Working Together

Synergistics Environmental Services

Proponent: **COZA MINING (PTY) LTD**

Project: **COZA IRON ORE PROJECT**

Report Name: **ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME**

Volume 1: Main Report
(1 of 4 volumes)

Report Status: **DRAFT**

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Report Number: S0707/DEIR01

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Reviewed by Kerry Fairley

For Submission to: Northern Cape Department of Environment and Nature Conservation (DENC), as part of the EIA in terms of the National Environmental Management Act.

Northern cape Department of Mineral Resources, as part of the EIA in terms of the Minerals and Petroleum Resources Development Act.

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PROJECT INFORMATION SHEET

PROJECT:

COZA IRON ORE PROJECT

REPORT DETAILS

Report Name:	Environmental Impact Assessment Report
Report Number:	S0707/DEIR01
Report Status:	Draft
Revision Number:	00
Date:	24 March 2014

PROPONENT

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EAP Expertise	Environmental Assessment Practitioner, Certified by the Interim Certification Board (CEAPSA). Professional member of the International Association for Impact Assessment (IAIA) 13+ years' environmental management and assessment experience, specifically in the mining and infrastructure development sectors. Environmental Impact Assessment: Project Management**.**

EXECUTIVE SUMMARY

Introduction

COZA Mining (Pty) Ltd is a junior mining company proposing to develop the COZA Iron Ore Project located approximately 10 km north-northwest of Postmasburg Town in the Tsantsabane Local Municipality of the Northern Cape Province. The proposed development is a green-fields project that will involve the mining of iron ore on Farm Doornpan 445 (Portion 1 and 2) (Doornpan) (refer to Figure 1.1 and Figure 1.2).

The proposed COZA Iron Ore Project will involve open pit mining that will be undertaken by means of a truck and shovel operation. Mined ore will be crushed, screened and blended on site prior to being transported for further processing at an offsite location (this area does not form part of this assessment). The processed ore will then be transported via rail to the ArcelorMittal (AMSA) steel refineries.

Synergistics Environmental Services (Pty) Ltd has been appointed to undertake the Scoping and Environmental Impact Assessment (EIA) process required for the COZA Iron Ore Project. The EIA process has been undertaken to inform the following environmental applications:

- **Environmental Authorisation:** For activities listed under the 2010 EIA Regulations of the National Environmental Management Act (No. 107 of 1998) as amended (NEMA).
- **Mining Right:** As required by Section 22 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) as amended (MPRDA).
- **Integrated Water Use License (IWUL) and Integrated Water and Waste Management Plan (IWWMP):** As required in terms of the National Water Act (No 36 of 1998) (NWA).

The purpose of this report is to present the results of the EIA process, which includes a comparative assessment of the positive and negative impacts of the proposed project and identified alternatives, as well as to present the Environmental Management Programme (EMPR), which sets out management measures to mitigate the identified impacts. This report has been compiled in accordance with requirements as contemplated in Section 39 of the MPRDA (now repealed, but still being used in the absence of replacement legislation) and Section 31 of Regulation 534 of the 2010 Environmental Impact Assessment Regulations published under the NEMA.

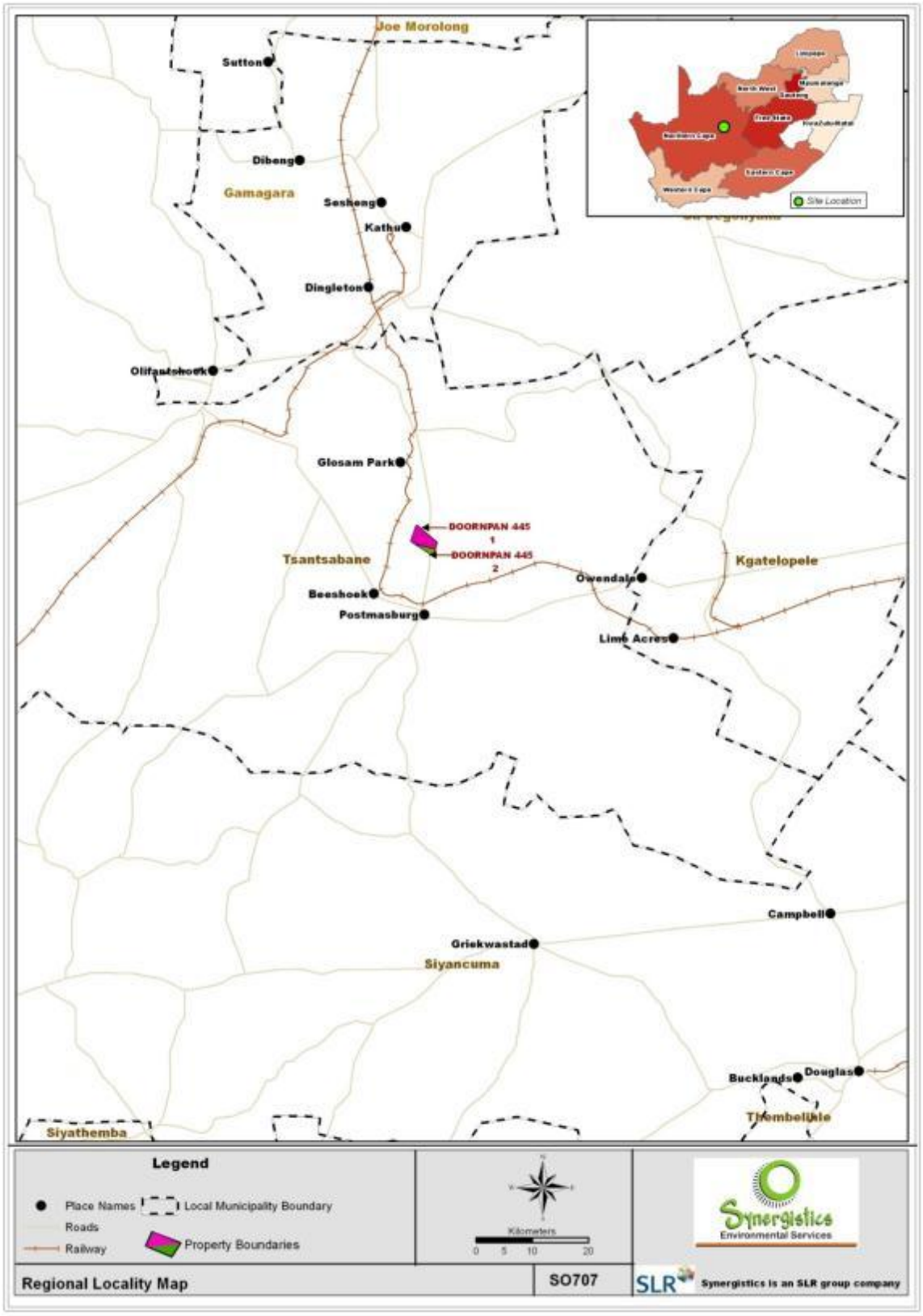

Figure 1.1 Regional Location of the COZA Iron Project

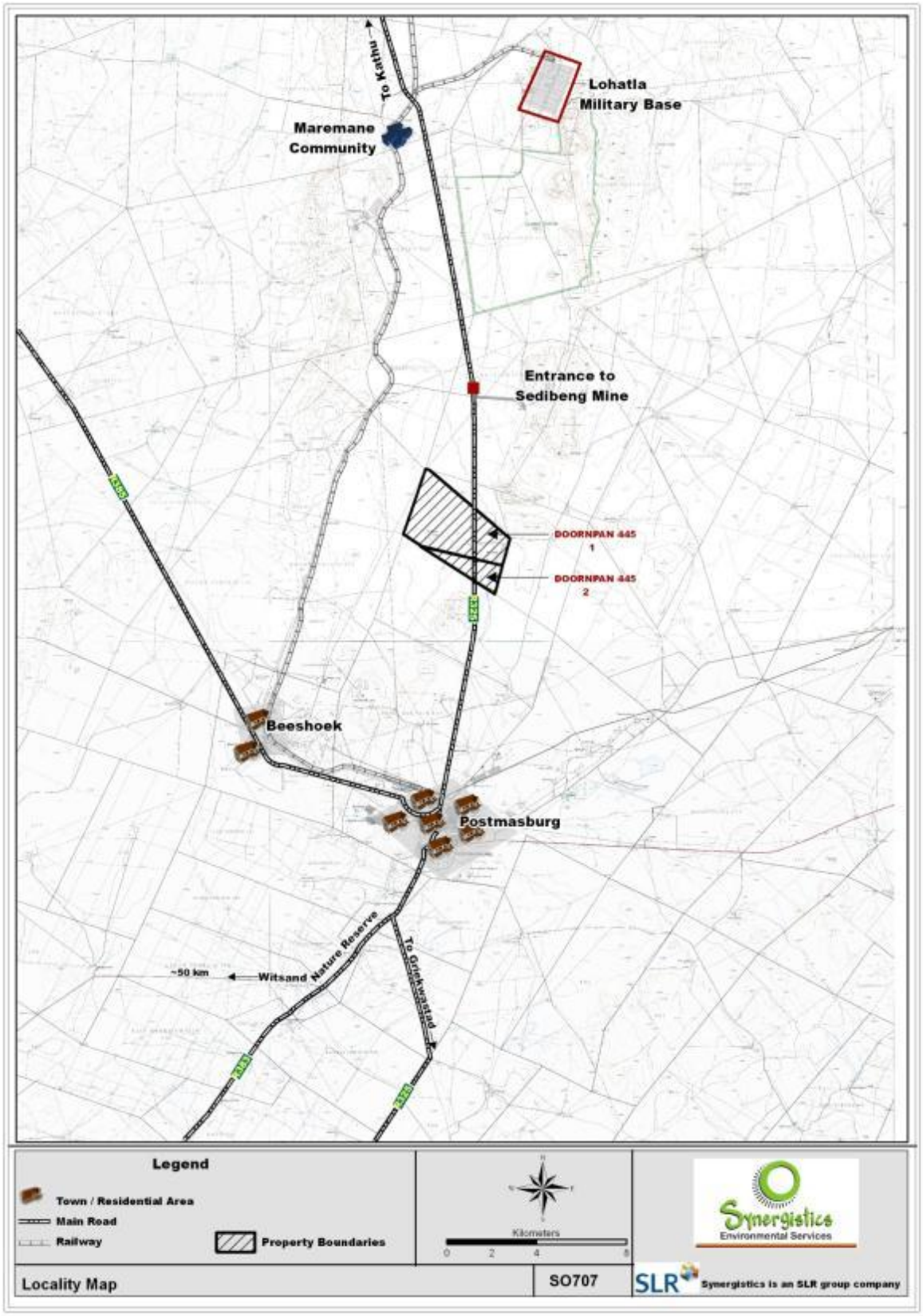

Figure 1.2: Approximate Location of the COZA Iron Ore Project

Project Description

The proposed COZA Iron Project will involve the mining of iron ore from an open pit to be located on Farm Doornpan. The proposed development will be a green-fields project with an estimated area of disturbance of 159 ha. A preliminary layout plan has been developed for the Doornpan mining area (refer to Figure 1.2).

Mining from the pit will be undertaken by means of truck and shovel. It is estimated that the pit will reach an average depth of 80 -100m below surface. Mining will involve the following activities:

- Site clearance which will involve the removal of vegetation within the mine footprint area of approximately 60 ha;
- Removal of available soils and stockpiling at designated areas for rehabilitation purposes;
- Drilling and blasting of overburden material;
- Loading and haulage of overburden to the waste rock dump site within the mine infrastructure areas; and
- Dewatering of the mine by means of dewatering boreholes.

Following a preliminary resource estimation process, it is estimated that 1 .7 million tons of ore is available to be mined at Doornpan.

Processing activities, including crushing, screening, and blending will take place on site in designated areas adjacent to the pit. Crushed ore will then be blended prior to transport off-site where it will be further processed. No tailings facilities will therefore be required at the mine.

The existing gravel access roads linking to the R325 will be upgraded to cater for operational phase traffic. Upgrading activities will include widening and lengthening of gravel roads. In addition, a number of haul roads will be constructed to link the pit, waste rock dump, crushing and screening plant, offices and waste storage facilities.

In order to accommodate fuel requirements during the construction and operational phases of the mine, it has been decided to install two 80 000 litre diesel tanks at the mine.

Water for mining activities will be sourced from pit dewatering activities at the mine. Dewatering will be undertaken by means of dewatering boreholes, which will be drilled around the proposed pit footprint during the construction phase. It is estimated that approximately 220 m^3/day of water will be extracted from the dewatering boreholes throughout the construction and operation phases of the project.

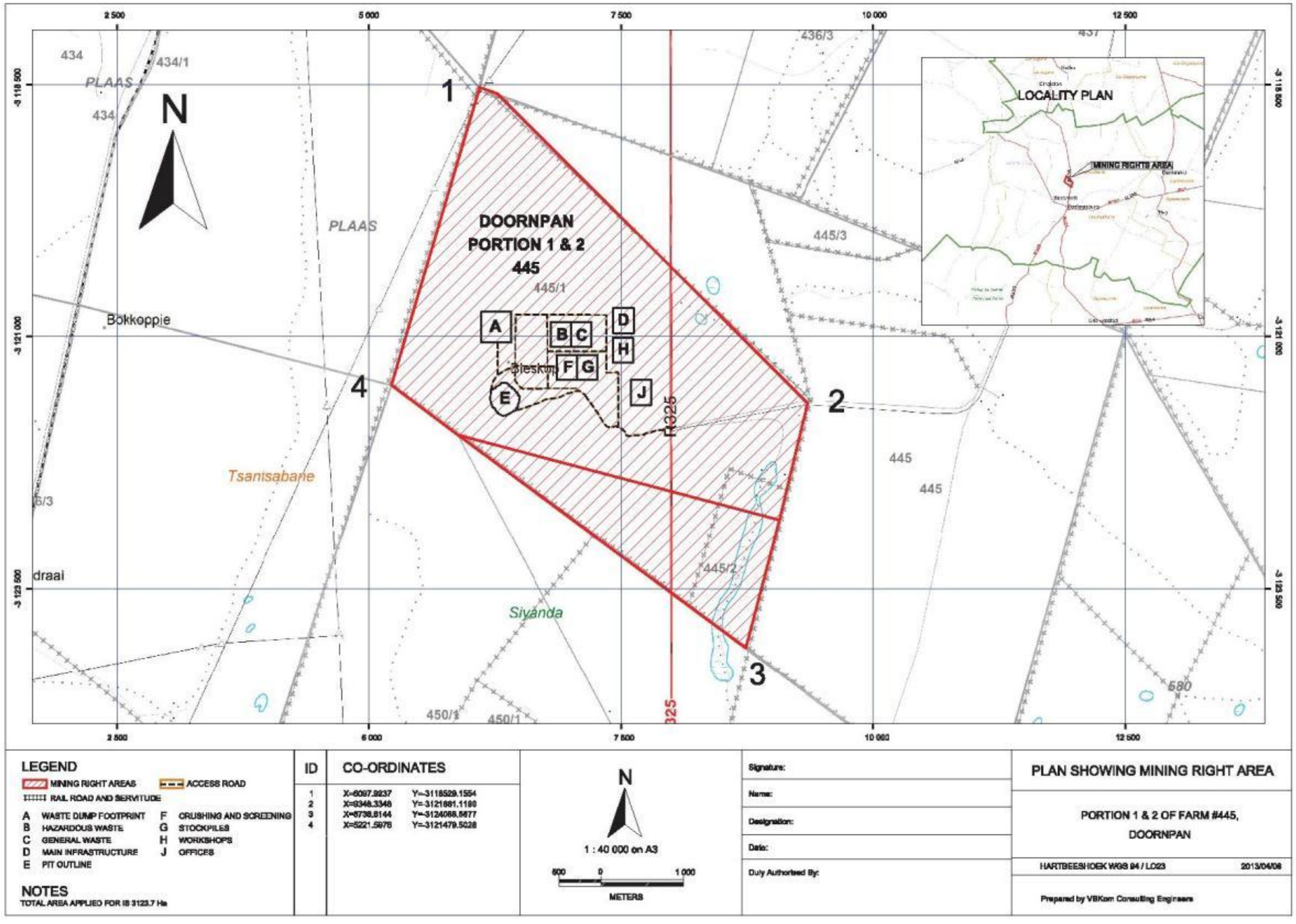

Figure 1.1. Preliminary Mine Layout Plan for the COZA Iron Ore Project

Approach and Methodology

This report has been compiled in accordance with requirements as contemplated in Section 39 of the MPRDA and Section 31 of the 2010 Environmental Impact Assessment Regulations published under the NEMA. The EIA component of the study involved the following key activities:

- Identifying of legislative requirements for the proposed development to ensure compliance through the different phases of the project;
- Establishing a detailed project description in order to understand the likely impacts;
- Undertaking detailed specialist studies (see Table 1.2) to understand the baseline environmental conditions and to inform the EIA on the projects impacts;
- Affording an additional opportunity for IAPs to comment on the proposed development;
- Identifying environmental and social impacts of the proposed development; and
- Assessing the significance of identified impacts in order to advise on the level of management and mitigation required.

The objectives of the EMPR were to

- Identify and list measures to avoid, minimise, manage or mitigate the identified impacts;
- Identify the roles and responsibility for the implementation of management and mitigation measures; and
- Establish the timeframes in which the management measures are to be implemented.
- Feedback.

Table 1.1 presents the Scoping and EIA process followed for the COZA Iron Ore Project as well as opportunities for IAP involvement.

Table 1.1: EIA Process and Opportunities for Involvement

Project Phase	Tasks	Opportunities for Participation by Competent Authorities, I&APs, State Departments and Organs of State	Schedule
SCOPING PROCESS	**Environmental Applications** NEMA	Competent Authority (DENC)	April 2013
	Project Notification Initial Public Participation Authority Kick-off Meeting	Competent authority, I&APs, state department and other organs of state	Late April 2013
	Scoping Process • Baseline Environment • Identification of Alternatives • Specialist Requirements • Collation of comments, issues and concerns	Competent authority, I&APs, state department and other organs of state and I&APS	Mid July 2013 to Late October 2013
	Review of Draft Scoping Report	Competent authority, I&APs, state department and other organs of state	9 July to 9 September 2013
	Review of Final Scoping Report	Competent authority, I&APs, state department and other organs of state	4 to 28 October 2013
	Acceptance of Scoping Report	Competent Authorities (DMR and DENC)	Late November 2013
EIA PROCESS	**Review of Draft EIR and EMPR**	Competent authority, I&APs, state department and other organs of state	End March to Early May 2014
	Feedback Meetings	Competent authority, I&APs, state department and other organs of state	25 and 26 March 2014
	Submission DMR MDEDET	Competent Authority (DMR and DENC)	Mid June 2014
	Review	Competent Authority (DMR and DENC)	July to August 2014
	Decision	Competent Authority (DMR and DENC)	October 2014
	Appeal Process	IAPS	October 2014

Table 1.2: Specialist Studies undertaken as part of the EIA process

Specialist Study (Volume II)	Terms of Reference and Methodology
Floral and Faunal Assessment (Appendix C and D, Volume III)	• Conduct a spring and autumn survey to identify presence of faunal and floral sensitive species. • Provide a description of the dominant fauna and flora species occurring in the area; • Describe floral species composition and structure, and distinguish clearly between areas containing predominantly exotic and predominantly natural vegetation; • Identify and describe endangered, rare or protected species; • Map potential habitat for species (based on relevant databases), with an indication of the relative importance of the specific community in the area under investigation; and • Provide an impact assessment of the proposed operation and recommended mitigation measures.
Air Quality Specialist Study (Appendix E, Volume III)	• Determine the regional climate and site-specific atmospheric dispersion. • Describe legal requirements and standards; • Identify the potential sensitive receptors within the vicinity of the proposed mine extension. • Develop an emission inventory for the proposed mine. • Develop a dispersion model to determine the magnitude and extent of anticipated air quality impacts. • Predict dust fallout and fine particulate (PM10) concentrations; • Define dust nuisance (dust fallout) and potential health impact areas; • Develop of a dust management plan for the mine. • Provide recommendations for air quality monitoring
Surface Water Impact Assessment (Appendix F Volume III)	• Conduct a baseline study to characterise the surface water regime at the proposed development site and the catchments in which it resides in terms of water quality and quantity. • Determine flood hydrology of the area; • Compile a site wide Environmental Water Balance; • Assess the impacts of the proposed development on the receiving surface water environment. • Provide recommendations on mitigation measures to reduce and/or avoid potential surface water impacts.

Specialist Study (Volume II)	Terms of Reference and Methodology
	• Develop a Stormwater Management Plan; and • Recommend monitoring program.
Groundwater Impact Assessment (Appendix G, Volume III)	• Perform a hydro-census of the study area; • Develop a comprehensive environmental groundwater baseline description including an analysis and description of ground water use, current water levels and qualities and aquifer parameters; • Identify and describe anticipated mining and surface activity related groundwater impacts; • Calculate dewatering rates, cones of depression and inflows into the pit areas; • Develop a transport model to determine the dispersion plume; • Identify groundwater management objectives and measures over life of mine; and • Design and compile a comprehensive groundwater monitoring plan in line with existing guidelines.
Soils and Land Capability (Appendix H, Volume III)	• Classify the types and volumes of soils that will be disturbed; • Investigate the suitability of soils for rehabilitation; • Conduct a soil balance to determine the volumes of soil required and available for rehabilitation; and • Develop a soil management plan to allow for stripping, stockpiling and management of soils to promote effective use in rehabilitation.
Economic Impact Assessment (Appendix I, Volume III)	• Base Profiling and Trend Analysis of the study area; • Identification of economic indicators to reflect the state of the market; • Develop and analyse community demographics and profiles at regional level; • Assess the economic benefits of mining vs. agriculture • Estimate value of impacts to the local economy due to project investment; • Model Development and Impact Assessment; and • Develop recommendations and a Mitigation Plan.
Heritage Impact Assessment (Appendix J, Volume III)	• Conduct an aerial photographic survey to identify and map heritage resources in the affected area; • Conduct a physical survey of the area consisting of a walkthrough of the proposed development footprint areas aimed at locating heritage resources falling within and directly adjacent to the proposed development footprint areas; • Map all heritage resources in the affected area;

Specialist Study (Volume II)	Terms of Reference and Methodology
	• Assess the significance of such resources using heritage assessment criteria; • Assess the impact of the development of such heritage resources; • Consider and assess alternatives in the event that heritage resources will be adversely affected by the proposed development; and • Propose mitigation of any adverse effects during and after the completion of the proposed development.
Social Impact Assessment ((Appendix K, Volume III)	• Review existing social documentation; • Establish local social baseline at a local level; • Determine the project's social impacts; • Identify opportunities for social development; and • Identify methods for future consultation with the surrounding communities.
Traffic Impact Assessment (Appendix L, Volume III)	• Determine baseline traffic conditions; • Conduct traffic counts; • Determination of trip generation, distribution and assignment due to mining operation; • Intersection and access analysis; • Safety assessment, including safe sight distances and pedestrian safety as well as the railway crossing; • Impact of the proposed project on existing road pavements and traffic conditions; and • Development of recommendations & Mitigation Plan.
Visual Impact Assessment (Appendix M, Volume III)	• Conduct a viewshed analysis for the study area and its surrounds; • Identify sensitive receptors for the different visual intrusions; and • Identify management and mitigation measures for identified visual impacts.

Public Issues and Concerns

A summary of the key issues and concerns raised and response given is provided in Table 1.3 below.

Table 1.3: Results of Consultation with IAPs and Authorities.

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
Authority Requirements	15 May 2013	Ms Jacoline Mans Department of Agriculture, Forestry and Fisheries	Tel: 054 334 0030 Email: JaolineMans@daff.gov.za	• The BID stated that the affected areas of the proposed open pit iron ore and associated infrastructure will be approximately 25 hectares on the farm Doornpan and 80 ha on farm Driehoekspan. Since vegetation clearance will be required, you may need a Forest Act Licence (from DAFF) and a Flora Permit (from Nature Conservation)	• Applications will be submitted to the relevant authorities for the removal of protected plant and tress species.
				• The BID listed the most important environmental legislation applicable to the project. The Northern Cape Nature Conservation Act (Act 9 of 2009) (NCNCA should also be consulted	• The act has been considered and applications for the removal of protected plants will be submitted prior to removal.
				• Kindly supply this office with copies of the relevant documental for comments, especially the specialist biodiversity. /ecological assessment and EMPR (once available). Please note that the office cannot download such documentation	• A CD copy of the EIA and EMPR report together with specialist studies will be submitted to the Department

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
				from the internet and it should be provided on a CD or in hardcopy format • Please ensure that the anticipated impacts on protected trees are assessed and try to design the mine in such a manner as to minimise the impact (if any) on such slow growing tree species. Where impacts cannot be avoided, appropriate mitigation may be required.	• Impacts on flora were assessed and are presented in Section. 8.6
Registration as an Interested and Affected Party	20 May 2013	Mr. S.E Fiff Transnet Limited	P O Box 17308, Bainsvlei 9338 Tel: (051) 408 2565	• Requested to be registered as an IAP	• Mr Fiff has been registered in the IAP database, Refer to Appendix A
	22 May 2013	Mr Tumisang Tugane Afribits	Tel: 079 874 0504 Email: infor@afribits.co.za	• Requested to be registered as an IAP	• Mr Tugane has been registered in the IAP database, Refer to Appendix A

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
	24 June 2013	Mrs Alretha Erasmus Postmasburg Landbou Unie	Tel: 053 313 1333 Email: jimbosalretha@gmail.com	• Requested to be registered as an IAP	• Mrs Erasmus has been registered in the IAP database, Refer to Appendix A
Community Benefits and Upliftment	23 May 2013	Graig Katz	10 Jakaranda Lane, Postdene, Postmasburg, 8420 Cell: 073 258 9846 Email: gregorygraig101@gmail.com	• Asked how the community will benefit from the project in terms of employment. • Asked how the project will be able to decrease the high unemployment.	• The proposed development will require approximately 150 during construction and 86 employees during the operational phase. COZA Mining will endeavour to employ local persons as much as possible but this will be dependent on the type of skills required and availability of required skills locally. • It should also be noted that as part of the mining right application, COZA Mining will be required to prepare a Social and Labour Plan which details a plan for socio-economic Upliftment for the area hosting the COZA Iron Ore Project. The details of the plan are still being developed in consultation with the relevant authorities and community representatives.

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
	23 May 2013	Rowena Jacobs	14 Jakaranda Lane, Postdene, Postmasburg, 8420 Cell: 079 146 9083	• Requested that they be kept up to date with the project and asked how the community will benefit from the project.	• IAPs registered on the IAP database will receive project communication information throughout the EIA process. As part of the mining right application, COZA Mining will be required to prepare a Social and Labour Plan which details a plan for socio-economic Upliftment for area hosting the COZA Iron Ore Project. The details of the plan are still being developed in consultation with the relevant authorities and community representatives.
	23 May 2013	Mr Boniface Masiame	Maremane Community P O Box 688 Postmasburg, 8420 072 830 4739	• Asked if any people from the communities are required for the process in terms of labour (specialist studies).	• Specialist studies are done by qualified specialists who go to site to scope the area to gather data. They are usually only there for approximately 1 day. The specialist work does not require labour as they do the work themselves. As such, specialist studies do not provide opportunities to the people from the community in terms of labour.
	23 May 2013	Itumeleng Moss	23 J.P Ketuiles Postmasburg, Boischoko, 073 435 6332	• Enquired as to how the project and mining will benefit local communities.	• A Social and Labour Plan will be developed for the mine which will identify local economic development projects that with benefit the host community.
	23 May	Mr Ephraim	Maremane Community	• Questioned whether the people from the	• The resource at Driehoekspan and

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	2013	Sibanda	P O Box 688 Postmasburg, 8420	Maremane Community would benefit in terms of employment if the processing will be undertaken elsewhere. He indicated that he believes processing creates more employment opportunities than mining.	Doornpan does not warrant the location of a processing plant within the mine areas. There is another area of interest for COZA that may have sufficient resource to support a processing plant. In terms of job opportunities, COZA's Social and Labour Plan (SLP) would have to consider the people at the three mining areas i.e. Driehoekspan, Doornpan and the other area of interest.
	23 May 2013	Lebogang Kunere	Maremane Community P O Box 688 Postmasburg, 8420 076 327 8305	• Asked what would be done for the community once they start to mine and they gain profit. He indicated that the community needs to get an idea of what benefits they will receive from the project.	• A draft social and labour plan detailing the social benefits is currently under review with the DRM. The local economic development initiatives will be done in collaboration with the local municipality. These projects are being currently being prepared and will be presented to the affected communities once available.
	23 May 2013	Mathapelo Kgotlaekae	Maremane Community P O Box 688 Postmasburg, 8420 076 346 6498	• Indicated that the community is fearful that once COZA is granted a mining right, there will be no benefits for the community. • Requested that the community must be consulted when preparing the SLP	• The SLP is still being finalised. This document will present the plans for community involvement. These will be communicated with the community once the plans have been drafted • The community will be approached once draft LED projects have been determined.
	5 June 2013	Mr Brandon Adams	Tel: (053) 313 3172 Email:	• When projects of this magnitude are undertaken, the locals are generally	• COZA are fully committed to implementing development plans and

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
			adamsbrandon49@gmail.com	excluded to participate in the development and wealth of their minerals mined. Lack of excess to this wealth creation opportunity is hampered by "red tape" rules and regulations, that make it impossible to participate and once the investors are making their riches, they vanish and left the local residents high & dry.	projects that will facilitate local community and rural development as part of their Social and Labour Plan (SLP). However, the project is still in its initial stages and COZA are still formulating their SLP. At this stage no specific information can be provided on the different community development initiatives that will be implemented by COZA. The projects are currently being reviewed by the DMR and will be drafted in collaboration with the municipality. The community will be made aware of the proposed LED projects.
Future Prospecting	23 May 2013	Islay Jane Sparks of Kumba Iron Ore's Kolumela Mine	PO Box 1420, Postmasburg, 8420 Cell: 081 038 2368 Email: islay-jane-sparks@ angloamerican.com	• Asked how much the mine will produce . • Enquired about the possibility for further expansion and whether exploration is still continuing.	• The mine will produce approximately 430 000 million tons per annum during the operational phase. • There are opportunities for further expansion. COZA is currently working on their resource estimation. There are also other areas of mining interest for COZA Mining in the Northern Cape.
Community Con	23 May 2013	Itumeleng Moss	23 J.P Ketuiles Postmasburg, Boischoko,	• Also queried whether the municipality was consulted	• Invitations were sent to the Municipal Mayor, Manager and Environmental

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			073 435 6332		Manager as well as the local Economic Development Officer. The ward councillor, who was also consulted, responded and requested Synergistics to also hold a meeting with the Maremane community
	23 May 2013	Mr Boniface Masiame	Maremane Community P O Box 688 Postmasburg, 8420 072 830 4739	• Raised the issue that the information of the meeting was not appropriately marketed toward the Maremane Community.	• The community were identified through the distribution of BIDs. Synergistics also consulted Mpho, the ward councillor, and Joseph, who are representatives of the Maremane community. The Maremane community said they knew of the Postmasburg meeting but it was too far, thus another meeting was organised for them at the Maremane Community Hall. • It would be appreciated if the community would advise Synergistics on how best to involve communities.
Community Consultation	23 May 2013	Mr Boniface Masiame	Maremane Community P O Box 688 Postmasburg, 8420 072 830 4739	• Asked if the Department of Rural Development and Land Reform (RDLR). Was consulted as they were key in the Maremane Community land claim process	• Regarding the department of Rural Development and Land Reform, the Department has been notified of the project, received BIDs and have been notified of the EIA process. The Department of Mineral Resources (DMR), in their report, also wants to find out if the Department of RDLR has been consulted.

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
				• Indicated that there are people that are not in the area but who at a later stage will be relocated to the land and will be affected by this development. He asked how these people would be accommodated.	• It will be appreciated if the community would advise us of the various community leaders that should the registered in the IAP database. The identified representatives will be informed of the project developments and the in turn they can report back to the other members of the Maremane Community.
				• Raised the issue that some of the people from the Maremane Community are from the Kuruman area and this meeting and the project is very far from Kuruman. As such the people will not know what is happening	• It would not be possible to have meetings with people from all over the area like Kuruman. We are dealing with people that are most likely to be directly impacted by the project. People from Kuruman are not being excluded however, it would be ideal to have leaders of the various communities to come to the scheduled meetings.
				• Asked whether meetings can be held in Kuruman	• Kuruman is too far for the people from Maremane and Kuruman is not an area that will be directly affected by the project. The ideal option would for the leaders of the Kuruman communities to come to the Maremane meetings and give feedback to the people of the community.
					• People who register will be kept

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
				• Raised a concern that Maremane community members from Kuruman are being excluded from the public participation process and problems may arise if people come to Maremane from Kuruman.	informed throughout the process. Synergistics would like the leaders to get involved to inform the other communities.
	23 May 2013	Hilda Sibanda Maremane Community Member	Maremane Community P O Box 688 Postmasburg, 8420 071 979 5017	• Indicated that she is reluctant to believe independent environmental consultants. She indicated that the community was previously consulted by independent consultants for the Sedibeng Mine, however they were not notified when the mine started. She indicated that they community was fearful that the same process would occur with the COZA project. • Asked why the application to the Northern Department of Environment and Nature Conservation was submitted before consultation with communities?	• As consultants Synergistics are bound by law to notify IAPs of authority decisions in terms of the National Environmental Management Act (No 107 of 1998) (NEMA). As such the Maremane community will be notified via post or sms. She indicated that members of the community will be kept informed of progress throughout the EIA process. She explained that the Public Participation Process (PPP) allows for the involvement of communities • The NEMA application was submitted as it was required by law. She advised that the application serves to notify the Department of the intention to commence with the EIA process

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	23 May 2013	Mathapelo Kgotlaekae	Maremane Community P O Box 688 Postmasburg, 8420 076 346 6498	• Indicated that the Maremane Community are sceptical that Synergistics will return to meet with the community	• There will be a feedback meeting, where Synergistics presents the findings of the EIA. She indicated that the community would also be notified of the availability of the environment reports for review as well as the authority decisions.
	5 June 2013	Mr Brandon Adams	Tel: (053) 313 3172 Email: adamsbrandon49@gmail.com	• An information sharing meeting was held on 23 May 2013, however no prior notice was given to Interested and Affected parties. The meeting should have been communicated in the local newspaper (The Ghaap, Diamond Field Advertiser.	• The information sharing meeting was advertised in the Kalahari Bulletin and Kathu Gazette. These newspapers circulate in the study area and its surroundings. Please refer to Section 3.5 on the IAP notification process.
Mine Cumulative Impacts	23 May 2013	Mimi Swart	P O Box 777, Postmasburg, 8420 083 292 2540 Swami5353@gmail.com	• Raised a concern regarding the prominence of mining in the area and the many problems that are not being appropriately dealt with. Indicated that there are problems related to groundwater and dust due to mining in the area. She raised a concern regarding the potential cumulative impacts of the mining in the area.	• The cumulative impacts for the project are assessed in Section 8 of the report.

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Project's Environmental Impacts	5 June 2013	Mr Brandon Adams	Tel: (053) 313 3172 Email: adamsbrandon49@gmail.com	• Pollution will affect all communities around the operations, what remedies will be available to alleviate this	• An environmental impact assessment has been undertaken and the impacts are presented in Section 8 and 9 of the report.
Project Phasing	23 May 2013	Mimi Swart	P O Box 777, Postmasburg, 8420 083 292 2540 Swami5353@gmail.com	• Asked what stage the process is at currently.	• The process is at its initial phase the scoping phase where consultation with IAPs takes place, potential issues are identified and terms of reference for specialist studies are developed.
Project Location	23 May 2013	Alfred Pegram	Private Bag X5005, Kimberley, 8300 apegram@ncpg.gov.za	• Asked how far the project will be from Portion 3 of the Farm 445.	• The mining area will be approximately 3 km from Portion 3 of the Farm 445.
Prospecting Activities	23 May 2013	Mr Boniface Masiame	Maremane Community P O Box 688 Postmasburg, 8420 072 830 4739	• Referring to a DMR document from 2010, the IAP asked about the prospecting and mining right and why COZA are not mining in all the areas.	• COZA were granted prospecting rights for various farms but only plan to mine on the Portion 1 of Doornpan and Remaining Extent of Driehoekspan at this stage.

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	23 May 2013	Lebogang Kunere	Maremane Community P O Box 688 Postmasburg, 8420 076 327 8305	• Queried if there would be a survey of the resource before mining commences. • Enquired what income was received from prospecting and where was the money spent	• Prospecting activities have already been undertaken for the project and the project team is currently at the resource estimation process. • No money was obtained from prospecting
Information on Applicant	23 May 2013	Mr Ephraim Sibanda	Maremane Community P O Box 688 Postmasburg, 8420	• Requested an organogram for COZA Mining.	• COZA Mining is still a new company and an organogram is not yet available. The community should liaise with Synergistics and the project manager Mr Tabi Kowet.
Application Process	23 May 2013	Mr Ephraim Sibanda	Maremane Community P O Box 688 Postmasburg, 8420	• Queried if COZA Mining has a mining licence.	• COZA does not have a mining right but have a prospecting right. The current EIA process is undertaken to apply for a mining right. The mining right application will be submitted at the end of June 2013.
Review of Draft Scoping Report	9 July 2013	Mr Jim Bredenkamp	P O Box 112, Postmasburg, 8420 053 313 1333 jim@jimbos.co.za	• Requested the electronic copy of the report in CD-ROM	• A copy of the report was posted on 15 July 2013.

Impact Assessment

The significance of the impact is dependent on the consequence and the probability that the impact will occur.

impact significance = consequence x probability

Where:

consequence = (severity + extent)/2

and

severity = [intensity + frequency + duration)]/3

Each criterion is given a score from 1 to 5 based (see below).

Table 1.4: Criteria for Assessing the Impact Significance

SEVERITY CRITERIA

INTENSITY = MAGNITUDE OF IMPACT	RATING
Insignificant: impact is of a very low magnitude	1
Low: impact is of low magnitude	2
Medium: impact is of medium magnitude	3
High: impact is of high magnitude	4
Very high: impact is of highest order possible	5

FREQUENCY = HOW OFTEN THE IMPACT OCCURS	RATING
Seldom: impact occurs once or twice	1
Occasional: impact occurs every now and then	2
Regular: impact is intermittent but does not occur often	3
Often: impact is intermittent but occurs often	4
Continuous: the impact occurs all the time	5

DURATION = HOW LONG THE IMPACT LASTS	RATING
Very short-term: impact lasts for a very short time (less than a month)	1
Short-term: impact lasts for a short time (months but less than a year)	2
Medium-term: impact lasts for the for more than a year but less than the life of operation.	3
Long-term: impact occurs over the operational life of the COZA Iron Ore Project	4
Residual: impact is permanent (remains after mine closure)	5

EXTENT = SPATIAL SCOPE OF IMPACT/ FOOTPRINT AREA / NUMBER OF RECEPTORS	RATING
Limited: impact only affects the immediate footprint of the part of the development	1
Small: impact affects the COZA Iron Ore Project area	2
Medium: impact extends to the neighbouring farmers	3
Large: impact extends to surrounding farmers beyond the immediate neighbours	4
Very Large: The impact affects the area covered by the Tsantsabane Local Municipality	5

PROBABILITY

PROBABILITY = LIKELIHOOD THAT THE IMPACT WILL OCCUR	RATING
Highly unlikely: the impact is highly unlikely to occur	0.2
Unlikely: the impact is unlikely to occur	0.4
Possible: the impact could possibly occur	0.6
Probable: the impact will probably occur	0.8
Definite: the impact will occur	1

IMPACT SIGNIFICANCE

NEGATIVE IMPACTS

≤1	Very low	Impact is negligible. No mitigation required.
>1≤2	Low	Impact is of a low order. Mitigation could be considered to reduce impacts, but does not affect environmental acceptability.
>2≤3	Moderate	Impact is real but not substantial in relation to other impacts. Mitigation should be implemented to reduce impacts.
>3≤4	High	Impact is substantial. Mitigation is required to lower impacts to acceptable levels.
>4≤5	Very High	Impact is of the highest order possible. Mitigation is required to lower

		impacts to acceptable levels. Potential Fatal Flaw.

POSITIVE IMPACTS

≤1	Very low	Impact is negligible.
>1≤2	Low	Impact is of a low order.
>2≤3	Moderate	Impact is real but not substantial in relation to other impacts.
>3≤4	High	Impact is substantial.
>4≤5	Very High	Impact is of the highest order possible.

Mitigation measures for significant impacts have been identified as part of the impact assessment. The impacts have been ranked before and after the implementation of the mitigation measures. Consideration also has to be given to the confidence level that can be placed on the successful implementation of the mitigation level by COZA:

- **High Confidence:** mitigation measure easy and inexpensive to implement.
- **Medium Confidence:** mitigation measure expensive or difficult to implement.
- **Low Confidence:** mitigation measure expensive and difficult to implement.

The significance of the impact is given without and with mitigation. Cognisance is given to the mitigation confidence when determining the potential to reduce the impact significance. If the mitigation confidence is low the impact is unlikely to be reduced and this is reflected in the assessment of the significance with mitigation. If the mitigation confidence is high the impact significance is reduced. If the confidence significance is moderate to the EAP, the significance has been based experience as to the likelihood that the measures can be implemented.

The mining operations at the COZA Iron Ore mine will result in a number of environmental impacts. The summary of the main impacts is given in the impact Table 1.5 below:

Table 1.5: Impact Assessment Table for the COZA Iron Ore Project

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
1. PLANNING AND DESIGN														
1.1. WATER RESOURCES														
Excess water at the mine	Lack of planning for excess water to be produced due to pit dewatering.	4	4	3	3.7	3	3.3	1	3.3	MEDIUM	Low	1.1.1	Alternatives for the management of excess water are to be finalised prior to commencement with construction activities in consultation with key stakeholders. This includes the DWA.	
Contamination of surface water	Lack of adequate storm water management infrastructure during operation.	3	4	4	3.7	3	3.3	1	3.3	HIGH	Very Low	1.1.2	Sizing of the storm water management infrastructure is to be finalised and approved by DWA prior to construction.	
1.2. SOCIO-ECONOMICS														
Increase in lack of cohesion for the landowners (Maremane Community)	Improper communication with the affected landowners	4	4	4	3.7	2	2.8	1	3	HIGH	Low	1.2.1	Community forum to be established where local community are informed about developments in the project and allowed to raise comments or concerns regarding the project.	
		4	4	4	3.7	2	2.8	1	3	HIGH	Low	1.2.2	The Maremane community are to be kept informed of key project stages well in advance i.e. commencement of construction, operation and decommissioning activities.	
												1.2.3	The Maremane Community are to be considered as key stakeholder and invited to all stakeholder engagement forums.	
Lack of housing and services for construction and mine staff.	Improper planning for staff housing and services.	3	5	5	4.3	2	3.2	1	3.2	HIGH	Low	1.2.4	Planning for staff housing and services must be undertaken.	
1.3. LAND USE														
Permanent loss of grazing land	Failure to plan for rehabilitation									HIGH	Low	1.3.1	Financial provision to be made for the rehabilitation of land at all stages of the mine.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
												1.3.2	Mine planning is to include provision for ongoing rehabilitation	
												1.3.2	Planning for soil stockpiling is to be undertaken	
1.4. ENVIRO-LEGAL COMPLIANCE														
Violation of relevant legislation	Removal of protected trees without a permit	5	1	5	3.7	1	2.3	1	2.3	HIGH	Low	1.4.1	Permits for the removal of protected plant and tree species is to be applied for prior to removal of these trees on site. Permits must be obtained from DAFF and DENC.	
	Destruction of heritage resources without a permit.	2	1	5	3.7	1	2.3	1	2.3	HIGH	Low	1.4.2	Permits for the removal of protected heritage sites is to be applied for prior their destruction or removal. Permits must be obtained from SAHRA,	
2. CONSTRUCTION														
2.1. TOPOGRAPHY														
Change in local relief	Development of stormwater management infrastructure, levelling of construction areas, construction ramps for the crusher.	2	1	4	2.3	3	2.7	1	2.7	HIGH	Moderate	2.1.1	During rehabilitation, mounds or excavations will be shaped/backfilled to resemble surrounding landscape.	
2.2 SOILS AND LAND CAPABILITIES														
Loss of utilisable soils	Failure to strip and conserve topsoil	1	2	4	2.3	1	1.7	0.6	1	HIGH	Very Low	2.2.1	The upper 100 mm of soils is to be removed as topsoil from all infrastructure areas, roads and pit areas.	
												2.2.2	Footprint area of disturbance to be minimised, demarcated and no unnecessary disturbance to take place.	
												2.2.3	Wind protection measures are to be put in place at stockpile areas, this can include wind breaks either natural vegetation or netting perpendicular to the direction of the prevailing wing i.e. north east (predominant direction) and north-north west (strong winds).	
	Compaction of soils during construction activities.	1	2	2	1.7	1	1.3	0.6	0.8	HIGH	Very Low	2.2.4	All temporary access roads, compacted and cleared areas to be ripped to promote vegetation growth following construction.	
												2.2.5	Monitoring of vegetation establishment on constructed and rehabilitated areas to take place following construction.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
Contamination of soils	Spillage of hydrocarbons and other hazardous chemicals, sewage and incorrect management and disposal of waste.	4	2	3	3	1	2	0.6	1.2	HIGH	Very Low	2.2.6	Handling of hydrocarbons and other hazardous chemicals to take place on impermeable surfaces.	
												2.2.7	Spills of hazardous waste to be cleaned up and taken to the hazardous waste storage area.	
												2.2.8	All soils that have become contaminated with hydrocarbons or hazardous chemicals are to be removed and managed as hazardous waste.	
												2.2.9	Chemical toilets to be provided at all areas of work and serviced by contractor.	
Loss of grazing land	Site clearance for temporary infrastructure required for construction purposes (temporary roads, construction staff accommodation, etc.)	1	1	2	1.3	2	1.7	1	1.7	MEDIUM	Low	2.2.10	Implement 2.2.2	
												2.2.11	Implement 2.2.4	
												2.2.12	Implement 2.2.5	
	Site clearance for mine infrastructure (workshop, site office, etc.)	2	1	5	2.67	2	2.3	1	2.3	MEDIUM	Low	2.3.13	Implement 2.2.2	
												2.3.14	Implement final rehabilitation and land use plan	
2.3 GROUNDWATER														
Decrease in groundwater quality	Seepage of hydrocarbons and other hazardous chemicals due to spillage.	2	1	3	2	1	1.5	0.6	0.9	HIGH	Very Low	2.3.1	Implement 2.2.6	
												2.3.2	Implement 2.2.7	
												2.3.4	Implement 2.2.8	
2.4 SURFACE WATER														
Reduction in surface water quality	Sedimentation of surface water runoff.	1	3	3	2.3	3	3	0.6	1.8	HIGH	Very Low	2.4.1	Implement 2.2.2	
												2.4.2	Implement 2.2.3 – 2.2.5	
	Contamination of surface water runoff due to spillage of hydrocarbons and other hazardous chemicals.	1	1	3	1.7	2	1.8	0.6	1.1	HIGH	Very Low	2.4.3	Dirty water run-off is to be contained and not allowed to enter into the surrounding environment.	
												2.4.20	Implement 2.2.6	
												2.4.12	Implement 2.2.7	
2.5 NATURAL VEGETATION														

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
Loss of natural vegetation	Site clearance for temporary infrastructure required for construction purposes (temporary roads, construction staff accommodation, etc.)	3	1	2	2	2	2	1	2.0	MEDIUM	Very Low	2.5.1	Implement 2.2.2	
												2.5.2	Implement 2.2.4	
												2.5.3	Implement 2.2.5	
	Site clearance for mine infrastructure (workshop, site office, etc.)	3	1	5	3	2	2.5	1	2.5	MEDIUM	Low	2.5.4	Implement 2.2.2	
												2.5.5	Implement 2.3.14	
Loss of species of conservation importance	Removal of protected plants due to clearance for temporary infrastructure required for construction purposes	4	1	5	3.33	1	2.2	1	2.2	HIGH	Low	2.5.6	Implement 2.2.2	
												2.5.7	Plant removal permits must be obtained prior to removal of protected plants.	
												2.5.8	Plant removal should only be limited to areas where disturbances cannot be avoided	
Establishment or spread of alien species.	Disturbance of areas providing opportunity for colonisation of areas by invasive plants.	2	3	4	3	2	2.5	0.8	2	HIGH	Low	2.5.7	Continuous monitoring and management of invasive species is to be undertaken at the mine.	
2.6 ANIMAL LIFE														
Killing of fauna	Poaching or vehicle collisions with animals crossing roads.	1	2	2	1.7	3	2.3	0.6	1.4	HIGH	Very Low	2.6.1	Environmental awareness training of construction staff.	
												2.6.2	Trespassing outside of work areas to be prohibited.	
Destruction of habitat	Site clearance for temporary construction	2	1	5	2.7	3	2.8	1	2.8	HIGH	Low	2.6.3	Implement 2.2.2	
Disturbance to fauna	Noise and light due to construction	2	3	2	2.3	3	2.7	0.6	1.6	HIGH	Very Low	2.6.4	Limit construction activities to day light hours where possible.	
Introduction of alien species	Introduction of domestic animals	2	2	4	2.7	3	2.8	0.6	1.7	MEDIUM	Very Low	2.6.5	Unsterilised and unvaccinated domestic animals to be banned from site.	
2.7.NOISE														
Increase in ambient noise levels	Movement of vehicles, blasting and use of mechanical equipment	1	3	2	2	3	2.5	0.4	1.0	HIGH	Very Low	2.7.1	Implement 2.6.4	
2.8. AIR QUALITY														
Decrease in air quality	Vehicle entrained dust, materials handling and blasting for construction of mine infrastructure	2	3	2	2.33	3	2.7	0.8	2.1	LOW	Low	2.8.1	Wet suppression to be implemented at construction areas and roads.	
												2.8.2	Minimise area to be cleared of vegetation.	
2.9 SOCIO-ECONOMICS														
Employment opportunities for local persons	Employment of construction workforce	2	1	2	1.7	4	2.8	0.8	2.3	LOW	Moderate	2.9.1	Recruitment to give preference to local communities.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
Increased revenue for local business	Procurement of local service providers for construction	4	1	2	2.3	4	3.2	0.6	1.9	LOW	Low	2.9.2	Preference to be given to local service providers.	
Disturbance to sense of place	Noise, dust and traffic resulting from construction work.	2	2	2	2.0	3	2.5	0.6	1.5	MEDIUM	Low	2.9.3	Maremane community must be kept informed of construction activities.	
												2.9.4	Grievance mechanism to be in place and communicated to IAPs including procedure for dealing with complaints to be in place during construction.	
												2.9.5	Implement 1.6.4	
Loss of income of landowners	Loss of agricultural land due to construction of mine infrastructure	2	1	5	2.7	3	2.8	1	2.8	HIGH	Low	2.9.6	Implement 1.9.2	
Disturbance to social cohesion.	Loss of social cohesion due to the development of the mine.	5	3	4	4.0	2	3.0	1	3.0	HIGH	Low	2.9.7	Implement 2.9.3	
Reduced safety and security for surrounding landowners	Increased access to neighbouring properties by outsiders during construction	3	1	2	2.0	3	2.5	0.6	1.5	HIGH	Low	2.9.8	Implement 1.6.2	
2.10 CULTURAL HERITAGE														
Disturbance of graves and other heritage sites	Site clearance and excavations for the development of mine infrastructure	4	1	5	3.3	2	3.2	0.8	2.1	HIGH	Low	2.10.1	Should heritage sites or graves be unearthed during construction activities are to cease until given approval to proceed by a specialist approved by SAHRA.	
												2.10.2	Relocation of graves should be undertaken in consultation with affected parties.	
												2.10.3	The old road on Bleskop Hill which was identified as having moderate heritage significance cannot be disturbed or impacted upon without a permit from the relevant heritage authority.	
												2.10.4	The old road must be documented with plan drawings as well as photographic recording. This documentation must accompany the permit application.	
3. OPERATIONAL PHASE														
3.1 SOILS														

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
Loss of utilisable soils	Stripping of areas for mining activities	5	3	5	4.3	2	3.2	0.8	2.5	HIGH	Very Low	3.1.1	Strip all available A and B horizon soils up to 1 m from all infrastructure areas, roads and pit areas.	
												3.1.2	Footprint area of disturbance to be minimised, demarcated and no unnecessary disturbance to take place.	
												3.1.3	Soils that cannot be used directly in rehabilitation to be stockpiled.	
												3.1.4	Wind protection measures are to be put in place at stockpile areas, this can include wind breaks either natural vegetation or netting perpendicular to the direction of the prevailing wing i.e. north east (predominant direction) and north-north west (strong winds).	
												3.1.5	Soil to be fertilised after placing on rehabilitation areas to restore fertility after stockpiling.	
Contamination of soils	Spillage of hydrocarbons and other hazardous chemicals, sewage and incorrect management and disposal of waste	2	2	4	2.7	**1**	1.8	0.8	1.5	HIGH	Very Low	3.1.6	Handling of hydrocarbons and other hazardous chemicals to take place on an impermeable surface.	
												3.1.7	Staff to be trained to manage hazardous spills in accordance with environmental emergency procedure.	
												3.1.8	All soils that have become contaminated with hydrocarbons or hazardous chemicals are to be treated in situ using a commercially available bioremediation product or managed as hazardous waste.	
3.2 GROUNDWATER														
Lowering of natural groundwater levels	Pit dewatering	2	5	5	4.0	1	2.5	1	2.5	HIGH	Moderate	3.2.1	Establish baseline yields and levels in monitoring boreholes.	
												3.2.2	Implement quarterly monitoring of boreholes.	
												3.2.3	Establish a grievance procedure allowing for compensation of affected groundwater users.	
Reduction in groundwater quality	Seepage of contaminated water from waste dumps and stockpiles	4	5	5	4.7	2	3.3	1	3.3	HIGH	Low	3.2.4	Contain contaminated water in lined pollution control dams.	
												3.2.6	Divert clean water runoff away from waste dumps and stockpile area.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
	Seepage of hydrocarbons and other hazardous chemicals due to spillage.	5	3	4	4.0	2	3.0	1	3.0	HIGH	Low	3.2.7	Workshop areas to be provided with impervious surfaces (concrete slabs).	
												3.2.8	Hazardous chemical storage areas are to be provided with impervious surfaces and bunded.	
												3.2.9	Dirty water runoff from workshop areas must be contained within the dirty water management areas.	
												3.2.10	Implement 3.1.6 – 3.1.8	
	Spillage and leakage of contaminated water from pollution control dams and dirty water management system.	2	5	4	3.7	1	2.3	1	2.3	HIGH	Low	3.2.12	Pollution control dams to be constructed to comply with relevant DWA requirements with appropriate liners.	
												3.2.13	Recycle and reuse contaminated water.	
												3.2.14	Implement effective clean and dirty water separation.	
	Contamination of groundwater by nitrate containing explosives and haematite dust in the pit.	2	5	4	3.7	1	2.3	0.8	1.7	HIGH	Low	3.2.15	Pit dewatering.	
3.3 SURFACE WATER														
Reduction in surface water quality	Sedimentation of surface water runoff	2	3	3	2.7	4	3.3	0.6	2.0	HIGH	Low	3.3.1	Ongoing maintenance of water management infrastructure for erosion repair.	
												3.3.2	Runoff from stockpile areas must be contained within the dirty water management areas.	
	Release of contaminated mine water into the receiving environment.	5	3	4	4.0	3	3.5	0.6	2.1	HIGH	Low	3.3.4	Impacted water to be contained within the impacted water management system which is designed to contain 1:50 year rainfall event in line with GN 704 requirements	
												3.3.5	Re-use of excess water in dust suppression and processing facilities.	
												3.3.6	Effective clean and dirty water management systems.	
	Inadequate clean and dirty water separation	4	4	4	4.0	4	4.0	0.2	0.8	HIGH	Very Low	3.3.7	Maintenance of dirty and clean water management systems.	
3.4 TOPOGRAPHY														
Change in local relief	Development of pits and waste rock dumps.	5	1	5	3.67	1	2.3	1	2.3	MEDIUM	Low	3.4.1	Waste rock dumps are to be vegetated and soil amelioration should be applied if difficult to vegetate.	
												3.4.2	Pit to be backfilled and rehabilitated.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
												3.4.3	Dumps are to be landscaped to a stable slope.	
3.5 LAND CAPABILITY														
Reduction in land capability	Reduction in the capability from grazing to wilderness land.	1	3	5	1	2	1.5	1	1.5	MEDIUM	Very Low	3.5.1	Implementation of final rehabilitation and land use plan.	
												3.5.2	Annual update of financial provision for rehabilitation to ensure sufficient funding.	
3.6 LAND USE														
Loss of agricultural land	Clearance of open pit and waste rock dump area.	1	3	5	1	2	1.5	1	1.5	MEDIUM	Low	3.6.1	Ensure consultation with the landowners on the final land use plan	
												3.6.2	Minimise areas to be cleared to that needed for open pit and waste rock dump areas.	
3.7 NATURAL VEGETATION														
Loss of natural vegetation	Clearance of open pit and waste rock dump area.	2	1	5	2.7	3	2.8	1	2.8	HIGH	Low	3.7.1	Implement 3.5.1	
												3.7.2	Implement 3.6.2	
Loss of species of conservation importance	Removal of protected plants due to clearance of pit and waste rock dump development areas.	2	1	5	2.67	3	2.8	0.6	1.7	HIGH	Low	3.7.4	Plant removal permits must be obtained prior to removal of protected plants.	
												3.7.5	Plant removal should only be limited to areas where disturbances cannot be avoided	
Disturbance of habitats for protected plants	Secondary impacts on the pan such as sedimentation and release of dirty water run-off.	2	2	3	2.33	1	1.7	0.4	0.7	HIGH	Very Low	3.7.5	No water is to be released into any pan during operation	
												3.7.6	Staff members are to be made aware of the location of the nearby pan and no disturbances to the pan will be allowed.	
Vegetation die-back	Dust fallout	1	3	4	2.7	3	2.8	0.4	1.1	MEDIUM	Low	3.7.7	Dust suppression must be applied along dust generating areas such as haul roads and handling areas.	
3.8 ANIMAL LIFE														
Loss of sensitive habitats	Site clearance	4	1	5	3.3	1	2.2	1	2.2	MEDIUM	Low	3.8.1	Minimise and limit the destruction or disturbance of vegetation within the proposed areas of activity, as well as in the surrounding areas	
Reduced palatability of vegetation	Dust fallout from mining activities and traffic along the road.	1	3	4	2.7	3	2.8	0.6	1.7	LOW	Very Low	3.8.2	Implement measures 3.9.1 - 3.9.4	
Displacement to fauna	Noise, light, destruction of habitat and vibration from mining activities	2	3	4	3.0	2	2.5	0.4	1.0	HIGH	Low	3.8.3	Prevent any further harassment of animals through the implementation of an awareness campaign.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
												3.8.4	Restrict lighting to operational areas.	
Killing of fauna	Poaching, vehicle collisions with animals crossing roads and presence of bird-unsafe structures.	1	2	2	1.7	3	2.3	0.6	1.4	MEDIUM	Very Low	3.8.5	Environmental awareness training of mine personnel on safe driving and protection of animals.	
												3.8.6	Poaching is prohibited no staff may trespass neighbouring properties.	
Introduction of alien species	Introduction of domestic animals	2	2	4	2.7	3	2.8	0.6	1.7			3.8.7	No domestic animals are to be allowed on site.	
3.9 AIR QUALITY														
Increased ambient PM_{10} levels	Mining activities with key contributors being entrainment of dust due to movement of vehicles and crushing and screening.	4	3	4	3.7	3	3.3	0.8	2.7	MEDIUM	Low	3.9.1	Chemical suppressant to be applied to main haul roads.	
												3.9.2	Wet suppression on other haul roads and handling areas.	
												3.9.3	Traffic control measures aimed at reducing traffic volumes and reducing vehicle speed.	
												3.9.4	Vegetation of cleared areas.	
												3.9.5	Chemical suppressant or water sprays on the primary crusher	
												3.9.6	Ensure dry dust extraction units with wet scrubbers on the secondary and tertiary crushers and screens	
Increased levels of fallout dust	Mining activities with key contributors being entrainment of dust due to movement of vehicles and crushing and screening.	2	3	4	3.0	2	2.5	0.8	2.0	HIGH	Low	3.9.7	Implement 3.9.1 - 3.9.6	
3.10 NOISE														
Increase in ambient noise levels	Vehicles, mechanical equipment, blasting	1	2	4	2.3	1	1.7	1	1.7	HIGH	Very Low	3.10.1	Investigate complaints if received.	
												3.10.2	Heavy vehicles are to be fitted with silencers to minimise noise generation	
												3.10.3	No blasting activities to take place at night.	
3.11 TRAFFIC														
Decrease in road safety	Turn off of mine vehicles into the site via the R325	2	2	4	2.7	3	2.8	0.6	1.7	HIGH	Very Low	3.11.1	Construct a turning lane for mine vehicles on the R325	
												3.11.2	Mine vehicles are to always have the lights on when accessing the site via the R325	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
												3.2.13	Mine access roads from the R325 are to be surfaced to prevent gravel from being spilled onto the R325	
3.12 VISUAL ENVIRONMENT														
Disturbance of natural views	Waste Rock Dumps are visible to neighbours.	1	4	4	3.0	3	3.0	0.6	1.8	HIGH	Very Low	3.12.1	Ongoing rehabilitation of waste dumps to reduce visual intrusion.	
	Night glow visible to neighbours	1	4	4	3.0	3	3.0	0.4	1.2	HIGH	Very Low	3.12.2	Lighting to be directed towards mining activities.	
3.13 SOCIO-ECONOMICS														
Contribution to regional economy	Creation of economic activity due to development of the mine	5	5	4	4.7	5	4.8	1	4.8	HIGH	Very High	3.13.1	Implement measures in Social and Labour Plan commitments for promoting local economy.	
Employment opportunities for local persons	Employment of additional workforce	5	5	4	4.7	3	3.8	0.6	2.3	HIGH	Moderate	3.13.2	Implement 2.13.1	
Increased revenue for local business	Additional procurement of local service providers	5	5	4	4.7	3	3.8	0.8	3.1	HIGH	High	3.13.3	Implement 2.13.1	
Community safety and security	Safety risk to persons accessing mining site.	3	2	4	3.0	3	3.0	0.4	1.2	MEDIUM	Very Low	3.13.7	Access control and signage in place to warn persons of safety risks.	
	Theft of private property from surrounding landowners.	3	2	4	3.0	4	3.5	0.4	1.4	HIGH	Very Low	3.13.9	Trespassing outside of work areas to be prohibited.	
Increase in social ills	Influx of people will attract social ills such as drunkenness and prostitution.	3	2	4	3.0	4	3.5	0.4	1.4	HIGH	Low	3.13.10	Ensure access control at mine site entrance.	
3.14 CULTURAL HERITAGE														
Disturbance of heritage resources	Site clearance and excavations for mining operations.	5	2	5	4.0	2	3.0	0.2	0.6	HIGH	Very Low	3.14.1	Should graves or heritage sites be unearthed during excavation operations are to be ceased until authorisation is given SAHRA.	
4. DECOMISSIONING, CLOSURE AND POST CLOSURE														
4.1 SOILS AND LAND CAPABILITY														
Loss of utilisable soils and land capability	Pollution due to mishandling of hydrocarbons	5	1	3	3.0	3	3.0	0.6	1.8	HIGH	Low	4.1.1	Handling of hydrocarbons and other contaminants should occur at designated areas on impervious surfaces	
	Erosion of rehabilitated areas	3	1	2	2	1	1.5	0.8	1.2	HIGH	Very Low	4.1.2	Monitor and repair erosion until under control.	
	Unsuccessful rehabilitation	4	1	5	3.33	2	2.7	0.6	1.6	HIGH	Very Low	4.1.3	The success of rehabilitation should be monitored and augmented for at least three years after closure. Should rehabilitation not prove successful, a rehabilitation specialist is to be included in the rehabilitation process.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
4.2 GROUNDWATER														
Reduction in groundwater quality	Contamination of groundwater by waste dumps and ore material.	1	5	5	3.7	1	2.3	0.8	1.9	LOW	Low	4.2.1	Groundwater monitoring to continue after closure as per DWA requirements.	
												4.2.2	Grievance procedure to be in place post closure.	
4.3 SURFACE WATER														
Decrease in surface water quality	Sedimentation of stormwater run-off due to erosion of rehabilitated areas	1	4	4	3.0	1	2.0	0.6	1.2	HIGH	Very Low	4.3.1	Monitor and maintain vegetation cover until self-sustaining.	
4.4 SOCIO-ECONOMIC														
Loss to the regional economy	Reduction in employment and procurement of services and goods.	5	1	3	3.0	3	3.0	0.6	1.8	HIGH	Low	4.4.1	Implement Social and Labour Plan Commitments.	
Loss of employment	Scaling down of operation activities	5	1	3	3.0	3	3.0	0.6	1.8	HIGH	Low	4.4.2	Implement Social and Labour Plan Commitments.	
4.5 VEGETATION														
Failure of vegetation to re-establish	Unsuccessful rehabilitation	5	1	3	3.0	3	3.0	0.6	1.8	HIGH	Low	4.1.3	Handling of hydrocarbons and other contaminants should occur at designated areas on impervious surfaces	
4.6 NOISE														
Increase in ambient noise levels	Demolition of mine infrastructure	5	1	3	3.0	3	3.0	0.6	1.8	HIGH	Lo w	4.6.1	Where possible, demolition activities are to be limited to daytime to minimise night impacts.	

Conclusions

The main impacts associated with the project include the emission of dust and its associated impacts, the loss of indigenous vegetation including protected trees due to mine construction, the compromise in safety along the R325 due to heavy vehicles transporting ore from the mine, as well as the loss of social cohesion of the Lohatla community.

COZA has undertaken to upgrade the gravel section of the R325 used by COZA and to maintain this during construction and operation of the road. This includes provision for dust control on the road using a chemical suppressant and surfacing of the bell-mouth section of the gravel roads leading to into the intersection to reduce gravel from access road being spilled onto the main road. Consultation between the local roads authority (Department of Transport, Roads and Public Works) and COZA is required to investigate the alternatives (including tarring of the road) in order to ensure that safety on the road is not compromised.

In order to manage the loss of social cohesion, COZA Mining must ensure that they communicate with the members of the Lohatla and keep them informed of mining activities. It is proposed that quarterly meeting are held during the construction phase and once per annum during the operation phase.

Cumulative dust impacts are also a concern, as baseline PM_{10} levels are above the NAAQS. It will therefore be vitally important that COZA implement dust management measures to minimise cumulative fugitive dust levels.

Depending on the geohydrological conditions encountered during mining, there may also be a small amount of excess water that will need to be managed in the final year of mining. Alternatives for the management of excess water will need to be finalised in consultation with key stakeholders including the DWA before construction commences.

The project will result in environmental impacts however with the implementation of the mitigation measures identified in the EMP, most impacts can be reduced to acceptable levels. As most of the assessment was undertaken using modelling exercises, it is vital that suggested monitoring is undertaken to ensure better understanding of the environmental impacts. There is currently no environmental reason why the proposed development should not be implemented if identified management measures are implemented provided that the impact on protected trees can be mitigated in accordance with the requirement of the Department of Agriculture, Fisheries and Forestry. It is expected that a suitable offset for such impacts can be identified and agreed upon.

COZA MINING (PTY) LTD

COZA IRON ORE PROJECT

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LIST OF ACRONYMS AND ABBREVIATIONS

AMSA	ArcelorMittal South Africa
CO	Carbon Monoxide
DE	Diesel Exhaust
dBA	Decibel (measure of noise)
DMR	Department of Minerals Resources
DENC	Department of Environment and Nature Conservation, Northern Cape
DWEA	National Department of Water and Environmental Affairs
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
EMP Report	Environmental Management Programme Report (synonym for EMPR)
EMPR	Environmental Management Programme Report (synonym for EMP Report)
ha	hectare
IAP	Interested or Affected Parties
km	Kilometre
LOM	Life of mine
m	Meter
m^3	Cubic metre
m/d	Metres per day
m^2/d	Metres squared per day
m^3/s	Cubic metres per second
m/y	Metres per year
l/h	Litres per hour
MAMSL	Metres above mean sea level
Ml	Million litres
mm	Millimetre
MRPDA	Mineral and Petroleum Resources Development Act, 28 of 2002
Mt	Mega tonnes
Mtpa	Million tonnes per annum
NEMA	National Environmental Management Act, 107 of 1998
NO_x	Nitrogen oxides
O_2	Oxygen
pa	Per annum
PAH	Polycyclic Aromatic Hydrocarbons
$PM_{2.5}$	Fine particulate matter with diameter less than 2.5 microns
PM_{10}	Fine particulate matter with diameter less than 10 microns

ROM	Run of Mine
SO_2	Sulphur dioxide
SO_4	Sulphate
Synergistics	Synergistics Environmental Services (Pty)
TSP	Total suspended particulates
VOC	Volatile Organic Compounds

LIST OF TERMS

Assessment
The process of collecting, organising, analysing, interpreting and communicating data that is relevant to some decision.

Baseline Environment
The prevailing environmental conditions (or status quo) prior to the implementation of a new activity.

Baseline Level
The concentration / measurement of a pollutant (i.e. air, water, noise) prior to the implementation of a new activity.

Competent Authority
The organ of state charged with evaluating environmental impacts and with granting or refusing authorisation of an activity. The competent authority is also responsible for approving the EIA and EMP Report and future updates of the report.

Convectional rainfall

Is the formation of precipitation due to heating of the ground surface. The heating causes surface water to evaporate and moist air to rise. As the moist air rises it expands and cools, condensation occurs, forming clouds and eventually precipitation.

Dewatering
The removal of water from waterlogged workings by pumping or drainage, to maintain dry conditions in mine pit.

EMP commitments
Mitigation measures contained in the EMP. Legally required to be implemented after approval by Competent Authority.

Endorheic System

An Endorheic system is a closed drainage system that retains water and does not allow for outflow to other external bodies of water such as rivers of oceans.

Environment
Surroundings within which humans exist and that are made up of:

- The land, water, and atmosphere of the earth
- Micro-organisms, plant and animal life
- Any part or combination of (i) and (ii) and the inter-relationships among and between them; and
- The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wee-being

Environmental Impact
The direct and indirect effect of human actions and activities on the environment.

Environmental Impact Assessment
A formal process used to predict the environmental consequences of a proposed development project or activity, to ensure that the potential problems are foreseen and addressed at an early stage in project planning and design. As a planning tool, it has both an information gathering and decision-making component, which provides the decision maker with an objective basis for granting or denying approval for a proposed development.

Environmental Impact Assessment (as per the Minerals and Petroleum Resources Development Act)
An EIA is an assessment of the positive and negative environmental consequences of the development of the proposed project. The primary objective of the EIA is to aid decision-making by providing factual information on the assessment of the impacts and determining their significance and on which to base valued judgements in choosing one alternative over another.

Environmental Management Programme
An action plan or system which addresses the how, when, who, where and what of integrating environmental mitigation and monitoring measures throughout an existing or proposed operation or activity. It encompasses all the elements that are sometimes addressed separately in mitigation, monitoring and action plans.

Fatal Flaw
A factor or situation that prevents the development of an environmentally acceptable project, except at prohibitive cost. Critical issues with the ability to stop a project's development.

Feasibility Study
A comprehensive design and costing study of the selected option for the development of a mineral project in which appropriate assessments have been made of realistically assumed geological, mining, metallurgical, economic, marketing, legal, environmental, social, governmental, engineering, operational and all other modifying factors, which are considered in sufficient detail to demonstrate at the time of reporting that extraction is reasonably justified (economically mineable) and the factors reasonably serve as the basis for a final decision by a proponent or financial institution to proceed with, or finance, the development of the project. The overall confidence of the study should be stated.

Footprint
Refers to the surface area of land directly affected by a proposed development or activity. Directly related to the physical extent and size of the development or activity.

Frontal rainfall

Is caused by a weather front. A cold front, as an example, lifts warm, moist air, which becomes saturated and eventually causes precipitation to occur.

Interested and Affected Parties

Individuals or groups concerned with or affected by the environmental impacts and performance of a project. Interested groups include those exercising statutory environmental control over the project, local residents/communities (people living and/or working close to the project), the project's employees, customers, consumers, investors and insurers, environmental interest groups and the general public.

Iron Ore

Ferruginous rock containing one or more minerals from which metallic iron may be profitably extracted. The chief ores of iron consist mainly of the oxides: $Fe_2 O_3$; goethite, alpha -FeO(OH); magnetite, $Fe_3 O_4$; and the carbonate, siderite or chalybite, $FeCO_3$.

Land Capability

The collective effects of soil, terrain and climate features, shows the most intensive long-term use of land for rain-fed agriculture and at the same time indicate the permanent limitations associated with the different agricultural land-use classes [http://www.agis.agric.za].

Land use

The activities that take place within a given area or space.

Life of Mine

Number of years that the operation is planning to mine and treat ore, and is taken from the current mine plan and is based on the defined mineral reserve and production rates.

Life of Mine Plan

A design and costing study of an existing operation in which appropriate assessments have been made of realistically assumed geological, mining, metallurgical, economic, marketing, legal, environmental, social, governmental, engineering, operational and all other modifying factors, which are considered in sufficient detail to demonstrate at the time of reporting that extraction is reasonably justified.

Mine Design

A framework of mining components and processes taking into account such aspects as mining methods used, access to the ore body, personnel and material handling, ventilation, water, power, and other technical requirements, such that mine planning can be undertaken.

Mine Planning

Production planning and scheduling, within the Mine Design, can be undertaken, taking into account such aspects as geological structures and mineralization and associated infrastructure and constraints.

Mineral

Any substance, whether in solid, liquid or gaseous form, occurring naturally in or on the earth or in or under water and which was formed by or subject to a geological process, and includes sand, stone, rock, gravel, clay, soil and any material occurring in residue stockpiles or in residue deposits, but excludes: Water, other that water taken from land or sea for the extraction of any material from such water; Petroleum; or Peat.

Mineral Reserve

A mineral reserve is the portion of the mineral resource, which is known to be economically feasible for extraction at the specific time of the reserve determination. A mineral reserve forms part of a mineral resource but excludes those portions of the mineral resource that are:

– Not sufficiently drilled and sampled
– Too deep to economically extract
– Too deep to technically extract
– Too low of grade to economically or technically extract
– Contaminated
– Of such nature to restrict the potential for beneficiation

A mineral reserve is sub-divided, in order of increasing confidence, into a probable mineral reserve and a proven mineral reserve.

Mineral Resource

An occurrence of material of economic interest that has been investigated, to some degree, in terms of location, quantity, grade, continuity and other geological characteristics, but where the economics has not been fully evaluated. It covers in situ mineral deposits as well as stockpiles and deposits that may have the potential for extraction. The mineral resource is sub divided in order of increasing confidence into inferred mineral resource, indicated mineral resource and measured mineral resource.

Mining

Mining is the making of any excavation for the purpose of winning a mineral on, in or under the earth , water or any residue deposit, whether by underground or open working or otherwise and includes any operation or activity incidental thereto.

Mining Area

Section 1 of the MPRDA defines a mining area as: the area for which the mining right or permit is granted and any adjacent or non-adjacent surface of land…upon which related incidental operations are being undertaken, including any area connected by such an area by means of road, railway line, power line, pipeline all buildings, structures, machinery, mine deposits or objects situated in that area which are used for the purpose of mining.

Mining Related Activities

Activities within the mining area that: are required for mine construction, operation and/or rehabilitation; serve no purpose other than to support the construction, operation and/or rehabilitation of the mine; and will be removed and rehabilitated at the end of the life of the mine unless they can be utilised as part of the end-use requirement of the mine and to the benefit of the local community and environment.

Mining Waste Dump

A facility for deposition (dumping) or stockpiling of mining waste rock.

Mitigation Measures

Measures designed to avoid, reduce or remedy adverse potential negative impacts. Includes measures to compensate for residual impacts.

Monitoring
The repetitive and continued observation, measurement and evaluation of environmental data to follow changes over a period of time to assess the efficiency of control measures.

Negative impact
A change that reduces the quality of the environment (for example, by reducing species diversity and the reproductive capacity of the ecosystem, by damaging health, property or by causing nuisance.

Overburden
Non-ore bearing / non-processable material overlying or interbedded between mineral deposits that must be stripped off before extraction can proceed. Regarded as mining waste rock.

Residual Environmental Impact
Impact that remains after mitigation measures have been implemented.

Run of Mine
The mined ore in its natural state, prior to treatment of any sort, as it is delivered by the haul trucks to the crushing plant.

Processing

In relation to any mineral, means the winning, extracting, concentrating, refining, calcining, classifying, crushing, screening, washing, reduction, smelting or gasification thereof.

Sensitive Area
A sensitive area or environment can be described as an area or environment where a unique ecosystem, habitat for plant and animal life, wetlands or conservation activity exists or where there is a high potential for eco-tourism.

Significant Impact
An impact can be deemed significant if consultation with the relevant authorities and other interested and affected parties, on the context and intensity of its effects, provide reasonable grounds for mitigating measures to be included in the environmental management report. The onus shall be on the proponent to include the relevant authorities and other interested and affected parties in the consultation process. Present and potential future, cumulative and synergistic effects should all be taken into account.

Stockpile
An accumulation of ore or mineral formed to create a reserve for processing, loading or other purposes or built up when demand slackens or when the treatment plant or beneficiation equipment is incomplete or temporarily unequal to handling the mine output.

Zone of Influence

Area within which a proposed development may have an influence or effect on the environment. This area will be defined in the EIA phase for the COZA Iron Ore Project.

COZA MINING (PTY) LTD

COZA IRON ORE PROJECT

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. INTRODUCTION TO THE PROJECT

1.1 Introduction

COZA Mining (Pty) Ltd is a junior mining company proposing to develop the COZA Iron Ore Project located approximately 10 km north-northwest of Postmasburg Town in the Tsantsabane Local Municipality of the Northern Cape Province. The proposed development is a green-fields project that will involve the mining of iron ore on Farm Doornpan 445 (Portion 1 and 2) (Doornpan) (refer to Figure 1.1 and Figure 1.2).

The proposed COZA Iron Ore Project will involve open pit mining that will be undertaken by means of a truck and shovel operation. Mined ore will be crushed, screened and blended on site prior to being transported for further processing at an offsite location (this area does not form part of this assessment). The processed ore will then be transported via rail to the ArcelorMittal (AMSA) steel refineries.

Synergistics Environmental Services (Pty) Ltd has been appointed to undertake the Scoping and Environmental Impact Assessment (EIA) process required for the COZA Iron Ore Project. The EIA process has been undertaken to inform the following environmental applications:

- **Environmental Authorisation:** For activities listed under the 2010 EIA Regulations of the National Environmental Management Act (No. 107 of 1998) as amended (NEMA).
- **Mining Right:** As required by Section 22 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) as amended (MPRDA).
- **Integrated Water Use License (IWUL) and Integrated Water and Waste Management Plan (IWWMP):** As required in terms of the National Water Act (No 36 of 1998) (NWA).

The purpose of this report is to present the results of the EIA process, which includes a comparative assessment of the positive and negative impacts of the proposed project and identified alternatives, as well as to present the Environmental Management Programme (EMPR), which sets out management measures to mitigate the identified impacts. This report has been compiled in accordance with requirements as contemplated in Section 39 of the MPRDA (now repealed, but still being used in the absence of replacement legislation) and Section 31 of Regulation 534 of the 2010 Environmental Impact Assessment Regulations published under the NEMA.

1.2 Project Location

The COZA Iron Ore Project is located in the Tsantsabane Local Municipal area in the Siyanda District in the Northern Cape Province (see Figure 1.1). The project will be located on Portion 1 and 2 of Doornpan 445 (28°12'31.53"S and 23°4'6.39"E) which is approximately 10 km north-northwest of Postmasburg Town and 12 km southwest of the Lohatla Military Base.

1.3 Project Need and Desirability

Prospecting activities that were undertaken on Farm Doornpan have revealed that the iron ore resource has the potential of being mined economically. The proposed development of the COZA Iron Ore Mine will have a number of positive outcomes for local communities and society in general. Development of the COZA Iron Ore Mine will result in direct employment opportunities during the construction and operation phase of the mine. Employed individuals, and their dependants, will benefit economically from the employment. Through employment, persons at the mine will also gain skills involved in the construction and operation of a mine. Persons from the local area employed at the mine will be spending their income in these communities therefore contributing to the local economy. The design, construction and operation of the mine could make use of the local consulting and manufacturing companies.

The proposed development will also ensure local economic development through the implementation of projects identified in the Social and Labour Plan. COZA Mining is fully committed to implementing development plans and projects that will facilitate local community and rural development in the area surrounding the COZA Iron Ore Project in line with the provisions of the Broad-Based Socio-Economic Empowerment Charter for the South African Mining Industry.

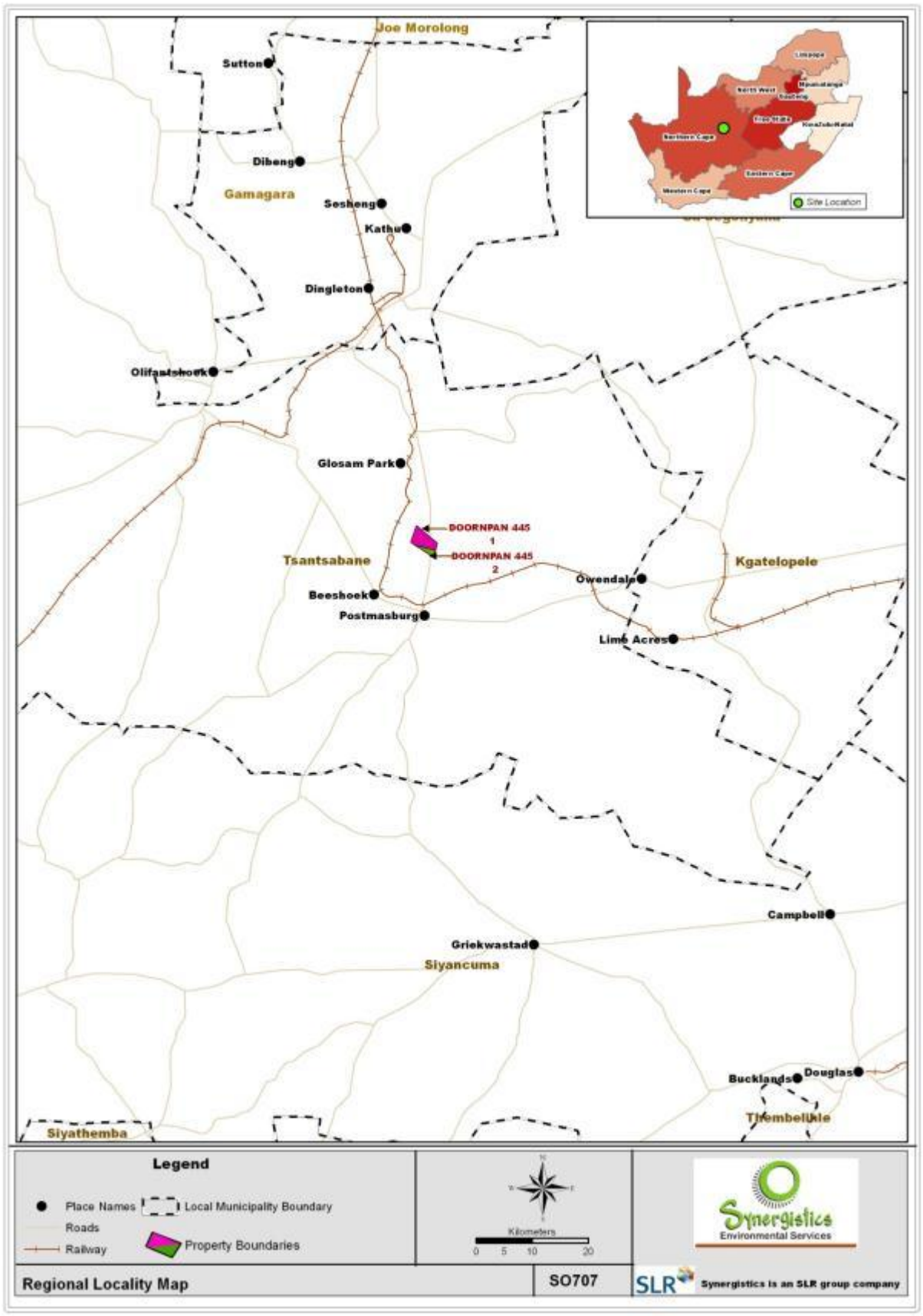

Figure 1.1 Regional Location of the COZA Iron Project

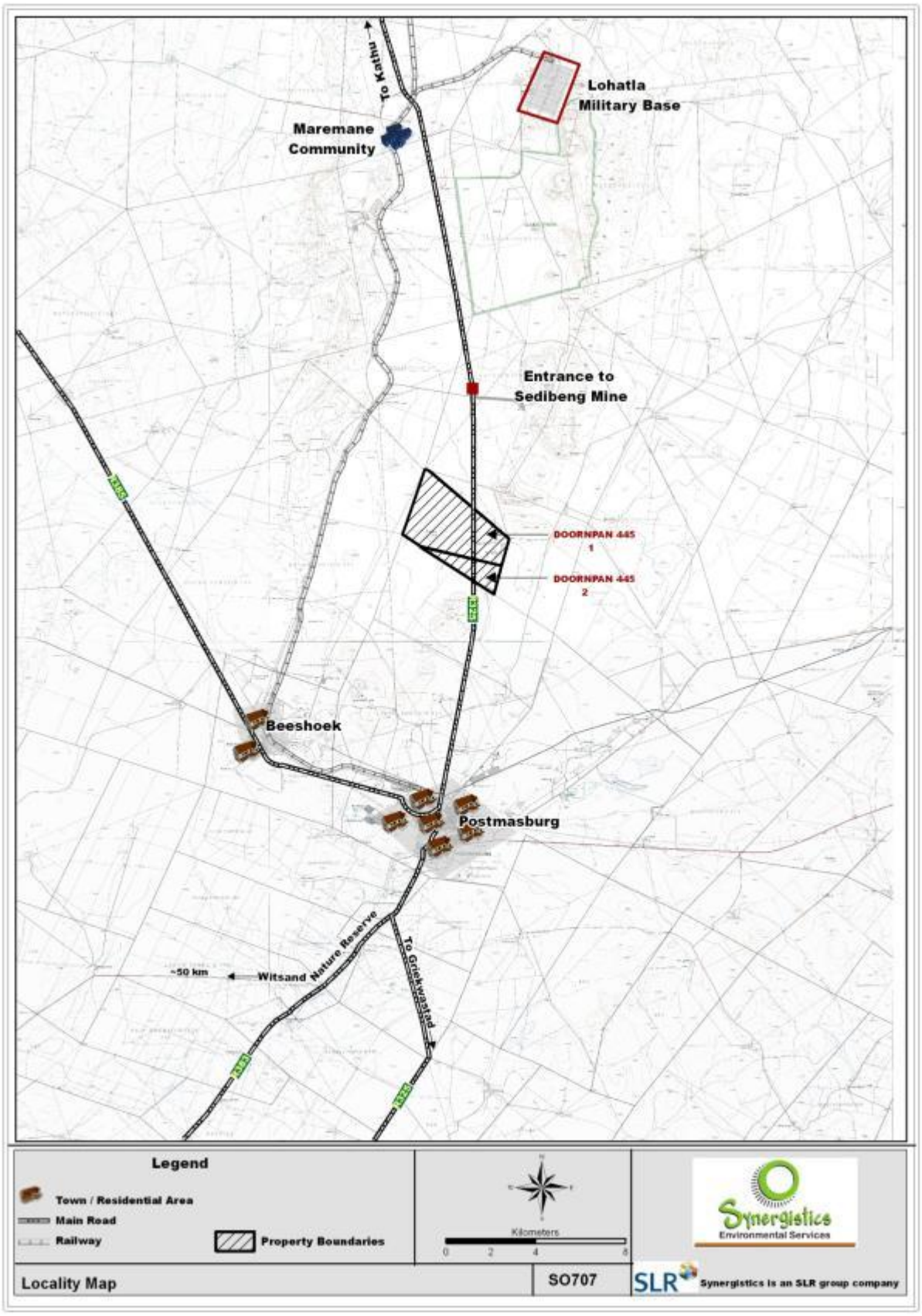

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Figure 1.2: Approximate Location of the COZA Iron Ore Project

2. LEGISLATIVE REQUIREMENTS

2.1 Applicable Legislation and Approvals Required

2.1.1 Mineral and Petroleum Resources Development Act (No 28 of 2002)

COZA Mining (Pty) Ltd has prospecting rights over Farm Doornpan that they intend to convert to a mining right. The process for applying for mining rights is governed by the Minerals and Petroleum Resources Development Act (No 28 of 2002) (MPRDA) which is administered by the Department of Mineral Resources (DMR).

Any person that wishes to mine in South Africa has to submit a mining right application in terms of Section 22 of the MPRDA to the Department of Mineral Resources. COZA Mining submitted a mining right application for Doornpan in July 2013 and the application was accepted and assigned the reference number: (NC) 30/5/1/2/2/10034MR on 24 July 2013. In the acceptance letter, COZA Mining was instructed to:

- Submit a Scoping Report in terms of Regulation 49 (2) on or before the 05 September 2013;
- Notify in writing and consult with the landowner or occupier and any other affected party and submit the result of such consultation to this office on or before the 05 September 2013; and
- Conduct an Environmental Impact Assessment (EIA) and submit an online copy and five manual copies of the Environmental Management Programme (EMPR) for approval on or before 10 April 2014

In response to the letter, the Scoping Report in a standard DMR template was submitted to the DMR on 4 September 2013. This report (EIA & EMPR) has been prepared and will be submitted to the DMR for review on 10 April 2014.

The MPRDA was recently amended as of June 2013, whereby mining will in future fall under NEMA instead of the MPRDA. All provisions for environmental submissions under the MPRDA have been repealed and the NEMA amendment has not yet been promulgated to cater for mining activities. As such, there is no regulated process for conducting an EIA or submitting an EMPR under the MPRDA. As such, the EIA has been undertaken as required under the now repealed Section 39 of the MPRDA. .

2.1.2 National Environmental Management Act (No 107 of 1998)

The National Environmental Management Act (No 107 of 1998) (NEMA) sets out principles for environmental management and allows for the listing of activities that cannot commence without environmental authorisation. The Environmental Impact Assessment (EIA) Regulations (Government Notice Regulation) GNR 544-546 of June 2010 have been published in terms of Section 24 (2) of NEMA to list activities that require environmental authorisation. In order to obtain environmental authorisation, an assessment of environmental impacts is required to advise the decision makers of the potential environmental impact associated with the activity. The assessment procedure is stipulated in GRN 543 of the EIA Regulations where activities listed under GNR 545 require a Scoping and EIA to be undertaken, activities listed in GNR 544, and 546 require a Basic Assessment (BA) process. The COZA Iron Ore Project triggers activities listed under all three regulations and therefore a Scoping and EIA process has been undertaken.

An application for environmental authorisation for these activities was submitted to the Northern Cape Department of Environment and Nature Conservation (DENC) and accepted on 5 April 2013 and has been assigned the following reference number: NC/EIA/04/SIY/TSA /POS/DRIE/2013 /NCP/EIA/0000215/2013. **The application submitted included activities to be undertaken on Farm Doornpan and Driehoekspan 435 (Remaining Extent). Following further investigations into the feasibility of the project, COZA decided that activities on Farm Driehoekspan be withdrawn from the application. A letter to withdraw activities to be undertaken at Driehoekspan has been submitted together with the Scoping Report to the DENC. In addition, GNR 544 and GNR 545 have recently (November 2013) been amended to include additional activities. These amendments do however not affect the application for environmental authorisation as none of the new activities are triggered by the proposed COZA Iron Ore Project.** Table 2.1 indicates the listed activities that are now applied for by COZA Mining.

Table 2.1: Listed activities included in the NEMA application

Activity No.	Activity Description	Applicability to COZA Iron Ore Project
GNR 544, 18 June 2010		
1	The construction of facilities or infrastructure for the generation of electricity where: i. the electricity output is more than 10 megawatts but less than 20 megawatts; or ii. the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.	**The use of backup generators in the case of power failures.** **Contractors' generator during the construction and operational phase.** **No electricity will be generated for external consumption.**
9	The construction of facilities or infrastructure exceeding 1 000 meters in length for the bulk transportation of water, sewage or storm water –	**Pipelines may be constructed for the transportation of water. Design specifications will be confirmed at a later stage.**

Activity No.	Activity Description	Applicability to COZA Iron Ore Project
	(i) with an internal diameter of 0.36 meters or more; or (ii) with a peak throughput of 120 liters per second or more, excluding where: a. such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or where such construction will occur within urban areas but further than 32 meters from a watercourse, measured from the edge of the watercourse.	
10	The construction of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.	**The construction of a power line with a capacity of more than 33 kV for power supply purposes. Design specifications will be confirmed at a later stage.**
11	The construction of: (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (vii) marinas; (viii) jetties exceeding 50 square meters in size; (ix) slipways exceeding 50 square meters in size; (x) buildings exceeding 50 square meters in size; or (xi) infrastructure or structures covering 50 square meters or more where such construction occurs within a watercourse or within 32 meters of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	**A pipeline from the mine to the Vaal Gamagara Pipeline is proposed. This pipeline will cover more than 50 m² and may cross a watercourse.**

Activity No.	Activity Description	Applicability to COZA Iron Ore Project
12	The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic meters or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010;	**In order to collect and contain dirty water generated at the mine, three pollution control dams will be constructed At this stage it is envisaged that the capacity of the pollution control dam 1 will be approximately 11 400 m^3 and pollution control dams 2 and 3 will be approximately 8 500m^3 each, giving a combined capacity of 28 400 m^3. The capacity of the dams may be increase depending on the dewatering requirements. As such, the combined capacity may exceed 50 000 m^3.**
13	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic meters [80 000 to 500 000 litres];	**The project will involve the construction of two fuel storage tanks with a combined capacity to store 160 m^3 of diesel.**
18	The infilling or depositing of any material of more than 5 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock *[of more than 5 cubic meters]* from: (i) a watercourse; (ii) the sea; (iii) the seashore; (iv) the littoral active zone, an estuary or a distance of 100 meters inland of the high-water mark of the sea or an estuary, whichever distance is the greater- but excluding where such infilling, depositing, dredging, excavation, removal or moving *(a)* is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or occurs behind the development setback line.	**The project will involve the construction of a pipeline from the mine to the Vaal-Gamagara Pipeline, which may require earthworks and the excavation/fill of earth from a watercourse.**
GNR 544, 18 June 2010		
22	The construction of a road, outside urban areas, i. with a reserve wider than 13,5 meters or, ii. where no reserve exists where the road is wider than 8 metres, or iii. for which an environmental authorisation was obtained for the route determination in terms of	**New haul roads and other roads will be required, e.g. service roads for construction of linear infrastructure. The haul roads will have a width of approximately 16m for one-way roads and 25m for bi-directional roads, whereas service and access roads will have a width of just over 8m.**

Activity No.	Activity Description	Applicability to COZA Iron Ore Project
	activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	
47	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre – i. where the existing reserve is wider than 13,5 meters; or ii. where no reserve exists, where the existing road is wider than 8 metres – excluding widening or lengthening occurring inside urban areas.	**The main access roads to the properties may require widening to accommodate the movement of heavy machinery on site.**
GNR 545, 18 June 2010		
5	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	**Waste rock dumps, pollution control dams and the sewage treatment plant require a water use license in terms of the NWA which governs the release of waste.** **Design specifications will be confirmed at a later stage.**
15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for: i. linear development activities; or ii. agriculture or afforestation where activity 16 in this Schedule will apply.	**The project will involve the physical alteration of approximately 60 ha of undeveloped land for mining/industrial use through the construction of mining infrastructure, including roads, canals, workshops, dams, dump stockpiles and the open pit.**
GNR 546, 18 June 2010		
14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: (1) purposes of agriculture or afforestation, inside areas identified in spatial instruments	**The proposed development is a green-fields development, which will result in the clearance of approximately 60 ha of indigenous vegetation.**

Activity No.	Activity Description	Applicability to COZA Iron Ore Project
	adopted by the competent authority for agriculture or afforestation purposes; (2) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the activity is regarded to be exclude from this list; (3) the undertaking of a linear activity falling below the (1) thresholds in Notice 544 of 2010.	

2.1.3 National Water Act (No 36 of 1998)

The NWA aims to manage national water resources in order to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected and integrated management of water resources takes place.

Other provisions of the NWA have been taken into account, specifically relating to Part 4 (section 19), which deals with pollution prevention, in particular situations where pollution of a water resource occurs or might occur as a result of activities on land. A person who owns controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources. If these measures are not taken, the catchment management agency/competent authority concerned may itself do whatever is necessary to prevent the pollution or to remedy its effects and to recover all reasonable costs from the persons responsible for the pollution.

Water use activities at mining operations are also required to comply with GN 704 which regulates the use of water for mining and mining related activities. The regulations were promulgated under Section 26(1) of the National Water Act in Government Notice (GN) 704 on 4 June 1999. The regulations provide for restrictions on locality, separation of clean and dirty water systems and protection of persons from polluted water systems. Any deviation from the requirements of the regulations is to be authorised under in terms of Section 43 of the National Water Act or by exemption from the Department of Water Affairs.

The proposed COZA Iron Ore Project will engage in water uses listed under Section 21 of the NWA. Any person wishing to use water in terms of Section 21 must either register the water use or submit an application for a Water Use Licence to the Department of Water Affairs prior to commencement. **Error! Reference source not found.** below provides a preliminary list of activities that will form part of the Integrated Water Use Licence Application (IWULA).

Table 2.2: Section 21 Water Uses Applicable for the COZA Iron Ore Project

Section 21 Water Use	Applicability to the project
(a) taking water from a water resource	**Abstraction of water from boreholes during the construction and operational phase and pit dewatering.**
(b) storing water	**Storage of drinking and raw water for the mine.**
(c): impeding or diverting the flow of water in a watercourse	**Disturbance of the pan on Farm Doornpan.**
(g) disposing of waste in a manner, which may detrimentally impact on a water resource.	**Construction and operation of the waste rock dumps, Pollution control dams, temporary waste storage facilities and sewage treatment plant.**
(i) altering the bed, banks, course or characteristics of a watercourse.	**Disturbance of the pan on Farm Doornpan (this still remains to be confirmed once final water uses have been identified).**
(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for safety of people.	**Dewatering activities will be required for the mine from year 3 and 4.**

An IWUL application together with an Integrated Water and Waste Management Plan (IWWMP) will be prepared and submitted to the DWA. The IWUL will be prepared for waste related and non-waste related water uses. The IWWMP containing specific information and designs for the water uses will be prepared by Synergistics with input from the feasibility team. The EIA will form the basis for the IWWMP.

2.1.4 National Environmental Management: Waste Act (No 59of 2008)

An application for a Waste Management Licence (WML) in terms of the National Environmental Management: Waste Act (No 59 of 2008) (NEM: WA) was submitted to the Department of Environmental Affairs (DEA) for waste management listed activities at the mine (reference number 12/9/11/L1235/8). The published list of waste management activities was amended on the 29th of November 2013. The amended list now comprises Categories A, B and C, where only activities listed under Categories A and B require a Waste Management Licence prior to commencement. Activities listed under Category C do not require a licence and instead require a person who wishes to commence with said activities to comply with the relevant requirements or standards determined by the Minister listed below:

(a) Norms and Standards for Storage of Waste, 2013; or

(b) Standards for Extraction, Flaring or Recovery of Landfill Gas, 2013; or

(c) Standards for Scrapping or Recovery of Motor Vehicles, 2013.

The proposed COZA Iron Ore Project does not trigger any of the waste management activities listed in categories A and B of the amended Regulation 718 of NEM: WA. As such, a Waste Management Licence is no longer required for the proposed project. The waste management licence application which was submitted for the COZA Iron Ore Project on 17 April 2013, is has been withdrawn.

The proposed COZA Iron Ore Project does however trigger a number of activities listed in Category C of the amended Regulation 718 of NEM: WA, as indicated in Table 2.3 below.

Table 2.3: List NEM:WA activities for the COZA Iron Ore Project

GN R 718 of November 2013	Description	Project Applicability
C(1)	The storage of general waste at a facility that has the capacity to store in excess of 100 m^3 of general waste at any one time, excluding the storage of waste in lagoons	**A waste storage facility will be operated at the mine. The storage facility will, at times, store in excess of 100 m^3 of general waste.**
C(2)	The storage of hazardous waste at a facility that has the capacity to store in excess of 80 m^3 of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste.	**A hazardous waste storage facility will be operated at the mine which will, at times, store in excess of 80 m^3 of hazardous waste.**
C(4)	The storage of waste tyres in a storage area exceeding 500 m^2.	**Waste tyres will be stored at the workshop area which may cover an area in excess of 500 m^2.**

The waste management facilities intended to be constructed as part of the COZA Iron Ore Project must therefore comply with the NEM: WA Norms and Standards for Storage of Waste, 2013. Under these Norms and Standards, COZA are required to register new waste storage facilities with the DENC within 90 days prior to the construction of the facilities taking place. The Norms and Standards also stipulate requirements in terms of:

- information required to register a waste management facility;
- the location of a facility;
- construction and design of a facility; and
- management of a waste storage facility.

COZA Mining will ensure that all waste storage facilities required for the COZA Iron Ore Project are constructed and operated as per the applicable NEM: WA Norms and Standards.

2.1.5 National Environmental Management: Air Quality Act (No 39 of 2004)

Regulation 248 as amended, published in terms of Section 21(1)(b) of the National Environmental Management: Air Quality Act (No 39 of 2004) (NEM: AQA), lists activities which may result in atmospheric emissions which may have a significant detrimental effect on the environment and which require an Atmospheric Emissions Licence (AEL) before they may commence.

The COZA Iron Ore Project will involve the construction of immobile liquid fuel storage facilities, which is an activity listed under Subcategory 2.4 of Government Notice 248. However, an AEL is only required for permanent immobile liquid fuel storage facilities if the combined storage capacity is greater than 1000 m^3 at a single site. COZA Mining, as part of the COZA Iron Ore Project, plans to construct two diesel tanks with a combined capacity of only 160 m^3. As such, an AEL will not be required for the development.

2.2 Other Legislation and Guidelines Applicable to the COZA Iron Ore Project

Error! Reference source not found. below summarises other applicable guidelines and legislation that have been considered when preparing the EIA Report.

Table 2.4: Other Applicable Legislation and Guidelines

	Legislation	Regulations / Guidelines	Description / Requirement	Project Implication
Guidelines for the EIA Process	National Environmental Management Act No 107 of 1998	2006 EIA Guidelines: Guideline 5: Assessment of Alternatives	Provides guidance for the consideration of project alternatives.	Cognisance has been given to the guideline when considering alternatives for the proposed COZA Iron Ore Project. This guideline will be consulted throughout the EIA process.
		2010 Guideline Series 5: Companion to the NEMA EIA Regulations of 2010	Provides guidance on the practical implementation of the EIA regulations. The guideline also provides clarity on the processes to be followed when applying for an environmental authorisation.	Cognisance has been given to the guideline when undertaking the scoping process. This guideline will be consulted throughout the EIA process.
		2010 Guideline 6: Environmental Management Framework Regulation, 2010	Provides guidance for the development of EMF. EMF's developed by the Minister, MEC or local authority are in turn used in the decision making process for the environmental authorisation process.	Cognisance has been given to the Siyanda District's 2008 EMF.
		2010 Guideline Series 7: Public Participation	Provides guidance on methods to be used when identifying and consulting with interested and affected parties.	Cognisance has been given to the guideline when conducting the public consultation process for the development. This guideline will be consulted throughout the EIA process.
		2010 Guideline Series 9: Need and Desirability	Provides guidance for considering the need and desirability of a proposed development within the context of sustainable development. It is stated that the authorities support economic growth and the promotion of social inclusion however, such growth should be ecologically sustainable.	This guideline has been consulted when establishing the needs and desirability of the project.

	Legislation	Regulations / Guidelines	Description / Requirement	Project Implication
Mining	**Minerals and Petroleum Resources Development Act No 28 of 2002**	Consultation Guideline	Provides guideline for consulting with communities	Cognisance was given to the guideline when undertaking the EIA process.
		Scoping Report Guideline	Provides guidance on completing a scoping report	Cognisance was given to the guideline when undertaking completing the scoping report.
		Guideline for Financial Provision	Provides guidance for developing financial provision for the mine	Cognisance has been given to the guideline when undertaking the EIA.
Biodiversity	**Northern Cape Nature Conservation Act (No 9 of 2009)**		No person may remove provincially protected plant species without a licence from the competent department	A permit to remove protected tree species will be required for the COZA Iron Ore Project.
	National Environmental |Management: Biodiversity Act 10 of 2004	Regulation 151 Publication of critically endangered, vulnerable and protected species	No person may carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit.	A permit will be required if there is a need to capture faunal protected species on site for search and rescue measures.

	Legislation	Regulations / Guidelines	Description / Requirement	Project Implication
	National Forests Act No 84 of 1998	Notice 835 List of Protected tree species under the Act	No person may carry out a restricted activity on any protected tree except if there is a licence granted by the minister.	A permit will be required prior to removing any protected trees on site.
Water Use	Regulation 704 of the National Water Act (No 36 of 1998)	GNR 704	Provides guidelines for the use of water in accordance with the National Water Act (No 36 of 1998) for mining related activities and is aimed at the protection of water resources	Cognisance to specific sections within GN 704 will be given when preparing the Integrated Water Use Licence Application. The stormwater management plan has been planned in accordance with GN 704.
Heritage Resources	National Heritage Resources Act	Section 38	(1)…..any person who intends to undertake a development categorised as: (c) any development or other activity which will change the character of a site- (i) exceeding 5000 m² in extent must notify the responsible authority at the very early stages and give details regarding the location nature and extent of the proposed development.	South African Heritage Resources Agency (SAHRA) has been notified of the development.
		Section 38(2)	The responsible heritage resources authority must within 14 days of receipt of a notification in terms of subsection (1) – (a) if there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report.	A Heritage Impact Assessment has been undertaken as part of the EIA and the report will be submitted to SAHRA for commenting.

	Legislation	Regulations / Guidelines	Description / Requirement	Project Implication
Noise	**National Environmental Management: Air Quality Act**	Section 34	Minister may prescribe national standards to: -control noise in general, by specific machinery, activities or in specified places or areas; -for determining definition for noise and maximum levels of noise.	Applicant is to adhere to the national standards for noise.
Health	**Environmental Health Impact Assessment (EHIA) in South Africa: Guidelines 2010**	Department of Health: 2010 Guidelines	The Department of Environmental Affairs should consult with Environmental Health (Department of Health) to conduct a screening process to determine if a project requires a Health Impact Assessment.	The scoping report was submitted to the Department of Health for review. No comments have been received.
Land use	**Northern Cape Planning and Development Act (No 7 of 1998)**	Section 44 (1)	'Any application made to amend or alter land use rights, including rezoning, departures and consent, regardless of whether the site concerned was previously administered in terms of the Black Communities 'Development Act, 1984 (Act No 4 of 1984), or any other act or ordinance, shall be processed in accordance with the procedure specified in Schedule A".	Application for rezoning will be submitted by COZA Mining at a later stage following a procedure specified in Schedule A of the Act.

2.3 Legislative Requirements for the Structure of the EIR and EMPR Report

The Environmental Impact Assessment Report is structured in accordance with GNR 543 (EIA regulations) in terms of the NEMA, as well as Regulation 50 of the MPRDA. The tables below provide a summary of the requirements of these regulations, with cross references to the report sections where these requirements have been addressed.

Table 2.5: Structuring of the EIA Report in terms of GNR543 Requirements (NEMA)

Legal and Regulatory Requirement	Cross Reference to Report Section
GNR 543 Section 31(2)	
An EIA Report must contain all the information that is necessary for the competent authority to consider the application and reach a decision contemplated in regulation 35, and must include :	
a) Details of: (i) the EAP who compiled the report; and (ii) the expertise of the EAP to carry out and EIA;	Project Information Sheet
b) A description of the proposed activity;	Section 4
c) A description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is: (i) a linear activity, a description of the route of the activity; or (ii) an ocean-based activity, the coordinates where the activity is to be undertaken;	Section 1.2
d) A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;	Section 6
e) Details of the **public participation process** conducted in terms of regulation 28(1), including: (i) **steps undertaken in accordance with the plan of study**; (ii) a list of all persons or organisations that were **registered as interested and affected parties**; (iii) a summary of comments received from, and a summary of issues raised by interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and (iv) copies of any representation and comments received from registered interested and affected parties.	Section 3.9 (steps taken and process followed), and Section 6 (results of process followed with summary of issues raised), as well as Volume II (detailed public participation report)
f) A description of the **need and desirability** of the proposed activity;	Section 1.3 and 1.4
g) A description of **identified potential alternatives** to the proposed activity, **including advantages and disadvantages that the proposed activity or alternatives** may have on the environment and the community that may be affected by the activity;	Section 5
h) An indication of the methodology used in determining the significance of potential environmental impacts;	Section 3.8
i) A description and comparative assessment of all alternatives identified during the EIA process;	Section 5
j) A summary of the findings and recommendations of any specialist report or report on specialist processes;	Section 6 and 9 and Volume II

Legal and Regulatory Requirement	Cross Reference to Report Section
k) A description of all environmental issues that were identified during the EIA process, an assessment of the significance of each issue and an indication of the extent to which issue could be addressed by the adoption of mitigation measures;	Section 9
l) An assessment of each identified potentially significant impact, including – (i) Cumulative impacts (ii) The nature of the impact; (iii) The extent an duration of the impact; (iv) The probability of the impact occurring; (v) The degree to which the impact can be reversed; (vi) The degree to which the impact may cause irreplaceable loss of resources; and (vii) The degree to which the impact can be mitigated.	Section 8
m) A description of any assumptions, uncertainties and gaps in knowledge;;	Section 3.2 and 3.3
n) A reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 11
o) An environmental impact statement which contains – (i) A summary of the key findings of the EIA; and (ii) A comparative assessment of the positive and negative implications of the proposed activity and identified alternatives.	Section 11
p) A draft environmental management programme containing the aspects contemplated in regulation 33;	Section 10
q) Copies of any specialist reports and reports on specialised processes complying with regulation 32;	Volume II
r) Any specific information that may be required by the competent authority; and	None requested
s) Any other matters required in terms of sections 24(4)(a) and (b) of the Act.	This EIA and EMPR Report

Table 2.6: Structuring of the EMP in terms of NEMA

Legal and Regulatory Requirement	Cross Reference to Report Section
GNR 543 Section 33)	
A draft environmental management programme must comply with section 24N of the Act and include - :	
a) Details of: (i) the person who compiled the EMP; and (ii) the expertise of the person to compile an EMP;	Project Information Sheet

Legal and Regulatory Requirement	Cross Reference to Report Section
b) Information on the proposed management and mitigation measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated by the Regulations, including environmental impacts or objectives in respect of – (i) Planning and design; (ii) Pre-construction and construction activities; (iii) Operation or undertaking of the activity; (iv) Rehabilitation of the environment; and (v) Closure, where relevant;	Section 10
c) A description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is: (i) a linear activity, a description of the route of the activity; or (ii) an ocean-based activity, the coordinates where the activity is to be undertaken;	Section 1.2
d) An identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b);	Section 10
e) Proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon;	Section 10.12
f) As far as reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development, including where appropriate, concurrent or progressive rehabilitation measures;	Section 10.10
g) A description of the manner in which it intends to – (i) Modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Remedy the cause of pollution or degradation and migration of pollutants; (iii) Comply with any prescribed environmental management standards or practices; (iv) Comply with any applicable provisions of the Act regarding closure, where applicable; (v) Comply with the provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Section 10
h) Time periods within the measures contemplated in the EMP must be implemented;	Section 10
i) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking the listed activity;	Section 10.12
j) An environmental awareness plan describing the manner in which – (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment;	Section 10.13

Legal and Regulatory Requirement	Cross Reference to Report Section
k) Where appropriate, closure plans, including closure objectives.	Section 10.10.1

Table 2.7: Structure of the EIA Report in terms of Regulation 50 of the MPRDA

Legal and Regulatory Requirement	Cross Reference to Report Section
The contents of an EIA Report must include the following:	
(a) an assessment of the environment likely to be affected by the proposed mining operation, including cumulative environmental impacts;	Section 5
(b) an assessment of the environment likely to be affected by the identified alternative land use or developments, including cumulative environmental impacts;	Section 5 (baseline environment) Section 8.2 Cumulative Impact Assessment
(c) an assessment of the nature, extent, duration, probability and significance of the identified potential environmental, social and cultural impacts of the proposed mining operation, including cumulative environmental impacts;	Section 8
(d) a comparative assessment of the identified land use and development alternatives and their potential environmental, social and cultural impacts;	Volume II (Socio-Economic Study)
(e) determine the appropriate mitigatory measures for each significant impact of the proposed mining operation;	Section 8
(f) details of the engagement process of interested and affected persons followed during the course of the assessment and an indication of how the issues raised by interested and affected parties have been addressed;	Section 3.9 (steps taken and process followed), and Section 6 (results of process followed with summary of issues raised), as well as in Volume II (detailed public participation report)
(g) identify knowledge gaps and report on the adequacy of predictive methods, underlying assumptions and uncertainties encountered in compiling the required information;	Section 3.2 and 3.3
(h) description of the arrangements for monitoring and management of environmental impacts;	Section 10.11
(i) inclusion of technical and supporting information as appendices, if any	Volume II

Table 2.8: Structure of the EMPR in terms of Regulation 51 of the MPRDA

Legal and Regulatory Requirement	Cross Reference to Report Section
AN EMPR contemplated in section 39(1) of the Act must include the following:	

Legal and Regulatory Requirement	Cross Reference to Report Section
(a) A description of the environmental objectives and specific goals for - (i) mine closure; (ii) the management of identified environmental impacts emanating from the proposed mining operation; (iii) the socio-economic conditions as identified in the social and labour plan; and (iv) historical and cultural aspects, if applicable.	Section 10.10.1
(b) An outline of the implementation programme which must include - (i) a description of the appropriate technical and management options chosen for each environmental impact, socio-economic condition and historical and cultural aspects for each phase of the mining operations. (ii) action plans to achieve objectives and specific goals contemplated in paragraph (a) which must include a time schedule of actions to be undertaken to implement mitigatory measures for the prevention, management and remediation of each environmental impact, socio-economic condition and historical and cultural aspects for each phase of the mining operation; (iii) procedures for environmental related emergencies and remediation; (iv) planned monitoring and environmental management performance assessment; (v) financial provision in relation to the execution of the EMP; (vi) an environmental awareness plan contemplated in section 39(3)(c) of the Act ; (vii) all supporting information and specialist reports that must be attached as appendices to the EMP; and (viii) an undertaking by the applicant to comply with the provisions of the Act and the regulations thereto.	Section 10.

3. STUDY APPROACH AND METHODOLOGY

3.1 Study Objectives

The objectives of the EIA were to:

- Identify legislative requirements for the proposed development to ensure compliance through the different phases of the project;
- Establish a detailed project description in order to understand the likely impacts;
- Undertake detailed specialist studies to understand the baseline environmental conditions and to inform the EIA on the projects impacts;
- Afford an additional opportunity for interested and affected parties (IAPs) to comment on the proposed development;
- Identify environmental and social impacts of the proposed development; and
- Assess the significance of identified impacts in order to advise on the level of management and mitigation required.

The objectives of the EMPR are to

- Identify and list measures to avoid, minimise, manage or mitigate the identified impacts;
- Identify the roles and responsibility for the implementation of management and mitigation measures; and
- Establish the timeframes in which the management measures are to be implemented.

3.2 Study Assumptions

It is assumed that the project description used for the assessment and as provided by COZA is a true reflection of the intended project and that Synergistics has been provided with all necessary information required to undertake an assessment of the potential impacts of the project.

It should be noted that some of the specialist studies were undertaken prior to the finalisation of the project description. The project description provided in specialist reports may thus differ slightly from that given in the EIA Report. **The EIA Report however presents the most up to date description for which the impacts have been assessed and management measures proposed.**

The identification of environmental impacts, the rating of impact significance and the recommendation of mitigation measures assumes that the design parameters and standard operating conditions at the proposed COZA Iron Ore Mine will be implemented with an acceptable level of management and maintenance efficiency.

3.3 Knowledge Gaps and Uncertainties

The impacts identified in this report are based on the current understanding of the baseline environment.

Modelling undertaken provide simulations of the future environment and as far as possible try to reflect the impending reality. However, additional monitoring and an updating of the models will be required throughout the different stages of the proposed development to ensure a thorough understanding of the impacts.

The project layout and design is based on information collected during the Scoping and EIA process, as well as a concept study conducted by COZA Mining. Information will however be continually refined and updated throughout the different stages of the proposed development. As such, the actual project layout and design may not match exactly what is described in the project description, as adjustments to the layout or the sizing of some infrastructure may have to be made based on updated information. Changes may include, for example, the sizing of pollution control dams based on updated dewatering estimates, or the positioning of infrastructure based on geotechnical conditions on site.

3.4 Study Area

The core study area can be defined as the area to be mined on the farm Doornpan, and areas affected by associated activities and infrastructure, as illustrated in Figure 1.1 and 1.2. The various specialist studies have been used to define a project zone of influence, which defines the broader study area. Maps are provided in the various specialist studies.

3.5 Scoping Phase

A scoping study was undertaken as the first phase of the EIA process. During the scoping phase:

- Project and baseline environmental information was gathered and collated;
- Landowners, adjacent landowners, local authorities, environmental authorities, as well as other stakeholders which may be affected by the project, or that may have an interest in the environmental impacts of the project were identified.
- IAPs were informed about the proposed project.
- Public meetings were arranged and IAP issues and concerns were identified.
- Environmental authorities were consulted (telephonically) to confirm legal and administrative requirements.
- Environmental issues and impacts were identified and described.
- Development alternatives were identified and evaluated, and non-feasible development alternatives were eliminated.
- The nature and extent for further investigations and specialist input required in the EIA phase was identified.

- The draft and final scoping reports were submitted for review by authorities, relevant organs of state and IAPs.
- Key IAP issues and concerns were collated into an issues and response report for consideration in the EIA phase.

Scoping is a critical step in the environmental assessment process. Through scoping, significant issues, which require further investigation, are identified. Issues that are identified as having a potentially significant impact are carried forward into the EIA phase and subsequently addressed in the EMPR.

The draft scoping report was submitted to the regulating authorities in July 2013 and the final scoping report was submitted in September 2013. The final scoping report was accepted by DENC on 4 November 2013.

3.6 EIA Phase

The EIA component of the study included:

- Specialist investigations (see Section 3.7) were undertaken in accordance with the terms of reference established in the scoping assessment (plan of study for EIA included in the scoping report).
- An evaluation of development alternatives and identification of a preferred option.
- An assessment of impacts, integrating specialist findings to assess existing (no-go development option), incremental (associated with the proposed project) and cumulative impacts using the impact assessment methodology as described in Section 3.8.
- Identification of mitigation measures to address these environmental impacts and development of actions required to achieve the mitigation measures defined.
- Continued engagement with IAPs.
- Continued engagement with environmental authorities on legal and administrative processes.
- Incorporation of public comment received during scoping into the draft EIA report.
- Production of an environmental impact statement.
- Issuing of the draft EIA report for review.

Once the draft EIA report has been reviewed, further comments received will be incorporated in the final EIA report and final EMPR.

3.7 Specialist Studies

The specialist studies undertaken as part of the EIA process in order to understand the environmental impacts of the project are summarised in Table 3.1.

Table 3.1: Specialist Studies undertaken as part of the EIA process

Specialist Study (Volume II)	Terms of Reference and Methodology
Floral and Faunal Assessment (Appendix C and D, Volume III)	• Conduct a spring and autumn survey to identify presence of faunal and floral sensitive species. • Provide a description of the dominant fauna and flora species occurring in the area; • Describe floral species composition and structure, and distinguish clearly between areas containing predominantly exotic and predominantly natural vegetation; • Identify and describe endangered, rare or protected species; • Map potential habitat for species (based on relevant databases), with an indication of the relative importance of the specific community in the area under investigation; and • Provide an impact assessment of the proposed operation and recommended mitigation measures.
Air Quality Specialist Study (Appendix E, Volume III)	• Determine the regional climate and site-specific atmospheric dispersion. • Describe legal requirements and standards; • Identify the potential sensitive receptors within the vicinity of the proposed mine extension. • Develop an emission inventory for the proposed mine. • Develop a dispersion model to determine the magnitude and extent of anticipated air quality impacts. • Predict dust fallout and fine particulate (PM10) concentrations; • Define dust nuisance (dust fallout) and potential health impact areas; • Develop of a dust management plan for the mine. • Provide recommendations for air quality monitoring
Surface Water Impact Assessment (Appendix F Volume III)	• Conduct a baseline study to characterise the surface water regime at the proposed development site and the catchments in which it resides in terms of water quality and quantity. • Determine flood hydrology of the area; • Compile a site wide Environmental Water Balance; • Assess the impacts of the proposed development on the receiving surface water environment. • Provide recommendations on mitigation measures to reduce and/or avoid potential surface water impacts. • Develop a Stormwater Management Plan; and

Specialist Study (Volume II)	Terms of Reference and Methodology
	• Recommend monitoring program.
Groundwater Impact Assessment (Appendix G, Volume III)	• Perform a hydro-census of the study area; • Develop a comprehensive environmental groundwater baseline description including an analysis and description of ground water use, current water levels and qualities and aquifer parameters; • Identify and describe anticipated mining and surface activity related groundwater impacts; • Calculate dewatering rates, cones of depression and inflows into the pit areas; • Develop a transport model to determine the dispersion plume; • Identify groundwater management objectives and measures over life of mine; and • Design and compile a comprehensive groundwater monitoring plan in line with existing guidelines.
Soils and Land Capability (Appendix H, Volume III)	• Classify the types and volumes of soils that will be disturbed; • Investigate the suitability of soils for rehabilitation; • Conduct a soil balance to determine the volumes of soil required and available for rehabilitation; and • Develop a soil management plan to allow for stripping, stockpiling and management of soils to promote effective use in rehabilitation.
Economic Impact Assessment (Appendix I, Volume III)	• Base Profiling and Trend Analysis of the study area; • Identification of economic indicators to reflect the state of the market; • Develop and analyse community demographics and profiles at regional level; • Assess the economic benefits of mining vs. agriculture • Estimate value of impacts to the local economy due to project investment; • Model Development and Impact Assessment; and • Develop recommendations and a Mitigation Plan.
Heritage Impact Assessment (Appendix J, Volume III)	• Conduct an aerial photographic survey to identify and map heritage resources in the affected area; • Conduct a physical survey of the area consisting of a walkthrough of the proposed development footprint areas aimed at locating heritage resources falling within and directly adjacent to the proposed development footprint areas; • Map all heritage resources in the affected area; • Assess the significance of such resources using heritage assessment criteria;

Specialist Study (Volume II)	Terms of Reference and Methodology
	• Assess the impact of the development of such heritage resources; • Consider and assess alternatives in the event that heritage resources will be adversely affected by the proposed development; and • Propose mitigation of any adverse effects during and after the completion of the proposed development.
Social Impact Assessment ((Appendix K, Volume III)	• Review existing social documentation; • Establish local social baseline at a local level; • Determine the project's social impacts; • Identify opportunities for social development; and • Identify methods for future consultation with the surrounding communities.
Traffic Impact Assessment (Appendix L, Volume III)	• Determine baseline traffic conditions; • Conduct traffic counts; • Determination of trip generation, distribution and assignment due to mining operation; • Intersection and access analysis; • Safety assessment, including safe sight distances and pedestrian safety as well as the railway crossing; • Impact of the proposed project on existing road pavements and traffic conditions; and • Development of recommendations & Mitigation Plan.
Visual Impact Assessment (Appendix M, Volume III)	• Conduct a viewshed analysis for the study area and its surrounds; • Identify sensitive receptors for the different visual intrusions; and • Identify management and mitigation measures for identified visual impacts.

3.8 Identification of Alternatives

A discussion on alternatives in given in Section 4.8. Specialist studies were undertaken for the project to identify sensitive areas and determine project impacts. Designing the layout of the proposed project was an iterative process whereby a preferred alternative, which avoids environmental impacts as far as possible, was identified based on the findings of the specialist studies. Only the potential impacts associated with the preferred alternative have been assessed in this EIA.

3.9 Environmental Impact Assessment Methodology

3.9.1 Identification and Description of Impacts

The identification and assessment of environmental impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with the proposed project. The process involves consideration of, *inter alia*: the purpose and need for the project; views and concerns of interested and affected parties; social and political norms, and general public interest.

The methodology used for assessing impacts associated with the proposed project follows the philosophy of EIAs, as described in the booklet Impact Significance, Integrated Environmental Management Information Series 5 (DEAT, 2002). The philosophy is summarised by the following extracts:

- "The impact magnitude [or intensity] and significance should as far as possible be determined by reference to legal requirements, accepted scientific standards or social acceptability. If no legislation or scientific standards are available, the EIA practitioner can evaluate impact magnitude based on clearly described criteria. Except for the exceeding of standards set by law or scientific knowledge, the description of significance is largely judgemental, subjective and variable. However, generic criteria can be used systematically to identify, predict, evaluate and determine the significance of impacts." (DEAT, 2002).
- "Determining significance [of impacts] is ultimately a judgement call. Judgemental factors can be applied rigorously and consistently by displaying information related to an issue in a standard worksheet format." (Haug et al., 1984, taken from DEAT, 2002).

3.9.1.1 Existing Impacts (Impacts of Existing Developments within Project Impact Area)

Although the COZA Iron Ore Project is a green-fields project, it is located in an area that is subject to some human impacts from a number of sources. Impact sources include current agricultural operations on the Farm Doornpan, neighbouring mining operations, most notably Sedibeng Mine, as well as the R325 road which lies adjacent to the proposed development site. The current level of environmental degradation (existing impacts) associated with existing developments have been described in Section 5. Defining the current level of degradation associated with existing developments is essential to understand and enable the assessment of cumulative impacts. The assessment of existing impacts is qualitative and limited to the area of impact for the individual environmental components.

3.9.1.2 Incremental Impacts (Impact of the COZA Iron Ore Project)

Incremental impacts refer to the impacts of an activity looked at in isolation (impacts of an individual activity), thus not considering the combined, cumulative or synergistic impacts of the activity, or the cumulative impacts of the activity with other activities or the existing impacts. Section 8 describes the incremental impacts of the COZA Iron Ore Project.

3.9.1.3 No-go Development Impacts

The no-go development is considered as an alternative in the evaluation of development alternatives. In the EIA the no-go development impacts would be similar to the existing impacts.

3.9.1.4 Cumulative Impacts

For this project, cumulative impacts will be determined as:

Existing Impacts	**+**	***Incremental Impacts***	**=**	***Cumulative Impacts***
Existing impacts within the project area and surrounds including existing mining and agricultural operations (current level of degradation)		Impacts of the proposed COZA Iron Ore Project		Existing impacts in the immediate surrounds combined with the impacts of the proposed COZA Iron Ore Project

In the assessment above, existing impacts often also represent the impacts of the no-go development option. Potential future projects in the area, for which the environmental impacts are currently undefined, have not been included in the cumulative impact assessment and will have to be assessed in separate EIA processes for these projects.

3.9.2 Impact Ranking Criteria

The impact rating criteria is given in Section 7 of the report.

3.9.3 Project Phases

The environmental impacts for the project have been assessed over five phases of the project i.e. the planning and design, construction, operation, decommissioning and post-closure phase.

3.9.3.1 Planning and Design

The planning and design phase refers to the stage when the feasibility studies are being undertaken, the project description is developed and the project is being designed. During this phase the EIA is completed and environmental authorisations are applied for. This phase commenced in the first quarter of 2013 and is anticipated to be completed in the first quarter 2015.

3.9.3.2 Construction

The construction phase will commence after the environmental authorisations have been obtained. This phase will involve the physical construction of the infrastructure required for the COZA Iron Ore Project. Construction is anticipated to commence late 2017.

For the purposes of the COZA Iron Ore Project, construction refers to the development of infrastructure required for mining to commence, including clean water management infrastructure such as canals and dams, dirty water management infrastructure such as pollution control dams and pumps, access and haul roads, on-site offices, crushing and screening plant, workshops clearance of laydown areas etc.

3.9.3.3 Operation

The mine operation is anticipated to commence in 2017. Operational activities are anticipated to proceed for about 4 years. Operational activities commence with site clearance, soil stripping, followed by the removal of overburden and then the extraction of the iron ore. These activities will commence once the initial construction activities have been completed.

3.9.3.4 Decommissioning and Closure

The decommissioning phase refers to the time in the mine life when mining operations are reduced in preparation for closure. This phase will occur once the resource has been mined optimally and economically. It is anticipated that mining activities will last approximately 4 years, it is therefore estimated that decommissioning will commence in 2020. The decommissioning phase will involve the final rehabilitation activities and implementation of the final land use plan.

The closure phase refers to when the mine is shut down and no mining activities are undertaken, this phase will occur after successful decommissioning has been achieved.

3.9.3.5 Post-Closure

Post-closure refers to the period after all mining and rehabilitation activities have been completed. It refers to the phase during which any predicted residual impacts of the mine are monitored and managed.

3.9.4 Mitigation Measures

A **no net loss** approach will be adopted in terms of the management of impacts at the COZA Iron Ore Project. The following hierarchy is thus applied:

- **Avoidance** – impacts are to be avoided where practicable e.g. through the implementation of alternatives;
- **Mitigation** – should it not be possible to avoid all impacts, the remaining impacts are to be mitigated to acceptable levels;
- **Offset** – should it not be possible to avoid and mitigate all impacts to acceptable levels it will be necessary to offset the remaining impacts. Suitable offsets will need to be identified.

Mitigation measures for significant impacts which cannot be avoided have been identified. The impacts have been ranked before and after the implementation of the mitigation measures.

Consideration has also been given to the confidence level that can be placed on the successful implementation of the mitigation level as follows:

- **High Confidence:** mitigation measure easy and inexpensive to implement.
- **Medium Confidence:** mitigation measure expensive or difficult to implement.
- **Low Confidence:** mitigation measure expensive and difficult to implement.

Where mitigation is not sufficient to reduce the impact to acceptable levels offsets have been proposed.

3.10 Public Participation

3.10.1 Identification of Interested and Affected Parties

Potential IAPs were identified using existing databases for similar developments in the Postmasburg and Kathu area. The databases included authorities, ratepayers association, farmers union and surrounding mines. The contact details of the IAPs were verified and updated where necessary. Landowners on and surrounding the project sites were identified using LexisNexis title deed search and networking. Identification of new IAPs was undertaken using the following methods:

- Site visit on the 9-10 May to deliver Background Information Documents (BID). During this visit, the Maremane Community was identified and key contacts were included in the IAP database.

- Requesting registered IAPs to identify any additional people that may be affected by the development (networking and referral).
- Placement of site and press advertisement.

People and/or organisations were registered as IAPs for the project if they:

- Are landowners or tenants adjacent to or within 100 m from the proposed study area
- Are the local municipality/ ward councillor with jurisdiction in the area
- Represent the ratepayers association
- Are an authority or organ of state having jurisdiction in respect of any aspect of the activity
- Responded to the BID, press advertisements and site posters
- Attended one of the information sharing meetings
- Own, operate or administrate infrastructure affected by the project.
- Contacted Synergistics telephonically, or via fax, e-mail or post regarding the project

A list of all parties that were consulted during the public participation and authority consultation process is provided in Appendix A (Public Participation Report).

3.10.2 Notification of Landowners, Lawful Occupiers and IAPs

Potential IAPs were notified and informed about the proposed development and the Scoping and EIA process being undertaken since the start of the Scoping Phase in May 2013. Notifications to IAPs were provided in English, Afrikaans and Setswana where required. Notification included:

- Direct letter to the landowners: a letter was sent to Mr More Matsididi as a representative of the Maremane Community. Mr Matsididi signed the acknowledgment of receipt on the 8th of March 2013 and signed consent to undertake the waste management listed activities in terms of NEM: WA on Doornpan.
- Distribution of the BID by hand during site visit, via email and at the information sharing meetings (see Section 3.10.2.2 for further detail)
- Press and site notification (see Section 3.10.2.1 for further detail)
- Two Public Information Sharing meetings (see Section 3.10.2.3 for further detail)

Responses received during this process are captured in Table 6.1 under Section 6.2.. Comments received are included in Appendix A.

3.10.2.1 Media Advertisements and Site Notices

Press adverts were placed in the following newspapers:

- Kathu Gazette in English on the 18th of May 2013
- Volksblad in Afrikaans on the 15 May 2013

Site notices (A2 and A3) were placed on the 9 and 10th of May 2013 at the following areas:

- Main entrance to Farms Driehoekspan and Doornpan (English and Afrikaans)
- Tsantsabane Local Municipality's notice board (English, Afrikaans and Setswana)
- Maremane Community at the local shop (Setswana)

The press and site notification were placed to elicit interest from other IAPs that might not have been identified during the stakeholder identification process. The advert and site notice and proof of notification are included in Appendix A.

3.10.2.2 Background Information Document

A BID (Appendix A) was circulated by hand between the 9th and 10th of May 2013 to all adjacent landowner, mines and communities. Other IAPs received the BID via email. The BID was also provided at the information sharing meeting on 23 May 2013.

The BID provided background information on the COZA Iron Ore Project and provided an explanation of the Scoping and EIA process that is currently being undertaken for the project. The BID also invited members of the public to register as IAPs and participate in the EIA process. A response sheet was attached the BID on which IAPs could provide written comments on the proposed development.

3.10.2.3 Information Sharing Meetings

Information sharing meetings were held on the 23rd of May 2013. Meetings were held at the following areas:

- Postmasburg Town Hall at 10h00 -12h00
- Maremane Community Hall at 13h30-15h30

The purpose of the meetings was to introduce the COZA Iron Project to IAPs as well as to advise them of the EIA process that is currently being undertaken by Synergistics. The meeting also afforded IAPs the opportunity to raise any issues of concern regarding the project and the EIA process. The meeting in Postmasburg was held in English whilst the Maremane Community meeting was held in Setswana. The list of attendees and minutes of the meeting are attached as Appendix A.

3.10.3 Notification of Competent Authorities

3.10.3.1 Northern Cape Department of Environment and Nature Conservation (DENC)

An application for environmental authorisation in terms of NEMA was submitted to the DENC on the 5th of April 2013 and has been assigned the reference number NC/EIA/04/SIY/TSA/POS/DRIE/2013/NCP/EIA/0000215/2013. The officer in charge of the project is Ms Dorien Werth.

3.10.3.2 National Department of Environmental Affairs (DEA)

An application for a waste management licence was submitted to the DEA in terms of NEM:WA on 17 April 2013 and has been assigned the reference number 12/9/11/L1235/8. Following the change in legislation, the application for the WML is no longer required for the project.

3.10.3.3 Northern Cape Department of Mineral Resources (DMR)

A mining right application has been submitted to the Department on 10 July 2013 the application was assigned reference no. NC30/5/1/2/2/10034MR. Following the submission of the right, a scoping report in a standard DMR template was submitted for consideration by the DMR.

3.10.3.4 Northern Cape Department of Water Affairs (DWA)

The DWA has been notified of the project through the circulation of the BID on the 10th of May 2013. A copy of the draft scoping report was also couriered to the Department on 9 September 2013. A water use licence will be submitted in July 2017 to DWA in terms of the NWA.

3.10.4 Notification of Other Relevant Authorities

In addition to the authorities listed above, the BID and notification of the availability of the draft scoping report was circulated to the following commenting authorities:

- Tsantsabane Local Municipality
- Siyanda District Local Municipality
- Northern Cape Department of Agriculture, Land Reform and Rural Development
- Northern Cape Department of Health
- South African National Roads Agency
- Northern Cape Department of Agriculture, Forestry and Fisheries

- South African Heritage Resources Agency

Authorities were also invited to attend the information-sharing meeting held on the 23rd of May 2013. The following authorities attended the meeting:

- Department of Cooperative Governance, Human Settlements & Traditional Affairs
- Department of Roads and Public Works

3.10.5 Review of Draft Scoping and Final Scoping Reports

The draft scoping report was made available from 9 July to 9 September 2013 for authorities and 9 July to 12 August 2013 for the public.

Copies of the final scoping report were made available for public and authority review for 21 calendar days from 4 October to 28 October 2013.

The reports were made available at the Tsantsabane Local Municipality (municipal library) and the Maremane Community Crèche. Registered IAPs were notified via email, post or sms on the availability of the Scoping Report. A summary of the report was prepared and translated into Setswana for the Maremane Community. IAPs were also notified that the electronic copy could be made available on request. No comments were received from authorities or the public on the draft or final scoping reports.

3.10.6 Review of Draft and Final EIA Report

Under the NEMA process, the draft EIA report will be made available for public and authority review in April 2014 for 6 weeks (40 calendar days). All registered IAPs will be notified in writing of the availability of the document for review and will be requested to submit comments.

Under the NEMA process, the final EIA report will be made available for public and authority review for approximately 3 weeks (21 calendar days) on submission to the authorities. The review periods for authorities are in accordance with GNR 543 for both the Scoping and EIA Reports.

3.10.7 Public Feedback Meeting during the EIA Phase

During the EIA review phase of the study, a public meeting will be arranged to present the results of the specialist studies. Registered IAPs will be directly invited to attend the meeting.

4. PROJECT DESCRIPTION

4.1 Proposed Mine Plan

The proposed COZA Iron Project will involve the mining of iron ore from an open pit to be located on Farm Doornpan. The proposed development will be a green-fields project with an estimated area of disturbance of 159 ha. A preliminary layout plan has been developed for the Doornpan mining area (refer to Figure 4.1).

Mining from the pit will be undertaken by means of truck and shovel. It is estimated that the pit will reach an average depth of 80 -100m below surface. Mining will involve the following activities:

- Site clearance which will involve the removal of vegetation within the mine footprint area of approximately 60 ha;
- Removal of available soils and stockpiling at designated areas for rehabilitation purposes;
- Drilling and blasting of overburden material;
- Loading and haulage of overburden to the waste rock dump site within the mine infrastructure areas; and
- Dewatering of the mine by means of dewatering boreholes.

Following a preliminary resource estimation process, it is estimated that 1 .7 million tons of ore is available to be mined at Doornpan. Table 4.1 shows the estimated rate of ore production throughout the Life of Mine (LOM).

Table 4.1: Estimated ore production over the LOM

Year 1	Year 2	Year 3	Year 4
133 818	215 423	346 555	1 050 164

4.2 Processing

Processing activities, including crushing, screening, and blending will take place on site in designated areas adjacent to the pit. Crushed ore will then be blended prior to transport off-site where it will be further processed. No tailings facilities will therefore be required at the mine.

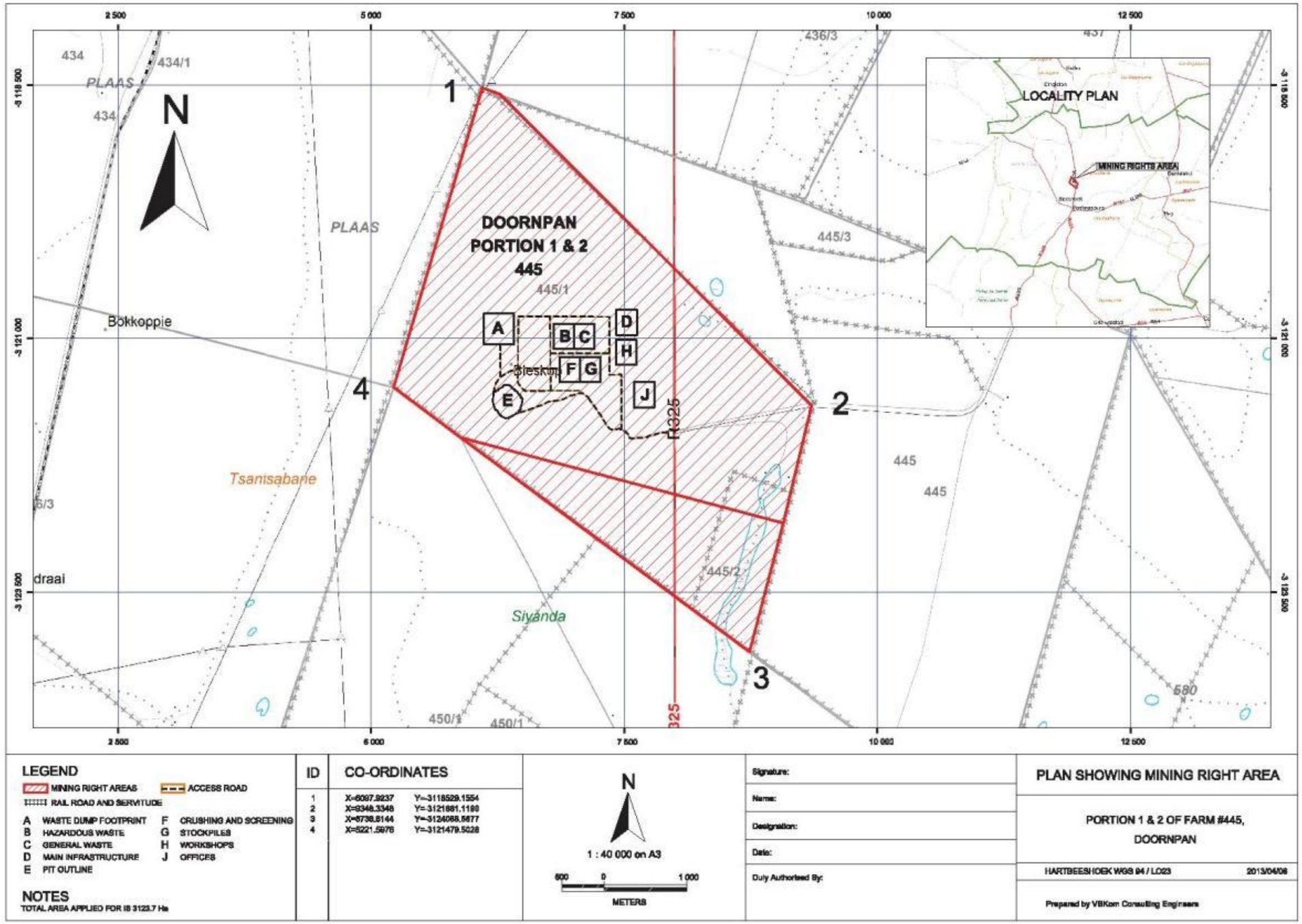


Figure 4.1: Preliminary Mine Layout Plan for the COZA Iron Ore Project

4.3 Transportation Requirements and Access Roads

Access to the site during the construction phase will be via the existing access roads that link to the R325. The existing gravel access roads linking to the R325 will be upgraded to cater for operational phase traffic. Upgrading activities will include widening and lengthening of gravel roads. In addition, a number of haul roads will be constructed to link the pit, waste rock dump, crushing and screening plant, offices and waste storage facilities (refer to Figure 4.1).

Processed ore will be transported by 32 ton ore trucks via the R325 to off-site loading facilities for transport via rail (the rail transportation of ore does not form part of this assessment). In addition, mine employees will be transported from Postmasburg to the mine and back via bus.

Table 4.2 sets out the calculated trips required for the transportation of waste rock and ore, as well as the transportation of mine employees.

Table 4.2: Number of trips required yearly

Vehicle Type	Purpose and Route	Trip Distance (km)	Year 1	Year 2	Year 3	Year 4	Total
100t Ore Truck	Waste rock from the pit to the dump	0.5	14 059	32 982	33 268	15 505	95 814
100t Ore Truck	Ore from the pit to the crushing and screening plant	0.5	3 345	5 386	8 664	26 254	43 649
135t Truck	Processed ore from the crushing and screening plant to off-site loading facility	>60	3 345	5 386	8 664	26 254	43 649
32 t Ore trucks	Transporting ore from the site to offloading areas via the R325	30	3 650	3 650	3 650	3 650	14 600
Passenger bus	Mine employees from employee housing in Postmasburg to the mine and back	15.5	2190	2190	2190	2190	8760

4.4 Equipment and Fuel Requirements

In order to complete mining within the planned life of mine, COZA have calculated the fuel requirements for equipment and mining activities for the proposed project. The required plant and equipment, usage, as well as fuel requirements are set out in Table 4.3 below.

Table 4.3: Equipment and fuel requirements

Equipment Requirements	Fuel Consumption (litres/hour)	Hours/annum	Fuel Consumption (litres/month)	Fuel Consumption (litres/annum)
1 x 3m³ Ore Shovel	41	3 872	13 228	158 736
1x 4m³ Waste Shovel	43	3 872	13 873	166 479
4 x 100t Ore Truck	90	3 139	94 157	1 129 890
1 x 40t Waste Truck	33	3 139	8 631	103 573
1 x Drill Rig	67	3 872	21 616	259 398
1 x FEL -Rehandle	43	3 355	12 023	144 282
2 x Track Dozer - dumps & loading area	57	1 807	17 245	206 945
1 x Wheel Dozer - loading area	55	1 807	8 281	99 371
1 x Diesel Tanker	24	1 291	2 614	31 373
1 x Water Tanker	24	2 065	4 183	50 197
1 x Crane	20	1 549	2 581	30 973
1 x Grader	27	1 807	4 124	49 487
1 x Hydraulic Hammer	24	1 807	3 660	43 922
3 x 4x4 S/C	10	4 388	10 970	131 635
1 x Bus	15	2 065	2 581	30 973
Total	**575**	**39 831**	**219 769**	**2 637 233**

In order to accommodate fuel requirements during the construction and operational phases of the mine, it has been decided to install two 80 000 litre diesel tanks at the mine.

4.5 Water Supply

Potable and raw water will be required for domestic purposes, mine construction and mine operations activities such as dust suppression and washing of mine machinery and vehicles at the wash bay. Calculated water requirements throughout the life of the mine is summarised in Table 4.4 below.

Water for mining activities will be sourced from pit dewatering activities at the mine. Dewatering will be undertaken by means of dewatering boreholes, which will be drilled around the proposed pit footprint during the construction phase. It is estimated that approximately 220 m^3/day of water will be extracted from the dewatering boreholes throughout the construction and operation phases of the project.

Table 4.4: Water requirements throughout life of mine

Activity	Water Usage (m^3)				
	Year 1	Year 2	Year 3	Year 4	Total
Dust suppression	70524	70524	70524	70524	282096
Working Faces/Shovel	5200	5200	5200	5200	20800
Drill Rigs	581	581	581	581	2323
Wash Bay	480	480	480	532	1974
Potable water for mine personnel	1121	1121	1121	1121	4484
Total	77906	77906	77906	77958	311677

4.5.1 Mine Water Balance

The mine water balance is for years 1 to 3 and for year 4 is presented in Figure 4.2 and 4.3 respectively. The water balance shows that there is a small amount of 230m^3/month of excess water that will need to be managed during year 4. This is however largely dependent on the geohydrological conditions encountered during mining.

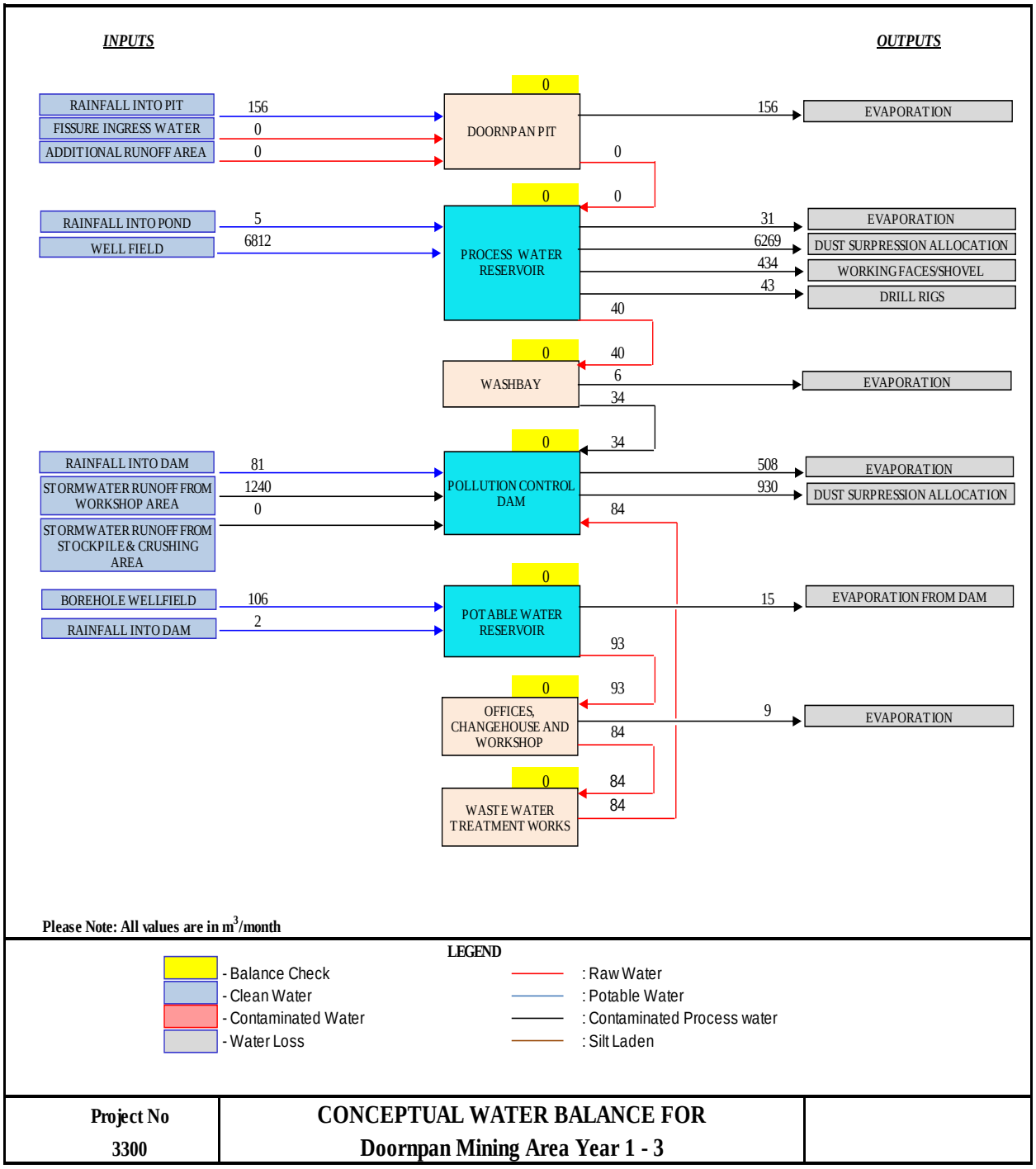


Figure 4.2: Conceptual water balance for the COZA Mine during year 1 to 3 of mining (Jeffares and Green, 2013a)

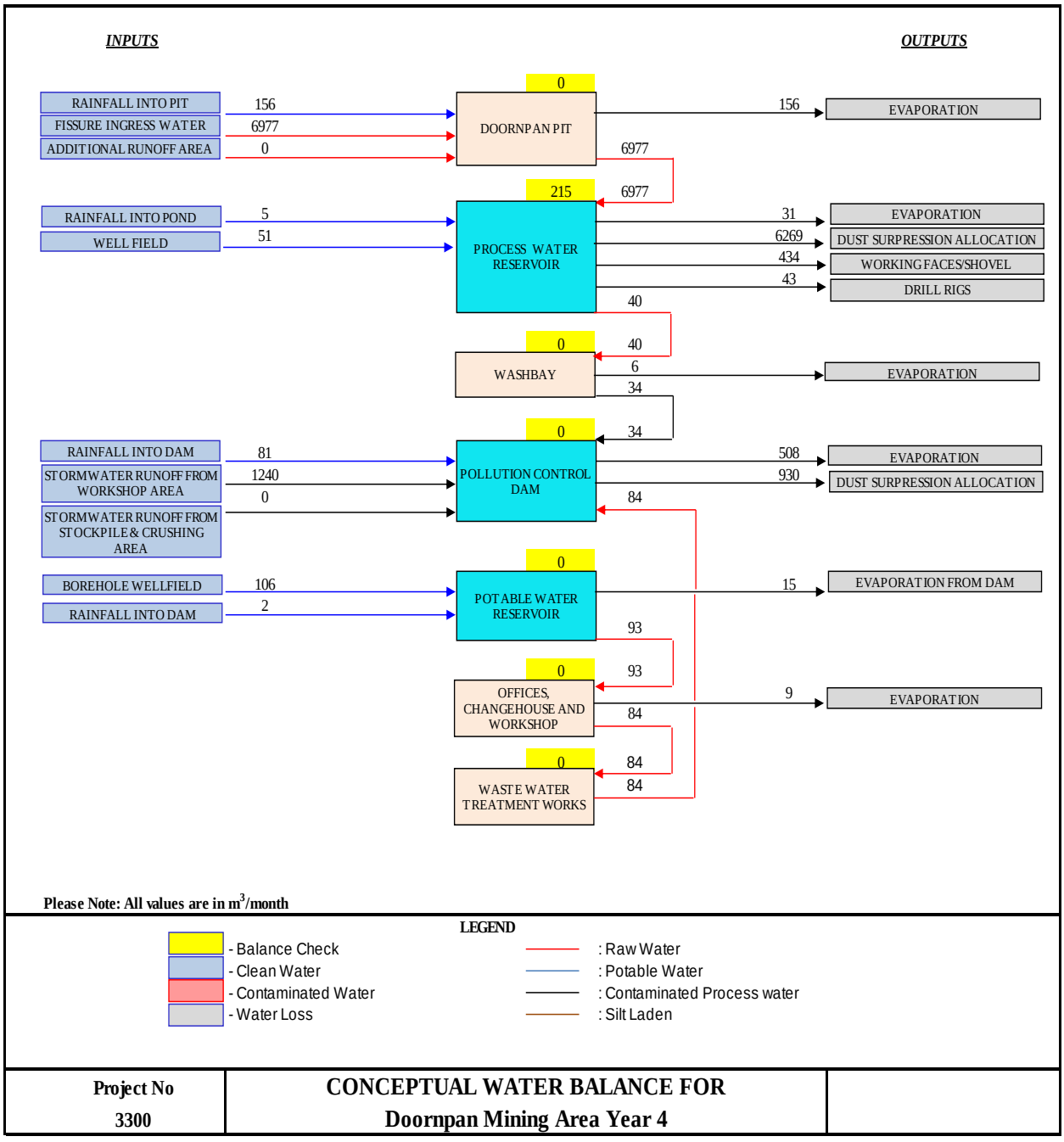


Figure 4.3: Conceptual water balance for the COZA Mine during year 4 of mining (Jeffares and Green, 2013a)

4.6 Labour Requirements

The labour requirements for the construction phase are estimated at 150. Most of the labour during this phase will be unskilled which will be sourced largely from surrounding local communities. The total staff requirement at full production for the Doornpan mining operation is estimated at 86 persons. Mine employees will be housed in Postmasburg, Kathu and Lohatla and will be provided with transport to and from the mine.

4.7 Supporting Infrastructure

4.7.1 Water Management Infrastructure

Water management infrastructure will be required for the management of clean and dirty water at the mine during the construction and operation phases. Water management infrastructure will include water storage facilities for clean and dirty water, pipelines, canals and berms. All stormwater management infrastructure will be sized to accommodate a 1:50 year return period storm event.

4.7.1.1 Clean water management infrastructure

In order to prevent clean storm water runoff from entering the dirty water areas, it is proposed to construct approximately 1.5 km of diversion berms upstream of the mining area. As depicted in Figure 4.2, the clean water diversion berms are proposed to be located to the north and south east of the mining infrastructure. In order to accommodate a 1:50 year storm event, the proposed northern diversion berm will be at least 0.3 m high, whereas the south eastern berm will be at least 0.6m high. Both proposed diversion berms will have a wall slope of 1:1.

4.7.1.2 Dirty water management infrastructure

In order to collect and contain dirty water generated at the mine and keep it separate from the clean water system, a number of main and secondary channels, as well as three pollution control dams will be constructed as depicted in Figure 4.5. The dirty stormwater runoff channels will be triangular in cross-section with a 1:1 channel wall side slope. In order to accommodate a 1:50 year flood event, the main channels will be 1.5m wide at the top and be 0.75m deep, whereas the secondary channels will be 1.25m wide and 0.65m deep. The capacity of the pollution control dam 1 will be approximately 11 400 m^3 and pollution control dams 2 and 3 will be approximately 8500 m^3 each. The capacities of the pollution control dams will be finalised once the layout and design of the various infrastructure has been finalised. All pollution control dams will be lined to prevent groundwater contamination. In addition, it is proposed to construct 0.6 m high paddock walls around the proposed waste dump to prevent stormwater runoff from the waste dumps from entering the downstream environment.

A preliminary stormwater management plan has been developed for the mine and is included as Appendix F.

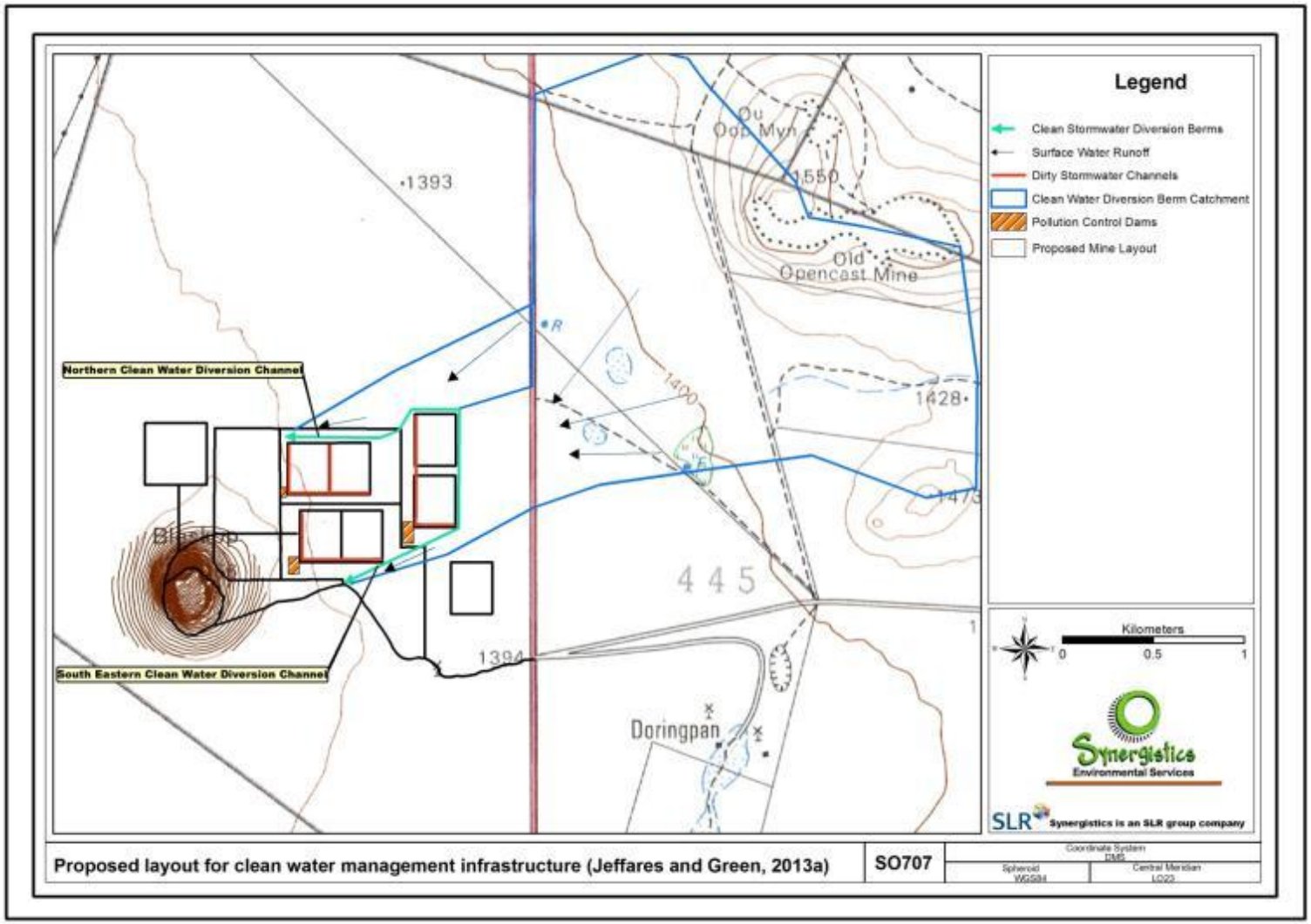


Figure 4.4: Proposed layout for clean water management infrastructure (Jeffares and Green, 2013a)

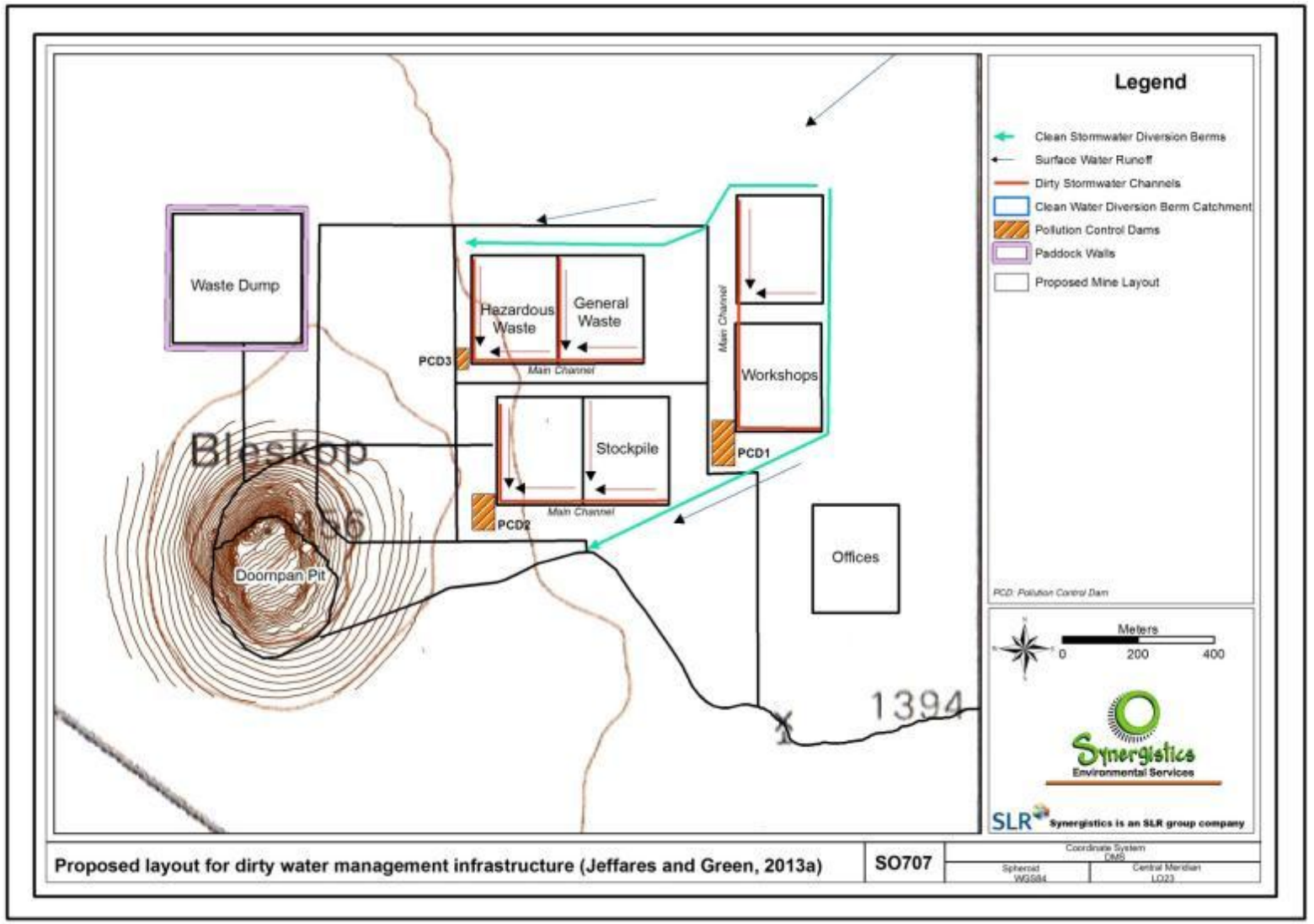


Figure 4.5: Proposed layout for dirty water management infrastructure (Jeffares and Green, 2013a)

4.7.2 Waste Management

4.7.2.1 Mineralogical Waste

Mine waste (overburden) will be discarded at the waste rock dump. Mineralogical waste will consist largely of dolomite, shale and banded iron formation. The calculated amount of mineralogical mine waste that will be produced throughout the life of mine is summarised in Table 4.4 below.

Table 4.5: Mineralogical waste production throughout life of mine

Period	Total Mineralogical Waste produced (tons)
Year 1	1 405 882
Year 2	3 298 206
Year 3	3 326 823
Year 4	1 550 536
Total	**9 581 446**

The waste rock dump will be 30 m high at mine closure. No tailings facilities will be constructed at the mining area.

4.7.2.2 Non-Mineralogical Waste

4.7.2.2.1. General and Hazardous Waste

General and hazardous waste as defined under NEM: WA will be generated at the mine. General waste will comprise concrete, rubble, glass, plastics and recyclable metals, whereas hazardous waste will include used oils, oily rags and some paints. Temporary waste storage facilities will be constructed for hazardous and general waste within the mine infrastructure area. A facility for the bailing and sorting of waste will be provided for within the temporary storage areas.

No disposal of waste will take place at the mine; waste will be disposed at a permitted hazardous waste facility or a municipal general waste disposal facility.

4.7.2.2.2. Storage of Waste tyres

Mine vehicles tyres will be changed at the service area within the workshop area. Waste tyres will then be stored at the workshop area. Waste tyres will be stored in accordance with the norms and standards for waste tyre storage.

4.7.2.2.3. Sewage

During the construction phase, a septic tank will be installed for the management of domestic effluent sewage at the mine. The septic tank will be emptied on a monthly basis and taken to the municipal sewage treatment works.

During the operational phase, a packaged sewage treatment plant will be required for the treatment of domestic effluent produced at the workshop and administration areas during the operation phase. The plant will be located within the mine infrastructure area. The sewage treatment plant will be a packaged plant, which will involve the biological treatment of sewage using aerobic and anaerobic methods with final chemical treatment of effluent. The plant will have capacity to treat 15 000 m^3 / annum of effluent.

4.7.3 Storage of Dangerous Goods

Fuel will be required for machinery and mine vehicles. Facilities for the storage of diesel, petrol and oil will be constructed at the mine. A fuel storage area will be constructed to store 160 m^3 of fuel and lubricants. These facilities will be provided with the necessary management measures such as bunding and concrete flooring to contain spillage and to accommodate fire management requirements.

An explosive magazine will also be constructed at the mine for the storage of explosives and chemicals to be used during blasting activities. The storage and fencing of the magazine will be in line with the legal requirements in terms of Explosives Act (No 15 of 2003).

4.7.4 Staff Accommodation

Temporary staff accommodation facilities will be constructed at the project site for the construction phase. The temporary accommodation will be in a form of prefabricated buildings which will accommodate approximately 150 persons. The services for the construction accommodation will be provided by COZA, this includes water, sanitation and electricity. Water will be sourced from boreholes and a septic tank will be constructed to manage sewage. A contractor will be appointed to collect the sewage from the mine to the municipal sewage treatment plant. It is expected that collection will be required once a month. Power for the construction accommodation will be sourced from onsite generators.

During the operation phase, staff is expected to be accommodated within existing areas in Postmasburg, Lohatla and Kathu.

4.7.5 Power Supply

During the construction phase power will be sourced from diesel generators, diesel powered construction infrastructure will also be used during this phase. Eskom will be approached to supply power to the mine during the operational phase. Distribution powerlines will be constructed to connect to Eskom's main powerline. Back up diesel generators will also be used during the operation phase.

4.8 Project Alternatives

4.8.1 No-Go Alternative

In accordance with the NEMA Regulations, the no-go alternative is required to be investigated and assessed. The no-go alternative would mean that the COZA Iron Ore Project is not undertaken. This option would result in the failure to exploit the iron ore reserves at Bleskop Hill. An economic assessment was undertaken and it is estimated that the project will result in both short term (construction) and long term (annual sustained) economic activity, resulting in an estimated R5.3 billion gain to the economy and creating and estimated 4 600 direct and indirect employment opportunities within the economy (Demacon, 2014).

From an environmental perspective, the COZA Iron Ore Project will not result in significant environmental impacts largely as a result of the fact that the project, besides being relatively small and short-lived for a mine, will take place in an area that will not result in significant environmental and social impacts.

When considering the economic gain and environmental impacts of the project the no-go alternative is not preferred as it will result in a substantial contribution to the economy not being realised.

4.8.2 Water Supply Alternatives

During the scoping phase, two alternatives for water supply were identified which included sourcing water from boreholes or from the Vaal-Gamagara Pipeline. Groundwater studies were undertaken and the mine and the mine water balance were determined. These studies showed that the best option would be the sourcing of water from boreholes around the pit, as this would provide sufficient water for the mine during construction and operation, whilst also dewatering the pit, thereby reducing the ingress of groundwater into the pit during years 3 and 4 of mining. Table 4.6 shows the reduction of groundwater ingress into the pit due to dewatering as calculated by Groundwater Complete (2014).

Table 4.6: Long-term minimum and maximum average monthly temperatures for the study area for the period 2008-2010 (Jeffares &Green, 2013).

Mining year	Estimated groundwater inflow: No borehole abstraction	Estimated groundwater inflow: With 228 m^3/d abstraction
1	N/A	**N/A**
2	N/A	**N/A**
3	30 m^3/d	**N/A**
4	370 m^3/d	**230 m^3/d**

Not abstracting water in this way would mean that the reduction in ingress would not occur. An estimated excess of 2894m^3/month of water would therefore have to managed, placing a financial burden on COZA and likely causing additional environmental impacts. As such, the assessment of water supply alternatives is not considered further in the EIA.

4.8.3 Excess Water Management Alternatives

From groundwater studies and the water balance determined for the mine, it is likely that a small amount of excess water would have to be managed in year 4 of mining assuming that dewatering commences from year 1. According to the water balance, there will be an excess of approximately 215m^3/month to manage in the 4th year of mining.

It is currently being investigated whether it would be feasible construct a pipeline to pump the excess water to the Vaal-Gamagara pipeline. As the excess will be relatively little, other options may also be considered. These alternatives will have to be finalised prior to the commencement of construction activities in consultation with key stakeholders, including the DWA.

4.8.4 Location of Support Infrastructure

The location of infrastructure for the mine was established taking into consideration identified sensitive areas at the mine. The mine layout has been designed to avoid sensitive areas as far as possible. Alternative locations were considered for infrastructure and the final layout is presented in Figure 4.1. The final layout has been designed to avoid sensitive heritage sites and where possible to avoid sensitive vegetation. Although the location of the pit is fixed as a result of accessing the mineral reserves, as far as practical, the mine layout was adjusted to avoid sensitive heritage and ecological sites.

4.9 NEMA Listed Activities

4.9.1 Site Clearance and Physical Alteration of Land

GNR 545: Activity 14; **GNR 546**: Activity 14

The COZA Iron Ore Project is a green-fields project, which is anticipated to involve the physical alteration of approximately 159 ha of undeveloped land for industrial use through the construction of mining infrastructure, including roads, canals, workshops, dams, dump stockpiles and the open pit. Figure 4.1 shows the proposed layout of the mine.

The project will also result in the clearance of approximately 60 ha of vegetation. The majority (>70%) of the vegetation on site is indigenous Eastern Kalahari Bushveld and two tree species protected under the National Forests Act (NFA 1998) have been confirmed to occur within areas to be cleared. These include the Camel Thorn Tree (*Acacia erioloba*) (5 large trees observed) and the shepherd's tree (*Boscia albitrunca*) (± 220 trees observed) (Anderson, 2014).

4.9.2 Activities Requiring a Water Use Licence

GNR 545: Activity 5

The proposed project will result in activities that will require licensing in terms of Section 21 of the National Water Act No 28 of 2002. These activities will include the following:

- Dewatering of groundwater inflow to the pit to allow for safe working conditions in the pit. Dewatering will be by means of dewatering boreholes around the pit. Dewatering will take place throughout the construction and operation phases to ensure that potential excess water during the 4th year of mining is manageable.
- The stockpiling and disposal of waste rock generated during the excavation of the open pit. Waste rock will be used to infill the open pit and will be stockpiled outside the pit areas. It is estimated that approximately 9.5 M tons of overburden will be disposed of in this way.
- The storage of extracted mine water generated during the excavation of the open pit. The mine water will be stored in pollution control dams which will be designed to contain a 1:50 year storm event as per the requirements of GN 704, as promulgated under Section 26(1) of the National Water Act.
- The irrigation of roads with extracted mine water for dust suppression purposes. It is anticipated that the majority of the water will be from dewatering activities. It is estimated that approximately 5 900 m^3/month of water will be used for this purpose.

4.9.3 Bulk Transportation of Water

GNR 544: Activities 9, 11

In order to prevent clean stormwater runoff from entering the dirty water areas, it is proposed to construct approximately 1.5 km of diversion berms upstream of the mining area as depicted in Figure 4.4. In order to accommodate a 1:50 year storm event, the proposed northern diversion berm will be at least 0.3 m high, whereas the south eastern berm will be at least 0.6 m high. Both proposed diversion berms will have a wall slope of 1:1. Peak flow rates through the northern diversion channel will be approximately 1.9 m^3/s, whereas it will be approximately 16 m^3/s in the larger south eastern diversion channel.

In order to collect and contain dirty water generated at the mine and keep it separate from the clean water system, a number of main and secondary channels will be constructed as depicted in Figure 4.4. The dirty stormwater runoff channels will be triangular in cross-section with a 1:1 channel wall side slope. In order to accommodate a 1:50 year flood event, the main channels will be 1.5m wide at the top and be 0.75 m deep, whereas the secondary channels will be 1.25 m wide and 0.65 m deep.

The project may also involve the construction of a pipeline for the bulk transportation of water, pending discussions with DWA. At this stage it is envisaged to lay a pipeline from the mine to the

Vaal-Gamagara Pipeline in order to source water and, if necessary, to dispose of excess water abstracted during the dewatering process. The peak throughput of the pipeline may exceed 120 liters per second and may cross a watercourse.

4.9.4 Off-stream Storage of Water

GNR 544: Activity12

In order to collect and contain dirty water generated at the mine and keep it separate from the clean water system, three pollution control dams will be constructed as depicted in Figure 4.5. At this stage it is envisaged that the capacity of the pollution control dam 1 will be approximately 11 400 m^3 and pollution control dams 2 and 3 will be approximately 8 500m^3 each, giving a combined capacity of 28 400 m^3. The capacity of the dams may increase depending on the dewatering requirements, which may change depending on the geohydrological conditions encountered during mining. As such, the combined capacity may exceed 50 000 m^3, i.e. trigger activity 12 of GN 544.

4.9.5 Storage of Dangerous Goods

GNR 544: Activity13

The project will involve the construction of two fuel storage tanks with a combined capacity to store 160 m^3 of diesel.

4.9.6 Power Generation and Electricity Transmission

GNR 544: Activities 1, 10

The project will involve the use of backup generators in the case of power failures. Generators will be used during the construction phase. Combined, electricity output may exceed 10 megawatts. No electricity will be generated for external consumption.

In addition, a power line with a capacity of more than 33 kV will be constructed for power supply purposes. The power line will connect with existing power lines.

4.9.7 Construction On or Near a Watercourse

GNR 544: Activities 9, 11, 18

The project may involve the construction of a pipeline for the bulk transportation of water, pending discussions with DWA. At this stage it is envisaged to lay a pipeline from the mine to the Vaal-Gamagara Pipeline. The pipeline may cross a watercourse and require earthworks and the

excavation/fill of earth from a watercourse. The details of this pipeline will be confirmed in the final EIA.

4.9.8 Road Construction

GNR 544: Activities 22, 47

As part of the COZA Iron Ore Project, the following roads will be constructed:

- On-site gravel haul roads for the movement of haul trucks (heavy vehicles) on site. The haul roads will have a width of approximately 16 m for one-way roads and 25 m for bi-directional roads. It must be noted that the lengths and placement of haul roads may change depending on schedule and design requirements.
- On-site gravel service roads to be used by private vehicles, buses, minibuses and some heavy vehicles for the transportation of material and staff around the site. The access roads are anticipated to be wider than 8m.
- An off-site access road will be constructed to provide access for the construction of the proposed pipeline from the mine to the Vaal-Gamagara Pipeline.
- The main access road from the R325 will be widened by more than 6 metres to accommodate the movement of heavy vehicles and machinery.

5. DESCRIPTION OF THE EXISTING STATUS OF THE ENVIRONMENT

5.1 Existing Status of the Biophysical Environment

5.1.1 Climate

5.1.1.1 Regional Climate

The COZA Iron Ore project falls in an area with a regional climate that is semi-arid with a mean annual precipitation of 318 mm.

5.1.1.2 Ambient Temperatures

Temperature data for the area of the project site was obtained from the South African Weather Service (SAWS) station 0321141 W. This station is located approximately 20 km south of the project area, as depicted in Figure 5.2. The average monthly temperatures for the project site, calculated from the weather station are presented in Table 5.1. The maximum temperature recorded at this weather station is 46.5 ºC and the minimum is -8.4 ºC.

Table 5.1: Long-term minimum and maximum average monthly temperatures for the study area for the period 2008-2010 (Jeffares &Green, 2013).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min Temp (˚C)	16.2	15.1	13.8	10.3	6.0	2.1	1.9	4.4	6.9	10.0	13.4	15.6
Max Temp (˚C)	32.0	29.3	28.6	25.0	22.3	17.1	18.0	20.7	24.4	27.0	29.7	31.2

5.1.1.3 Precipitation and Evaporation

Rainfall data for the area of the COZA Iron Ore project site was obtained from the SAWS rainfall station 0320828 W. This rainfall station is located approximately 14 km southwest of the project site (see Figure 5.2). The mean monthly rainfall over the period 1950 to 2000 is presented in Figure 5.1. From the Figure, it is evident that the precipitation tends to fall in summer and autumn (November to April). It is also noted that small amounts of rainfall are recorded over the winter and spring months (May to October).

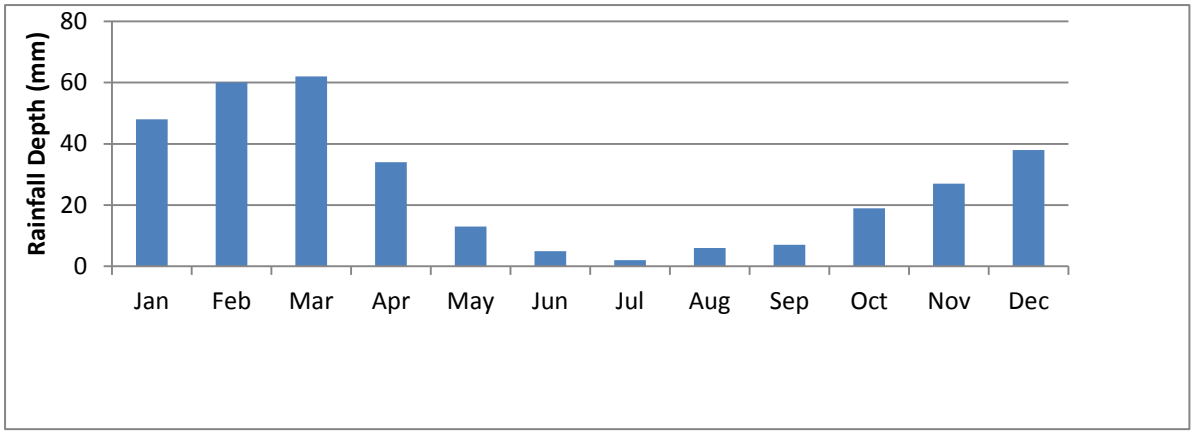


Figure 5.1: Long-term average monthly rainfall for the study area for the period 1950 to 2000 (Jeffares &Green, 2013)

The annual potential evaporation rate for the COZA Iron Ore study area is 2 450 mm. From Table 5.2, it is evident that the highest evaporation rates occur during the hotter summer months of October to March. The mean annual evaporation is higher than mean annual precipitation (318 mm) which results in a net moisture deficit of 2 132 mm over the year.

Table 5.2: Calculated monthly mean evaporation rates for the study area (Jeffares &Green, 2013)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Evaporation Rate (mm)	333	256	221	154	111	85	98	133	184	247	292	336	2450

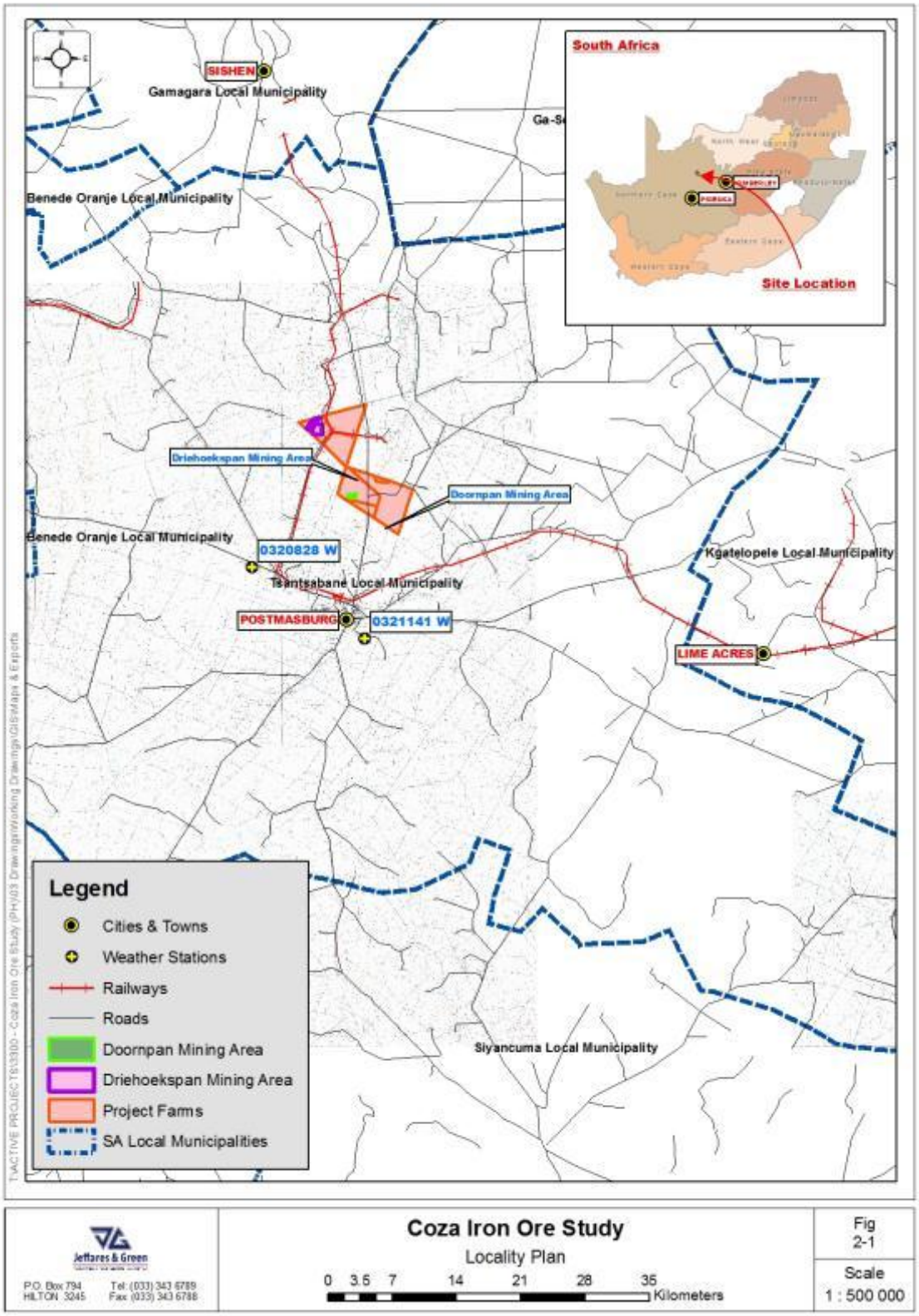


Figure 5.2 Location of Weather Stations (Jeffares &Green, 2013).

5.1.1.4 Wind direction and speed

Wind direction data were obtained from the Postmasburg weather station for the period of September 2012 to March 2013. From this period, the predominant winds were from the north east with average wind speed of 3.5 m/s. The strongest winds (more than 6 m/s) were from the north-north-west and occurred mostly during the day. During the night, wind speeds decreased and the wind field was dominated by winds from the north-east.

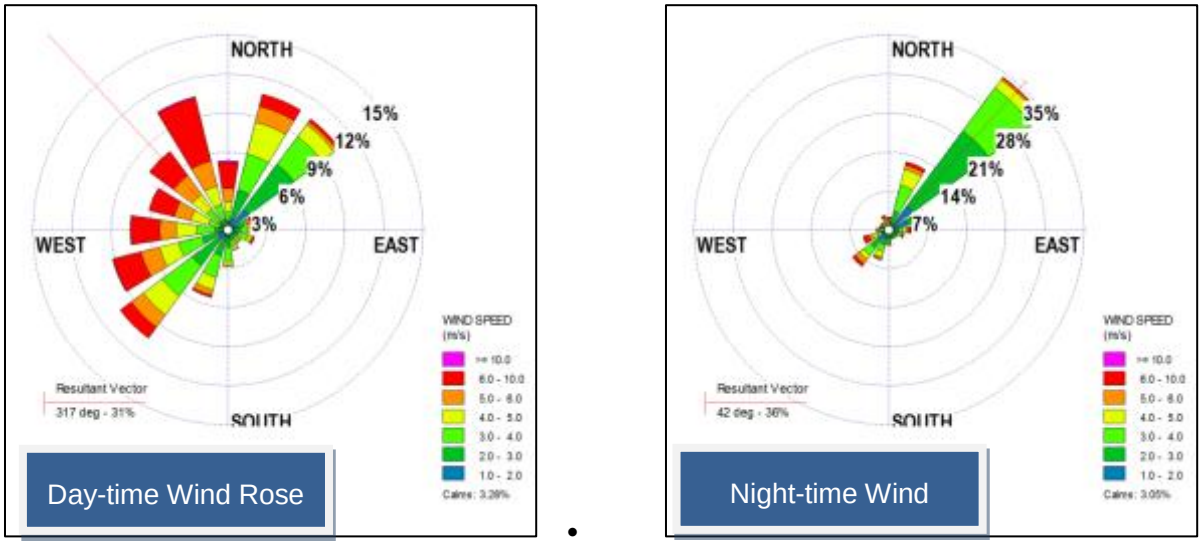


Figure 5.3: Day and night time wind roses from Postmasburg, Sep 2012-Mar 2013) (Airshed, 2014)

5.1.2 Topography

The study area is flanked by hills to the west and east (Figure 5.4). The Klipfontein range of hills to the east of the study area runs in a north to south direction. The general topography within the study area is flat to undulating with slopes of approximately 2% - 3% with an average surface elevation of approximately 1 370 m above mean sea level (mamsl).

On the south-western part of Farm Doornpan is the Bleskop Hill, which is proposed to be mined as part of the COZA Iron Ore Project. The hill has elevation of 1 429 (AMSL). Other key topographical features on the farm include a wetland/pan located west of the hill and an ephemeral drainage line southeast of the proposed mining area.

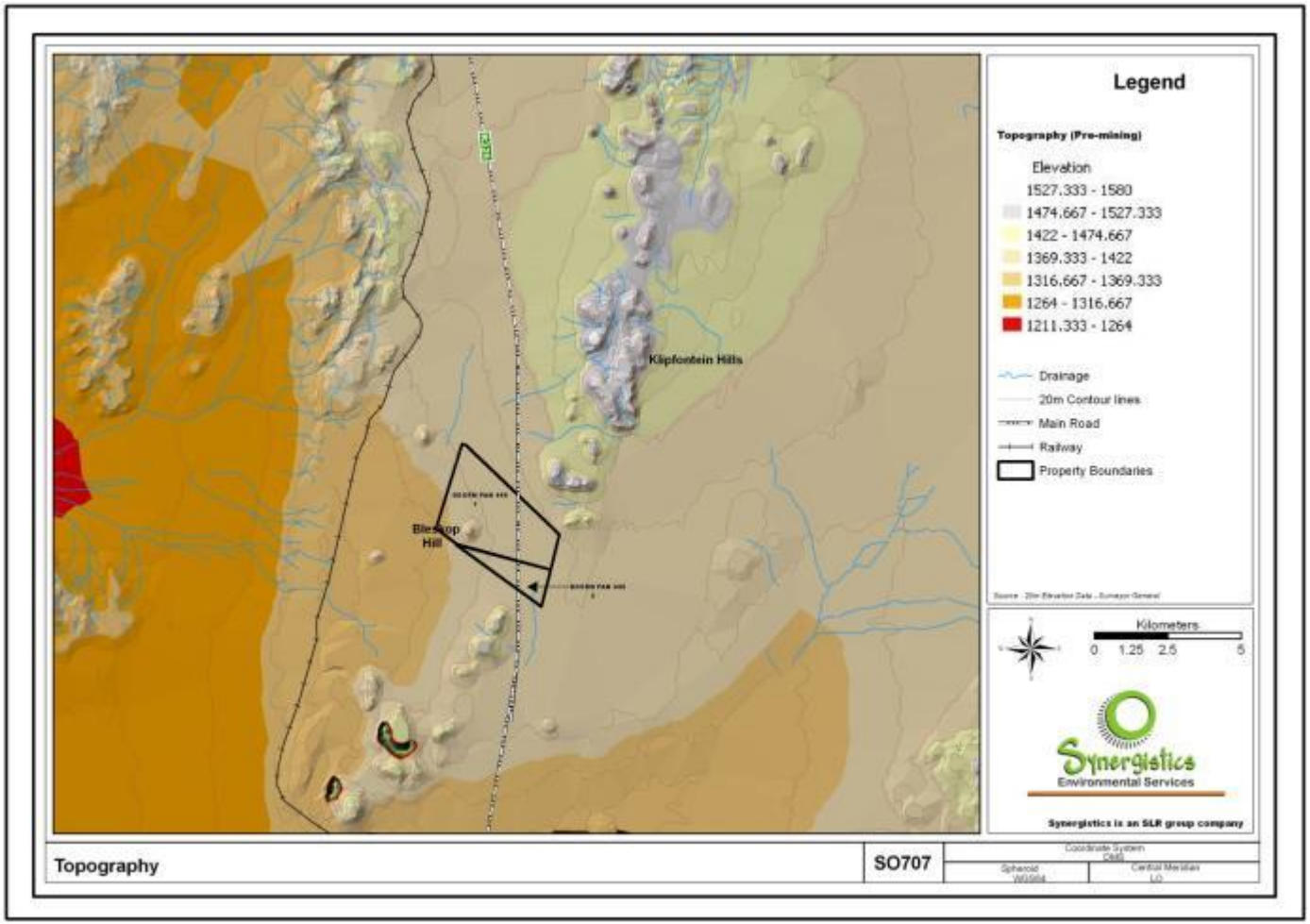


Figure 5.4 Topography of the study area

5.1.3 Geology

5.1.3.1 Regional Geology

The majority of the area is underlain by the Campbellrand Group, which contains carbonate rocks. These carbonate rocks are unconformably overlain by the Asbestos Hills Subgroup which comprises the Wolhaarkop Breccia (chert-rich breccia) which grades upwards into the Manganore Iron Formation. A series of uplift, weathering and deformational events lead to the enrichment of iron formation to form the high grade hematite deposit (> 60 % Fe) as well as its distribution (COZA Mining, 2013).

The farm Doornpan according to Moen (as cited in PGS Heritage, 2013) is mainly underlain by dolomitic limestone with subordinate coarsely crystalline dolomite, and chert with lenses of limestone of the Lime Acres Member of the Ghaapplato Formation of the Campbell Group. Some of the hills on the farm consist of rocks of the upper section of the Lime Acres Member of the Ghaap plato Formation. These rocks consist of chert and chert breccia (silica breccia or manganese marker) containing a thin ferruginous layer of shale that grades southwards into red jasper with chert. This ferruginous layer is fairly constant throughout the area and serves as a marker. Stromatolitic puckered limestone consisting of alternating dark and light bands lies underneath the chert member which forms the top of the Ghaapplato Formation. Lenticular bodies of limestone occurring in the dolomite are probably the result of irregular dolomitisation of the original limestone.

A simplified geological map of the study area is provided in Figure 5.5 below.

5.1.3.2 Structural Geology

A geophysical investigation was conducted by Groundwater Complete in July 2013 to delineate geological structures such as faults and intrusive features like dolerite dykes. A total of four traverses were surveyed during which five anomalies were identified in the Doornpan mining right area. The positions of the traverses and anomalies are indicated in Figure 5.6..

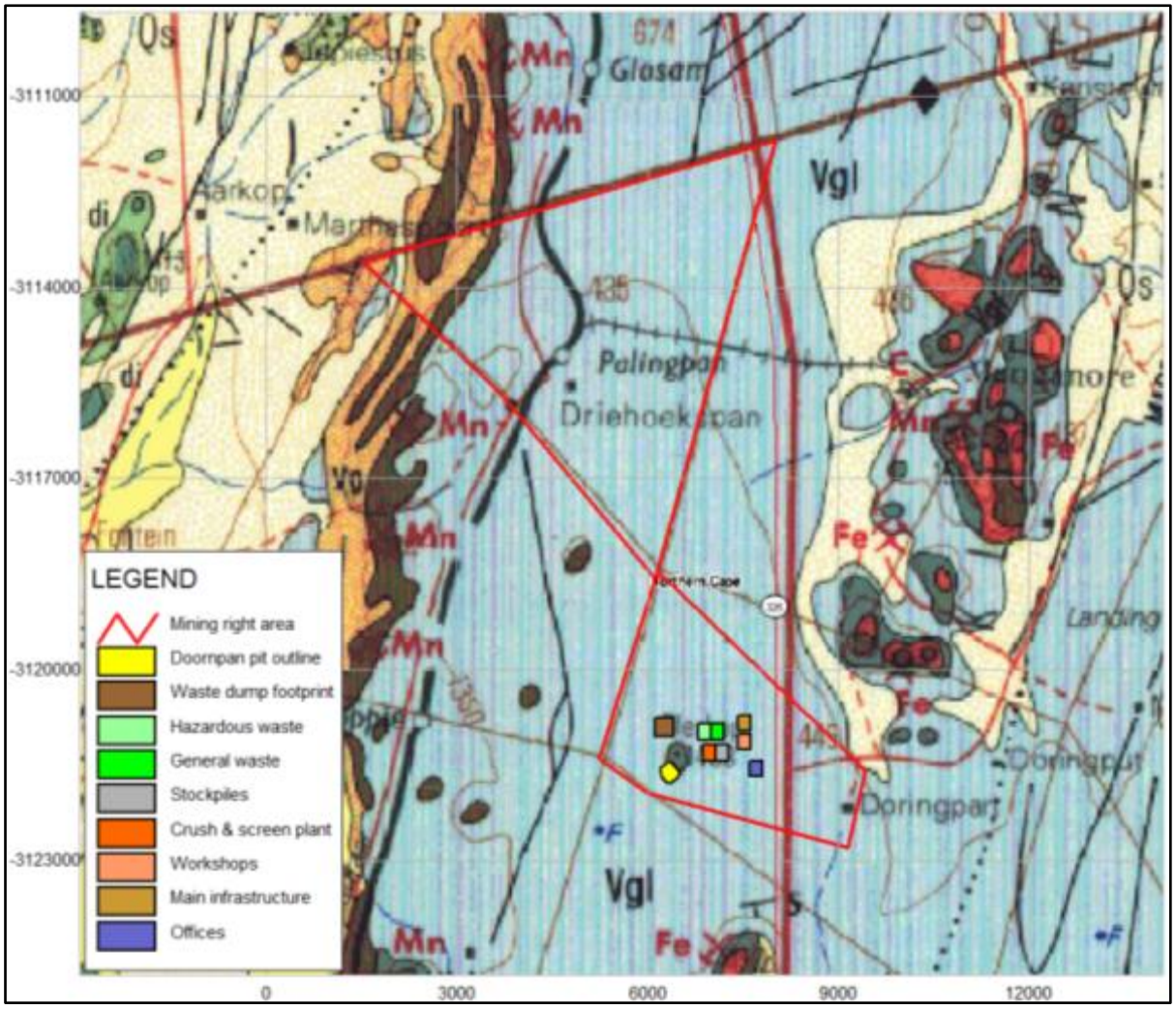


Figure 5.5: Geology of the Study Area (PGS Heritage ,2013)

Notes: *Qs* *- Relatively recent deposits of loose material,*

Vgl - Dolomitic limestone - Lime Acres Member of the Ghaapplato Formation, Campbell Group.

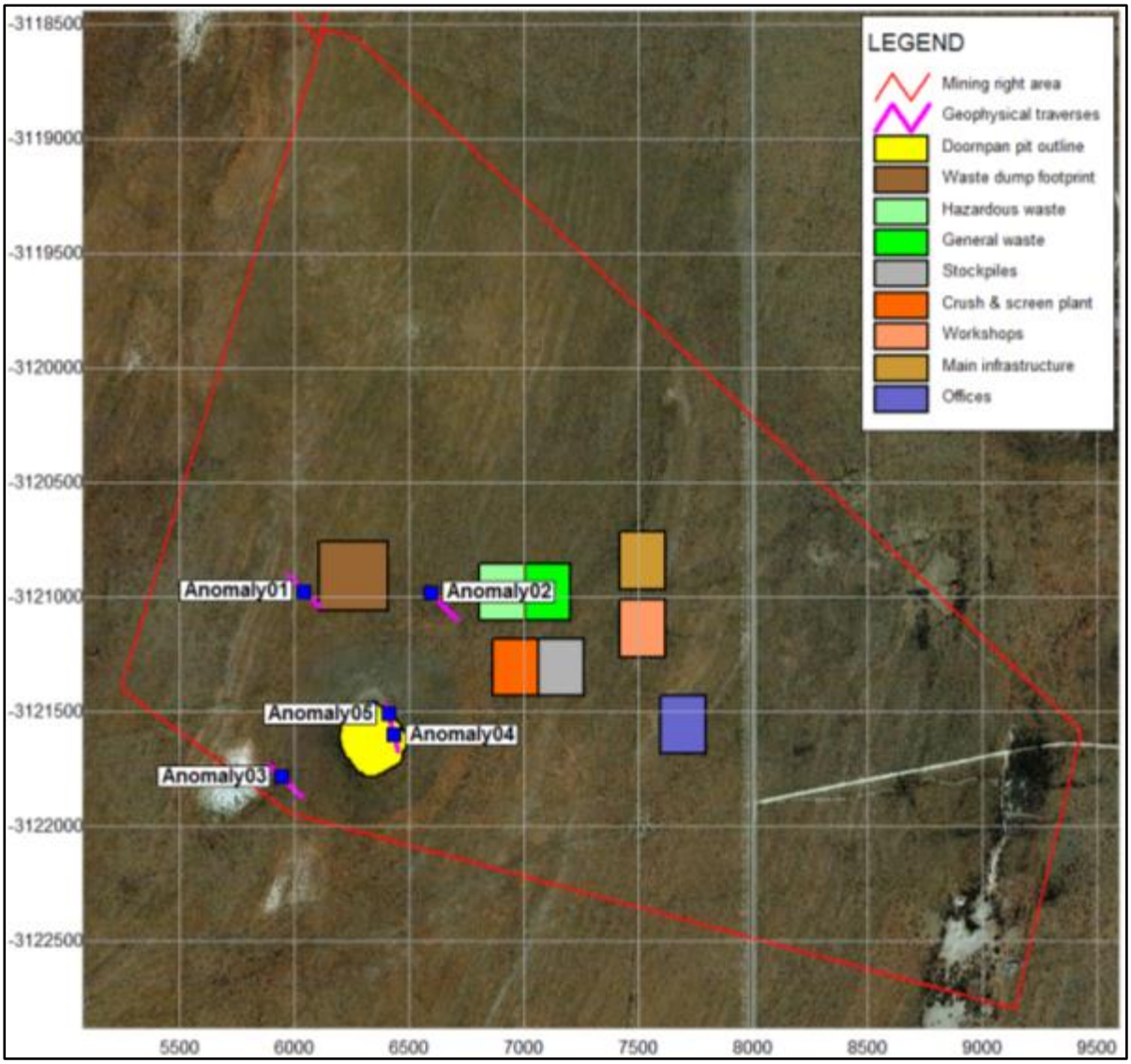
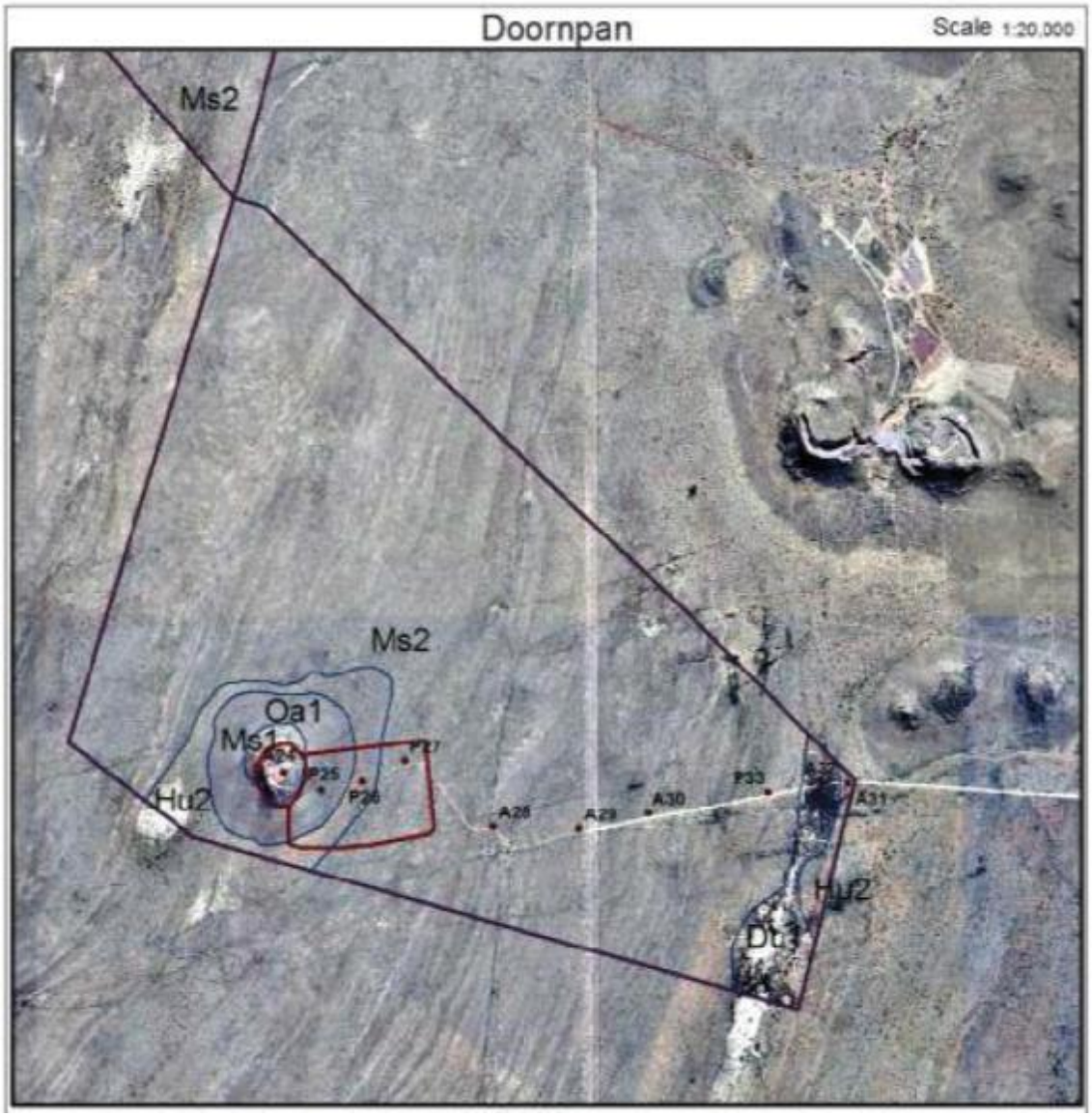


Figure 5.6: Positions of geophysical traverses and anomalies in the study area (Groundwater Complete, 2014)

5.1.4 Soils

The soils in the region are generally shallow, normally not exceeding more than 300 mm in depth (ARC, 2013). The predominant soil types in the study area are soil-rock complexes of the Mispah and Coega forms and a shallow phase Hutton underlain by rock and sporadic limestone. Deeper Hutton and Oakleaf soils are also present, but are largely confined to the drainage ways. A soil map of the study area is provided in Figure 5.7.



Legend

Map units
Footprints
A1 Observations
P6 Sample points
N
ARC • LNR

Map unit	Dominant Soil form/family >40%	Effective depth (mm)	General Description
Ms1	Ms1100	100 - 150	Rock outcrops in association with very shallow, stony, reddish-brown, fine-grained, sandy Mispah, Glenrose and Hutton soils underlain by rock, occurring on the crests and steeper upper midslopes.
Ms2	Ms1100	100 - 300	Soil – rock complex. Very shallow, dark reddish-brown, fine-grained sands on underlying rock (including limestone) in some places. Sporadic occurrence of deeper sandy Hutton soils (400- 700 mm) was found in the vicinity of the weakly developed drainage lines.
Hu2	Hu3100	300 - 750	Shallow, dark reddish-brown, fine sand to loamy sand Hutton and Oakleaf soils, derived from local alluvium/colluvium on underlying rock. Surface limestone occurs sporadically.
Oa1	Oa1210	400 – 900+	Shallow to moderately deep, very stony, dark reddish-brown, finegrained, sandy Hutton and Oakleaf soils, derived from local colluvium and/or *in situ* rock. Soils are underlain by rock and occur on the lower midslopes and upper footslopes.

Figure 5.7: Soil map of the Study Area (ARC, 2013)

Analysis of soil samples taken in the study area reveals that soils generally have a light texture, which varies from loamy fine sand to sandy loam (ARC, 2013). Coupled with the low rainfall, this means that the soils are susceptible to wind and water erosion if vegetation is disturbed or removed. Organic carbon content of soils is also relatively low. The pH values show that the soils are mainly slightly acidic.

5.1.5 Land Capability and Agricultural Potential

Soils in the area are generally very shallow, have a low clay content and thus a low water-holding capacity, contains coarse fragments in the topsoil or subsoil that decreases the water retention capacity, and has a low trace elements status (ARC, 2013). All these factors make the soils in the study area largely unsuitable for the production of crops. Coupled with the low average annual rainfall in the area, the agricultural potential in the study area is considered to be low.

According to Schoeman *et al*, 2004 as cited in ARC, 2013, the only agricultural activities in the area are livestock and/or game farming. The average grazing capacity for the study area is 22-25 ha per animal unit and the long-term annual average Normalised Difference Vegetation Index (NDVI) is moderate to low.

The study area falls within the land capability class VII according to Schoeman *et al*. (2004), indicating that the area has very severe limitations that make it unsuited to cultivation, restricting use largely to grazing (see Figure 5.8).

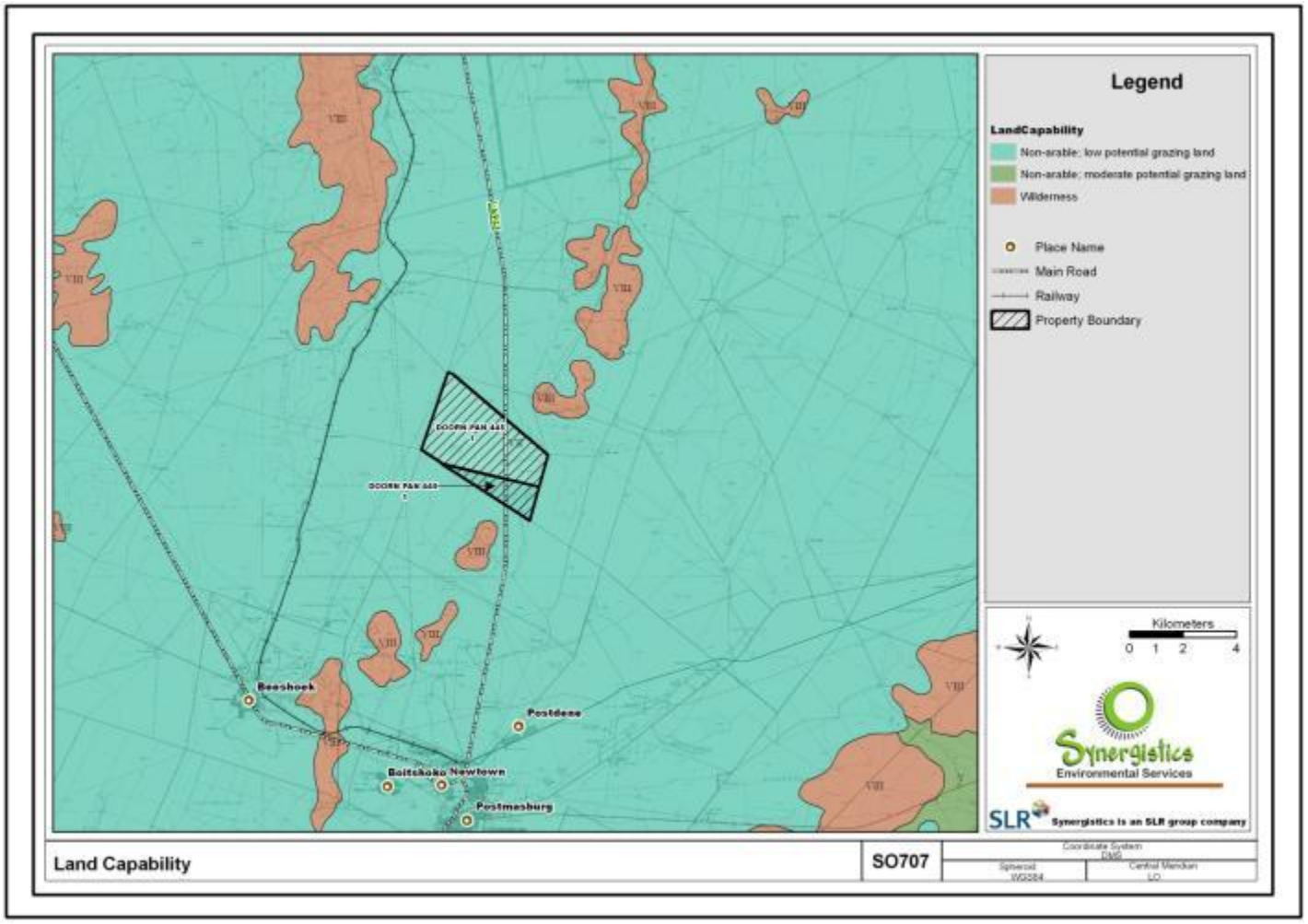


Figure 5.8: Land Capability

5.1.6 Groundwater

5.1.6.1 Aquifer Characterisation

The general geohydrological regime in the area is made up of two aquifer systems. The first, upper, semi-confined to unconfined aquifer occurs in the calcrete underlain by a clayey layer which has been a reliable source of water supply for many decades to the farming community. This aquifer yields of up to 2 litres per second in some instances with a shallow water table and spring formation being common, especially in the lower-lying topography. The second, deeper aquifer is associated with the fractures, fissures and joints and other discontinuities within the older Transvaal Supergroup rocks. The aquifer occurs at depths of more than 60 meters below surface in the study area. It is semi-confined and has greatly varying yields that are directly associated with the geology and geological structure. The aquifer yield may be as high as 40 litres per second in mainly the chert breccia (Manganese Marker) and banded iron formation and iron ore formations.

Following pump tests on newly drilled monitoring boreholes on Doornpan, the transmissivity of the aquifer matrix (between fracture zones) near the proposed mine site on the Farm Doornpan was measured to vary between ± 0.6 and 2.2 m^2/d with an average of 0.9 m^2/d (Groundwater Complete, 2014). These transmissivities calculate to a representative hydraulic conductivity of ± 0.045 m/d for the area. The representative transmissivity of the fractures in the area vary between ± 1.1 and 29.5 m^2/day with an average of 2.4 m^2/d. The average hydraulic conductivity of the fractures is therefore in the region of 0.12 m/d. Aquifer recharge in the COZA Project area was estimated at between 5 and 10% of the mean annual precipitation.

5.1.6.2 Groundwater use, depth and quality

A hydro-census was conducted on the 13-17 May 2013 by Aquatico to determine groundwater use, levels, and qualities as well as to conduct pump testing for the purposes of defining the aquifers on site. In addition, four boreholes were drilled on the farm Doornpan for monitoring purposes and to conduct pump tests. Borehole positions are illustrated in Figure 5.10. The information collated during the hydro-census is given in Table 5.3 and Table 5.4. General information on the newly drilled monitoring boreholes on Doornpan is provided in Table 5.5.

The water users in the area include farmers, mines and communities. Approximately half of the boreholes encountered were being used at the time, with the majority of used boreholes used for both domestic and agricultural use. From the results of the groundwater survey, it is evident that farmers in the area rely heavily on groundwater as a sole source of domestic water as well as for livestock and gardening.

From water level measurements in boreholes of users in the area, as well as in purpose drilled monitoring boreholes, the depth to water level is estimated to vary between ± 3 and 17 meters below surface on a surface elevation of between 1270 - 1480 m (amsl) (Groundwater Complete, 2014). The contours of the static water levels or piezometric heads in the study area was modelled by Groundwater Complete and is illustrated in Figure 5.9 below. Flow occurs faster where contours are closer together and gradient are thus steeper. On the relatively steeper sloping hillocks where groundwater gradients are higher, groundwater seepage rates are correspondingly higher. Seepage rates on the other hand are much lower in the flat plateaus and valley bottoms. Average groundwater gradients were calculated from the water level elevation data. The general groundwater gradient in the proposed Doornpan mining area is towards the west at approximately 1.1%**.**

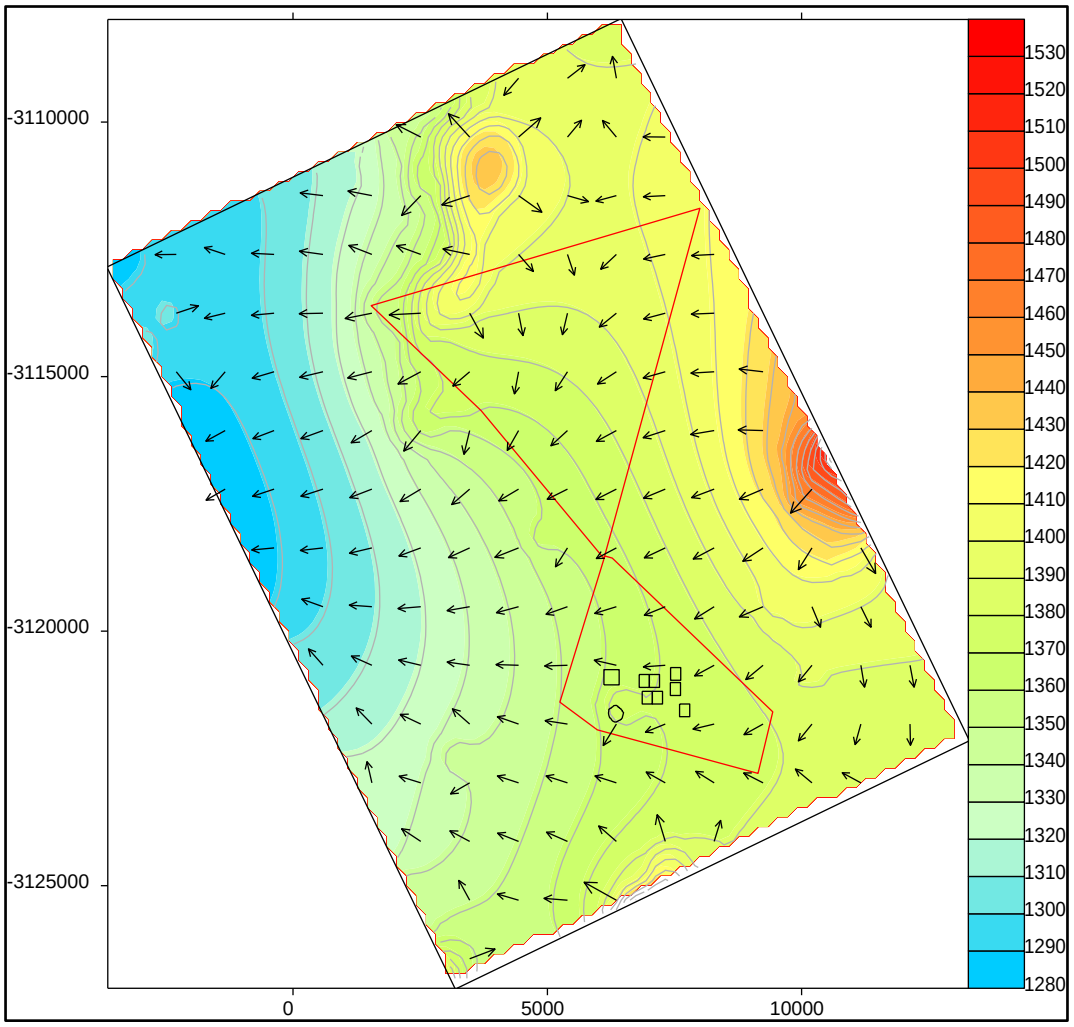


Figure 5.9: Modelled groundwater level contour map of the Study Area (Groundwater Complete, 2014).

Borehole yield information could not be obtained for the majority of boreholes encountered in the hydrocensus, however yields varying between ± 2 500 l/h and 25 000 l/h were indicated by Christiaan and Louis Claasens on Farms Morolong and Vlakfontein respectively.

The groundwater quality is generally within the SANS 241 (2011) drinking water standards for most boreholes. Of the 41 boreholes sampled, there were a few boreholes where concentrations of nitrates (8 samples), ammonia (1 sample) and iron (1 sample) exceeded the drinking water standards. The high nitrates and ammonia may be attributed to congregation of livestock at watering points whereas the high iron could be attributed to the geology of the area.

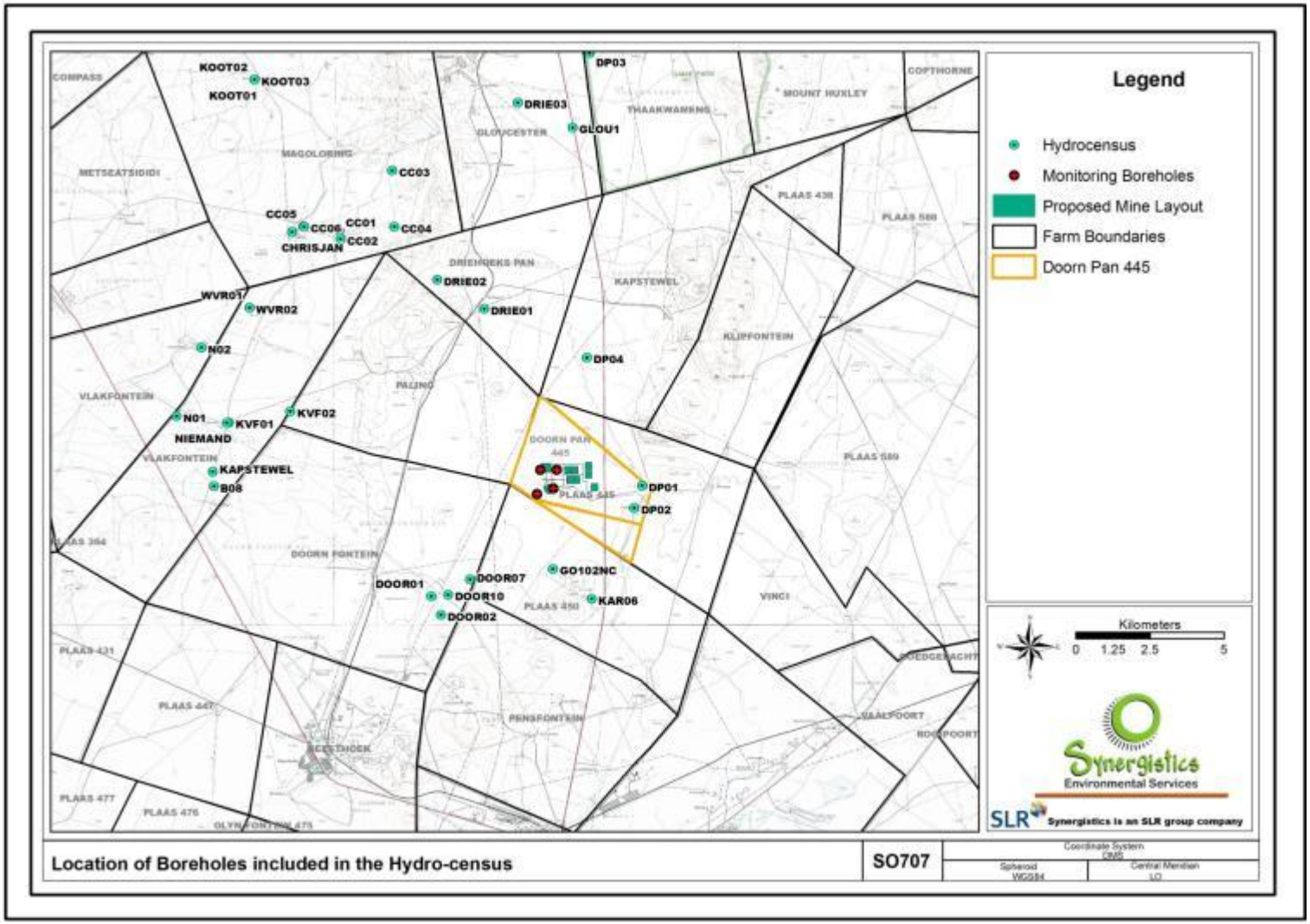


Figure 5.10: Location of monitoring boreholes and those included in the hydro-census

Table 5.3: Results of the hydro-census

Borehole Description	Borehole Location		Farm Name	Owner	Elevation	Water level	Water Use	Sampled
	South (WGS84)	East (WGS84)						
DRIE01	-28.15453	23.04500	Driehoekspan	More Matsididi & Basil Louw	1385	-	-	Yes
DRIE02	-28.14572	23.03075	Driehoekspan	More Matsididi & Basil Louw	1380	-	-	Yes
DRIE03	-28.09194	23.05519	Gloucester	More Matsididi & Basil Louw	1390	-	-	Yes
DP04	-28.16928	23.07611	Kapstewel	More Matsididi & Onkemetse Gill	1385	-	-	Yes
B08	-28.20831	22.96312	Vlakfontein	Adam Wahl & Mark Oosthuizen & Christiaan Claasens	1480	7.0	-	Yes
DP01	-28.20814	23.09285	Doornpan	More Matsididi & Onkemetse Gill	1390	15.8	-	Yes
DP02	-28.21489	23.09053	Doornpan	More Matsididi & Onkemetse Gill	1390	14.9	-	Yes
DP03	-28.07689	23.07689	Thaakwameng	More Matsididi & Onkemetse Gill	1385	-	-	Yes
GO102NC	-28.23340	23.06590	Plaas 450	Mark Oosthuizen	1385	-	-	Yes
KAR06	-28.24250	23.07760	Plaas 450	More Matsididi & Onkemetse Gill	1435	36.0	-	Yes
DOOR01	-28.24170	23.02900	Doornfontein	Mark Oosthuizen	1348	13.9	-	Yes
DOOR02	-28.24740	23.03190	Doornfontein	Mark Oosthuizen	1356	7.4	-	Yes
DOOR07	-28.23660	23.04070	Doornfontein	Mark Oosthuizen	1355	-	-	-
DOOR10	-28.24120	23.03410	Doornfontein	Mark Oosthuizen	1353	3.1	-	Yes
CC01	-28.13076	23.00103	Morolong	Christiaan Claasens & Louis Claasens	1315	-	Irrigation, Livestock	Yes
CC02	-28.13341	23.00146	Morolong	Christiaan Claasens & Louis Claasens	1319	11.3	Irrigation, Livestock	Yes
CC03	-28.11254	23.01716	Morolong	Christiaan Claasens & Louis Claasens	1340	32.9	Irrigation, Livestock	Yes
CC04	-28.12964	23.01777	Morolong	Christiaan Claasens & Louis Claasens	1343	36.3	Irrigation, Livestock	Yes
CC05	-28.12955	22.99029	Morolong	Christiaan Claasens & Louis Claasens	1311	6.0	-	-
CC06	-28.12958	22.99044	Morolong	Christiaan Claasens & Louis Claasens	1310	17.4	-	Yes
KVF01	-28.18895	22.96762	Vlakfontein	Christiaan Claasens	1278	-	Irrigation, Livestock	Yes
KVF02	-28.18558	22.98623	Vlakfontein	Christiaan Claasens	1296	-	-	Yes
FARM446	-28.06285	22.96258	Lomoteng	Assmang	1338	12.0	-	Yes
GLOU_COMM	-28.07956	22.37280		Gloucester mining area	1412	-	-	Yes
GLOU1	-28.09951	23.07181	Gloucester	Gloucester	1416	-	-	Yes
KAPSTEWEL	-28.20391	22.96276	Vlakfontein	Kapstewel	1416	7.0	-	Yes
FARM437	-28.20382	23.96301		Farm437	1279	-	-	Yes
N01	-28.18706	22.95180	Vlakfontein	No Farmer	1276	-	Irrigation, livestock	Yes
N02	-28.16630	22.95929	Vlakfontein	No Farmer	1276	-	Irrigation, livestock	Yes
NIEMAND	-28.18911	22.96706	Vlakfontein	No Farmer	1281	-	Irrigation, livestock	Yes
CHRISJAN	-28.13119	22.98676	Morolong	Chrisjan Claasen	1310	12.1	Irrigation, livestock, domestic	Yes
CC02	-28.12869	22.90909	Morolong	Chrisjan Claasen	1306	-	Irrigation, livestock, domestic	Yes
WVR01	-28.15420	22.97397	Vlakfontein	Willem van Rensburg	1297	-	Irrigation, livestock, domestic	Yes

Borehole Description	Borehole Location		Farm Name	Owner	Elevation	Water level	Water Use	Sampled
	South (WGS84)	East (WGS84)						
WVR02	28.15420	22.97397	Vlakfontein	Willem van Rensburg	1297	-	Irrigation, livestock, domestic	Yes
KOOT01	28.08497	22.97538	Magoloring	Koot Claasen	1416	-	Irrigation, livestock, domestic	Yes
KOOT02	28.08497	22.97538	Magoloring	Koot Claasen	1416	-	Irrigation, livestock, domestic	Yes
KOOT03	28.08497	22.97538	Magoloring	Koot Claasen	1416	12.0	Irrigation, livestock,	Yes

Table 5.4: Results of chemical analysis of samples collected during the hydrocensus

Borehole Description	Date Meas.	pH	EC mS/m	TDS mg/l	Malk mg/l	Cl mg/l	SO4 mg/l	NO3-N mg/l	NH4 mg/l	PO4 mg/l	F mg/l	Ca mg/l	Mg mg/l	Na mg/l	K mg/l	Al mg/l	Fe mg/l
SANS 241 (2011)	Drinking Water	≥5 - ≥9.7	≤170	≤1200		≤300	≤500 (acute health) ≤250 (aesthetic)	≤11	≤1.5		≤1.5			≤200		≤0.3	≤2 (chronic health) ≤0.3 (aesthetic)
Risk Type		Operational	Aesthetic	Aesthetic		Aesthetic	Acute Health -1 and Aesthetic	Acute health -1	Aesthetic		Chronic health			Aesthetic		Operational	Chronic health and aesthetic
B08	2013/05/24	8.45	11.30	49.00	48.00	<0.423	<0.04	0.15	0.26	0.08	0.19	16.10	2.82	<0.013	0.34	<0.003	<0.003
CC01	2013/05/24	8.25	59.20	346.00	255.00	7.03	60.70	0.09	0.10	0.05	0.66	76.50	31.20	14.30	2.25	<0.003	<0.003
CC02	2013/05/24	8.19	55.50	324.00	228.00	3.66	70.60	0.10	0.10	0.03	0.81	71.70	26.80	11.60	1.86	<0.003	<0.003
CC03	2013/05/24	7.75	73.50	423.00	325.00	19.90	54.10	0.65	0.12	0.05	0.36	89.30	39.60	21.60	2.93	<0.003	<0.003
CC04	2013/05/24	7.91	56.50	309.00	248.00	12.40	35.70	0.34	0.18	0.03	0.28	55.50	20.20	33.00	2.37	<0.003	<0.003
CC06	2013/05/24	7.92	96.50	436.00	295.00	97.60	<0.04	0.16	**49.40**	<0.008	0.22	35.10	31.70	17.70	26.60	<0.003	**1.71**
DOOR01	2013/05/24	7.75	106.00	567.00	560.00	12.10	20.90	9.20	0.61	0.03	0.33	95.80	82.40	5.19	4.34	<0.003	<0.003
DOOR02	2013/05/24	7.77	86.70	460.00	452.00	12.50	12.90	4.27	0.14	0.06	0.31	88.50	64.60	4.49	0.94	<0.003	<0.003
DOOR10	2013/05/24	8.09	95.90	513.00	488.00	13.00	21.00	8.81	0.09	0.05	0.30	97.50	74.00	4.71	0.73	<0.003	<0.003
DP01	2013/05/24	7.78	77.50	397.00	386.00	14.40	4.81	5.13	0.13	0.03	0.26	77.80	56.70	4.75	1.08	<0.003	<0.003
DP02	2013/05/24	9.07	74.30	409.00	373.00	38.30	15.00	1.80	0.64	0.01	0.24	6.39	103.00	17.30	3.24	<0.003	<0.003
DP03	2013/05/24	8.33	111.00	655.00	646.00	18.80	35.60	2.92	0.14	0.15	0.34	97.90	96.80	10.10	5.42	<0.003	<0.003
DP04	2013/05/24	7.78	110.00	593.00	526.00	41.00	26.70	**14.90**	0.07	0.04	0.26	92.60	83.20	15.20	3.47	<0.003	<0.003
DRIE01	2013/05/24	7.66	104.00	580.00	576.00	12.80	24.50	5.34	0.06	0.04	0.26	109.00	80.40	1.92	<0.018	<0.003	<0.003
GO102NC	2013/05/24	8.01	114.00	665.00	619.00	22.40	43.20	5.75	0.11	0.04	0.31	124.00	89.30	8.08	0.19	<0.003	<0.003
KVF01	2013/05/24	8.52	76.20	429.00	341.00	21.80	36.20	8.42	0.09	0.04	0.31	87.80	58.90	10.10	1.06	<0.003	<0.003
KVF02	2013/05/24	8.44	83.80	484.00	476.00	9.87	9.82	2.05	0.07	0.04	0.31	100.00	69.70	4.75	1.23	<0.003	<0.003
KOOT01	2013/05/24	8.42	91.40	463.00	254.00	66.10	29.50	**33.20**	0.05	0.04	0.25	89.20	63.50	25.80	2.91	<0.003	<0.003
KOOT02	2013/05/24	8.30	91.60	453.00	256.00	66.30	30.20	**32.80**	0.06	0.05	0.27	82.00	59.50	25.60	2.63	<0.003	<0.003
KOOT03	2013/05/24	8.47	92.70	462.00	264.00	66.80	30.50	**32.30**	0.06	0.04	0.30	86.10	59.40	25.40	2.69	<0.003	<0.003
CHRISJAN01	2013/05/24	8.04	77.30	432.00	334.00	27.30	33.50	6.00	0.05	0.04	0.37	99.10	40.30	22.30	2.41	<0.003	<0.003
CHRISJAN02	2013/05/24	8.44	51.10	281.00	245.00	9.40	20.90	1.76	0.21	0.21	0.34	54.10	38.90	8.04	0.97	<0.003	<0.003
WVR01	2013/05/24	7.77	73.10	382.00	172.00	46.10	57.90	**26.70**	0.06	0.04	0.24	90.90	41.50	15.70	0.30	<0.003	<0.003
WVR02	2013/05/24	7.73	72.90	380.00	172.00	45.90	57.80	**26.20**	0.05	0.04	2.45	91.10	39.40	14.40	0.19	<0.003	<0.003
NIEMAND01	2013/05/24	8.10	65.90	359.00	243.00	25.20	31.10	**15.80**	0.27	0.04	0.32	87.00	35.90	18.10	0.16	<0.003	<0.003
NIEMAND02	2013/05/24	8.55	75.30	417.00	327.00	24.50	33.60	8.66	0.06	0.04	0.32	90.60	53.20	9.51	0.77	<0.003	<0.003
FARM446	2013/05/24	8.70	60.60	355.00	279.00	12.40	43.30	0.30	0.75	0.04	0.95	47.10	40.80	40.70	0.75	<0.003	<0.003

Borehole Description	Date Meas.	pH	EC mS/m	TDS mg/l	Malk mg/l	Cl mg/l	SO4 mg/l	NO3-N mg/l	NH4 mg/l	PO4 mg/l	F mg/l	Ca mg/l	Mg mg/l	Na mg/l	K mg/l	Al mg/l	Fe mg/l
SANS 241 (2011)	Drinking Water	≥5 - ≥9.7	≤170	≤1200		≤300	≤500 (acute health) ≤250 (aesthetic)	≤11	≤1.5		≤1.5			≤200		≤0.3	≤2 (chronic health) ≤0.3 (aesthetic)
Risk Type		Operational	Aesthetic	Aesthetic		Aesthetic	Acute Health -1 and Aesthetic	Acute health -1	Aesthetic		Chronic health			Aesthetic		Operational	Chronic health and aesthetic
GLOU_COMM	2013/05/24	8.50	88.00	552.00	340.00	63.40	78.80	1.94	0.01	0.04	0.42	88.80	55.40	53.10	5.64	<0.003	<0.003
GLOU1	2013/05/24	8.47	116.00	689.00	395.00	83.70	127.00	1.23	0.09	0.04	0.25	91.80	85.00	62.50	0.47	<0.003	<0.003
KAPSTEWEL	2013/05/24	8.59	77.00	420.00	398.00	15.60	5.91	4.91	0.09	0.04	0.26	83.10	64.10	6.03	1.04	<0.003	<0.003
FARM437	2013/05/24	8.28	90.50	549.00	426.00	54.30	36.70	7.97	0.09	0.04	0.35	94.40	88.70	10.20	0.70	<0.003	<0.003
DRP20	2013/05/24	8.04	17.80	76.00	47.80	3.35	11.80	2.89	0.10	0.04	0.26	13.60	9.10	2.66	3.15	<0.003	<0.003
WATER_HOLE	2013/05/24	8.32	91.80	560.00	484.00	26.20	44.30	2.63	0.11	0.05	0.32	90.70	92.50	12.00	1.19	<0.003	<0.003
SWART_MODDER01	2013/05/24	8.67	82.10	429.00	379.00	21.90	12.30	9.43	0.14	0.04	0.35	75.80	71.70	8.71	0.99	<0.003	<0.003
FARM434	2013/05/24	8.54	63.50	297.00	219.00	17.50	16.30	**13.40**	0.14	0.04	0.33	65.40	32.90	19.00	0.76	<0.003	<0.003
W02	2013/05/24	8.57	76.60	430.00	300.00	33.30	43.50	9.72	0.09	0.03	0.42	99.80	42.00	18.70	2.61	<0.003	<0.003

Table 5.5: Details of monitoring boreholes on Doornpan

Borehole	Latitude	Longitude	Elevation (mamsl)	Depth (m)	Water intersected (m)	Water level (m)
DO-BH01	-28.20333	23.06160	1383	55	35	7
DO-BH02	-28.20338	23.06724	1382	25	19	11
DO-BH03	-28.21066	23.06054	1377	30	18	7
DO-BH04	-28.20898	23.06562	1420	70	63	47

5.1.7 Surface Water

The project site is located within quaternary catchment D73A of the Lower Vaal Management Area which in turn falls within the Orange River Basin. According to the Water Resources of South Africa 2005 study (WR2005), quaternary catchment D73A is classified as an endorheic system. Rainfall in this system does not exit the catchment as surface flow, but may only leave as evaporation and seepage. Information on the quaternary catchment D73A is provided in Table 5.6.

Table 5.6 Quaternary Catchment D73A Details (Jeffares &Green, 2013)

Quaternary Catchment	Catchment Area (km²)	Evaporation Zone	Rain Zone	Water Management Area	MAR (MCM)	MAR Depth (mm)	MAP (mm)
D73A	3 236	7A	D7C	10	0	14.7	323

5.1.7.1 Surface Water Features

Jeffares & Green conducted a desktop analysis to determine the surface water features on site. The desktop analysis was conducted using information from the National Freshwater Priority Areas (NFEPA, 2011) and the Environmental Potential Atlas (ENPAT, 2000 & 2002). Wetlands were identified within the study area and its surrounds and are illustrated in Figure 5.11. There are no wetlands or pans within the proposed mining and infrastructure footprint area on the Farm Doornpan. In addition, no defined drainage lines could be identified within the mining area. The closest surface water features identified are approximately 400 m and 1.5 km from the mining area which include an ephemeral pan and NFEPA wetland (see Figure 5.11).

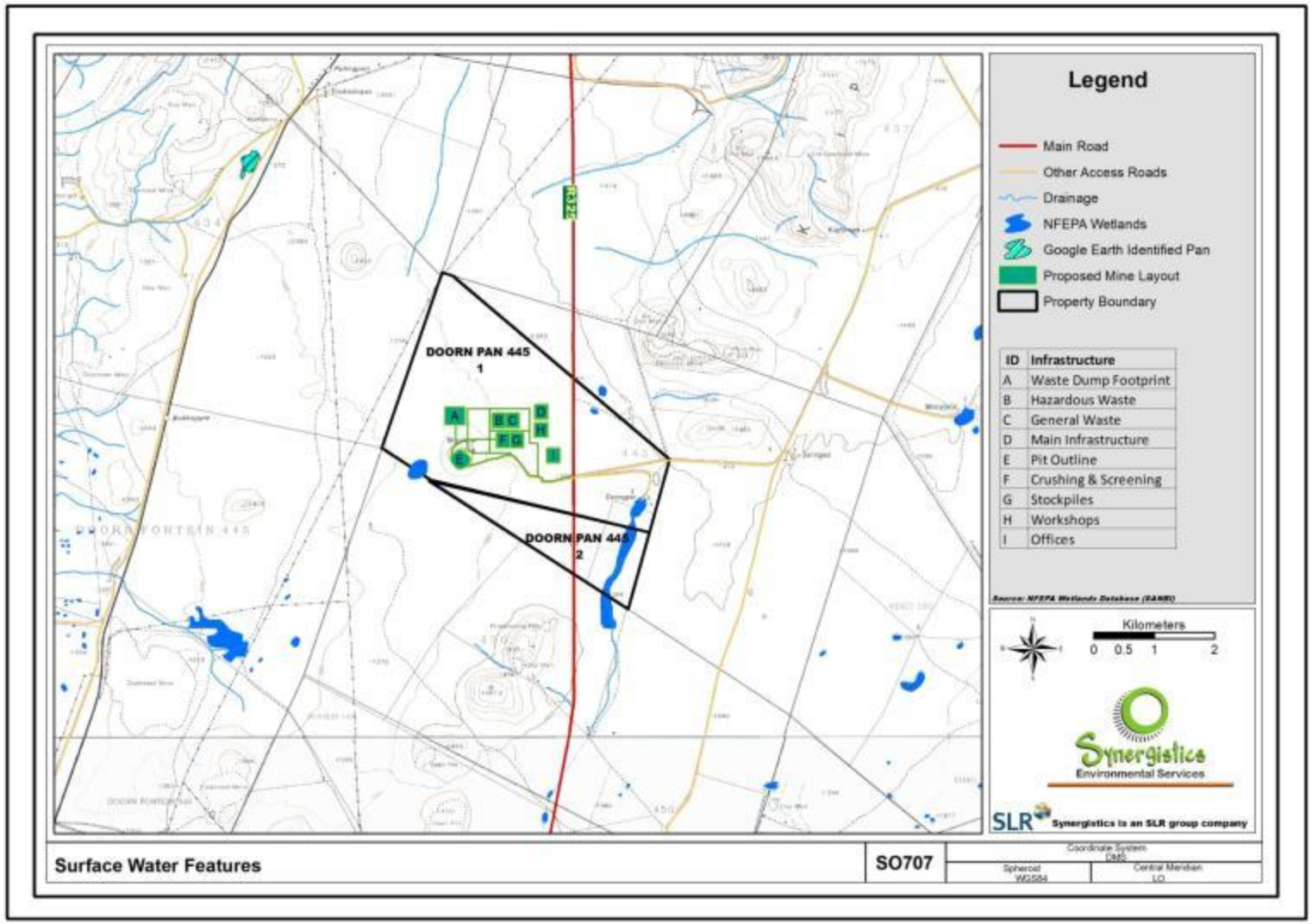


Figure 5.11: Surface Water Features and Catchment Areas for the COZA Iron Ore Project

5.1.8 Flora

The study area falls within the Eastern Kalahari Bushveld Bioregion of the Savanna Biome (Mucina & Rutherford, 2006). The vegetation of the southern Kalahari in general is relatively species-poor and less than 2.5 % of the total species list of the southern Kalahari is regarded as endemic, while less than 6 % of the plant species is regarded as near-endemic species (Van Rooyen & Van Rooyen 1998). The proposed development area does however fall within the Griqualand West Centre of Endemism (GWC) as defined by van Wyk and Smith (2001). According to van Wyk and Smith (2001), the GWC is considered a priority area for conservation in the Northern Cape, as the number of threats to the area is increasing rapidly, little research has been done and it is poorly understood.

According to the vegetation classification of South Africa by Mucina & Rutherford (2006, Biodiversity GIS vegetation map), there are two vegetation types present in the study areas – Kuruman Thornveld and Kuruman Mountain Bushveld (Figure 5.12). Both vegetation types are considered to be Least Threatened and have a wide distribution and extent. The vegetation types therefore do not have a high conservation status. The two vegetation types are described in more detail below.

The Kuruman Thornveld occurs on flats from the vicinity of Postmasburg and Danielskuil (west of the Kuruman Hills) in the south extending via Kuruman to Tsineng and Dewar in the north (Mucina & Rutherford 2006). Its features are usually flat rocky plains and some sloping hills with a very well developed, closed shrub layer and well developed open tree stratum consisting of camel thorn (*Acacia erioloba*). Smaller trees in this vegetation unit include Blackthorn (*Acacia mellifera subsp*. *Detinens*) and Shepherd's tree (*Boscia albitrunca*). Taller shrubs are Velvet Brandybush (*Grewia flava*), River Honeythorn (*Lycium hirsutum*), Camphor Bush (*Tarchonanthus camphoratus*) and Common Spike-Thorn (*Gymnosporia buxifolia*). Small shrubs present are Besembossie (*Gnidia polycephal*), *Helichrysum* species (e.g. Golden Everlasting), *Hermannia* species (e.g. Doll's Rose) and *Plinthus sericeus*. Common grasses are Arrowfeather Threeawn (*Aristida meridionalis)*, *A. stipitata* and Lehmann Lovegrass (*Eragrostis lehmanniana*).

The Kuruman Mountain Bushveld covers the hills with generally gentle to moderate slopes and hill pediment areas, with an open to closed shrubveld. The grass layer is fairly well developed. Common large shrubs include Blackthorn (*Acacia mellifera* ssp. *Detinens*), common *Guarri Euclea* undulate, Bloubos *Diospyros lycioides*, *Searsia tridactyla*, Yellow Pomegranate (*Rhigozum obovatum*) and Vaalbos (*Tarchonanthus camphoratus* and *T. obovatus*). Shepherd's trees (*Boscia albitrunca*) are occasional. Several rock figs (*Ficus cordata*) grow on the peaks of the hills where large boulders or sheer rock outcrops are a feature. Common grasses include Black Spear Grass (*Heteropogon contortus, Enneapogon sp., Eragrostis sp*)., Koperdraadgras

(*Aristida diffusa*) and Oxtail Buffalo Grass (*Cenchrus ciliaris*). Dwarf shrubs and herbaceous species include (*Hermannia species, Eriocephalus sp., Helichrysum*) species and a variety of small legume species such as *Indigofera sp.*

A floral specialist, Tania Anderson, was commissioned to compile a list of floral species of conservation concern that could occur in the development areas and immediate surrounds (Anderson, 2013 – See Specialist Vegetation Study, Appendix D). It was found that a total of 118 plant species may be present in the study area, of which 61 species were recorded during a field survey of the area. Of these, 17 species of conservation concern could potentially be present in the study area, of which two have been confirmed to occur in the area.

Two tree species protected under the National Forests Act (NFA 1998) were found to occur in the study area. These include the Camel Thorn Tree (*Acacia erioloba*) (5 large trees observed) and the shepherd's tree (*Boscia albitrunca*) (± 220 trees observed) (Anderson, 2014).

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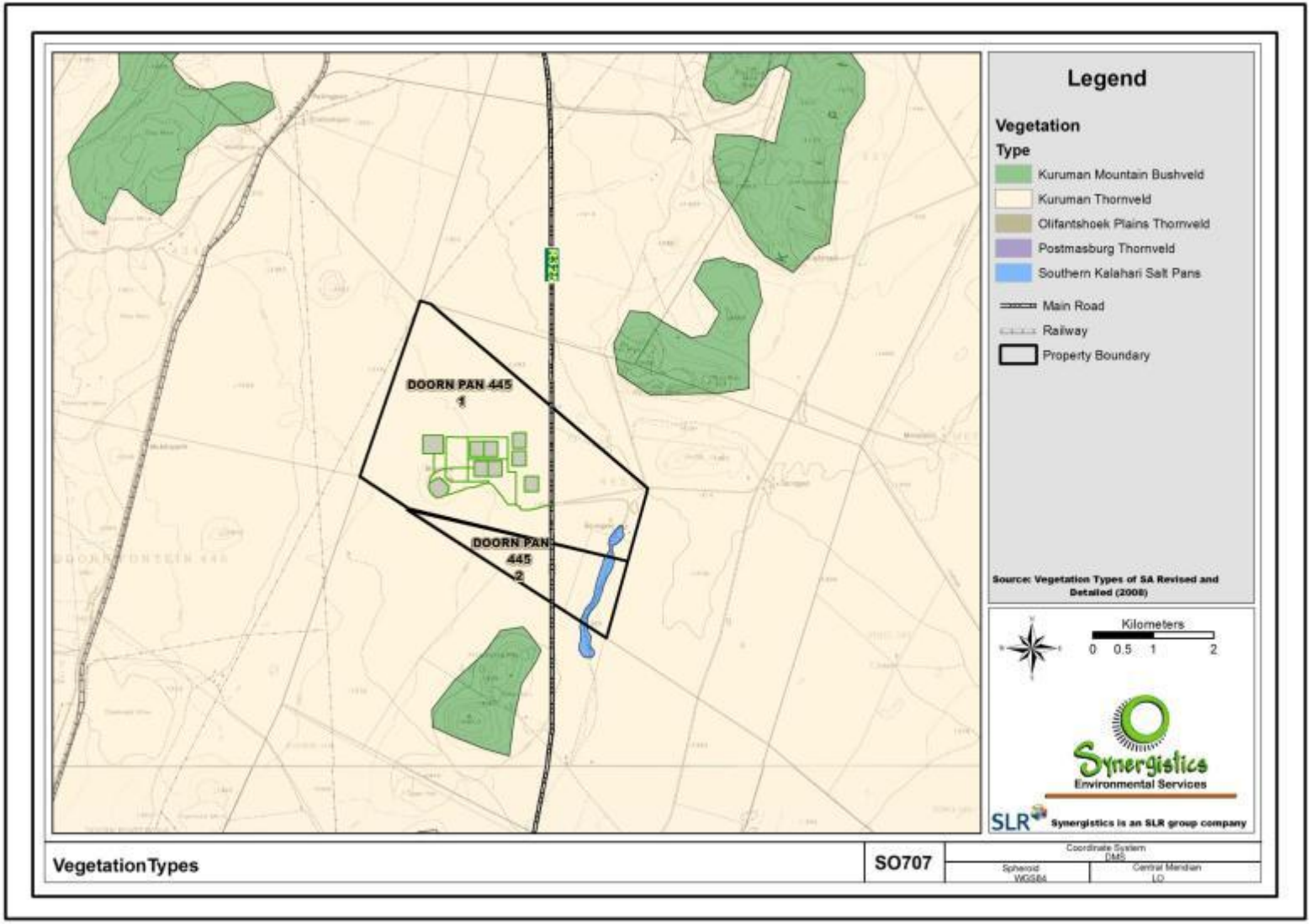

Figure 5.12. Vegetation map of the vegetation types in the mining areas

5.1.9 Fauna

Faunal species diversity and numbers in the region is relatively low as is typical of semi-desert areas (Wilson, 2014). The area proposed for development and its immediate surrounds is largely undeveloped. However, considerable degradation of the natural habitat has occurred in the region due mainly to mining, especially on the iron and manganese ore hills and outcrops between Kathu and Postmasburg. A number of game farms are found in the region; most notably a game farm on the farm Thaakwaneng 675, situated approximately 10km north of the farm Doornpan.

A faunal specialist, Beryl Wilson, was commissioned to compile a list of fauna of conservation concern that could be in the development areas and immediate surrounds (Wilson, 2014 – See Faunal Specialist Study, Appendix C).

Current literature, museum records and various past surveys in the region by the specialist indicated an approximate total of 56 mammal, 266 bird, 45 reptile and 11 amphibian and uncalculated arachnid naturally-occurring species to have been recorded in the region (Wilson, 2014). Of these, 14 mammal, 14 bird, two reptile, one amphibian and five arachnid species of conservation significance are thought to potentially occur in the general area of which only seven are predicted as having a high chance of occurrence (Wilson, 2014).

The seven that have a high chance of occurrence include the Bushveld Sengi *Elephantulus intufi* (Data Deficient), the Bushveld Gerbil *Gerbilliscus leucogaster* (Data Deficient), the African Wild Cat (*Felis silvestris lybica)* (Least Concern / Protected Species), Rock Monitor *Varanus albigularis* (Globally Vulnerable / Protected Species), two species of Burrowing Scorpion (Protected Species), and a species of Creeping Scorpion (Protected Species). Species of conservation concern include those listed in the NEMBA ToPS list (February 2007) for Protected Species.

5.1.10 Ecological Sensitivity

Sensitive habitats are known to occur in the region. Areas with untransformed natural vegetation, high diversity and complexity, species of special concern and systems vital to sustaining ecological function are potentially sensitive. Examples of sensitive habitats include wetlands, seasonal pans, perennial and non-perennial rivers and streams (watercourses) and ecological corridors with high connectivity to other ecosystems. Highly sensitive habitats often contain larger and/or healthier populations of species of special concern, or a higher species diversity of these particular species, and are considered to be of higher conservation value and more sensitive than areas with fewer or sparsely distributed species of special concern.

The ecosystem status of vegetation types in the study area is considered to be least threatened, meaning that no significant disruption of ecosystem functioning as more than 80 % of their original extent is untransformed (Anderson, 2014). In general, the habitat is not predicted to be critical to the survival, in terms of breeding, roosting or foraging of any of the locally occurring conservation-worthy faunal species (Wilson, 2014). In addition, the area is fairly significantly degraded due to historical overutilisation. The area is also not under consideration in the National Protected Area Expansion Strategy (2010)

In terms of fauna, the site has a low sensitivity based on the fact that only Least Concerned, Data Deficient and Near Threatened species are routinely recorded in the area and veld type in general. In addition, it is unlikely that the area constitutes critically important habitat or resources of the species of conservation concern. Any pans or streams in the area are however considered to have a medium sensitivity, due to the use of them by Giant Bullfrogs in the area, which are a Near Threatened and a Protected Species.

Areas with untransformed natural vegetation, high diversity and complexity, species of special concern and systems vital to sustaining ecological function are potentially sensitive. The analysis of the vegetation on Doornpan indicates that the vast majority of the study area comprises vegetation of a medium sensitivity, with one small natural area (a pan, 2.4 ha with buffer zone) considered to be of medium-high sensitivity.

5.1.11 Air Quality

5.1.11.1 Pollution sources and sensitive receptors

Current potential air emissions sources within the study area include mining activities, blasting activities from the nearby military base and mines, the use gravel access roads, vehicle exhaust emissions and farming activities.

Air quality sensitive receptors generally include places of residence and areas where members of the public may be affected by atmospheric emissions generated by mining/industrial activities. The proposed Doornpan pit is located approximately 12 km north-northwest of Postmasburg and approximately 11 km north-east of Beeshoek. Other sensitive receptors in the project area include scattered farmsteads. These are indicated in Figure 5.13.

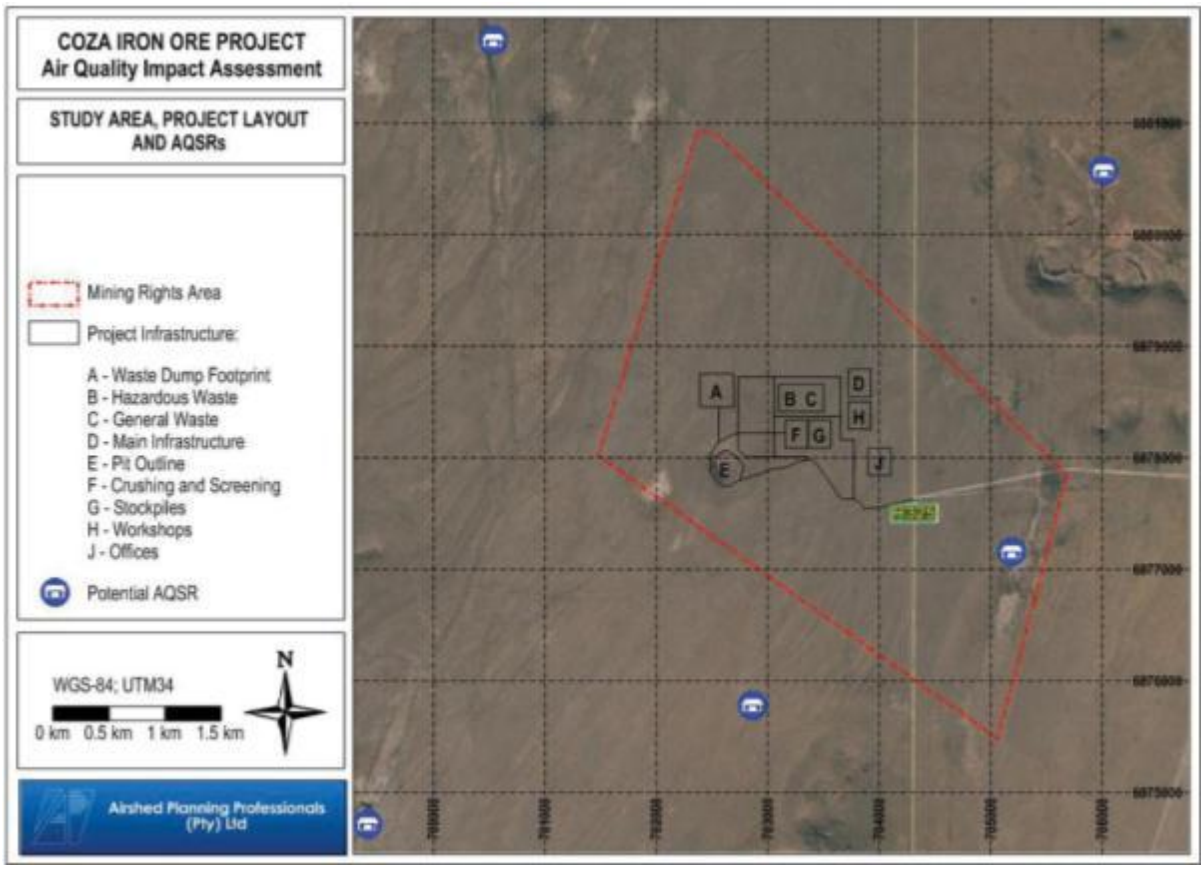

Figure 5.13: Nearby sensitive receptors in terms of air quality (Airshed, 2014).

5.1.11.2 Baseline Air Quality

Ambient NO_2, O_3, PM_{10}, $PM_{2.5}$ and SO_2 concentrations are recorded at the Postmasburg ambient monitoring station which is approximately 10 km from the site. Reference is made to data recorded between September 2011 and March 2013 in describing existing (or pre-development) ambient pollutant concentrations in the area.

A summary of recorded and calculated average and median concentrations of criteria pollutants recorded at Postmasburg are provided in Table 5.7.

Table 5.7: Summary of ambient concentrations of pollutants of concern recorded near Postmasburg

Parameter	$PM_{2.5}$	PM_{10}	SO_2	NO_2
Data Availability	89%	91%	88%	92%
1-hour Average Minimum Concentration	-	-	0 µg/m³	0 µg/m³
1-hour Average Maximum Concentration	-	-	32 µg/m³	42 µg/m³
Exceedances of the 1-hour NAAQS Limit Value	-	-	0 hours	0 hours
24-hour Average Minimum Concentration	2.91 µg/m³	5.83 µg/m³	0.38 µg/m³	-
24-hour Average Maximum Concentration	29.7 µg/m³	93.9 µg/m³	14.5 µg/m³	-
Exceedances of the 24-hour NAAQS Limit Value	0 days	8 days (1%)	0 days	-
Average Concentration	9.53 µg/m³	30.0 µg/m³	2.18 µg/m³	2.60 µg/m³
Median SO_2 Concentration	8.00 µg/m³	22.0 µg/m³	2.00 µg/m³	2.00 µg/m³

From ambient air quality data recorded at Postmasburg between September 2011 and March 2013, it is evident that air quality in the area is generally good with respect to most of the criteria pollutants. Recorded ambient concentrations of $PM_{2.5,}$ NO_2 and SO_2 were all below the respective National Ambient Air Quality Standards (NAAQS) (GN 1210, 24 December 2009) limit values and no exceedences were recorded with respect to these pollutants. Recorded PM_{10} concentrations were high, however with the NAAQS limit value of 75 µg/m^3 exceeded a total of 8 days during 2012.

5.1.12 Traffic

The main roads near the study area include the R325 that connects Postmasburg to Kathu and the R385 which connects the area to Kimberley. The R385 lies approximately 10km west of the proposed mine and the R325 lies approximately 1 km east of the proposed mining area. The R325 will be the used during the mine construction and operation phase. This road will be largely used for the transportation of ore from the mine as well as for staff and visitors coming to the mine. This road serves a number of mines between Postmasburg and Kathu and therefore carries a large volume of heavy trucks which damages the road (TTH Traffic, 2014).

Transport and Traffic Technology Africa (Pty) Ltd conducted traffic counts on the R325 to establish baseline traffic volumes. The counts were conducted for heavy vehicles and cars over a 12 hour period between 06:00 and 18:00 on 2 consecutive days at each access on the main road (R325). The counts were done on normal weekdays outside of school holidays on the 26 and 27th of November 2013. The results of the traffic count is presented in Table 5.8. below for a 12 h period. The Average Daily Traffic (ADT) is the average 2 way traffic volume per day averaged over a full year.

Table 5.8: Results of traffic counts for a 12 hour period with ADT estimates

Count station	Date	Main road R325 North of access	Main Road R325 South of access	Access Road DR3395
Doornpan 1A	Tuesday 26 Nov 2013	2 359 (12h) **3 000** ADT est	2 295 (12h) **2900** ADT est	220 (12h) **280** ADT est
Doornpan 1B	Wednesday 27 Nov 2013	2 323 (12h) **2 900** ADT est	2 290 (12h) **2 900** ADT est	213 (12h) **270** ADT est

Peak hour traffic for the 26 and 27th November is shown in Figure 5.14 and Figure 5.15 below which also shows the percentage of heavy vehicles.

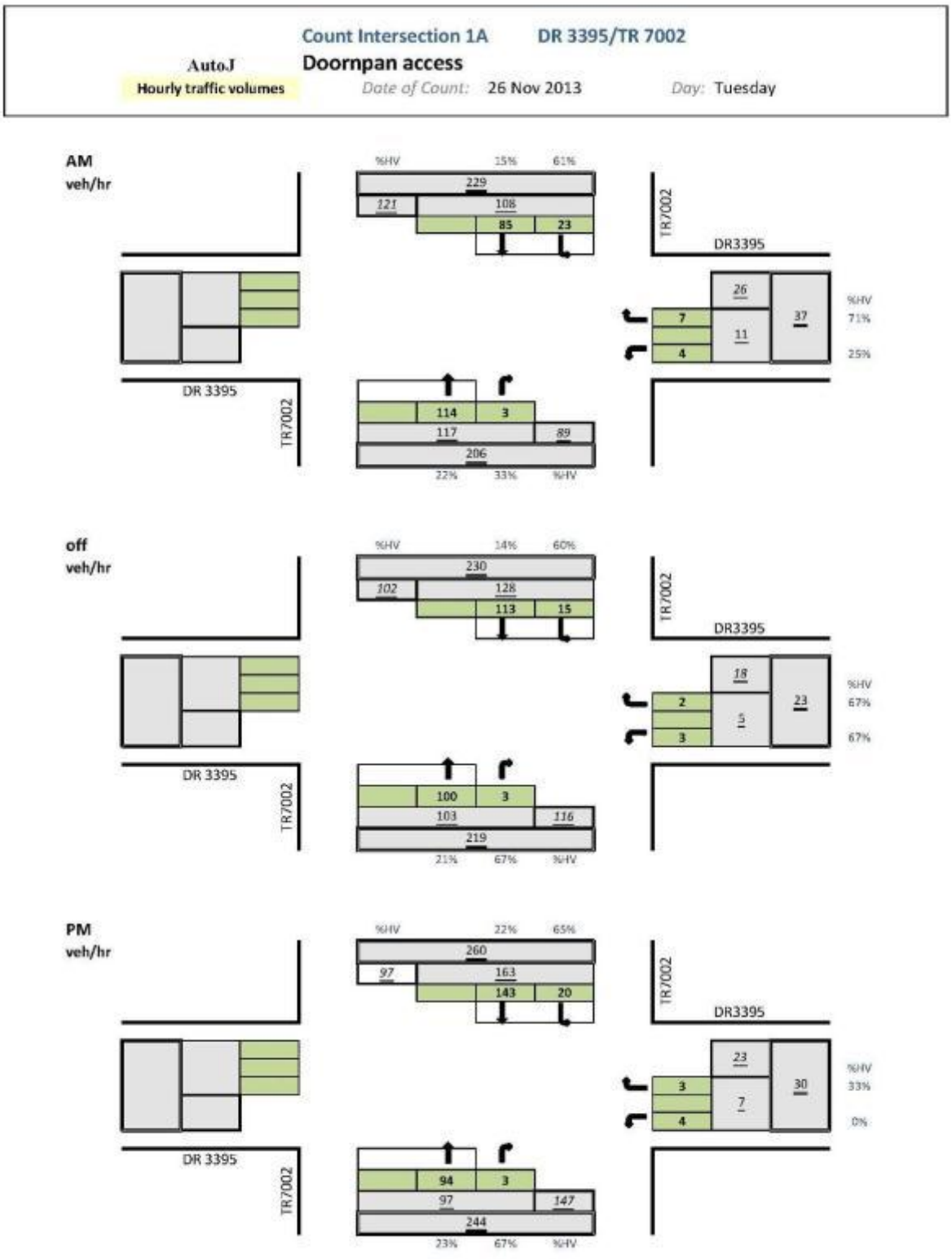

Figure 5.14: Traffic Counts taken at intersection of R325 on the 26th of November (TTH Traffic, 2014).

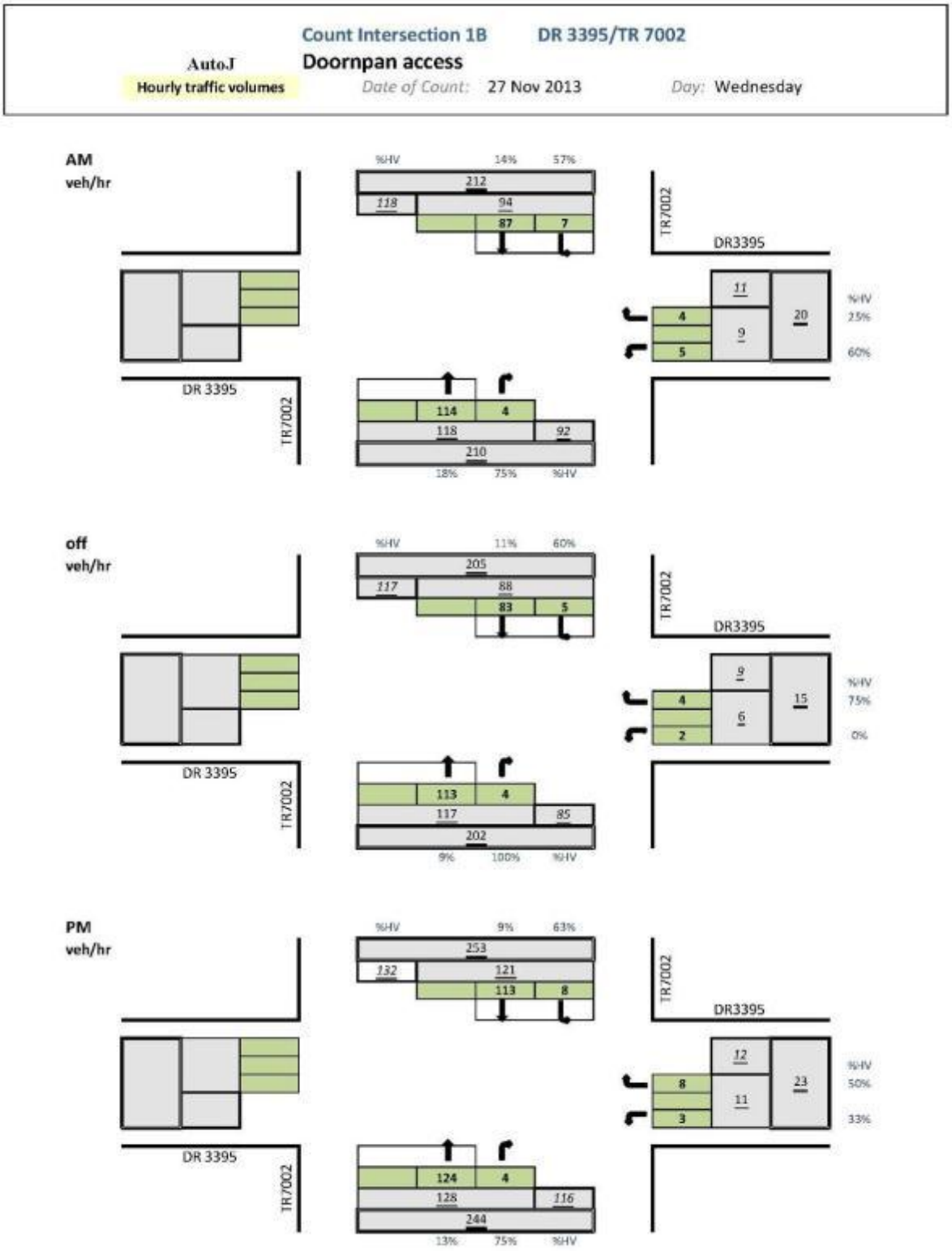

Figure 5.15: Traffic Counts taken at intersection of R325 on the 27th of November (TTH Traffic, 2014).

5.1.13 Noise

The study area is located in an area that can be classified as a rural district. Table 5.9 indicates the allowable noise levels as per SANS 10103 for different districts. Baseline noise monitoring was conducted on the 5th and 6th of December, 2013 at three separate locations near potential sensitive receptors. Baseline noise monitoring results indicate:

- An average night time noise level of 22-24 dB at receptors 1 & 2, distant from potential noise sources.
- An average night time noise level of 30-35 dB at receptor 3, near the busy provincial road R325.
- An average day time noise level of 32-37 dB at receptors 1 & 2, distant from potential noise sources.
- An average day time noise level of 51-59 dB at receptor 3, near the busy provincial road R325.

The current baseline noise levels is well within SANS 10103 outdoor noise levels for rural districts as indicated in Table 5.6 for all measured receptors except for receptor 3 which is located near the provincial road R325.

Table 5.9: Equivalent Continuous Rating Levels for Outdoor Noise (SANS 10103)

Type of District	SANS 10103 Table 2: Equivalent Continuous Rating Levels for Outdoor Noise (dBA)		
	Day/Night	Day	Night
Rural districts	45	45	35
Suburban districts with little road traffic	50	50	40
Urban districts	55	55	45
Urban districts with one or more of the following: workshops, business premises and main roads.	60	60	50
Central business districts	65	65	55
Industrial districts	70	70	60

5.2 Cultural and Heritage Resources

In 2010 a Heritage Impact Assessment was undertaken by Lita Webley and David Halkett of the farms Driehoekspan and Doornpan (Webley & Halkett, 2010a & b). One Early and one Middle Stone Age findspot were identified on Doornpan.

PGS Heritage & Grave Relocation Consultants undertook a Phase 1 Heritage Impact study for this EIA (See Appendix J). Archival and historical research has revealed a long and significant history in terms of the surroundings of the study area (PGS Heritage, 2014). The historical research highlighted that there might be some historical and archaeological sites within the study area which may be associated with the histories of the Thlaro and Thlaping. The surroundings of Postmasburg and the study area also contain a number of well-known pre-colonial mining sites, rock art sites as well as Stone Age sites, most notably Blinklopkop, a pre-colonial s1pecularite mine located approximately 10 km southeast of the study area. Based on archival and historical maps of the study area, one farmstead is located on the farm Doornpan, could be at least 85 years old (PGS Heritage, 2014). As such, this farmstead could constitute a significant heritage resource. This farmstead is however not located near the proposed mining site and will not likely be disturbed by the proposed development.

Three sites which may have heritage significance were identified near the proposed mine footprint areas during a systematic walkthrough of the site. The three sites comprise the following (PGS Heritage, 2014):

- An excavation, roughly 2 m across and 10 m deep, thought to be either a historic well or historic exploration and mining activities. The site can however be interpreted as a historic well due to the presence of a non-perennial stream. The site is likely to be older than 60 years.
- A stone age findspot where a single Middle Stone Age flake was observed.
- An historic road likely constructed during exploration and mining activities undertaken on Bleskop Hill, thought to be older than 60 years.

Although considered generally protected and of heritage significance, none of the sites are considered unique or possessing of any great scientific significance.

The location of the sites are presented in Figure 5.16. Sites 1 to 5 comprise the following:

- Site1: Deep circular excavation
- Site 2: Stone Age findspot
- Site 3: Historic road

- Site 4: Middle Stone Age flake
- Site 5: Early Stone Age core

5.2.1 Paleontological Resources

With respect to paleontological resources, the study area is underlain by chemical and clastic sedimentary sequences of the Campbell and Postmasburg Groups of the Transvaal Supergroup. These sedimentary sequences are associated with banded iron formations in the Postmasburg region where mining is envisaged. The dolomite sequences can contain good examples of stromatolite structures that are of medium paleontological significance. The mining of the Doornpan resource will most probably lead to the exposure of the chemical sedimentary sequences associated with the deposition of Banded Iron Stone Formation. The exposed sequences of chemical sedimentary rocks can in turn contain stromatolite structures which will only be exposed during mining operations.

Plate 1. Typical stromatolite structures usually associated with dolomite deposits such as is found in the study area (Photograph from Wikipedia 201 en.wikipedia.org/wiki/Stromatolite).

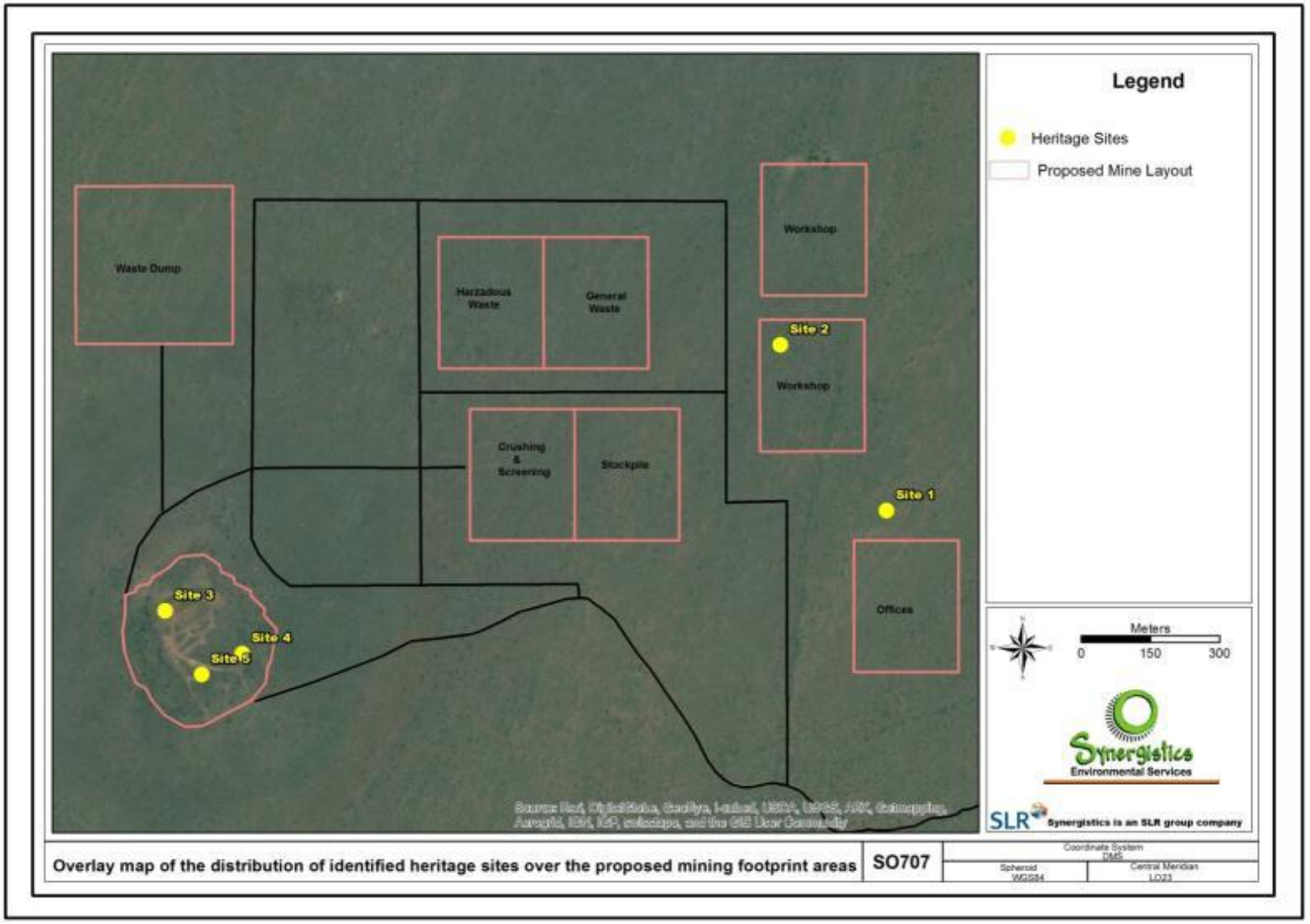

Figure 5.16: Overlay map of the distribution of identified heritage sites over the proposed mining footprint areas.

5.3 Socio-Economic Environment

5.3.1 Current Land use

The study area is within a rural district, zoned for agricultural use. The dominant land use in the area surrounding the COZA Iron Ore project is livestock farming. Due to the arid nature of the climate, intensive commercial agriculture is not possible. There is also human settlement to the east and northern of the study areas, these include two local farmers and the Maremane Community. Mining activities and the infrastructure associated with mining activities (powerlines and railway) are also prevalent in the area, due to the presence of iron ore.

The Transnet freight railway line linking Beeshoek Mine to Sishen Mine and ultimately to the Sishen Saldanha export line is located west of Doornpan's proposed mining area is. There are a number of abandoned buildings associated with the railway line on Farm Driehoekspan.

The R325 to Kathu crosses farm Doornpan east of the proposed mining area. Approximately 10 km northeast of the project area is the Lohatla Military Base, which is used as a training area for the South African National Defence Force. The military base is located in an area that was proclaimed as a nature reserve (Ga-Thlose Nature Reserve) in 1890. Part of the farm where the military base is located is now currently used as a game park (see Figure 5.17 for the current land use).

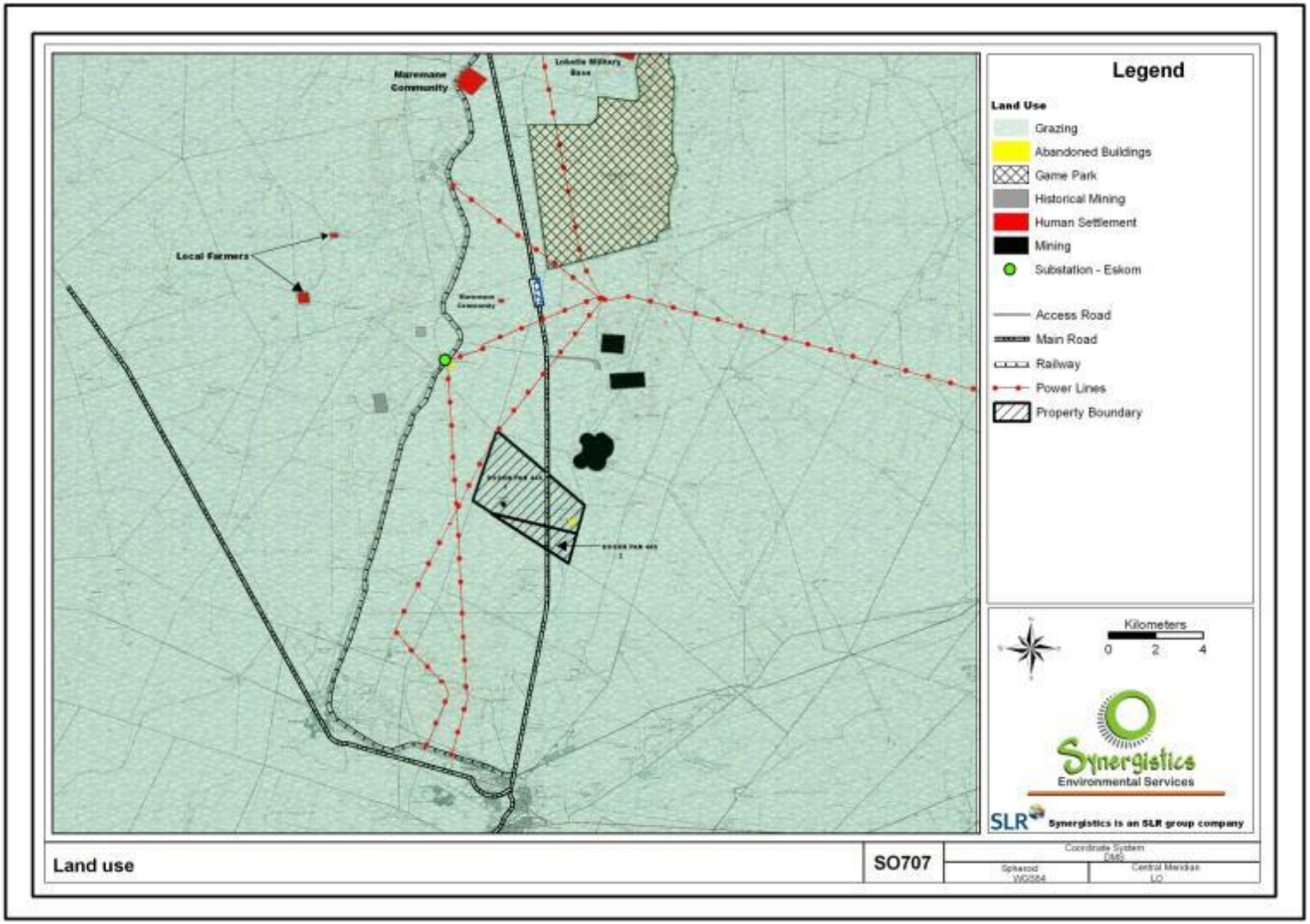

Figure 5.17: Land Use surrounding the Study Area

5.3.2 Socio-Economic Profile

5.3.3 Land Tenure

The proposed project is located on land owned by the Maremane Community. The land is registered under the Maremane Communal Property Association (MCPA). The MCPA represents members of the community that have legal right over the land. Mr More Mastididi was consulted as a representative of the community, however consultations with the other members of the Maremane community have revealed that there are other members of the CPA that need to be consulted. Synergistics consulted with the DALRD to establish members of the CPA and it was confirmed that Mr Mastididi was in fact the relevant representative. In addition Mr Tshwaro Mothlabedi was identified as another representative to be consulted.

5.3.4 Description of Local Communities

5.3.4.1 Maremane Community

Members of the Maremane community were dispossessed of their land for the purposes of establishing the Lohatla Military Base in the 1970's. The displaced people were taken to places such as Laxey, Pepsi and the surrounding areas of Kuruman (The New Age, 24 April 2012). According to the Rural Development and Land Reform's former deputy minister in 2010 Mr Thulas Nxesi, the Maremane community lost approximately 12 million hectares of land (South African Government Information, 4 December 2010). Post 1994 the community lodged a claim to have their land returned and in 2010 the community was handed over 11 200 ha of land on properties surrounding the military base. Figure 5.17 illustrates areas where some members of the Maremane Community are currently located near the study area. The majority of the people are currently residing in an informal settlement located on Farm Lohatla this settlement area is currently referred to as "Lohatla" by its inhabitants. There are little economic activities occurring in the area except for a local shop and a crèche. During the public meeting held with the community, it was evident that the unemployment rate is low. There are also a small number of people forming part of the Maremane community located on Farm Driehoekspan. This group of people is involved in agricultural activities (goat and sheep farming).

The current areas where the Maremane community are residing are not included in the local municipality's town planning scheme and therefore there are some challenges with service delivery.

5.3.4.2 Farming Community

Two local farmers who are involved in low intensity stock farming (cattle and sheep) also surround the study area (see Figure 5.17 for location of farmers). There is a game farms approximately 6 km northeast of Driehoekspan.

5.3.5 Social Baseline Description

5.3.5.1 Regional Demographic Information

Demacon Market Studies conducted a baseline socio-economic assessment of the study area. A 50 km radius as illustrated in Figure 5.19 was determined as the area of the study for the baseline description. The area had an estimated population of 63 243 or 17 931 households in 2013. The average household size amounts to approximately 3.5 members per household. The population growth is averaged at 1.4 % per annum (Demacon, 2013).

Figure 5.18 shows the age profiles within the study area. The study area is characterised by a relative large percentage of young adults between the ages of 20-34 years (30.5%). This can be attributed to the employment opportunities due to mining developments in the area.

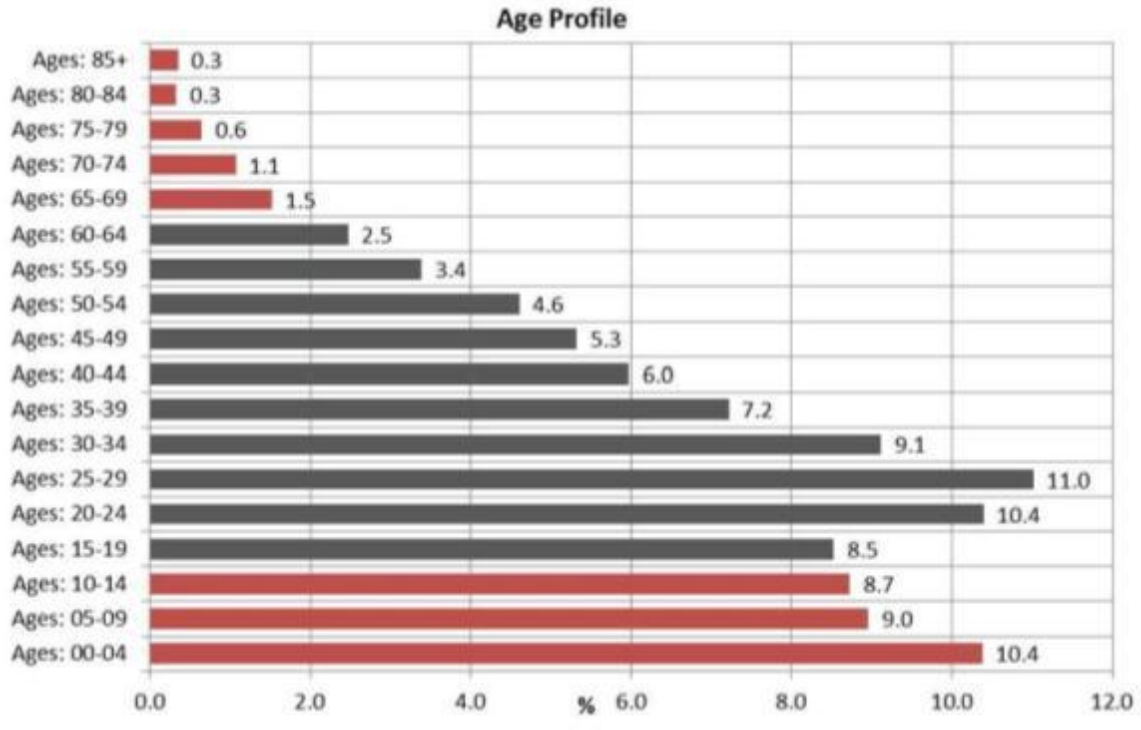

Figure 5.18: Age Profile within the study area (Source: Demacon Market Studies, 2013)

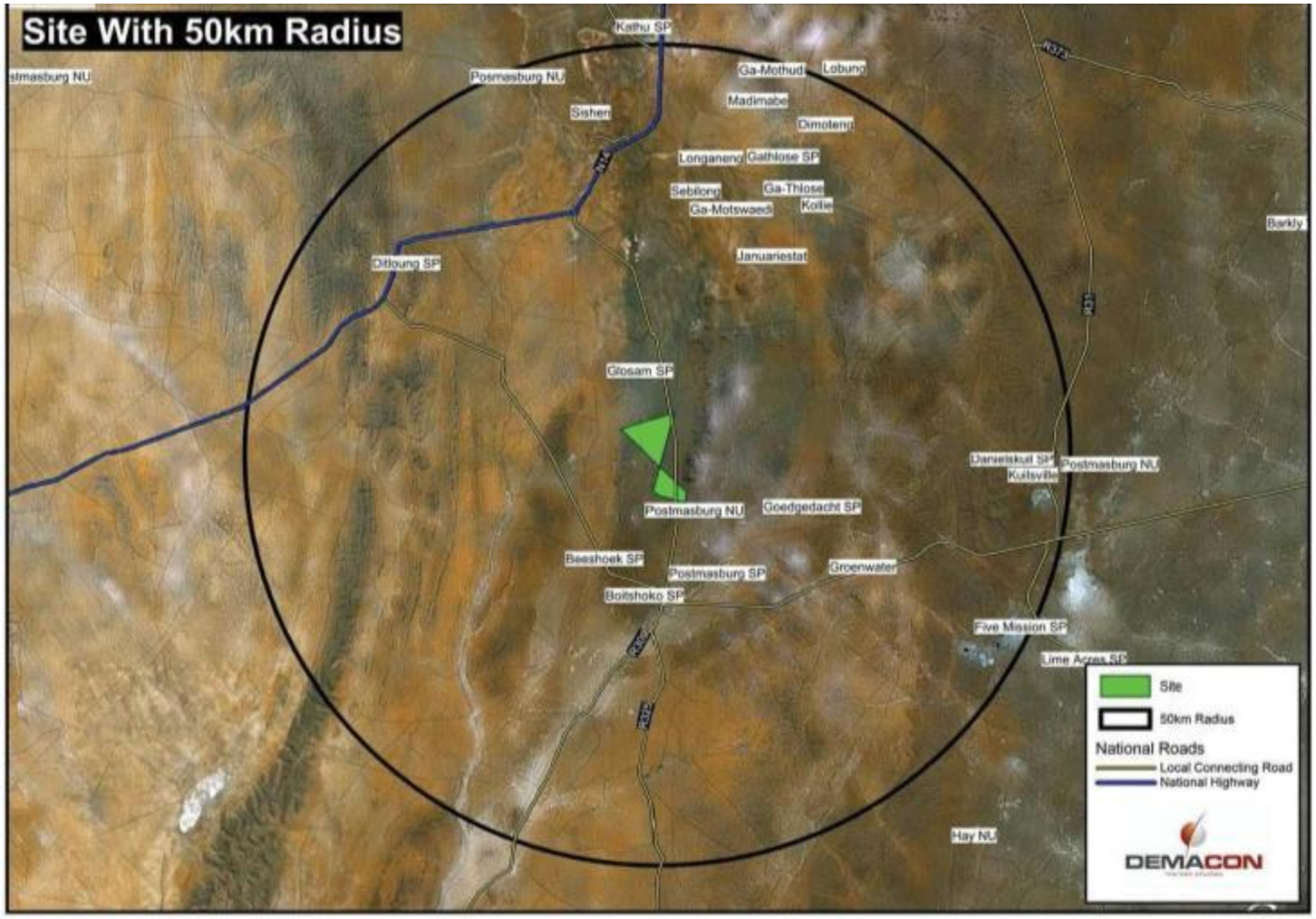

Figure 5.19: Socio-Economic Study Area (Demacon Market Studies, 2013)

5.3.5.2 Education Profile

The education profile of the study area is indicated in Figure 5.20. The area has moderate figures of illiteracy with 9.3 % having had no schooling. 27.6% of the market population has at least Grade 12 or obtained higher education.

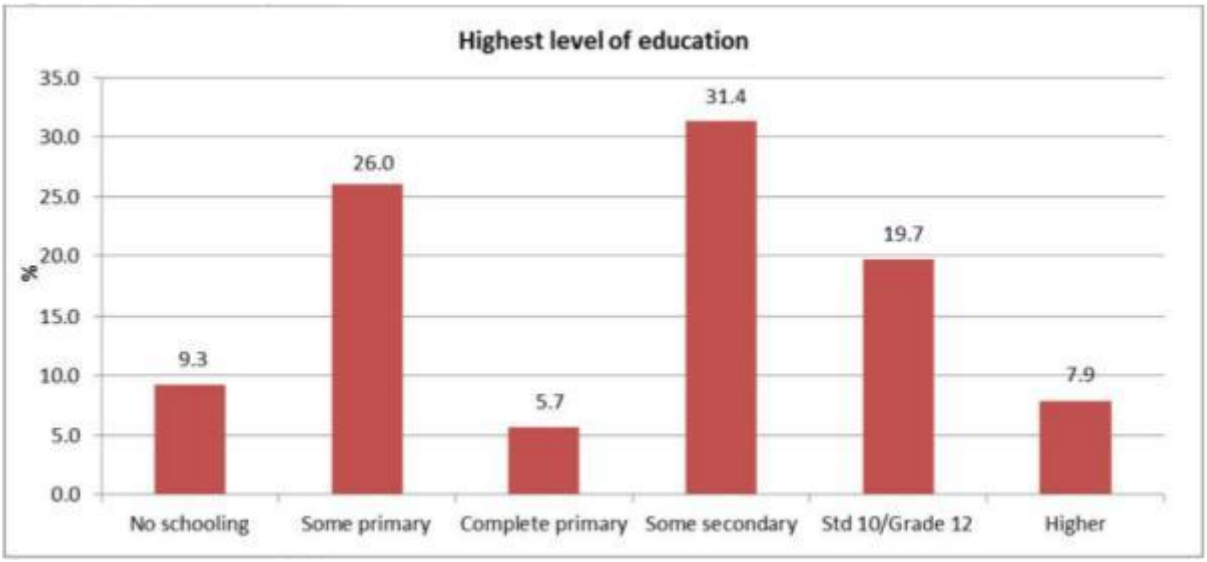

Figure 5.20: Education Profile (Demacon Market Studies, 2013)

5.3.5.3 Employment Profile

The majority of the market population is economically active (88.6 %) while 11.4 % are not economically active. Figure 5.21 shows that of the 88.6 % that are economically active, 84.4 % are employed while 15.6 % are unemployed. The low level of unemployment can be ascribed to the rural nature of the study area, with people only moving in the area for employment purposes to work in the mining or government sectors as the major employment sectors.

The employment profile of the surrounding communities is likely to be different from the overall study area as described above. During consultations meetings the community indicated high unemployment amongst the youth. Members of the community that are employed, are largely employed by surrounding mines.

5.3.6 Economic Outline

5.3.6.1 Regional and local economic structure

Tsantsabane's local economy contributes to approximately 17 % of the district's economy and it is the third largest economy in the district. The municipality hosts one of the country's largest iron ore reserves, and as such, mining is an important sector within the municipality contributing approximately 39% of the local economy in 2011, see Figure 5.21.

The affected area for the mining development is characterised by low intensity goat/sheep farming with some historic but abandoned mining activity. The local communities are involved in informal economic activities such as local shops, crèches or small scale agricultural activities (chicken farms, vegetation).

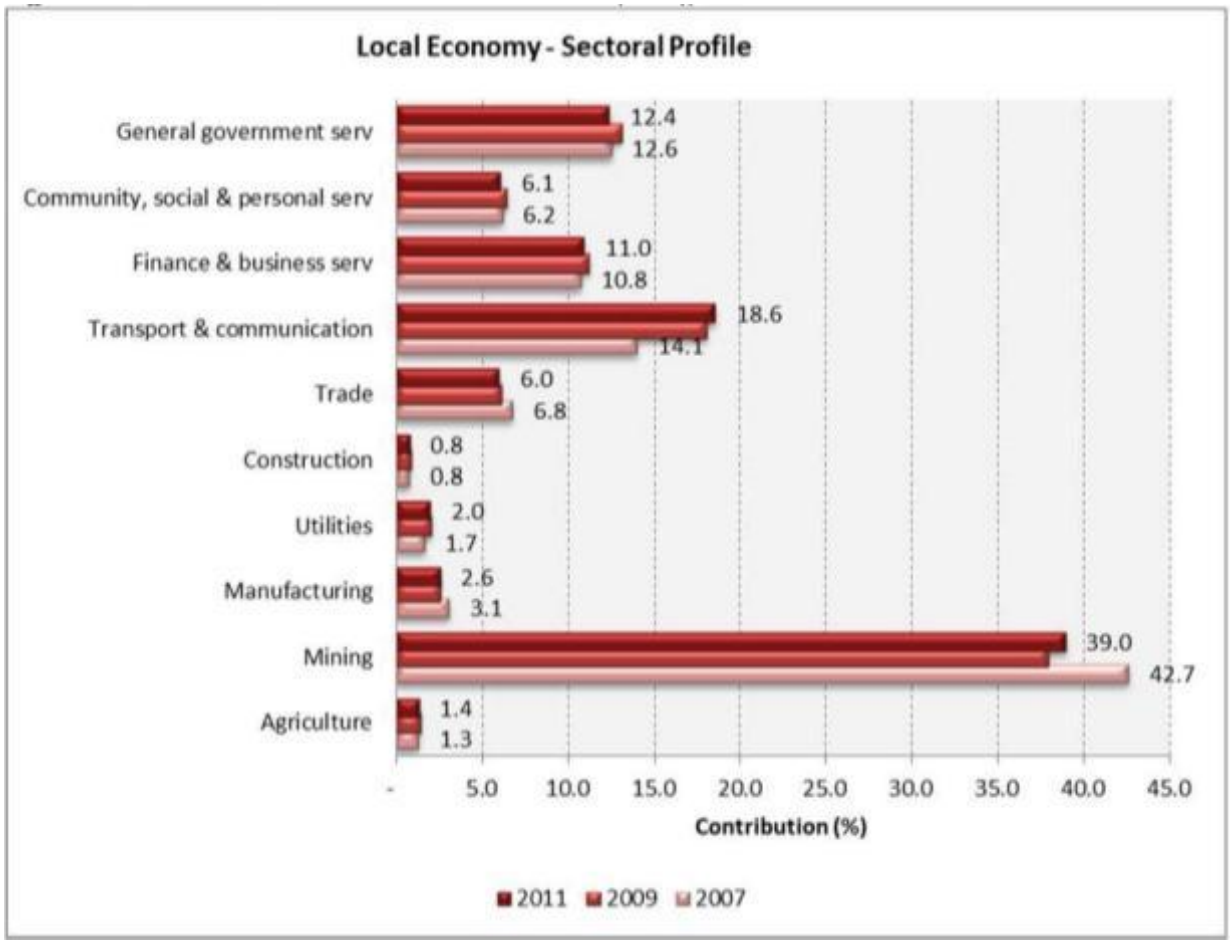

Figure 5.21: Economic Structure and Performance (GVA), 2011 (Demacon Market Studies, 2013)

5.3.6.2 Level of Economic Diversity

The level of economic diversity of a region can be measured using the tress index. A tress index of zero represents a totally diversified economy and the higher the tress index (closer to 100), the more concentrated or vulnerable the region's economy. Figure 5.22 shows the tress index for the nation, province and on a local level. Tsantsabane local economy dependence on its driving sectors decreased from 64.1 in 2001 to 60.2 in 2011. The growth in transport and communications sector over the past few years has led to the decrease in dependency on the mining sector.

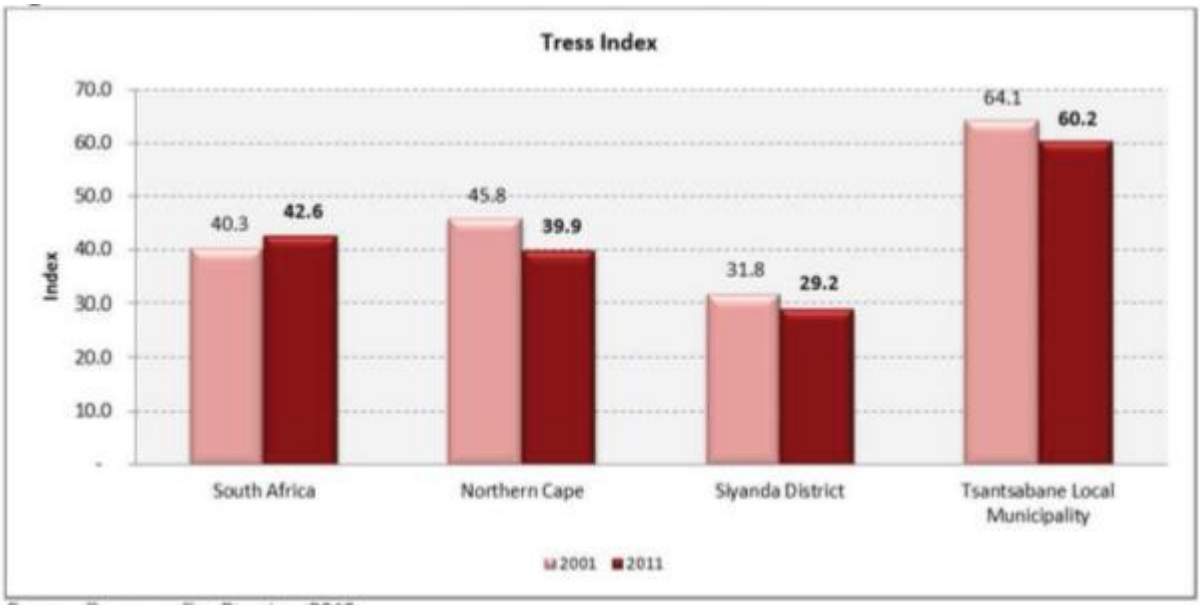

Figure 5.22 Tress Index for the affected administrative areas (Demacon Market Studies, 2013)

6. DESCRIPTION OF THE PROCESS OF ENGAGEMENT OF IAPS, INCLUDING THEIR VEIWS AND CONCERNS

6.1 Notification of IAPs on the COZA Iron Ore Project

IAPs were notified in accordance with Section 54 of GNR543 of the EIA Regulation published under NEMA. Information on the IAP notification process is provided in detail under Section 3.5.10.

6.2 Summary of Issues raised by IAPs

Issues and concerns relating to the COZA Iron Ore Project have been captured by means of:

- Written, email and telephonic responses received following public notification of the project (Appendix A).
- Minutes from the public meeting held at the Postmasburg Town Hall and Lohatla Village (Appendix A); and

A summary of issues and concerns raised by IAPs is provided in Table 6.1, with the names of the I&AP and the date the issue or concern was raised. Responses to all concerns are provided in the table and in Appendix A.

Table 6.1: **Summary of Public Issues and Concerns**

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
Authority Requirements	15 May 2013	Ms Jacoline Mans Department of Agriculture, Forestry and Fisheries	Tel: 054 334 0030 Email: JaolineMans@daff.gov.za	• The BID stated that the affected areas of the proposed open pit iron ore and associated infrastructure will be approximately 25 hectares on the farm Doornpan and 80 ha on farm Driehoekspan. Since vegetation clearance will be required, you may need a Forest Act Licence (from DAFF) and a Flora Permit (from Nature Conservation)	• Applications will be submitted to the relevant authorities for the removal of protected plant and tress species.
				• The BID listed the most important environmental legislation applicable to the project. The Northern Cape Nature Conservation Act (Act 9 of 2009) (NCNCA should also be consulted	• The act has been considered and applications for the removal of protected plants will be submitted prior to removal.
				• Kindly supply this office with copies of the relevant documental for comments, especially the specialist biodiversity. /ecological assessment and EMPR (once available). Please note that the office cannot download such documentation from the internet and it should be provided on a CD or in hardcopy format	• A CD copy of the EIA and EMPR report together with specialist studies will be submitted to the Department

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
				• Please ensure that the anticipated impacts on protected trees are assessed and try to design the mine in such a manner as to minimise the impact (if any) on such slow growing tree species. Where impacts cannot be avoided, appropriate mitigation may be required.	• Impacts on flora were assessed and are presented in Section. 8.6
Registration as an Interested and Affected Party	20 May 2013	Mr. S.E Fiff Transnet Limited	P O Box 17308, Bainsvlei 9338 Tel: (051) 408 2565	• Requested to be registered as an IAP	• Mr Fiff has been registered in the IAP database, Refer to Appendix A
	22 May 2013	Mr Tumisang Tugane Afribits	Tel: 079 874 0504 Email: infor@afribits.co.za	• Requested to be registered as an IAP	• Mr Tugane has been registered in the IAP database, Refer to Appendix A
	24 June 2013	Mrs Alretha Erasmus Postmasburg Landbou Unie	Tel: 053 313 1333 Email: jimbosalretha@gmail.com	• Requested to be registered as an IAP	• Mrs Erasmus has been registered in the IAP database, Refer to Appendix A

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
Community Benefits and Upliftment	23 May 2013	Graig Katz	10 Jakaranda Lane, Postdene, Postmasburg, 8420 Cell: 073 258 9846 Email: gregorygraig101@gmail.com	• Asked how the community will benefit from the project in terms of employment. • Asked how the project will be able to decrease the high unemployment.	• The proposed development will require approximately 150 during construction and 86 employees during the operational phase. COZA Mining will endeavour to employ local persons as much as possible but this will be dependent on the type of skills required and availability of required skills locally. • It should also be noted that as part of the mining right application, COZA Mining will be required to prepare a Social and Labour Plan which details a plan for socio-economic Upliftment for the area hosting the COZA Iron Ore Project. The details of the plan are still being developed in consultation with the relevant authorities and community representatives.
	23 May 2013	Rowena Jacobs	14 Jakaranda Lane, Postdene, Postmasburg, 8420 Cell: 079 146 9083	• Requested that they be kept up to date with the project and asked how the community will benefit from the project.	• IAPs registered on the IAP database will receive project communication information throughout the EIA process. As part of the mining right application, COZA Mining will be required to prepare a Social and Labour Plan which details a plan for socio-economic Upliftment for area hosting the COZA Iron Ore Project. The details of the plan are still being developed in consultation with the relevant

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
					authorities and community representatives.
	23 May 2013	Mr Boniface Masiame	Maremane Community P O Box 688 Postmasburg, 8420 072 830 4739	• Asked if any people from the communities are required for the process in terms of labour (specialist studies).	• Specialist studies are done by qualified specialists who go to site to scope the area to gather data. They are usually only there for approximately 1 day. The specialist work does not require labour as they do the work themselves. As such, specialist studies do not provide opportunities to the people from the community in terms of labour.
	23 May 2013	Itumeleng Moss	23 J.P Ketuiles Postmasburg, Boischoko, 073 435 6332	• Enquired as to how the project and mining will benefit local communities.	• A Social and Labour Plan will be developed for the mine which will identify local economic development projects that with benefit the host community.
	23 May 2013	Mr Ephraim Sibanda	Maremane Community P O Box 688 Postmasburg, 8420	• Questioned whether the people from the Maremane Community would benefit in terms of employment if the processing will be undertaken elsewhere. He indicated that he believes processing creates more employment opportunities than mining.	• The resource at Driehoekspan and Doornpan does not warrant the location of a processing plant within the mine areas. There is another area of interest for COZA that may have sufficient resource to support a processing plant. In terms of job opportunities, COZA's Social and Labour Plan (SLP) would have to consider the people at the three

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
					mining areas i.e. Driehoekspan, Doornpan and the other area of interest.
	23 May 2013	Lebogang Kunere	Maremane Community P O Box 688 Postmasburg, 8420 076 327 8305	• Asked what would be done for the community once they start to mine and they gain profit. He indicated that the community needs to get an idea of what benefits they will receive from the project.	• A draft social and labour plan detailing the social benefits is currently under review with the DRM. The local economic development initiatives will be done in collaboration with the local municipality. These projects are being currently being prepared and will be presented to the affected communities once available.
	23 May 2013	Mathapelo Kgotlaekae	Maremane Community P O Box 688 Postmasburg, 8420 076 346 6498	• Indicated that the community is fearful that once COZA is granted a mining right, there will be no benefits for the community. • Requested that the community must be consulted when preparing the SLP	• The SLP is still being finalised. This document will present the plans for community involvement. These will be communicated with the community once the plans have been drafted • The community will be approached once draft LED projects have been determined.
	5 June 2013	Mr Brandon Adams	Tel: (053) 313 3172 Email: adamsbrandon49@gmail.com	• When projects of this magnitude are undertaken, the locals are generally excluded to participate in the development and wealth of their minerals mined. Lack of excess to this wealth creation opportunity is hampered by "red tape" rules and regulations, that make it impossible to participate and once the investors are making their riches, they vanish and left	• COZA are fully committed to implementing development plans and projects that will facilitate local community and rural development as part of their Social and Labour Plan (SLP). However, the project is still in its initial stages and COZA are still formulating their SLP. At this stage no specific information can be provided on

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
				the local residents high & dry.	the different community development initiatives that will be implemented by COZA. The projects are currently being reviewed by the DMR and will be drafted in collaboration with the municipality. The community will be made aware of the proposed LED projects.
Future Prospecting	23 May 2013	Islay Jane Sparks of Kumba Iron Ore's Kolumela Mine	PO Box 1420, Postmasburg, 8420 Cell: 081 038 2368 Email: islay-jane-sparks@ angloamerican.com	• Asked how much the mine will produce . • Enquired about the possibility for further expansion and whether exploration is still continuing.	• The mine will produce approximately 430 000 million tons per annum during the operational phase. • There are opportunities for further expansion. COZA is currently working on their resource estimation. There are also other areas of mining interest for COZA Mining in the Northern Cape.
Community Consultation	23 May 2013	Itumeleng Moss	23 J.P Ketuiles Postmasburg, Boischoko, 073 435 6332	• Also queried whether the municipality was consulted	• Invitations were sent to the Municipal Mayor, Manager and Environmental Manager as well as the local Economic Development Officer. The ward councillor, who was also consulted, responded and requested Synergistics to also hold a meeting with the Maremane community

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
	23 May 2013	Mr Boniface Masiame	Maremane Community P O Box 688 Postmasburg, 8420 072 830 4739	• Raised the issue that the information of the meeting was not appropriately marketed toward the Maremane Community.	• The community were identified through the distribution of BIDs. Synergistics also consulted Mpho, the ward councillor, and Joseph, who are representatives of the Maremane community. The Maremane community said they knew of the Postmasburg meeting but it was too far, thus another meeting was organised for them at the Maremane Community Hall. • It would be appreciated if the community would advise Synergistics on how best to involve communities.
Community Consultation	23 May 2013	Mr Boniface Masiame	Maremane Community P O Box 688 Postmasburg, 8420 072 830 4739	• Asked if the Department of Rural Development and Land Reform (RDLR). Was consulted as they were key in the Maremane Community land claim process • Indicated that there are people that are not in the area but who at a later stage will be relocated to the land and will be affected by this development. He asked how these people would be accommodated.	• Regarding the department of Rural Development and Land Reform, the Department has been notified of the project, received BIDs and have been notified of the EIA process. The Department of Mineral Resources (DMR), in their report, also wants to find out if the Department of RDLR has been consulted. • It will be appreciated if the community would advise us of the various community leaders that should the registered in the IAP database. The identified representatives will be

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
					informed of the project developments and the in turn they can report back to the other members of the Maremane Community.
				• Raised the issue that some of the people from the Maremane Community are from the Kuruman area and this meeting and the project is very far from Kuruman. As such the people will not know what is happening	• It would not be possible to have meetings with people from all over the area like Kuruman. We are dealing with people that are most likely to be directly impacted by the project. People from Kuruman are not being excluded however, it would be ideal to have leaders of the various communities to come to the scheduled meetings.
				• Asked whether meetings can be held in Kuruman	• Kuruman is too far for the people from Maremane and Kuruman is not an area that will be directly affected by the project. The ideal option would for the leaders of the Kuruman communities to come to the Maremane meetings and give feedback to the people of the community.
				• Raised a concern that Maremane community members from Kuruman are being excluded from the public participation process and problems may arise if people come to Maremane from	• People who register will be kept informed throughout the process. Synergistics would like the leaders to get involved to inform the other communities.

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
				Kuruman.	
	23 May 2013	Hilda Sibanda Maremane Community Member	Maremane Community P O Box 688 Postmasburg, 8420 071 979 5017	• Indicated that she is reluctant to believe independent environmental consultants. She indicated that the community was previously consulted by independent consultants for the Sedibeng Mine, however they were not notified when the mine started. She indicated that they community was fearful that the same process would occur with the COZA project. • Asked why the application to the Northern Department of Environment and Nature Conservation was submitted before consultation with communities?	• As consultants Synergistics are bound by law to notify IAPs of authority decisions in terms of the National Environmental Management Act (No 107 of 1998) (NEMA). As such the Maremane community will be notified via post or sms. She indicated that members of the community will be kept informed of progress throughout the EIA process. She explained that the Public Participation Process (PPP) allows for the involvement of communities • The NEMA application was submitted as it was required by law. She advised that the application serves to notify the Department of the intention to commence with the EIA process

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
	23 May 2013	Mathapelo Kgotlaekae	Maremane Community P O Box 688 Postmasburg, 8420 076 346 6498	• Indicated that the Maremane Community are sceptical that Synergistics will return to meet with the community	• There will be a feedback meeting, where Synergistics presents the findings of the EIA. She indicated that the community would also be notified of the availability of the environment reports for review as well as the authority decisions.
	5 June 2013	Mr Brandon Adams	Tel: (053) 313 3172 Email: adamsbrandon49@gmail.com	• An information sharing meeting was held on 23 May 2013, however no prior notice was given to Interested and Affected parties. The meeting should have been communicated in the local newspaper (The Ghaap, Diamond Field Advertiser.	• The information sharing meeting was advertised in the Kalahari Bulletin and Kathu Gazette. These newspapers circulate in the study area and its surroundings. Please refer to Section 3.5 on the IAP notification process.
Mine Cumulative Impacts	23 May 2013	Mimi Swart	P O Box 777, Postmasburg, 8420 083 292 2540 Swami5353@gmail.com	• Raised a concern regarding the prominence of mining in the area and the many problems that are not being appropriately dealt with. Indicated that there are problems related to groundwater and dust due to mining in the area. She raised a concern regarding the potential cumulative impacts of the mining in the area.	• The cumulative impacts for the project are assessed in Section 8 of the report.

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
Project's Environmental Impacts	5 June 2013	Mr Brandon Adams	Tel: (053) 313 3172 Email: adamsbrandon49@gmail.com	• Pollution will affect all communities around the operations, what remedies will be available to alleviate this	• An environmental impact assessment has been undertaken and the impacts are presented in Section 8 and 9 of the report.
Project Phasing	23 May 2013	Mimi Swart	P O Box 777, Postmasburg, 8420 083 292 2540 Swami5353@gmail.com	• Asked what stage the process is at currently.	• The process is at its initial phase the scoping phase where consultation with IAPs takes place, potential issues are identified and terms of reference for specialist studies are developed.
Project Location	23 May 2013	Alfred Pegram	Private Bag X5005, Kimberley, 8300 apegram@ncpg.gov.za	• Asked how far the project will be from Portion 3 of the Farm 445.	• The mining area will be approximately 3 km from Portion 3 of the Farm 445.
Prospecting Activities	23 May 2013	Mr Boniface Masiame	Maremane Community P O Box 688 Postmasburg, 8420 072 830 4739	• Referring to a DMR document from 2010, the IAP asked about the prospecting and mining right and why COZA are not mining in all the areas.	• COZA were granted prospecting rights for various farms but only plan to mine on the Portion 1 of Doornpan and Remaining Extent of Driehoekspan at this stage.

ISSUE OF CONCERN	DATE	NAME	CONTACT DETAILS	COMMENTS	RESPONSE
	23 May 2013	Lebogang Kunere	Maremane Community P O Box 688 Postmasburg, 8420 076 327 8305	• Queried if there would be a survey of the resource before mining commences. • Enquired what income was received from prospecting and where was the money spent	• Prospecting activities have already been undertaken for the project and the project team is currently at the resource estimation process. • No money was obtained from prospecting
Information on Applicant	23 May 2013	Mr Ephraim Sibanda	Maremane Community P O Box 688 Postmasburg, 8420	• Requested an organogram for COZA Mining.	• COZA Mining is still a new company and an organogram is not yet available. The community should liaise with Synergistics and the project manager Mr Tabi Kowet.
Application Process	23 May 2013	Mr Ephraim Sibanda	Maremane Community P O Box 688 Postmasburg, 8420	• Queried if COZA Mining has a mining licence.	• COZA does not have a mining right but have a prospecting right. The current EIA process is undertaken to apply for a mining right. The mining right application will be submitted at the end of June 2013.
Review of Draft Scoping Report	9 July 2013	Mr Jim Bredenkamp	P O Box 112, Postmasburg, 8420 053 313 1333 jim@jimbos.co.za	• Requested the electronic copy of the report in CD-ROM	• A copy of the report was posted on 15 July 2013.

7. IMPACT ASSESSMENT

7.1 Assessment of Incremental Environmental Impacts

The significance of the impact is dependent on the consequence and the probability that the impact will occur.

impact significance = consequence x probability

Where:

consequence = (severity + extent)/2

and

severity = [intensity + frequency + duration)]/3

Each criterion is given a score from 1 to 5 based (see below).

Table 7.1: Criteria for Assessing the Impact Significance

SEVERITY CRITERIA

INTENSITY = MAGNITUDE OF IMPACT	RATING
Insignificant: impact is of a very low magnitude	1
Low: impact is of low magnitude	2
Medium: impact is of medium magnitude	3
High: impact is of high magnitude	4
Very high: impact is of highest order possible	5

FREQUENCY = HOW OFTEN THE IMPACT OCCURS	RATING
Seldom: impact occurs once or twice	1
Occasional: impact occurs every now and then	2
Regular: impact is intermittent but does not occur often	3
Often: impact is intermittent but occurs often	4
Continuous: the impact occurs all the time	5

DURATION = HOW LONG THE IMPACT LASTS	RATING
Very short-term: impact lasts for a very short time (less than a month)	1
Short-term: impact lasts for a short time (months but less than a year)	2
Medium-term: impact lasts for the for more than a year but less than the life of operation.	3
Long-term: impact occurs over the operational life of the COZA Iron Ore Project	4
Residual: impact is permanent (remains after mine closure)	5

EXTENT = SPATIAL SCOPE OF IMPACT/ FOOTPRINT AREA / NUMBER OF RECEPTORS	RATING
Limited: impact only affects the immediate footprint of the part of the development	1
Small: impact affects the COZA Iron Ore Project area	2
Medium: impact extends to the neighbouring farmers	3
Large: impact extends to surrounding farmers beyond the immediate neighbours	4
Very Large: The impact affects the area covered by the Tsantsabane Local Municipality	5

PROBABILITY

PROBABILITY = LIKELIHOOD THAT THE IMPACT WILL OCCUR	RATING
Highly unlikely: the impact is highly unlikely to occur	0.2
Unlikely: the impact is unlikely to occur	0.4
Possible: the impact could possibly occur	0.6
Probable: the impact will probably occur	0.8
Definite: the impact will occur	1

IMPACT SIGNIFICANCE

NEGATIVE IMPACTS

≤1	Very low	Impact is negligible. No mitigation required.
>1≤2	Low	Impact is of a low order. Mitigation could be considered to reduce impacts, but does not affect environmental acceptability.
>2≤3	Moderate	Impact is real but not substantial in relation to other impacts. Mitigation should be implemented to reduce impacts.
>3≤4	High	Impact is substantial. Mitigation is required to lower impacts to acceptable levels.
>4≤5	Very High	Impact is of the highest order possible. Mitigation is required to lower impacts to acceptable levels. Potential Fatal Flaw.

POSITIVE IMPACTS

≤1	Very low	Impact is negligible.
>1≤2	Low	Impact is of a low order.
>2≤3	Moderate	Impact is real but not substantial in relation to other impacts.
>3≤4	High	Impact is substantial.
>4≤5	Very High	Impact is of the highest order possible.

Mitigation measures for significant impacts have been identified as part of the impact assessment. The impacts have been ranked before and after the implementation of the mitigation measures. Consideration also has to be given to the confidence level that can be placed on the successful implementation of the mitigation level by COZA:

- **High Confidence:** mitigation measure easy and inexpensive to implement.
- **Medium Confidence:** mitigation measure expensive or difficult to implement.
- **Low Confidence:** mitigation measure expensive and difficult to implement.

The significance of the impact is given without and with mitigation. Cognisance is given to the mitigation confidence when determining the potential to reduce the impact significance. If the mitigation confidence is low the impact is unlikely to be reduced and this is reflected in the assessment of the significance with mitigation. If the mitigation confidence is high the impact significance is reduced. If the confidence significance is moderate to the EAP, the significance has been based experience as to the likelihood that the measures can be implemented.

Table 7.2: Impact Assessment Table for the COZA Iron Ore Project

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
1. PLANNING AND DESIGN														
1.1. WATER RESOURCES														
Excess water at the mine	Lack of planning for excess water to be produced due to pit dewatering.	4	4	3	3.7	3	3.3	1	3.3	MEDIUM	Low	1.1.1	Alternatives for the management of excess water are to be finalised prior to commencement with construction activities in consultation with key stakeholders. This includes the DWA.	
Contamination of surface water	Lack of adequate storm water management infrastructure during operation.	3	4	4	3.7	3	3.3	1	3.3	HIGH	Very Low	1.1.2	Sizing of the storm water management infrastructure is to be finalised and approved by DWA prior to construction.	
1.2. SOCIO-ECONOMICS														
Increase in lack of cohesion for the landowners (Maremane Community)	Improper communication with the affected landowners	4	4	4	3.7	2	2.8	1	3	HIGH	Low	1.2.1	Community forum to be established where local community are informed about developments in the project and allowed to raise comments or concerns regarding the project.	
		4	4	4	3.7	2	2.8	1	3	HIGH	Low	1.2.2	The Maremane community are to be kept informed of key project stages well in advance i.e. commencement of construction, operation and decommissioning activities.	
												1.2.3	The Maremane Community are to be considered as key stakeholder and invited to all stakeholder engagement forums.	
Lack of housing and services for construction and mine staff.	Improper planning for staff housing and services.	3	5	5	4.3	2	3.2	1	3.2	HIGH	Low	1.2.4	Planning for staff housing and services must be undertaken.	
1.3. LAND USE														
Permanent loss of grazing land	Failure to plan for rehabilitation									HIGH	Low	1.3.1	Financial provision to be made for the rehabilitation of land at all stages of the mine.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
												1.3.2	Mine planning is to include provision for ongoing rehabilitation	
												1.3.2	Planning for soil stockpiling is to be undertaken	
1.4. ENVIRO-LEGAL COMPLIANCE														
Violation of relevant legislation	Removal of protected trees without a permit	5	1	5	3.7	1	2.3	1	2.3	HIGH	Low	1.4.1	Permits for the removal of protected plant and tree species is to be applied for prior to removal of these trees on site. Permits must be obtained from DAFF and DENC.	
	Destruction of heritage resources without a permit.	2	1	5	3.7	1	2.3	1	2.3	HIGH	Low	1.4.2	Permits for the removal of protected heritage sites is to be applied for prior their destruction or removal. Permits must be obtained from SAHRA,	
2. CONSTRUCTION														
2.1. TOPOGRAPHY														
Change in local relief	Development of stormwater management infrastructure, levelling of construction areas, construction ramps for the crusher.	2	1	4	2.3	3	2.7	1	2.7	HIGH	Moderate	2.1.1	During rehabilitation, mounds or excavations will be shaped/backfilled to resemble surrounding landscape.	
2.2 SOILS AND LAND CAPABILITIES														
Loss of utilisable soils	Failure to strip and conserve topsoil	1	2	4	2.3	1	1.7	0.6	1	HIGH	Very Low	2.2.1	The upper 100 mm of soils is to be removed as topsoil from all infrastructure areas, roads and pit areas.	
												2.2.2	Footprint area of disturbance to be minimised, demarcated and no unnecessary disturbance to take place.	
												2.2.3	Wind protection measures are to be put in place at stockpile areas, this can include wind breaks either natural vegetation or netting perpendicular to the direction of the prevailing wing i.e. north east (predominant direction) and north-north west (strong winds).	
	Compaction of soils during construction activities.	1	2	2	1.7	1	1.3	0.6	0.8	HIGH	Very Low	2.2.4	All temporary access roads, compacted and cleared areas to be ripped to promote vegetation growth following construction.	
												2.2.5	Monitoring of vegetation establishment on constructed and rehabilitated areas to take place following construction.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
Contamination of soils	Spillage of hydrocarbons and other hazardous chemicals, sewage and incorrect management and disposal of waste.	4	2	3	3	1	2	0.6	1.2	HIGH	Very Low	2.2.6	Handling of hydrocarbons and other hazardous chemicals to take place on impermeable surfaces.	
												2.2.7	Spills of hazardous waste to be cleaned up and taken to the hazardous waste storage area.	
												2.2.8	All soils that have become contaminated with hydrocarbons or hazardous chemicals are to be removed and managed as hazardous waste.	
												2.2.9	Chemical toilets to be provided at all areas of work and serviced by contractor.	
Loss of grazing land	Site clearance for temporary infrastructure required for construction purposes (temporary roads, construction staff accommodation, etc.)	1	1	2	1.3	2	1.7	1	1.7	MEDIUM	Low	2.2.10	Implement 2.2.2	
												2.2.11	Implement 2.2.4	
												2.2.12	Implement 2.2.5	
	Site clearance for mine infrastructure (workshop, site office, etc.)	2	1	5	2.67	2	2.3	1	2.3	MEDIUM	Low	2.3.13	Implement 2.2.2	
												2.3.14	Implement final rehabilitation and land use plan	
2.3 GROUNDWATER														
Decrease in groundwater quality	Seepage of hydrocarbons and other hazardous chemicals due to spillage.	2	1	3	2	1	1.5	0.6	0.9	HIGH	Very Low	2.3.1	Implement 2.2.6	
												2.3.2	Implement 2.2.7	
												2.3.4	Implement 2.2.8	
2.4 SURFACE WATER														
Reduction in surface water quality	Sedimentation of surface water runoff.	1	3	3	2.3	3	3	0.6	1.8	HIGH	Very Low	2.4.1	Implement 2.2.2	
												2.4.2	Implement 2.2.3 – 2.2.5	
	Contamination of surface water runoff due to spillage of hydrocarbons and other hazardous chemicals.	1	1	3	1.7	2	1.8	0.6	1.1	HIGH	Very Low	2.4.3	Dirty water run-off is to be contained and not allowed to enter into the surrounding environment.	
												2.4.20	Implement 2.2.6	
												2.4.12	Implement 2.2.7	
2.5 NATURAL VEGETATION														

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
Loss of natural vegetation	Site clearance for temporary infrastructure required for construction purposes (temporary roads, construction staff accommodation, etc.)	3	1	2	2	2	2	1	2.0	MEDIUM	Very Low	2.5.1	Implement 2.2.2	
												2.5.2	Implement 2.2.4	
												2.5.3	Implement 2.2.5	
	Site clearance for mine infrastructure (workshop, site office, etc.)	3	1	5	3	2	2.5	1	2.5	MEDIUM	Low	2.5.4	Implement 2.2.2	
												2.5.5	Implement 2.3.14	
Loss of species of conservation importance	Removal of protected plants due to clearance for temporary infrastructure required for construction purposes	4	1	5	3.33	1	2.2	1	2.2	HIGH	Low	2.5.6	Implement 2.2.2	
												2.5.7	Plant removal permits must be obtained prior to removal of protected plants.	
												2.5.8	Plant removal should only be limited to areas where disturbances cannot be avoided	
Establishment or spread of alien species.	Disturbance of areas providing opportunity for colonisation of areas by invasive plants.	2	3	4	3	2	2.5	0.8	2	HIGH	Low	2.5.7	Continuous monitoring and management of invasive species is to be undertaken at the mine.	
2.6 ANIMAL LIFE														
Killing of fauna	Poaching or vehicle collisions with animals crossing roads.	1	2	2	1.7	3	2.3	0.6	1.4	HIGH	Very Low	2.6.1	Environmental awareness training of construction staff.	
												2.6.2	Trespassing outside of work areas to be prohibited.	
Destruction of habitat	Site clearance for temporary construction	2	1	5	2.7	3	2.8	1	2.8	HIGH	Low	2.6.3	Implement 2.2.2	
Disturbance to fauna	Noise and light due to construction	2	3	2	2.3	3	2.7	0.6	1.6	HIGH	Very Low	2.6.4	Limit construction activities to day light hours where possible.	
Introduction of alien species	Introduction of domestic animals	2	2	4	2.7	3	2.8	0.6	1.7	MEDIUM	Very Low	2.6.5	Unsterilised and unvaccinated domestic animals to be banned from site.	
2.7.NOISE														
Increase in ambient noise levels	Movement of vehicles, blasting and use of mechanical equipment	1	3	2	2	3	2.5	0.4	1.0	HIGH	Very Low	2.7.1	Implement 2.6.4	
2.8. AIR QUALITY														
Decrease in air quality	Vehicle entrained dust, materials handling and blasting for construction of mine infrastructure	2	3	2	2.33	3	2.7	0.8	2.1	LOW	Low	2.8.1	Wet suppression to be implemented at construction areas and roads.	
												2.8.2	Minimise area to be cleared of vegetation.	
2.9 SOCIO-ECONOMICS														
Employment opportunities for local persons	Employment of construction workforce	2	1	2	1.7	4	2.8	0.8	2.3	LOW	Moderate	2.9.1	Recruitment to give preference to local communities.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
Increased revenue for local business	Procurement of local service providers for construction	4	1	2	2.3	4	3.2	0.6	1.9	LOW	Low	2.9.2	Preference to be given to local service providers.	
Disturbance to sense of place	Noise, dust and traffic resulting from construction work.	2	2	2	2.0	3	2.5	0.6	1.5	MEDIUM	Low	2.9.3	Maremane community must be kept informed of construction activities.	
												2.9.4	Grievance mechanism to be in place and communicated to IAPs including procedure for dealing with complaints to be in place during construction.	
												2.9.5	Implement 1.6.4	
Loss of income of landowners	Loss of agricultural land due to construction of mine infrastructure	2	1	5	2.7	3	2.8	1	2.8	HIGH	Low	2.9.6	Implement 1.9.2	
Disturbance to social cohesion.	Loss of social cohesion due to the development of the mine.	5	3	4	4.0	2	3.0	1	3.0	HIGH	Low	2.9.7	Implement 2.9.3	
Reduced safety and security for surrounding landowners	Increased access to neighbouring properties by outsiders during construction	3	1	2	2.0	3	2.5	0.6	1.5	HIGH	Low	2.9.8	Implement 1.6.2	
2.10 CULTURAL HERITAGE														
Disturbance of graves and other heritage sites	Site clearance and excavations for the development of mine infrastructure	4	1	5	3.3	2	3.2	0.8	2.1	HIGH	Low	2.10.1	Should heritage sites or graves be unearthed during construction activities are to cease until given approval to proceed by a specialist approved by SAHRA.	
												2.10.2	Relocation of graves should be undertaken in consultation with affected parties.	
												2.10.3	The old road on Bleskop Hill which was identified as having moderate heritage significance cannot be disturbed or impacted upon without a permit from the relevant heritage authority.	
												2.10.4	The old road must be documented with plan drawings as well as photographic recording. This documentation must accompany the permit application.	
3. OPERATIONAL PHASE														
3.1 SOILS														

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
Loss of utilisable soils	Stripping of areas for mining activities	5	3	5	4.3	2	3.2	0.8	2.5	HIGH	Very Low	3.1.1	Strip all available A and B horizon soils up to 1 m from all infrastructure areas, roads and pit areas.	
												3.1.2	Footprint area of disturbance to be minimised, demarcated and no unnecessary disturbance to take place.	
												3.1.3	Soils that cannot be used directly in rehabilitation to be stockpiled.	
												3.1.4	Wind protection measures are to be put in place at stockpile areas, this can include wind breaks either natural vegetation or netting perpendicular to the direction of the prevailing wing i.e. north east (predominant direction) and north-north west (strong winds).	
												3.1.5	Soil to be fertilised after placing on rehabilitation areas to restore fertility after stockpiling.	
Contamination of soils	Spillage of hydrocarbons and other hazardous chemicals, sewage and incorrect management and disposal of waste	2	2	4	2.7	**1**	1.8	0.8	1.5	HIGH	Very Low	3.1.6	Handling of hydrocarbons and other hazardous chemicals to take place on an impermeable surface.	
												3.1.7	Staff to be trained to manage hazardous spills in accordance with environmental emergency procedure.	
												3.1.8	All soils that have become contaminated with hydrocarbons or hazardous chemicals are to be treated in situ using a commercially available bioremediation product or managed as hazardous waste.	
3.2 GROUNDWATER														
Lowering of natural groundwater levels	Pit dewatering	2	5	5	4.0	1	2.5	1	2.5	HIGH	Moderate	3.2.1	Establish baseline yields and levels in monitoring boreholes.	
												3.2.2	Implement quarterly monitoring of boreholes.	
												3.2.3	Establish a grievance procedure allowing for compensation of affected groundwater users.	
Reduction in groundwater quality	Seepage of contaminated water from waste dumps and stockpiles	4	5	5	4.7	2	3.3	1	3.3	HIGH	Low	3.2.4	Contain contaminated water in lined pollution control dams.	
												3.2.6	Divert clean water runoff away from waste dumps and stockpile area.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
	Seepage of hydrocarbons and other hazardous chemicals due to spillage.	5	3	4	4.0	2	3.0	1	3.0	HIGH	Low	3.2.7	Workshop areas to be provided with impervious surfaces (concrete slabs).	
												3.2.8	Hazardous chemical storage areas are to be provided with impervious surfaces and bunded.	
												3.2.9	Dirty water runoff from workshop areas must be contained within the dirty water management areas.	
												3.2.10	Implement 3.1.6 – 3.1.8	
	Spillage and leakage of contaminated water from pollution control dams and dirty water management system.	2	5	4	3.7	1	2.3	1	2.3	HIGH	Low	3.2.12	Pollution control dams to be constructed to comply with relevant DWA requirements with appropriate liners.	
												3.2.13	Recycle and reuse contaminated water.	
												3.2.14	Implement effective clean and dirty water separation.	
	Contamination of groundwater by nitrate containing explosives and haematite dust in the pit.	2	5	4	3.7	1	2.3	0.8	1.7	HIGH	Low	3.2.15	Pit dewatering.	
3.3 SURFACE WATER														
Reduction in surface water quality	Sedimentation of surface water runoff	2	3	3	2.7	4	3.3	0.6	2.0	HIGH	Low	3.3.1	Ongoing maintenance of water management infrastructure for erosion repair.	
												3.3.2	Runoff from stockpile areas must be contained within the dirty water management areas.	
	Release of contaminated mine water into the receiving environment.	5	3	4	4.0	3	3.5	0.6	2.1	HIGH	Low	3.3.4	Impacted water to be contained within the impacted water management system which is designed to contain 1:50 year rainfall event in line with GN 704 requirements	
												3.3.5	Re-use of excess water in dust suppression and processing facilities.	
												3.3.6	Effective clean and dirty water management systems.	
	Inadequate clean and dirty water separation	4	4	4	4.0	4	4.0	0.2	0.8	HIGH	Very Low	3.3.7	Maintenance of dirty and clean water management systems.	
3.4 TOPOGRAPHY														
Change in local relief	Development of pits and waste rock dumps.	5	1	5	3.67	1	2.3	1	2.3	MEDIUM	Low	3.4.1	Waste rock dumps are to be vegetated and soil amelioration should be applied if difficult to vegetate.	
												3.4.2	Pit to be backfilled and rehabilitated.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
												3.4.3	Dumps are to be landscaped to a stable slope.	
3.5 LAND CAPABILITY														
Reduction in land capability	Reduction in the capability from grazing to wilderness land.	1	3	5	1	2	1.5	1	1.5	MEDIUM	Very Low	3.5.1	Implementation of final rehabilitation and land use plan.	
												3.5.2	Annual update of financial provision for rehabilitation to ensure sufficient funding.	
3.6 LAND USE														
Loss of agricultural land	Clearance of open pit and waste rock dump area.	1	3	5	1	2	1.5	1	1.5	MEDIUM	Low	3.6.1	Ensure consultation with the landowners on the final land use plan	
												3.6.2	Minimise areas to be cleared to that needed for open pit and waste rock dump areas.	
3.7 NATURAL VEGETATION														
Loss of natural vegetation	Clearance of open pit and waste rock dump area.	2	1	5	2.7	3	2.8	1	2.8	HIGH	Low	3.7.1	Implement 3.5.1	
												3.7.2	Implement 3.6.2	
Loss of species of conservation importance	Removal of protected plants due to clearance of pit and waste rock dump development areas.	2	1	5	2.67	3	2.8	0.6	1.7	HIGH	Low	3.7.4	Plant removal permits must be obtained prior to removal of protected plants.	
												3.7.5	Plant removal should only be limited to areas where disturbances cannot be avoided	
Disturbance of habitats for protected plants	Secondary impacts on the pan such as sedimentation and release of dirty water run-off.	2	2	3	2.33	1	1.7	0.4	0.7	HIGH	Very Low	3.7.5	No water is to be released into any pan during operation	
												3.7.6	Staff members are to be made aware of the location of the nearby pan and no disturbances to the pan will be allowed.	
Vegetation die-back	Dust fallout	1	3	4	2.7	3	2.8	0.4	1.1	MEDIUM	Low	3.7.7	Dust suppression must be applied along dust generating areas such as haul roads and handling areas.	
3.8 ANIMAL LIFE														
Loss of sensitive habitats	Site clearance	4	1	5	3.3	1	2.2	1	2.2	MEDIUM	Low	3.8.1	Minimise and limit the destruction or disturbance of vegetation within the proposed areas of activity, as well as in the surrounding areas	
Reduced palatability of vegetation	Dust fallout from mining activities and traffic along the road.	1	3	4	2.7	3	2.8	0.6	1.7	LOW	Very Low	3.8.2	Implement measures 3.9.1 - 3.9.4	
Displacement to fauna	Noise, light, destruction of habitat and vibration from mining activities	2	3	4	3.0	2	2.5	0.4	1.0	HIGH	Low	3.8.3	Prevent any further harassment of animals through the implementation of an awareness campaign.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
												3.8.4	Restrict lighting to operational areas.	
Killing of fauna	Poaching, vehicle collisions with animals crossing roads and presence of bird-unsafe structures.	1	2	2	1.7	3	2.3	0.6	1.4	MEDIUM	Very Low	3.8.5	Environmental awareness training of mine personnel on safe driving and protection of animals.	
												3.8.6	Poaching is prohibited no staff may trespass neighbouring properties.	
Introduction of alien species	Introduction of domestic animals	2	2	4	2.7	3	2.8	0.6	1.7			3.8.7	No domestic animals are to be allowed on site.	
3.9 AIR QUALITY														
Increased ambient PM_{10} levels	Mining activities with key contributors being entrainment of dust due to movement of vehicles and crushing and screening.	4	3	4	3.7	3	3.3	0.8	2.7	MEDIUM	Low	3.9.1	Chemical suppressant to be applied to main haul roads.	
												3.9.2	Wet suppression on other haul roads and handling areas.	
												3.9.3	Traffic control measures aimed at reducing traffic volumes and reducing vehicle speed.	
												3.9.4	Vegetation of cleared areas.	
												3.9.5	Chemical suppressant or water sprays on the primary crusher	
												3.9.6	Ensure dry dust extraction units with wet scrubbers on the secondary and tertiary crushers and screens	
Increased levels of fallout dust	Mining activities with key contributors being entrainment of dust due to movement of vehicles and crushing and screening.	2	3	4	3.0	2	2.5	0.8	2.0	HIGH	Low	3.9.7	Implement 3.9.1 - 3.9.6	
3.10 NOISE														
Increase in ambient noise levels	Vehicles, mechanical equipment, blasting	1	2	4	2.3	1	1.7	1	1.7	HIGH	Very Low	3.10.1	Investigate complaints if received.	
												3.10.2	Heavy vehicles are to be fitted with silencers to minimise noise generation	
												3.10.3	No blasting activities to take place at night.	
3.11 TRAFFIC														
Decrease in road safety	Turn off of mine vehicles into the site via the R325	2	2	4	2.7	3	2.8	0.6	1.7	HIGH	Very Low	3.11.1	Construct a turning lane for mine vehicles on the R325	
												3.11.2	Mine vehicles are to always have the lights on when accessing the site via the R325	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
												3.2.13	Mine access roads from the R325 are to be surfaced to prevent gravel from being spilled onto the R325	
3.12 VISUAL ENVIRONMENT														
Disturbance of natural views	Waste Rock Dumps are visible to neighbours.	1	4	4	3.0	3	3.0	0.6	1.8	HIGH	Very Low	3.12.1	Ongoing rehabilitation of waste dumps to reduce visual intrusion.	
	Night glow visible to neighbours	1	4	4	3.0	3	3.0	0.4	1.2	HIGH	Very Low	3.12.2	Lighting to be directed towards mining activities.	
3.13 SOCIO-ECONOMICS														
Contribution to regional economy	Creation of economic activity due to development of the mine	5	5	4	4.7	5	4.8	1	4.8	HIGH	Very High	3.13.1	Implement measures in Social and Labour Plan commitments for promoting local economy.	
Employment opportunities for local persons	Employment of additional workforce	5	5	4	4.7	3	3.8	0.6	2.3	HIGH	Moderate	3.13.2	Implement 2.13.1	
Increased revenue for local business	Additional procurement of local service providers	5	5	4	4.7	3	3.8	0.8	3.1	HIGH	High	3.13.3	Implement 2.13.1	
Community safety and security	Safety risk to persons accessing mining site.	3	2	4	3.0	3	3.0	0.4	1.2	MEDIUM	Very Low	3.13.7	Access control and signage in place to warn persons of safety risks.	
	Theft of private property from surrounding landowners.	3	2	4	3.0	4	3.5	0.4	1.4	HIGH	Very Low	3.13.9	Trespassing outside of work areas to be prohibited.	
Increase in social ills	Influx of people will attract social ills such as drunkenness and prostitution.	3	2	4	3.0	4	3.5	0.4	1.4	HIGH	Low	3.13.10	Ensure access control at mine site entrance.	
3.14 CULTURAL HERITAGE														
Disturbance of heritage resources	Site clearance and excavations for mining operations.	5	2	5	4.0	2	3.0	0.2	0.6	HIGH	Very Low	3.14.1	Should graves or heritage sites be unearthed during excavation operations are to be ceased until authorisation is given SAHRA.	
4. DECOMISSIONING, CLOSURE AND POST CLOSURE														
4.1 SOILS AND LAND CAPABILITY														
Loss of utilisable soils and land capability	Pollution due to mishandling of hydrocarbons	5	1	3	3.0	3	3.0	0.6	1.8	HIGH	Low	4.1.1	Handling of hydrocarbons and other contaminants should occur at designated areas on impervious surfaces	
	Erosion of rehabilitated areas	3	1	2	2	1	1.5	0.8	1.2	HIGH	Very Low	4.1.2	Monitor and repair erosion until under control.	
	Unsuccessful rehabilitation	4	1	5	3.33	2	2.7	0.6	1.6	HIGH	Very Low	4.1.3	The success of rehabilitation should be monitored and augmented for at least three years after closure. Should rehabilitation not prove successful, a rehabilitation specialist is to be included in the rehabilitation process.	

ENVIRONMENTAL IMPACT	IMPACT SOURCE/DESCRIPTION	Intensity	Frequency	Duration	Severity	Extent	Consequence	Probability	Impact Significance			MITIGATION		
									Without Mitigation	Mitigation Confidence	With Mitigation	Ref.	Mitigation Measures	Mitigation Cost
4.2 GROUNDWATER														
Reduction in groundwater quality	Contamination of groundwater by waste dumps and ore material.	1	5	5	3.7	1	2.3	0.8	1.9	LOW	Low	4.2.1	Groundwater monitoring to continue after closure as per DWA requirements.	
												4.2.2	Grievance procedure to be in place post closure.	
4.3 SURFACE WATER														
Decrease in surface water quality	Sedimentation of stormwater run-off due to erosion of rehabilitated areas	1	4	4	3.0	1	2.0	0.6	1.2	HIGH	Very Low	4.3.1	Monitor and maintain vegetation cover until self-sustaining.	
4.4 SOCIO-ECONOMIC														
Loss to the regional economy	Reduction in employment and procurement of services and goods.	5	1	3	3.0	3	3.0	0.6	1.8	HIGH	Low	4.4.1	Implement Social and Labour Plan Commitments.	
Loss of employment	Scaling down of operation activities	5	1	3	3.0	3	3.0	0.6	1.8	HIGH	Low	4.4.2	Implement Social and Labour Plan Commitments.	
4.5 VEGETATION														
Failure of vegetation to re-establish	Unsuccessful rehabilitation	5	1	3	3.0	3	3.0	0.6	1.8	HIGH	Low	4.1.3	Handling of hydrocarbons and other contaminants should occur at designated areas on impervious surfaces	
4.6 NOISE														
Increase in ambient noise levels	Demolition of mine infrastructure	5	1	3	3.0	3	3.0	0.6	1.8	HIGH	Lo w	4.6.1	Where possible, demolition activities are to be limited to daytime to minimise night impacts.	

7.2 Cumulative Impact Assessment

For this project, cumulative impacts will be determined as:

Existing Impacts	**+**	***Incremental Impacts***	**=**	***Cumulative Impacts***
Existing impacts within the project area and surrounds including existing mining and agricultural operations (current level of degradation)		Impacts of the proposed COZA Iron Ore Project		Existing impacts in the immediate surrounds combined with the impacts of the proposed COZA Iron Ore Project

Note that the cumulative impact assessment is based on an objective view of the current state of degradation of the environment and the contribution that the COZA Iron Ore Project will have on this aspect of the environment. The incremental impact **after mitigation** has been used for the purposes of the cumulative impact assessment. The precautionary principle is applied with the highest impact significance used as the incremental impact of the project. It should be noted that consideration for the purposes of this assessment cognisance has been given to activities within a 5 km radius of the proposed COZA Mine.

The cumulative impacts of the project are given below:

Table 7.3: Cumulative Impact Assessment Table for the COZA Iron Ore Project

ENVIRONMENTAL IMPACTS	IMPACT SOURCE	SIGNIFICANCE			COMMENT
		EXISTING IMPACT	INCREMENTAL IMPACT	CUMULATIVE IMPACT	
Topography					
Change in landscape character	Infrastructure development Pit and waste rock dump.	**Very Low**	**Low**	**Low**	Mining operations exist in the area. It is not anticipated that the proposed mining activity will significantly increase the impact on topography provided that rehabilitation is successfully implemented.
Soils					
Loss of utilisable soils	Soil stripping for infrastructure and mining.	**Low**	**Low**	**Low**	Previous prospecting activities have impacted on soils at the site. It is not anticipated that the project will result in an increase in the significance of the loss of utilisable soils provided that soils are salvaged and used in rehabilitation.
Land Capability					
Loss of grazing land	Development of mining operations and associated infrastructure.	**Very Low**	**Low**	**Low**	Some mining and prospecting activity in the area has resulted in the loss of grazing land. New activities as part of the proposed project will involve further impact. Rehabilitation should aim at the replacement of grazing land as far as practicable.

Natural Vegetation					
Removal of natural vegetation	Site clearance	**Low**	**Moderate**	**Moderate**	Some of the natural vegetation has been removed as part of previous prospecting and mining activities. The project will potentially result in the removal of protected trees. The impact will be moderate provided that rehabilitation and other recommended mitigation measures are implemented.
Animal Life					
Disturbance to fauna	Site clearance, noise, dust, poaching	**Very Low**	**Low**	**Low**	There are human activities in the area, including livestock farming and mining, that may be causing some disturbances to local animal life. New activities as part of the proposed project will involve further impact. Assuming mitigation measures are implemented, the cumulative impact should be low.
Air Quality					
Increase in dust levels	Movement of vehicles and material handling at the mine.	**Moderate**	**Low**	**Moderate**	Cumulative off-site PM10 concentrations in exceedance of NAAQSs are likely since baseline PM10 concentrations are already in exceedance of NAAQSs. The additional impact due to the proposed mine is however not expected to add significantly to current levels.

Social and Economic					
Contribution to the regional economy	Continued mining operations	**Very High Positive**	**Very High Positive**	**Very High Positive**	Mining operations are a major contributor to the regional economy. The COZA Iron Ore Project will allow for a continued contribution by the COZA Mine.
Disruption of social cohesion	Inappropriate consultation with the landowners (Maremane Community)	**Moderate**	**Moderate**	**Moderate**	COZA will need to ensure that consultation to discuss use of land is conducted in a fair manner and should ensure that it is done with the correct members of the MCPA.
Employment opportunities	Additional workforce	**Very Low Positive**	**Moderate Positive**	**Moderate Positive**	The COZA Iron Ore Project will result in additional job opportunities, especially during the construction phase.
Reduced safety and security	Increased access to private land	**Low**	**Low**	**Low**	Mining activities does result in an influx of persons into an area. This results in a risk to the safety and security of other persons in the area. The impact is however not expected to be of high significance.

8. DISCUSSION OF IMPACTS

8.1 Soils and Land Capability

The clearance of soils is required for the development of the mine and the mine infrastructure. Soils are regarded as a valuable resource as they are essential for rehabilitation.

The overall impacts on the soils of the area due to the proposed project are expected to be moderate to low due to the current land use, namely low intensity grazing, as well as the fact that the area does not constitute an area of high agricultural potential. However, the proposed infrastructure areas will be situated in an area where deeper soils with a slightly better soil potential are present.

Potential impacts from the COZA project on soils and land capability, as well as proposed mitigation measures, are discussed below.

8.1.1 Compaction of Soils

The movement of heavy vehicles and the storage of heavy equipment and materials results in the compaction of soils. This is of particular importance during the construction phase during which several laydown areas will be in place at construction sites and heavy vehicle traffic will be traversing the area. Compacted soils are not suitable for the establishment of vegetation and thus compaction results in the sterilisation of soil resources if not remediated.

To mitigate this impact, temporary access roads, compacted and cleared areas are to be ripped after use to promote the re-establishment of vegetation.

8.1.2 Soil Contamination

Mining activities involve the storage and handling of hazardous chemicals including hydrocarbons. Spillage or leakage of these materials makes the soils unsuitable for vegetation establishment. Impervious areas are to be put in place where such materials are stored or handled during the construction and operational phases to prevent the release of such chemicals into the soil environment. All soils that have become contaminated with hazardous chemicals are to be treated *in situ* with a commercially available bioremediation product or removed and managed as hazardous waste.

8.1.3 Erosion of Soil Resources

Exposed soil surfaces are prone to erosion by wind and storm water run-off. During the construction phase, areas will be cleared. Areas to be cleared should be minimised as far as possible by demarcating construction areas and restricting the movement of vehicles outside these areas.

Topsoil stockpiles will also be vulnerable to erosion. Due to the wind erosion hazard in this area, wind protection measures should be taken wherever possible. Such measures will include the seeding of

stockpile areas to promote vegetation growth. Measures may also potentially include windbreaks, either natural vegetation or constructed (fencing, netting etc.), perpendicular to the direction of the prevailing wind. Such measures may need to be undertaken with the cooperation of an engineering specialist.

8.1.4 Stripping of Soil for Mining Activities

The stripping and stockpiling of soils is required for the development of the mine and the mine infrastructure. To optimise rehabilitation, all the available A and B horizons should be stripped up to 1m in areas to be mined must be stockpiled separately for use in rehabilitation at a later stage. However, stockpiling for long periods usually causes soils to lose their fertility. To restore fertility, stockpiled soils will require fertilisation following placement on rehabilitation areas.

8.2 Groundwater

8.2.1 Groundwater Supply

8.2.1.1 Potential Impacts

In order for mining to occur safely in an open pit operation such as the proposed COZA Iron Ore project, groundwater inflow into the pit has to be removed by pumping it to a containment dam, a process known as dewatering. Dewatering of the aquifer system will be undertaken via two or three dewatering boreholes located around the pit area. Dewatering will commence from the first year of mining to avoid excessive seepage of water into the pit during the third and fourth year when the groundwater table will likely be intersected. Most of the water required for the mine will be sourced from the dewatering boreholes. From modelling conducted by Groundwater Complete (2014), the maximum amount of water that will be dewatered is expected to be 228m^3/day during the fourth and final year of mining.

As groundwater in the aquifer around the pit is removed, groundwater levels around the pit will lower, leading to a cone of depression around the proposed pit at Doornpan. Due to the small area being mined, coupled with the low transmissivity of the underlying aquifer, it is expected that the cone of depression will be relatively small. The maximum size the cone of depression is expected to attain during the fourth and final year of mining was modelled by Groundwater Complete (2014) and is depicted in Figure 8.1. It is expected that the maximum groundwater level drawdown will be ± 53 meters and that the cone of depression will not exceed a maximum distance of ± 500 meters from the pit.

Due to the fact that a secondary fractured rock aquifer (such as the one underlying the COZA Project area) is a highly complex system, Groundwater Complete (2014) also simulated a cone of depression with the presence of a highly transmissive structure in the underlying geology, which can significantly

influence the extent of groundwater level impacts. The cone of depression in this case can extend to up to ± 700 meters from the proposed pit in the fourth year of mining (see Figure 8.2).

The drawdown of groundwater in the aquifer underlying the proposed pit at Doornpan is however not expected to impact on surrounding groundwater users. A hydrocensus indicated that the nearest boreholes to the proposed pit at Doornpan are located more than 2.5 km away to the north, east and south of the pit, and are well outside the cone of depression as modelled by Groundwater Complete (2014).

Even though no impacts on surrounding groundwater users are expected, the aquifer structure will be destroyed wherever it is intersected by the opencast pit, which represents an impact in its own right. This will lead to permanently altered aquifer conditions where material was removed and replaced as part of the mining operations. It is expected that the transmissivity and porosity of the backfill material will be very high. This impact will however only be localised to the pit workings post mining and is unlikely to have any significant impacts from an ecological or socio-economic perspective.

Due to the low transmissivity of the underlying aquifer, it is expected that the recovery of groundwater levels post mining will be in the order of 110 years after active mining has ceased.

It must be noted however that uncertainties with respect to the geological structure underlying the proposed pit area, coupled with numerous model restrictions, one is expected to come across either over or under estimations of the predicted groundwater impacts (Groundwater Complete, 2014). The model results should therefore only be regarded as being qualitative rather than quantitative. The model results/predictions need to be verified and updated regularly by means of a comprehensive groundwater monitoring program as outlined in section 9.9.1.

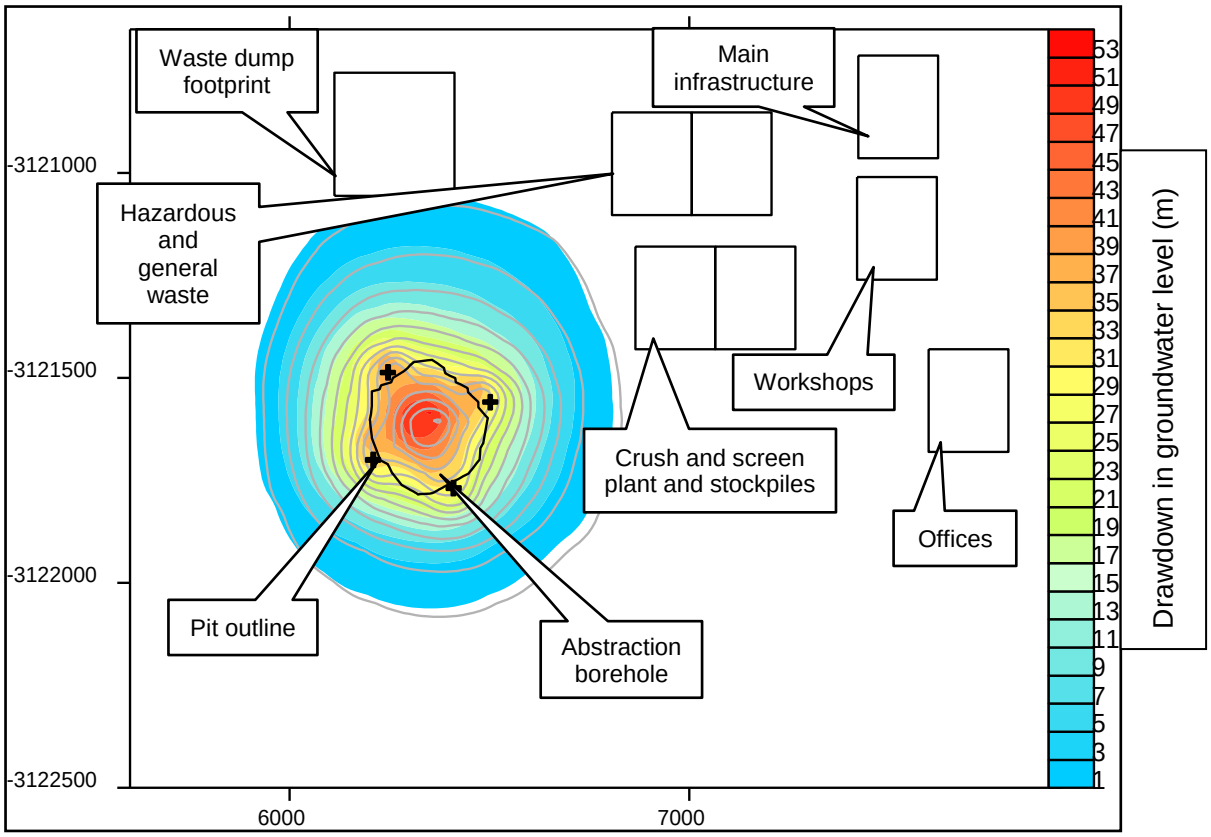

Figure 8.1: Simulated cone of depression at the end of year 4 of mining

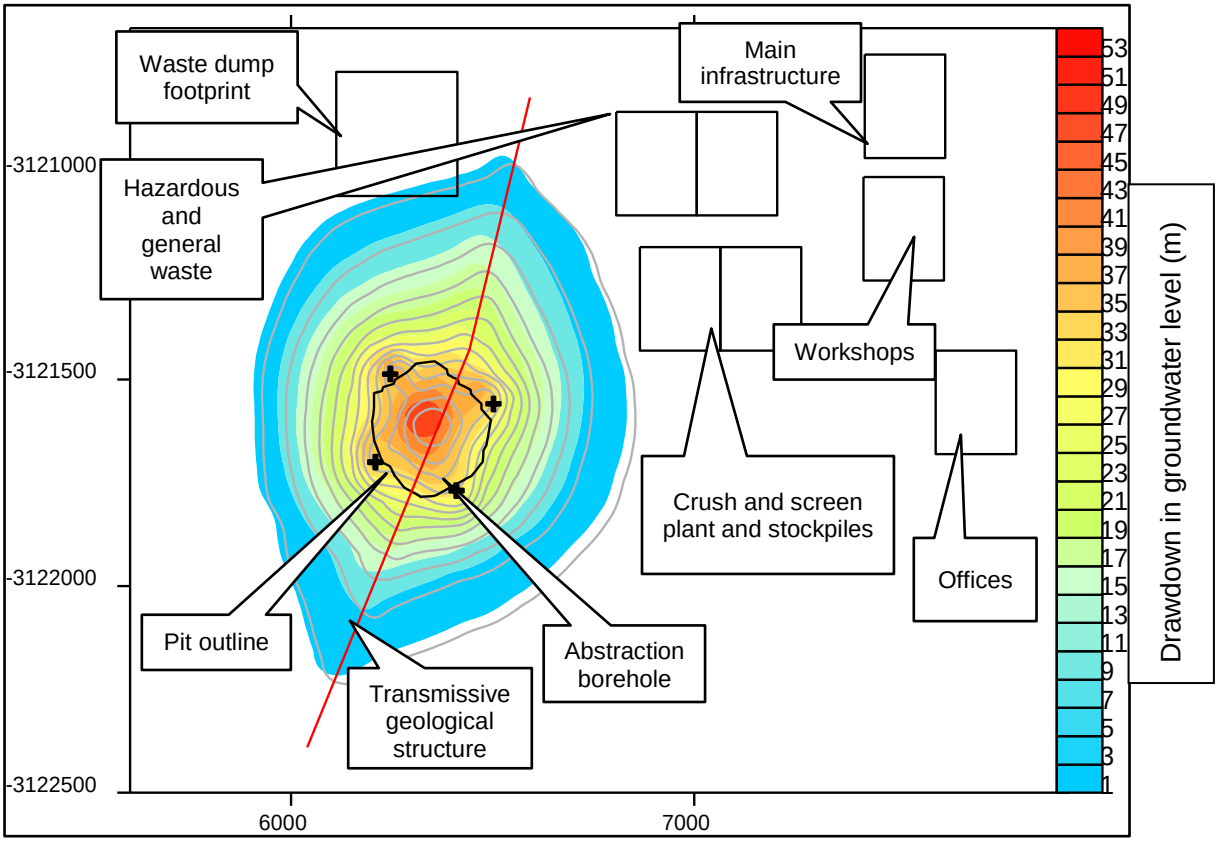

Figure 8.2: Influence of geological structures (theoretical) on extent of impact/cone of depression at the end of year 4 of mining.

8.2.1.2 Mitigation Measures

The dewatering of the local aquifer system and destruction of its structure cannot be prevented as it is an unavoidable consequence of the proposed mining activities at Doornpan. In order to mitigate the potential impact of drawdown in the groundwater supply, the following mitigation measures are proposed:

- To minimize the extent of disturbance of the aquifer by minimising disturbance footprint areas;
- To monitor water quality of on-site monitoring boreholes on a quarterly basis and communicate the results to potentially affected groundwater users; and
- To establish a grievance procedure, allowing for compensation of affected groundwater users.

8.2.2 Groundwater Quality

A number of potential sources of groundwater contamination associated with the proposed COZA Iron Ore Project were identified within the COZA mining right area. These source areas are discussed below.

8.2.2.1 Opencast Pit

In the iron ore mining industry of the Northern Cape Province, base metal sulphides associated with the formation of acid mine drainage (AMD) do not occur in sufficient quantities to cause any measurable reactions (Groundwater Complete, 2014). In addition, sediments do not contain pore water with high saline content, as is common coal and base metal mining industries. Results of various studies conducted for the surrounding iron ore mines have shown that none of these reactions or contaminants applies to the COZA Project. As such, the impacts of the proposed COZA project on groundwater quality are expected to be relatively minor and mostly related to contaminants such as nitrate associated with nitrate-based explosives and contamination by suspended solids, especially haematite dust and mud particles created by the physical impact of the mining operation during the operational phase of mining (Groundwater Complete, 2014).

Nitrate contamination associated with the use of nitrate-based explosives in mining operations tends to cause increased nitrate concentrations close to the blasting areas in the pit. Nitrate is highly soluble in water and seepage emanating from such areas is expected to contain high concentrations of nitrate and pose a significant groundwater contamination risk (Groundwater Complete, 2014). This risk will however only be temporary in the case of the COZA Project as it was found at comparative mining operations that the nitrate concentrations return to acceptable levels within one or two years after regular blasting has ended in the specific area (Groundwater Complete, 2014).

As mentioned, contamination by suspended solids also poses a groundwater contamination risk due to the high iron content of suspended material, especially hematite particles, in the pit. Contamination by iron or any other heavy metals are, however, not a significant risk with respect to the COZA Project

because the high pH of the groundwater in the area (Groundwater Complete, 2014). Iron and other metals will not tend to stay in solution where it can spread significantly, but will form insoluble metal oxides and hydroxides and precipitate, therefore settling out.

It is also important to note that during active opencast mining and until a new groundwater equilibrium has been reached (expected >50 years post mining), the mine void acts as groundwater sink and groundwater will move radially inwards towards the void (Groundwater Complete, 2014). This means that during this period poor quality leachate generated by the mining activities is more likely to move towards the mine void and cannot drain towards the immediate surroundings.

Groundwater Complete (2014) simulated the contamination plume which would result due to groundwater contamination from the pit and other sources. The simulated plume 50 years post mining is depicted in Figure 8.3. It must be noted however that contaminant concentrations are likely to be overestimated in the simulation as source areas were assigned a theoretical concentration of 100 % in the simulation. This conservative approach was taken because sources of groundwater contamination could not be estimated or predicted with a high degree of confidence (Groundwater Complete, 2014). As such, long-term impacts have to be confirmed through groundwater monitoring during the operational and decommissioning phases and updating and refinement of the models.

According to the simulation, contaminant migration will be slow due to the overall low transmissivity of the fractured rock aquifer which will greatly restrict the rate of contamination movement away from the opencast pit. The pollution plume was simulated not to exceed a maximum distance of approximately 150 meters in the down gradient direction at a time of 50 years post closure. As such, the impact on groundwater quality due to the pit excavation is expected to be minor and the surrounding groundwater users should not be affected.

Much of the impact to groundwater quality due to the abovementioned mechanisms is an unavoidable consequence of the proposed mining activities at Doornpan. In order to mitigate the potential impact on groundwater quality, the following mitigation measures are proposed:

- To minimize the extent of disturbance of the aquifer by minimising disturbance footprint areas;
- To monitor water quality of on-site monitoring boreholes on a quarterly basis and communicate the results to potentially affected groundwater users; and
- To establish a grievance procedure, allowing for compensation of affected groundwater users.

8.2.2.2 Waste Dumps and Stockpiles

Potential sources of groundwater contamination from surface including the proposed waste rock dumps, hazardous and general waste dumps and stockpiles are in direct contact with the high transmissivity weathered zone aquifer and pose a greater groundwater contamination risk compared to the underground workings. Surface water run-off originating from the dumps and stockpiles, toe-seeps

and seepage through the base of the facilities, are expected to be of poor quality and will cause adverse groundwater quality impacts should it enter the aquifer regime (Groundwater Complete, 2014).

The spread of contaminants from surface infrastructure to the aquifer regime is however expected to be limited in the case of the COZA Project due to a number of prevailing factors, which include:

- Low groundwater recharge percentage;
- Low transmissivity of aquifer host rock; and
- Limited operation time (5 years of active mining) (Groundwater Complete, 2014).

As such, contaminant migration will be relatively slow. According to the simulation conducted by Groundwater Complete (2014), the pollution plumes emanating from surface infrastructure are not expected to migrate significantly, and are not expected to migrate more than 50 meters in the down gradient direction at a time of 50 years post closure (see Figure 8.3). As such, the impact on groundwater quality is expected to cover only a small area, and poses no risk to surrounding water users.

To mitigate the impact on groundwater quality due to seepage and runoff from waste dumps and stockpiles, the following mitigation measures are proposed:

- The footprints of the general and hazardous waste storage facilities must be covered with impermeable surfaces to minimise ingress of contaminated water into the underlying aquifer,
- All dirty water must be contained within the dirty water management areas and ultimately in appropriately lined pollution control dams;
- Clean runoff water must be diverted away from the waste dumps and stockpile area;
- Quarterly monitoring of boreholes must be implemented to monitor the groundwater quality and the potential spread of the contamination plume; and
- A grievance procedure must be established, allowing for compensation of affected groundwater users.

8.2.2.3 Workshops and Fuel Storage Facilities

Organic/hydrocarbon contamination sources like fuels, lubricants and organic cleaning agents/solvents used in the proposed workshops and stored in dedicated facilities on site pose a risk to groundwater quality. Spillages and leakages from hydrocarbon storage facilities may lead to the contamination of the underlying aquifer regime by harmful hydrocarbons.

As indicated by the simulation conducted by Groundwater Complete (2014), it is not however expected that contamination, if it occurs, will likely spread significantly. This impact is therefore expected to cover only a small area and can largely be mitigated. The following mitigation measures are proposed:

- Workshop areas are to be covered with impermeable surfaces (concrete) to avoid the ingress of contaminants due to spillage into the underlying aquifer;
- All hazardous chemical storage areas are to be appropriately lined and bunded to avoid the spillage and/or ingress of contaminants into the underlying aquifer;
- All dirty water runoff from workshop areas must be contained within the dirty water management areas and ultimately in appropriately lined pollution control dams, as per the stormwater management plan; and
- A spill response plan must be in place whereby spillages of hydrocarbons and any other hazardous substances are cleaned up by appropriately trained staff.

8.2.2.4 Pollution Control Dams

Spillages and leakages of poor quality water from proposed pollution control dams and the dirty water management system in general may lead to adverse groundwater quality impacts and the down gradient movement of a pollution plume. These wet waste management facilities pose a particular risk to groundwater quality in that they may cause artificial recharge to the aquifer and may cause a local increase in flow rate of contaminated seepage. These impacts can however be largely mitigated. The following mitigation measures are proposed:

- All pollution control dams will be constructed to comply with the relevant DWA requirements with appropriate liners to minimise ingress of contaminated water into the underlying aquifer;
- Prevent contact between clean and dirty areas to minimise the amount of contaminated water to be managed and contained;
- Recycle and reuse contaminated water as far as possible; and
- Minimise the extent of disturbance of the aquifer by minimising the mine footprint as much as possible.

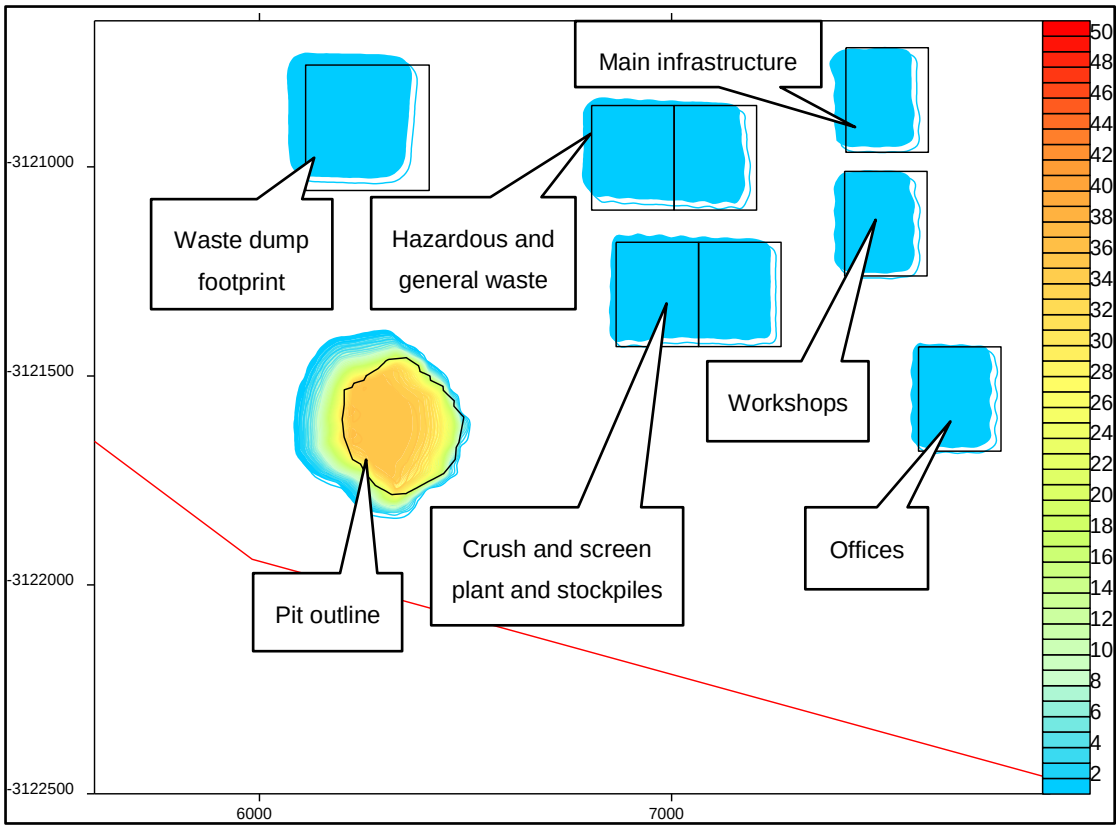

Figure 8.3: Model simulated pollution plumes at 50 years post closure

8.3 Surface Water

There are no major surface water features in the mining area and run-off from the area is unlikely to reach surrounding catchments. Due to the limited gradient over the majority of the site, surface water falling on site is likely to seep onto the surface or evaporate.

Of importance is the accumulation of water in the ephemeral pan to the south west of the proposed pit area at Doornpan. This pan will likely retain water for limited periods of time after major rainfall events and may play an important ecological function in the area as a result of the absence of watercourses and other surface water features in the area.

Of concern is the risk of run-off from construction and mining areas becoming contaminated and this water being allowed to enter into the natural environment. Pollution control measures to contain hydrocarbons and other potential contaminants during the construction period are thus essential. Information gathered from other similar mines in the area show that there is not a major risk of contamination from waste sources at the mine as waste rock that will be generated is unlikely to have a significant salt content or have acid forming potential. However, run-off from these areas can be expected to have elevated sediment loads. Such water should be managed and prevented from entering the nearby pan. Provision has been made for the management of dirty water from the plant

and maintenance areas and this water will be contained in pollution control dams and prevented from entering into the surrounding environment.

8.4 Flora

The COZA Iron Ore Project will have a direct impact on flora as a result of the site clearance and the removal of vegetation. Two protected tree species: *Acacia erioloba* (camel thorn) and *Boscia albitrunca* (shepherd's tree) occur within the proposed mine footprints on Doornpan and the construction of infrastructure and mining operations will impact on a number of these trees and protected species (see Figure 8.4). A permit to remove the two protected tree species (camel thorn and shepherd's tree) will be required from both the Forestry sub-directorate oGf Department Agriculture, Forestry and Fisheries as well as from the Department of Nature and Environmental Conservation (DENC), Northern Cape, before any vegetation clearing commences.

A potential indirect impact that could affect protected tree species is dewatering to continue mining once the groundwater depth is reached. The camel thorn is a species which is sensitive to changes in depth to the water table. An upper perched aquifer may be affected by the cone of depression, and if so, this effect may also extend away from the mine. This implies that camel thorn trees dependent on the perched aquifer may be negatively affected up to a certain distance away from the mine.

Fugitive dust from blasting, tipping and haulage also presents a potential risk to vegetation. Dust deposits on plants reduces their ability to photosynthesise and can change soil chemistry, leading to reduced plant vigour and die-back of parts of plants or death of individuals in severe cases. Dust is also a concern for the palatability of the vegetation for animals.

The disturbance of soils during the construction period will also leave the site prone to invasion by alien species. Some invasion by weed species (thorn apple) has already taken place and more such species are likely to invade the site if left unmanaged.

Other Indirect impacts associated with the development include habitat fragmentation and soil erosion, with the residual impact being a habitat that is potentially less suitable for the development and survival of flora.

The overall potential impacts of the proposed project are predicted to be of moderate significance and are not expected to significantly affect the conservation status of species of special concern in the area. With the implementation of mitigation measures as outlined below, it should be possible to reduce most negative impacts to a low significance. The recommended mitigation measures include:

- Staff should receive environmental education to ensure that that no harvesting of plants occurs;
- Rehabilitation of cleared and disused areas;
- Avoidance of medium-high sensitive habitat (see Figure 8.4);

- Regular monitoring for erosion to ensure that no erosion problems are occurring at the site;
- The harvesting of any protected trees on the site should be strictly forbidden;
- Implement fire control measures;
- Monitoring and control of alien vegetation;
- Implementation of dust suppression measures.

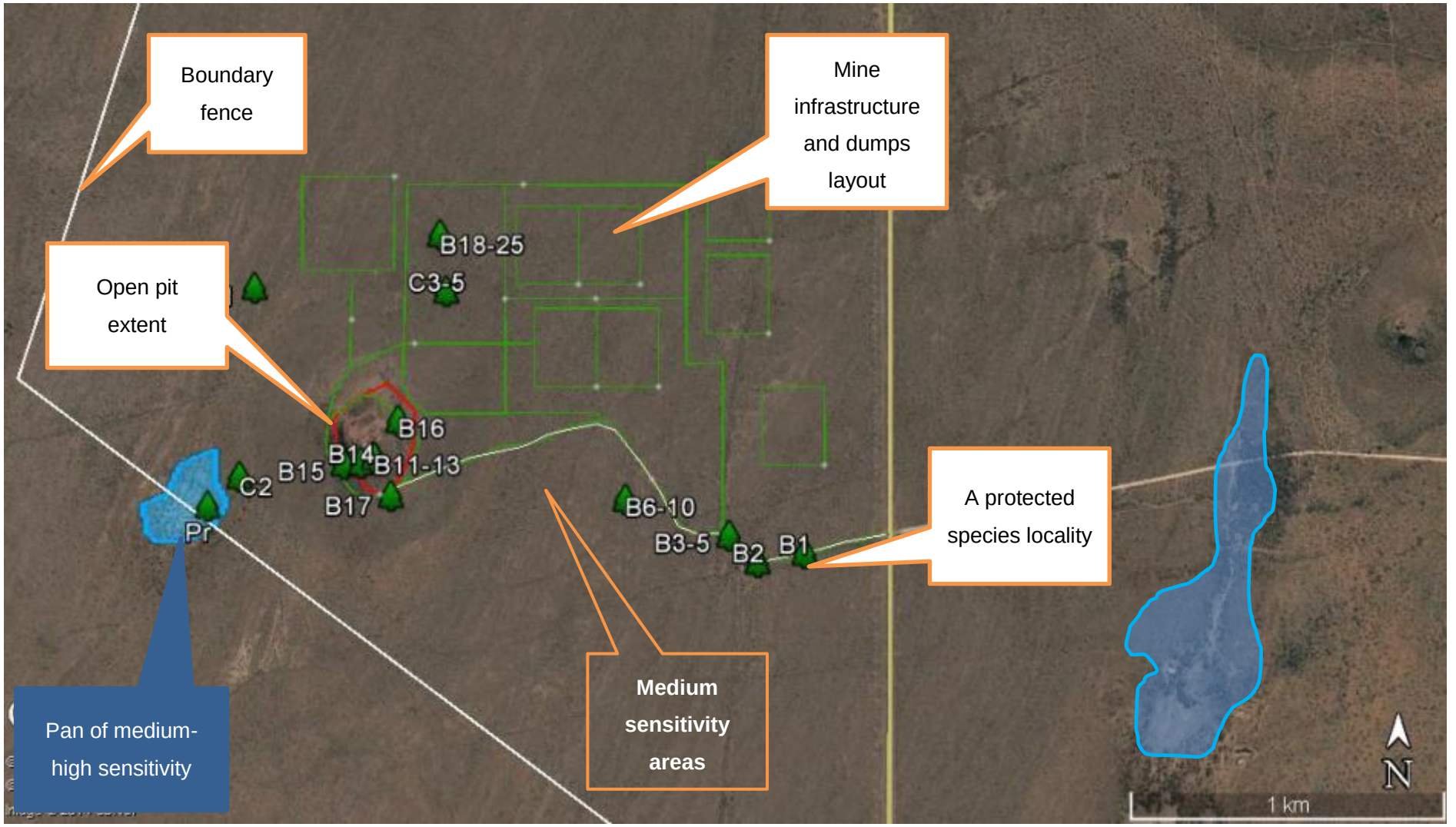

Figure 8.4: Sensitivity map with sensitivity ratings for the Doornpan mining area. The positions of protected trees and other protected species are indicated by coded green trees. The codes are: C = camel thorn, B = *Boscia albitrunca* (shepherd's tree), Pr = *Prepodesma orpenii*.

8.5 Fauna

A number of potential impacts have been identified in terms of faunal species and habitats due to the proposed COZA Iron Ore Project. These impacts and proposed mitigation measures are discussed in detail below.

8.5.1 Loss and Degradation of Habitat

The change in topography and other landscape features due to development of the open pit, waste rock dumps and mining infrastructure will result in the loss of terrestrial habitat for sedentary species such as Bushveld Gerbil and Bushveld Elephant-shrew and any arachnids on site. The proposed project is also likely to cause environmental degradation through air, noise, soil and water pollution.

The area to be disturbed is however not unique in terms of vegetation and is fairly significantly degraded due to historical overutilisation (Wilson, 2014). Coupled to the fact that the project will cover a relatively small area, the potential impact on local fauna will be relatively low as it does not involve the loss of any highly sensitive or important habitat for fauna in the area.

There is however an ephemeral pan near the site that may be important function in the ecological system and this endorheic habitat could possibly also support protected faunal species such as the Giant Bullfrog (although the presence of this species was not confirmed). This water feature may potentially be indirectly affected by the proposed mining operation through alterations in the catchment of the pan, or the groundwater regime.

Dust emissions can also cause a decline in the growth vitality, palatability and quality of food plants in areas surrounding the proposed project area. This reduction in air and food quality can be detrimental to the long-term survival of localised fauna. Additionally, the sourcing of water from boreholes to meet the operational needs of the project, even in limited quantities, will ultimately have a long-term effect on the vegetation components and later the associated fauna around the project area.

To mitigate the abovementioned potential impacts, the following management measures are proposed:

- To avoid sensitive areas such as the ephemeral pan and obvious drainage lines where possible;
- To minimise and limit the destruction or disturbance of vegetation within the proposed areas of activity, as well as in the surrounding areas;
- To limit or prevent further habitat fragmentation by considering the least destructive haul routes, which would include favouring already existing access roads in the area;

- Soil and water contamination from diesel spills, particularly at the storage tanks, must be prevented by ensuring these areas are adequately constructed on bunded foundations;
- Monitoring dust pollution if necessary, and applying reasonable and applicable dust-suppression measures;
- The establishment of a veld fire action policy in the event of a veld fire to prevent unnecessary loss of fauna and habitat; and
- Groundwater abstraction should be monitored and kept to a minimum.

8.5.2 Disturbance and Displacement of Fauna

The project activities, particularly more so in the construction than operational phases, will create noise, dust and general disturbances which will cause some animals to move away and put others at significant risk of being killed, especially sedentary species (Elephant-shrews, Gerbils and Scorpions) or species with limited ranging capabilities. Larger, more mobile species are more likely to flee successfully and are unlikely to die as a direct result of the proposed project.

It is also expected that high traffic zones associated with the proposed mining operations will results in incidences of road mortalities, especially with respect to terrestrial and slow moving species such as Tortoises, Rock Monitors and Hedgehogs.

With increased human occurrence and movement in an area there is usually an associated risk of poaching, and sometimes of the capture and trade of certain species. A conservation-worthy species particularly at risk is Rock Monitors.

Any open water bodies such as reservoirs prove as attractants to animals in a semi-desert environment, and as such, can pose a serious direct threat to fauna by way of accidental drowning. In southern Africa's arid areas, raptor drownings in small farm reservoirs is a significant cause of mortality as these reservoirs are often the only water available to birds.

To mitigate the abovementioned potential impacts, the following management measures are proposed:

- To prevent the destruction of wildlife in the area including the abuse to any animal found on the property by educating workers, implementing on-site supervision and worksite rules, and by enforcing legislation on the hunting and abuse of animals on site;
- Raptor-proofing all open reservoirs, dams or ponds to prevent drowning and contribute to raptor conservation;

- Bird-unsafe electrical structures must be modified to insulate dangerous live components, and to cut a gap in the earthwire – perch deterrents can also be installed to keep birds away from the dangerous areas on the structure;

8.5.3 Introduction / Spread of Alien Species

The COZA Project could potentially result in the introduction and spread of alien species at the site. Of concern is the introduction of domestic species, especially cats, that can interbreed with populations of African Wild Cats, a protected species. The introduction of domestic animals brings with it the introduction of new strains of diseases to local faunal populations.

To mitigate the abovementioned potential impacts, the following management measures are proposed:

- To control and prevent the activities of domestic feral animals (dogs and cats) that may occur in or are brought into the area that could compete with local wildlife for food or resources and spread diseases or foreign parasites.
- The importation of unsterilised and unvaccinated domestic animals, in particular cats, on to site must be banned; and
- A regular refuge removal regime must be implemented to discourage baboon-raiding activities.

8.6 Air Quality

8.6.1 Ambient Air Quality Standards

The National Ambient Air Quality Standards (NAAQS) (GN 1210, 24 December 2009) set limit values on the concentration (in $\mu g/m^3$) of a number of priority pollutants that are potentially harmful to human health and the environment. Limit values are average values determined over particulate time periods termed “averaging periods” and are fixed on the basis of scientific knowledge with an aim of reducing harmful effects on human health or the environment (or both).

The NAAQS also incorporates “frequency of exceedence” values, which allows for a certain number of exceedences as averaged over a calendar year. It is important to note that ambient air quality standards relate only to areas where the general public has access to, as well as all off-site areas. Table 8.1 shows the NAAQS Standards for priority pollutants.

Table 8.1: National Ambient Air Quality Standards for criteria pollutants

Pollutant	Averaging Period	Limit Value (µg/m³)	Limit Value (ppb)	Frequency of Exceedance	Compliance Date
CO	1-hour	30 000	26 000	88	Immediate
NO_2	1 hour	200	106	88	Immediate
	1 year	40	21	0	Immediate
$PM_{2.5}$	24 hour	65	-	4	Immediate – 31 Dec 2015
	24 hour	40	-	4	1 Jan 2016 – 31 Dec 2029
	24 hour	25	-	4	1 Jan 2030
	1 year	25	-	0	Immediate – 31 Dec 2015
	1 year	20	-	0	1 Jan 2016 – 31 Dec 2029
	1 year	15	-	0	1 Jan 2030
PM_{10}	24 hour	120	-	4	Immediate – 31 Dec 2014
	24 hour	75	-	4	1 Jan 2015
	1 year	50	-	0	Immediate – 31 Dec 2014
	1 year	40	-	0	1 Jan 2015
SO_2	10 minutes	500	191	526	Immediate
	1 hour	350	134	88	Immediate
	24 hour	125	48	4	Immediate
	1 year	50	19	0	Immediate

The National Dust Control Regulations (NDCR) were published on the 1st of November 2013 (Government Gazette No. R. 827). Acceptable dustfall rates according to the Regulation are summarised in Table 8.2.

Table 8.2: Acceptable dustfall rates

Restriction areas	Dustfall rate (D) in mg/m²-day over a 30 day average	Permitted frequency of exceedance
Residential areas	D < 600	Two within a year, not sequential months.
Non-residential areas	600 < D < 1 200	Two within a year, not sequential months.

8.6.2 Emission Sources

Airshed (2014) compiled an emissions inventory for the proposed project. Sources of emission and associated pollutants considered in the emissions inventory included:

- Fugitive dust emissions:

- Construction i.e. land clearing, bulk earthworks, grading of roads etc. – $PM_{2.5}$, PM_{10} and TSP
- Blasting – $PM_{2.5}$, PM_{10} and TSP
- Crushing and screening – $PM_{2.5}$, PM_{10} and TSP
- Drilling – $PM_{2.5}$, PM_{10} and TSP
- Handling of ore and waste rock – $PM_{2.5}$, PM_{10} and TSP
- Transport of ore and waste rock, vehicle entrained dust from road surfaces – $PM_{2.5}$, PM_{10} and TSP
- Vehicle exhaust emissions – CO, DE, formaldehyde, NO_x, $PM_{2.5}$, PM_{10}, SO_2 and VOC
- Windblown dust – $PM_{2.5}$, PM_{10} and TSP[1]

- Vehicle exhaust emissions - CO, DE, formaldehyde, NO_x, $PM_{2.5}$, PM_{10}, PAH, SO_2 and VOC

The results of the emission inventory for both the construction and operational phases, including mitigated and unmitigated scenarios, are given in Table 8.3 below. The mitigated scenario represents the scenario where the recommended air quality management plan is implemented and gives an indication of the potential impacts of the proposed mining operation with all the proposed mitigation measures in place.

Table 8.3: Estimated annual average emission rates per source group (Airshed, 2014)

	Estimated Annual Average Emission Rates (tonnes/annum)												
	Unmitigated			Mitigated			CO	DE	Form al-dehy de	NO_x	PAH	SO_2	VOC
Source Group	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$							
Construction Phase													
Construction	491	232	35.2	246	116	17.6	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total	**491**	**232**	**35.2**	**246**	**116**	**17.6**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Operational Phase													
Blasting	2.78	1.45	0.083	2.78	1.45	0.083	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Drilling	7.07	3.71	1.95	2.12	1.11	0.59	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Crushing and Screening	210	21.0	2.10	105	10.5	1.05	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Materials Handling	45.3	21.4	3.25	22.7	10.7	1.62	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Unpaved Haul Roads	1080	308	30.8	270	76.9	7.69	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Vehicle/Equip ment Exhaust	9.57	9.57	8.78	9.57	9.57	8.78	48.7	8.78	2.15	117	0.004	0.32	10.7
Total	**1 354**	**365**	**46.9**	**412**	**110**	**19.8**	**48.7**	**8.78**	**2.15**	**117**	**0.004**	**0.32**	**10.7**

[1] The nature of the ore being mined i.e. density and particle size, makes windblown dust from these sources unlikely. Windblown dust emissions were considered initially but not included in the emissions inventory.

The most significant sources include fugitive particulate matter (PM) from drilling, blasting, bulk earthworks, windblown dust from exposed surfaces such as stockpiles and waste dumps, hauls roads and infrastructure. Fugitive emissions refer to emissions that are spatially distributed over a wide area and not confined to a specific discharge point as would be the case for process related emissions (IFC, 2007). Gases from the storage and combustion of fuels in stationary and mobile equipment also add to airborne emissions but to a lesser extent.

8.6.3 Potential Impacts

Based on the emissions expected from the proposed mining operation, the dispersion of atmospheric pollutions were simulated using atmospheric dispersion models (see Airshed, 2014 - Appendix E, for details on modelling software used). Based on the results of atmospheric dispersion modelling, potential impacts of the proposed project were estimated for both mitigated and unmitigated scenarios (Airshed, 2014). Results of atmospheric dispersion modelling indicated the following:

- Simulated $PM_{2.5}$ concentrations exceeded 24-hour NAAQS off-site when unmitigated. With mitigation measures in place, it was illustrated that levels could be reduced to within NAAQSs (see Figure 8.5).
- Simulated unmitigated PM_{10} concentrations exceeded the NAAQS of off-site but not at any of the sensitive receptors identified. Basic mitigation measures have shown reduction concentrations to levels that exceeded only the 24-hour NAAQS over a small area over the south-western boundary of the mine rights area (see Figure 8.6).
- Cumulative off-site PM_{10} concentrations in exceedance of NAAQSs are likely since baseline PM_{10} concentrations are already in exceedance of NAAQSs.
- Simulated dustfall rates only exceeded the limit for residential areas only in close proximity to areas of disturbance. In the absence of sampled baseline/pre-development dustfall rates, the potential for cumulative dustfall in exceedance of NDCR could not be gauged.
- 1-hour NO_2 concentrations were found to exceed the NAAQS over a small area to the south-west boundary of the mine rights area but not at any sensitive receptors (see Figure 8.7).
- Low baseline NO_2 concentrations make cumulative impacts unlikely.
- Predicted dustfall rates, CO, DE, formaldehyde, PAH, SO_2 and VOC were found to be low and within selected air quality criteria outside the mine rights area.
- Increased lifetime cancer risk associated with DE, PAH and formaldehyde exposure is considered low.

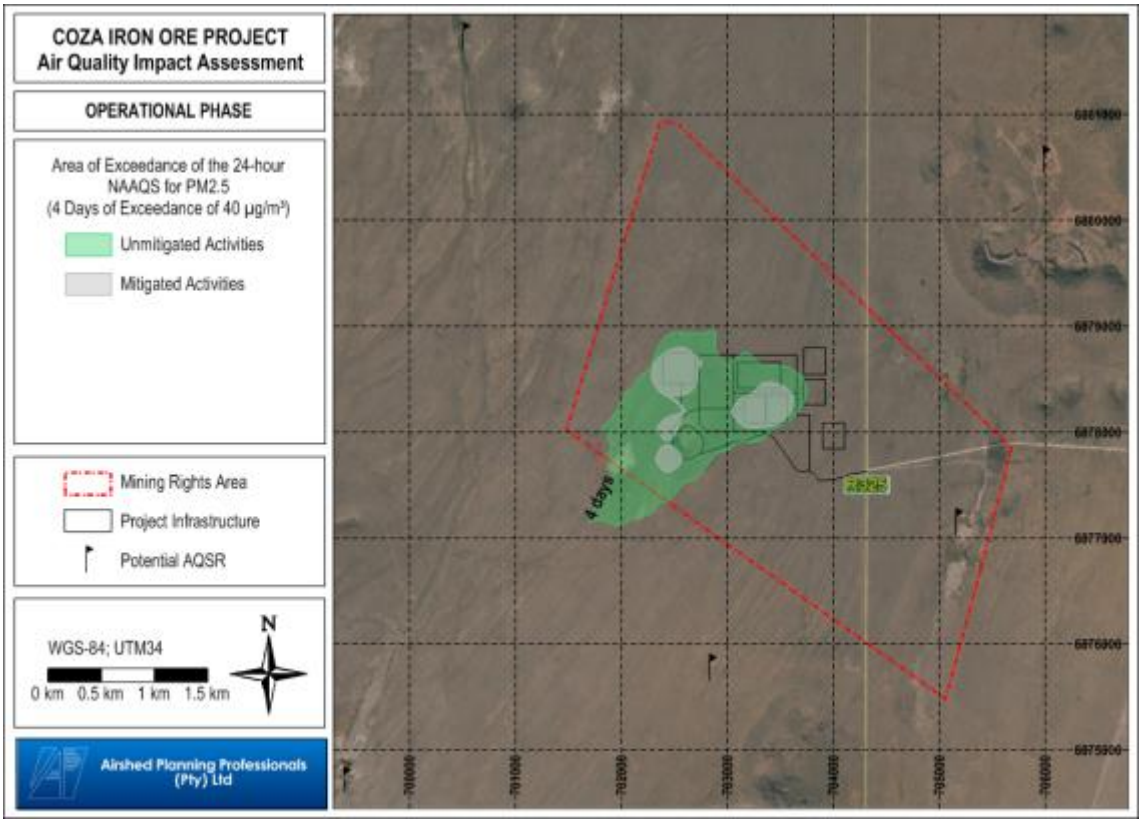

Figure 8.5: Operational phase - Area of exceedance of the 24-hour NAAQS for $PM_{2.5}$

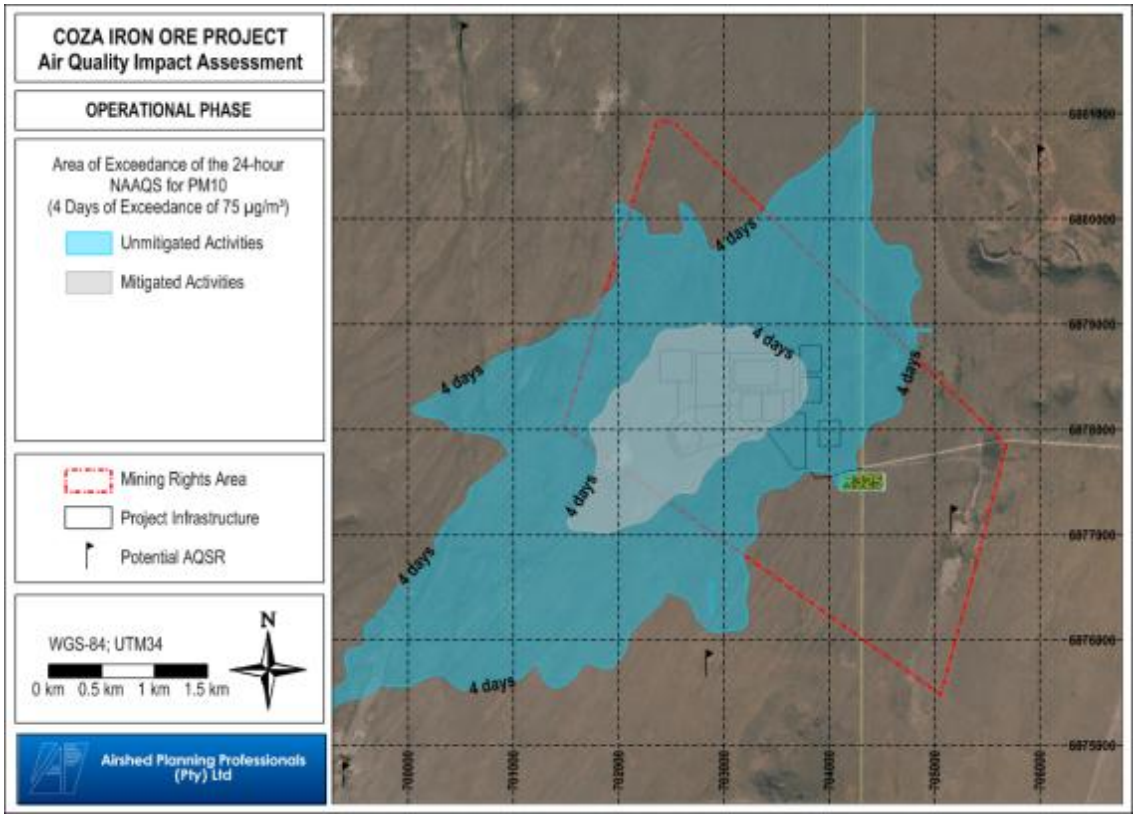

Figure 8.6: Area of exceedance of the 24-hour NAAQS for PM_{10}

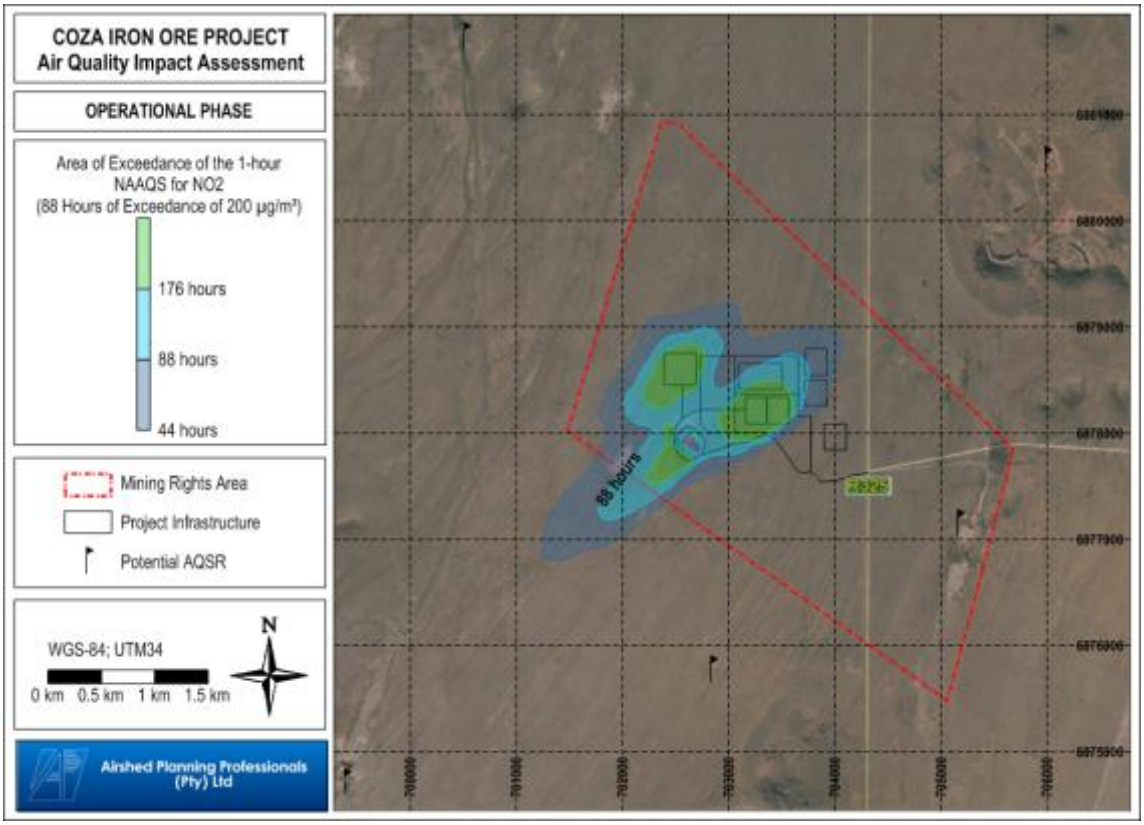

Figure 8.7: Operational phase - Hours of exceedance of the 1-hour NAAQS limit value for NO_2

8.6.4 Mitigation Measures

Airshed (2014) identified emissions of particulate matter as the most significant potential impact of the project in terms of air quality. The most significant potential sources of particulate matter impacts were identified as vehicle entrained dust from unpaved roads and dust created from crushing and screening. Measures recommended to reduce emissions from these sources include the following:

- Traffic control measures aimed at reducing the entrainment of material by restricting traffic volumes and reducing vehicle speeds;
- Measures aimed at binding the surface material or enhancing moisture retention, such as wet suppression and chemical stabilization; and
- Enclosure of crushing operations (Airshed, 2014).

Other important mitigation measures include:

- The minimisation of cleared areas;
- Rehabilitation and vegetation of cleared areas to minimise windblown dust; and

- Implementation of control techniques with respect to materials handling, e.g. minimisation of drop height, wet suppression and wind sheltering during stacking and loading operations.

It is also recommended that, as a minimum, continuous dustfall, PM_{10} and $PM_{2.5}$ sampling be conducted as part of the project's air quality management plan. Details of the recommended monitoring plan is provided in Section 9.9.2.

8.7 Traffic

Mining operation on farm Doornpan will result in additional traffic which will have an impact on the R325. Trip generation information for the COZA Iron Ore Project is given below:

Construction phase: it is estimated that 80 trips per day will be generated with 30 of those trips being heavy vehicles. Peak hour traffic flow would be approximately 10% of the daily traffic resulting in 8 trips per hour.

Operation phase: Six bus trips will be required and 20 trips per day with passenger cars and light vehicles. In total 26 staff trips will be required. Ore delivery will require 5 trips by 32ton trucks per day. Allowance has been made for some external trips such as visits, training etc. these trips have been estimated at 10 trips per day. The total trip generation is therefore 53 trips per day for the operation phase and an estimated 20 peak hour trips

Trip Distribution: The exact areas where ore will be transported and where the staff will be coming from is not yet know but for the purposes of the assessment it was assumed that traffic will either flow north or south of the R325. The trip distribution has therefore been assessed as 100% to the south or 100% to the north.

The traffic impacts for the project were assessed taking into consideration the baseline traffic counts and the mine's trip generation information. It is expected that existing traffic will grow by 5% over the 4 year period. Due to the relative small amount of peak traffic during construction phase, the analysis was undertaken taking into consideration the operational traffic peak flows. The traffic specialist used the Auto J programme to assess traffic impacts (Refer to Appendix L). The results indicate that the intersection of the access road with the main R325 intersection would operate well due to the relatively low peak volumes and low operational traffic. It shows that there will be a maximum delay of 9 seconds per vehicle resulting in Level of Service (LOS) A which is an acceptable LOS.

With regard to safety considerations at the R325 Doornpan Access, a good and clear distance of at least 300 m is required to ensure that cars can safely turn into and out of the roadway. Trucks require longer times of 13 seconds or more to pull away. For the Doornpan access, this clear access exists

and a stop controlled access will be available on both the Doornpan access and the R3395 legs therefore making accidents at the intersections very low. There is however a risk of accidents due to skidding as a result of the gravel from access road being spilled onto the main road. To manage this impact, the bell-mouth section of the gravel roads leading to into the intersection will need to be surfaced.

8.8 Noise

Proposed mining operation will involve noise-generating activities including the operation of large vehicles and machinery and blasting, which will result in noise impacts around the proposed mine. However, the mine is situated at least 5 km from the nearest sensitive receptors. Considering that blasting is only done during daytime hours, noise impacts to sensitive receptors should be minimal.

8.9 Visual

A Visual Impact Assessment conducted by Synergistics Environmental Services (Synergistics, 2014) shows that the mine will have a minimal impact on surrounding sensitive receptors in terms of their visual environment. The impact on views is limited to a single receptor situated approximately 8.5km to the north of the mine, on the Farm Driehoekspan, as well as motorists on an 11 km section of the R325 (see Figure 8.8). Due to the limited number of receptors that will experience disturbance of views as a result of the mine development, the visual impact is not regarded to be of a high order of magnitude.

It should however be noted that the night glow from the mine is likely to be visible for a distance of up to 20 km from the mine, which may affect a number of other receptors. The occurrence of nightglow for an extended distance will impact on the sense of place within the rural setting. However, given that there is already such infrastructure in the region, the cumulative impact of the project will probably be low. The impact will also be experienced by a limited number of receptors due to the low population in the area.

Although visual impacts are expected to be low, consideration should to be given to actions that can be implemented to further reduce such impacts. Lighting impacts can be reduced by limiting the height of lighting towers. Lighting should be focussed in the direction of areas of work and light spill can be reduced by the inclusion of lighting hoods to reduce light spill. Sodium vapour lights can also be considered as the light spill for such lights is less and the lights have lower potential to attract insects.

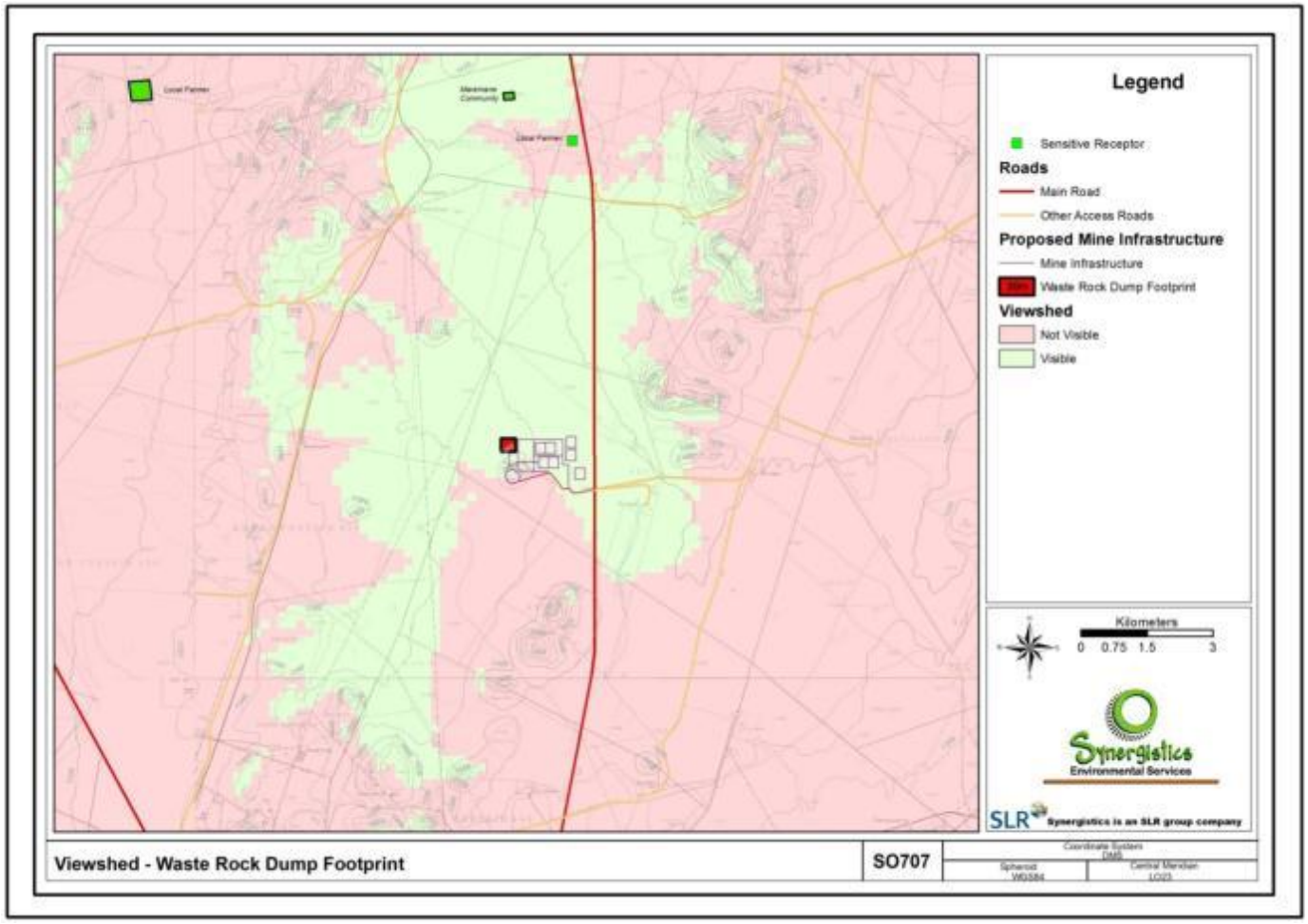

Figure 8.8: Viewshed for the Proposed Waste Rock Dump

8.10 Cultural and Heritage Resources

Although considered generally protected and of heritage significance, none of the sites that were identified at the proposed site are considered unique or possessing of any great scientific significance. In general, the impact of the proposed project on cultural and heritage resources is expected to be low.

A risk calculation for Site 3 has however shown that the impact risk of the proposed development on this site will represent a Moderate Impact Risk (PGS Heritage, 2014). As such, the following mitigation measures are required for this site:

- The road is older than 60 years and cannot be disturbed or impacted upon without a permit from the relevant heritage authority.
- The site must be documented with plan drawings as well as photographic recording. This documentation must accompany the permit application.
- Once the permit is received, the proposed road on this side of the slope can be constructed.

8.11 Social

8.11.1 Social Cohesion

The COZA Iron Ore Project will be located in an area that has been awarded to the Maremane Community as part of a successful land claim that was issued in 2010. The Maremane community is currently not in agreement on the correct representative for the community. In addition to this, the members of the community are currently residing in different areas such as Lohatla, Postmasburg, Kuruman and Lexly. The social cohesion of these members is likely to be further impacted by the project as some members may feel the project benefits are directed towards a few. This is a high social impact as it will result in disturbances to social cohesion which can later cause community in fighting or strikes at the mine. In order to mitigate this, it is proposed that Coza Mining must ensure that they communicate with the members of the Lohatla community as the community that will be directly affected by the development. According the Department of Rural Development and Land Reform, these are two official representative of the Maremane Community Property Association this includes Mr Mastididi and Mr Tswaro. COZA is to ensure that both these members are consulted when discussing access to land. A meeting with the local community must also be held together either the official representatives as per the land claim.

8.11.2 Employment

The Coza Iron Ore Project will result in the employment of 150 persons during construction and 80 persons during operation. This will be a positive impact for the area as there are currently high unemployment rates. Due to high unemployment rates in the area, there might be expectations that the jobs will all be directed towards the local population as the affected community. In order to manage this, COZA is to ensure communication with members of Lohatla to discuss the exact number of jobs available to the local community. During this meeting COZA is to communicate the number of jobs and the required skills in order for the community to understand. It is proposed that quarterly meeting are held during the construction phase and once per annum during the operation phase.

8.11.3 Increase in Social Ills

The development of the construction camp and the new mine is likely to attract social ills such as drunkenness and prostitution which can contribute to HIV/AIDS in the area In order to manage this, COZA will be required to ensure access control at the mine and introduce policies for drinking within the mine premises. In relation to HIV/AIDS, Coza is to have a workplace HIV AIDS policy

9. ENVIRONMENTAL MANAGEMENT PROGRAMME

9.1 Aims

The aim of the EMPR is to detail the actions required to effectively implement the mitigation measures identified in the EIA. These actions are required to minimise negative impacts and enhance positive impacts associated with the COZA Iron Ore Project. The EMPR actions present the commitments made by COZA Mining for addressing the impacts of the project.

The structure of the EMP is presented in a way that for each impact that has been identified in the EIA report the following information will be included:

- The objectives of each of the actions to be implemented for management;
- The time periods in which the actions are to be implemented; and
- The person responsible for the implementation of the actions

The EMPR identifies management actions that need to be implemented in various phases of the mining project life cycle.

- **Planning and design phase** refers to the stage when the feasibility studies are being undertaken, the project description is developed and the project is being designed. During this phase the EIA is completed and environmental authorisations are applied for. This phase commenced in the first quarter of 2013 and is anticipated to be completed early 2015.
- **Construction phase** will commence after the environmental authorisations have been obtained. This phase will involve the physical construction of the infrastructure required for the COZA Iron Ore Project. Construction is anticipated to commence in late 2017 and continue until late 2018.
- **Operation** is anticipated to commence in 2019. Operational activities are anticipated to proceed for about 4 years. Operational activities commence with site clearance, soil stripping, followed by the removal of overburden and then the extraction of the iron ore. These activities will commence once the initial construction activities have been completed.
- **Decommissioning phase** refers to the time in the mine life when mining operations are reduced in preparation for closure. This phase will occur once the resource has been mined optimally and economically. It is anticipated that mining activities will last approximately 4 years, it is therefore estimated that decommissioning will commence in 2023. The decommissioning phase will involve the final rehabilitation activities and implementation of the final land use plan.
- **Post -closure phase** refers to after the mine has been shut down and no mining activities are undertaken.

9.2 Roles and Responsibilities

It is the responsibility of COZA Mining to implement the EMPR and to make sure that all the actions are carried out. The successful implementation of the EMPR is however dependent on clearly defined roles and responsibilities for each of the management actions given.

Roles have been ascribed to the following parties:

Project Manager:	COZA is to delegate responsibility for adherence with the EMP to the Project Manager. The project manager is responsible for the design and planning of the COZA Iron Ore Project and the appointment of personnel.
Environmental Manager:	An environmental scientist appointed by the project manager to provide support to the engineering team and who will be responsible for monitoring compliance with the EMPR on a monthly basis. The Environmental Manager is to be appointed prior to the commencement of construction activities.
Community Affairs Manager:	A designated person to deal with public issues. This person is to be appointed during the planning and design phase of the project.
Human Resources Manager	A designated person appointed to deal with recruitment. This person is to be appointed during the planning and design phase of the project.
Contractor	These are companies appointed by COZA Mining to carry-out specific components of the project. Adherence to the EMP must be included as a contractual agreement for all contractors involved in the construction of the mine.
Construction Manager:	Engineer appointed to manage the construction phase of the project. This person is to be appointed prior to the commencement of construction activities.

Mining Manager:	Engineer appointed to manage and oversee mining activities. This person is to be appointed prior to the commencement of operations.
Engineering Manager:	Engineer appointed to manage and oversee maintenance of the mine. This person is to be appointed prior to the commencement of operations
Procurement Manager:	Responsible for procurement during the operation of the mine.
Safety Manager:	Responsibility for safety issues related to the operational workforce.

The schedule serves to give the time frame for the environmental action to commence. The successful commencement of the committed action within the specified time frame is to be monitored.

9.3 Planning and Design

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
PERMITS AND LICENCES				
Objective: To ensure compliance with environmental legislative requirements				
1.1	Apply and obtain all environmental authorisations, licences and permits required for the project, including but not limited to: • Acceptance of the EMPR in terms of the MPRDA • Environmental Authorisation in terms of the NEMA for required activities • Integrated Water Use Licence in terms of the NWA for required activities • Permit to remove protected plants on site • Permit to remove pretected heritage resources	Project Manager	Prior to Construction	Supporting documentation for permits and licences.
1.2	Finalise footprint areas to ensure applications for licences and permits are correct.	Project Manager	Prior to Construction	Feasibility Study
WATER RESOURCE PROTECTION				
Objective: To provide for the seperation of run-off from clean and potentially contaminated areas.				
1.3	Storm water diversion measures to be provided for diversion of clean water around potentially contaminated sites (workshops, overburden stockpiles, waste dumps).	Project Manager	Prior to Construction	Engineering Design in accordance with the requirements of Regulation GN 704, dated June 1999, under the National Water Act, 1998 (Act 36 of 1998)..
Objective: To provide for erosion protection measures in clean management system				

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
1.4	Erosion protection to be included in water management infrastructure design.	Project Manager	Prior to Construction	Engineering Design
Objective: To provide impervious surfaces to avoid the ingress of contaminated water into the underlying aquifer				
1.5	Designs to incorporate impervious surfaces and bunding to be provided where hazardous chemicals are stored.	Project Manager	Prior to Construction	Engineering Design
1.6	Designs of pollution control dams are to incorporate an appropriate liner to restrict ingress of water into the underlying aquifer.	Project Manager	Prior to Construction	Engineering Design
Objective: To Provide for the managagement of excess water				
1.7	Alternatives for the management of excess water are to be finalised prior to commencement with construction activities in consultation with key stakeholders. This includes the DWA.	Project Manager	Prior to Construction	Updated groundwater model and water balance
PROTECTION OF BIODIVERSITY				
Objective: To minimise the establishment of alien vegetation on site				
1.8	An alien invasive plant management plan for construction shall be developed.	Project Manager and EAP	Prior to Operations	Prior to commencement of construction
1.9	A veld fire action policy must be established of to prevent unnecessary loss of fauna and habitat in the event of a veld fire	Project Manager and EAP	Prior to Operations	Prior to commencement of construction

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
LAND USE				
Objective To ensure the achievement of rehabilitation on closure				
1.10	Financial provision for rehabilitation of the mine must be made.	Project Manager	Prior to Construction	Rehabilitation cost calculation
TRAFFIC				
Objective To avoid the creation of a traffic hazards due to deterioration of road surface				
1.11	Budgetting should include provisions for the regular maintenance of road upgrades.	Project Manager	Prior to Construction	
SOCIO-ECONOMICS				
Objective To ensure minimisation of the pressure on social services at the local municipality due to additional peiople to the area.				
1.12	Planning for staff housing and services must be undertaken.	Project Manager	Prior to Construction	
1.13	Community forum to be established to keep landowners and local community informed of activities at the mine.	Community Affairs Manager	Prior to Construction	
ENVIRONMENTAL MONITORING				
Objective: To establish baseline monitoring database				
1.14	Implement air quality monitoring programme which will involve monitoring of $PM_{10,}$ $PM_{2.5}$ and dust fallout.	Environmental Manager	Prior to Construction	Monitoring Equipment and Protocol Environmental Service Provider to be appointed
1.15	Implement groundwater and surface water monitoring programme	Environmental Manager	Prior to Construction	Environmental Service Provider to be appointed

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
PROCUREMENT AND RECRUITMENT				
Objective: To promote the employment of local persons.				
1.16	Prioritisation to be given to persons from local communities as stated in the Douglas Middelburg Optimisation (DMO) Social Labour Plan (SLP)	Human Resources Manager	Prior to Construction	DMO Social Labour Plan
Objective: To promote the use of local service providers.				
1.17	Develop a database of local service providers as stated in the DMO SLP.	Human Resources Manager	Prior to Construction	DMO Social Labour Plan
Objective: To prevent the immigration of work seekers into the area				
1.18	Communicate recruitment policy to the general public.	Human Resources Manager	Prior to Construction	Recruitment Policy
ENVIRONMENTAL AWARENESS AND TRAINING				
Objective: To ensure persons working at the mine are awate of potential environmental issues related with the COZA Iron Ore Project				
1.19	Environmental training and awareness material and disciplinary procedures to be in place with respect to environmental issues relating to the COZA Iron Ore Project prior to commencement of construction period.	Project Manager	Prior to Construction	Training material
Objective: To ensure that contractors allow for sufficient planning to implement environmental mitigation and rehabilitation measures				
1.20	Ensure that a EMPR commitments are provided for in contract budget.	Procurement Manager	Prior to Appointment	

9.4 Construction Phase

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
DISTURBANCE FOOTPRINT				
Objective: To contain and minimise disturbance of the natural environment.				
2.1	Demarcate construction areas.	Construction Manager	Prior to commencement of stripping.	
2.2	Site clearance to be limited to areas required for the construction of infrastructure.	Construction Manager	As required	
2.3	In areas designated for soil stripping, the topsoil must be removed and stored for use in rehabilitation.	Construction Manager	During soil stripping	
2.4	Topsoil stripped from linear infrastructure areas must be placed in windrows along such infrastructure or in soil stockpiles.	Construction Manager	During operations	
2.5	Soil stockpiles must be benched and sloped to 1: 6.	Contractor	During soils stockpiling	
2.6	Each bench must be 1.5 m high.	Contractor	During soils stockpiling	
2.7	No soil stockpile must be higher than 15 m.	Contractor	During soils stockpiling	
2.8	Trespassing outside of work areas to be prohibited.	Contractor	During construction	Training, awreness and diciplinary procedures
2.9	Limit construction activities to daylight hours	Construction Manager	During construction	

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
Objective: To protect sensitive habitats and species				
2.10	Sensitive habitats (wetlands) in close proximity to construction, earthmoving and soil striping activities, access roads and other infrastructure will be clearly demarcated as no-go areas until such time as the risk of damage to these habitats are no longer present.	Construction Manager	Prior to commencement of cosntruction activities	Contractors to be informed of no-go areas
2.11	Trapping, catching and hunting of all animals are prohibited.	Construction Manager	During construction	Training, awareness and diciplinary procedures
2.12	All reservoirs used in construction are to be raptor-friendly (with ladders) to allow birds to drink and bathe.	Contractor	During construction phase	
2.13	Workforce on site is to be made aware of the presence of fauna and protected species on site.	Contractor	During construction phase	Training, awreness and diciplinary procedures
POLLUTION CONTROL				
Objective: To ensure appropriate storage and handling of hazardous substances				
2.14	Handling of hydrocarbons and other hazardous chemicals to take place over impermeable surfaces.	Contractor	On site establishment	Impervious surfaces
2.15	All hazardous chemicals including hydrocarbons such as fuel, oils and greases are to be contained in bunded areas with sufficient capacity to contain the quantity stored.	Contractor	On site establishment	

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
2.16	Servicing and repair of construction vehicles and equipment in the field should be avoided. Should it be necessary to undertake repairs on site, use should be made of impervious surfaces to be placed under areas of work to prevent the contamination of soils by hydrocabons and other chemicals and such materials.	Contractor	On site establishment	Impervious surfaces
2.17	Drip trays are to be placed under stationary vehicles and equipment which leak oil or lubricants.	Contractor	On site establishment	Drip trays
2.18	Spills of hazardous substances to be managed in line with an Emergency Preparedness and Response Procedure which covers: • Reporting of incidents • Containment of spills • Clean-up procedures • Handling and disposal of cleaning equipment	Environmental Manager	On site establishment.	Spill procedures for hazardous substances. Spill kits as appropriate to areas of work. Training on clean-up.
WASTE MANAGEMENT				
Objective: To prevent the contamination of soils and water resources due to inappropriate management and disposal of waste.				
2.19	Hazardous and general waste is to be separated at source.	Contractor	On site establishment	Bins for the separation of waste at contractors laydown areas.
2.20	Waste skips are to be provided for the temporary storage of hazardous and general waste on site.	Contractor	Contractor	Waste skips (clearly demarcated)
2.21	Liquid hazardous wastes (e.g. solvents, degreasers) to be stored	Contractor	As required	Bunded area

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
	in sealed containers within bunded areas.			
2.22	General and hazardous waste is to be taken to a suitable licenced waste management facility.	Contractor	As required	
Objective: To ensure appropriate management of sewage				
2.23	Portable chemical toilets are to be provided within areas of work and serviced on a regular basis.	Construction Manager	On commencement of construction	Chemical toilets
DUST MANAGEMENT				
Objective: To minimise the entrainment of dust due to construction activities				
2.24	Surface wetting is to be implemented on all construction roads and cleared areas to minimise entrainment of dust.	Construction Manager	On commencement of construction activities	
CULTURAL HERITAGE				
Objective: To minimise the disturbance to graves and other heritage sites during construction				
2.25	Should heritage sites or graves be unearthed, activities in the area are to cease immediately.	Contractor	As required	Contractors to be informed of requirement
2.26	Heritage sites and graves will not be removed and work at the site will not resume until clearance is given by the specialist for removal or work to continue.	Environmental Manager	As required	Consultation with a heritage specialist approved by SAHRA
2.27	The heritage site or grave will not be destroyed, disturbed or relocated until the necessary permits have been obtained.	Environmental Manager	As required	Supporting documentation

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
ENVIRONMENTAL MONITORING				
Objective: To monitor impact of construction activities on water resources				
2.28	Monitoring of groundwater	Environmental Manager	Continued from Planning Phase	Groundwater Monitoring Programme.
Objective: To monitor impact of construction activities on air quality				
2.29	Monitoring of $PM_{10,}$ $PM_{2.5}$ and dust fallout.	Environmental Manager	Commence prior to contruction	Dust Monitoring Programme
PUBLIC RELATIONS				
Objective: To allow for the efficient management of complaints				
2.30	Complaints to be investigated in accordance with defined procedure.	Community Affairs Manager	On commencement of construction activities	Complaints Procedure
Objective: To minimise the loss of agricultural land due to fires				
2.31	Adequate fire-fighting equipment to be available at all times at all work sites in the event of accidental fires and to be inspected and maintained as per supplier specifications, particularly in areas where flammable substances are being stored and handled.	Contractor	On commencement of construction activities	Veld fire management plan
Objective: To minimise disturbance to neighbours and affected landowners				
2.32	No land is to be accessed or used prior to agreement with the landowner.	Contractor	Prior to site establishment	Landowner Agreement

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
2.33	Use of any private access roads must be agreed with the landowners.	Community Affairs Manager	During construction	Landowner Agreement
2.34	Trespassing into areas outside of agreed work areas to be prohibited.	Contractor	During Construction	Workforce Training and Awareness
Objective: To promote information sharing				
3.35	Community forum is to be set up to keep affected landowners and the local community informed of planned activities. Meetings must be held quarterly the construction phase.	Community Affairs Manager	Quarterly	Community Forum
PROCUREMENT AND RECRUITMENT				
Objective: To maximise employment opportunities for local persons				
2.36	Recruitment of construction workforce to give preference to local communities in accordance with the Wolvekrans Social and Labour Plan commitments.	Contractor	As required during construction	
Objective: To maximise revenue for local business				
2.37	Preference to be given to local service providers in accordance with Social and Labour Plan commitments.	Procurement Manager	As required during construction	
ENVIRONMENTAL AWARENESS AND TRAINING				
Objective: To ensure persons working at the mine are aware of potential environmental issues related with the COZA Iron Ore Project				
2.38	All construction workers, suppliers and service providers entering the construction site to attend and undergo	Environmental Manager	Upon appointment and before entering the	Training and awareness materials Landowner agreement

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
	environmental awareness induction training session covering key environmental issues pertaining to the construction site and surroundings with regard to protection of the natural environment, the conditions of the environmental authorisation, the requirements of the EMPR and the rights of landowners on whose properties construction takes place.		construction site	
2.39	Individuals dealing with potential hazardous situations that could lead to hazardous spills, pollution incidents, excessive dust or other forms of environmental damage to receive appropriate job-specific training and to be aware of 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.	Environmental Manager	Ongoing	Training and awareness materials
2.40	Implement an ongoing environmental awareness programme based on the project specific needs and problem areas identified on site. The programme will involve regular communication of environmental requirements and protection measures by means of newsletters, posters, meetings or other suitable means.	Environmental Manager	Ongoing, at least monthly	Training and awareness materials
2.41	A copy of the EMPR and all environmental authorisations must be kept at the main site office.	Project Manager	From date of site establishment	Copy of EMPR

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
2.42	Each contractor must keep a copy of the EMPR and this copy must be made available to staff.	Contractor	From date of site establishment	
GROUNDWATER RESOURCES				
Objective: To ensure the management of groundwater resources				
2.43	Water abstraction must comply with water use licensing requirements.	Project Manager	Commencement of construction	
2.44	No water will be abstracted from any private borehole without an agreement being entered into with the landowner.	Project Manager	Commencement of construction	
2.45	If the surrounding farmers experience negative groundwater impacts due to mining activities, COZA Mining must take all the necessary steps to mitigate the impacts.	COZA Mining	If groundwater monitoring shows that farmers are being negatively affected by mining activities.	
SURFACE WATER RESOURCES				
Objective: To ensure the management of surface water resources				
2.46	Sediment originating from construction activities shall be prevented from contaminating stormwater.	Contractor	Commencement of construction	
2.47	Dirty water run-off must be contained and not allowed to enter into the surrounding environment.	Contractor	Commencement of construction	
CONSTRUCTION REHABILITATION				
Objective: To ensure rehabilitation after construction				

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
2.48	All infrastructure including foundations and concrete surfaces that will not be used during mine operations must be removed from site.	Project Manager	On completion of construction	
2.49	All temporary access roads are to be ripped after construction where possible to assist with vegetation growth.	Project Manager	On completion of construction	
2.50	Material that has been contaminated with fuels, oils, lubricants or any other hazardous materials must be disposed of as hazardous waste.	Project Manager	On completion of construction	
2.51	Lay down, stockpile and other compacted areas outside of the permanent footprint area must be ripped to at least 150 mm and covered with topsoil or a growth medium to at least 300 mm or to such a depth to sustain vegetation growth.	Environmental Manager	On completion of construction	
2.52	Vegetation growth on rehabilitated areas must be monitored until the following rainy season to ensure re-growth and sustainable growth.	Environmental Manager	On completion of construction	

9.5 Operational Phase

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
SOIL MANAGEMENT				
Objective: To minimise the loss of utilisable soils				
3.1	Topsoil from areas where mining will take place must be removed and stored.	Mining Manager	Prior to commencement of mining activitiies,	Soil stripping plan.
3.2	Soils stockpiles must be benched and sloped to 1: 6. Each bench must be 1.5 m high. No soil stockpile must be higher than 15 m high.	Mining Manager	As required	Desiganted stockpile areas safe from contamination by mining activities.
3.3	Handling of hydrocarbons and other hazardous chemicals must take place on impervious areas. Bunded areas to be provided for the storage of hydrocarbons and other hazardous chemicals.	Mining Manager/ Environmental Manager	As required	
SPILL MANAGEMENT				
Objective: To prevent pollution of soils and water resources due to handling and storage of hazardous chemicals				
3.4	All hazardous chemicals including hydrocarbons such as fuel, oils and greases are to be contained in bunded areas with sufficient capacity to contain the quantity stored	Engineering Manager	During operations	Bunded areas as storage areas
3.5	Major servicing and repair of construction vehicles and equipment in the field should be avoided. Where maintenance is required to take palce in natural or rehabilitated areas, impervious surfaces are to be put in palce to protect the soil from contamination.	Engineering Manager	During operations	Impervious materials for use in the field
3.6	Drip trays are to be placed under stationary vehicles and equipment	Mining and	During operations	Drip trays

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
	which leak oil or lubricants.	Engineering Manager		
3.7	Spills of hazardous waste to be managed in line with an Incident Management Procedure, which covers: • Reporting of incident • Containment procedures • Clean-up procedure • Handling and disposal of cleaning equipment	Environmental Manager	During operations	Spill procedures for hazardous substances. Spill kits as appropriate to areas of work. Training on clean-up
3.8	All soils that have become contaminated with hydrocarbons or hazardous chemicals are to be removed and disposed of as hazardous waste.	Mining Manager	As required	Contractor agreement
WASTE MANAGEMENT				
Objective: To ensure the correct management of waste on site				
3.9	General waste must be removed from site on a regular basis for disposal at a permitted general waste site.	Engineering Manager	During operations	Contractor agreement or waste removal procedure
3.10	Hazardous waste must not be kept on site for longer than 3 months.	Engineering Manager	During operations	Skips and contractor agreement
3.11	Hazardous waste must be disposed at a permitted hazardous waste site.	Engineering Manager	During operations	Contractor agreement or waste removal procedure
DIRTY WATER MANAGEMENT				
Objective: To mitigate the impact of lowering groundwater levels due to pit dewatering				

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
3.12	Establish baseline yields and levels of surrounding boreholes in potentially impacted area.	Environmental Manager	Prior to commencement of dewatering activities.	Groundwater Monitoring Programme
3.13	Groundwater flow model must be verified and updated on a yearly basis.	Environmental Manager	Every five years from start of operation	
3.14	Supply alternative water source to affected water user if monitoring shows mining impact on borehole. Water should be provided at a level commensurate with the lesser of either: • the current yield, • or the requirements of the user, • or at a level that is considered to be a practical usage for the particular farm..	Mining Manager	As required	Groundwater Monitoring Programme
Objective: To ensure communication with surrounding landowners on groundwater issues				
3.15	Grievance response prociedure to be developmed and communicated to potentially affected farmers.	Environmental Manager	Prior to commencement of dewatering activities.	Grievance response prociedure
Objective: To manage the contamination of groundwater by waste dumps and ore material				
3.16	Clean water and dirty water management system including a pollution control dam for the containment of dirty water run-off must be established.	Mining Manager	Prior to operation	Stormwater Management Plan
3.17	Monitoring, including groundwater level and quality, of monitoring boreholes, on the COZA project area must be undertaken on a quarterly basis and mitigation identified and implemented if required.	Environmental Manager	Quarterly	Groundwater Monitoring Programme

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
3.18	Management measures are to be applied when sampling reveals that groundwater contamination is occurring.	Environmental Manager	As required	
3.19	Containment of dirty water run-off on site by means of lined canals and pollution control dams.	Environmental Manager	Throughout operational phase	Stormwater Management Plan
Objective: To prevent dirty water used in dust suppression entering into clean water system				
3.19	Water used in dust suppression is to be contained in a dirty water system and prevented from entering any clean water canal or natural watercourse.	Environmental Manager	Throughout operational phase	Stormwater Management Plan
CLEAN WATER MANAGEMENT				
Objective: To reduce sedimentation of surface water runoff				
3.20	Water management infrastructure is to be inspected for erosion. Should erosion of canal banks become a problem, these areas will be stabilised and protected.	Environmental Manager	After construction (annually)	
3.21	Water management system to be kept free of sediment and vegetation	Mining Manager	Annually before the rainy season	
DUST SUPPRESSION				
Objective: To reduce dust emissions				
3.22	Chemical suppressant or surface wetting to be applied to main haul	Mining Manager	Prior to commencement of	

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
	roads.		opration and mainatened on a quarterly basis.	
3.23	Wetting of ore material at transfer and handling points must take place.	Mining Manager	Ongoing Throughout operational phase	
3.24	Water used for dust suppression shall be in quantities small enough not to generate significant run-off that could result in erosion.	Mining Manager	Throughout operational phase	
NOISE MANAGEMENT				
Objective: To minimise the disturbance to nearby sensitive receptors				
3.25	No blasting to take place at night.	Mining Manager	Throughout operational phase	
3.26	Machinery and vehicles to be maintained to minimise noise levels.	Mine Manager	Throughout operational phase	
TRAFFIC				
Objective: To prevent the decrease in road safety				
3.27	Construct a turning lane for mine vehicles on the R325	Engineering Manager	Throughout operational phase	Engineering designs
3.28	Mine vehicles are to always have the lights on when accessing the site via the R325	Mine Manager	Throughout operational phase	Environmental Awareness Training

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
3.29	Bell-mouth section of mine access road from the R325 is to be surfaced to prevent gravel from being spilled onto the R325	Mine Manager	Throughout operational phase	
LIGHTING				
Objective: To minimise night glow				
3.30	Lighting to be directed towards mining activities.	Engineering Manager	Throughout life of mine	
CULTURAL HERITAGE				
Objective: To minimise the disturbance to graves and other heritage sites due to site clearance and excavations during operational phase				
3.31	Should graves or heritage sites be unearthed during excavation, operations in the area are to cease immediately.	Environmental Manager	Throughout operational phase	
3.32	The heritage site or graves will not be destroyed, disturbed or relocated until the necessary permits have been obtained.	Environmental Manager	As required	
PUBLIC RELATIONS				
Objective: To allow for the efficient management of complaints				
3.33	Complaints to be investigated in accordance with defined procedure.	Community Affairs Manager	On commencement of operations	Complaints Procedure
3.34	Should it be demonstrated that mining has caused any damage or loss of resource (e.g. water) to any party the affected persons are to	Community Affairs Manager	As required	Agreement with affected parties

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
	be given fair compensation.			
Objective: To promote information sharing				
3.35	Community forum is to be set up to keep affected landowners and he local community informed of planned activities. Meetings must be held yearly during the operational phas.	Community Affairs Manager	Yearly	Community Forum
Objective: To minimise the impact on the safety and security of surrounding farmers				
3.36	A 500 meter safety zone around the perimeter of blasting will be maintained and evacuated during blasting.	Safety Manager	Throughout operational phase	
3.37	Access control and signage to be in place during blasting on roads that enter the blasting zone.	Safety Manager	Throughout operational phase	
3.38	Trespassing onto private property by mine employees is to be prohibited.	Safety Manager	Throughout operational phase	
3.39	Mine area is to be fenced to ensure access control.	Safety Manager		
PROCUREMENT AND RECRUITMENT				
Objective: To maximise revenue for local business				
3.40	Preference to be given to local service providers in accordance with Social and Labour Plan commitments.	Procurement Manager	As required, during operational phase	
Objective: To maximise the contribution to the local and regional economy				

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
3.41	Implement measures in Social and Labour Plan commitments for promoting local economy.	Community Affairs Manager	During operational phase	
REHABILITATION				
Objective: To promote grazing as a final land use				
3.42	At least 0.3 m of soil or other growth medium to placed over all rehabiliated areas.	Environmental Manager	During operational phase as required.	Final Land Use Plan
Objective: To minimise erosion and maximise establishment of vegetation				
3.43	Rehabiliated areas are to be fertilised and seeded with a naturally occurring seed mix.	Environmental Manager	Before the next rainy season following the placement of soil.	Revegetation Protocol
3.44	Vegetation establishment and erosion is to be monitored and augmented as required until vegetation cover resembles that of the natural environment.	Environmental Manager	Annually (after each rainy season)	
ENVIRONMENTAL MONITORING				
Objective: To monitor impact of mining activities on water resources				
3.45	Monitoring of groundwater levels and quality	Environmental Manager	Continued from Construction Phase	Groundwater Monitoring Programme.
3.46	Monitoring of water use by the mine at all key water use points (dewatering, processing, forced evaporation, dust suppression)	Environmental Manager	On commencement of water use	Water meters
Objective: To monitor impact of mining activities on air quality				

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
3.47	Monitoring of $PM_{10,}$ $PM_{2.5}$ and dust fallout.	Environmental Manager	Continued from Construction	Air Quality Monitoring Programme

9.6 Decommissioning

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
IMPLEMENT FINAL LAND USE PLAN				
Objective: To facilitate successful rehabilitation				
4.1	All infrastructure not required is to be demolished and removed.	Plant Manager / Engineering Manager	During decomissioning	
4.2	All hard standing not required is to be broken apart and removed.	Plant Manager / Engineering Manager	During decomissioning	
4.3	All demolished material and footprint areas is to be checked for contamination with hazardous substances and hazardous material to be removed and disposed of as hazardous waste.	Plant Manager / Engineering Manager	During decomissioning	
4.4	Footprint areas are to be shaped and excavated areas backfilled to ensure that they resemble the surrounding landscape.	Plant Manager / Engineering Manager	During decomissioning	
4.5	Cover mining areas destined as grazing land with a minimum of 0.3 m of soil or other growth medium.	Mine Manager	After operations	Final Land Use Plan

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
4.6	Fertilize and vegetate unvegetated areas with naturally occurring seed mix.	Mine Manager	After Operations	Final Land Use Plan
MAINTAIN REHABILITATED AREAS				
Objective: To promote self-sustianing landscape free of erosion and alien invasive species				
4.7	Eroded areas are to be identified and repaired	Environmental Manager	Prior to closure	
4.8	Areas where vegetation establishment has not been successful are to be identified and seeding augmented as required.	Environmental Manager	Prior to closure	
4.9	Alien invasive vegetation establishment is to be identified and such species removed.	Environmental Manager	Prior to closure	
MONITORING				
Objective: To monitor improvements in the receiving environment				
4.10	Groundwater monitoring.	Environmental Manager	Continue from operational Phase	Groundwater monitoring programme
4.11	Air Quality monitoring	Environmental Manager	Continue from operational Phase	Air quality monitoring programme
SOCIO-ECONOMIC				
Objective: To minimise impacts of job loss.				

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
4.12	Measures identified in the Social and Labour Plan for promoting portable skills for workers must be implemented.	Mine Manager	Prior to closure	
DUST MANAGEMENT				
Objective: To minimise the generation of dust during decommissioning				
4.13	Surface wetting or chemical suppression should be used on roads.	Mine Manager	During the decommissioning phase	Surface wetting or chemical suppression should be used on roads.

9.7 Post Closure

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
PROTECTION OF WATER RESOURCES				
Objective: To monitor contamination of groundwater due to waste rock dumps.				
5.1	Gronudwater monitoring requirements after closure must be assessed by a qualified geohydrologist. Monitoring must be implemented if required.	COZA Mining	As per specialist reccommendations.	Groundwater monitoring programme
VEGETATION ESTABLISHMENT				
Objective: To promote self-sustaining vegetation				

REF.	ACTION	RESPONSIBILITY	TIME PERIOD FOR IMPLEMENTATION	REQUIREMENTS FOR IMPLEMENTATION
5.2	Rehabilitated areas are to be monitored in terms of vegetation establishment and erosion.	Environmental Manager	After closure for at least 3 years.	Monitoring Procedure
5.3	Vegetation establishment is to be augmented where required by re seeding.	Environmental Manager	After closure for at least 3 years.	Consultation with rehabilitation speciealist if required
5.4	Eroded areas are to be repaired	Environmental Manager	After closure for at least 3 years.	

9.8 Rehabilitation and Closure Objectives

COZA Mining needs to plan for sustainable closure by ensuring that every reasonable effort has been made to achieve rehabilitation closure objectives that will give effect to the following principles:

- Safety and health of people and animals are safeguarded from hazards resulting from the suspended mining operations.
- Environmental damage or residual environmental impacts are minimised to the extent that they are acceptable to all parties involved.
- The land is rehabilitated to achieve a condition approximating its natural state, or so that the envisaged end use of wilderness or conservation area is achieved.
- The physical and chemical stability of the remaining structures must be such that risk to the environment through naturally occurring forces is eliminated.
- Mine closure is achieved efficiently, cost effectively, and in compliance with the law.
- The social impacts resulting from mine closure are managed in such a way that establishment of a socially stable community in line with the principles of sustainable development is facilitated.

9.9 Environmental Monitoring

9.9.1 Groundwater Monitoring Programme

The groundwater flow model has revealed that mine dewatering will create a localised cone of depression around the mining area and will reverse groundwater flow towards the mine. The cone of depression is not expected to extend to more than 700 m from the mine. Groundwater monitoring will need to be undertaken to ensure that the mine's impacts groundwater levels and quality are verified and better understood. Samples will be taken from on-site monitoring boreholes on a quarterly basis. Water levels of these boreholes will also be determined on a quarterly basis when the sampling is done. Samples will be analysed for chemical and physical constituents normally associated with iron ore mining. These constituents are listed in Table 9.1 below.

Table 9.1: Groundwater Monitoring Plan

Monitoring	Variable
Quarterly*	EC, pH, TDS, total hardness, total alkalinity, calcium, magnesium, sodium, potassium, chloride, sulphate, fluoride, nitrate, iron, manganese, aluminium and turbidity.

***Note**:*

** Once trends are established, some of these constituents may be sampled less frequent, while others found to be problematic may be added as determined on consultation with the relevant role players, such as the DWA: Regional Office.*

Together with the monitoring, the following activities are to form part of the groundwater monitoring programme:

- Development of a groundwater monitoring database that will be updated on a monthly basis as information becomes available. This information will be used in understanding the mine's groundwater impacts and updating the groundwater numerical model
- Development of a monitoring response protocol after completion of the construction phase, this protocol is to describe procedures to be followed in event that groundwater monitoring reveals that action must be undertaken.
- Compilation of an annual compliance report presenting results of the monitoring and submission to authorities.
- Updating and verification of the groundwater flow model to ensure that at least 2 years prior to mine closure the groundwater closure scenario is understood.
- Maintenance of monitoring boreholes to prevent excessive rust and degradation.

9.9.1.1 Boreholes to be Monitored

Table 10.2 provides information on the boreholes to be included in the groundwater monitoring programme. The groundwater monitoring boreholes were sited and drilled mainly downgradient of possible sources of groundwater contamination and can therefore be classified as source monitoring boreholes.

Table 9.2: Mine Boreholes to be included in Monitoring Programme

Borehole ID	Latitude	Longitude
DO-BH01	-28.20333	23.06160
DO-BH02	-28.20338	23.06724
DO-BH03	-28.21066	23.06054
DO-BH04	-28.20898	23.06562

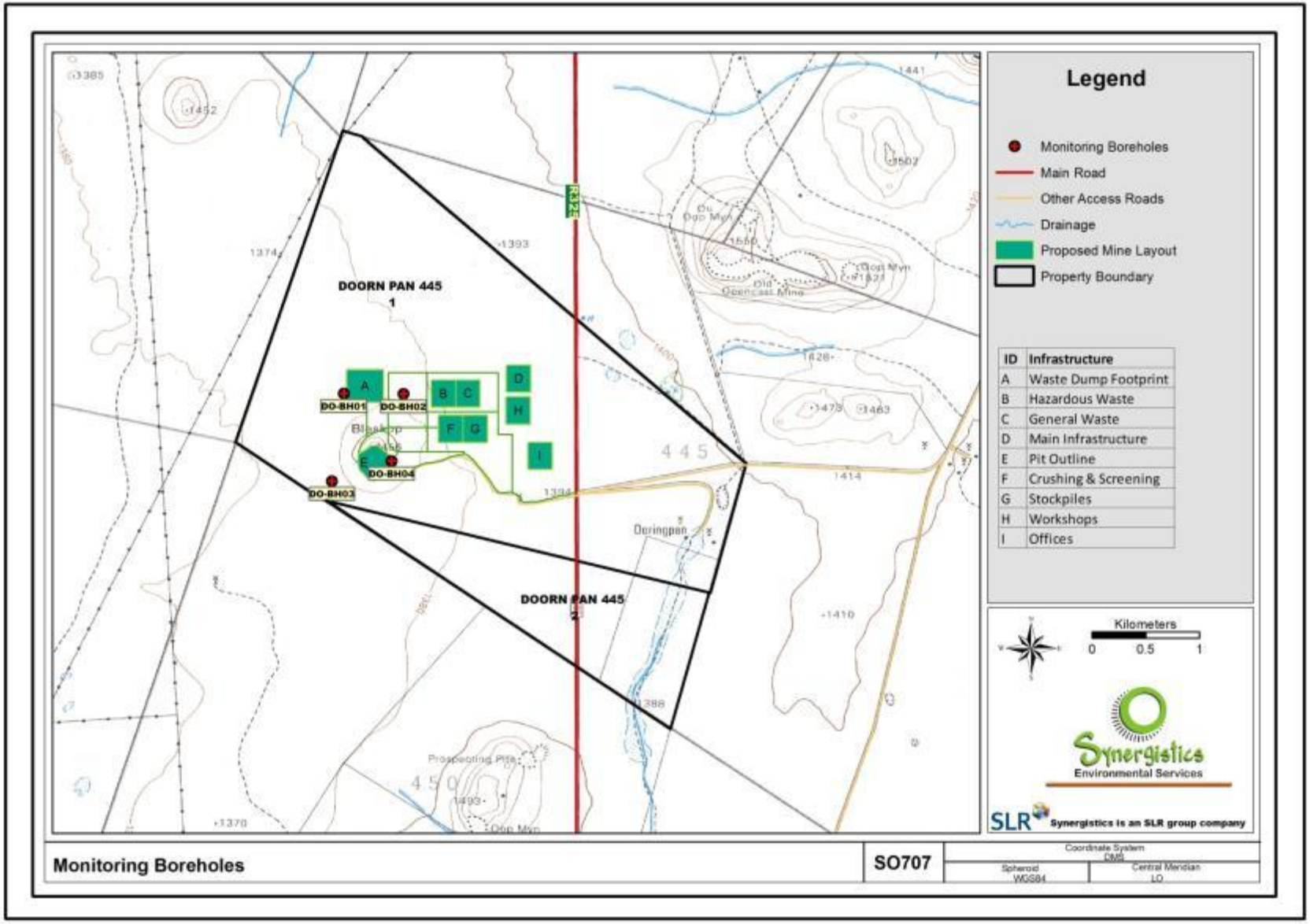

Figure 9.1: Boreholes to be included in the groundwater monitoring programme.

9.9.2 Air Quality Monitoring Programme

An air quality monitoring programme will be established for the construction and operation phases of the proposed project. The emission of dust is the main concern with respect to atmospheric impacts due to the proposed project. As such, the monitoring programme will include the monitoring of dust fallout (nuisance dust), PM_{10} (health risk dust) and $PM_{2.5}$. The ambient air quality standards that will be used when evaluating the results are given in Section 8.6.1. Recommended sampling locations and parameters are given in Table 9.3 and shown in Figure 9.2.

Table 9.3: Proposed sampling locations and parameters for air quality monitoring (Airshed, 2014)

No.	Description	Parameter to be Sampled	Reasoning
1	Southern boundary location	Dustfall, PM_{10} and $PM_{2.5}$	Downwind of operations in area of simulated maximum impact
2	Western boundary location	Dustfall	Upwind of operations on western boundary
3	Northern boundary location	Dustfall	Upwind of operations on northern boundary
4	Eastern boundary location	Dustfall	Downwind of operations on eastern boundary
5	Haul road location	Dustfall	Downwind of haul road to between pit and waste rock dump
6	Crusher location	Dustfall	Downwind of crusher area
7	Access road location	Dustfall	Downwind of access road

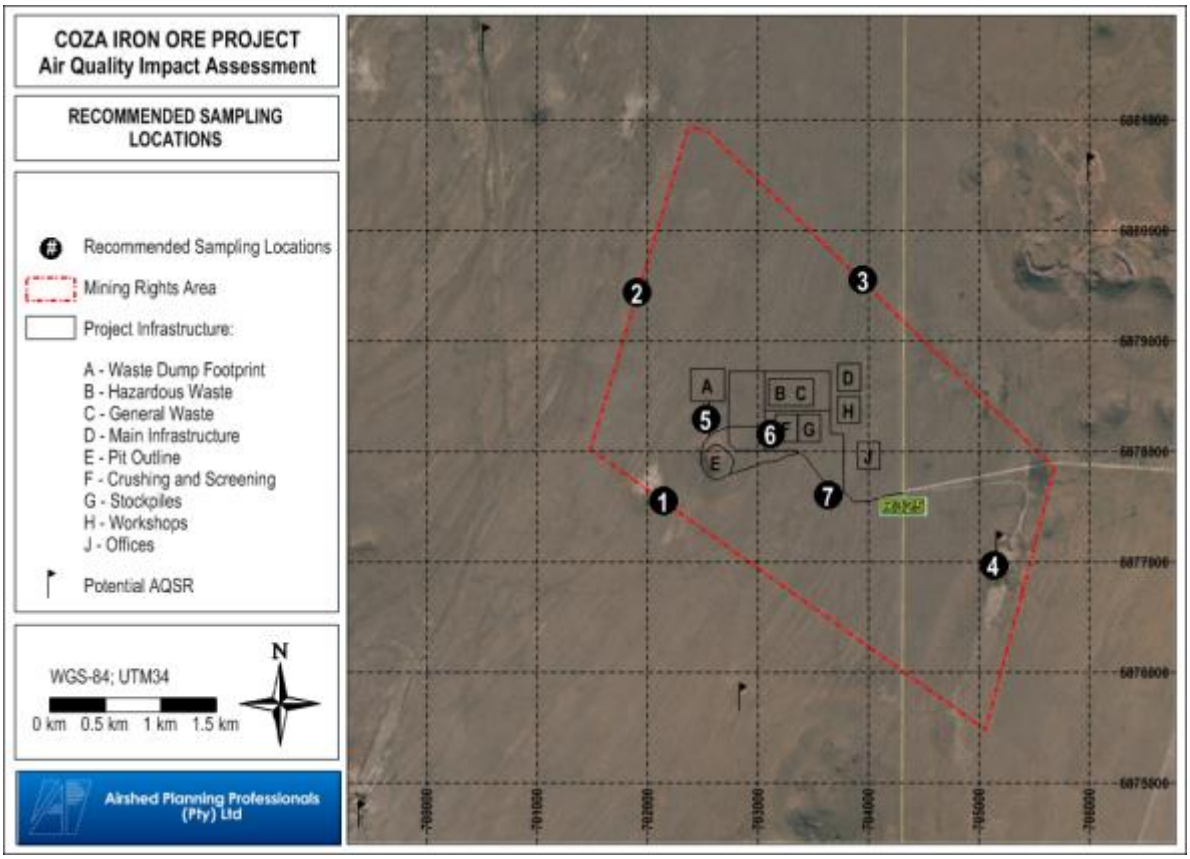

Figure 9.2: Recommended sampling locations for air quality monitoring (Airshed, 2014)

The following cost effective sampling methods are recommended:

- For dustfall, the NDCR specifies that the method to be used for measuring dustfall and the guideline for locating sampling points shall be ASTM D1739 (1970), or equivalent method approved by any internationally recognized body.
- For PM_{10} and $PM_{2.5}$ the method as set out by British Standards (BS EN 12341) is recommended (Airshed, 2014).

9.10 Environmental Awareness Plan

9.10.1 Environmental Induction Training

The purpose of the induction training is to promote a general awareness of the sensitivity of the environment, the legal commitments and the aspirations of COZA Mining in terms of environmental management and the environmental consequences of individual actions. Induction is applicable to all employees, contractors and service providers that will be working within the mining area.

9.10.1.1 Environmental Induction for Employees and Service Providers

The induction training for employees, contractors and service providers is to take the form of a presentation including:

- A description of environmental sensitivities in the COZA Iron Ore Project environment.
- A description of environmental legal requirements and COZA's commitment to comply with these requirements;
- A description of broad-based objectives of environmental management at the COZA Iron Ore Mine;
- A discussion of how individual actions can impact on the environment;
- A discussion of how individual actions can assist in the successful implementation of the environmental management programme (EMPR);
- The Code of Conduct.

All employees are to sign that they have understood and will comply with the Code of Conduct. Employees are to be re-inducted on an annual basis (after returning from their annual leave).

Requirements

- Environmental induction material (posters, power point presentations etc.);
- Code of Conduct;
- Register of inducted employees, service providers and contractors.

9.10.2 General Environmental Awareness Programme

The purpose of the general environmental awareness programme is to promote ongoing environmental awareness amongst the workforce. It will focus on addressing particular environmental issues which have been identified as problematic through the Performance Assessment Programme and EMPR compliance monitoring. All members of the workforce and contractors at COZA's Iron Ore Mine at Doornpan are to be incorporated into the general environmental awareness programme.

9.10.2.1 Monthly Environmental Topics

A monthly environmental awareness topic is to be chosen by management based on the outcomes of internal audits as well as topics of general environmental interest. The topic is to be communicated to the workforce through:

- Discussions at all SHE meetings (to be itemised on the agenda).
- Posters on notice boards.

Monthly environmental topics could include:

- What is the environment;
- The COZA environment;
- You and the environment;
- The Code of Conduct;
- Reporting environmental incidents;
- Environmental risks;
- Environmental emergency training;
- Preventing and cleaning up spills;
- Reduce, reuse and recycle;
- General versus hazardous waste;
- Alien vegetation control;
- Saving water;
- Saving energy;
- Historical sites.

Requirements

- Environmental topics to be included on the agenda of relevant meetings;
- Environmental awareness material to be produced and posted.

9.10.2.2 Job Specific Environmental Awareness Training

The purpose of the job specific environmental awareness training is to ensure that employees within the specific management units are equipped to implement the actions committed to in the EMPR. All members of the COZA Iron Ore Mine's workforce are to be subject to job specific environmental training. This training is to undertaken by the managers of each of the management units. Supervisors will be trained to assist with the implementation and training of the work force.

9.10.2.3 Environmental Risk Identification

The environmental risks associated with each management area are to be identified by the manager and supervisors together with the technical services manager. The risks are to be documented and actions to reduce these risks should be developed. The actions are to ensure overall compliance with the commitments of the EMPR. The findings of the performance assessment audits and EMPR compliance monitoring will assist in identifying risks.

9.10.2.4 Training

All members of the workforce (mining, plant workers, administration etc.) are to be subject to job specific training. This may include but not be limited to:

- Preventing pollution;
- Spill prevention and clean-up procedures;
- The location and purpose of material safety data sheets (MSDSs)
- Managing waste;
- No-go areas;
- Incident reporting.

The aspects to be covered however are dependent on the findings of the individual risk assessments. This is to be undertaken for each management area initially. Thereafter all new members of the workforce are to undergo environmental training as part of the training required to do their particular job.

9.10.2.5 Corrective Action

- Any actions undertaken by a worker that pose a risk to the environment are to be stopped immediately.
- The worker is to be instructed in how to correct the action.
- Non-compliance is to be incorporated into the standard disciplinary procedure applicable to COZA.

Requirements

- Risk assessment and action plan for each area at the COZA Iron Ore Mine at Doornpan.
- Training of the workforce within each management area.
- Training of new members of the workforce.
- Records of appropriate training conducted.

9.10.2.6 Community Communication and Awareness

The purpose of the external communication and awareness programme is to:

- Inform neighbouring and nearby landowners and land users of the environmental risks associated with operations at the COZA Iron Ore Mine.
- Inform and update interested and affected parties regarding environmental issues and monitoring undertaken.
- Provide a forum for communication of issues.

External communication is to include residents and land users on neighbouring and nearby farms, registered interested and affected parties, and interested authorities.

9.10.2.7 Complaints Register

A complaints register is to be kept at the office within each section for the registration of internal complaints by employees and contractors. External persons will be able to officially register their complaints in a register kept at a readily accessible point (e.g. the main office at Coza Mine or in Postmasburg). Complaints are to be followed up by the appropriate manager and the person is to be notified (preferably in writing) of how the complaint has been addressed. Complaints can also be received by facsimile, mail or e-mail and all registered interested and affected parties will be notified of the contact details (see below).

9.10.2.8 Notification of Interested & Affected Parties

Registered interested and affected parties are to be provided with contact details for the mine and encouraged to direct their queries through this preferred channel of communication.

Requirements

- Register of interested and affected parties.
- Internal complaints registers at each section.
- External complaints register at the main office.

9.10.3 Environmental Emergency Procedures

9.10.3.1 Overflow of the Pollution Control Dam

The objective is to manage any overflow event of the pollution control dams or balancing dam.

Actions

- The Mine Manager and Engineering Manager are to be notified immediately.
- The water in the dam network system should be redistributed to other dams that have capacity.
- The pumping of water from the pit is also to be stopped immediately if possible (and if this will not endanger the employees).

- If the only option is to discharge water directly into the environment, a directive from the Department of Water Affairs should be applied for. This water should be released into the clean storm water diversion system.

9.10.3.2 Pollution Incidents

Should spilled water enter the nearby pan, the spillage event is to be regarded as a **pollution incident.**

In the case of a pollution incident, the following additional actions should be taken:

- Water quality samples are to be taken downstream of the pollution source (or in the affected pans, to determine the magnitude and extent of the contamination.
- The Manager must as soon as is reasonably practicable report the incident to:

Director, Department of Water Affairs (DWA) – Northern Cape Region.

Tel: (053) 830 8802 Fax: (053) 831 4534

The incident is to be reported and investigated through the incident reporting procedure.

- The cause of the incident is to be investigated.
- Measures to prevent a repeat of the incident in the future are to be identified.
- Within 14 days of the incident, a report is to be submitted to Northern Cape DWA. This is to include:
    - A description of the nature of the incident;
    - The nature, toxicity and the quantity of the substances involved;
    - Measures undertaken to minimise the impacts;
    - Risks to public health and safety;
    - Causes of the incident; and
    - Measures implemented to avoid the reoccurrence of the incident in the future.

A directive may be issued by the authorities.

9.10.3.3 Hydrocarbon or Chemical Spills

The objective is to contain and remediate spillages of hydrocarbons (petrol, diesel, oil, lubricants) or chemicals (flocculants, solvents).

Actions

- Contact the supervisor in the event of a spill.
- The supervisor or manager should organise a team (of an appropriate size in relation to the spill) to assist with the clean-up.

- Labour is to be employed to construct earth berms/trenches or place absorbent booms to contain large volumes of spilled oil / chemicals to prevent it from entering any watercourse, pan or stormwater drain.
- Demarcate the spilled area where practicable.
- Choose appropriate Personal Protective Equipment (PPE) for employees responding to the spill.
- Consult the relevant Material Safety Data Sheet (MSDS) for recommendations regarding PPE and method of disposal.
- Move the spill kits to the area.
- If the spill is beyond the control of the designated staff, the predetermined emergency spill response company should assist with containment and clean-up.
- Limit existing leaks (e.g. turn containers upright, close bowzer, plug leaks in damaged containers).
- Where possible, transfer the substance from the damaged container into a new one.
- Scoop up the spilled substance along with contaminated soil or any absorbent material using the spill kit shovel. Place the scooped up substance into the plastic bags from the spill kit.
- Neutralise the residue with a solution recommended by the MSDS sheet.
- The waste bags must be marked as hazardous waste and disposed of as hazardous waste.

Pollution Incident

Should spilled oil or chemical enter any watercourse or pan the spillage event is to be regarded as a **pollution incident.** In the case of a pollution incident the following additional actions should be taken:

- Water quality samples are to be taken at the downstream monitoring positions to determine the magnitude and extent of the contamination.

Director, Department of Water Affairs (DWA) – Northern Cape Region.

Tel: (053) 830 8802 Fax: (053) 831 4534

The incident is to be reported and investigated through the incident reporting procedure.

- The cause of the incident is to be investigated.
- Measures to prevent a repeat of the incident in the future are to be identified.
- Within 14 days of the incident, a report is to be submitted to Northern Cape DWA. This is to include:
    - A description of the nature of the incident;
    - The nature, toxicity and the quantity of the substances involved;

- Measures undertaken to minimise the impacts;
- Risks to public health and safety;
- Causes of the incident; and
- Measures implemented to avoid the reoccurrence of the incident in the future.

A directive may be issued by the authorities.

10. CONCLUSION

The main impacts associated with the project include the emission of dust and its associated impacts, the loss of indigenous vegetation including protected trees due to mine construction, the compromise in safety along the R325 due to heavy vehicles transporting ore from the mine, as well as the loss of social cohesion of the Lohatla community.

COZA has undertaken to upgrade the gravel section of the R325 used by COZA and to maintain this during construction and operation of the road. This includes provision for dust control on the road using a chemical suppressant and surfacing of the bell-mouth section of the gravel roads leading to into the intersection to reduce gravel from access road being spilled onto the main road. Consultation between the local roads authority (Department of Transport, Roads and Public Works) and COZA is required to investigate the alternatives (including tarring of the road) in order to ensure that safety on the road is not compromised.

In order to manage the loss of social cohesion, COZA Mining must ensure that they communicate with the members of the Lohatla and keep them informed of mining activities. It is proposed that quarterly meeting are held during the construction phase and once per annum during the operation phase.

Cumulative dust impacts are also a concern, as baseline PM_{10} levels are above the NAAQS. It will therefore be vitally important that COZA implement dust management measures to minimise cumulative fugitive dust levels.

Depending on the geohydrological conditions encountered during mining, there may also be a small amount of excess water that will need to be managed in the final year of mining. Alternatives for the management of excess water will need to be finalised in consultation with key stakeholders including the DWA before construction commences.

The project will result in environmental impacts however with the implementation of the mitigation measures identified in the EMP, most impacts can be reduced to acceptable levels. As most of the assessment was undertaken using modelling exercises, it is vital that suggested monitoring is undertaken to ensure better understanding of the environmental impacts. There is currently no environmental reason why the proposed development should not be implemented if identified management measures are implemented provided that the impact on protected trees can be mitigated in accordance with the requirement of the Department of Agriculture, Fisheries and Forestry. It is expected that a suitable offset for such impacts can be identified and agreed upon.

11. CONSULTANT'S EXPERIENCE AND DECLARATION OF INDEPENDENCE

Synergistics Environmental Services (Pty) Ltd is an independent environmental consultancy that was established in 2004. The company has extensive experience in environmental impact assessments; environmental management plans, programmes and systems; environmental auditing; environmental monitoring reporting; environmental performance assessments; closure and rehabilitation costing and planning; and development of environmental action plans.

Kerry Fairley, the project director responsible for this EIA and EMP Report, is certified as an Environmental Assessment Practitioner in South Africa and has over 11 years' experience in the field of environmental consulting. She has successfully completed various environmental impact assessments, audits and management programmes for mining and mining related activities.

The undersigned herewith declare that this report represents an independent, objective assessment of the environmental impacts that can be associated with the COZA Iron Ore Project.

Signed:

Kerry Fairley

Pri.Sci.Nat

EAPSA

Synergistics Environmental Services (Pty) Ltd

Dated: 25 August 2011

Signed:

Zama Khumalo

BA (Geography)

Synergistics Environmental Services (Pty) Ltd

Dated: 25 August 2011

12. APPLICANT'S DECLARATION AND UNDERTAKING

The undersigned herewith declare that the information presented in Section 4 and 9 of this report is in accordance to the current plans by COZA Mining (Pty) Ltd for mining and undertake to comply with the mitigation and management measures as described in Section 9.

Signed: _____

Name: _____

Designation: _____

Dated: _____

13. REFERENCES

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14. APPENDICES

Appendix A: Public Consultation Report

Appendix B: Copy of Original and Amended NEMA Applications

Appendix C: Faunal Specialists Study

Appendix D: Specialist Vegetation Study

Appendix E: Air Quality Impact Assessment

Appendix F: Surface Water Impact Assessment

- **Appendix F1: Baseline Hydrology Report**
- **Appendix F2: Floodline Report**
- **Appendix F3: Stormwater Management Plan Report**
- **Appendix F4: Water Balance Report**

Appendix G: Groundwater Impact Assessment

- **Appendix G1: Dewatering Simulation Update**

Appendix H: Soils and Land Capability Survey

Appendix I: Economic Impact Assessment

Appendix J: Heritage Impact Assessment

Appendix K: Social Impact Assessment

Appendix L: Traffic Impact Assessment

Appendix M: Visual Impact Assessment

Appendix N: Study Team CVs

CONSULTANT'S EXPERIENCE

AND

DECLARATION OF INDEPENDENCE

Synergistics Environmental Services (Pty) Ltd is part of the SLR Group of companies. The company has extensive experience in environmental impact assessments; environmental management plans, programmes and systems; environmental auditing; environmental monitoring reporting; environmental performance assessments; closure and rehabilitation costing and planning; and development of environmental action plans.

The undersigned herewith declare that this report represents an independent, objective assessment of the environmental impacts associated with the proposed COZA Iron Ore Project.

	Name	Designation	Signature
Prepared by:	Zama Khumalo	Project Manager	
	Rudi de Jager	Environmental Scientist	
Reviewed by:	Kerry Fairley	Director