

CIG/ENVSOL/22/PROJ/0058

Ndanganeni Colliery Mine Closure Strategy

Annual Rehabilitation

Middelburg, Mpumalanga Province

31 October 2022

Prepared for:

Lian Roos

Of

EcoElementum Pty Ltd



CIG/ENVSOL/22/PROJ/0058

QUALITY MANAGEMENT

| | | | |
|-----------------------|---|---|-------------------|
| Report Title | Ndanganeni Colliery Annual Rehabilitation Report | | |
| Project Number | CIG/ENVSOL/22/PROJ/0058 | | |
| | Draft Report | Final Report | Revision 1 |
| Date | 26 October 2022 | 31 October 2022 | |
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CIG/ENVSOL/22/PROJ/0058

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DECLARATION OF INDEPENDENCE

CIGroup Environmental (Pty) Ltd, as the Environmental Solutions specialists, were appointed to conduct a Mine Closure Strategy according to the new GNR 1147 for Ndanganeni Mine near Middelburg in the Mpumalanga Province. CIGroup Environmental does not have a vested interest in the proposed activity proceedings, will not engage in and have no conflicting interest in the undertaking of the activity. CIGroup Environmental has provided all information at their disposal regarding the Closure Strategy, whether such information is favourable to the Client or not.



Jacques Harris

Operations Manager

CIGroup Environmental (Pty) Ltd

21 October 2022

Date

CIG/ENVSOL/22/PROJ/0058**EXECUTIVE SUMMARY**

The regulations pertaining to financial provision (GN R1147) under the NEMA set out the requirements for an applicant or holder of a right or permit to determine and make financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of prospecting, exploration, mining, or production operations.

GN R1147 now requires an applicant or holder of a right or permit to compile and annually review the following three documents:

1. A final rehabilitation plan;
2. An annual rehabilitation plan; and
3. An environmental risk assessment report.

This report deals with the annual rehabilitation plan and the financial rehabilitation liability of the mine.

The following aspects were considered for the annual rehabilitation plan of the mine:

- Reducing the contaminated footprint of the mine will ensure less pollution to the surrounding environment;
- Improving the storm water management will confine pollution to manageable portions that can be treated; and
- Giving the environment time to settle and improving rehabilitation

The cost for rehabilitating some of the disturbed areas are detailed in the following table:

| Mine Closure Financial Liability | | | | | |
|---|---|-------------|---------------|--|-----------------------|
| Item | Description | Unit | BOQ | Assumptions | Cost |
| | | | Number | | Rand |
| 10 | General surface rehabilitation, including of all denuded areas | | | | |
| | Disturbed Areas | ha | 277.00 | <i>Ripping, Groundcover and Vegetation</i> | R 4 672 504.84 |
| | Ground Discard areas | ha | 41.32 | <i>Ripping, Groundcover and Vegetation</i> | R 2 099 981.95 |
| | Totals | | | | R 6 772 486.79 |

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It is recommended that monitoring (Surface water, Groundwater, Fauna, and Flora) is done annually to determine current and future results compared to the baseline status before closure commence.

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1 Introduction

1.1 Background

Ndanganeni Colliery produces approximately 1.45MT ROM annually and has established export and inland coal markets for its sized coal products. Exports are mainly done by utilising the Maputo Mozambique Corridor and customers that exports from South Africa's Richards Bay Coal Terminal (RBCT).

The current mining area comprises over 3 000 hectares in extent, is located on the Remaining Extent of Portion 11 (a Portion of Portion 9) and Portion 17 of the Remaining Extent of the Farm Kopermyn 435 JS and Portions 1, 3, 4, 5, 6, 7 and the Remaining Extent of the Farm Hartogshof 413 JS, Steve Tshwete Local Municipality, Nkangala District Municipality, Mpumalanga Province of South Africa. The site is located approximately 22 km southeast of Middelburg.

Ndanganeni Colliery is a holder of a mining right granted in terms of section 23 of the Mineral and Petroleum Resources Development Act, 2002 ("MPRDA"), in respect of coal, in, on and under the remaining extent of Portion 11 (a portion of Portion 9), Portion 17 the remaining extent of the Farm Kopermyn 435 JS, Portions 1, 3, 4, 5, 6, 7 and the remaining extent of the Farm Hartogshof 413 JS, in the magisterial district of Middelburg, in the Mpumalanga province under Department of Mineral Resources ("DMR") reference number: MP 30/5/1/2/2/299 MR/ 10134 MR ("Kopermyn Mining Right").

Sumo Colliery SA (Pty) Ltd ("Sumo") previously held a mining licence no. 6/2000 issued in terms of section 9(1) of the Minerals Act on 15 September 2000, in respect of coal on Portion 12 and Portion 20 of the Farm Kopermyn 435 JS, in the magisterial district of Middelburg in the Mpumalanga province, measuring 88, 53 hectares in extent (the "Mining Licence"). Portion 23 was created by a subdivision that took place after the Mining Licence was issued in that, in any event, it forms part of the mining boundary authorised in terms of the Mining Licence, where coal washing activities, amongst others, are conducted.

Ndanganeni Colliery has applied to incorporate Portion 23 and 28 of the Farm Kopermyn 435JS into the Kopermyn Mining Right and Kopermyn EMP by way of amendment in terms section 102 of the MPRDA.

The section 102 EMP amendment in this regard has subsequently been granted on the 20th of May 2019 under the reference number MP 30/5/1/2/3/2/1 (10134) EM.

1.2 Locality

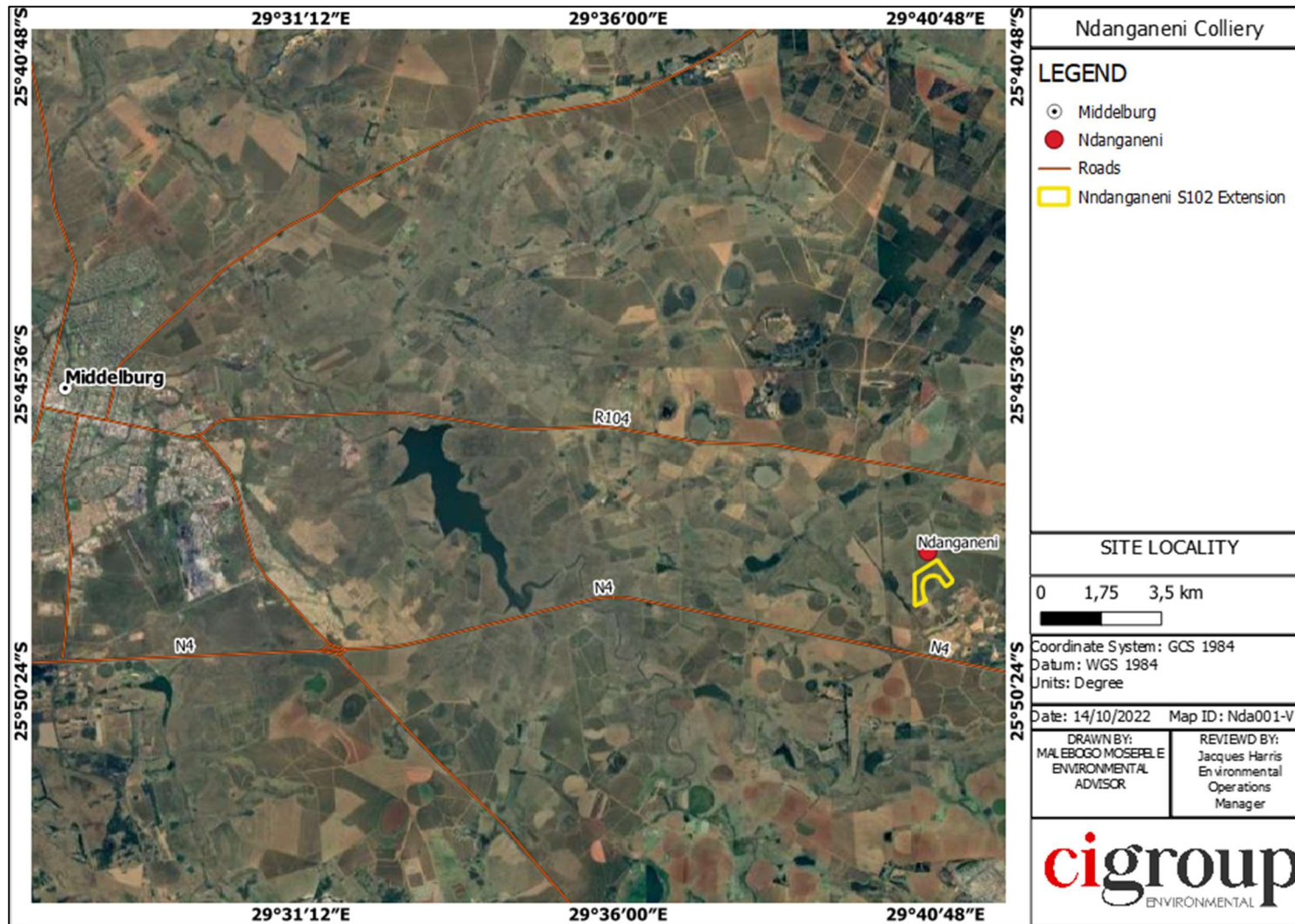


Figure 1.1 Mine Location

1.3 Mine Boundary

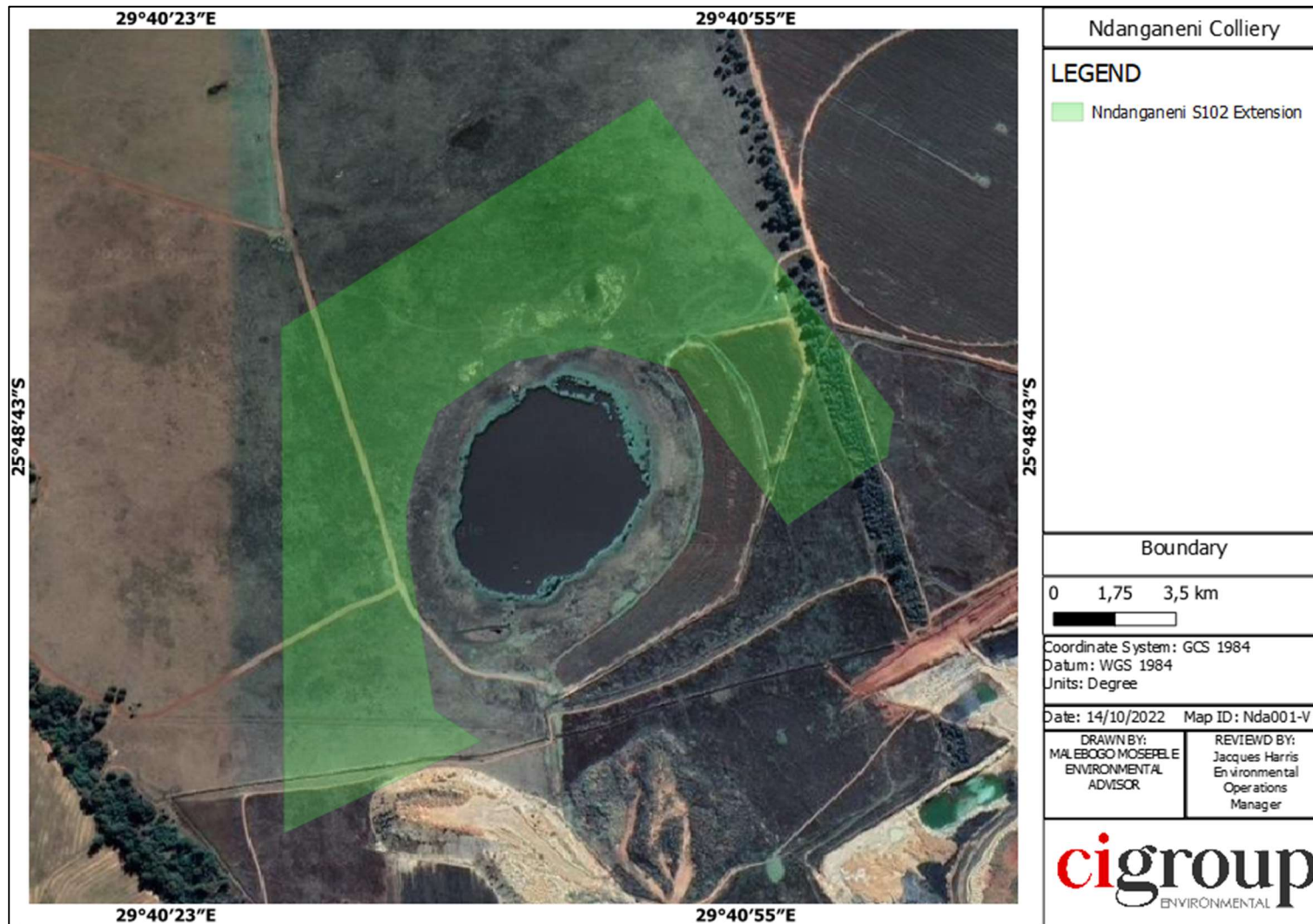


Figure 1.2 Mine Boundary

1.4 General Mine Plan

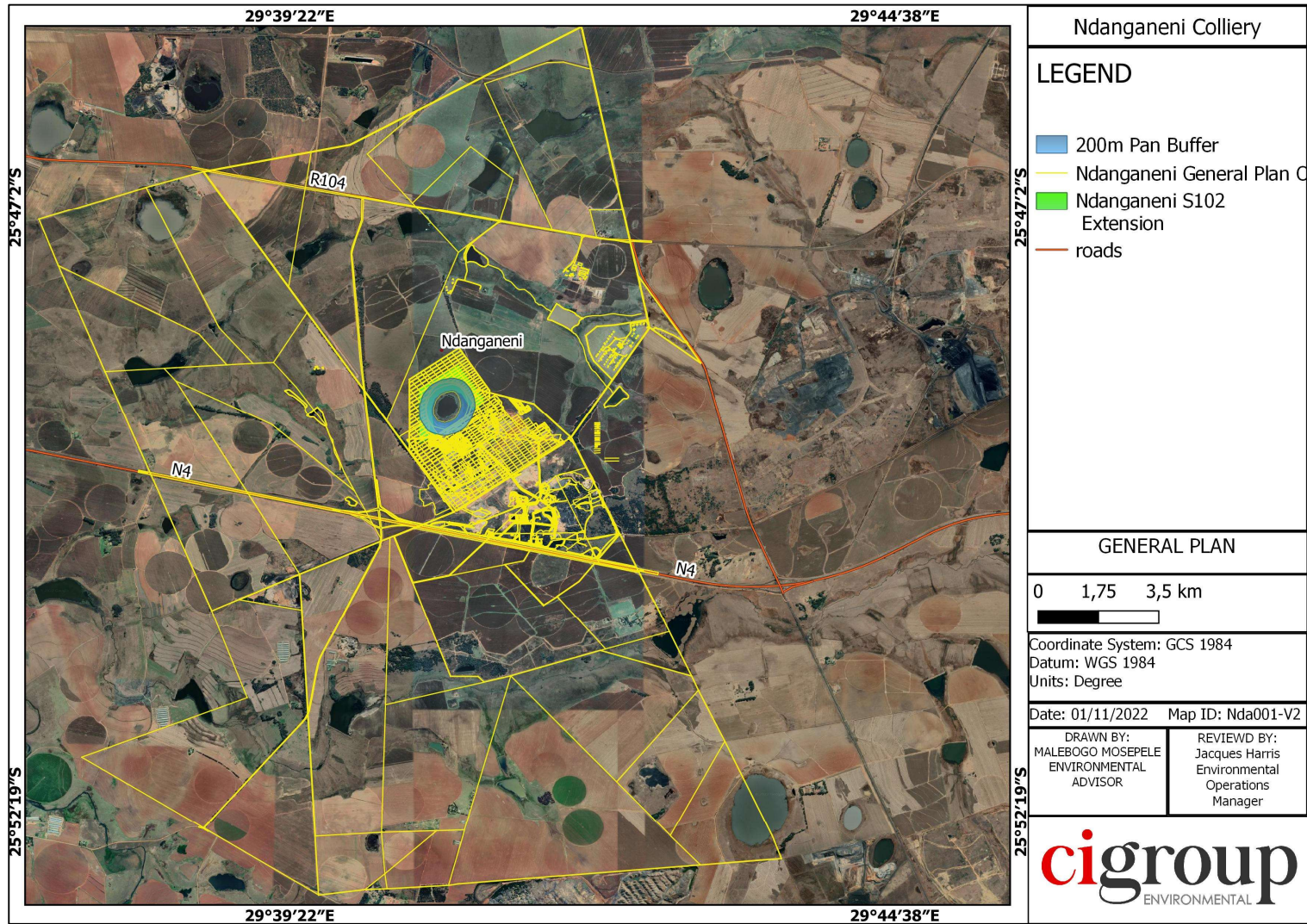


Figure 1.4 General Mine Plan

1.5 Scope of Work

The objective of the annual rehabilitation plan is to:

- review concurrent rehabilitation and remediation activities already implemented;
- establish rehabilitation and remediation goals and outcomes for the forthcoming 12 months, which contribute to the gradual achievement of the post-mining land use, closure vision and objectives identified in the holder's final rehabilitation, decommissioning and mine closure plan;
- establish a plan, schedule, and budget for rehabilitation for the forthcoming 12 months;
- identify and address shortcomings experienced in the preceding 12 months of rehabilitation; and
- evaluate and update the cost of rehabilitation for the 12-month period and for closure, for purposes of supplementing the financial provision guarantee or other financial provision instrument.

1.6 Document requirements

The following sections is required in the document:

- details of the person or persons that prepared the plan;
- the pertinent environmental and project context relating directly to the planned annual rehabilitation and remediation activity;
- results of monitoring of risks identified in the final rehabilitation, decommissioning and mine closure plan with a view to informing rehabilitation and remediation activities;
- an identification of shortcomings experienced in the preceding 12 months;
- details of the planned annual rehabilitation and remediation activities or measures for the forthcoming 12 months, including those which will address the shortcomings of the previous year, or which were identified from monitoring in the preceding 12 months;
- a review of the previous year's annual rehabilitation and remediation activities, indicating a comparison between activities planned in the previous year's annual rehabilitation and remediation plan and actual rehabilitation and remediation implemented; and
- costing.

2 Reference Sections

2.1 Independent Assessor

The details of the specialists responsible for preparing this report are contained in **Table 2.1** below. The CVs of the specialists are contained in **Appendix A**.

Table 2.1: Details of Specialist

| Name | Title | Professional Registrations | Years of Experience |
|----------------|-----------------------------|------------------------------------|---------------------|
| Jacques Harris | Environmental Group Manager | <i>Pri.Sci.Nat</i> (No: 400363/13) | 25 |

Table 2.2 Specialist Experience

| Country | Commodity | Company | Description | Date |
|--------------|-----------|---|---|------------------------------|
| Namibia | Zinc | Scorpion Zinc, NamZinc in association with Vendanta | Closure plan and closure cost assessment | 2016 |
| Malawi | Uranium | Paladin Energy Ltd | Closure strategy, plan, and financial liability | 2018 |
| Botswana | Diamond | GemDiamond | Closure strategy, plan, and financial liability | 2019, 2018, 2017, 2016, 2015 |
| Lesotho | Diamond | GemDiamond | Closure strategy, plan, and financial liability | 2019, 2018, 2017, 2016, 2015 |
| Mozambique | Coal | ENRC | Closure strategy, plan, and financial liability | 2018, 2017 |
| | | Zambezi Coal | Closure strategy, plan, and financial liability | 2018 |
| South Africa | Quartz | Ferroglobe (Samquartz) | Closure strategy, plan, and financial liability | 2019, 2018, 2017, 2016, 2015 |
| | Manganese | Assmang Cato Ridge | Closure strategy, plan, and financial liability | 2019, 2017, 2015, 2013, 2011 |
| | | ARM | Closure of 8 derelict mines and financial liability | 2015 |
| | Vanadium | Vametco | Closure and Rehabilitation Due Diligence | 2019 |
| | Platinum | Rustenburg Platinum Mine | Closure strategy, plan and financial liability Final landform design and water management | 2016 |
| | | Two River Platinum | Closure strategy, plan, and financial liability | 2015 |
| | | Anglo American, Bokoni Mine | Closure strategy, plan, and financial liability | 2016 |
| | | Modikwa Platinum | Closure strategy, plan, and financial liability | 2015 |
| | Gold | Sibanye Gold, Burnstone | Rehabilitation Strategy and Implementation Plan | 2017 |

| | | | | |
|--|--------|--|--|------------------------------|
| | | Sibanye Gold, Driefontein | Rehabilitation Strategy and Implementation Plan | 2017 |
| | | Anglo Gold Ashanti, West Wits | Closure strategy, plan, and financial liability | 2015 |
| | | CRG | Rehabilitation Strategy and Implementation Plan | 2017 |
| | Chrome | DeGrootboom | Rehabilitation Strategy and Implementation Plan | 2017 |
| | | Tharisa Chrome Mine | Rehabilitation Strategy and Implementation Plan | 2017 |
| | | DwarsRivier | Rehabilitation Strategy and Implementation Plan | 2016 |
| | Coal | Kangra, Aasvoelkrans, Balgarthan, Bellengue, Leiden, Longridge, Maquassa East, Maquassa West, Mount Ngwibi, Mpsi, Nooitgesiend, Panbuilt, Rooipunt, Savmore North and South, Taaibosh Spruit, Umgala, Utrecht, Zimbutu | Rehabilitation Strategy and Implementation Plan Water Management closure liability | 2018, 2017 |
| | | Exxaro, Matla, Eloff, Belfast, Eerstelingsfontein. Glisa, Strathrae, Leeuwpan | Rehabilitation Strategy and Implementation Plan | 2018, 2017, 2016, 2015, 2014 |
| | | Exxaro Coal, Forzando, Dorstfontein East, Dorstfontein North, Tumelo | Rehabilitation Strategy and Implementation Plan | 2016, 2015, 2014 |
| | | Exxaro, Steincoalspruit | Full closure certificate | 2015 |
| | | Buffalo Coal | Rehabilitation Strategy and Implementation Plan | 2015, 2014 |
| | | Aviemore, Wesselsnek, Magdalena | | |
| | | Yzermyn | Closure Liability Due Diligence | 2018 |
| | | Somkele | Rehabilitation Strategy and Implementation Plan | 2016 |
| | | ZAC | Rehabilitation Strategy and Implementation Plan | 2016 |

2.2 Legal Context

The General Notification 1147 (GN R1147) under NEMA according to the new legislation now requires an applicant or holder of a right or permit to compile and annually review the following three documents:

- A final rehabilitation plan;
- An annual rehabilitation plan; and
- An environmental risk assessment report.

A full set of legal requirements for closure and rehabilitation is found in **Appendix B** of this documentation.

2.3 Environmental Context

The aim of this section is to provide the status of the biophysical and socioeconomic conditions present in and around the mine. The descriptions have been based on available data on the local environmental settings, as well as on specialist studies that have been completed on the mine.

This section is included in **Appendix C** of this documentation.

3 Risk Assessment

3.1 Risks Identified

The most significant identified during the risk assessment include:

- Extreme Risks
 - People will lose employment which will have a negative impact on families and their communities
 - Safety aspects on the mine, relates to people and animals and the possibility of fatalities.
 - Safety risks around the pit lake areas that could cause casualties of animals and people and possible fatalities
 - Suppliers will lose business which will have a negative impact on local business and on a regional scale.
- High Risks
 - Surface water contamination degrading the water bodies downstream of mine resulting in further rehabilitation and a financial risk.
 - Groundwater contamination increasing as water rebound influencing downstream surface activities and groundwater supplies and resulting in a financial liability
 - Heavy rainfall events causing the erosion of the trenches and berms allowing for polluted water to the enter the environment
 - Extreme drought conditions prohibiting the growth of vegetation and resulting in poor rehabilitation
 - Migration of mine workers after the mine has closed will negatively affect community structures
 - Not able to return quality of soil back to its natural soil quality impacting on the final land-use of the area
 - Wetland system downstream of the mine in danger to be impacted by mine closure reducing the quality of the wetland

- Redesign of the areas around the pits to represent the topography of pre-mining conditions could have a financial impact.

3.2 Latent and Residual Risks

According to the Mineral and Petroleum Resources Development Regulations, 2004 (Published under Government Notice R527 in Government Gazette 26275 of 23 April 2004) (GN R527) latent and residual impacts are defined as follows:

“Latent environmental impact means any environmental impact that may result from natural events or disasters after a closure certificate has been issued” (own emphasis);

and

“Residual environmental impact means the environmental impact remaining after a closure certificate has been issued” (own emphasis).

Latent and residual risks are specifically related to post mining impacts that occur at the site once rehabilitation has been completed.

The residual impacts identified for the Ndanganeni mine as required by NEMA General Notification (GN R1147) are described as follows:

- Loss of employment and loss of revenue for the employees, suppliers and surrounding communities has a social impact on the region;
- Leaving an open void because of the type of mining that took place could pose a safety risk to animals and humans;
- Potential ongoing pollution of surface water resources could affect aquatics and quality downstream of the mine; and
- Potential ongoing pollution of groundwater resources could affect quality downstream of mine.

The possible latent impacts identified for the Ndanganeni mine as required by NEMA General Notification (GN R1147) are described as follows:

- Heavy rainfall (Climate Change) events causing the erosion of the trenches and berms allowing for polluted water to the enter the environment; and
- Extreme drought conditions (Climate Change) can impact the rehabilitation of the mine’s surface areas making it difficult to obtain the final land use.

4 Annual rehabilitation

4.1 Changes from the previous report

From the previous report the large open void has partially been rehabilitated which includes the movement of soil back into the voids. The void surface area has decreased, and the ground disturbance areas have increased. The mine will start with a new mining area, but the author has calculated that only 10% of the total area will constitute a void at the end of the life of mine. The rest of the area will be backfilled as the mine progress to its final closure.

4.2 Monitoring

4.3 Groundwater and Surface Water Localities

Groundwater and surface water sampling localities conducted by EcoElementum are identified in Figure 4.1.

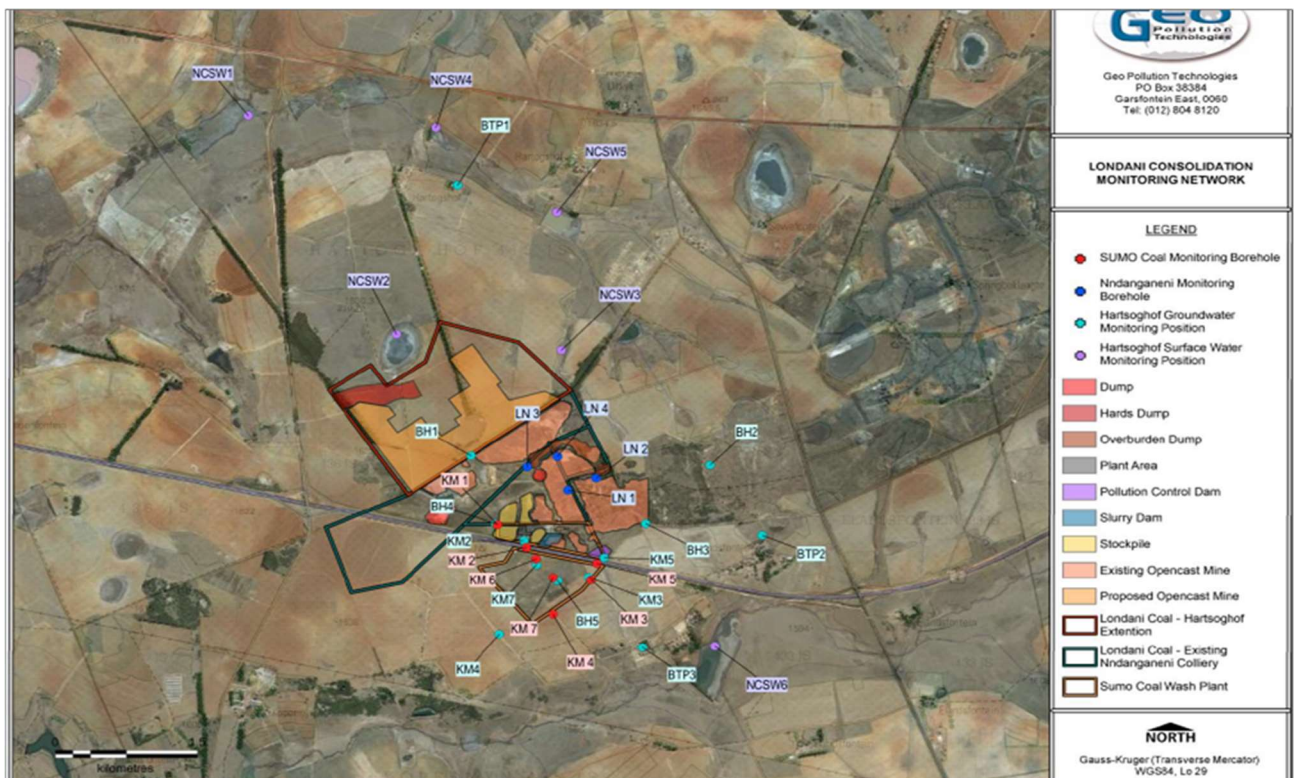
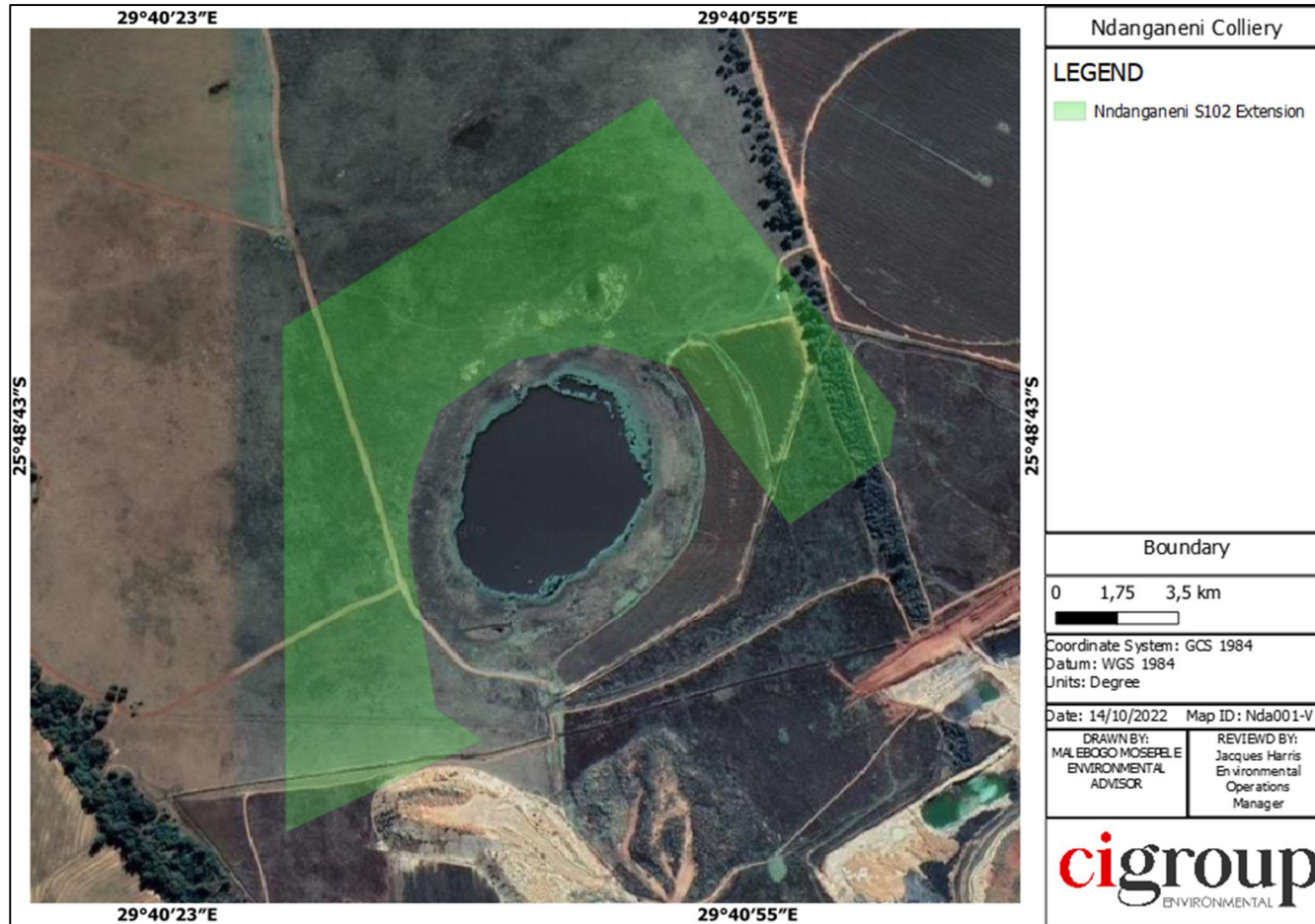


Figure 4.1 Groundwater and surface water sample localities (EcoElementum 2018)

It is recommended that monitoring (Surface water, Groundwater, Fauna, and Flora) is done annually to determine current and future results compared to the baseline status before closure commence.

4.4 Rehabilitation activities

4.4.1 Site characteristics



The site characteristics is included in Figure 4.2:

Figure 4.2 New pit on mine

4.4.2 Rehabilitation options

As part of the risk assessment and monitoring information, the surface area of the site is creating acid mine drainage (low pH water) that could pose a threat to downstream communities. Contributing factors to the low pH water during rain events, include a thick discard at the Ndanganeni Colliery wash plant area and several other areas on site. The discard dump areas also require further rehabilitation and storm water management is required to separate clean water from polluted water.



Figure 4.3 Ground discard areas C3 (Jacques Harris Sketchup 2022)

The aim of the annual rehabilitation on site would be to reduce the polluted area footprint in C3 by introducing the following activities:

- Dose a portion of the ground discard areas behind the wash plant;
- Improve stormwater management around the discard dump area to capture pollution towards the highway; and
- Rehabilitate the discard dump areas by introduce new soil and vegetation to the rehabilitated ground discard areas.



Figure 4.4 Disturbed areas D3 and D4 (Jacques Harris Sketchup 2022)

The aim of the annual rehabilitation on site would be to reduce the vegetate disturbed areas D3 and D4 by introducing the following activities:

- Profile D3 and D4 to obtain final topography;
- Improve stormwater management around the D3 and D4 towards the highway; and
- Rehabilitate the areas by introducing vegetation to the rehabilitated disturbed areas.

4.4.3 Preparation Prior to Rehabilitation

The following aspects related to the rehabilitation and site preparation prior to rehabilitation being initiated apply:

- The rehabilitation plan must be followed unless further studies are required;
- A rehabilitation team must be appointed to oversee and give guidance during the rehabilitation process;
- The rehabilitation team must draw up a specific risk assessment to deal with the rehabilitation processes required for the site;

- A health and safety and environmental officer will guide contractors during the process;
- Ensure that rehabilitation contractors restrict their activities to the areas that need to be rehabilitated; and
- Continuous management and monitoring are required to ensure contractors keep to the rehabilitation plan and schedule.

4.4.4 Landform Redesign and Final Topography

Landform redesign is required to include a final topography that coincides with all the surface drainage areas of the site. The aim of the final landform is to ensure that the topography blends into the surrounding landscape.

Key elements of a successful landform design include:

- The comprehensive characterisation of the properties of soils, overburden, and mineral processing wastes to determine their potential erodibility, capacity to support plant growth and potential to have adverse impacts on water quality;
- The segregation and selective placement of those materials to ensure the creation of a favourable medium for plant growth and the protection of water resources; and
- The incorporation of surface water management into the design.

4.4.5 Drainage

The rehabilitation procedures will be planned and carried out to ensure surface runoff patterns. A key objective of the rehabilitation and closure activities will be to ensure, good soil displacement does not occur, and that re-vegetation is effective and contribute to the reduction in financial liability of the process.

Key rehabilitated processes required include:

- Grading and contouring the disturbed surface area as necessary to reduce erosion potential from surface runoff.

These general procedures may be modified, and more detailed methods specified based on knowledge gained in the planned pre-closure site studies, which will be carried out during the final operating period of the mine.

Elements such as drainage paths and contour drains, will be shaped, as much as practical, to keep with natural landforms of the surrounding environment. Contour and catch drains are designed to collect surface runoff from revegetation or disturbed areas

4.4.6 Remediation of Contaminated Areas

Traditional remediation techniques such as excavation can be used to avert risk from many types of pollutants. Remediation requires environmental and financial mitigation to assist clients during rehabilitation.

Methods used to remediate contaminated areas include:

- All contaminated soil will be identified, excavated, if possible, to at least 200 mm below the contaminated zone and then treated; and
- Removed soils will be managed as determined by the nature and extent of the contamination.

5 Bill of Quantities

Table 5.1 Bill of Quantities (BOQ)

| Components | Length | Perimeter | Area | Volume | Hectares |
|------------------|--------|-----------|---------|---------|----------|
| FILL | | | | | |
| Void (V7) | | 3814 | 126786 | 633 930 | 12.7 |
| Pit Lake (V4) | | 743 | 20 453 | 397 879 | 2.05 |
| Pond/PCD (V8) | | 386 | 9 120 | 45 600 | 0.91 |
| Pond/PCD (V11) | | 148 | 1 465 | 7 325 | 0.15 |
| Dam (V2) | | 295 | 6 501 | 2 935 | 0.65 |
| Dam (V3) | | 415 | 9 294 | 205 673 | 0.93 |
| Dam (V5) | | 604 | 15 648 | 58 746 | 1.56 |
| Dam (V9) | | 621 | 15 639 | 78 195 | 1.56 |
| Dam (V10) | | 171 | 1 352 | 6 760 | 0.14 |
| Void 12 | | 946 | 15 174 | 75 870 | 1.52 |
| New Void V13 | | 420 | 44 177 | 220 883 | 4.42 |
| Void 14 | | 473 | 10 573 | 42 292 | 1.10 |
| Slurry Pond (V6) | | 418 | 9 143 | 72 511 | 0.91 |
| Wetland Pan 1 | | 1 374 | 135 601 | 271 202 | 13.56 |
| Wetland Pan 2 | | 650 | 25 137 | 50 274 | 2.51 |
| | | | | | |
| Heights | | | | | |
| Hards (HD1) | | 592 | 16 096 | 81 811 | 1.61 |
| Hards (HD2) | | 744 | 33 761 | 355 922 | 3.38 |

| | | | | | |
|-------------------------------|-------|-------|---------|---------|-------|
| Hards (HD3) | | 550 | 16 790 | 127 750 | 1.68 |
| Hards (HD4) | | 551 | 17 438 | 52 227 | 1.74 |
| Hards (HD5) | | 1 005 | 36 599 | 441 409 | 3.66 |
| Hards (HD6) | | 474 | 16 085 | 228 511 | 1.61 |
| Hards (HD8) | | 583 | 18 086 | 54 258 | 1.81 |
| Subsoil (SS1) | | 702 | 21 293 | 90 413 | 2.13 |
| Subsoil (SS2) | | 1 044 | 57 760 | 737 017 | 5.78 |
| Subsoil (SS3) | | 600 | 21 030 | 275 276 | 2.10 |
| Subsoil (SS4) | | 991 | 61 453 | 234 455 | 6.15 |
| Subsoil (SS5 + SS6) | | 1 067 | 35 212 | 521 690 | 3.52 |
| Subsoil (SS7) | | 508 | 14 500 | 43 500 | 1.45 |
| Ground Cover/Topsoil (TS1) | | 978 | 60 180 | 275 758 | 6.02 |
| Ground Cover/Topsoil (TS2) | | 590 | 21 317 | 129 180 | 2.13 |
| Ground Cover/Topsoil (TS3) | | 656 | 24 015 | 139 826 | 2.40 |
| Ground Cover/Topsoil (TS4) | | 488 | 17 233 | 88 869 | 1.72 |
| Ground Cover/Topsoil (TS5) | | 484 | 14 651 | 90 027 | 1.47 |
| Ground discard and dumps (C1) | | 1 573 | 53 314 | 53 314 | 5.33 |
| Ground discard and dumps (C2) | | 6 354 | 359 932 | 359 932 | 35.99 |
| | | | | | |
| | | | | | |
| Infrastructure | | | | | |
| Plant Infrastructure 1 | | | 1 732 | | 0.17 |
| Housing Infrastructure 1 | | | 283 | | 0.03 |
| Housing Infrastructure 2 | | | 724 | | 0.07 |
| Weighbridge | | | 96 | | 0.01 |
| Housing Infrastructure 4 | | | 79 | | 0.01 |
| Housing Infrastructure 5 | | | 50 | | 0.01 |
| Housing Infrastructure 6 | | | 92 | | 0.01 |
| Housing Infrastructure 7 | | | 513 | | 0.05 |
| Housing Infrastructure 8 | | | 314 | | 0.03 |
| Housing Infrastructure 9 | | | 62 | | 0.01 |
| Housing Infrastructure 10 | | | 68 | | 0.01 |
| Housing Infrastructure 11 | | | 54 | | 0.01 |
| Roads 1 | 6 040 | | 43 762 | | 4.38 |
| Roads 2 | 822 | | 3 721 | | 0.37 |
| Roads 3 | 1 248 | | 10 039 | | 1.00 |
| Roads 4 | 3 440 | | 21 553 | | 2.16 |
| Roads 5 | 2 744 | | 10 592 | | 1.06 |
| | | | | | |
| Specific areas | | | | | |
| Disturbed area (D1) | | 1630 | 43 886 | | 4.39 |
| Disturbed area (D2) | | 568 | 14 385 | | 1.44 |
| Disturbed area (D3+D4) | | 6 729 | 664 126 | | 66.46 |

| | | | | | |
|-----------------------|--|---------|-----------|--|--------|
| Disturbed area (D5) | | 1 827 | 62 322 | | 6.23 |
| New disturbed area | | 397 589 | 1 987 943 | | 198.79 |
| | | | | | |
| Surface | | | | | |
| Total Surface | | 14 137 | 5 061 094 | | 506.13 |
| General Surface Rehab | | | 2 647 679 | | 264.77 |
| Care and Maintenance | | | 2 413 415 | | 241.34 |

6 CLOSURE COST ASSESSMENT

The Ndanganeni Colliery mining area is currently an operational mining site. The methods and closure costs for each of the possible latent and residual risks identified, as stated in the previous sections, are detailed in the Decommissioning, Closure and Rehabilitation Plan for Ndanganeni Colliery Mining Area as part of the GNR 1147 document.

Table 6.1 Annual rehabilitation cost

| Mine Closure Financial Liability | | | | | |
|----------------------------------|---|------|--------|--|-----------------------|
| Item | Description | Unit | BOQ | Assumptions | Cost |
| | | | Number | | Rand |
| 10 | General surface rehabilitation, including of all denuded areas | | | | |
| | Disturbed Areas | ha | 277.00 | <i>Ripping, Groundcover and Vegetation</i> | R 4 672 504.84 |
| | Ground Discard areas | ha | 41.32 | <i>Ripping, Groundcover and Vegetation</i> | R 2 099 981.95 |
| | | | | | |
| | Totals | | | | R 6 772 486.79 |

7 Conclusion

As this is the first iteration of the Annual Rehabilitation Report that is in line with the GN R1147, there are no Annual Rehabilitation changes to be noted.

As part of the risk assessment and monitoring information, the surface area of the site is creating acid mine drainage (low pH water) that could pose a threat to downstream communities. Contributing factors to the low pH water during rain events, include a thick discard left behind at the Ndanganeni Colliery wash plant area and several other areas on site. The discard dump also requires further rehabilitation and storm water management is required to separate clean water from polluted water.

An estimated value for doing the rehabilitation was calculated to be R 6 772 486.79.

From the previous report the large open void has partially been rehabilitated which includes the movement of soil back into the voids. The void surface area has decreased, and the ground disturbance areas have increased. The mine will start with a new mining area, but the author has calculated that only 10% of the total area will constitute a void at the end of the life of mine. The rest of the area will be backfilled as the mine progress to its final closure.

It is further recommended, and as legally required, that the Annual Rehabilitation Report be annually reviewed and updated as further studies are conducted.

Appendix A: Assessor CV

Jacques Muirhead Harris

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 E-mail: jacques.mharris@gmail.com
 Tel: +(27) 71 684 3414
 LinkedIn: <https://za.linkedin.com/in/jacques-harris-687100>

Summary

I am currently the Environmental Operations Manager (SACNASP 400363/13, IRMSA 53533736, SAIOSH 55514187) for CIGroup, with over 25 years' experience in business management processes. I obtained my experience working as a teacher at Linden High School, at a large international manufacturing facility, Saint-Gobain Abrasives (2360 people in RSA), an international consulting firm, WorleyParsons RSA (1500 in RSA), an African Consulting Firm, GCS Pty Ltd (100 Professionals) and currently at CIGroup South Africa.

Through my career I have managed large teams (30 people) and have been involved through all the processes of business. I have been intrinsically involved in setting up Key Performance Indicator (KPI's), and conducting Employment, Retrenchments, Disciplinarys, and the CCMA processes. I have been part of the EXCOM and MANCOM of companies and was part of the Salary Negotiation Team with the Unions (NUMSA and SAEAWU) at Saint-Gobain.

My experience includes procurement activities in terms of procurement contracts, supplier quality assurance audits, BBEEE compliance, raw material storage and product life cycles and financial risk. I have developed ISO 9001, and ISO 14001 systems and managed the OSHAS 18001 systems. I was responsible for Enterprise Risk Management for Saint-Gobain, Project Risk facilitation for WorleyParsons, financial risk modeling for Quatern and responsible for bid and contract risk management for projects. My RND experience include the development of new products for manufacturing through our laboratory services, developing new applications for products, and optimising applications. Operations management in GCS and WorleyParsons included allocating time for procurement for projects, bidding, and contract management, reporting and quality control, budgeting, time management, stakeholder engagement, Human resources, and Scope management.

In Business Development I have marketed products and service in the Mines and Minerals, Power, Oil and Gas, Manufacturing, Government and Financial sectors in South Africa. I have been a manager for Large Account Management Clients (LAMC) with sales and project budgets of up to R30 million, which include companies such as Exxaro, SolarReserve, Government, Columbus Stainless Steel, Investec etc. My sustainability experience includes Carbon, Water and Ecological footprints and offsets and financial implications working towards the climate change objectives of companies.

As a teacher of mathematics and science, education and training has always been important in my working career. In Saint-Gobain I initiated a 2-year course that became the Centre of Excellence of Management studies for Saint Gobain.

Qualification

1992: BSc. Hons Chemistry
1991: HED. Chemistry and Math's
1990: BSc. Chemistry, Biochemistry

Courses and Certificates

1998: Handling Discipline
1998: Assertive Communication Skills
1998: Hands on Managing of IR
1998: Total Workplace Environment
1998: Successful Selling
1998: Training the Trainer
2001: Business / Technical Writing
2002: OSHAS 18001 Auditing Training
2002: Sales Training
2002: Level 2 – RND
2007: Competition Law
2009: Internal Risk Management
2009: Financial Risk Management
2009: Business Development Planning
2011: ISO 9001:2008 ISO lead auditor
2012: Serious about Zero Harm
2013: Risk facilitator training
2013: Global Reporting initiative
2014: Sustainable Design and SEAL Coordinator
2017: Occupational Health and Safety

Skills

Statistical Control and Assurance
 Research and Development
 Sustainability
 Project Management
 Project Risk Management
 Enterprise Risk Management
 Financial Risk Assessment
 Financial Modelling
 ISO systems (9001, 14001, 45001, 17025, 31001)
 Quality Management
 Health and Safety
 Environmental Management
 Societal Management
 Energy Balance
 Carbon Footprint
 Water Footprint
 Closure and Rehabilitation

Jacques Muirhead Harris

Registrations

- SACNASP Registration, 400363/13, 2013;
- The Institute of Risk Management South Africa IRMSA 53533736
- SAIOSH Membership Number 55514187
- IOCSA, Chartered Consultant, A00107, 2017;
- Environmental Law Association, ELA, 2016/140/GP, 2015; and
- International Association for Impact Assessment South Africa, IAIA, 3985, 2015

Work Summary

2019 – Present: CIGROUP Pty Ltd Environmental Operational Manager

Units: Health and Safety, Environmental Sustainability, Environmental Systems, Environmental Closure and rehabilitation, Risk and Quality.

2018 – 2019: GCS Pty Ltd Group SHERQ Manager Consulting

Units: Health and Safety, Environmental Sustainability, Environmental Systems, Environmental Closure and rehabilitation, Risk and Quality.

2014 – 2018: GCS Pty Ltd Group Environmental Manager

Units: Pre-Authorizations, Environmental Authorization, Water Authorization, Post-Authorization, Environmental Control Management, Sustainability, Ecology, Health and Safety, Environmental Systems, Closure and Rehabilitations, Business Development

2011 – 2014: WorleyParsons RSA Environmental Manager

Units: Environmental and Water Authorizations, Closure and Rehabilitation, Risk Facilitation and Assessment, Financial Risk Modelling.

2009 – 2011: WorleyParsons Senior Project Manager

Environmental, Public and Private Partnership, Risk Management and Financial Risk Projects

2008 - 2009: Quatern Advisory Executive Energy

Unit Manager, Power, Risk Management and Financial Risk Projects

2003 - 2008: Saint-Gobain SHERQ and Sustainability Manager

SHERQ Unit Manager – ISO 9001; ISO 14001, OSHAS 18001, ISO 170125, Enterprise Risk Management; Sustainability GRI reporting for RSA

1999 - 2003: Saint-Gobain RND Manager

Research and Development on Products, Services and Client Development

1995 - 1999: Saint-Gobain Laboratory Manager

RND and Operations Laboratory and Quality Manager

1993 - 1995: Linden High School Teacher

Grade 8 – 12 Math's and Science Teacher

Legislation Experience

MPRDA; NEMA; NEM:AQA; NEM:WA; NRM:BA; NWA; Occupational Health and Safety Act; Mine Health and Safety Act; MFMA; and PFMA

Business Travels

USA (3); UK (2); France (2); Australia (1); Mozambique (1); Namibia (1); and Zambia (1)

System Management Experience

Laboratory Management: ISO 17025

Quality: ISO 9001

Environment: ISO 14001

Health and Safety: ISO 45001

Enterprise Risk Management: ISO 31001

Sustainability: GRI

Project Management: PMBOK

Public and Private Partnerships: PPP

Performance Management.

Computer Literacy

VBA – Good; MS Word – Advanced; MS Excel – Advanced; MS Access – Advanced; MS Project – Advanced; MS Power point – Advanced; Outlook – Good; Eviews – Good; @Risk – advanced; Sketchup – Good; Edraw – Good; and Proman - Advanced

Conference Presentations

2015 – Wits; Environmental Management Systems ISO14001

2015 – Masterclass: Closure liability of mines in South Africa

2016 – IAIA: Closure liability of mines in South Africa

2017 – 8th Annual Construction Risk Conf: Environmental Risk

2018 – GSSA: Climate Change

ACHIEVEMENTS

In 1999 I developed a statistical quality control system that were used until the company closed doors in South Africa. In 2002 I started a Center of Excellence for Management training teaching a total of 125 entrants in becoming supervisors and managers. In 2004 I certified Saint-Gobain in ISO 9001 (SANS accredited) which were held until I left in 2008. In 2006 I obtained a Diamond award for one of 24 best SHERQ facilities from 420 facilities worldwide. I was asked to present the facility and achievements (1million hours without a lost time accident) in Manchester UK. I was the lead in the Risk Assessment Process for St Helena Airport and designed a Disaster Management Plan for an Oil refinery in Vladivostok Russia. Currently I am requested to do a number of presentations on various subjects for the industry.

Jacques Muirhead Harris

I believe that I have the qualification and experience in assisting your company in their future endeavors. I am a hard and dedicated worker loyal to the company I work for (can be seen in the years spent at previous companies). I am focused and precise on the financial and scheduled components of my activities, and work towards satisfying the needs of my clients. Clients are key to the success of any business.

Social

- Project Manager and team member: Study to determine the **socioeconomic benefits of Roads on the economy of South Africa** (RSA Department of Transport (R2mil project))
- Team Member: Chitima **Social Impact Assessment and Resettlement Management Plan** (ERG)
- Team Member: Belfast **Social Impact Assessment, Social and Labor Plan** and Management for Resettlement Implementation.
- Team member: **Social and Labor Plan** for Goeboe salt mine.
- Team member: **Social and Labor Plan** for Chrominet Grrnfields project

Environmental Impact Assessment

- Estima Coal Mine (Mozambique) - Power Plant EIA
- Director: Individual Environment, Waste, Water, Electrical and GIS assessments for **Concentrated Solar Plants** in Humansrus, Rooipunt, Arriesfontein.
- Director: Individual Environment, Water, Electrical and GIS assessments for **Photovoltaic Plants** in Southdrift, Humansrus, Rooipunt, Arriesfontein and Farm 198
- Director: Individual Environment, Waste, Water and GIS assessments for **Anaerobic Plants** in Starke, Bonnievale, Keibees and Butt Farming
- Director: Individual Environmental and Water Assessments for **Biomass Gasification Plants** in Ringkink, Lourensford and J&J Sawmills
- Director: Health and Safety, Environment, Water, Waste and GIS **assessments for an Oil Tank farm** in Saldanha Bay (Equator Principles)
- Director: **Environmental and Waste Assessments** for George Mukari Hospital Extension
- **Environmental Management Plan** for uMdloti Wastewater Treatment works
- **Environmental Feasibility** for the construction of a bypass road at Hazyview
- Director: **EIA** for Subenza substation.
- Project Manage: **EIA** for Witsand Desalination Plant.
- Project Manage: **EIA** for Elliotdale Rural Development.

ISO systems and Accreditations

- **Environmental, Health and Safety and Environmental certification and accreditation**, Saint-Gobain Abrasives South Africa
- **Quality control, assurance management and statistical control for products leaving the facility** for Saint-Gobain Abrasives.
- **Environmental, Health and Safety and Environmental implementation**, Quatern, KV3, WorleyParsons and GCS in RSA
- **Disaster Management, Environmental, Health and Safety Management Plan**, Oil Refinery, Vladivostok, Russia
- **Health and Safety, Carbon foot printing as lead auditor on all Cape Town Wastewater Treatment sites** for NIRAS on behalf of the German development Band (KfW) as lender.
- **ISO 9001** development/implementation for Consulting Engineers for CIGroup

Mine Closure and Rehabilitation

- Paladin Energy – Kayelekera Uranium Mine in Malawi
- Exxaro – NBC GNR 1147 Closure and Rehabilitation for 3 mines
- Kangra – GNR1147 Closure and Rehabilitation process on all 18 mines
- Tharissa – Mine closure, Decommissioning, Closure and Closure Liability
- Bokoni Anglo American - Mine closure, Decommissioning, Closure and Closure Liability
- Dwarsrivier (Assore) - Mine closure, Decommissioning, Closure and Closure Liability
- Gem Diamond (Botswana) - Mine closure, Decommissioning, Closure and Closure Liability
- Ladomode – Mine Closure Assessment
- Sibanye Gold – Driefontein and Burnstone Rehabilitation Strategy and Implementation Action Plan
- Pilansburg Platinium Mine – Mine Closure Design, Rehabilitation and Financial Provision
- Director: Assmang Mangnese Cato Ridge Works Conceptual Closure Plan.
- Director: Cronimet Conceptual Closure Plan and closure Liability Assessment.
- African Rainbow Minerals Limited (ARM) Dormant mines closure liability assessments. Drafted a legal opinion on old order mining rights and liabilities to environmental legislation.

Sustainability

- Project Director to determine the **feasibility of changing gas into electricity** using the Combined Heat and Power Technology for Heritage Hill Development (Project size R256 Million)
- Project Manager Mbombela **Integrated Waste Management Plan**, Municipal Service Plan, and Waste Recycling and Minimisation Plan.
- Gem Diamond (Botswana, Lesotho) – **Energy Balance, Carbon, and Water footprint**
- **Water management for rehabilitation for 18 Kangra mines.**

Corporate

- **Business improvement and Marketing Strategy for Forza Racing** for Quatern Advisory Services.
- **Business risk management Assessment for meridian Wine Merchants** for Quatern Advisory Services.
- **Project Manager to determine the appropriate Tariff for Kouga Municipality** for Quatern Advisory Services.
- **Business risk management plan for Goeboe salt mine in the Northern Cape** for Quatern Advisory Services.
- **Risk Facilitator and Risk Manager** for the Siemens Photovoltaic Plant for WorleyParsons.
- **Risk Facilitator and Risk Manager** for the St Helena Airport for WorleyParsons.
- Assisted the client in conducting a full **Environmental Due Diligence and Risk Assessment** of purchasing an Anglo Mine
- Assisting Duetche Bank KfW with a due diligence on funding for Water treatment works in Cape-Town CIGroup

Public and Private Partnership

- **Broadband Financial Risk Modelling** for the Municipality of Cape Town (8 billion Rand Project)
- Project Manager: Eden District Municipality **Landfill PPP** and Risk Management Processes
- Director: **Environmental and Waste Assessments** for George Mukari Hospital Extension
- Team Member: City of Johannesburg **Waste to Electricity Feasibility Study** – Contributed to the Risk and BEE implications of the study
- Team Member: **PPP Strategy and Policy** for the City of Windhoek. Created **access software** for the purpose of running the system.
- Team Member: **Mbombela Integrated Waste Management Plan** with landfill site transport routes, pickers, and additional facilities

Health and Safety

- Director for **Sanral N17 Upgrade Health and Safety Compliance Officer**
- Director for **SANRAL N2 Umtate upgrade**
- Director for **Compliance Officer for Grahamstown Slope Stability study**
- Director for **the City of Johannesburg Orlando Station Upgrade (H&SCO)**
- Director for **Health and Safety Compliance for KwaZakhele Storm Water and Roads construction**
- Director of **Compliance Officer for Nelson Mandela Bay Stadium Health and Safety Audit**
- Director for **N2 Bridge Construction Health and Safety**
- Director for **Health and Safety Compliance Officer for Kwa Nomzamo sewage plant augmentation**
- Director for **Health and Safety Compliance Officer for Derdepoort 189&190 Township Establishment**
- Director for **Compliance Officer on Goedemoed Correctional Services Health and Safety**
- Assisted companies to develop **Mine Health and Safety Files for mines including Anglo American, African Rainbow Minerals, Exxaro, Kangra, Arcelor Mittal, and Samancor.**
- Developed the **Health and Safety Management system for Goeboe salt mine.**

Engineering

- **Design, development, and operations of a water treatment facility** for Saint-Gobain Abrasives.
- **Development and operations of a Field instrumentation unit to measure power consumption on Abrasives machines** for Saint-Gobain Abrasives.
- **Maintenance and operations of a ovens and furnaces at Isando operation** for Saint-Gobain Abrasives.
- **Bottling plant feasibility for Ensunc at** Quatern advisory services.
- Thubelisha appointed Quatern to provide a **Professional Engineering Audit of Services to verify and quantify installed services, at Delft Symphony, N2 Gateway project, Cape Town.**
- **Pre-feasibility study in generating electricity and heat using gas as a primary source of energy through Micro CHP's** for Quatern Advisory Services
- **Feasibility Assessment for the Visitor Centre for SKA at Carnavon in the Northern Cape SKA** for Quatern advisory services.
- **Assmang Manganese Cato Ridge Work Slag Investigation.** Investigated the use of slag for stabiliser for pipeline
- **Assessment of the contamination of ballast and surrounding areas** for Transnet on South African railway network

Appendix B: Closure legislation

1. Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)

The Constitution of South Africa is the supreme act to which all other acts must speak to. The Constitution sets out the rights for every citizen of South Africa and aims to address past social injustices. With respect to the environment, Section 24 of the constitution states that:

“Everyone has the right:

- a) To an environment that is not harmful to their health or well-being;**
- b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:
 - i. Prevent pollution and ecological degradation;**
 - ii. Promote conservation; and**
 - iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.****

The constitution also establishes the idea of the polluter pays principal - simply that the party responsible for pollution of the environment remains responsible for financial reparations of the impacts from their activities.

2. National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) provides the framework environmental legislation and establishes an integrated environmental management system for South Africa. It aims to prevent pollution and degradation of South Africa’s natural environments while at the same time promoting sustainable economic and social development.

Central to NEMA is the idea of Integrated Environmental Management (IEM). IEM seeks to:

- Promote the integration of the principles of environmental management into the making of all decisions;
- Identify, predict, and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and

alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with section 2 principles; and

- Ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them.

NEMA also enforces the idea of the polluter pays principle as established in the Constitution. Section 28(1) of the NEMA states:

“Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment”.

This is central to the idea of mine closure whereby the holder of a mining permit remains responsible for ensuring the mined area is rehabilitated to a state acceptable to all parties and that is not harmful to people or the surrounding environment.

Section 24P of the NEMA also sets out the requirements for financial provision for remediation of environmental damage while Section 24R of the NEMA speaks specifically to environmental authorization on mine closure. Section 24P (5) states the following:

“The requirement to maintain and retain the financial provision contemplated in this section remains in force notwithstanding the issuing of a closure certificate by the Minister responsible for mineral resources in terms of the Mineral and Petroleum Resources Development Act, 2002 to the holder or owner concerned and the Minister responsible for mineral resources may retain such portion of the financial provision as may be required to rehabilitate the closed mining or prospecting operation in respect of latent, residual or any other environmental impacts, including the pumping of polluted or extraneous water, for a prescribed period. responsible for mineral resources in terms of the Mineral and Petroleum Resources Development Act, 2002 to the holder or owner concerned and the Minister responsible for mineral resources may retain such portion of the financial provision as may be required to rehabilitate the closed mining or prospecting operation in respect of latent, residual or any other environmental impacts, including the pumping of polluted or extraneous water, for a prescribed period” (own emphasis).

Furthermore, Section 24R (1) of the NEMA states:

“Every holder, holder of an old order right and owner of works remain responsible for any environmental liability, pollution or ecological degradation, the pumping and treatment of polluted or extraneous water, the management and sustainable closure thereof notwithstanding the issuing of a closure certificate by the Minister responsible for mineral resources in terms of the Mineral and Petroleum Resources Development Act, 2002, to the holder or owner concerned” (own emphasis).

Important to note here is that the NEMA specifically states that the liabilities associated with mining do not end with the issuing of a closure certificate. This is at odds with the MPRDA as illustrated before. Furthermore, the NEMA carries heavier penalties than the MPRDA for transgressions.

2.1. NEMA 2017 Environmental Impact Assessment (EIA) Regulations GN R326

The Department of Environmental Affairs (DEA) has developed a list of activities which are likely to have an impact on the environment. The list of activities was published in 2014 and were separated into three listing notices (GN R983, GN R984 and GN R985) and were amended by the Department in 2017. The amended list of activities was separated into three listing notices (GN R.324, GN R.325 and GN R327).

Any activity which is listed under these notices requires an environmental assessment to be conducted and approved before the activity can proceed. Activities falling under Listing Notice 1 (GN R327) or Listing Notice 3 (GN R324) require a Basic Assessment (BA) to be conducted while any activity falling under Listing Notice 2 (GN R325) requires a full Scoping and Environmental Impact Assessment (S&EIA) process to be conducted.

With the introduction of the 2014 NEMA EIA Regulations (GN R982), as amended by the 2017 NEMA EIA Regulations (GN R326) on 07 April 2017, mine closure is now a listed activity under GN R983 which requires a BA. The listing detailed in **Error! Reference source not found..**

Table 1.1: Listing Notice GN R327 which triggers a BA.

| Activity Number | Activity Description |
|----------------------------|--|
| Activity 22 under GN R324. | The decommissioning of any activity requiring - <ul style="list-style-type: none"> (i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or (ii) a prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure. but excluding the decommissioning of an activity relating to the secondary processing of a - <ul style="list-style-type: none"> a) mineral resource, including the smelting, beneficiation, reduction, refining, calcining, or gasification of the mineral resource; or b) petroleum resource, including the refining of gas, beneficiation, oil, or petroleum products; - in which case activity 31 in this Notice applies. |

Therefore, any mine that wishes to apply for a closure certificate is now required to conduct a BA and submit this alongside the application for a closure certificate.

2.2. NEMA 2015 Regulations Pertaining to Financial Provision

The NEMA regulations pertaining to financial provision were previously regulated under the MPRDA, however they have since been retracted from the MPRDA and have now been gazetted under the NEMA.

The regulations pertaining to financial provision (GN R1147) under the NEMA set out the requirements for an applicant or holder of a right or permit to determine and make financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of prospecting, exploration, mining, or production operations.

GN R1147 now requires an applicant or holder of a right or permit to compile and annually review the following three documents:

1. A final rehabilitation plan;
2. An annual rehabilitation plan; and
3. An environmental risk assessment report.

The NEMA regulations require that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the plans and report for a period of at least 10 years forthwith. The calculation of these costs needs to be based on real costs and are no longer calculated according to given rates.

The transitional arrangement under regulation 17(4) states that:

“A financial provision approved in terms of the Mineral and Petroleum Resources Development Regulations, 2004 must be regarded to be the financial provision approved in terms of these Regulations, on condition that a holder that operates in terms of a financial provision approved in terms of the Mineral and Petroleum Resources Development Act, 2002 at the time of the coming into operation of these Regulations, must review and align such approved financial provision with the provisions of these Regulations, after the coming into operation of these Regulations, as set out in sub-regulations (5) to (10), and annually thereafter as set out in regulations 9 and 11, read with the necessary changes” (own emphasis).

Therefore, the previous financial provisions for the Ndanganeni Colliery Mine which were approved as per the Mineral and Petroleum Resources Development Regulations (published under Government Notice R527 in Government Gazette 26275 of 23 April 2004) (GN R527), can be approved of in terms of GN R1147 so long as Ndanganeni Mining reviews and aligns the previous financial provisions with GN R1147 and continues to do so on an annual basis.

In terms of the time within which the first review and alignment must take place the transitional arrangement under regulation 17(5) further states that:

“A holder must –

(a) within three months of its financial year end following the coming into effect of these Regulations and annually thereafter; or

(b) within 15 months after the coming into effect of these Regulations and annually thereafter;

ensure that a review, assessment and adjustment of the financial provision is conducted in accordance with regulation 11 of these Regulations, read with the necessary changes, and submit an updated financial provision, including the

plans and report contemplated in regulation 11(1), a copy of the independent auditor's reports and proof of payment or arrangements to provide the financial provision for approval by the Minister responsible for mineral resources, which updated financial provision must be included in—

- i) any audit required in terms of an environmental authorisation issued in terms of the Act; and**
- ii) any amendment of an environmental management programme to be submitted in terms of the Environmental Impact Assessment Regulations, 2014" (own emphasis).**

This document comprises the final rehabilitation plan for the Ndanganeni mine and contains all the required information as per Appendix 4 of the NEMA regulations. This plan should be read in conjunction with the Annual Rehabilitation Plan and the Environmental Risk Assessment Report.

3. Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)

The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) was enacted to make provision for equitable access to and sustainable development of South Africa's mineral and petroleum resources; and to provide for matters connected therewith. The MPRDA recognises that mineral and petroleum resources are non-renewable resources yet are important resources for ensuring the continued economic growth and social upliftment of the people of South Africa. The MPRDA therefore sets out the State's obligation to protect the environment for the benefit of present and future generations, to ensure ecologically sustainable development of mineral and petroleum resources and to promote economic and social development.

As part of the commitments to protect the environment for the benefit of present and future generations and to ensure ecologically sustainable development of mineral and petroleum resources the MPRDA provides that all mining activities need to minimise their impacts on the surrounding environment as much as possible. This includes rehabilitation and mitigation of latent environment impacts of the site post closure of the mine.

Section 43 of the Act enforces the need for every mine to apply for a closure certificate upon completion of the activity. Section 43(1) states that:

"The holder of a prospecting right, mining right, retention permit, mining permit, or previous holder of an old order right or previous owner of works that has

ceased to exist, remains responsible for any environmental liability, pollution, ecological degradation, the pumping and treatment of extraneous water, compliance to the conditions of the environmental authorisation and the management and sustainable closure thereof, until the Minister has issued a closure certificate in terms of this Act to the holder or owner concerned” (own emphasis).

Important to note here is that the MPRDA specifically speaks to the holder of a right or permit. Even if the right or permit has ceased to exist the holder remains responsible for any environmental liability associated with their activities until a closure certificate is granted. As mentioned earlier, this is at odds with the NEMA which states that the liabilities associated with mining activities remain with the holders of the rights or permits notwithstanding the issuing of a closure certificate.

3.1. MPRDA Regulations (GN R537)

The MPRDA Regulations (GN R537 of 23 April 2004) regulate the procedures and criteria for mining related activities as set out in the MPRDA.

The MPRDA Regulations set out the principles for mine closure in Section 56 as follows:

“In accordance with applicable legislative requirements for mine closure, the holder of a prospecting right, mining right, retention permit or mining permit must ensure that -

- a) The closure of a prospecting or mining operation incorporates a process which must start at the commencement of the operation and continue throughout the life of the operation;**
- b) Risks pertaining to environmental impacts must be quantified and managed pro-actively, which includes the gathering of relevant information throughout the life of a prospecting or mining operation;**
- c) The safety and health requirements in terms of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) are complied with;**
- d) Residual and possible latent environmental impacts are identified and quantified;**
- e) The land is rehabilitated, as far as is practicable, to its natural state, or to a predetermined and agreed standard or land use which conforms with the concept of sustainable development; and**
- f) Prospecting or mining operations are closed efficiently and cost effectively”.**

The Regulations also set out the procedure for applying for a closure certificate in Section 57 when a mine reaches its Life of Mine (LoM).

4. Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA)

The Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA) was enacted to provide for the protection of the health and safety of employees and other persons at mines. The Act seeks to promote a culture of safe and healthy work environments in the South African mining sector. The Act further seeks to regulate employers' and employees' duties to identify hazards; to eliminate, control and minimise the risk to health and safety; to entrench the right to refuse to work in dangerous conditions; and to give effect to the public international law obligations of the Republic relating to mining health and safety.

According to Section 2(2) of the act the MHSA applies to the mine until a closure certificate is awarded as per Section 43 of the MPRDA:

“The employer of a mine that is not being worked, but in respect of which a closure certificate in terms of the Minerals and Petroleum Resources and Development Act has not been issued, must take reasonable steps to continuously prevent injuries, ill-health, loss of life or damage of any kind from occurring at or because of the mine”.

This section of the act highlights that the employer of a mine remains liable for any injuries, ill-health, loss of life or damage of any kind occurring at or because of the mine until a mine closure certificate has been awarded. Not only are they liable but they must take reasonable steps to continuously prevent any of these incidents from occurring.

5. National Water Act, 1998 (Act No. 36 of 1998) (NWA)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to ensure the protection and sustainable use of South Africa’s water resources. The three main pillars of the NWA are sustainability, equity, and efficiency. The NWA requires that any activity which might impact on water resources apply for a Section 21 Water Use License (WUL).

The NWA also enforces the idea of the polluter pay principle. Section 19(1) of the NWA states that:

“An owner of land, a person in control of land or a person who occupies or uses the land on which –

- a) any activity or process is or was performed or undertaken; or**
- b) any other situation exists,**

which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing, or recurring.”

Appendix C: Risk Assessment Process

1. Geology

The investigated area falls within the 2628 East Rand 1:250 000 geology series map and is characterised by consolidated sedimentary layers of the Karoo Supergroup. The Karoo Supergroup consists mainly of sandstone, shale and coal beds of the Vryheid Formation of the Ecca Group and is underlain by the Dwyka Formation of the Karoo Supergroup. The Karoo sediments again are underlain at depth by felsitic lavas of the Selons River Formations of the Rooiberg Group. Dolerite intrusions, also previously known as diabase, occur in the form of sills and dykes throughout the area. Deposits of alluvial sand can be found in the low-lying areas around the streams.

The bigger portion of the project area is located within the Witbank Coal Field and a smaller part of project is wither the Ermelo Coal Field. Evander and High Veld Coal fields are located at about 20 km to the southwest of the project area near Bethal. The coal bearing strata are contained within the Vryheid Formation of the Ecca Group. According to historical information, and information collected from the surrounding collieries, it appears that the No.1 coal seam formed in a small, isolated basin in the west (Lemoenfontein Colliery) and a separate larger basin, containing the No. 2 coal seam, in the east. This basin extent and increases to the east and contains the Elandsfontein and Springboklaagte coal reserve, in which Elcoal and Mafube Collieries have been established.

The overburden of the 2 Seam ranges between 7.16 m and 18.66 m with an average of 15.80 m, and the inter-burden between the 2 and 1 Seams ranges from 1.81 m and 11.33 m with an average of 4.48 m.

2. Topography

The topography in the district can be described as gently undulating with slopes lying between 3 and 10°. It is characteristic of the post-African erosion surface back-working into the African surface, which remains preserved in places on the higher lying interfluves. There are wetlands or vleis in the upper part of the valleys and many pans, which vary from insignificant vegetated depressions to large deeply etched features with bare clayey floors, all of which are characteristically present on African surface remnants. Outcropping, resistant sandstone and dolerite ridges flank the flat, marshy valley floors, which also have gentle gradients. The mining area stretches over a wide region and includes various topographical features. Several watersheds, pans, hills, and valleys are incorporated

within the mining area. These topographical features also play a role in how the coal is mined in the region.

3. Climate

Falling in a summer rainfall area, the location is predicted to receive the most precipitation in the summer months of October to March overall. November to January is predicted the highest rainfall months with between 85 mm to 107 mm predicted per month during these months. February, March, and October are predicted to receive 54 mm to 76 mm precipitation. All other months are predicted to receive less than 26 mm precipitation on average during the month.

Wind speed averages around 3.1 m/s. September to December are the windiest months and average wind gust speed ranges between 12 and 14 m/s. Average wind gust speeds for the remainder of the year range between 10 and 12 m/s. Strong winds come predominantly from the northwest and northeast; however, topography does affect wind direction in a specific location. Surface inversions occur during 80% of nights in winter and about 40% of nights in summer to a depth of 100-150 m above the surface. Nocturnal stability regularly occurs close to the ground causing stagnation and slow catabolic drift, particularly in winter. The predominant wind direction is from the northeast.

Precipitation cleanses the air by washing out particles suspended in the atmosphere (Kupchella & Hyland, 1993). It is calculated that precipitation accounts for about 80-90% of the mass of particles removed from the atmosphere (CEPA/FPAC Working Group, 1999). The highest precipitation days are predicted during the months of October to March. During these months precipitation is predicted to only occur 13 to 22 days on average. The rest of the year precipitation is predicted to occur less than 6 days per month.

4. Land Capability

Typical soil forms found in the greater area include:

- The Clovelly soils have very shallow to shallow depth and have an apedal structure. The individual particles are coated with free iron oxides and are associated with a moist regime.
- The Hutton soils have very deep weak structured subsoils that generally exceed 1200 mm and are high potential soils.

- The Lichtenburg soils have varying depth but also have several rock outcrops which have compromised the Land Capability of this unit.
- The Avalon soils generally have moderate depth and are underlain by soft plinthite which denotes the presence of a low permeability horizon in the subsurface.
- The Fernwood soils generally have moderate depth and are found in wetlands and pans. The bleached subsoil horizon and topsoil horizon with variegated colours depicts periods of extended saturation with water.

The wetlands and pans form part of the sensitive landscapes on the property. These should be protected and should be left undisturbed and should not be impacted upon

The current land use includes that of the existing opencast operations at Ndanganeni Colliery except for the wetland and pan areas found on site.

5. Land Use

The study area is characterised by mining activities (to the east), cultivated commercial properties, settlements (mainly south), wetland and waterbodies (south, east, on site and west), grasslands, railway line (northwest), the N4 highway (immediately south), grazing land and other agricultural activities.

6. Biodiversity

6.1. Fauna and Avifauna

Unlike flora, fauna are mobile and additional surveys, including nocturnal visits and camera trapping, would result in the confirmation of additional species. The proximity of agricultural, forestry and mining activities near the site has resulted in a significant decline in larger mammals and birds in the general area.

Three species of conservation-important mammals was confirmed by the Virtual Museum records namely: the Endangered Oribi, Near-threatened Southern African Hedgehog and Near-threatened Serval. These species are likely to occur in the vicinity, but not likely on the proposed mining area, as the site has already been disturbed and heavily modified.

A flock of Greater Flamingos (*Phoenicopterus roseus*) was observed at larger dam (25°48'53"S, 29°40'42"E). The birds seem to be using it as a rest site. Burrows of small mammals (rodents) were also observed at this site. A detailed faunal survey is needed by a faunal specialist/s for further understanding the animal life at the HH study site.

6.2. Flora

The study area is broadly characterised as part of the Grassland Biome. This bioregion consists of 29 vegetation units. Eastern Highveld Grassland is characterised by slightly to moderately undulating plains, including some low hills and pan depressions. The vegetation is short dense grassland dominated by Highveld grasses (*Aristida*, *Digitaria*, *Eragrotis*, *Themeda* and *Tristachya*). The vegetation has small scattered rocky outcrops with sour grasses and some woody species (e.g., *Acacia caffra*, *Celtis africana*). Altitude varies from 1520-1780 masl (above sea level) (Mucina and Rutherford, 2006). The altitude at the HH study site varied from 1626-1641 masl.

7. Water

7.1. Surface water

A catchment area is usually bounded by the topographic water-divide. The catchment area is the whole of the land and water surface area contributing to the discharge at a particular stream or cross section, from which every point on a stream channel has a unique catchment of its own, the size of the catchment increasing as the control point moves downstream, reaching its maximum size when the control is at the seacoast. The study area falls within the B12C quaternary catchment. The three (3) sub basins are the Southern Block (No. 2 Seam), Northern Block (No. 2 Seam) and the Western Block (No. 1 Seam). The total surface area for the opencast is 194.67 hectares.

- Quaternary Catchment Area: B12C
- River name: Olifants River
- Management Unit: Upper Olifants

The site falls on the water divide between the Msili River and an unnamed tributary of the Klein Olifants River. Theoretically run-off which gets generated, would leave the site in the form of sheet flow into a northern non-perennial tributary of the Msili River which is situated directly east of the proposed strip-mining area, and towards southern non-perennial tributaries of the unnamed tributary of the Klein Olifants River. Both these River systems flow into a westerly direction to join the Klein-Olifants River on the Farm Erfdeel 446 JS. According to the previously compiled EMPR document (2006), the northern non-perennial tributary of the Msili River has completely been destroyed by the construction of the N4 highway.

7.2. Wetlands

The locality of the various wetland units identified on site is depicted in Figure 25. Unit 1 (Southern Pan) is earmarked for future mining. The Southern Pan has a PES Class C,

indicating a moderately modified wetland system with a moderate EIS rating. The wetland has definite hydrological functional importance with several natural services still intact. Unit 2 is the hillslope seep wetland system that has a PES Class D, indicating largely modified wetland system with a moderate EIS rating. The wetland has some hydrological functional importance with some natural services still intact.). A Farm dam (used for irrigation) also exists on the south-eastern boundary of the study area. The pan had previously been excavated to create storage capacity to supply raw water for centre pivot irrigation purposes. In addition, a berm was created through the centre of the pan to divide the pan in two halves.

7.3. Ground water

Based on information collected during the 2008 and 2015 hydro census it can be concluded that the aquifer system in the study area can be classified as a "Major Aquifer System", since the local population is dependent on groundwater. The vulnerability, or the tendency or likelihood for contamination to reach a specified position in the groundwater system after introduction at some location above the uppermost aquifer, in terms of the above, is classified as medium. A Groundwater Quality Management Index of 8 was estimated for the study area from the ratings for the Aquifer System Management Classification. According to this estimate a high-level groundwater protection is required for the aquifer.

8. Air Quality

8.1. Vehicle exhaust gases

Vehicle exhausts contain several pollutants including carbon dioxide (CO₂), carbon monoxide (CO), hydrocarbons, oxides of nitrogen (NO_x), sulphur and PM₁₀. Tiny amounts of poisonous trace elements such as lead, cadmium and nickel are also present. The quantity of each pollutant emitted depends upon the type and quantity of fuel used, engine size, speed of the vehicle and abatement equipment fitted. Once emitted, the pollutants are diluted and dispersed in the ambient air. Pollutant concentrations in the air can be measured or modelled and then compared with ambient air quality criteria.

8.2. Veldt fires

Veldt fires are widespread across the world, occurring in autumn, winter, and early spring. In addition to controlled burning for firebreaks and veldt management, many fires are set deliberately for mischievous reasons. Some are accidental, notably those started by motorists throwing cigarettes out of car windows. Emissions from veldt fires are like those generated by coal and wood combustion. Whilst veldt fire smoke primarily impacts visibility and landscape aesthetic quality, it also contributes to the degradation of regional scale air quality. Dry combustible material is consumed first when a fire starts. Surrounding live,

green material is dried by the large amount of heat that is released when there are veld fires, sometimes this material can also burn. The major pollutants from veld burning are particulate matter, carbon monoxide, and volatile organics. Nitrogen oxides are emitted at rates from 1 to 4 g/kg burned, depending on combustion temperatures. Emissions of sulphur oxides are negligible (USEPA, 1996).

8.3. Agricultural activities

Little information is available with respect to the emissions generated due to the growing of crops. The activities responsible for the release of particulates and gasses to atmosphere would however include:

- Particulate emissions generated due to wind erosion from exposed areas;
- Particulate emissions generated due to the mechanical action of equipment used for tilling and harvesting operations;
- Vehicle entrained dust on paved and unpaved road surfaces;
- Gaseous and particulate emissions due to fertilizer treatment; and
- Gaseous emissions due to the application of herbicides and pesticides.

8.4. Current mining activities within the project area

Mining operations like drilling, blasting, hauling, collection, and transportation are the major sources of emissions and air pollution. Coal left in the ground can catch fire, and mine fires are difficult to control, with some burning for decades or even centuries, creating a major source of air pollution. The use of explosives releases carbon monoxide (CO). Dust and coal particles stirred up during the mining process, as well as soot released during coal transport, contributes to emissions and respiratory problems. Various coal mines exist near the Ndanganeni Colliery site.

8.5. Vehicle use of the gravel road transecting the study area

Dust emissions occur when soil is being crushed by a vehicle, because of the soil moisture level being low. Vehicles used on the roads will generate PM-10 emissions throughout the area and they carry soils onto the paved roads which would increase entrainment PM-10 emissions. The quantity of dust emissions from unpaved roads varies linearly with the volume of traffic.

8.6. Power Stations within the area

The coal fired combustion process in power stations produces large quantities of gaseous and solid waste that are mainly released into the air or disposed of in large ash dumps or sludge and slurry ponds. The gaseous emissions contain a potent mixture of pollutants. Various studies have shown these pollutants to have adverse effects through air pollution

(Pope, III et al., 2009; Dominici et al., 2006; Van Horen, 1996). To add fuel to the fire, so to speak, burning coal produces one and a half times the CO₂ emissions of oil combustion and twice the amount of CO₂ emissions from natural gas combustion, while producing the same amount of energy (Epstein et al., 2011). This difference holds true for many other pollutants produced during the electricity generation process. With regards to solid waste, ash dumps have been found to contribute to air pollution, particularly in the form a particulate matter (PM) when fly ash from ash dumps is carried into the atmosphere by the wind.

9. Social Context

Mpumalanga province is the second smallest in size after Gauteng measuring 76 495 km² and covering 6.3% of the land area in the country. This current land area represents a decrease in the land area as the size recorded during census 2001 was 79 487 km². This decrease is attributed to the allocation of land to the City of Tshwane from the Victor Kanye (previously called Delmas) (Statistics SA, 2012).

Mpumalanga province is divided into four (4) district municipalities (DMs) namely Nkangala, Ehlanzeni and Gert Sibande. Nkangala DM covers 16 892km² / 188 118 ha in area and is further composed of six local municipalities namely:

- Steve Tshwete
- Victor Khanye
- Emalahleni
- Emakhazeni
- Thembisile Hani
- Dr J S Moroka

According to the draft Spatial Development Framework (2010), Steve Tshwete local municipality is located within Nkangala DM, and measures 3 976 km² with the municipality office being based in Middelburg. Steve Tshwete is composed of several towns and settlements namely Komati, Blinkpan, Pullen's Hope, Doornkop, Middelburg, Hendrina, Kraanspoort, Koornfontein, Rietkuil, Mhluzi, Kwa Makalane, Lesedi, Kwazamokuhle, Naledi and Presidentsrus.

The town of Pullen's Hope is situated directly to the east of the proposed mine site and is located approximately 40 km south of Middelburg and it is the 4th largest within the municipality. Pullen's Hope is also important because it serves the Hendrina Power Station which is located within its boundaries. Steve Tshwete is in a prime position as it is near the Maputo Development Corridor and the Middelburg/Bethal/Ermelo/Richards Bay

Corridor, and it also hosts the Columbus Steel factory. Additionally, Steve Tshwete is the second most urbanized local municipality at 72.1% after Emalahleni at 86.2% (IDP, 2013-2014).

Appendix D: Declaration of Independence

I, Jacques Harris, declare that –

- I act as the independent external assessor in this assessment;
- I have expertise in conducting Mine Closure Assessments, including knowledge of the Acts, Regulations and any guidelines that have relevance to the permit/license in question;
- I will comply with the Acts, Regulations, and all other applicable legislation;
- I will perform the work relating to the Mine Closure Assessment in an objective manner, even if this results in views and findings that are not favourable to the permit/license holder or site operator;
- I undertake to disclose to the permit/license holder or site operator and the Competent Authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the permit/license by the Competent Authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the Competent Authority, unless access to that information is protected by law, in which case it will be indicated that such information exists and will be provided to the Competent Authority;
- I will perform all obligations as expected from an external assessor in terms of the Regulations; and
- I am aware of what constitutes an offence in terms of the Acts and that a person convicted of an offence in terms of the Acts is liable to the penalties as contemplated in the Acts.

Disclosure of Vested Interest

I do not have and will not have any vested interest (either business, financial, personal, or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations.



Signature of the External Assessor

CIGroup Environmental (Pty) Ltd

Name of Company

31 October 2022

Date

Appendix E: Master Rate declaration (Dymol letter)

