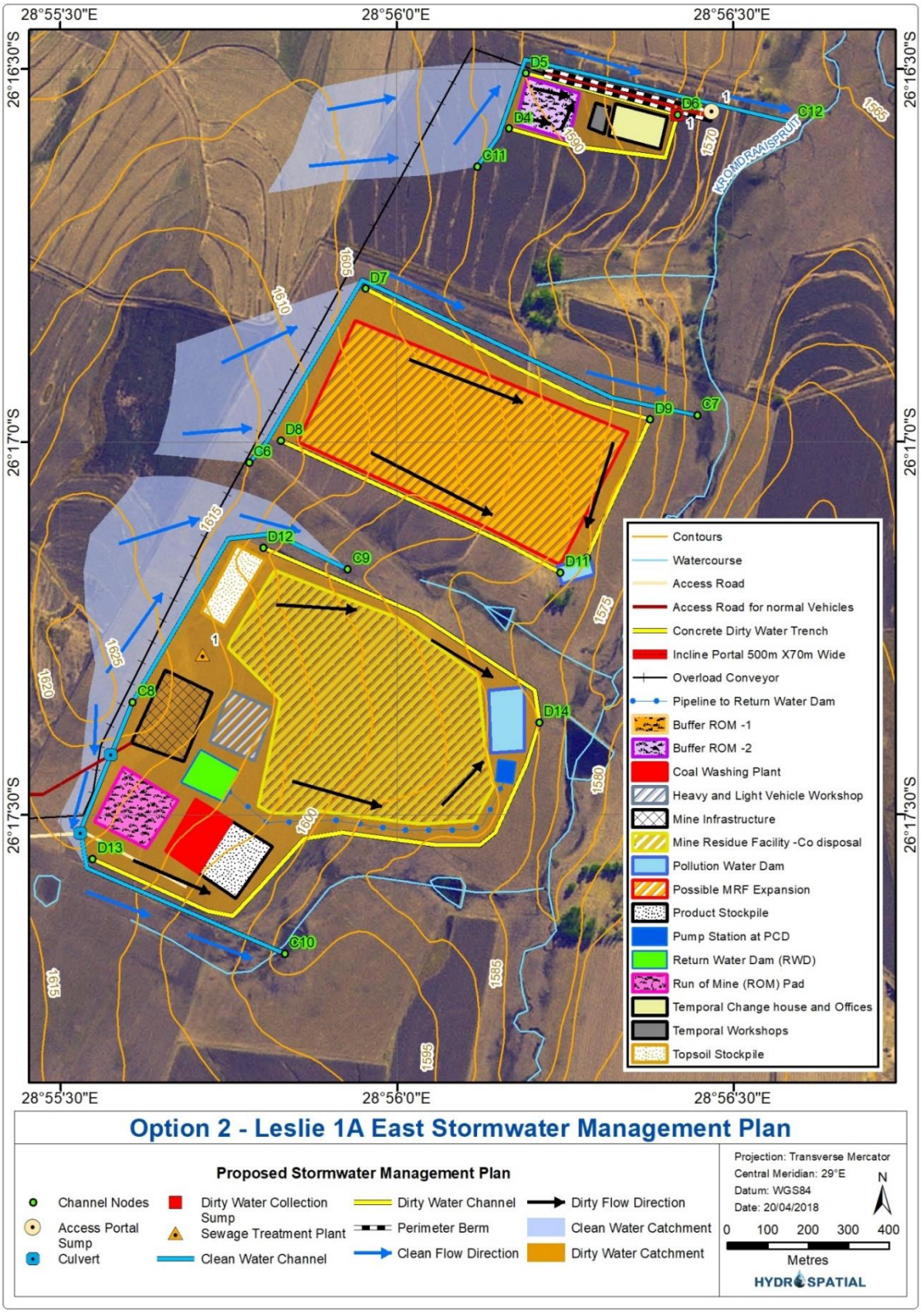

Figure 11-2: Proposed stormwater management plan for Leslie 1A East

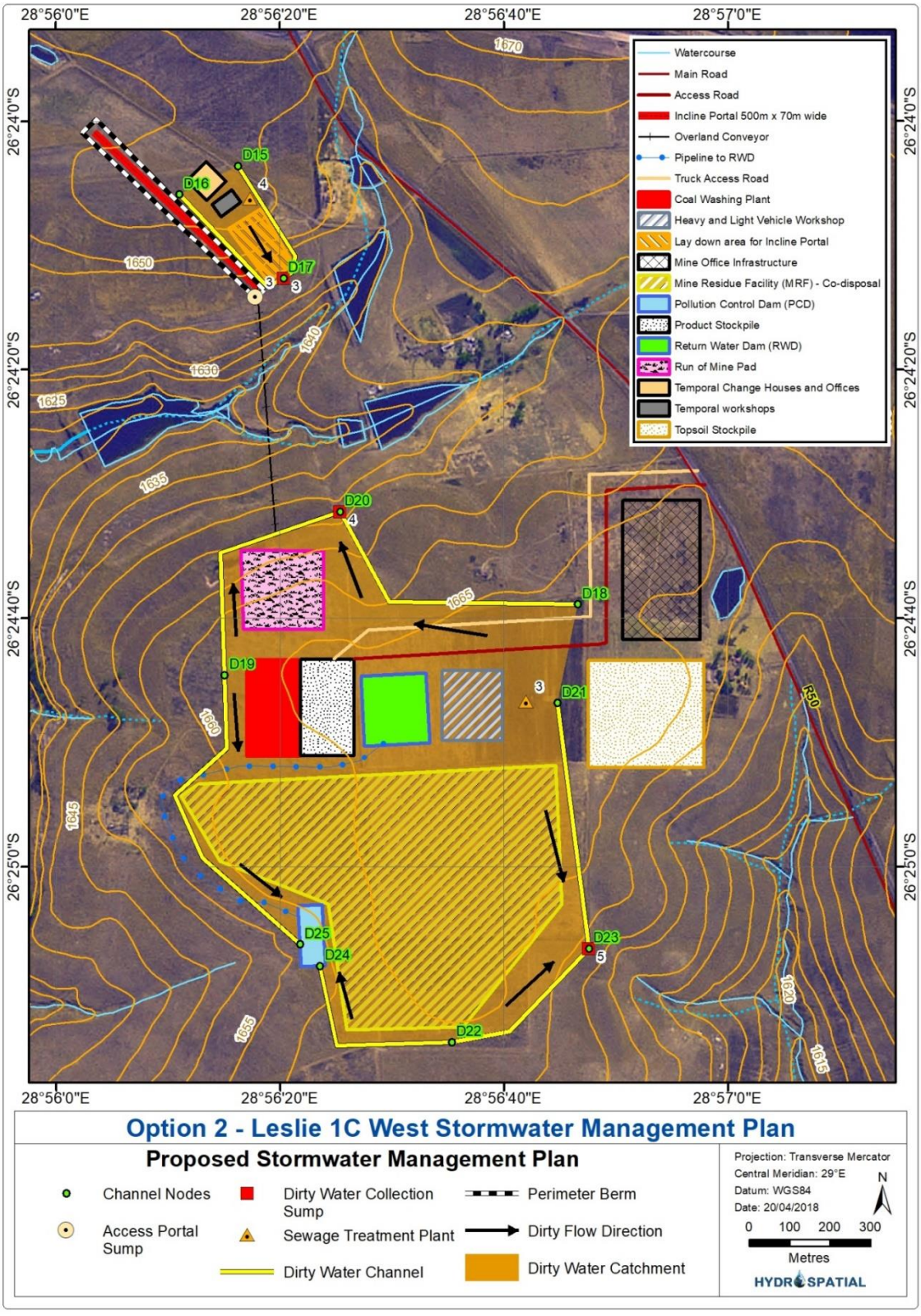

Figure 11-3: Proposed stormwater management plan for Leslie 1C West

11.3.2. Surface Water Quality

A surface water quality monitoring programme is essential as a management tool to detect negative water quality impacts as they arise and to ensure that the necessary mitigation measures are implemented. Parameters suggested to be monitored are indicated in Table 11-3. Monthly monitoring should be implemented at least a year prior the commencement of construction activities to establish a baseline that captures all seasons, and then throughout the construction, operation, closure and post closure phases.

Table 11-3: Water Quality Parameters

Parameter	Units	Standards/Guideline Water Quality Limits						
		SANS 241:2015 Drinking Water Quality Limits		RQO Limits for RU47 (applicable to SW1 to SW4)	RQO Limits for RU31 (applicable to SW5 to SW8 &SW10)	RQO Limits for RU11 (applicable to SW9)	SA Water Quality Guideline Limits Agricultural Use: Irrigation	SA Water Quality Guideline Limits Agricultural Use: Livestock Watering
		Risk	Limit/s					
pH at 25°C	pH Units	Operational	≥ 5 to ≤ 9.7	-	-	-	≥ 6.5 to ≤ 8.4	-
Electrical Conductivity (EC) at 25°C	mS/m	Aesthetic	≤ 170	≤ 111	-	≤ 111	≤ 40	≤ 153
Total Dissolved Solids (TDS)	mg/l	Aesthetic	≤ 1 200	-	-	-	≤ 260	≤ 1000
Total Suspended Solids (TSS)	mg/l	-	-	-	-	-	≤ 50	-
Turbidity	NTU	Operational	≤ 1	-	-	-	-	-
		Aesthetic	≤ 5					
Total Alkalinity as $CaCO_3$	mg/l	-	-	-	-	-	-	-
Total Hardness as $CaCO_3$	mg/l	-	-	-	-	-	-	-
Chloride as Cl	mg/l	Aesthetic	≤ 300	-	-	-	≤ 100	≤ 1500
Sulphate as SO_4	mg/l	Acute health	≤ 500	-	≤ 200	≤ 500	-	≤ 1000
		Aesthetic	≤ 250					

Parameter	Units	Standards/Guideline Water Quality Limits						
		SANS 241:2015 Drinking Water Quality Limits		RQO Limits for RU47 (applicable to SW1 to SW4)	RQO Limits for RU31 (applicable to SW5 to SW8 &SW10)	RQO Limits for RU11 (applicable to SW9)	SA Water Quality Guideline Limits Agricultural Use: Irrigation	SA Water Quality Guideline Limits Agricultural Use: Livestock Watering
		Risk	Limit/s					
Fluoride as F	mg/l	Chronic health	≤ 1.5	-	-	-	≤ 2	≤ 2
Nitrate as N	mg/l	Acute health	≤ 11	-	-	-	-	≤ 100
Faecal Coliforms	Count/100ml	-	-	-	-	-	≤ 1	≤ 200
Ammonium as N	mg/l	-	-	-	-	-	-	-
Orthophosphate as P	mg/l	-	-	≤ 0.08	-	≤ 0.125	-	-
Sodium as Na	mg/l	Aesthetic	≤ 200	-	-	-	≤ 70	≤ 2000
Potassium as K	mg/l	-	-	-	-	-	-	-
Calcium as Ca	mg/l	-	-	-	-	-	-	≤ 1000
Magnesium as Mg	mg/l	-	-	-	-	-	-	≤ 500
Aluminium as Al	mg/l	Operational	≤ 0.3	≤ 0.15	≤ 0.105	-	≤ 5	≤ 5
Cadmium as Cd	mg/l	Chronic health	≤ 0.003	≤ 0.005	≤ 0.003	-	≤ 0.01	≤ 0.01

Parameter	Units	Standards/Guideline Water Quality Limits						
		SANS 241:2015 Drinking Water Quality Limits		RQO Limits for RU47 (applicable to SW1 to SW4)	RQO Limits for RU31 (applicable to SW5 to SW8 &SW10)	RQO Limits for RU11 (applicable to SW9)	SA Water Quality Guideline Limits Agricultural Use: Irrigation	SA Water Quality Guideline Limits Agricultural Use: Livestock Watering
		Risk	Limit/s					
Total Chromium as Cr	mg/l	Chronic health	≤ 0.05	-	-	-	-	-
Copper as Cu	mg/l	Chronic health	≤ 2	≤ 0.008	≤ 0.006	-	≤ 0.2	≤ 0.5
Iron as Fe	mg/l	Chronic health	≤ 2	≤ 3	≤ 2.5	-	≤ 5	≤ 10
		Aesthetic	≤ 0.3					
Lead as Pb	mg/l	Chronic health	≤ 0.01	≤ 0.013	≤ 0.0095	-	≤ 0.2	≤ 0.1
Manganese as Mn	mg/l	Chronic health	≤ 0.4	≤ 1.3	≤ 0.99	-	≤ 0.02	≤ 10
		Aesthetic	≤ 0.1					
Nickel as Ni	mg/l	Chronic health	≤ 0.07	-	-	-	≤ 0.02	≤ 1
Cobalt as Co	mg/l	-	-	-	-	-	≤ 0.05	≤ 1
Zinc as Zn	mg/l	Aesthetic	≤ 5	-	≤ 0.0252	-	≤ 1	≤ 20

Water quality samples must be kept cool (+-4°C) and transported immediately to an accredited laboratory for water quality analysis within 24 hours of sampling, as per the DWS Best Practice Guideline G3: Water Monitoring Systems. The impacts on water quality will be determined by comparing the monitoring results against the WUL limits or guidelines and standards provided, as well as to previous results to determine any deviations in trends over time. If the trend analysis indicates any deviations to the baseline monitoring, in terms of deteriorating water quality, then an immediate investigation must be undertaken to determine whether the mine may be responsible. If responsible, urgent action must be undertaken to implement mitigation against the source of pollution.

Reporting should be done on a quarterly basis (or as recommended by the DWS) and reports should be submitted to the DWS. Monitoring reports must include a trend analyses, as well as separate table/s where results received from the lab are compared to standard/guideline and WUL limits, indicating any parameters that may have exceeded limits. Water quality monitoring is recommended at the locations indicated on Figure 11-4.

11.3.3. Surface Water Quantity

Streamflow monitoring should be conducted directly downstream of the mine. A rating curve should be developed and water level heights should be automatically (preferably) read, otherwise manually noted off an installed stage board at least once a day. This should be done during the construction, operation, closure and post closure phases of the Project. Streamflow monitoring must be undertaken according to the DWS Best Practice Guideline G3: Water Monitoring Systems.

11.3.4. Water Infrastructure

Water infrastructure (channels, silt traps, dirty water containment facilities and energy dissipaters) should be monitored every year in September before the rainy season begins, to ensure that any blockages, silted up structures, or breaches in structures, are repaired and are in good working order for the rainy season. They should further be monitored immediately after every storm event during the rainy season. Monitoring of the plant water infrastructure should be conducted on a monthly basis. Should blockages, silted up structures or breaches occur, immediate action should be undertaken to remove debris and / or repair breaches. Monitoring should be undertaken by the onsite Environmental Control Officer (ECO) or maintenance manager. Inspections must be recorded and should include the following:

- Date of inspection;
- Rainfall amount received;
- Photographs of blockages, silted up structures or breaches witnessed;
- What action was undertaken to fix issues, and the amount of time taken to address them; and
- Photographs post action taken.

Inspection reports should be kept ready and supplied to the DWS when requested, or as part of the WUL conditions.

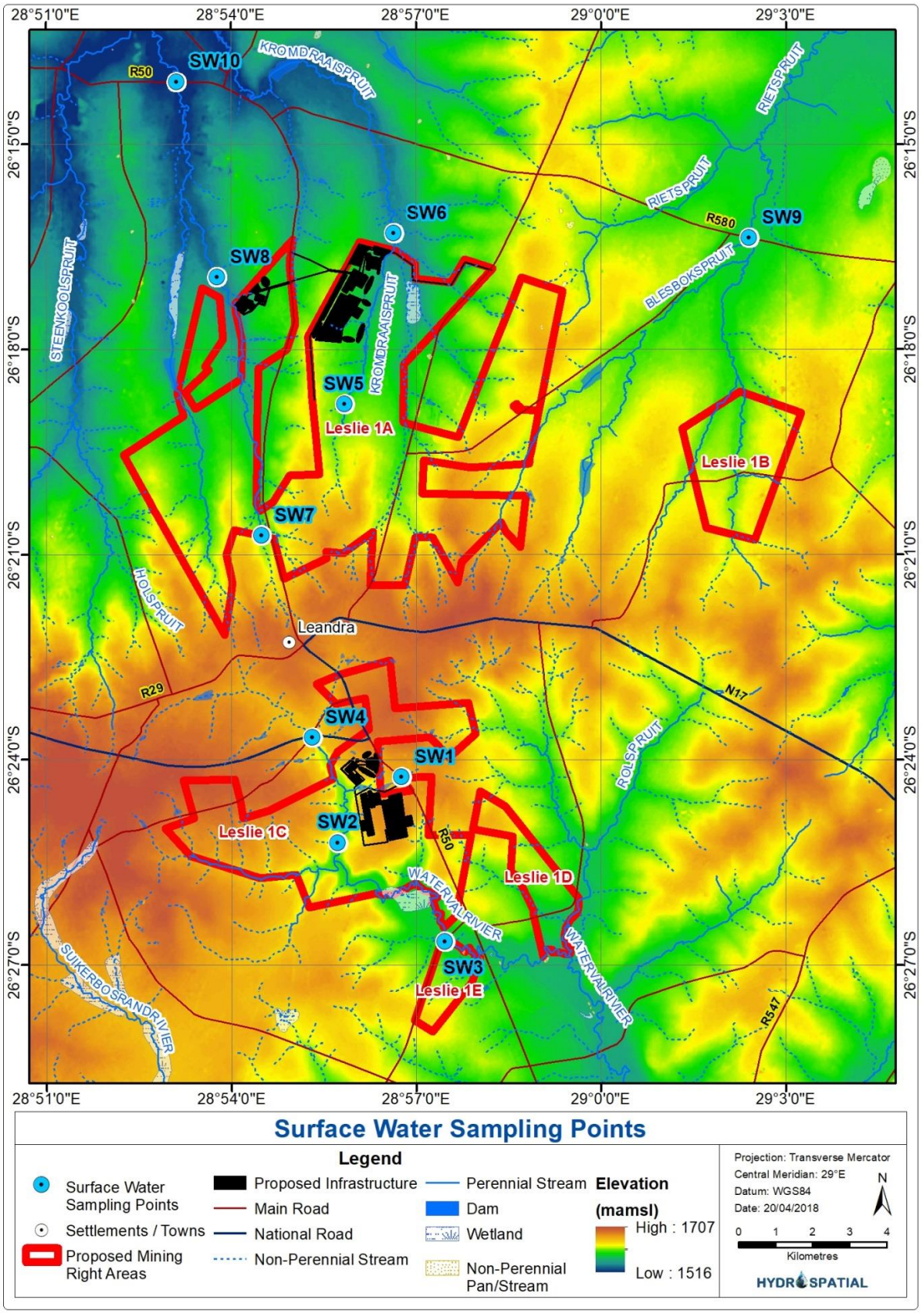

Figure 11-4: Surface water sampling points

11.4. Air Quality Monitoring

To assess the air quality impacts of particulate emissions from the Leslie 1 Project accurately, particularly with regard to the health implications for residents in the surrounding areas, continuous air quality monitoring must be undertaken during the construction, operational and closure phases of the mine. This air quality monitoring should be implemented as far prior to the start of the construction phase of the mine as possible to establish a baseline against which the impacts of the Leslie 1 Project activities on ambient air quality can be assessed.

It is recommended that a continuous dustfall monitoring programme be established with at least four buckets around each emission source (open pits; active ROM, overburden and soil stockpiles; coal processing plant; and haul roads) during mining operations. The position of the buckets should be re-assessed annually as mining progresses. The buckets must be operated in accordance with the National Dust Control Regulations (Government Notice No. R827, 2013).

Additionally, continuous PM2.5 and PM10 monitoring must be undertaken using continuous ambient air quality monitoring analysers to assess the impacts on current and future residential areas that are impacted by the mine's emissions.

Meteorological stations (co-located with the continuous PM monitoring) would need to be erected for the life of the mine to measure (at minimum) wind speed and wind direction, but preferably also temperature, humidity, barometric pressure and rainfall.

As part of this monitoring programme, monthly reports must be produced with recommendations to management with regard to the effectiveness of the mitigation methods being applied. If the number of exceedances measured at any monitoring site is higher than that allowed by the NAAQS or the National Dust Control Regulations, the mine must take urgent measures to further mitigate emissions until ambient air quality concentrations or dustfall rates are brought back into line with the National Standards and Regulations.

This emphasises the importance of monitoring (both in summer and in winter) prior to commencement of mining activities; as the development of a baseline will make it possible to more accurately evaluate the mine's actual contribution to ambient concentrations of pollutants and dustfall levels.

11.5. Noise

Environmental Noise Monitoring can be divided into two distinct categories, namely:

- Passive monitoring – the registering of any complaints regarding noise; and
- Active monitoring – the measurement of noise levels at identified locations.

As there is a significant potential for a noise impact (medium significance), active environmental noise monitoring is recommended. Additional monitoring should be undertaken should a valid complaint be registered. The mine must investigate any such complaint as per the following sections. It is recommended that the noise investigation be done by an independent acoustic consultant. Noise monitoring should continue as long as there are potential noise sensitive receptors staying within 2 000m from the mining activities.

11.5.1. Monitoring Localities and Procedures

11.5.1.1. Monitoring Localities

Initially noise monitoring is recommended at the receptors staying within 1 000m from the proposed mining (and plant) activities. Additional measurement locations should be implemented after considering the product haulage routes. Additional noise measurements conducted at the location of the I&AP that registered a noise complaint. The measurement location should consider the direct surroundings to ensure that other sound sources cannot influence the reading. If possible, a second instrument must be deployed at the mine during the measurement. Noise measurement locations should be identified as mining progress.

11.5.1.2. Monitoring Procedures

Ambient sound measurements should be collected as defined in SANS 10103:2008. Due to the variability that naturally occurs in sound levels at most locations, it is recommended that semi-continuous measurements are conducted over a period of at least 16 hours, covering the full daytime period of 06:00 – 22:00. Measurements should be collected in 10-minute bins defining the 10-minute descriptors such as $L_{Aeq,I}$ (National Noise Control Regulation requirement), $L_{A90,f}$ (background noise level as used internationally) and $L_{Aeq,f}$ (Noise level used to compare with IFC noise limit). Spectral frequencies should also be measured to define the potential origin of noise. The equipment could also be set to record the 1-second sound level. Measurements should be collected during a period or in conditions similar to when the receptor experienced the disturbing noise event.

11.5.1.3. Relevant Standard for Noise Monitoring

Noise measurements must be conducted as required by the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008.

11.5.1.4. Monitoring Frequencies

Quarterly noise monitoring is recommended. Additional noise measurement locations can be added to investigate a noise complaint during the quarterly monitoring.

11.5.2. Data Capture Protocols

11.5.2.1. Monitoring Technique

Noise measurements must be conducted as required by the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008.

11.5.2.2. Variables to be Analysed

Measurements should be collected in 10-minute bins defining the 10-minute descriptors such as $L_{Aeq,I}$ (National Noise Control Regulation requirement), $L_{A90,f}$ (background noise level as used internationally) and $L_{Aeq,f}$ (Noise level used to compare with IFC noise limit). Spectral frequencies should also be measured to define the potential origin of noise.

11.5.2.3. Database Entry and Backup

Data must be stored unmodified in the electronic file saved from the instrument. This file can be opened to extract the data to a spread sheet system to allow the processing of the data and to illustrate the data graphically. Data and information should be safeguarded from accidental deletion or corruption.

11.5.2.4. Feedback to Receptor

A monitoring report must be compiled considering the requirements of the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008. The mine must provide feedback to the potential noise-sensitive receptors using the channels and forums established in the area to allow interaction with stakeholders, alternatively in a written report.

11.5.2.5. Standard Operating Procedures for Registering a Complaint

When a noise complaint is registered, the following information must be obtained:

- Full details of the complainant;
- Date and approximate time when this non-compliance occurred;
- Description of the noise or event.

11.6. Blasting and Vibration

A monitoring programme for recording blasting operations is recommended. The following elements should be part of such a monitoring program:

- Ground vibration and air blast results;
- Blast Information summary;
- Meteorological information at time of the blast;
- Video Recording of the blast;

- Fly rock observations.

Most of the above aspects do not require specific locations of monitoring. Ground vibration and air blast monitoring requires identified locations for monitoring. Monitoring of ground vibration and air blast is done to ensure that the generated levels of ground vibration and air blast comply with recommendations. Proposed positions were selected to indicate the nearest points of interest at which levels of ground vibration and air blast should be within the accepted norms and standards as proposed in this report. The monitoring of ground vibration will also qualify the expected ground vibration and air blast levels and assist in mitigating these aspects properly. This will also contribute to proper relationships with the neighbours.

Various monitoring positions were identified for Leslie 1 Box-cut areas. Some of these points may be applicable to more than one installation. Monitoring positions are indicated in Figure 11-5 to Figure 11-10 and Table 11-4 lists the positions with coordinates. These points will need to be re-defined after the first blasts done and the monitoring programme defined.

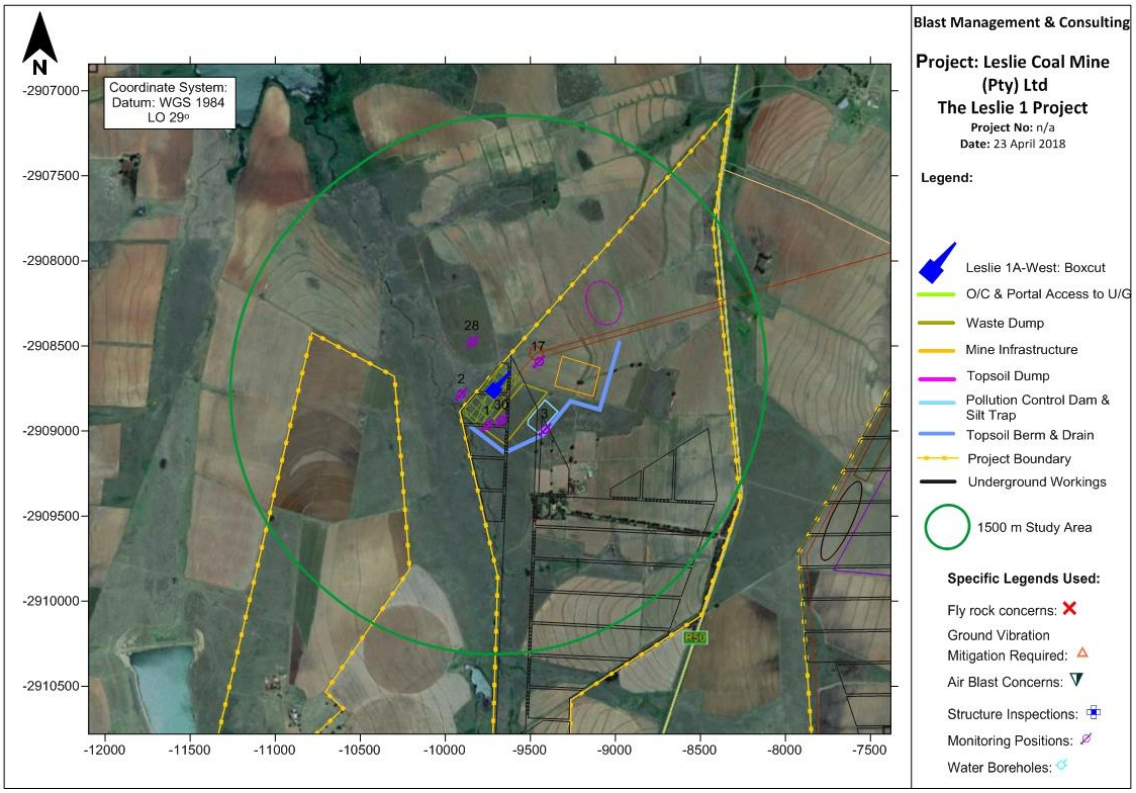

Figure 11-5: Monitoring Positions suggested for Leslie 1A East Portal area

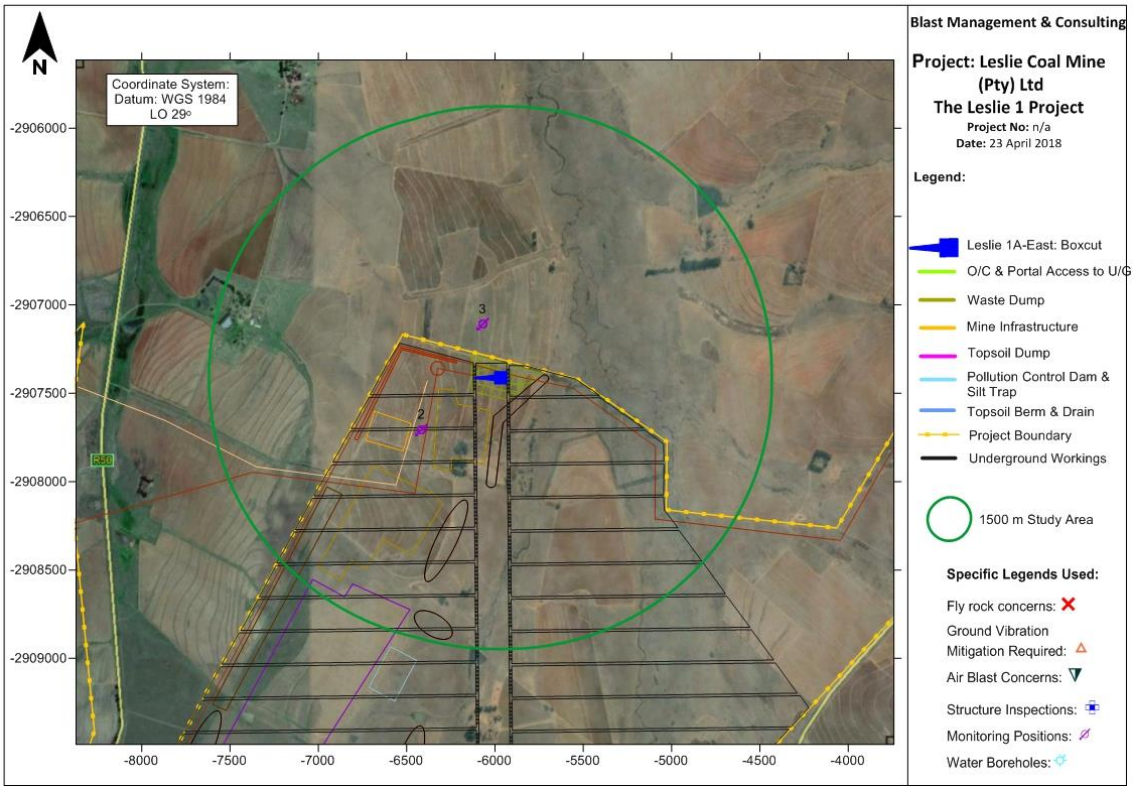

Figure 11-6: Monitoring Positions suggested for Leslie 1A West Portal area

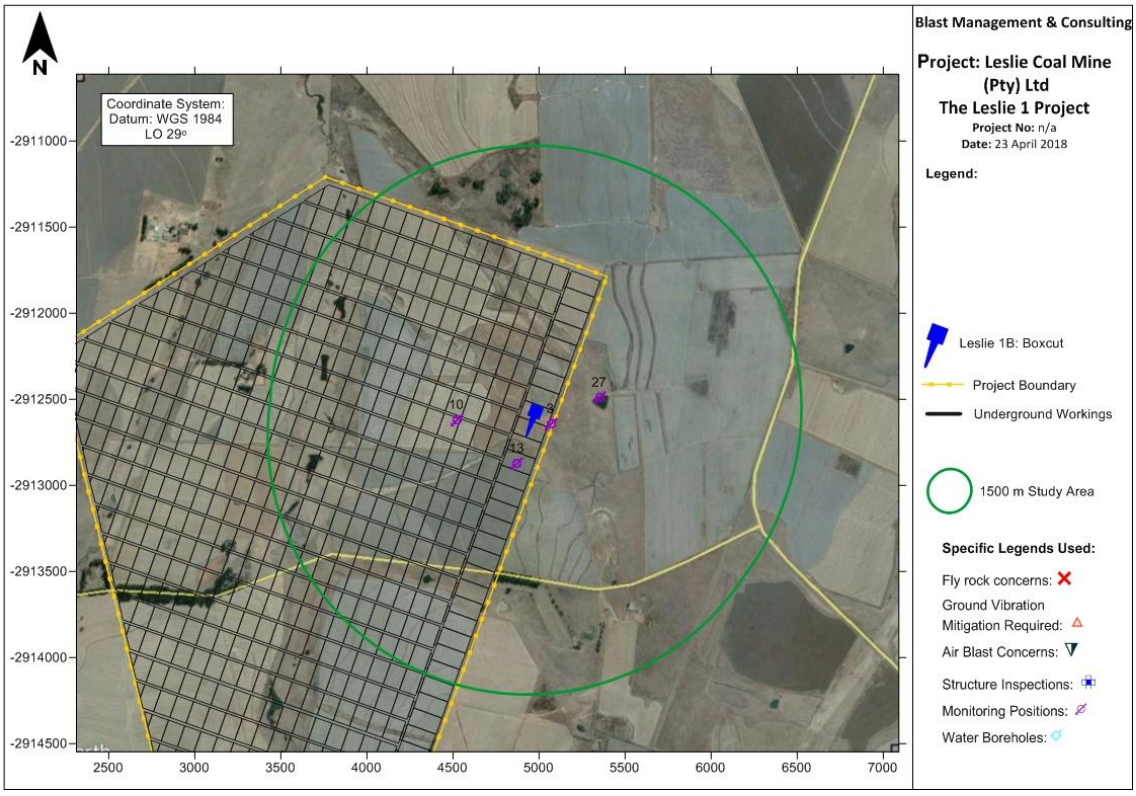

Figure 11-7: Monitoring Positions suggested for Leslie 1B Portal area

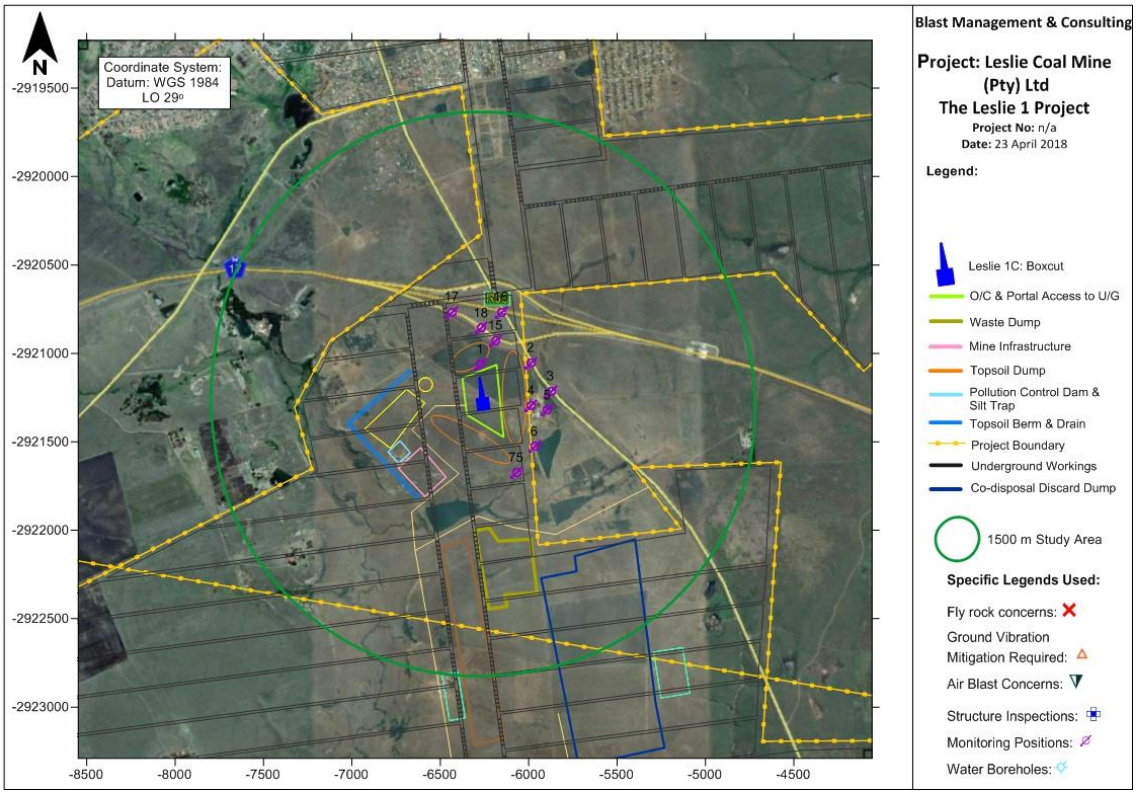

Figure 11-8: Monitoring Positions suggested for Leslie 1C Portal area

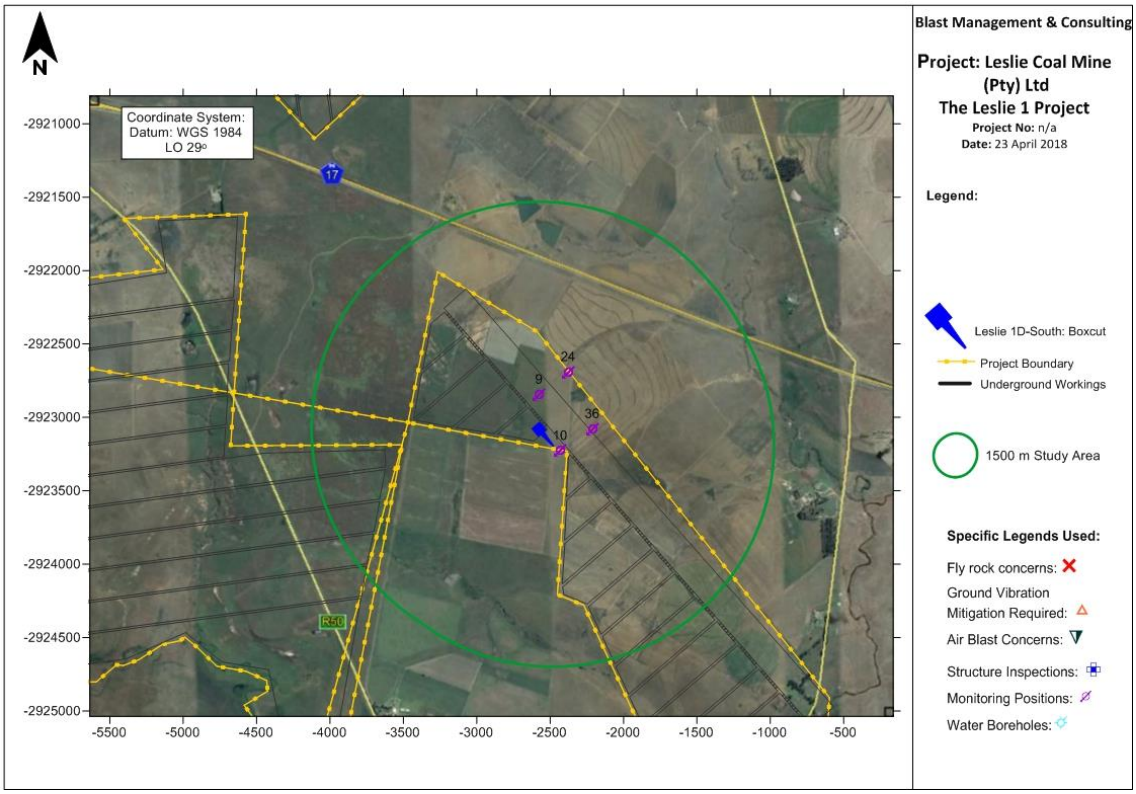

Figure 11-9: Monitoring Positions suggested for Leslie 1D portal area

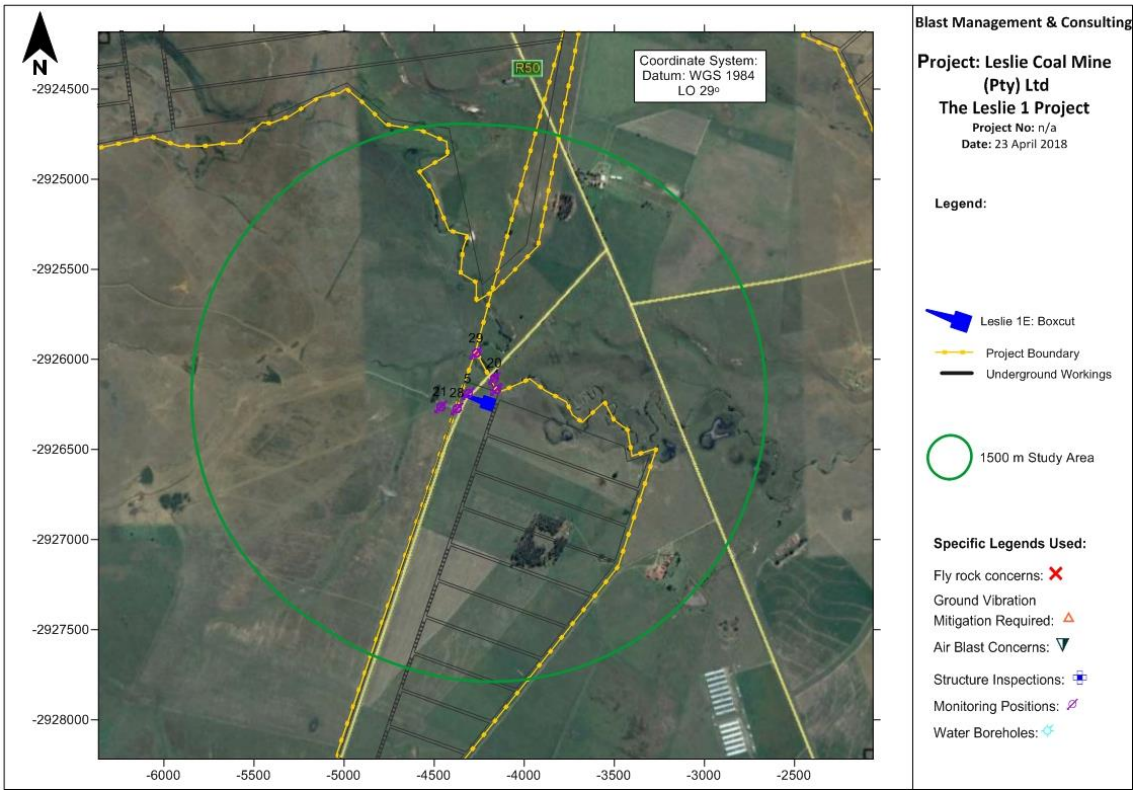

Figure 11-10: Monitoring Positions suggested for Leslie 1E Box-cut area

Table 11-4: List of possible monitoring positions

Tag	Description	Y	X
	Leslie 1A West		
1	Hydrocensus Borehole (Spr01)	9753.06	2908968.64
2	Pan	9902.27	2908784.99
3	Heritage Site (LES004 - Old structure. bricks and concrete foundation)	9411.57	2908988.33
17	Cultivated Fields	9450.12	2908592.95
28	Cultivated Fields	9840.03	2908471.15
30	Heritage Site (LES002)	9666.09	2908936.77
	Leslie 1A East		
2	Cultivated Fields	6414.76	2907706.15
3	Cultivated Fields	6068.68	2907110.00
	Leslie 1B		
3	Heritage Site (LES015 -burial ground)	-5069.39	2912642.94
10	Cultivated Fields	-4522.15	2912620.38

Tag	Description	Y	X
13	Cultivated Fields	-4873.30	2912872.23
27	Dam	-5352.07	2912490.63
	Leslie 1C		
1	Cultivated Fields	6270.98	2921063.03
2	R50 Road	5987.03	2921053.93
3	R50 Road	5874.06	2921214.69
4	Farm Buildings/Structures	5983.52	2921296.43
5	Dam	5892.77	2921321.38
6	Dam	5965.69	2921527.52
15	N17 Road	6185.69	2920927.16
16	N17 Road Bridge	6153.24	2920766.56
17	N17 Road	6432.11	2920766.39
18	N17 Road Toll Booth	6267.72	2920857.17
75	Heritage Site (LES019)	6068.23	2921674.72
	Leslie 1D South		
9	Power Lines/Pylons	2572.89	2922844.65
10	Power Lines/Pylons	2428.62	2923227.18
24	Cultivated Fields	2373.37	2922691.00
36	Cultivated Fields	2209.26	2923079.11
	Leslie 1E		
4	River	4152.97	2926167.04
5	Road	4311.59	2926191.81
20	Power Lines/Pylons	4162.98	2926104.77
21	Power Lines/Pylons	4463.98	2926264.24
28	Road	4370.53	2926271.71
29	River	4265.80	2925967.40

11.7. Heritage

11.7.1. Construction phase

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camps area and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project and these must be catered for. Temporary infrastructure, such as construction camps and laydown areas, is often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented.

11.7.2. Chance find procedure

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

11.7.2.1. Possible finds during construction

The study area contains numerous old homesteads as identified during the fieldwork. Excavations of foundations and soil clearance could uncover the following:

- Stone foundations;
- Ash middens associated with the farmsteads and homesteads that can contain bone, glass and clay ceramics, ash, metal objects such as spoons, knives, and knives;
- Possible infant burials.

11.7.2.2. Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. The table below gives guidelines for lead times on permitting.

Table 11-5: Lead times for permitting and mobilisation

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provide	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	1 month
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

11.7.3. Heritage Management Plan for EMP implementation

Table 11-6: Heritage Management Plan for EMP implementation

No.	Mitigation Measures	Phase	Timeframe	Responsible Party for Implementation	Monitoring Party (Frequency)	Target	Performance Indicators (Monitoring Tool)	Cost
Possible finds								
A	Implement chance find procedures in case where possible heritage finds are uncovered	Construction	During construction	Applicant ECO Heritage Specialist	ECO (weekly)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report	**Possibly R50 000**
Known sites								
012	• Monitor during site clearance for possible infant and still-born burials and implement chance find procedure if any finds are uncovered.	Construction	During construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report	**Less than R10 000**
006, 007, 008, 009, 016, 019, 028 and 029	• Implement design elements to exclude the burial grounds with a 50-metre buffer. If this is not possible, a detailed grave relocation	Construction	During construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA	ECO Monthly Checklist/Report	**Less than R3 000 000**

No.	Mitigation Measures	Phase	Timeframe	Responsible Party for Implementation	Monitoring Party (Frequency)	Target	Performance Indicators (Monitoring Tool)	Cost
	process must be implemented as required under the NHRA and National Health Act regulations.					under Section 36 and 38 of NHRA		
014	• The best option for the site would be *in situ* preservation. If it cannot be preserved, this site will need to be fully mitigated with excavations and documentation of the site.	Construction through to Operational	Construction Operational	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report	**Less than R200 000**
Palaeontology	• The EAP and ECO must be informed that a Very High Palaeontological Sensitivity is allocated to the whole study area. A Phase 1 PIA document and "Chance Find Protocol" must be completed during the first month of excavation. • These recommendations must be incorporated	Construction through to Operational	Construction Operational	Applicant ECO Palaeontologist	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	ECO Monthly Checklist/Report	**Less than R100 000**

No.	Mitigation Measures	Phase	Timeframe	Responsible Party for Implementation	Monitoring Party (Frequency)	Target	Performance Indicators (Monitoring Tool)	Cost
	in the EMPr of this project.							

12. Performance Assessment Report Frequency

An environmental audit of the EMPr should be undertaken on an annual basis by an independent auditor.

13. Environmental Awareness Plan

13.1. Communication Chain

The communication of the environmental risks for each phase of the project will take place for the management, administrative and mine worker sectors of the mine, as well as contractors and sub-contractors.

13.1.1. Management Sector

A workshop will be conducted to inform all management of the risks associated with the project. The risks for all aspects will be explained and the appropriate management options discussed. The workshop will also elaborate on the monitoring programmes that will be implemented to identify and monitor the level of impact on the environment and discuss various remediation actions, should there be deterioration.

The evaluation process is integral in the assurance that the mine reduces any possible environmental risks associated with the project. The workshop will be conducted prior to the construction phase to ensure that all risks are discussed before there is any chance of the impacts occurring.

The workshop may be repeated at certain stages during the construction phase, in the case of new employees.

This workshop will seek to explain the following necessary actions:

- Risks associated with each aspect will be discussed to ensure that there is an understanding of how each action of the project may impact on the environment.
- The mitigation of the environmental risk will be elaborated on.
- It is important that each person understand these management strategies as it ensures that the impact on the environment is kept to a minimum.
- Data collection regarding each aspect will also be explained to ensure that each aspect is monitored according to those protocols specified by the authorisations and licence. Along with data collection, the reporting of findings will be discussed.
- This workshop will take place before the construction phase begins, thus ensuring a full understanding of the project and its associated environmental risks before any construction activity is undertaken.
- The workshop will be repeated at the beginning of the operational phase as part of a handover to the next responsible party.
- The following communication channels and media will/ can be used to communicate environmental and social issues within Leslie 1 Mining employees during construction:

    - Head of Department (HOD) Meetings: The Mine Manager communicates information to senior management on environmental issues and the information is minuted.

- HSEC Meetings: 'Environmental issues' should be an agenda item on monthly safety, health & environmental meeting agendas.
- Publications: Leaflets, posters etc. are produced by the relevant department or other designated persons, for use on notice boards, and distribution.
- EMS Database: Feedback from line management on objectives, targets and actions.
- Daily/ Weekly Safety Meeting: All meetings are scheduled to commence with a discussion on safety, health & environmental topics.

13.1.2. Construction Workers Sector

The workers associated with the activities on site will attend an induction course to ensure that each person is aware of the environmental risks associated with the project. This induction will form part of the health and safety induction. The environmental risks of each aspect as well as the mitigation will be elaborated on.

A debriefing should take place when the project moves from one phase to the next. A Job Hazard Analysis (JHA) or Issue Base Risk Assessment could also be conducted to identify potential risks associated with the project.

Furthermore, weekly toolbox talks / green meetings must cover topics raising awareness on environmental and social issues relating to the project.

13.1.3. Contractors

A Risk Conversancy Training (RCT) is conducted and is applicable to all contactors. Here focus will be on activities that carry an environmental risk, actions to be taken to reduce these risks, and procedures to be followed in the event of an incident.

Furthermore, weekly toolbox talks / meetings must cover topics raising awareness on environmental and social issues relating to the project.

13.1.4. Environmental Control Officer

The ECO will oversee environmental awareness induction training to all contractor staff. The ECO will ensure that the necessary environmental induction training takes place and that records of attendance are maintained and up to date.

14. Method of communication

14.1. Induction

All full-time staff and contractors are required to attend an induction session. Employees are inducted when they start on the project. Any contractor, who works on the project is required to undergo the prescribed induction training. This induction will form part of the health and safety induction.

Environmental issues and aspects related to the project will be addressed in the induction sessions. All environmental impacts and aspects and their mitigatory measures will be discussed, explained and communicated to employees. The induction sessions will be modified according to the level of employee attending the induction session so that all employees gain a suitable understanding of environmental issues and pollution.

The records of all individuals attending induction sessions to be kept; the records to be kept include names, ID, contact details, designation and signature.

14.1.1. On the Job Training

On the job training is an essential tool in environmental awareness. Employees will be given details of the expected environmental issues and concerns specifically related to their occupation. Employees will be trained on how to respond if an environmental problem or source of environmental pollution arises. The training will be on-going, and all new employees will be provided with the same standard of training as existing employees. In addition, contractors working on the project will be subjected to a Risk Conversancy Training (RCT).

The records of all individuals receiving on the job training to be kept; the records to be kept include names, employee number, contact details, designation and signature.

14.1.2. Hazardous Substances

Individuals dealing with potential hazardous situations and risks that could lead to hazardous spills, pollution incidents, excessive dust or other forms of environmental damage should receive appropriate job specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. All these actions will be done in accordance to the Leslie 1 Project procedures on management of hazardous substances

14.1.3. Delivery of Hazardous Substances

All hazardous substances are delivered directly to the Supply Chain management stores. Personnel responsible for the supervision of delivery, collection and transport of hazardous substances should

receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. This all makes part of competency declaration for use. Material Safety Data Sheets of each hazardous substance delivered must be kept at the Supply Chain management stores as well as point of distribution. Prior to any use of a new chemical, the Material Safety Data Sheet of each substance must be delivered to the SHEC department of Leslie 1 Mining for approval of use by the Environmental Specialist.

14.1.4. Dust mitigation

Individuals dealing with potential situations and risks that could lead to excessive dust should receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation

14.1.5. Fire Incidents

Individuals dealing with potential hazardous situations and risks that could lead to fire incidents or emergencies should receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

14.1.6. Pollution Incidents or Forms of Environmental Damage

Any incident or form of environmental damage must be dealt with in accordance with the Incident management procedure.

Individuals dealing with potential situations and risks that could lead pollution incidents or other forms of environmental damage to receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

14.1.7. Waste Management

Mining personnel and contractors responsible for the operation and safe handling of the various waste streams will receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. Leslie 1 Mining must ensure that training and awareness programmes cover the safe transportation, handling, storage, transfer, handling, use and disposal of all waste streams, and the location of waste receptacles for each waste stream. All waste management activities must be done in accordance to the Leslie 1 Project procedures and in terms of registers dealing with storage of waste in specific areas.

Staff awareness training programme will accommodate training, on which bin to use for organic waste and on sealing the lid on the bin once organic waste has been discarded.

14.1.8. Water Management

All persons responsible for active water management will receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

14.1.9. Water Consumption and Use

All staff will receive training on minimising water consumption and how to use water sparingly.

15. Environmental Communication Strategies

Mine management is required to establish procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to environmental risks for each phase of the project will take place for the management, administrative and worker sectors of the mine, as well as contractors. The organisation shall conduct processes for external communication on its significant environmental aspects and record its decision in line with Leslie Coal Mine communication policy as well as conditions stated in any EA or License.

15.1. Stakeholder Engagement Plan

The International Finance Corporation (IFC) Performance Standard 1 (PS1), requires that a Stakeholder Engagement Plan (SEP) and Grievance Mechanism (GM) be compiled for a project. The SEP needs to provide guidance for engagement with Stakeholders. This SEP has been developed to plan engagement activities for the Proposed Project.

If compliance with IFC standards is required, this plan will provide:

- A description of the regulatory and other requirements for Stakeholder Engagement (SE);
- The IFC framework regarding stakeholder engagement;
- A summary of the applicable South African legislation;
- A list of potential stakeholders identified for the project;
- Implementation plan for further consultation during the different phases of the project;
- A proposed grievance mechanism; and
- Management functions for the implementation of the SEP and grievance mechanism.

15.2. Internal Communication

Internal communication is done within the Administrative Sector.

15.3. External Communication Strategies

The following communication channels and media can be used to communicate environmental issues to individuals who are not employed by Leslie Coal Mine or its subcontractors:

- **Environmental Stakeholder engagement meeting:** An Environmental Stakeholder engagement meeting has been established and used as a forum to keep interested and affected parties informed of the significant environmental aspects identified through the Environmental Impact Assessments and Management Plans. This is also the forum where interested and affected parties get the opportunity to raise environmental concerns. Records are kept of all decisions and concerns. The Environmental Stakeholder engagement meeting is chaired by the Mine Manager, or another appropriately appointed competent individual.

- **Publications:** Selected publications should be produced and used to communicate environmental issues to outside parties. Examples include newsletters and Annual Reports.
- **Communication from External Parties and Employees:** A clear communication point is established within the company through the Leslie Coal Mine communication procedure that determines who is responsible for liaison with the media in respect of any crisis that may arise. A complete procedure for media liaison is available to all employees. Communication from external interested and affected parties may be received by email, fax, telephonically or by mail. Where required, a written response will be sent, on receiving such communication, by the appropriately appointed individual under signature of the Mine Manager, to the respective interested and / or affected party. All telephonic or facsimile correspondence received on the mine must be forwarded to the relevant department for action. All events or concerns will be captured and actioned on an existing and / or future database.
- **E-mail:** E-mail communication received must be stored, with replies, in an appropriate folder on a server. E-mail messages, relevant to environmental management, should be kept for a minimum of two years before deletion.
- **Mail:** Correspondence received by mail must be filed, along with the response (where relevant), within the relevant department's filing system for a minimum period of two years. Paper correspondence will be archived in this department.
- **Storage of Correspondence:** All original correspondence must be retained by the Mine Manager for a minimum period of two years.
- **Environmental Reports:** Copies of relevant specialist study reports and Environmental Impact Assessments will be available on request from an external party by the Mine Manager.
- **Queries from Interested and Affected Parties:** Response to queries about environmental impacts and aspects will be addressed by the relevant department, and approved by the Mine Manager.
- **Queries and Requests from the Media**: Requests for articles from the media on environmental issues regarding the road construction will be co-ordinated by the Corporate Communication manager according to the public communication strategy, with input from the relevant department, as approved by the General Manager, in line with the Leslie 1 Mining Public and Community Communication and Liaison Strategy. Due to the environmental awareness generated by induction, on the job training etc., employees are able to identify environmental problems, issues, concerns and pollution timeously.

15.4. Evaluation of the Environmental Awareness Plan

The evaluation of the environmental awareness and training plan will be conducted by Leslie Coal Mine management. This evaluation will entail the auditing of the operation in both the construction and operation phase once activity has commenced. The environmental awareness and training plan described above is sufficient to make all those involved in the project aware of those risks that may occur as well as the necessary mitigation required to minimize these risks.

The environmental awareness and training plan indicates that Leslie Coal Mine are serious about the environments well-being and empowerment of the local people. Environmental issue will be highlighted at monthly meetings scheduled at the mine.

15.5. Emergency Incident Reporting

Environmental incident reporting is a vital part of communication at the Leslie 1 Project operation. Employees are required to report any and all environmentally related problems, incidents and pollution, so that the appropriate litigator action can be implemented timeously. In the event of an Environmental Incident, the incident must be reported according to the Incident Reporting Procedure.

An Emergency Incident Preparedness and Response Plan needs to be developed.

16. Information Required by CA

The financial provision will be reviewed annually and submitted to the DMR for review.

17. Oath Undertaking

The EAP herewith confirms:

- The correctness of the information provided in the reports;
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.