NAME OF APPLICANT: CHINA AFRICAN PRECIOUS METALS (PTY) LTD. – ORKNEY GOLD MINE

TEL NO: (011) 516 4860

FAX NO: (011) 463 7726

PHYSICAL ADDRESS: 35 BALLYCLARE DRIVE, BALLY OAKS OFFICE PARK, BRYANSTON, 2021

DMR REFERENCE NO.: NW 30/5/1/2/2/76 MR

SHANGONI
Management Services (Pty) Ltd

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
And
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

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CAPM GOLD

IMPORTANT NOTICE

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

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

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

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

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

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the—-

  (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

  (ii) degree to which these impacts—

    (aa) can be reversed;

    (bb) may cause irreplaceable loss of resources, and

    (cc) can be avoided, managed or mitigated;

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

(g) identify suitable measures to manage, avoid or mitigate identified impacts; and

(h) identify residual risks that need to be managed and monitored.

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Annexure I **Alternatives Assessment Report**

REFERENCES

CAPM Gold China African Precious Metals (Pty) Ltd. Social and Labour Plan.

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PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. Details and expertise of the EAP

1.1 Details of the EAP

Name of the Practitioner: Shangoni Management Services: Brian Hayes / Ashley Miller
Tel No.: (012) 807 7036
Fax No.: (012) 807 1014
E-mail address: brian@shangoni.co.za / ashley@shangoni.co.za

1.2 Expertise of the EAP.

Table 1: The qualifications of the EAP

NAME	QUALIFICATIONS
Brian Hayes	Professional Engineer. M.Sc.: Environmental Engineering.
Ashley Miller	B.Sc. (Honours): Environmental Analysis and Management

Table 2: Summary of the EAP's past experience

NAME	SUMMARY OF EXPERIENCE
Brian Hayes	Brian is a registered professional engineer (Chemical) with a master degree in Environmental Engineering from the University of Nottingham. Brian has 23 years' experience in environmental management and environmental engineering.
Ashley Miller	Ashley obtained his B.Sc. (Honours) degree in Environmental Analysis and Management through the University of Pretoria. Ashley is part of the Mining Department at Shangoni Management Services (Pty) Ltd. and has three (3) years' experience in Environmental Management Programme Reports (EMP), Environmental Impact Assessments (EIA), Scoping Reports and Basic Assessments. He also has experience in Integrated Water and Waste Management Plans (IWWMP), Integrated Water Use Licence Applications (IWULA), Water Use Licence audits as well as Environmental Management Programme Performance Assessment audits.

Detailed CV's of the EAP are attached in Annexure B.

2. Description of the property.

Table 3: Description of the property

Farm Name:	Vaalkop 439 IP Modderfontein 440 IP Nooitgedacht 434 IP Witkop 438 IP Erf 2 of Orkney Township Erf 1290 of Orkney Township
Application area (Ha)	Surface Rights area: 128.6 Ha Mining Right area: 10 561.7 Ha
Magisterial district:	The China African Precious Metals (Pty) Ltd. (CAPM) Orkney Gold Mine is situated in the City of Matlosana Local Municipality, within the Dr. Kenneth Kaunda District Municipality in the North West Province South Africa.
Distance and direction from nearest town	The CAPM Orkney Gold Mine is situated in close proximity to the following towns: Orkney 2.5 km south. Klerksdorp 10 km north-northwest. Stilfontein 16.2 km Northeast. Potchefstroom 50 km Northeast. Kanana 3.2 km West. Hartbeesfontein 33 km Northwest.
21-digit Surveyor General Code for each farm portion	No.1 Shaft: T0IP00000000043900009 No.2 Shaft: T0IP00000000044000010 No.3 Shaft: T0IP00000000043900012 No.4 Shaft: T0IP00000000043400170 No.5 Shaft: T0IP00000000044000006 No.6 Shaft: T0IP00000000043400101 T0IP00000000043800071 Surface Right Permit No.: C21/1942 No.7 Shaft: T0IP00000000043400169

3. Locality map

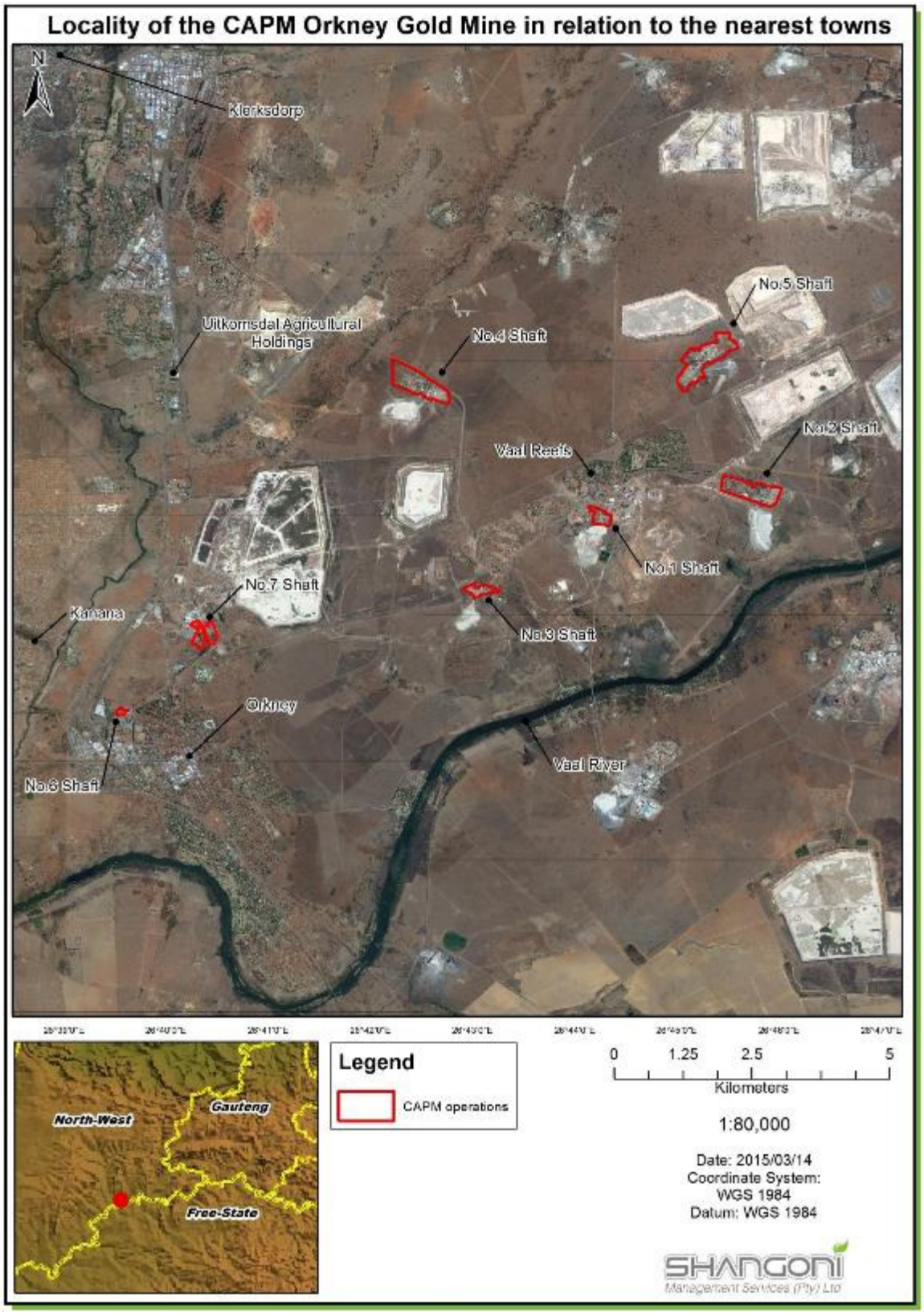

Figure 1: Locality of the CAPM Orkney Gold Mine in relation to the nearest towns

4. Description of the scope of the proposed overall activity.

4.1 Listed and specified activities

Table 4: Activities and listed activities associated with the proposed development

NAME OF ACTIVITY	ARIAL EXTENT OF ACTIVITY Ha or m²	LISTED ACTIVITY (mark with X)	APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985)/NOT LISTED	REMARKS
Underground mining of gold bearing ore.	Mining Right area: 10 561.7 Ha	-	**Not Listed**	CAPM Orkney Gold is already in possession of the Mining Right to mine gold bearing ore therefore does not trigger the Listed Activity 17 of Listing Notice 2 (GNR.984 dated December 2014).
Transport of ore to the surface	N/A	-	**Not Listed**	-
Transport of ore to the Nicolor South Plant.	Approximate distance: 18 km	-	**Not Listed**	-
Utilisation of existing road network (haulage).				-
Pumping of shaft water to the surface (to AnglogoldAshanti Vaal River Operations plant).	N/A	-	**Not Listed**	A Water Use Licence is required for the pumping of the shaft water to surface. CAPM has therefore applied for a Water Use Licence for this activity.
Utilisation of existing surface shaft infrastructure, including: • Workshops (vehicle, machinery and infrastructure maintenance). • Washbays.	Approximate combined surface area of all seven (7) shaft areas: 132.5 Ha. No.1 Shaft: 7.6 Ha. No.2 Shaft: 29.0 Ha.	-	**Not Listed**	-

NAME OF ACTIVITY	ARIAL EXTENT OF ACTIVITY Ha or m²	LISTED ACTIVITY (mark with X)	APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985)/NOT LISTED	REMARKS
• Sumps. • Sewage sump. • Offices. • Storm water management infrastructure (channels, earth channels) • Shaft, headgear and associated infrastructure (excluding the No.3 Shaft and No.5 Shaft). • Cooling ponds. • Water tower. • Cooling plant. • Conveyors. • Radiation deterioration area (No.7 Shaft). • Hostels.	No.3 Shaft: 7.5 Ha. No.4 Shaft: 35.0 Ha. No.5 Shaft: 40.3 Ha. No.6 Shaft: 1.4 Ha. No.7 Shaft: 11.7 Ha.			
Operation and utilisation of fans: • 7 Shaft Main Ventilation Fan. • 6 Shaft Veld Fan. • Kanana Ventilation Duct	Approximate combined surface area of all fan surface areas: 1 450 m^2. 7 Shaft Main Ventilation Fan: 700 m^2. 6 Shaft Veld Fan: 450 m^2. Kanana Ventilation Duct: 300 m^2.	-	**Not Listed**	An air quality monitoring programme will be implemented and once operations of the fans commence, the fans will be included into the monitoring programme to determine if an Emissions Licence in term of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) will be required.

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site

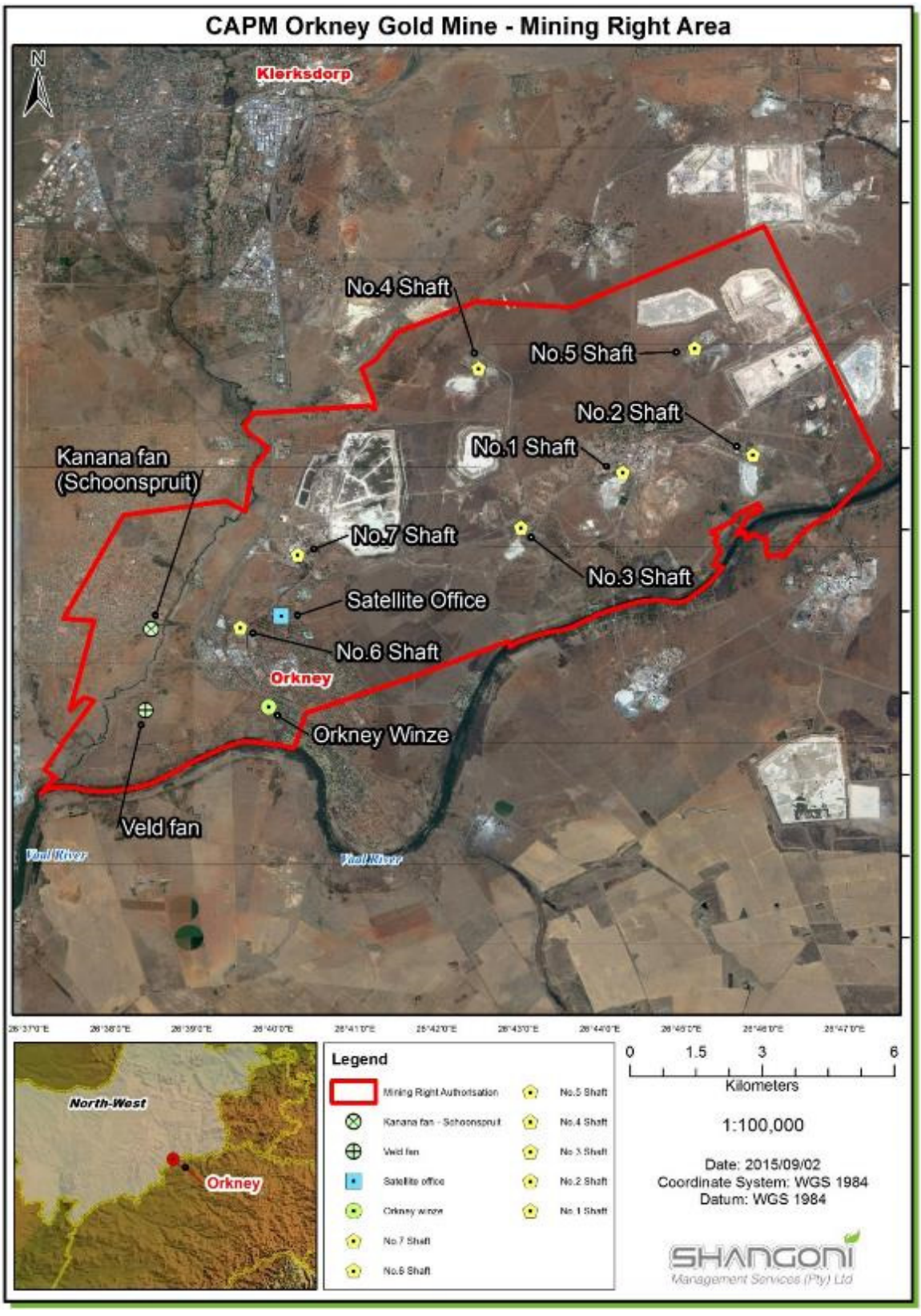

Figure 2: The CAPM Orkney Gold Mine Mining Rights area

4.2 Description of the activities to be undertaken

4.2.1 History and prior ownership

The seven (7) shafts that constitutes CAPM Orkney Gold Mine, initially formed part of the Anglo American Vaal Reef Operation and were named No.'s 1 to 7 shafts. The ownership of the shafts then changed to African Rainbow Minerals (Pty) Ltd. (ARMgold) and consisted of ARMgold 1 (No.1, No.2 and No.5 shaft) and ARMgold 2 (No.3, No.4, No.6 and No.7 Shaft). In October 2003, ARMgold merged with Harmony Gold and the mines name changed to the Harmony Orkney Operation No.1 to No.7 shafts.

Pamodzi Gold bought the operations from Harmony Gold in March of 2008, however Pamodzi was provisionally liquidated in March of 2009 and final liquidation granted in October 2009. In late 2009, Aurora Empowerment Systems took over management of the Orkney Operations. Pamodzi Gold then entered into a sales agreement with CAPM with the Section 11 application being submitted in August 2011. The sales agreement with CAPM included the full acquisition of all assets of the Orkney Gold Mine. CAPM however, only took legal ownership of the assets in October 2012.

4.2.2 Mineral to be mined

The mine is situated on a portion of the Klerksdorp Gold Fields. It exploits gold bearing conglomerates of the Central Rand and Ventersdorp Groups that are some of the several major gold fields situated on the northern and western margins of the 320km by 160km area of preservation of Central Rand Sediments. Gold is produced as the primary product with uranium as a potential by-product.

4.2.3 Description of the main mining activities and processes

The CAPM Orkney Gold Mine is an existing mine situated on a portion of the Klerksdorp Gold Field. As described above, the operation was subsequently sold to CAPM in 2011 through a Section 11 Application. CAPM however, only took legal ownership of the assets in October 2012. The operation has been in under care and maintenance since 2009. The mine consists of seven shaft areas (as described in Section 4.2.1 above). CAPM Orkney Gold Mine intends to commence with operations at the No.7 and No.6 shafts. Approximately two (2) years after the commencement of operation at the No.7 and No. 6 shaft. CAPM intends to begin operation at the No. 4 and No. 1 Shaft where after the commencement of operations at the No.2 Shaft will be investigated.

As it stands, operations at the No.3 Shaft will not commence as the shaft barrel was twisted. It is for this reason that CAPM is currently in the process of decommissioning and rehabilitating this shaft area. The head gear and associated infrastructure has been removed and the shaft has been capped. Similarly, operations at the No.5 Shaft will not commence as operations at the shaft have ceased and the majority of the infrastructure (excluding the shaft and headgear) have been decommissioned and removed. CAPM is therefore also in the process of decommissioning and rehabilitating this shaft area.

CAPM received permission from the DMR to gain access up to a level of 60 m below the surface, in order to re-equip both No.6 and No.7 Shafts with steel, which has been completed. Once full operations commence, dewatering of the No. 7 Shaft will take place at approximately 1.5 Megalitres per day (a Water Use Licence for this water use will be in place). Upon reaching the base level of the No.7 Shaft (approximately 1420 m below the surface), dewatering of the No. 6 Shaft will occur. The No. 4 Shaft will remain as an emergency exit shaft until operations commence at that shaft.

4.2.3.1 Mining method

The mining method to be employed at the CAPM Orkney Gold Mine is conventional scattered breast mining consisting of the standard deep level underground stoping layout, for extraction of narrow generally flat dipping gold reefs occurring deeper than 500m below surface.

4.2.3.2 Ore Processing

No ore processing activities will be undertaken at the CAPM Orkney Gold Mine. All ore mined at the No.7 and No.6 Shafts will be transported to the surface where it will be temporarily stockpiled at the shaft area. The ore will then be transported via haulage trucks to the Nicolor South Plant, located at the Buffelsfontein Gold Mine for processing.

The main metallurgical processes undertaken at the Nicolor South Plant are follows:

- Ore reception.
- Milling.
- Thickening.
- Leaching.
- Adsorption.
- Elution.
- Smelting.

A description of each of these processes is provided below with Figure 3 below presenting the process flow of the Nicolor South Plant.

4.2.3.2.1 Ore reception

Ore is transported to the plant via haulage truck. Prior to entering the plant, the mass is measured at the plant weighbridge. The ore is then placed on pads according to source. At the appropriate time the ore is then conveyed to a stockpile which sits on four vibro-feeders that feed two grinding mills.

4.2.3.2.2 Milling

The Grinding Mill is a large revolving cylinder in which size reduction of the ore (to 75 microns) takes place. The size reduction is by self-grinding and impact (steel balls are added into the mill to assist). Water is added to the milling process in order to allow for efficient milling and ease of transport. The resultant slurry (approximately 15% solids) is then pumped to the thickening section.

4.2.3.2.3 Thickening

Excess water is removed through the utilisation of large settling tanks known as thickeners. The thickened slurry (approximately 50% solids) is then pumped to the leaching section.

4.2.3.2.4 Leaching

The thickened slurry flows into tanks which provide sufficient retention time to allow the gold in the solids to be dissolved by an oxygenated cyanide solution.

4.2.3.2.5 Adsorption

After the leaching process, the gold in solution is pumped to the CIP section where gold is adsorbed onto carbon in a set of tanks.

4.2.3.2.6 Elution

The gold loaded carbon is then pumped to the elution circuit where the gold is desorbed with superheated water. The desorbed gold in solution is in turn passed through an electro- winning circuit which extracts gold from the solution using an electrical current. The gold in solution is deposited on steel wire wool cathodes.

4.2.3.2.7 Smelting

The gold coated wire wool is removed from the electro-winning cell and then calcined. After calcination the resulting material is the smelted to produce a gold bar.

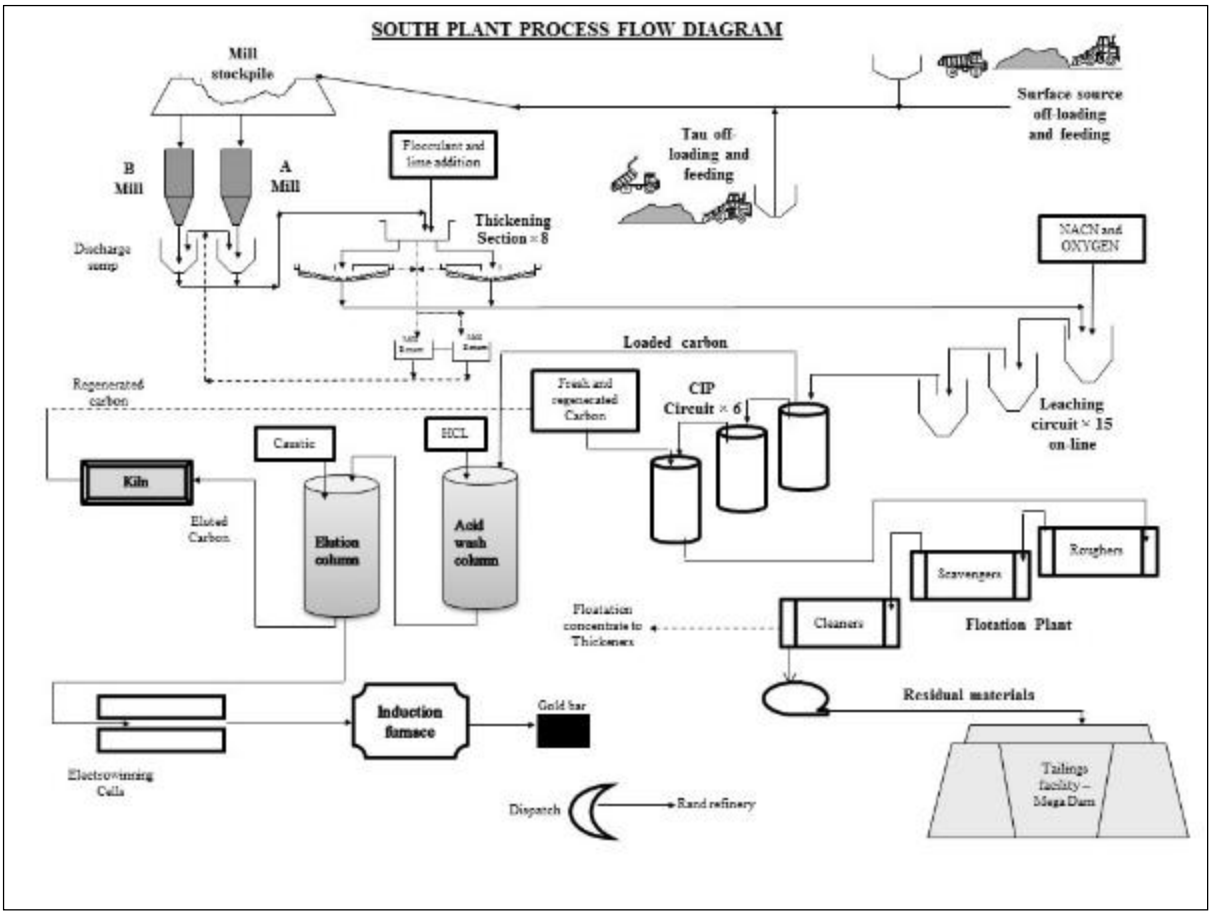

Figure 3: Nicolor South Plant process flow diagram

4.2.3.3 Mine and plant residue

As described above, all ore mined at the CAPM Orkney Gold Mine will be transported to the Nicolor South Plant, located at the Buffelsfontein Gold Mine, for processing. As a result, the mine does not have and will not have any mine or plant residue stockpiles. As described above in Section 4.2.2.2, all residue produced by the Nicolor South Plant is deposited on the Mega Dam Tailings Facility, which is located to the north-east of the plant (refer to Figure 4 below). The Mega Dam Tailings Facility is however the property of AGA and an agreement is in place between the Nicolor South Plant and AGA for the deposition of the plant residue. The tailings facility is therefore the responsibility of AGA.

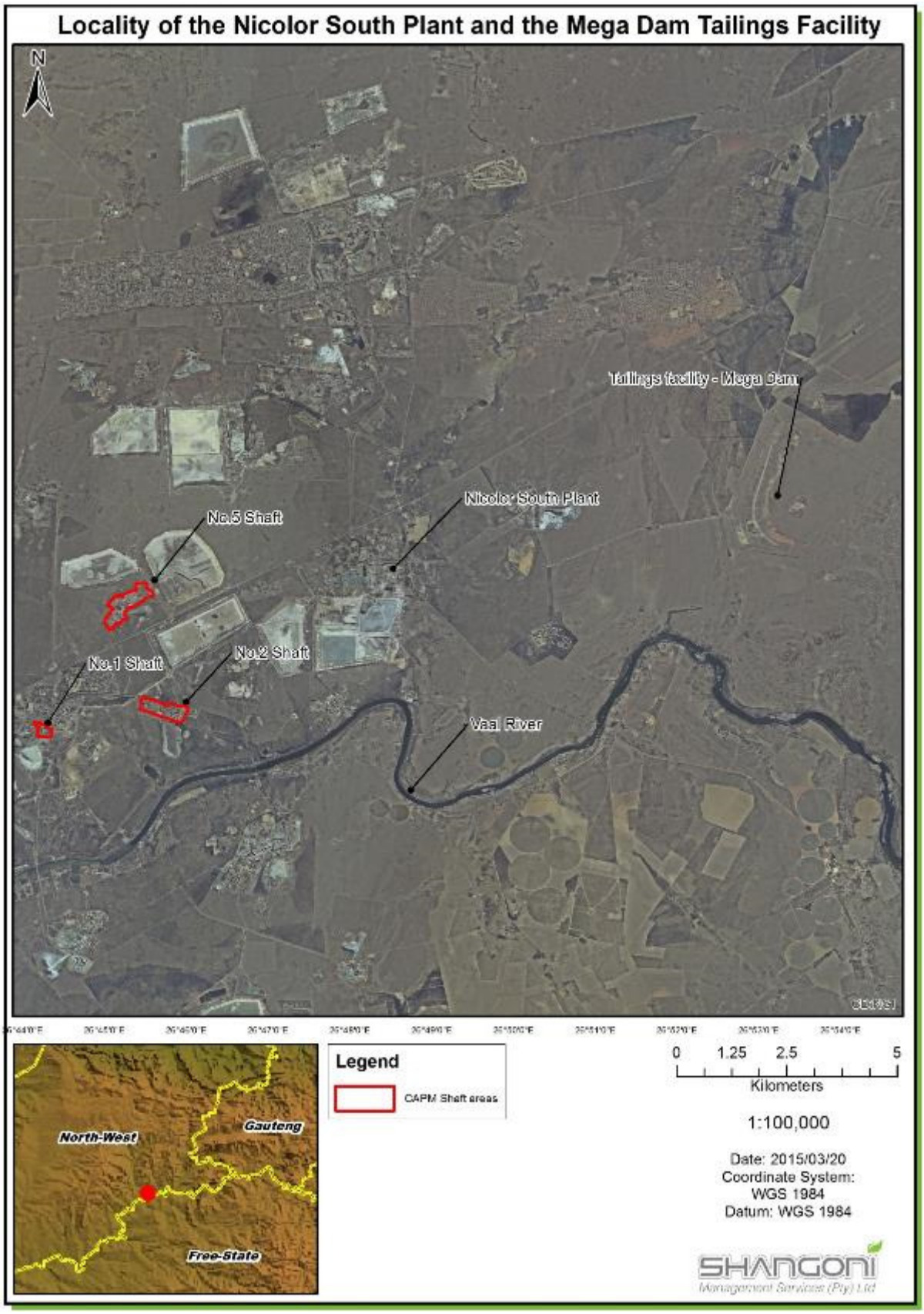

Figure 4: Locality of the Nicolor South Plant and the Mega Dam Tailings Facility in relation to the CAPM operations

4.2.3.4 Linear activities: Ore transport on site

The ore that is mined at the CAPM Orkney Gold Mine is transported to the surface where after it is either temporarily stockpiled (in a designated area) or transported via haulage trucks directly to the Nicolor South Plant, dependent on the plant processing capability. A maximum of 40 ktpm of ore will be transported, via road, per month.

4.2.3.5 Linear activities: Ore transport off-site

As described above, the ore will be transported via haulage trucks to the Nicolor South Plant for processing. The current formal road network will be utilised to transport ore from the various shafts to the Nicolor South Plant. Ore from the No. 6 and No. 7 shafts (the first shafts to commence with operation) will transported via haulage trucks along the R502, which is an approximate distance of 18 km.

4.2.3.6 Water management

Groundwater

Once operations at the No.7 Shaft commence, all shaft water (fissure water accumulating within the shaft) will pumped to surface and pumped directly to the Anglo Vaal Operations plant located adjacent to the No.7 Shaft area. CAPM Gold and Anglo Vaal Operations are currently in negotiations regarding the acceptance of the shaft water. Refer also to the geohydrological investigation titled “China African Precious Metals: Orkney Gold Mine, Geohydrological Investigation as input to the EMPR” dated March 2015 and compiled by Shangoni AquiScience (AquiScience, 2015). The report is attached hereto as Annexure C1).

Storm water

The information contained in this section of the document is extracted from the report titled: “*China African Precious Metals (Pty) Ltd. Orkney Gold Mine, Storm Water Management Plan*” dated March 2015 and compiled by Shangoni Management Services (Shangoni, 2015). The conceptual Storm Water Management Plan report is attached hereto as Annexure C2.

As part of the conceptual SWMP, each management area at the CAPM Orkney Gold Mine operation and respective shaft areas is discussed by indicating the main drainage philosophy anticipated using contour data and the current / proposed runoff control strategies. The location as well as direction of clean and affected runoff is indicated in the SWMP. A detailed description of the storm water environment, and the measures to control clean runoff and retain affected runoff is also provided in the discussion tables using the maps as reference. Refer to Part 4 of the SWMP (attached hereto as Annexure C2) for a detailed description of the storm water management to be employed at the CAPM Orkney Gold Mine.

Process water

As no ore processing activities are undertaken at the CAPM Orkney Gold Mine, no process water is required or generated.

Potable water

Potable water at the CAPM Orkney Gold mine is obtained from three (3) sources, namely, Mid-Vaal (non-profit organisation), the City of Matlosana Local Municipality and AnglogoldAshanti Vaal River Operations (AGA). Table 5 below presents the sources of potable water at the various shaft areas.

Table 5: Sources of potable water at the CAPM Orkney Gold Mine

Shaft	Potable water source
No. 1 Shaft	None.
No. 2 Shaft	None.
No. 3 Shaft	None.
No. 4 Shaft	Potable water at the No. 4 Shaft Hostel is currently obtained from Mid-Vaal.
No. 5 Shaft	Potable water at the No. 5 Shaft hostel is currently obtained from AGA. A written agreement/contract between CAPM and AGA is in the process of being finalised, for the use of potable water. AGA provides CAPM with monthly invoices for the current potable water requirements.
No. 6 Shaft	Potable water at the No. 6 Shaft is currently obtained from the City of Matlosana Local Municipality.
No. 7 Shaft	All potable water requirements at the No. 7 shaft are obtained from AGA. A written agreement/contract between CAPM and AGA is in the process of being finalised, for the use of potable water. AGA provides CAPM with monthly invoices for the current potable water requirements.

Domestic waste water

Portable chemical toilets are in place at the No.1, No.2, No.3 and No.4 Shafts. These portable toilets are currently only utilised by security staff as these shafts are currently under care and maintenance and will remain under care and maintenance until such a time where operations once again commence or the shaft areas decommissioned and rehabilitated.

Conservancy tanks are also in place at the No.4 Shaft, to collect the domestic waste water. A suitable contractor is utilised to service the conservancy tanks, which is emptied by means of a honey sucker and appropriately disposed of at a licenced facility. All sewage from the No.5 shafts will be pumped AGA sewage system

The sewage reticulation system at the No.6 and No.7 shafts are connected to the municipal sewage system.

Water balance

Figure 5 below shows the water balance for the initial dewatering at the No.7 Shaft. It is estimated that approximately 1 500 m^3 of water per day will be pumped from the No.7 Shaft to the AnglogoldAshanti Vaal River Operations (AGA) metallurgical plant. Water from the No.6 Shaft will be pumped to the No.7 Shaft for dewatering. After initial dewatering, approximately 1 000 m^3 of water per day will be pumped from the No.7 Shaft to ensure safe continuation of mining activities (*Figure 6*). Water will be pumped through 2 settlers and 2 underground dams at 40 level to an underground dam on 23 level, where after it will be pumped to the surface. Water will be pumped directly to the AGA metallurgical plant.

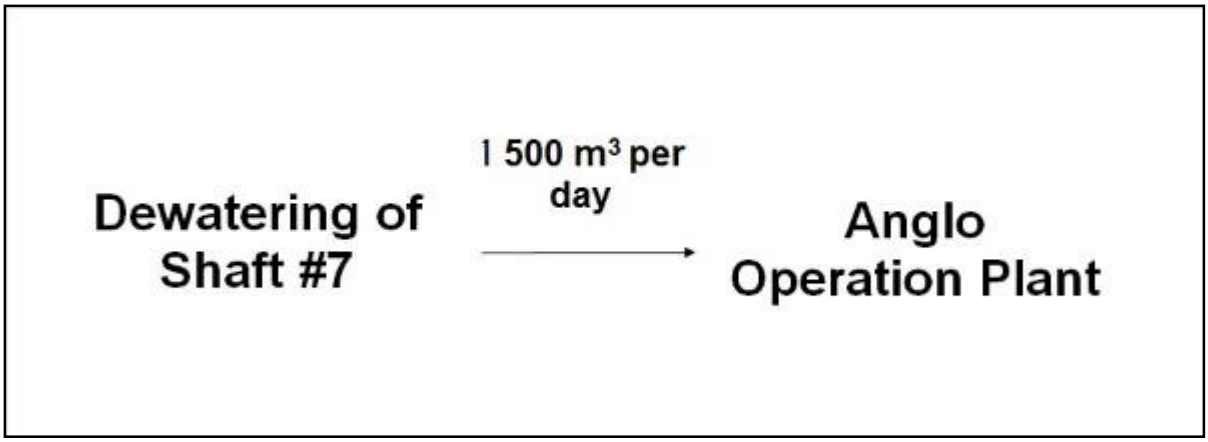

Figure 5: Initial dewatering water balance

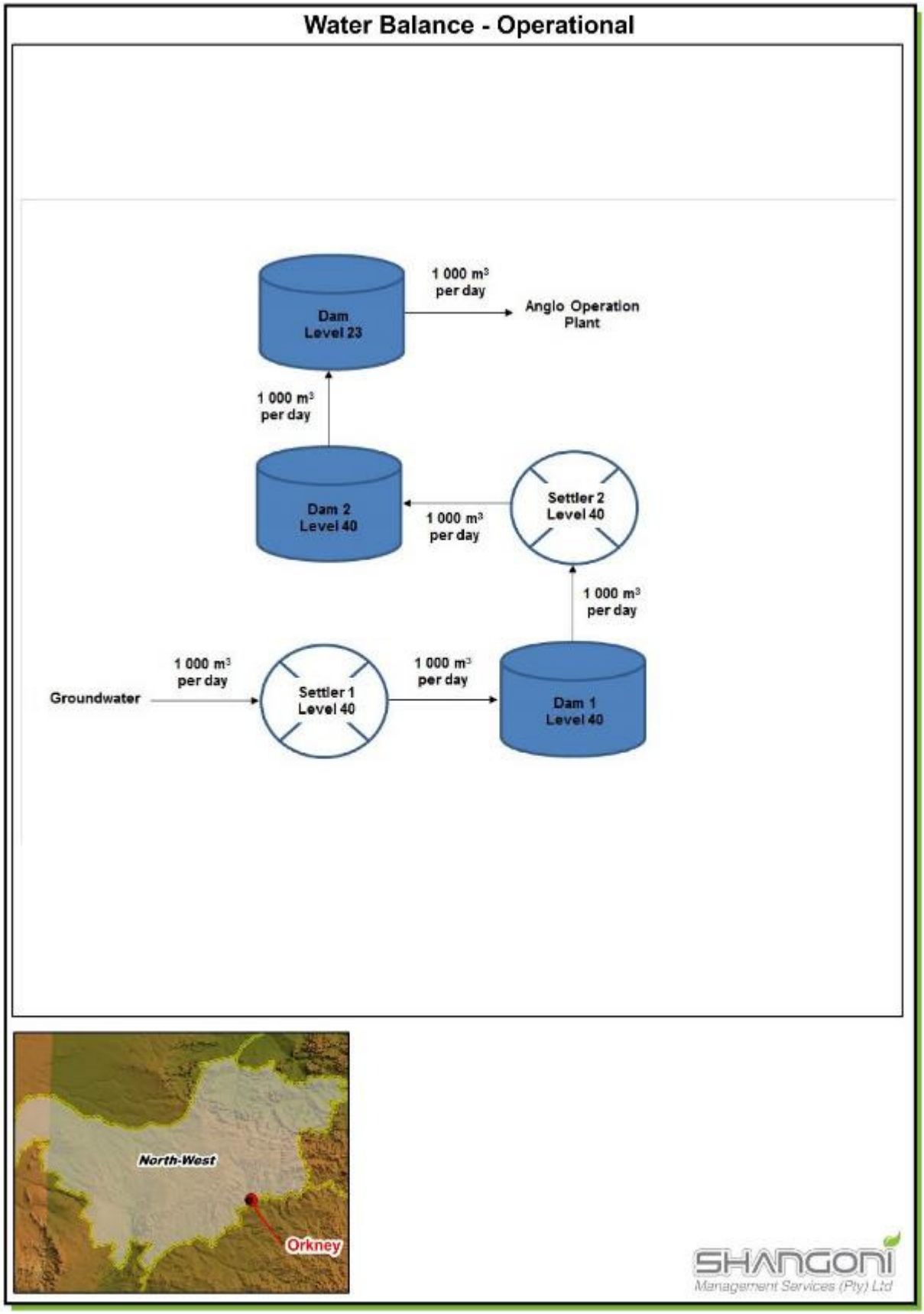

Figure 6: Operational Phase water balance

4.2.3.7 Non-mineral waste management

General waste at the shaft areas of the CAPM Orkney Gold Mine is disposed of / collected in appropriately marked bins. General waste accumulating in these bins as well as collected at the hostels and office areas is removed by a suitable contractor to a licenced landfill facility. Hazardous waste (such as oil, grease, fluorescent light bulbs) is stored in marked bins at designated areas across the shaft areas and serviced by a suitable contractor for disposal at a licenced disposal facility.

The main waste streams that will be generated at the CAPM Orkney Gold Mine are presented in Table 6 below.

Table 6: Main waste streams generated at the CAPM Orkney Gold Mine

Waste Stream	Waste Type	Point of Generation	Method of Disposal
Hazardous Waste	Used Oil	No.6 and No.7 Shaft	Hazardous Waste Disposer
	Old Batteries	No.7 Shaft	Recycling Company
	Oil Filters		Recycling Company
	Oil/grease rags	No.6 and No.7 Shaft	Hazardous Waste Disposal Site
	Mixed grease		Hazardous Waste Disposer
	Fluorescent tubes		Recycle
	Asbestos	All sites	Remove to hazardous waste site
General Waste	Cardboard boxes	No.6 and No.7 Shaft	Municipal general waste disposal site (Orkney)
	Paper waste		
	Twine		
	Garden Waste		
	Wood		Recycling Company
	Plastic		Recycling Company
	Steel waste		Recycling Company
	Rubber		Recycling Company

4.2.4 Estimated reserves

The information in this part of the document was sourced from the following documents:

- The mineral resources technical document titled: "*An independent JORC 2012 Technical Report on the Mineral Resources for the Orkney Mine North-West Province, South Africa, on behalf of China African Precious Metals (Pty) Ltd.*" dated July 2014 and compiled by Minxcon (Minxcon, 2014).
- The CAPM Orkney Gold Mine - Mining Works Programme (MWP) attached hereto as Annexure D.

The depleted Mineral Resources per shaft for the Orkney Operations for 2014 are listed in the following tables

Table 7: 2014 Mineral Resource Statement for the No.2 Shaft (extracted from Minxcon, 2014)

Orkney 2	Mt	Grade	Tonnes Au	Moz
		g/t		
Measured	2.29	15.22	34.89	1.12
Indicated	0.52	12.99	6.77	0.22
M&I	**2.81**	**14.83**	**41.66**	**1.34**
Inferred	0.41	13.91	5.64	0.18
Total	**3.22**	**14.69**	**47.3**	**1.52**

Table 8: 2014 Mineral Resource Statement for the No.4 Shaft (extracted from Minxcon, 2014)

Orkney 4	Mt	Grade	Tonnes Au	Moz
		g/t		
Measured	8.37	11.05	92.45	2.97
Indicated	5.06	10.75	54.41	1.75
M&I	**13.43**	**10.94**	**146.86**	**4.72**
Inferred	10.77	6.39	68.84	2.21
Total	**24.2**	**8.91**	**215.7**	**6.93**

Table 9: 2014 Mineral Resource Statement for the No.6 Shaft (extracted from Minxcon, 2014)

Orkney 6	Mt	Grade	Tonnes Au	Moz
		g/t		
Measured	11.89	6.78	80.56	2.59
Indicated	3.89	6.33	24.6	0.79
M&I	**15.78**	**6.66**	**105.16**	**3.38**
Inferred	10.17	4.83	49.08	1.58
Total	**25.95**	**5.94**	**154.24**	**4.96**

Table 10: 2014 Mineral Resource Statement for the No.7 Shaft (extracted from Minxcon, 2014)

Orkney 7	Mt	Grade	Tonnes Au	Moz
		g/t		
Measured	4.03	5.8	23.37	0.75
Indicated	2.61	5.47	14.29	0.46
M&I	**6.64**	**5.67**	**37.66**	**1.21**
Inferred	11.3	4.15	46.84	1.51
Total	**17.94**	**4.71**	**84.5**	**2.72**

Table 11: Ore Reserve Statement – April 2014 (extracted from MWP, 2015)

Mineral Reserve Category	Shaft or Area	Tonnes	Au	Grade	Au
		Mt	000kg	g/t	Moz
Proven	Orkney 6	1.76	7.01	4.00	0.23
	Orkney 7	0.45	1.78	3.99	0.06
	Orkney 4	0.81	5.82	7.18	0.19
Total Proven		**3.01**	**14.61**	**4.85**	**0.47**
Probable	Orkney 6	0.50	1.79	3.59	0.06
	Orkney 7	0.02	0.06	3.39	0.00
	Orkney 4	0.26	1.29	5.04	0.04
Total Probable		**0.77**	**3.14**	**4.06**	**0.10**
Total Ore Reserve		**3.78**	**17.75**	**4.69**	**0.57**

Table 12: 2014 Inferred mineral resources for the CAPM Orkney Gold Mine (extracted from Minxcon, 2014)

Mineral Resource Category	Shaft or Area	Tonnes	Au	Grade	Au
		Mt	000kg	g/t	Moz
Inferred	Orkney 6	10.17	49.08	4.83	1.58
	Orkney 7	11.30	46.84	4.15	1.51
	Orkney 2	0.41	5.64	13.91	0.18
	Orkney 4	10.77	68.84	6.39	2.21
Total		**32.65**	**170.41**	**5.22**	**5.48**

4.2.5 Production rate and Life of Mine

The estimated production rate will be 1.56Mtpa to the Nicolor South Plant (130ktpm). There will be a build-up for the first 4 years.

The total period for which authorisation is required (Life of Mine), is approximately 12 years, with a breakdown as provided in Table 13 below (refer also to Section 17 below).

Table 13: Breakdown of the Life of Mine

Stages of operation	Timeframe (Years)
Planning	N/A
Construction	N/A
Commissioning	0.5 years
Operation	10 years
Closure	1.5 year
Total Period	**12 years**

5. Policy and Legislative Context

Table 14: Policy and legislative context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	**REFERENCE WHERE APPLIED** (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT** (E.g In terms of the National Water Act:-Water Use Licence has/has not been applied for).
The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)	Throughout this document.	The CAPM Orkney Gold Mine is in possession of a Mining Right to mine gold resources. Refer to Annexure E for a copy of the Mining Right.
The Mineral and Petroleum Resources Development Regulations, 2004, Regulations R.562 dated April 2004).		
The National Environmental Management Act, 1998 (Act No. 107 of 1998).		
The National Environmental Management Amendment Act, 2008 (Act No. 62 of 2008).		
The Environmental Impact Assessment Regulations, R. 982 dated December 2014.		

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	**REFERENCE WHERE APPLIED** (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT** (E.g In terms of the National Water Act:-Water Use Licence has/has not been applied for).
The Environmental Impact Assessment Regulations, R. 983 dated December 2014.	Refer to Section 4.1 above.	The proposed recommencement of the operations at the CAPM Orkney Gold Mine does not trigger any listed activities. It is also important to note that the CAPM Orkney Gold mine is currently in the possession of a Mining Right to mine the gold resources. Refer to Annexure E for a copy of the Mining Right.
The Environmental Impact Assessment Regulations, R. 984 dated December 2014.		
The Environmental Impact Assessment Regulations, R. 985 dated December 2014.		
The National Water Act, 1998 (Act No. 36 of 1998).	Refer to Section 4.1, Chapter G and Chapter H of Section 7.4.1 and Section 1.4.8 of Part B (Environmental Management Programme) of this EIA and EMPr.	A Water Use Licence is in the process of being applied for.
The National Heritage Act (Act No. 25 of 1999).	Refer to Chapter N of Section 7.4.1, Section 9 as well as the Risk Assessment Report attached hereto as Annexure F.	Several features within the No.7 Shaft area are under the protection of the National Heritage Act, 199, and would require a demolition permit should they be earmarked for demolition.

6. Need and desirability of the proposed activities

6.1 Need and Desirability in terms of the Guideline on Need and Desirability, dated 20 October 2014.

On the 20th of October 2014, the Department of Environmental Affairs published a Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010, in Government Notice 891 of 2014. The following table indicates on how the guideline requirement were considered in this EIAR.

Table 15: Need and Desirability of the Proposed Project

Requirement	Part where requirement is addressed/response
1. How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?[1]	Refer to the background description of the baseline environment provide Chapter E and Chapter F of Section 7.4.1. The Ecological Assessment Report is also attached hereto as Annexure C3. Refer also to Part 4 for the Risk Assessment of the potential impacts which may occur.
1.1 How were the following ecological integrity considerations taken into account?	
1.1.1 Threatened Ecosystems.[2]	
1.1.2 Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.[3]	
1.1.3 Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs").	Refer to Chapter E of Section 7.4.1 for the ecological baseline description of the study area. The Ecological Assessment Report is also attached hereto as Annexure C3.
1.1.4 Conservation targets.	
1.1.5 Ecological drivers of the ecosystem.	
1.1.6 Environmental Management Framework.	As indicated in the KKDM IDP, the CAPM Orkney Gold Mine falls within the development corridor of the Spatial Development Framework. Refer also to Chapter O of Section 7.4.1.
1.1.7 Spatial Development Framework.	
1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).[4]	Mining equipment, machinery and mine vehicles burn fossil fuels and release a number of emissions such as hydrocarbons, carbon dioxide, carbon monoxide, mono-nitrogen oxides and possibly methane. These emissions, with specific reference to methane and carbon dioxide, are greenhouse gasses that are key drivers in climate change. All vehicle, machinery and equipment will be inspected and maintained on a regular basis to ensure efficiency, working condition and to

[1] Section 24 of the Constitution and section 2(4)(a)(vi) of NEMA refer.

[2] Must consider the latest information including the notice published on 9 December 2011 (Government Notice No. 1002 in Government Gazette No. 34809 of 9 December 2011 refers) listing threatened ecosystems in terms of Section 52 of National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

[3] Section 2(4)(r) of NEMA refers.

[4] Section 2(4)(n) of NEMA refers.

Requirement		Part where requirement is addressed/response
		minimise the release of emissions. Refer also to Part 5 of Annexure F for mitigation measures and commitments regarding vehicle inspection and maintenance.
1.2	How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[5]	Refer impact assessment table, Part 7.3.8. The CAPM Orkney Gold Mine is an existing mine and no mining or mining related activities (except for transport) will occur outside of the surface rights area. No positive impacts to the ecological integrity of the area can result from the proposed mining activities.
1.3	How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[6]	Refer to Section 7.4 and Section 7.5 for the Risk Assessment as well the Risk Assessment Report attached hereto as Annexure F.
1.4	What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?[7]	Types of non-mineral wastes, as typically expected to be generated, as well as the management thereof is discussed in Section 4.2.3.7.
1.5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including	The baseline description of the cultural heritage associated with the CAPM Orkney Gold Mine is discussed in Chapter N of Section 7.4.1. As discussed in the cultural heritage background description, several features / infrastructure associated with the CAPM Orkney Gold Mine can be considered to be of cultural heritage and is protected under the National Heritage Act, 1999

[5] Section 24 of the Constitution and Sections 2(4)(a)(i) and 2(4)(b) of NEMA refer.

[6] Section 24 of the Constitution and Sections 2(4)(a)(ii) and 2(4)(b) of NEMA refer.

[7] Section 24 of the Constitution and Sections 2(4)(a)(iv) and 2(4)(b) of NEMA refer.

	Requirement	Part where requirement is addressed/response
	offsetting) the impacts? What measures were explored to enhance positive impacts?[8]	(Act No. 25 of 1999), with specific reference to the No.3 Shaft and the No.7 Shaft.
1.6	How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[9]	Non-renewable resources (finite resources) to be used/exploited by the CAPM Orkney Gold Mine will include gold bearing ore and, to a lesser extent, fossil fuels (vehicle transport, grease and oil and electricity). The nature of the operation is to mine gold bearing ore. Mining and extraction costs are key drivers to minimise wastage and ensure optimal resource usage.
1.7	How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?[10]	Renewable resources that will be used, primarily will constitute water use (groundwater abstraction) as the shaft water will be pumped to the surface and be supplied to the AnglogoldAshanti Vaal River Operations processing plant. Other renewable resources that will be affected by the project include the vegetation and fauna within the project boundary area. Refer background discussions as per Chapter E (Vegetation), Chapter F (Surface water) and Chapter I (Groundwater), with potential impacts assessed in Part 4 of the Risk Assessment Report attached hereto as Appendix F.
1.7.1	*Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste*	Mining is by definition an activity that is dependent on depleting resources. The community that may become dependent on the mine may thus also become dependent on the depleting resource. Given that the life of mine is 10 years (for the No.6 Shaft and No.7 Shaft only, the community will have a reasonably long term benefit and the

[8] Section 24 of the Constitution and Sections 2(4)(a)(iii) and 2(4)(b) of NEMA refer.

[9] Section 24 of the Constitution and Sections 2(4)(a)(v) and 2(4)(b) of NEMA refer.

[10] Section 24 of the Constitution and Sections 2(4)(a)(vi) and 2(4)(b) of NEMA refer.

Requirement		Part where requirement is addressed/response
	they generate, without compromising their quest to improve their quality of life)	community members may benefit from the CAPM Orkney Gold Mine, be it directly (by employment) or indirectly (trickle-down effect and subcontracting by the mine).
1.7.2	*Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)*	
1.7.3	*Do the proposed location, type and scale of development promote a reduced dependency on resources?*	As previously described, the CAPM Orkney Gold Mine is an existing mine which was purchased by CAPM. Therefore there was no possibility of selecting the location for the proposed project. The mining of gold resources in this area has however been conducted for over a century. The commencement of the proposed operation will allow for the creation of jobs for many members of the local community, thereby contributing to the economy of the area and possibly leading to the reduced dependency, of the local community, on natural resources of the area.
1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts?[11]	De Castro and Brits cc was appointed to: • Determination of the Vegetation Type(s) in accordance with existing national vegetation maps • A description of the regional biodiversity context using existing information. • Mapping of remaining areas of untransformed vegetation and transformed habitats (land-cover types). • Compilation of a preliminary species list of indigenous and naturalised plant species. • Determination of the occurrence, or possible occurrence, of plant 'species of conservation concern' • Determination of the occurrence, or possible occurrence, of threatened and / or sensitive

[11] Section 24 of the Constitution and Section 2(4)(a)(vii) of NEMA refer.

Requirement	Part where requirement is addressed/response
	vertebrate fauna (mammals, birds, reptiles and amphibians). • Where applicable ecological management recommendations (e.g. control of alien invasive plants and identification of areas sensitive to further development) will be provided. Refer also to Annexure C3.
1.8.1 What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	All limits of the current knowledge, associated with the proposed project and CAPM Orkney Gold Mine, is provided in Section 15.
1.8.2 What is the level of risk associated with the limits of current knowledge?	
1.8.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	The proposed activities to be conducted at the CAPM Orkney Gold Ming include the deep level underground mining of gold bearing ore and the transportation of the ore to the Nicolor South Plant for processing. Therefore no residue deposits are owned or will be operated by CAPM.
1.9 How will the ecological impacts resulting from this development impact on people's environmental right in terms following:[12]	
1.9.1 Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	All potential negative and positive impacts associated with the proposed activity have been identified, discussed and assessed in Section 8.5 below.
1.9.2 Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	
1.10 Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services	

[12] Section 24 of the Constitution and Sections 2(4)(a)(viii) and 2(4)(b) of NEMA refer.

	Requirement	Part where requirement is addressed/response
	applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	
1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	
1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?[13]	As described above, the CAPM Orkney Gold Mine is an existing gold mine which was purchased by CAPM. Therefore, the impacts that the mine have on the biophysical environment are existing impacts. Once the operations at the various shaft areas commence, further impacts on the biophysical environment may occur (refer to Part 4 of Appendix F)
1.13	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?[14]	Refer Part 11 of the Risk Assessment Report for the cumulative impacts, which may occur as a result of the proposed project.
2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	
2.1.1	*The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,*	Refer to Chapter O of Section 7.4.1 of this document.
2.1.2	*Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),*	
2.1.3	*Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and*	

[13] Section 2(4)(b) of NEMA refer.

[14] Regulations 22(2)(i)(i), 28(1)(g) and 31(2)(1) in Government Notice No. R. 543 refer.

Requirement		Part where requirement is addressed/response
2.1.4	*Municipal Economic Development Strategy ("LED Strategy").*	
2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	
2.2.1	*Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?*	
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?[15]	
2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term?[16] Will the impact be socially and economically sustainable in the short- and long-term?	The potential negative and positive impacts that have been identified and presented in Section 9 below. Refer to the Risk Assessment Report (attached hereto as Annexure F for a detailed description and assessment. Impacts in terms of groundwater may result in the intergenerational impact distribution (refer to Chapter I of Section 7.4.1 as well as the Risk Assessment Report attached hereto as Annexure F. These intergenerational impacts may occur as a result of the potential generation of Acid Rock Drainage.
2.5	In terms of location, describe how the placement of the proposed development will:[17]	
2.5.1	*result in the creation of residential and employment opportunities in close proximity to or integrated with each other,*	The CAPM Orkney Gold Mine is an existing Gold mine. Once operational, the CAPM Orkney Gold Mine will create approximately 471 jobs with the majority of the work force being sourced from the local communities (minimum of 95%).

[15] Section 2(2) of NEMA refers.

[16] Sections 2(2) and 2(4)(c) of NEMA refers.

[17] Section 3 of the Development Facilitation Act, 1995 (Act No. 67 of 1995) ("DFA") and the National Development Plan refer.

Requirement	Part where requirement is addressed/response
2.5.2 reduce the need for transport of people and goods,	The proposed project may result in the increase in traffic within the area and the town of Orkney, as a result of the transportation of the mined ore to the processing plant. Traffic within the area will also increase as a result of the increase of public transportation transporting employees to the mine.
2.5.3 result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	
2.5.4 compliment other uses in the area,	The CAPM Orkney Gold Mine is surrounded by other existing gold mines (including AnglogoldAshanti Vaal River Operations, and the dormant Buffelsfontein Gold Mine). There are also several areas in the vicinity of the CAPM Orkney Gold Mine that are utilised for agricultural activities and includes the Uitkomsdal Agricultural Holdings (refer to Figure 1). The area is also characterised by residential areas and towns including the towns of Orkney, Klerksdorp and Stilfontein.
2.5.5 be in line with the planning for the area,	As previously described, The CAPM Orkney Gold Mine is an existing gold mine that was purchased by CAPM. The IDP of the Dr. Kenneth Kaunda District municipality indicates that the mining sector contributes the highest percentage to the municipalities GPD (19.6%) as well as the GDP of the North West Province (26%). Therefore, and as described in the IDP, the CAPM Orkney Gold Mine is in line with the planning of the area.
2.5.6 for urban related development, make use of underutilised land available with the urban edge,	Not applicable.
2.5.7 optimise the use of existing resources and infrastructure,	The existing infrastructure, currently on site, will be utilised and possibly upgraded and the existing road network will be utilised for the transportation of the ore to the Nicolor South Plant. Where necessary, the current infrastructure will be upgraded for safety purposes and where unnecessary infrastructure has been identified, these will either be decommissioned and rehabilitated or donated to the local community.
2.5.8 opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	

Requirement	Part where requirement is addressed/response
2.5.9 discourage "urban sprawl" and contribute to compaction/densification,	The CAPM Orkney Gold Mine is an existing Gold mine. Once operational, the CAPM Orkney Gold Mine will create approximately 471 jobs with the majority of the work force being sourced from the local communities (minimum of 95%).
2.5.10 contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	
2.5.11 encourage environmentally sustainable land development practices and processes,	Refer to Section 9 as well the Risk Assessment Report attached hereto as Annexure F.
2.5.12 take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	As previously described, the CAPM Orkney Gold Mine is an existing gold mine that was purchased by CAPM. As part of the purchase agreement all associated infrastructure was to be purchased. Therefore, the location of the proposed project could not be selected. It is also important to note that the position of the shafts was selected based on the geology of the area as well as the location of the gold bearing ore within the Mining Right area.
2.5.13 the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	Refer to Section 9 as well the Risk Assessment Report attached hereto as Annexure F.
2.5.14 impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	
2.5.15 in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	The CAPM Orkney Gold Mine will utilise the existing infrastructure associated with the shaft area. Employees will also be sourced from the local communities thus acting as a catalyst to create a more integrated settlement. It is however important to note that the project may lead to an influx of opportunistic work seekers that are likely to stay in informal settlements or form informal settlements in the area. The CAPM Orkney Gold Mine will attempt to discourage this through their employment policies (refer also to the SLP attached hereto as Annexure G).

Requirement	Part where requirement is addressed/response
2.6 How were a risk-averse and cautious approach applied in terms of socio-economic impacts?[18]	The CAPM Orkney Gold Mine will employ approximately 471 individuals, of which the majority (a minimum of 95%) will be sourced from the local community. Refer also to the SLP attached hereto as Annexure G as well as the Risk Assessment Report attached hereto as Annexure F.
2.6.1 What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?[19]	All limits of the current knowledge are provided in Section 15 below. A socio-economic impact assessment has not been conducted for the proposed project. However, the CAPM Orkney Gold Mine is an existing gold mine that was purchased by CAPM in 2012. Infrastructure associated with the No.3 and No.7 Shafts are characteristic of the 1930's and the infrastructure associated with the remainder of the shaft areas are characteristic of the late 1940'sand late 1960's (refer to Chapter N). The CAPM Orkney Gold Mine is also surrounded by other existing mining companies. Therefore, the local community can be said to be desensitized to the mining operations within this area. As described above, a positive impact will be experienced, in terms of socio-economic aspects, as the CAPM Orkney Gold Mine (as stipulated in the SLP attached hereto as Annexure G) will source employees from the local community.
2.6.2 What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	
2.6.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
2.7 How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1 Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to Section 9 below as well Part 4 of the Risk Assessment Report, attached hereto as Annexure F.

[18] Section 2(4)(a)(vii) of NEMA refers.

[19] Section 24(4) of NEMA refers.

Requirement		Part where requirement is addressed/response
2.7.2	*Positive impacts. What measures were taken to enhance positive impacts?*	
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	
2.9	What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?[20]	
2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?[21] Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	Refer to the methodology applied in assessment of alternatives: Social, Environmental, Economic and Technical criteria were considered in the alternative comparative assessment. Although Social and Environmental components to the preferred alternatives were not always favoured, it carries a very strong weight to the overall alternative assessment.
2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?[22]	Refer to the CAPM Orkney Gold Mine SLP attached hereto as Annexure G.
2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?[23]	The EIA process focussed on quantification of environmental impacts associated with the operation. A number of specialists were employed:

[20] Section 2(4)(b) of NEMA refers.

[21] Section 2(4)(c) of NEMA refers.

[22] Section 2(4)(d) of NEMA refers.

[23] Section 2(4)(e) of NEMA refers.

Requirement	Part where requirement is addressed/response
	• Ecology (Fauna & Flora) – (De Castro & Brits). • Geohydrology (Shangoni AquiScience). • Heritage (Sidney Miller). • Storm Water Management Plan (Shangoni Management Services). • Noise (Varicon). Assessments as per above specialists include specialist recommendations for mitigating identified risks, that have been incorporated into this EIAR.
2.13 What measures were taken to:	
2.13.1 ensure the participation of all interested and affected parties,	Refer to Section 7.2, for detail on the Public Participation Process followed.
2.13.2 provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,[24]	
2.13.3 ensure participation by vulnerable and disadvantaged persons,[25]	
2.13.4 promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,[26]	
2.13.5 ensure openness and transparency, and access to information in terms of the process,[27]	
2.13.6 ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge[28]*, and*	

[24] Section 2(4)(f) of NEMA refers.

[25] Section 2(4)(f) of NEMA refers.

[26] Section 2(4)(h) of NEMA refers.

[27] Section 2(4)(k) of NEMA refers.

[28] Section 2(4)(g) of NEMA refers.

Requirement	Part where requirement is addressed/response
2.13.7 ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?[29]	Refer to the CAPM Orkney Gold Mine SLP attached hereto as Annexure G.
2.14 Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?[30]	As previously described the CAPM Orkney Gold Mine is surrounded by other existing gold mining operations as well as agricultural and residential areas including the towns of Orkney, Kanana, Klerksdorp and Stilfontein. The CAPM Orkney Gold Mine will employ 471 employees with the majority (a minimum of 95%) being sourced from the local community. Therefore, when the mine commences with operations, it will lead to the increased job security of the existing employees as well as supply additional jobs to approximately 471 individuals.
2.15 What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?[31]	The CAPM Orkney Gold Mine has several procedures and Code of Practices (COP's) in place which intend to inform all employees of work that may be potentially harmful to their health and well-being as well as the environment, and include (but is not limited to): • Induction. • Environmental Awareness Training (CAPM-ENV-01). • Review and Refresher training manual (CAPM-RAD-All Functions). • Training Strategy (MI-TR-01).
2.16 Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1 the number of temporary versus permanent jobs that will be created,	The CAPM Orkney Gold Mine, as described above, will employ approximately 471 employees,

[29] Section 2(4)(q) of NEMA refers.

[30] Section 2(4)(g) of NEMA refers.

[31] Section 2(4)(j) of NEMA refers.

Requirement	Part where requirement is addressed/response
2.16.2 whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),	with the majority (a minimum of 95%) being sourced from the local community. Refer to the CAPM Orkney Gold Mine SLP attached hereto as Annexure G.
2.16.3 the distance from where labourers will have to travel,	
2.16.4 the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and	
2.16.5 the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	
2.17 What measures were taken to ensure:	
2.17.1 that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and	Refer to Section 7.2 for a description of the Public Participation Process that has been conducted for the CAPM Orkney Gold Mine. All issues and concerns raised by all I&APs, stakeholders and organs of state will be addressed in the manner as described in Section 7.2.
2.17.2 that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	
2.18 What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?[32]	During the initial Public Participation Process, all issues and concerns raised by the I&APs, stakeholders and the Organs of State will be taken into account, responses provided and should it be required, the appropriate changes will be made to the mines operations.
2.19 Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?[33]	The mitigation measures are based on various specialist assessments, as per Section 7.4.1, and believed to be realistic although potentially onerous in execution. Not all mitigation measures will necessarily result in reversible impacts or in a low significance impact. Rehabilitation strategies aimed at mine closure have been proposed but the effectiveness of implementation will determine long term environmental legacy or are

[32] Section 2(4)(o) of NEMA refers.

[33] Section 240(1)(b)(iii) of NEMA and the National Development Plan refer.

Requirement	Part where requirement is addressed/response
	ineffective on certain localised areas based on ecological complexity.
2.20 What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?[34]	The CAPM Orkney Gold appointed a qualified external contractor to determine the financial provisioning and calculation of the Quantum as required in terms of the MPRDA (2002) and the NEMA (1998). The Financial Provisioning Report for the proposed operation is attached hereto as Annexure H and is discussed in detail in Section 1.7 of Part B (EMP).
2.21 Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?[35]	The alternatives for the proposed project are described in Section 7.1 below. The alternatives are discussed in great detail in the Alternatives Assessment Report Attached hereto as Annexure I, with the alternatives being assessed in terms of the following four categories: 1. Environmental. 2. Technical/Engineering. 3. Economical. 4. Social. Refer to Annexure I for a detailed description of the method utilised in assessing the alternatives for the proposed project.
2.22 Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?[36]	The cumulative impacts have been presented in Part 11 of the Risk Assessment Report attached hereto as Annexure F.

[34] Section 2(4)(p) of NEMA refers.

[35] Section 2(4)(b) of NEMA refers.

[36] Regulations 22(2)(i)(i), 28(1)(g) and 31(2)(1) in Government Notice No. R. 543 refer.

7. Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site.

7.1 Details of the development footprint alternatives considered

As per Annexure I, a detailed investigation and comparative assessment of the alternative options, for the activities to be conducted at CAPM Orkney Gold Mine, was undertaken including the positive and negative implications of the proposed activity and identified alternatives. Below is a summary of the various alternatives considered, as well as the preferred alternative.

7.1.1 Proposed activity

The proposed activity is to re-instate the mining of gold bearing ore utilising the conventional scattered breast mining method consisting of the standard deep level underground stoping layout at the No.7 Shaft. The operations will initially commence at the No.7 Shaft through the dewatering of the shaft and the reconditioning of the shaft with depth. Once mining operations within the No.7 Shaft commence, the dewatering and shaft recondition of the No.6 Shaft will take place, where after mining within the No.6 Shaft will commence. All shaft water abstracted from the No.7 and the No.6 Shaft will be supplied to the AnglogoldAshanti Vaal River Operations (AGA) processing plant (an agreement between AGA and CAPM, for AGA to accept the water, is in the process negotiations). All ore mined within the No.7 and No.6 Shaft will be hoisted to surface and transported by haulage truck (utilising the formal road network) to the Nicolor South Plant, where the gold bearing ore will be processed. Therefore, CAPM does not and will not (for the time being) own and/or manage any mine and plant residue deposits.

Once operations at the No.7 and the No.6 Shafts are successfully underway, the CAPM Orkney Gold Mine will investigate the viability of re-commencing operations at the No.4 Shaft (approximately 2 years after and the No.1 Shaft, approximately two (2) years after the commencement at the No.6 Shaft).

7.1.2 Process alternatives

Two alternatives have been identified in terms of process and include the following:

- Construction of a processing plant to process the mined ore.
- Utilisation of an existing processing plant to process the mined ore.

The preferred alternative for the CAMP Orkney Gold Mine is transport the mined ore to the Nicolor South Plant for processing. Although this alternative has high cost investment over the long term due to processing fees and transport costs, the plant is not owned or operated by CAPM and therefore no mine and plant residue deposits will be owned or managed by CAPM. The construction of a processing will be a very high initial cost investment but will however allow for a greater return on investment.

7.1.3 Scheduling alternatives

Two alternatives in terms of scheduling have been identified and these include:

- The commencement of operations initially at the No.7 Shaft, then the No.6 Shaft and approximately after two (2) years operations will commence at the No.4 Shaft and No.1 Shaft.
- The commencement of operations at all of the shafts at once.

The preferred alternative, in terms of scheduling, is to initially only commence operations at the No.7 Shaft and then the No.6 Shaft and then in approximately two (2) years, commence operations at the No.4 Shaft and the No.1 Shaft. This alternative is preferred due to the very high investment required to recondition the shafts and all associated infrastructure, of all five shafts, in order to be safe for operations in terms of MPRDA, 2002 and the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA, 1996).

7.1.4 No-go option

If the gold reserves within the CAPM Orkney Gold Mine Mining Right area are not mined at this time, the *status quo* environmental conditions within the Mining Right area will continue until change in activity and/or development occurs within or close to this area.

Physical and biophysical environment – The proposed project is expected to create a number of environmental impacts and include impacts on surface water and most notably, groundwater. Acid mine drainage is likely to develop due to the interactions of the groundwater with the pyrite that constitutes 10% to 30% of the VCR. As the groundwater is allowed to recharge and flood the shafts, it may become contaminated and acidic and upon reaching the Environmental Critical Level (ECL) (Refer to Chapter I of Section 7.4.1 of the EIA and EMPr) the aquifers will become contaminated.

Social – The CAPM Orkney Gold Mine is situated within the vicinity of the town Orkney. The proposed re-commencement of the operations at the No.7 Shaft and the No.6 Shaft (initially) will result in the creation of job opportunities. As stipulated in the CAPM Orkney Gold Mine SLP (refer to the Annexure G) the CAPM Orkney Gold Mine will employ 471 individuals, of which the majority (a minimum of 95%) will be sourced from the local community. This will therefore result in the experience of a positive impact in terms of social as well as economic aspects. However, should the “no-go option” be implement, the baseline status quo will remain with no additional job creation. Several potential impacts

in terms of social aspects are also likely to be generated as a result of the re-instatement of operations at the CAPM Orkney Gold Mine and include: increase traffic, impacts on sense of place, influx of jobseekers to the area (including the increased crime, spread of HIV) and visual aspects. It is however important to note that the CAPM Orkney Gold Mine is an existing mine that was purchased by CAPM in 2011 and mining within the area has taken place for over a century. Therefore, the local community and regular visitors to the area would be desensitised to the mining activities that will be conducted.

Economic – In the event that the "no-go option" is implemented, several existing jobs will be lost and skills development may cease. The positive impacts associated with the creation of 471 jobs and contributions of the mine to the local economy would therefore be lost. The remaining gold bearing ore body will also remain *in situ* and unutilised. It is however important to note that should the CAPM Orkney Gold Mine not proceed with the proposed re-instatement of operations, the mining of the gold reserves may not necessarily be avoided as the Mining Right could be sold to another company unless the DMR declares the reserves "off-limits" and sterilises these reserves.

7.2 Details of the Public Participation Process Followed

A detailed public participation process is undertaken. The Public Participation Process as followed includes:

- Stakeholder identification.
- Registration of Interested and Affected Parties (I&AP's) and key stakeholders.
- Methods of notification:
  - Newspaper advertisement.
  - Site notices.
  - Notification letter including BID.
  - Electronic (E-Mail) notifications including BID.
- Access and opportunity to comment by I&APs.
- Consultation with the relevant authorities.

7.3 Summary of issues raised by I&APs

Table 16 below provides a summary of the comments and issues raised and reaction to those responses.

Table 16: Issues and concerns raised by I&APs

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
AFFECTED PARTIES	To be completed after the initial Public Participation Process has been conducted.			
Landowner/s				
Lawful occupier/s of the land				
Landowners or lawful occupiers on adjacent properties				
Municipal councillor				
Municipality				
Organs of state (Responsible for infrastructure that may be affected				

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
Roads Department, Eskom, Telkom, DWA e				
Communities				
Dept. Land Affairs				
Traditional Leaders				
Dept. Environmental Affairs				
Other Competent Authorities affected				

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
OTHER AFFECTED PARTIES				
INTERESTED PARTIES				

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.

7.4 The Environmental attributes associated with the development footprint alternatives. A baseline environment.

7.4.1 Type of environment affected by the proposed activity

Chapter A: Geology

The information contained in this section of the document is extracted from the report titled: “China African Precious Metals: Orkney Gold Mine, Geohydrological Investigation as input to the EMPR” dated March 2015 and compiled by Shangoni AquiScience (AquiScience, 2015). The report is attached hereto as Annexure C1).

1.1 Regional setting

The Witwatersrand Supergroup overlies the Dominion Group (ca. 3074±6 Ma), and is made up of coarse clastic rocks and bimodal volcanic rocks. The Mesoarchaean Witwatersrand Basin, one of the world's premier gold regions and the greatest known source of gold on Earth, was deposited between ca. 2985 and 2849 Ma on the Kaapvaal Craton (ca. 3.6–3.2 Ga). The Witwatersrand Supergroup consists of the West Rand and Central Rand groups. The West Rand Group unconformably overlies the Dominion Group with clastic and largely marine sedimentary rocks. This sequence was deposited in a tectonically stable environment of the volcano-sedimentary succession of the Dominion Group. Unconformably overlying the West Rand Group are sandstone, conglomerate and shale units of the Central Rand Group. The upper part of the Central Rand Group is unconformably overlain by the Ventersdorp Contact Reef (VCR) of the Venterspost Formation, which has the maximum age of 2729±19 Ma.

The Neoarchaean Ventersdorp Supergroup (ca. 2.72–2.63 Ga), unconformably overlies the VCR and comprises of ultramafic and mafic metavolcanic rocks of the Klipriviersberg Group, and metasedimentary rocks and bimodal metavolcanic rocks of the Platberg Group (R-Vr; Rm). Bimodal metavolcanic and clastic metasedimentary rocks of the Platberg Group overlie the Klipriviersberg Group (ca. 2709±8 Ma). The group attains a maximum thickness of approximately 330 m and consists of boulders, cobbles, and fragments of (mainly) amygdaloidal metavolcanic rocks, with subordinate amounts of quartzite, chert and shale. . Normal fault activity and extension arguably accompanied emplacement of the Klipriviersberg Group, and culminated in graben formation and deposition of the Platberg Group.

Unconformably overlying the Ventersdorp Supergroup is the relatively thin Black Reef Formation (Vbr), which has been interpreted as the basal lithostratigraphic unit of the Palaeoproterozoic Transvaal Supergroup. The formation consists of a lower quartzite unit, with a sporadically developed conglomerate at the base, overlain by interbedded, black carbonaceous shale and dolomite beds in the upper portion. The Black Reef Formation represents a highly reflective interface due to a major laterally

extensive acoustic impedance contrast between high-velocity, high density dolomite of the Chuniespoort Group of the Transvaal Supergroup and the underlying low-velocity, less dense Ventersdorp metabasalts. Above the Black Reef Formation, the Transvaal Supergroup is divided into the Chuniespoort Group and the Pretoria Group. The Chuniespoort Group consists of dolomite, banded iron formation and lacustrine deposits. Figure 7 below presents a geological map of the West Rand and Figure 8 below present a stratigraphic profile of the Witwatersrand Supergroup.

1.2 Local geology associated with the shaft areas

The Klerksdorp Goldfield is located on the Northwest margin of the Witwatersrand Basin and lies some 150 km south-southwest of Johannesburg. The Witwatersrand Basin sedimentary rocks are overlain by up to 2,000 m of cover rocks and the reefs themselves occur at depths of between 80 m and 4,000 m below surface. Two primary conglomerate reefs are exploited within the Klerksdorp Goldfield, namely the Vaal Reef and the Ventersdorp Contact Reef (VCR). The Vaal Reef and VCR reef horizons occur at depths of between 80 m and 4,000 m below surface. The VCR dips moderately west-north-west, while the Vaal Reef generally dips gently to the southeast. The geology of the project area and stratigraphic column and sedimentology of the Witwatersrand sequence in the area of the Klerksdorp goldfield is illustrated in Figure 7 and Figure 8, respectively.

1.2.1 Elsburg Reef (No.6 Shaft and No.7 Shaft

The Elsburg Reefs rest on the Gold Estates Quartzites. Each reef was deposited disconcordantly over and on top of its predecessor. The reefs are oligiomictic to polymictic, matrix to pebble supported, small to medium pebble conglomerates. The dip of the reefs ranges from 5° to 15° and the strike is subject to pronounced changes, which are considered to be mainly controlled by faulting. The Elsburg Reefs have historically been exploited at No.6 Shaft and No.7 Shaft, usually in conjunction with the overlying VCR, against which they sub-outcrop along a northeast trending band, south of and sub-parallel to the Buffelsdoorn Fault. The sedimentological characteristics of the Elsburg Reefs in the region of the sub-outcrop are similar to those exhibited by the VCR (Minxcon, 2014).

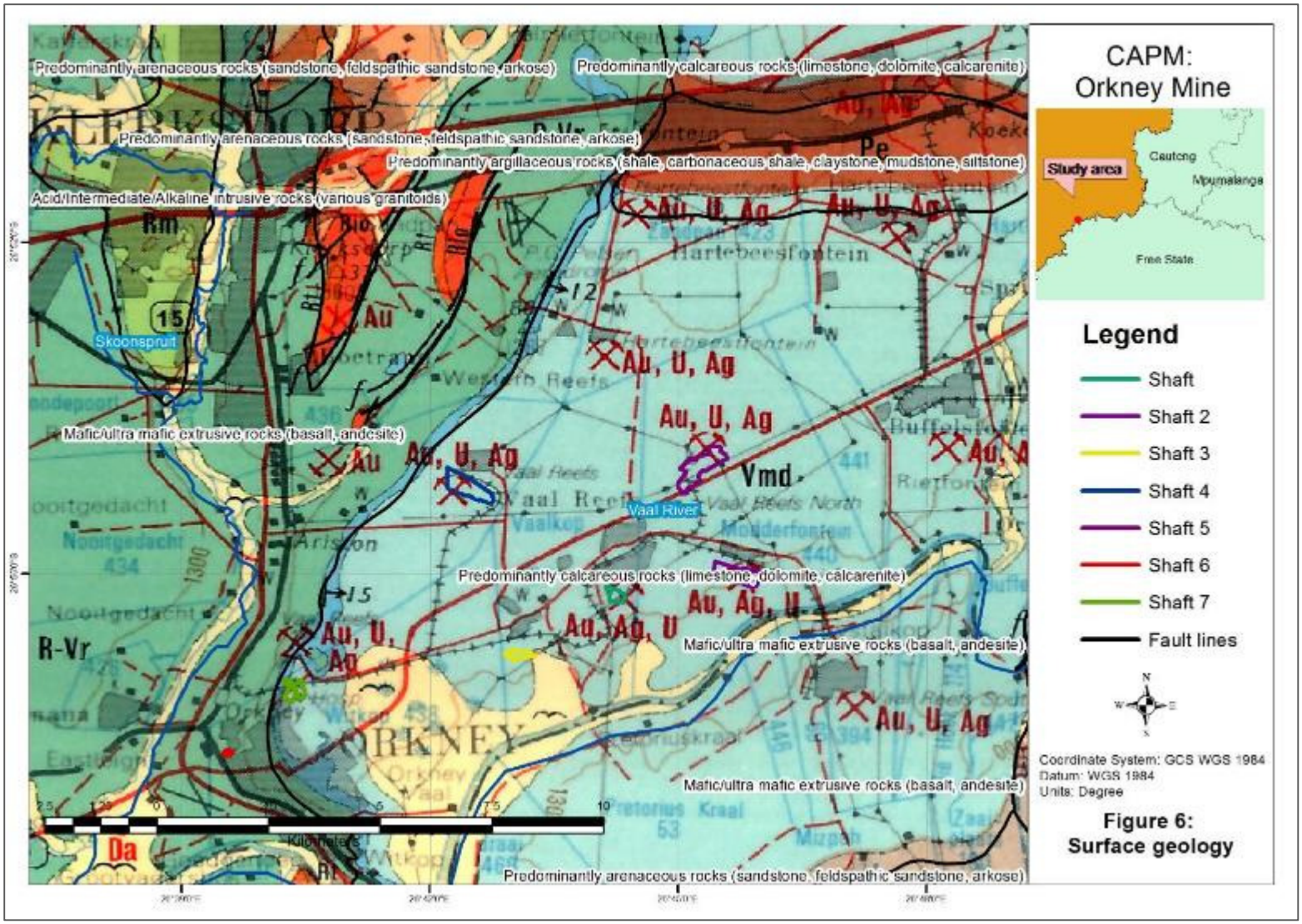

Figure 7: Geological map of the West Rand (extracted from AquiScience, 2015)

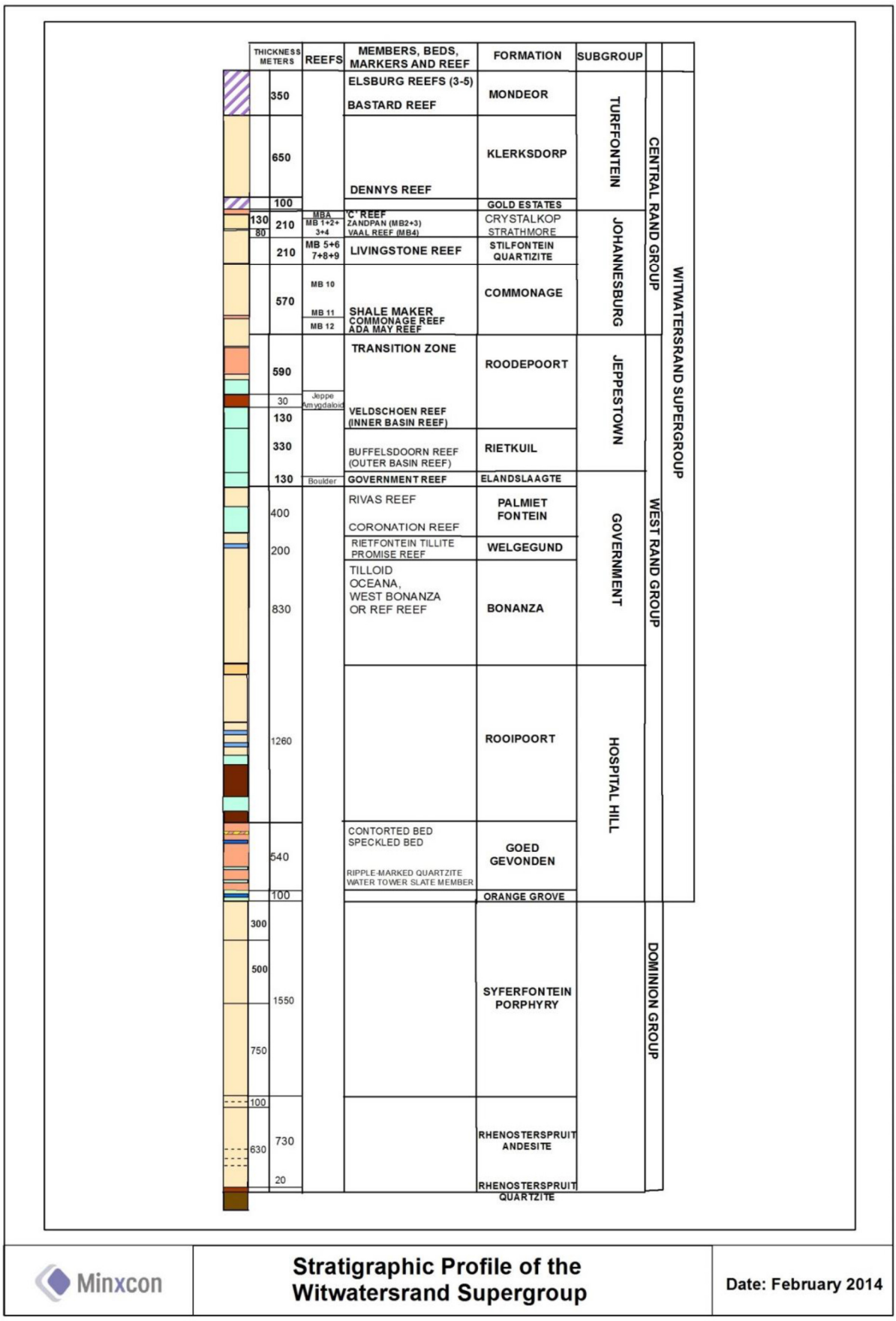

Figure 8: Stratigraphic profile of the Witwatersrand Supergroup (extracted from Minxcon, 2014)

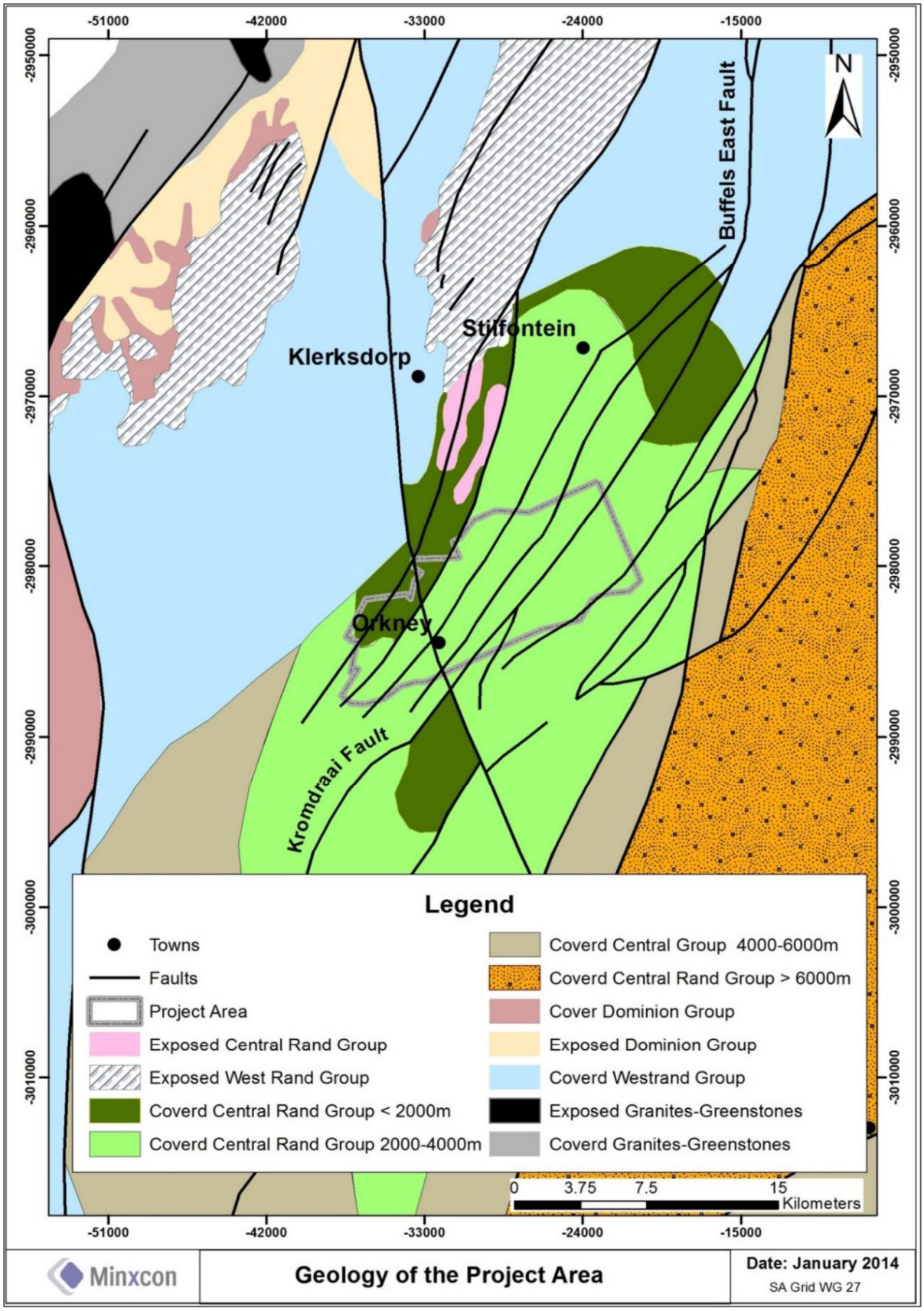

Figure 9: Local geology of the area (extracted from Minxcon, 2014)

1.2.2 VCR (No.3 Shaft, No.6 Shaft and the No.7 Shaft)

At the base of the Klipriviersberg Group, and conformable with the overlying lavas, is a succession of conglomerates and quartzites known as the VCR. The VCR, an auriferous, urnaniferous, pyritic, oligiomictic conglomerate, is unconformable with the underlying quartzites and it ranges in thickness from 40 cm to 400 cm. The VCR unconformity is recognised as being the last regional unconformity occurring within the Witwatersrand Basin and basically signifies the conclusion of the sedimentary processes within the basin (Minxcon, 2014).

The approximately 2800 Ma old VCR is a unique Witwatersrand orebody, from which about 6% of the world's gold production is derived. A major portion of this production is mined at depths exceeding 2500 m and deepest levels of mining are at about 3600 m. The orebody's hangingwall consists of volcanic rocks. This differs from the older Witwatersrand orebodies, which have quartzitic hangingwalls. The thickness of the VCR is generally about 1.20 m, but is highly variable, at an average dip of about 18°. A pronounced unconformity beneath this orebody is also expressed by varying footwall rock type characteristics and frequent rolling of the reef plane. These rolls follow topographic variations of the palaeosurface (Roberts and Schweitzer, 1999).

The VCR has been exploited historically at Orkney 3 Shaft, Orkney 6 Shaft and Orkney 7 Shaft. The VCR, as with the Vaal Reef, can occur as a composite reef consisting of several distinct sedimentary packages. A terrace and slope-based geological model was developed by AngloGold for the VCR and has been retained by the geologists of all subsequent geology teams employed by all the subsequent owners, including Harmony, Pamodzi and Aurora. The model divides the mineralized zones into a main channel; lower, middle, and upper terraces; and also involves delineation of certain higher-grade, reworked channels. The reef is clearly identifiable and its location at the contact between the overlying Klipriviersberg lavas and the underlying Witwatersrand Supergroup rocks renders the footwall and hangingwall rocks distinct from the reef, except in areas where Elsburg conglomerates sub-outcrop against the VCR. The contrasting lithologies aid fault negotiation and have often facilitated the use of three-dimensional seismic survey techniques to image the gross reef topography in the past. Mining of the VCR stopped during 2004 and currently the reef is not being exploited by any of the Orkney Shafts (Minxcon, 2014).

Pyrite (FeS_2) is present within the VCR with a prevalence of between 10%-30% (Minxcon, 2014).

1.2.3 Vaal Reef (No.1 to No.5 Shafts

The Vaal Reef is by far the most significant reef mined at the Orkney Operations and is the major contributor to gold production. The reef strikes northeast and is heavily faulted to form a series of graben structures. The Vaal Reef, which occurs in the Central Rand group of the Klerksdorp Goldfield, has mining grades of between 10g/t and 20g/t and comprises a series of oligomictic conglomerates and quartzite packages developed on successive non-conformities. Several distinct facies have been

identified, each with its own unique gold distribution and grade characteristics. The Vaal Reef is usually no more than 50 cm thick and is well-mineralised, with nodular and crystalline pyrite, gold, uraninite and carbonaceous matter concentrated along the base of the conglomerate layer. It is believed to have been transported largely from a source area to the north and northwest of the basin and lies on an erosional surface, or unconformity, that was covered by fluvial drainage during a transgressive stage of basin development. The reef dip is generally less than 30° but can vary locally in direction and magnitude and may in some places exceed 45° in dip. Gold is present throughout the reef horizon, however it tends to be concentrated close to the basal contact where carbon commonly occurs as thin seams close to the regional unconformity. Well-mineralised carbon seams occur most commonly in three stacked sequences (Manzi *et. al.* 2013).

Pyrite is present within the Vaal Reef with a prevalence of between 10%-30%.

1.2.4 Intrusives

The major faults within the lease area include the (Minxcon, 2014):

- Nooitgedacht and Buffelsdoorn faults occurring in the Orkney 6 Shaft and Orkney 7 Shaft areas.
- Witkop fault between Orkney 6 Shaft and Orkney 7 Shaft.
- WK22 and Orkney 3 Shaft faults between Orkney 7 Shaft and Orkney 3 Shaft.
- Orkney 5 Shaft Fault.
- Orkney 2 Shaft South Fault.

These faults typically have throws of tens of metres and further divide the reef into blocks of up to 100 m in width. The horsts and grabens are further disturbed by faults sympathetic to the major faults and typically have throws of tens of meters and further divide the reef into blocks of up to 100 m in width. Drilling from access development can identify these brittle faults, as the dip of the stratigraphy is reasonably constant (15º to 20º).

Dykes and sills of various ages are common in the mining area, the older ones often being related to faults, with varying amounts of throw, whereas the younger ones are accepted as not being related to faulting. The most common intrusives in the mining area are the olivine lamprophyres and ilmenite-diabase's. These intrusives usually strike north-south, dip vertically, are thin, transect all other structures and have movements on the contacts, which are often weight-bearing (Minxcon, 2014).

A generalised cross-section of the faults and dykes present within the region is presented in Figure 10 below.

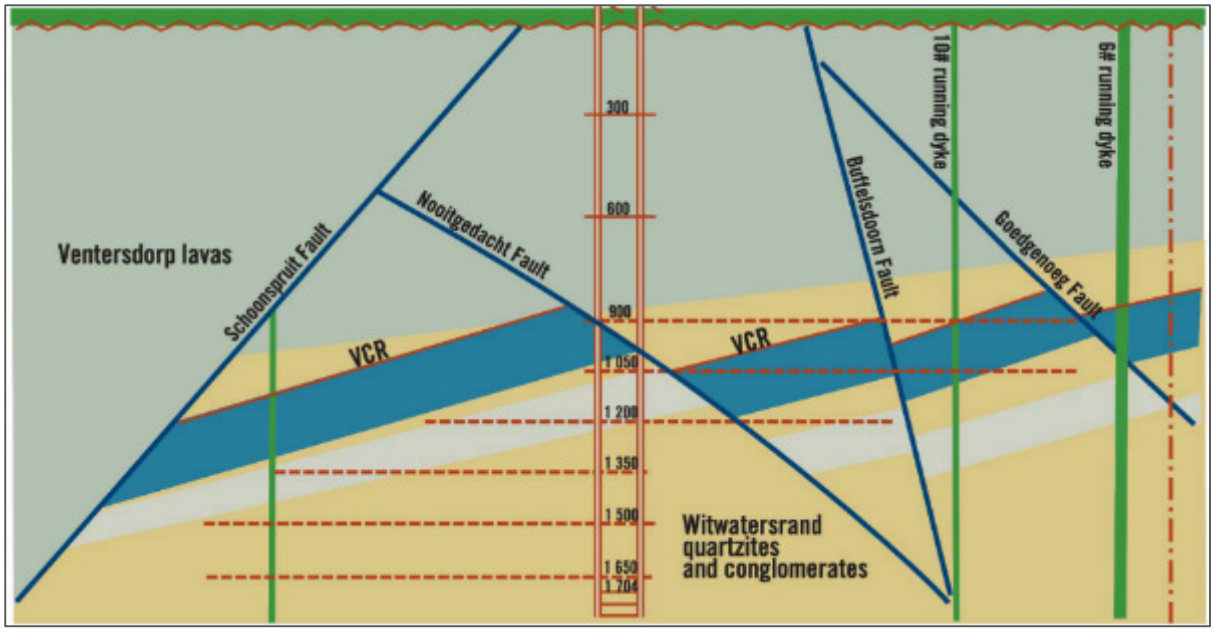

Figure 10: Generalised cross section of the region (extracted from AquiScience, 2015)

Chapter B: Climate

1.1 Precipitation

Precipitation in the area is highly seasonal with a mean annual rainfall of 548.3 mm according to the rainfall data from the DWA hydrological datasets collected at station C2E010. Most of the rainfall occurs during the summer months with the majority of rain events between October and April. The region receives the highest rainfall in January and the lowest in July. Table 17 below presents the monthly and annual average precipitation.

Table 17: Monthly and annual average annual rainfall as collected at station C2E010 (Adapted from Shangoni, 2015)

Month	Rainfall (mm)
January	91.5
February	74.2
March	67.1
April	44.6
May	14.6
June	7.0
July	4.4
August	8.7
September	19.2
October	56.4
November	73.9

Month	Rainfall (mm)
December	84.7
Annual	**548.3**

Chapter C: Topography

The information contained in this section of the document is extracted from the following report:

- "*China African Precious Metals: Orkney Gold Mine, Geohydrological Investigation as input to the EMPR*" dated March 2015 and compiled by Shangoni AquiScience (AquiScience, 2015).
- "*China African Precious Metals (Pty) Ltd. Orkney Gold Mine, Storm Water Management Plan*" dated March 2015 and compiled by Shangoni Management Services (Shangoni, 2015).

1.1 Local topography

The study area is generally flat but undulating with the slimes dams and waste rock dumps forming the significant topographical high points. The CAPM shafts are situated at approximately 1305 mamsl (shaft 6) to 1335 mamsl (shaft 5). Shafts 6 and 7 are situated on the western slope of a water divide, most probably a dolerite dyke or faulting zone controlling the flow, with surface flow following the contours perpendicular towards the Skoonspruit on gradients ranging between 0.01 and 0.02. Flow from shafts 1, 2 and 3 will be mostly towards the Vaal River to the south on gradients ranging between 0.005 and 0.02. Shaft 4 is situated on the eastern slope of the water divide mentioned above and flow will mostly be directed towards the south-southeast.

Figure 11 below presents a Digital Elevation Model of the area and Figure 12, Figure 13 and Figure 14 presents the general topography of the various shaft areas

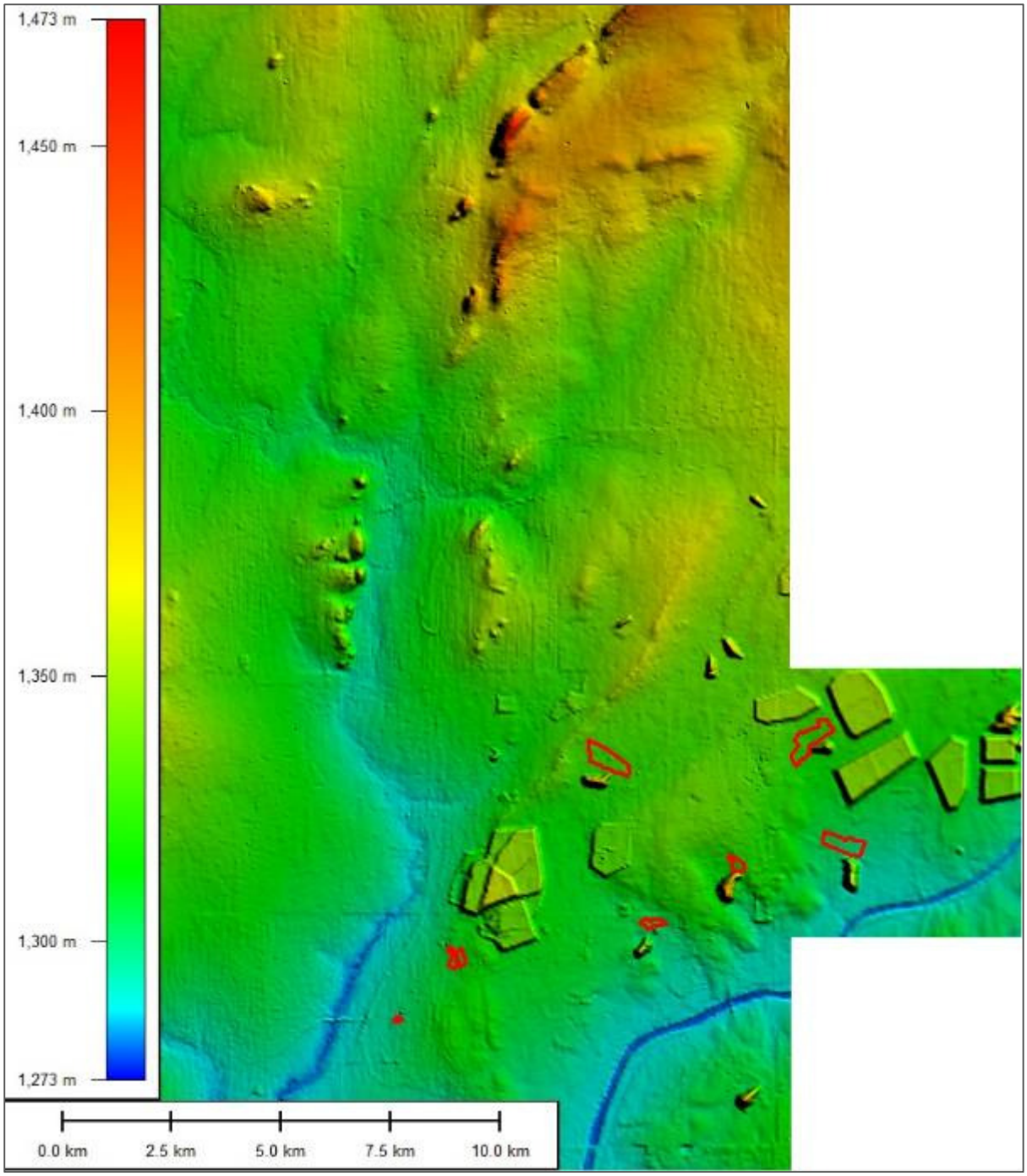

Figure 11: Digital Elevation Model of the study area (extracted from Shangoni, 2015)

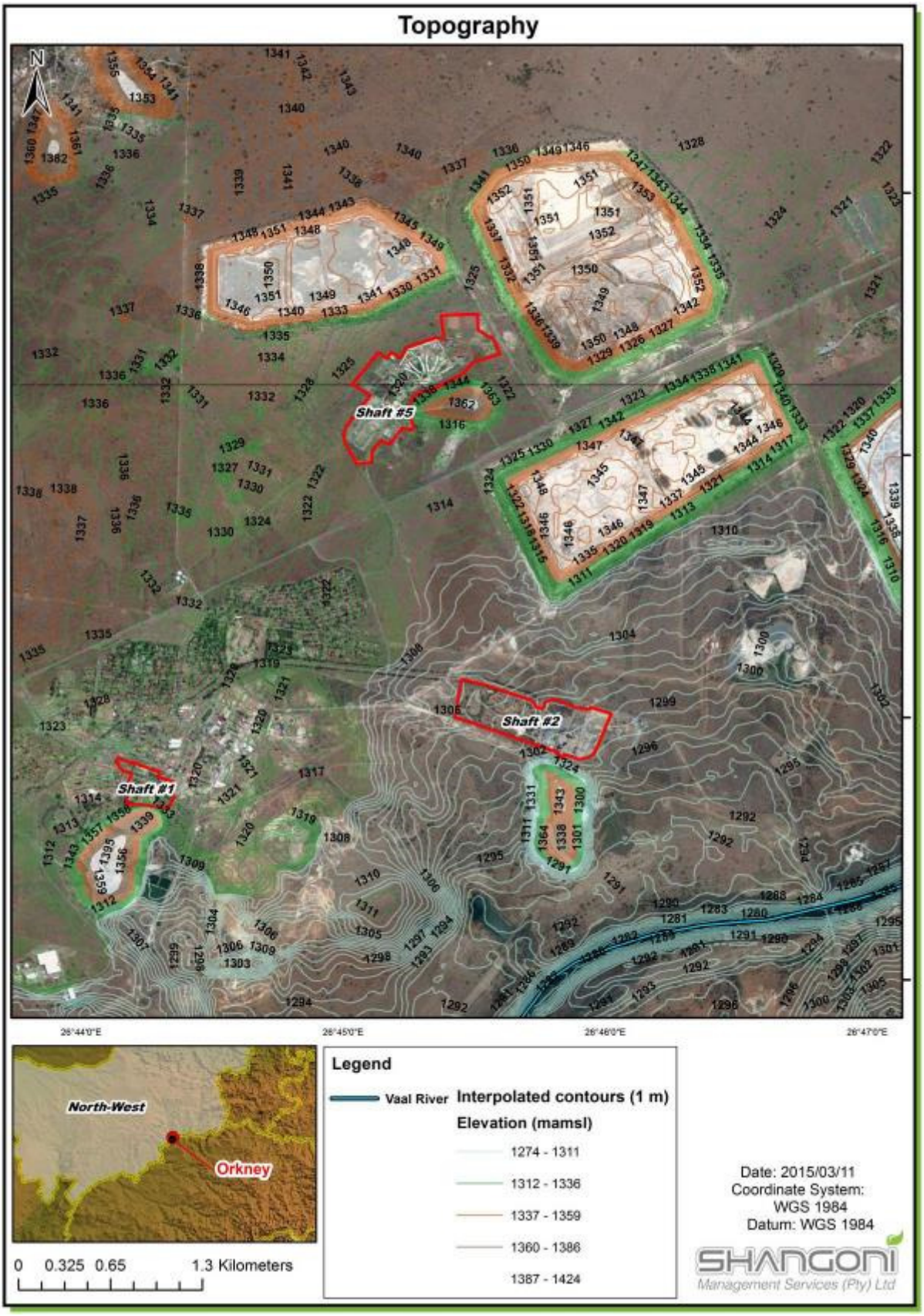

Figure 12: Topography associated with the No.1 Shaft, No.2 Shaft and No.3 Shaft (extracted from Shangoni, 2015)

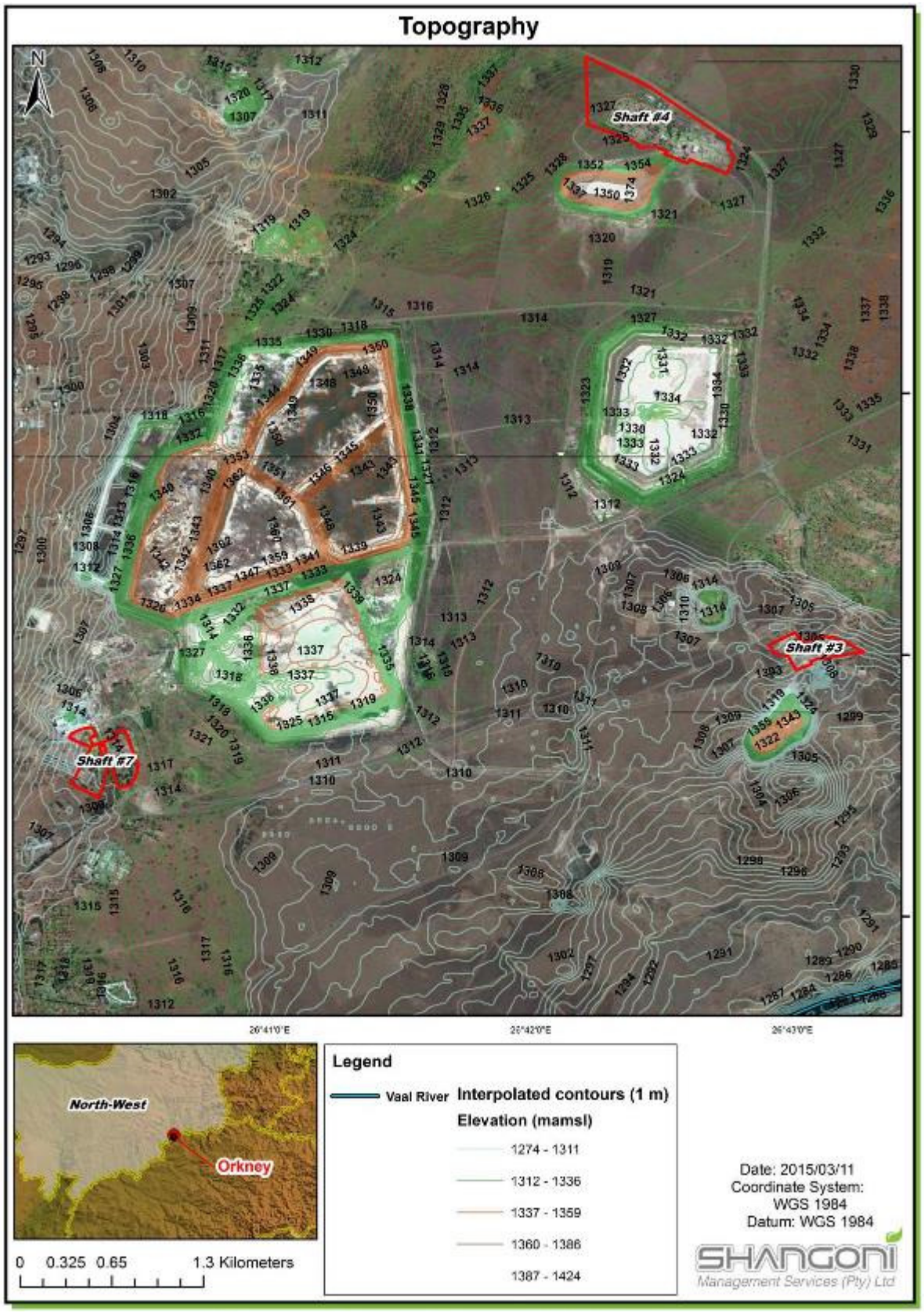

Figure 13: Topography Associated with the No.3 Shaft, No.4 Shaft and the No.7 Shaft (extracted from Shangoni, 2015)

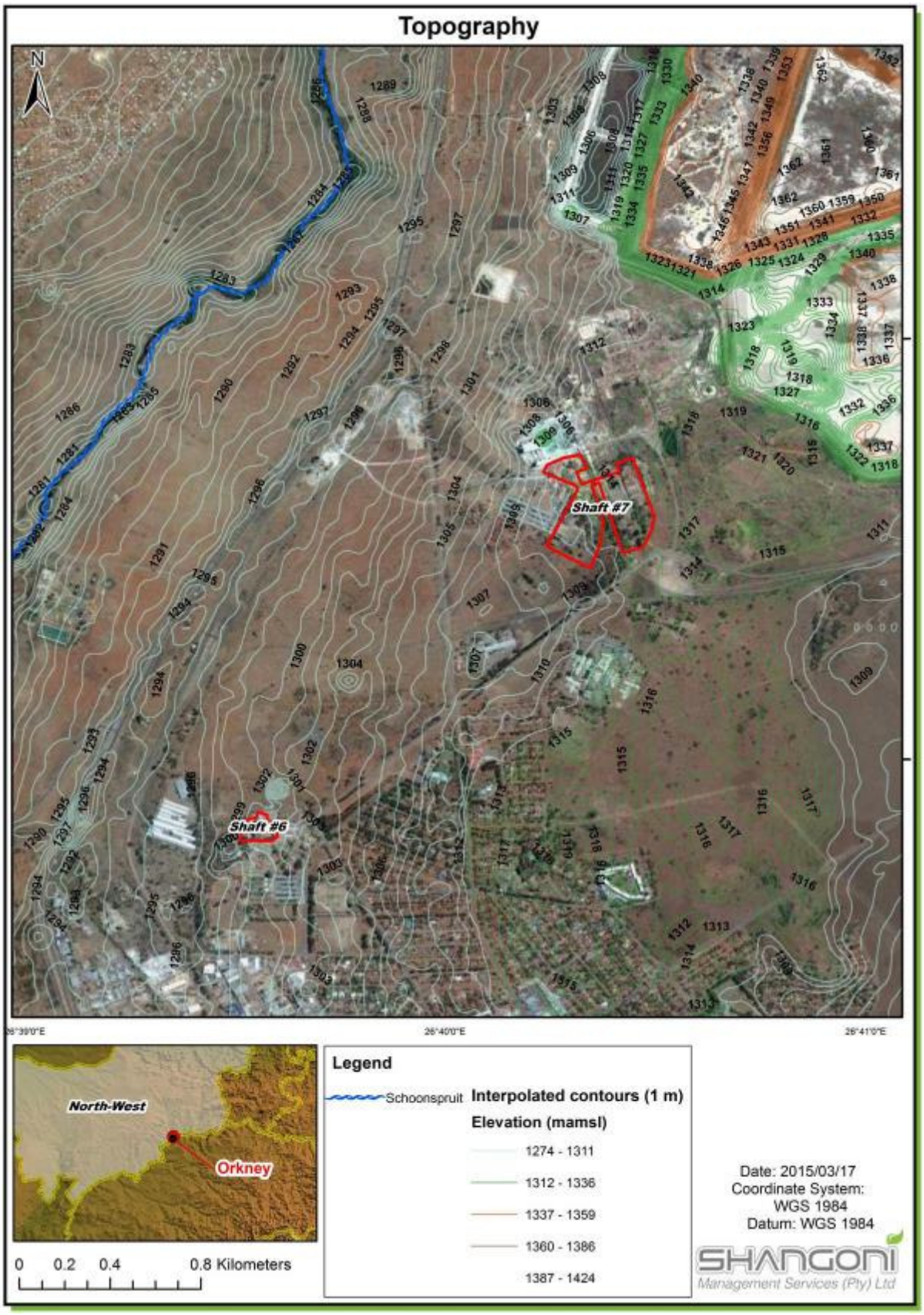

Figure 14: Topography associated with the No.6 Shaft and No.7 Shaft (extracted from Shangoni, 2015)

Chapter D: Soil

The general soils in the area are classified as undifferentiated shallow soils and shallow soils on hard or weathering rock. Most of the soils have restricted soil depth and restricted land use options.

1.1 Plinthic Catena

This is divided in to three age groups being the BC25c Diabase and Hekpoort lava with shale, slate and quartzite of the Pretoria Group. The second group is the BC23d Ventersdorp lava, which has quartz porphyry and volcanic agglomerate and tuff in places having the Witwatersrand quartzite occurring sporadically. The third group is Bd13e being mainly ECCA sandstone, shale of mudstone with sporadic dolerite and diabase occurring. Aeolian sand overlies most rocks and the main soil colour is amber-red. FA13c and Fb6b are rare or absent in the area (approved ARM EMPr, dated 1999).

1.2 Types of Soils Identified

A reconnaissance survey of the lease area by KynochAgri-Services and the Research Institute for Reclamation Ecology Potchefstroom University for CHE (approved ARM EMPr, dated 1999) resulted in the classification of the soils found as follows:

- Class B: Soils mainly of alluvial origin with high loamy (clay) texture coloured dark to black. Found in low lying areas along the river and in vlei areas. This is formed from rock outcrops, Mispah, Hutton, Westleigh-form soils of Rensburg, Katspruit-forms of soils. It is utilised as grazing, nature conservation of recreation facilities.
- Class C: Mispah soil type with Hutton and other shallow soils consisting of orthic A-horizon on solid rock (dolomite). The soil is only suitable for use as grazing, domestic and recreational.
- Class D: Shallow soil type found adjacent to Class C in very rocky areas.
- Class E: Covers a large spectrum of soils such as Hutton, Mispah and Litosols known for drainage capability and as such is high potential grazing land. Major portion of lease area is situated on this type of ground.

Chapter E: Vegetation

The information contained in this section of the document is obtained from the report titled: "*Baseline botanical and faunal biodiversity surveys for the footprints of seven shaft complexes in the Orkney district belonging to China African Precious Metals: Orkney Gold Mine (North West Province)"* dated April 2015 and compiled by De Castro and De Castro (De Castro, 2015). The report is attached hereto as Annexure C3.

1.1 Regional description

The area in which the CAPM Orkney Gold Mine is situated corresponds to the Grassland Biome, and more particularly, the Dry Highveld Grassland Bioregion (refer to Figure 15 below). The study area compromises of two ecological types, known as:

1. Vaal-Vet Sandy Grasslands.
2. Vaal Reefs Dolomite Sinkhole Woodland.

Vaal-Vet Sandy Grasslands

This vegetation type is restricted to the North West and Free State Provinces where it is confined to the western section of the study area (only the No.6 Shaft) (refer to Annexure C3). It typically occurs on plains and consists of a low tussocky-dominated grassland consisting of karroid elements. It is characterised by the dominance of *Themeda triandra*, although the widespread occurrence of *Aristida congesta* and *Cymbopogon pospischilii* are the result of heavy grazing and/or erratic rainfall.

The Vaal-Vet Sandy Grassland is Endangered, and is poorly conserved in the Bloemhof Dam, Faan Meintjies, Schoonspruit, Wolvespruit and Sandveld Nature Reserves. It is transformed by cultivation and inappropriate grazing regimes (refer to Annexure C3).

Table 18 below presents a list of plant species characteristic of the Vaal-Vet Sandy Grassland.

Table 18: Plan species characteristic of the Vaal-Vet Sandy Grassland (adapted from De Castro, 2015)

Vaal-Vet Sandy Grassland		
Grassy Layer	**Forb Layer**	**Woody/Shrub Layer**
Anthephora pubescens, Aristida congesta, Chloris virgata, Cymbopogon caesius, Cynodon dactylon, Elionurus muticus, Eragrostis chloromelas, E. lehmanniana, E. plana, E. trichophora, Heteropogon contortus, Setaria sphacelata, Themeda triandra, Tragus berteronianus, Brachiaria serrata, Cymbopogon pospischilii, Digitaria eriantha, Eragrostis curvula, E. superba, Pogonarthria squarrosa, Trichoneura grandiglumis, Triraphis andropogonoides	***Herbs**: Barleria macrostegia, Euphorbia inaequilatera, Helichrysum caespititium, Hermannia depressa, Hibiscus pusillus, Monsonia burkeana, Selago densiflora, Vernonia oligocephala* ***Geophytic herbs:** Bulbine narcissifolia, Ledebouria marginata* ***Succulent herbs:** Tripteris aghillana var. integrifolia*	***Low shrubs:** Felicia muricata, Anthospermum rigidum subsp. pumilum*

Vaal Reefs Dolomite Sinkhole Woodland

This vegetation type is restricted to a small area of dolomite sinkholes near Stilfontein and Orkney with the Vaal River forming its southern boundary. It is associated with chert-rich dolomite ridges, forming a prominent woodland-grassland mosaic, especially near sinkholes and dolomite outcrops (De Castro, 2015).

It is Vulnerable with a small section conserved within the Sterkfontein Caves conservation area (as part of the Cradle of Humankind World Heritage Site). This vegetation type is transformed by mining, cultivation and urban expansion, and contains the highest concentration of mines when compared to the other vegetation types.

Table 19 below presents a list of plant species characteristic of the Vaal Reefs Dolomite Sinkhole Woodland.

Table 19: Plant Species characteristic to the Vaal Reefs Dolomite Sinkhole Woodland (adapted from De Castro, 2015)

Vaal reefs Dolomite Sinkhole Woodland		
Grassy Layer	**Forb Layer**	**Woody/Shrub Layer**
Aristida congesta, Digitaria eriantha, Eragrostis curvula, Themeda triandra, Anthephora pubescens, Aristida canescens, Bewsia biflora, Brachiaria serrata, Chloris pycnothrix, Cymbopogon caesuis, C. pospischillii, Cynodon dactylon, Diheteropogon amplectens, Elionurus muticus, Eragrostis chloromelas, E. lehmanniana, E. subperba, Eustachys paspaloides, Heteropogon contortus, Melinis repens, Setaria sphacelata, Triraphis andropogonoides	***Non-succulents**: Commelina africana, Barleria macrostegia, Euphorbia inaequilatera, Crabbea angustifolia, Dicoma anomala, Hermannia depressa, Ipomoea obscura, Nidorella hottentotica, Osteospermum muricatum, Pollichia campestris, Vernonia oligocephala hottentotica*	***Small trees:** Acacia (=Vachellia) karroo, Searsia lancea* ***Tall shrubs**: Diospyros lycioides subsp. lycioides, Ehretia rigida, Grewia flava* ***Low shrubs**: Asparagus suaveolens, Gymnosporia heterophylla, Sida dregei, Asparagus laricinus, Felicia muricata, Indigofera heterotricha, Triumfetta sonderi* ***Geoxylic suffrutex**: Elephanthorrhiza elephantina*

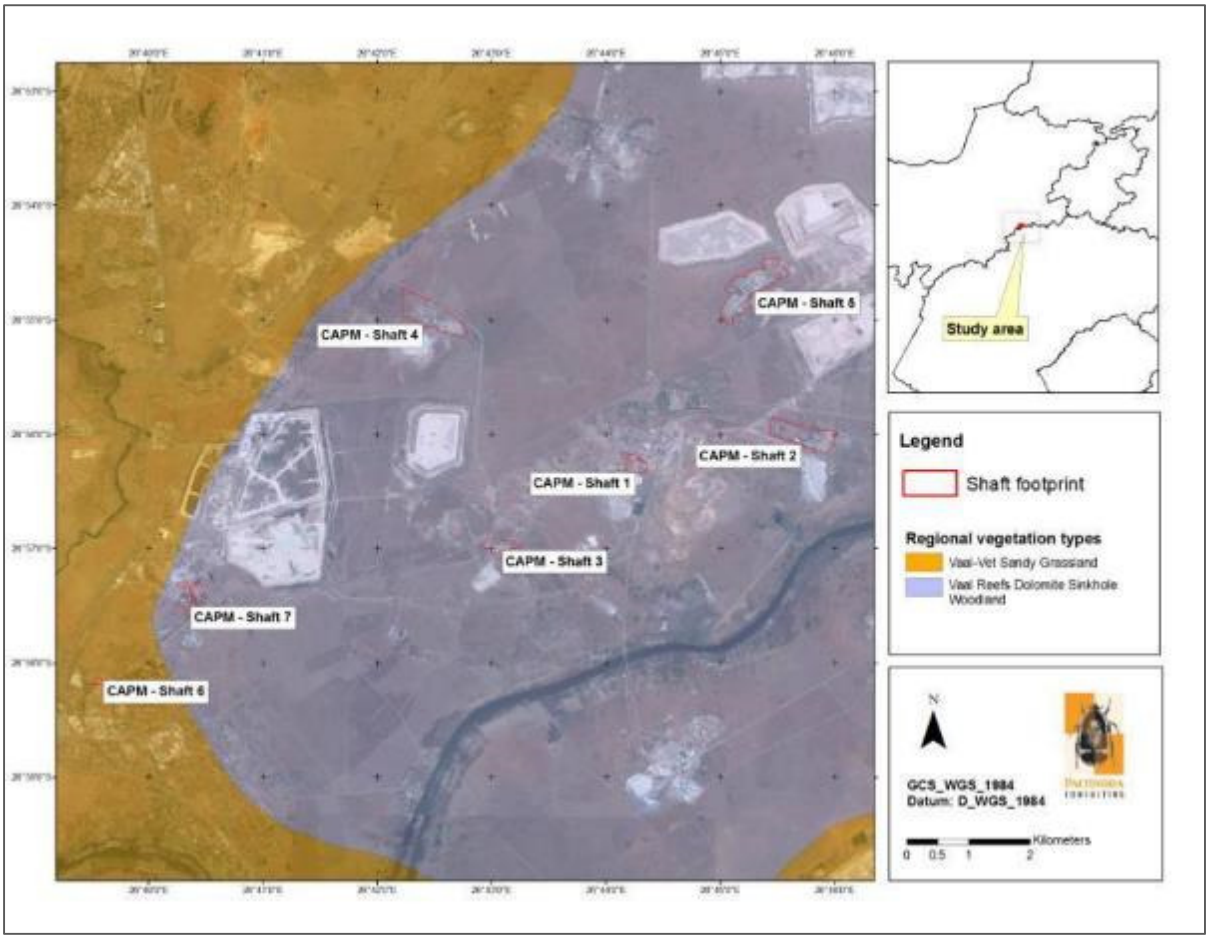

Figure 15: Regional vegetation types associated with the CAPM Orkney Gold Mine (extracted from De Castro, 2015)

1.1.1 Biodiversity conservation assessment

The majority of the CAPM Orkney Gold Mine shaft areas are located within “Critical Biodiversity Areas T2” (CBA T2), except of the No.6 Shaft and the No. 7 Shaft areas which have no remaining natural habitat and are therefore not part of any biodiversity area (De Castro, 2015). A “CBA T2” is an area that is "optimal' (as opposed to "irreplaceable") for achieving provincial conservation targets, and represent areas where there are spatial options for achieving targets.

Figure 16 below presents the conservation categories based on the North West Province Biodiversity Conservation Assessment (refer also to Annexure C3).

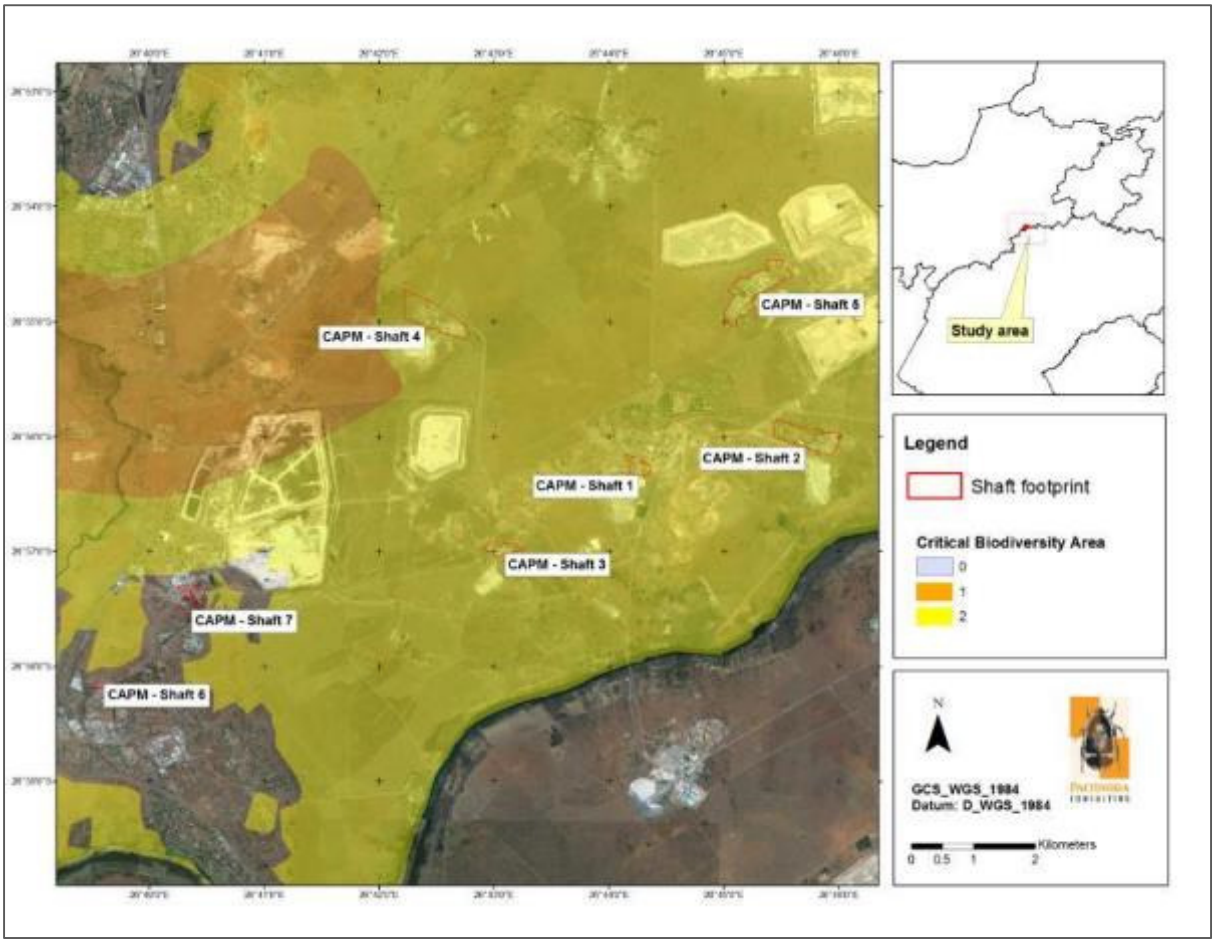

Figure 16: North West Province Biodiversity Conservation Assessment categories in relation to the CAPM Orkney Gold Mine (extracted from De Castro, 2015)

1.1.2 Threatened Ecosystems

The Vaal Vet Sandy Grassland is classified as an endangered ecosystem. However this ecosystem is located to the west of the shaft footprint areas. None of the shaft footprint areas fall within any threatened ecosystems as defined by the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA, 2004).

1.2 Local description

1.2.1 Plant species of conservation concern

Table 20 below presents a list of all of the Red and Orange listed plant species historically recorded within the study area and all adjacent areas.

Table 20: List of Red and Orange listed plant species (adapted from De Castro, 2015)

Taxon	Latest (IUCN version 3.1) Conservation Status Category*	Habitat	Flowering Time	Grid squares from which species is known to occur	Probability of occurrence within the study area and shaft complex
AMARYLLIDACEAE					
Boophone disticha (L. f.) Herb.	Declining	Dry grassland and rocky areas. Widespread in South Africa (known from 9 provinces) and extends up the eastern half of southern Africa to Uganda.	October to January	-	**High** (recorded adjacent to No.7 Shaft)
Crinum bulbispermum (Burm.f.) Mile-Redh. & Schweik.	Declining	Along rivers and streams or in damp depressions in black clay or sandy soil. In the authors experience always occurs in areas that are seasonally or at least periodically flooded.	September to November	-	**Low**
Nerine gracilis R.A. Dyer	Vulnerable [**VU** B1ab (ii, iii, v)]	Undulating grasslands in damp, moist areas; the plants grow in full sun in damp depressions, near pans or on the edges of streams; grassland, riverbanks, vleis.	February and March	-	**Unlikely**
ASPHODELACEAE					
Kniphofia typhoides Codd	Near Threatened [**NT** A2 ac]	Wetland areas dominated by climax *Themeda* grassland on heavy black clay.	February-March	2627CC	**Unlikely**
Trachyandra erythrorrhiza (Conrath) Oberm.	Near Threatened [**NT** B1ab (ii, iii, iv, v)]	Marshy areas, grassland, usually in black turf marshes.	September to November	-	**Unlikely**
CRASSULACEAE					

Taxon	Latest (IUCN version 3.1) Conservation Status Category*	Habitat	Flowering Time	Grid squares from which species is known to occur	Probability of occurrence within the study area and shaft complex
Adromischus umbraticola C.A. Sm. subsp. *umbraticola*	Near Threatened **[NT** B1ab (ii, iii, v)]	Rock crevices on rocky ridges, usually south-facing, or in shallow gravel on top of rocks, but often in shade of other vegetation.	September to January	-	**Low**
FABACEAE					
Pearsonia bracteata (Benth.) Polhill	Near Threatened [**NT** B1ab(i,ii,iii,iv,v)]	Plants in Gauteng and North West occur in gently sloping Highveld grassland, while those in the Wolkberg were collected from steep wooded slopes and cliffs in river valleys. De Castro & Brits (2013) observed this species at West Wits in untransformed Dolomite Grassland and quartzitic grassland.	December to April (De Castro & Brits, 2013 recorded it flowering in late October at Vaal Reefs in 2006).	2626DC	**Moderate** (potential habitat observed in untransformed grassland on Shaft complexes No.4 and No.5, especially on Black Reef formation)
HYACINTHACEAE					
Drimia sanguinea (Schinz) Jessop	Near Threatened **[NT** A2d]	Open veld and scrubby woodland in a variety of soil types.	August to December	-	**High** (not recorded although potential habitat

Taxon	Latest (IUCN version 3.1) Conservation Status Category*	Habitat	Flowering Time	Grid squares from which species is known to occur	Probability of occurrence within the study area and shaft complex
					observed on Shaft complexes No.4 & No.5)
HYPOXIDACEAE					
Hypoxis hemerocallidea Fisch. & C.A. Mey.	Declining	Raimondo *et al.* (2009) state that this species occurs in a wide range of habitats, including sandy hills on the margins of dune forests, open, rocky grassland, dry, stony, grassy slopes, mountain slopes and plateaus. Appears to be drought and fire tolerant. Widespread in the eastern half of southern Africa, where its distribution extends from the Eastern Cape to Botswana and Mozambique. Western Cape to Malawi.	September to March	2626DC	**Recorded** (recorded in patches of natural grassland corresponding to Shaft complexes No.2, No.5 & adjacent to No.7)
MESEMBRYANTHEMACEAE					
Lithops lesliei (N.E. Br.) N.E. Br. subsp. *lesliei*	Near Threatened [**NT** A4acd]	Primary habitat appears to be the arid grasslands in the interior of South Africa where it usually occurs in	March to June	-	**Unlikely**

Taxon	Latest (IUCN version 3.1) Conservation Status Category*	Habitat	Flowering Time	Grid squares from which species is known to occur	Probability of occurrence within the study area and shaft complex
		rocky places, growing under the protection of surrounding forbs and grasses.			

One declining species (*Hypoxis hemerocallidea*) was recorded within the study area (No.2 Shaft and No.5 Shaft), while *Boophone disticha* was recorded from untransformed grassland adjacent to one of the shaft footprints (No.7 Shaft). Two near threatened species (*Pearsonia bracteata* and *Drimia sanguinea*) could also occur owing to the presence of suitable habitat. Both *H. hemerocallidea* and *B. disticha* are widespread but declining since they are very popular species used for muthi (refer to Annexure C3).

1.2.2 Weeds and declared invaders

Invaders and weed species are plants that invade natural and semi-natural habitats, especially areas disturbed by humans. Weeds that invade severly disturbed areas are commonly known as ruderal and agrestal weeds. Declared weeds and invaders have the tendency to dominate or replace the canopy or herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems (De Castro, 2015).

Three categories of problem plants have been identified in the amended Regulations (Regulation 15) of the Conservation of Agricultural Resources Act, 1983, Act No. 43 of 1983) and are as follows:

- Category 1 plants:
  - May not occur on any land other than a biological control reserve and must be controlled or eradicated. Therefore, no person shall establish, plant, maintain, propagate or sell/import any category 1 plant species.
- Category 2 plants:
  - Plants with commercial application and may only be cultivated in demarcated areas (such as biological control reserves) otherwise they must be controlled.
- Category 3 plants:
  - Ornamentally used plants and may no longer be planted, except those species already in existence at the time of the commencement of the regulations (30 March 2001), unless they occur within 30 m of a 1:50 year floodline and must be prevented from spreading.

Four categories of alien and invasive species are identified in terms of the NEM:BA, 2004 and are as follows:

- Category 1a listed invasive species:
  - Species which must be combatted or eradicated. It basically instructs a person to comply with section 73(2) of the Act. In addition, an authorised official from the Department must be allowed to assist with the eradication of these species.
- Category 1b invasive species:
  - Species that should be controlled as listed by the notice in terms of section 70(1)(a). Any person in control of these species must control these species, and must allow an authorised official from the Department to assist with the control of these species.
- Category 2 invasive species:

  - Species that requires a permit to carry out a restricted activity (e.g. afforestation) on a specified area. A person in possession of a permit or who owns land with Category 2 species must also ensure that these species will not spread outside the land. Unless otherwise specified, if any Category 2 species occurs outside any specified area, it should be treated as a Category 1b species and must be managed accordingly.
- Category 3 invasive species:
  - A species that is subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of the Act. If any of these species occur in a riparian area it should be treated as a Category 1b species, and must be managed accordingly.

Table 21 below provides a list of the weeds and invader plant species identified within the study area.

Table 21: List of weeds and invader plant species identified within the study area (adapted from De Castro, 2015)

Species	Vernacular Name	Type	Control Measure	NEMBA Category	CARA Category
Flaveria bidentis	Smelter's Bush	Weed	Control by means of invasive species management programme	1b	1
Malvastrum coromandelianum	Prickly Malvastrum	Weed	Control by means of invasive species management programme	1b	1
Salsola kali	Tumbleweed	Weed	Control by means of invasive species management programme	1b	1
Verbena bonariensis	Wild Verbena	Weed	Control by means of invasive species management programme	1b	-
*Acacia melanoxylon**	Australian Blackwood	Invader	Control spread of species	-	2
*Argemone ochroleuca**	Mexican Poppy	Weed	Control spread of species	-	1
*Arundo donax**	Giant Reed	Weed	Control spread of species	-	1
*Canna indica**	Indian Shot	Weed	Control spread of species	-	1
*Casuarina cf. cunninghamiana**	Beefwood	Invader	Control spread of species	-	2
*Cereus jamacaru**	Queen of the Night	Weed	Eradicate	-	1
*Cortaderia selloana**	Pampas Grass	Weed	Control spread of species	-	1
*Datura ferox**	Large Thorn Apple	Weed	Control spread of species	-	1

Species	Vernacular Name	Type	Control Measure	NEMBA Category	CARA Category
*Eucalyptus camaldulensis**	Red River Gum	Invader	Control spread of species	-	2
*Gleditsia triacanthos**	Honey Locust	Invader	Control spread of species	-	2
*Grevillea robusta**	Australian Silky Oak	Invader	Control spread of species	-	3
*Ipomoea purpurea**	Morning Glory	Invader	Control spread of species	-	3
*Jacaranda mimosifolia**	Jacaranda	Invader	Control spread of species	-	3
*Ligustrum cf. japonicum**	Liguster	Invader	Control spread of species	1	3
*Macfadyena unguis-cati**	Cat's claw Creeper	Weed	Should be eradicated	-	1
*Melia azedarach**	Syringa	Invader	Should preferably be eradicated	-	3
*Morus alba**	Common Mulberry	Invader	Control spread of species	-	3
*Nerium oleander**	Oleander	Weed	Highly poisonous - should be removed	-	1
*Nicotiana glauca**	Wild Tobacco	Weed	Control spread of species	-	1
*Opuntia ficus-indica**	Sweet Prickly Pear	Weed	Eradicate	-	1
*Pennisetum setaceum**	Fountain Grass	Weed	Control spread of species	-	1
*Pinus spp.**	Pines	Invader	Control spread of species	-	2
*Pyracantha angustifolia**	Yellow Firethorn	Invader	Control spread of species	-	3
*Solanum mauritianum**	Bugweed	Weed	Control spread of species	-	1
*Tecoma stans**	Yellow Bells	Weed	Should preferably be eradicated	-	1
*Tipuana tipu**	Tipu Tree	Invader	Control spread of species	-	3
*Xanthium strumarium**	Large Cocklebur	Weed	Control spread of species	-	1

1.3 Description of the vegetation units and sensitivity of the shaft areas

1.3.1 No.1 Shaft

Approximately 85% of the total surface area of the No.1 Shaft is transformed by infrastructure and built-up land cover with the remaining 15% consisting of secondary grassland. The secondary grassland unit consists of two grassland communities and cumulatively occupies an area of 1.13 ha. The vegetation

unit is dominated by grasses with a low forb diversity. The dominent species are the grassess *Eragrostis curvula* and *Enneapogon cenchroides*. The grasses *Hyparrhenia hirta, Aristida congesta* subsp. *barbicollis* and *Cynodon dactylon* are common and localised sub-dominants. Other common grasses include *Aristida congesta* subsp. *congesta*, *Melinis repens, Eragrostis lehmanniana* var*. lehmanniana*, *E. trichophora*, *Urochloa mosambicensis*, *Pogonarthria squarrosa* and *Heteropogon contortus*. Forbs include *Tagetes minuta*, Bidens bipinnata*, Sida rhombifolia, Alternanthera pungens*, Guilleminea densa**, *Vernonia* cf. *staehelinoides*, *Verbena officinalis** and *Helichrysum nudifolium.* No species of conservation concern were recorded within this unit however the unit has a low-medium ecological sensitivity.

The infrastructure unit of the No.1 Shaft occupies an area of approximately 6.41 ha. The vegetation within this unit are all secondary in nature and compromise of planted trees and ruderal weed communities. This unit is negligible in terms of ecological importance and function and does not contain suitable habitat for any plant species of conservation concern.

Figure 17 and Figure 18 below presents the broad-scale vegetation units and the ecological sensitivity, respectively.

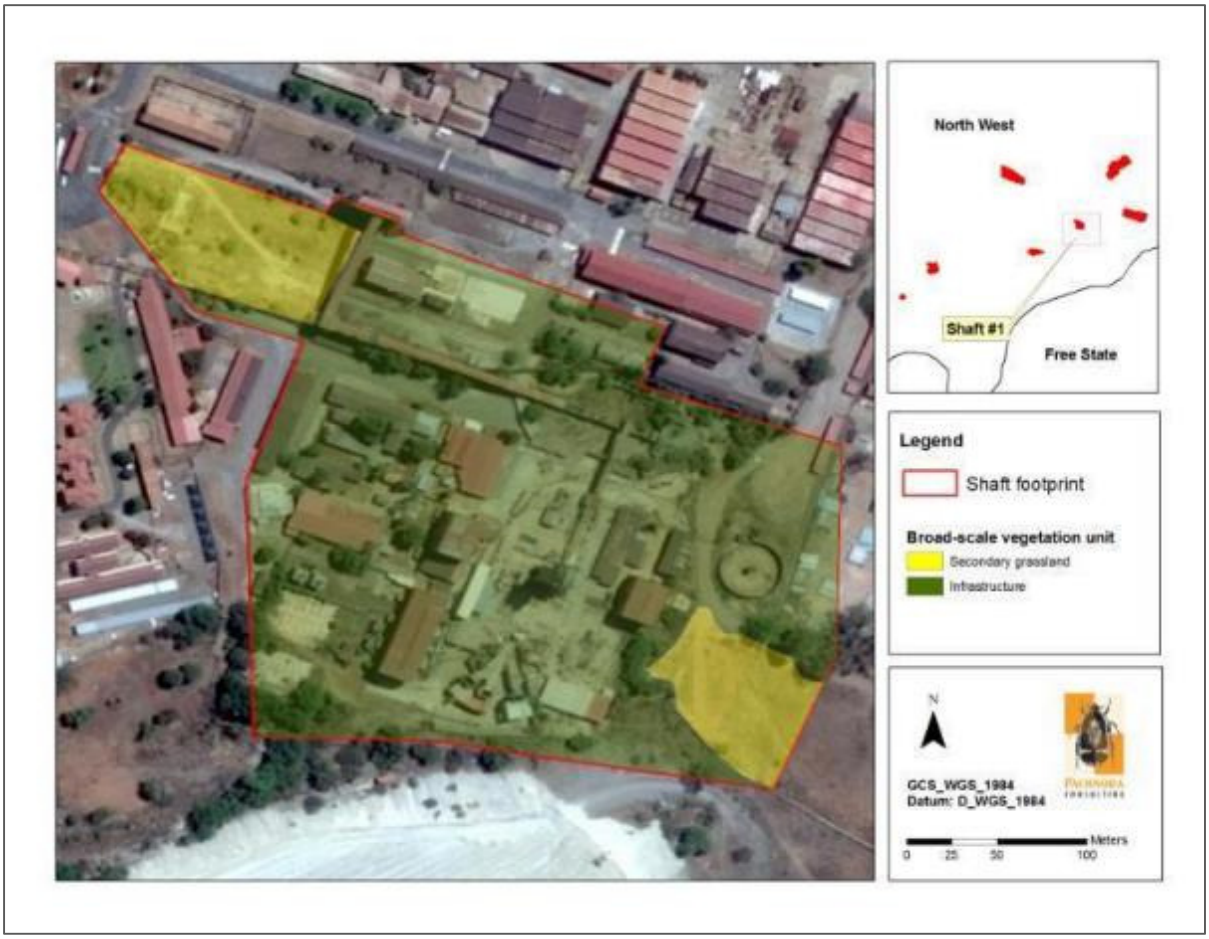

Figure 17: Broad-scale vegetation units associated with the No.1 Shaft (extracted from De Castro, 2015)

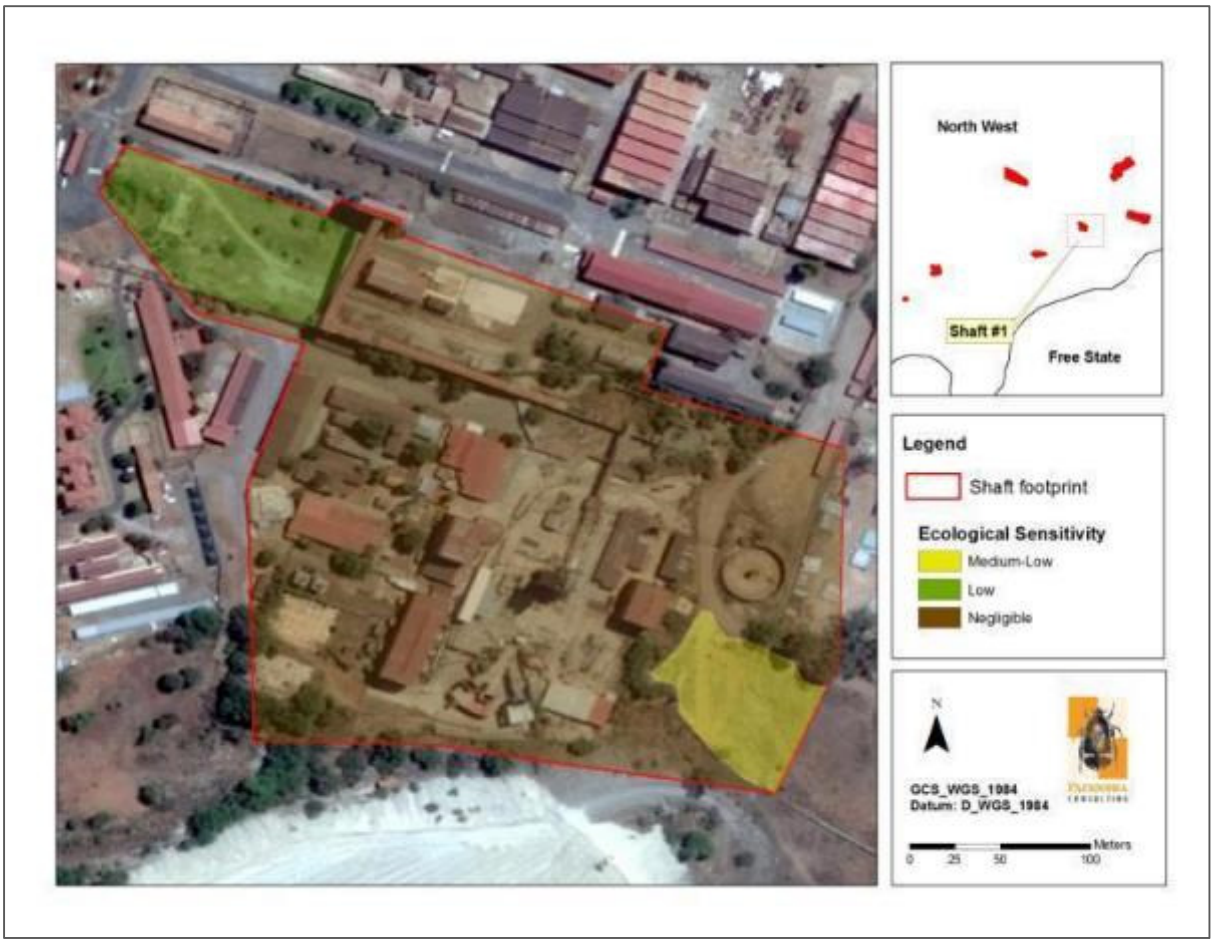

Figure 18: Ecological sensitivity associated with the No.1 Shaft (extracted from De Castro, 2015)

1.3.2 No.2 Shaft

Approximately 14% of the No.2 Shaft footprint area consists of secondary grass and the remainder 86% consists of infrastructure. 4.01 ha of the shaft footprint area consists of secondary grassland and compromises of two discrete grassland communities. The two communities are characterised by by a grassland sere consisting of secondary and pioneer graminoid taxa. The vegetation is primarily dominated by graminoid species, and forb richness is low. The dominant grass is *Cynodon dactylon*. Sub-dominant grasses include *Hyparrhenia hirta* and *Urochloa mossambicensis,* while the dominant forb species include *Schkuhria pinnata**. Other noteworthy plant species include *Tagetes minuta**, *Guilleminea densa**, *Bidens bipinnata*, Verbena bonariense*, Felicia muricata* and relict populations of *Indigofera heterotricha, Sida chrysantha, Hypoxis hemerocallidea* and *Ledebouria revoluta* (these taxa are prominent on untransformed grassland communities). The species richness is made up of alien ruderal weeds and indigenous pioneer species, which is typical of such secondary grassland. The unit has a low-medium ecological sensitvity as there are no species of conservation concern apart from scattered individuals of the declining geophyte *H.hemerocallidea.*

The vegetation occuring within the infrastructure unit are all secondary nature. The ecological sensitivity is negligible and contain no species of conservation concern. The vegetation comprises of planted trees (both indigenous and exotic ornamentals, in particular *Tipuana tipu*, Melia azedarach**, *Olea europaea* subsp. *africana, Combretum erythrophyllum* and *Searsia pendulina*) and ruderal weed communities. The derelict soccer field is dominated by *Cynodon dactylon* and *Urochloa mossambicensis*, while prominent forb species include *Tagetes minuta** and *Bidens bipinnata*.*

Figure 19 and Figure 20 below presents the broad-scale vegetation units and the ecological sensitivity, respectively.

Figure 19: Broad-scale vegetation units associated with the No.2 Shaft (extracted from De Castro, 2015)

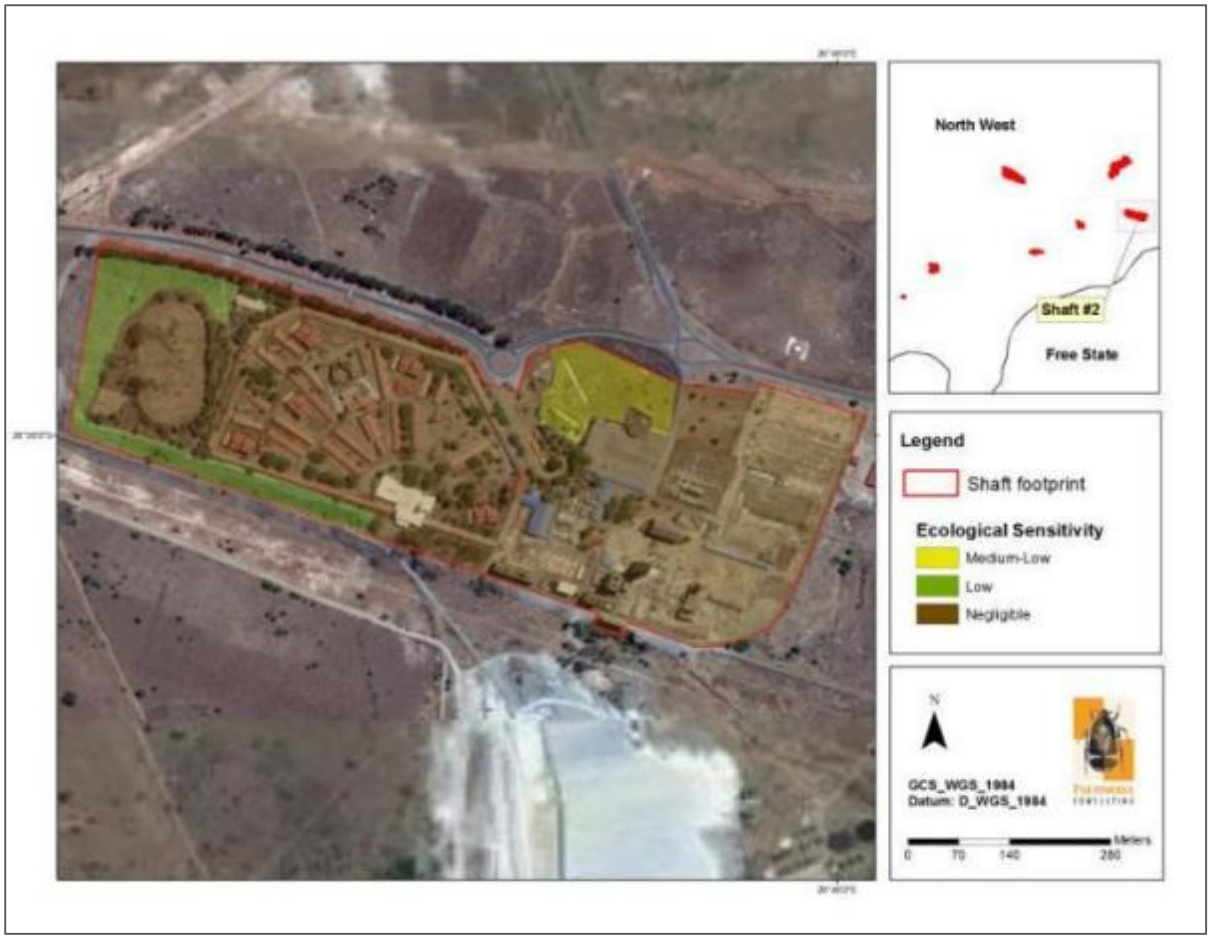

Figure 20: Ecological sensitivity associated with the No.2 Shaft (extracted from De Castro, 2015)

1.3.3 No.3 Shaft

Approximately 1.03 ha or 14% of the shaft footprint area consists of secondary grassland and secondary hygophilous grassland. The western section of the shaft footprint consists of a "plagioclimax" of *Hyparrhenia hirta*, while the grassland on the eastern section is structurally interspersed by exotic (and naturalised) bush clumps. Typical canopy constituents (pertaining to the bush clumps) include *Celtis australis*, Tipuana tipu*, Morus alba** along with indigenous species such as *Ziziphus mucronata, Searsia pyroides* and *Diospyros lycioides*. No Species of conservation concern were recorded from the secondary grassland unit. The dominant composition includes alien ruderal weeds and indigenous pioneer species, which is typical of secondary grassland. The unit therefore has a low ecological sensitivity.

The southern section of the shaft footprint consists of a small artificial drainage line which periodically receives storm water from the nearby shaft complex. The moist conditions have facilitated the colonisation of facultative wetland plant taxa such as *Phragmites australis* and *Verbena bonariense**. Other sub-dominants include *Pennisetum clandestinum**. This unit does not contain suitable habitat for

'species of conservation concern' although it is likely to facilitate the dispersal of small mammal taxa. Therefore, this unit has a ***low-medium*** ecological sensitivity

The remaining 86% or 6.44 ha comprises of infrastructure and the vegetation is secondary in nature with planted trees (indigenous and exotic ornamentals as wellas declared invader taxa) and ruderal weed communities. The infrastructure unit does not contain a suitable habitat for any plant species of conservation concern and the ecological sensitivity is negligible.

Figure 21 and Figure 22 below presents the broad-scale vegetation units and the ecological sensitivity, respectively.

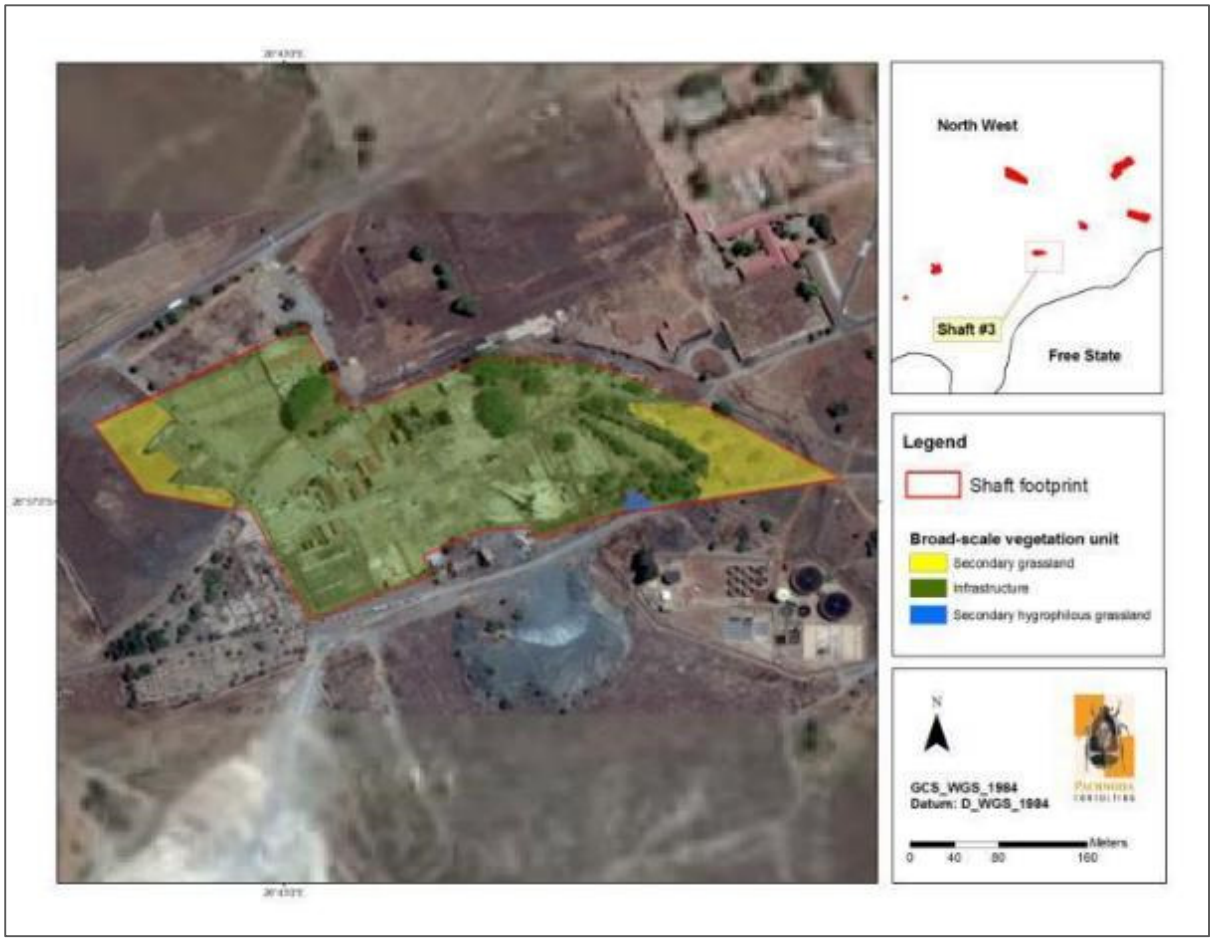

Figure 21: Broad-scale vegetation units associated with the No.3 Shaft (extracted from De Castro, 2015)

Figure 22: Ecological sensitivity associated with the No.3 Shaft (extracted from De Castro, 2015)

1.3.4 No.4 Shaft

Approximately 70% of the shaft footprint area is transformed by infrastructure, approximately 6% constitutes secondary grassland and approximately 24% constitutes untransformed grassland. The untransformed grassland has a high richness value for both graminoid and forb species and shows high affinities to an open *Themeda triandra - Indigofera heterotricha* grassland alliance. The untransformed grassland unit provides habitat for two plant species of conservation concern (*Pearsonia bracteata* and *Drimia sanguinea*) and therefore has a high ecological sensitivity.

The secondary grassland unit constitutes approximately 6% of the shaft footprint area and restricted to a derelict soccer field. The dominant grass species include *Urochloa mossambicensis*, while sub-dominants include *Eragrostis chloromelas* and *Cynodon dactylon*. No species of conservation concern were recorded from this unit.

The majority of the shaft footprint area consists of infrastructure and comprises of a transformed habitat with all vegetation being secondary in nature from neglected gardens and ruderal weed communities.

This unit does not contain suitable habitats for any plant species of conservation concern and is negligible in terms of its ecological importance.

Figure 23 and Figure 24 below presents the broad-scale vegetation units and the ecological sensitivity, respectively.

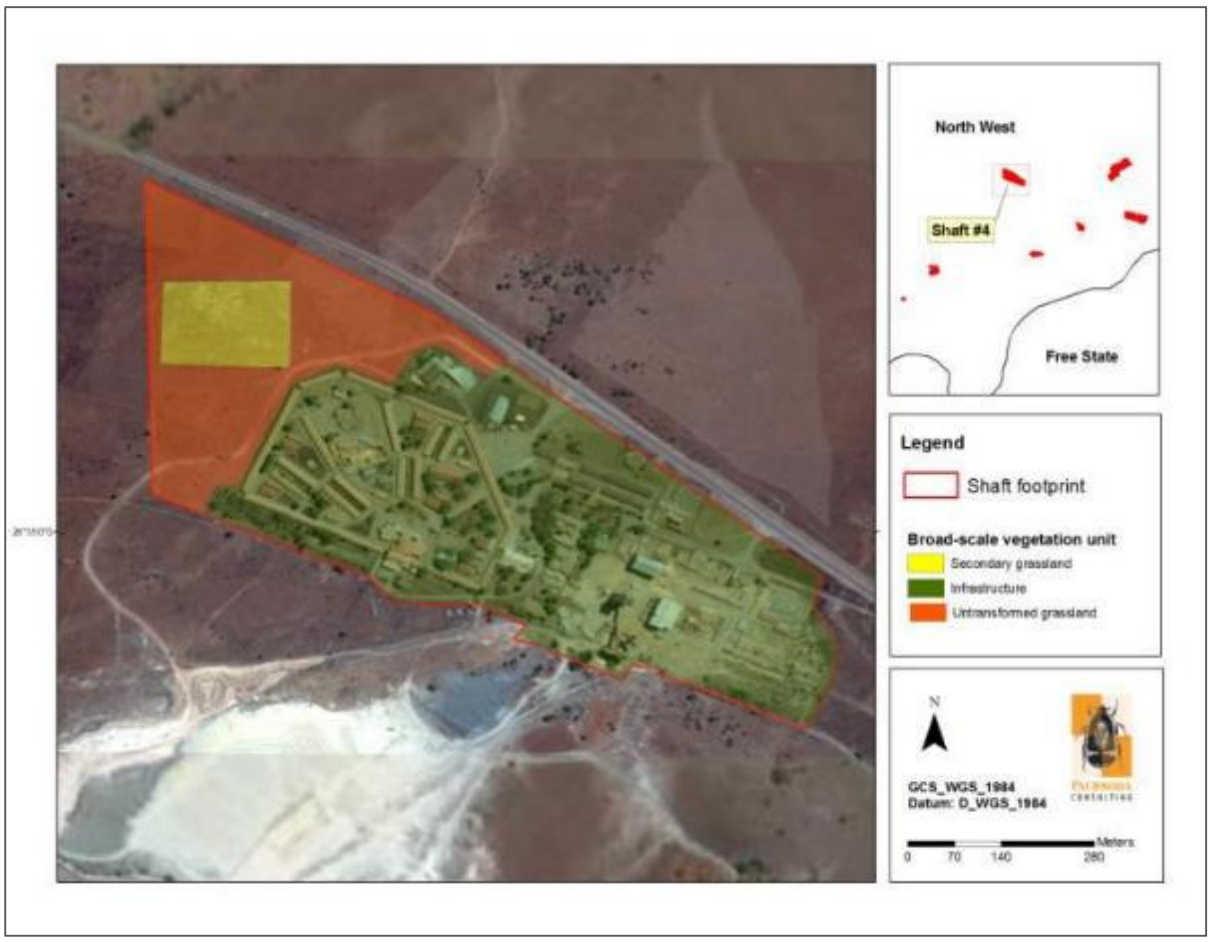

Figure 23: Broad-scale vegetation units associated with the No.4 Shaft (extracted from De Castro, 2015)

Figure 24: Ecological sensitivity associated with the No.4 Shaft (extracted from De Castro, 2015)

1.3.5 No.5 Shaft

Approximately 3% of the shaft consists of an agricultural mosaic, 10% consists of secondary grasslands, a further 10% consists of untransformed grassland and the remaining 77% has been transformed by infrastructure.

The agricultural mosaics constitutes 1.29 ha and is utilised for the production of maize for subsistence farming purposes. This unit has a low ecological sensitivity and is rapidly colonised by agrestal weeds.

The untransformed grassland unit occupies an area of approximately 4 ha and has a high graminoid and forb species richness. It is described as a short to medium (50-60 mm) *Themeda triandra - Indigofera heterotricha - Ledebouria revoluta* grassland alliance, of which the herbaceous layer represents approximately 70 % of the total vegetation cover. The unit also provides a habitat for two provincial protected plant species (*Babiana hypogea* and *Crinum graminicola*) and on declining species (*Hypoxis hemerocallidea*). It also provides potential habitat for two near threatened plant species (*Pearsonia bracteata* and *Drimia sanguinea*). This unit is floristically diverse and has a medium-high ecological sensitivity.

The secondary grassland unit occupies an approximate area of 4 ha and primarily confined to an old soccer field. The unit is characterised by secondary graminoid species and agrestal weed communities. No species of conservation concern were recorded within this unit and the unit comprises of secondary vegetation confined to previously transformed habitats with a low species richness. The unit has a low ecological sensitivity.

The remaining 30.73 ha constitutes the infrastructure unit within which the vegetation is secondary in nature and comprises of neglected gardens and ruderal weed communities. The ecological sensitivity of this unit is negligible and does not contain suitable habitats for any plant species of conservation concern.

Figure 25 and Figure 26 below presents the broad-scale vegetation units and the ecological sensitivity, respectively.

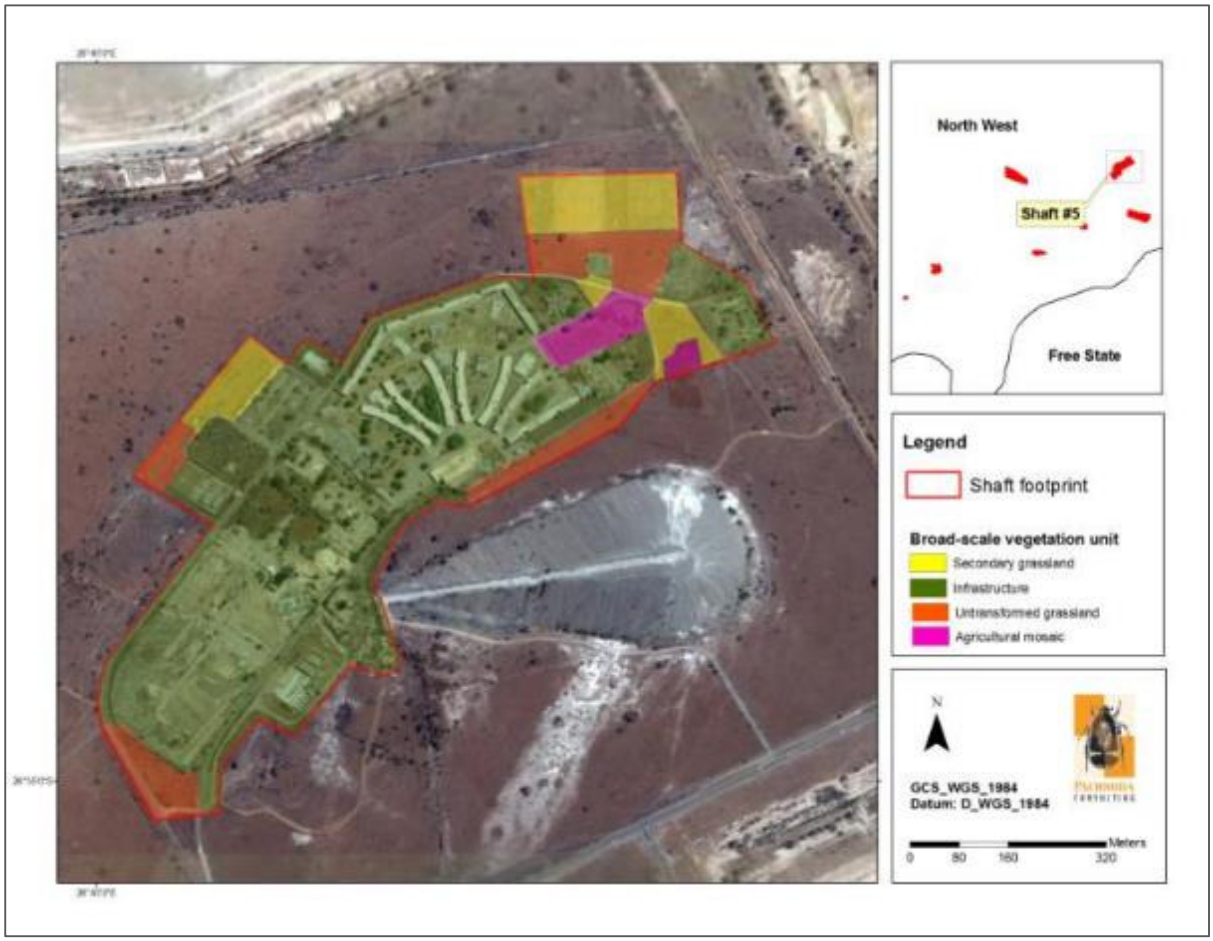

Figure 25: Broad-scale vegetation units associated with the No.5 Shaft (extracted from De Castro, 2015)

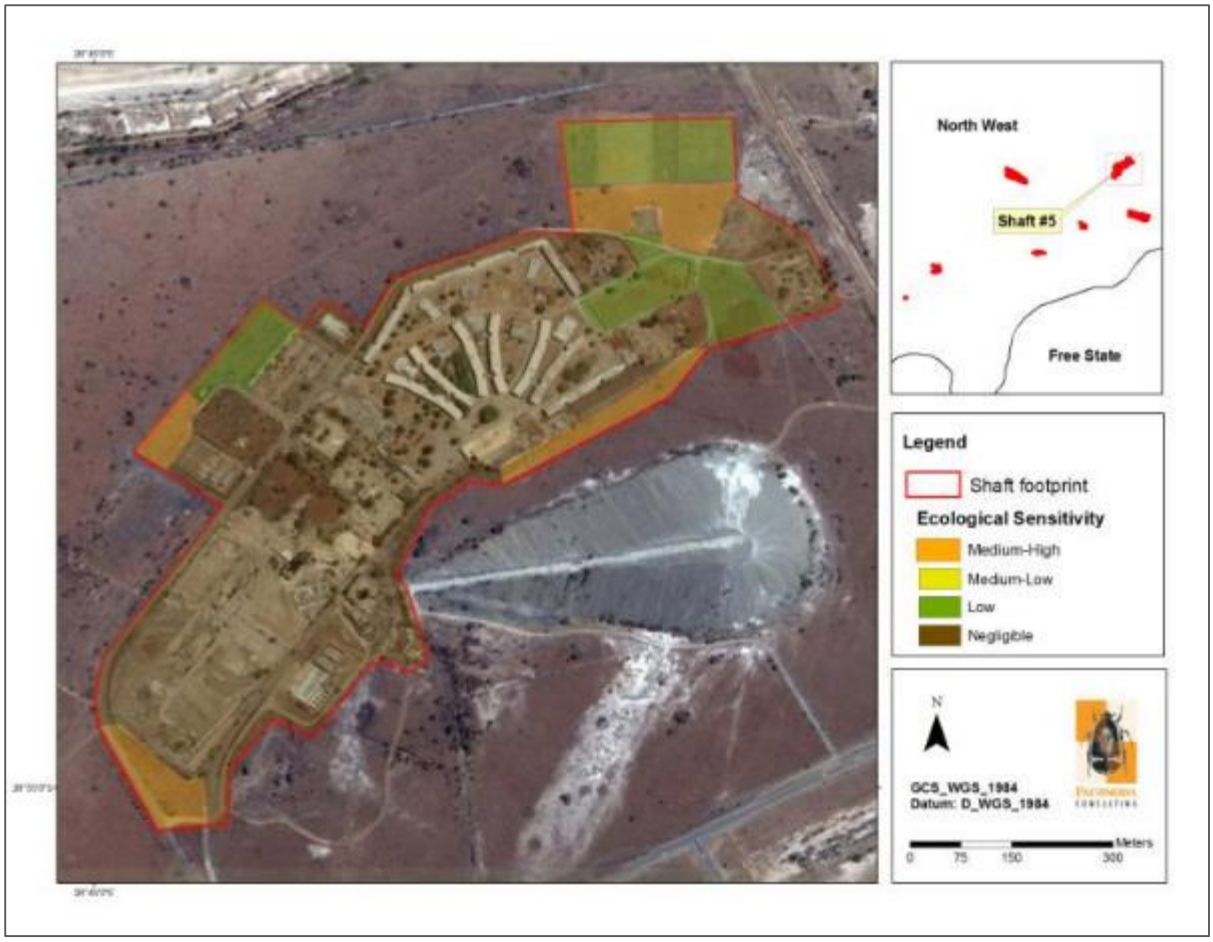

Figure 26: Ecological sensitivity associated with the No.5 Shaft (extracted from De Castro, 2015)

1.3.6 No.6 Shaft

The entire footprint of the No.6 Shaft is transformed by infrastructure. All vegetation within this unit is secondary in nature and comprises of neglected gardens and ruderal weed communities. The ecological sensitivity of this unit is negligible and does not contain suitable habitat for any plant species of conservation concern.

Figure 27 and Figure 28 below presents the broad-scale vegetation units and the ecological sensitivity, respectively.

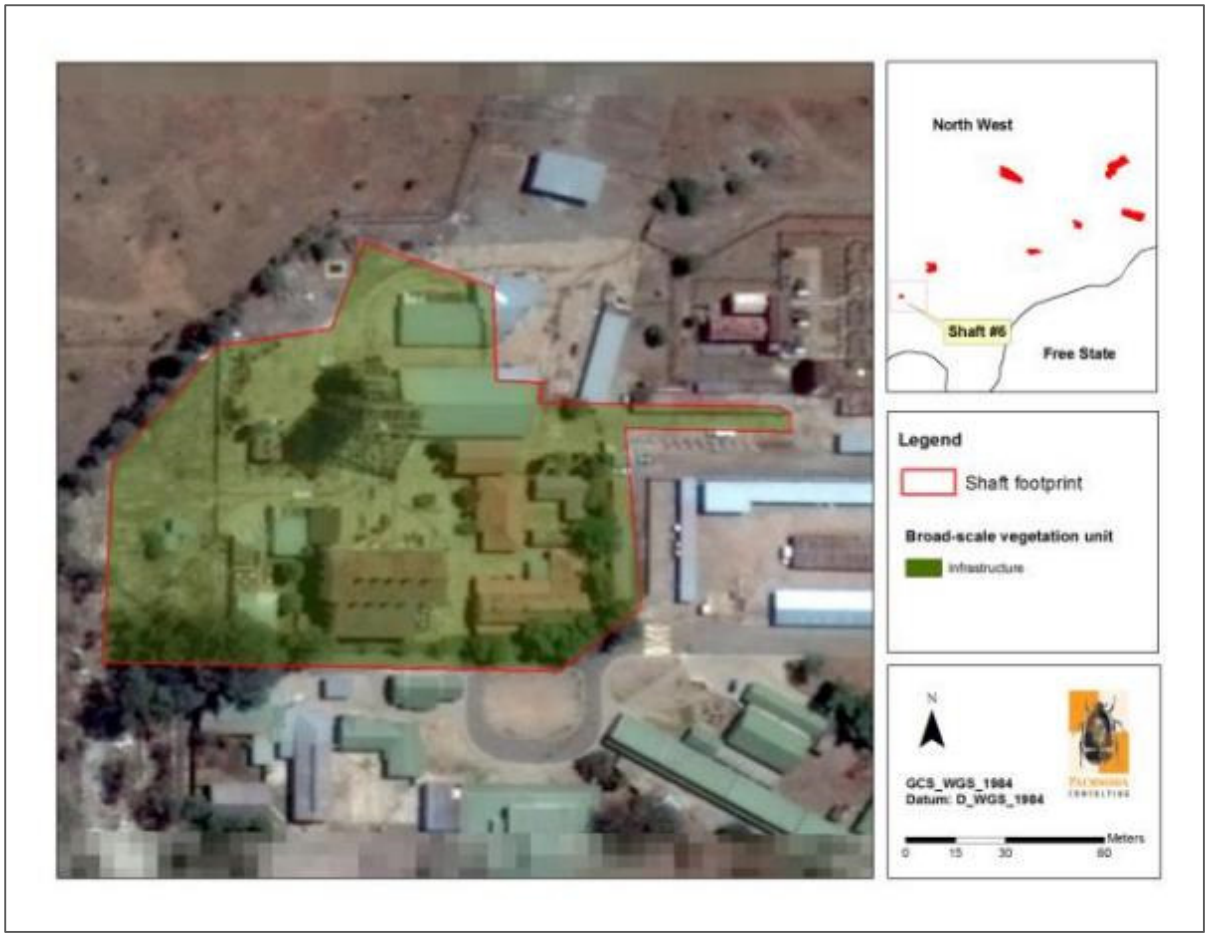

Figure 27: Broad-scale vegetation units associated with the No.6 Shaft (extracted from De Castro, 2015)

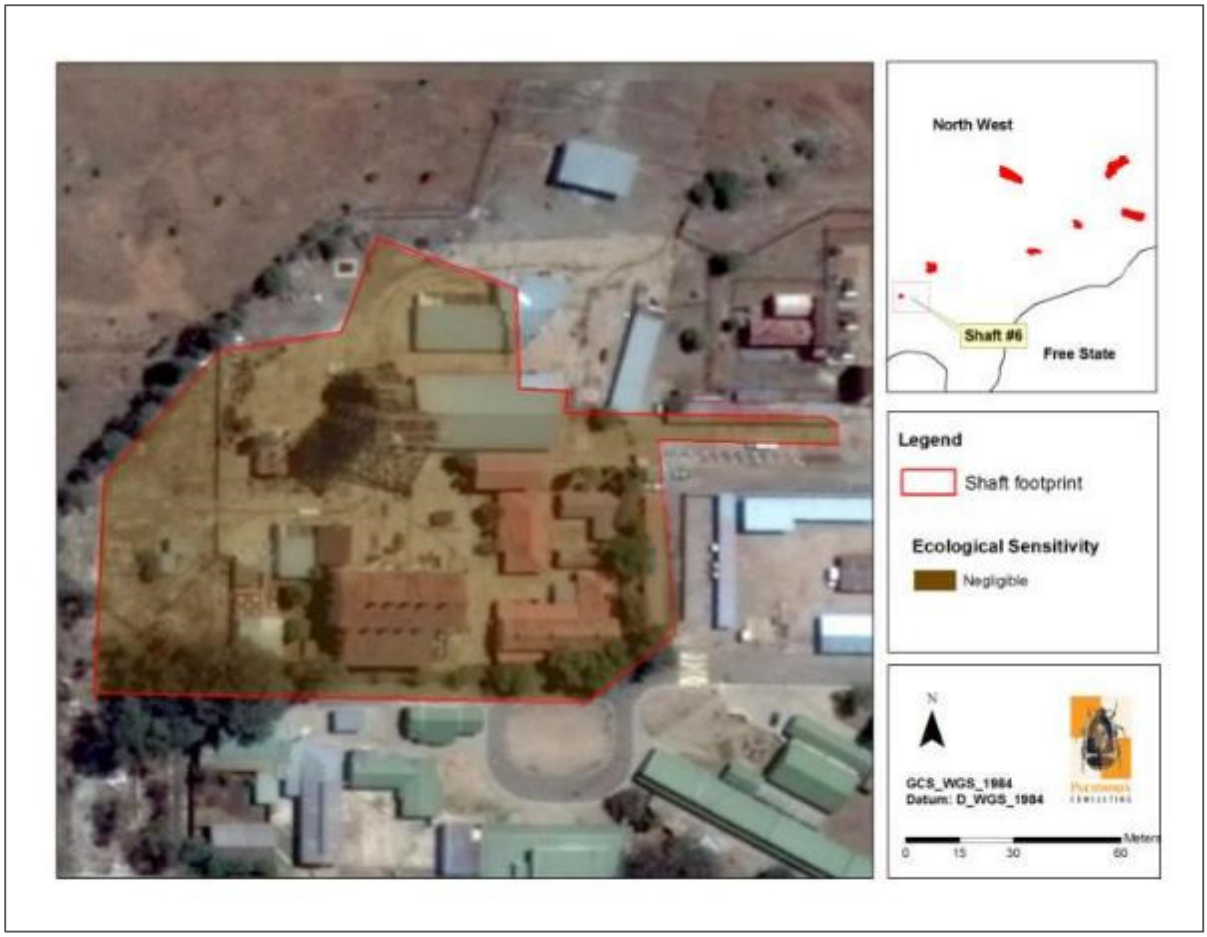

Figure 28: Ecological sensitivity associated with the No.6 Shaft (extracted from De Castro, 2015)

1.3.7 No.7 Shaft

Approximately 15% of the footprint area comprises of secondary grassland with the remaining 85% comprising of infrastructure. The secondary grassland unit occupies and are of approximately 1.77 ha and is characterised by degraded grassland and ruderal weed species among tall stands of *Eucalyptus* cf. *camaldulensis.* No species of conservation concern were identified within this unit and the dominant plant species include *Melinis repens, Enneapogon cenchroides* and *Tagetes minuta*. This unit has an ecological sensitivity of low.

The infrastructure occupies an area of approximately 9.93 ha and consists of transformed habitat with all vegetation being secondary in nature. The vegetation consists of neglected gardens, extensive stands of *Eucalyptus* spp. and ruderal weed communities. The unit does not contain suitable habitat for any plant species of conservation concern and therefore the ecological sensitivity of the unit is negligible.

Figure 29 and Figure 30 below presents the broad-scale vegetation units and the ecological sensitivity, respectively.

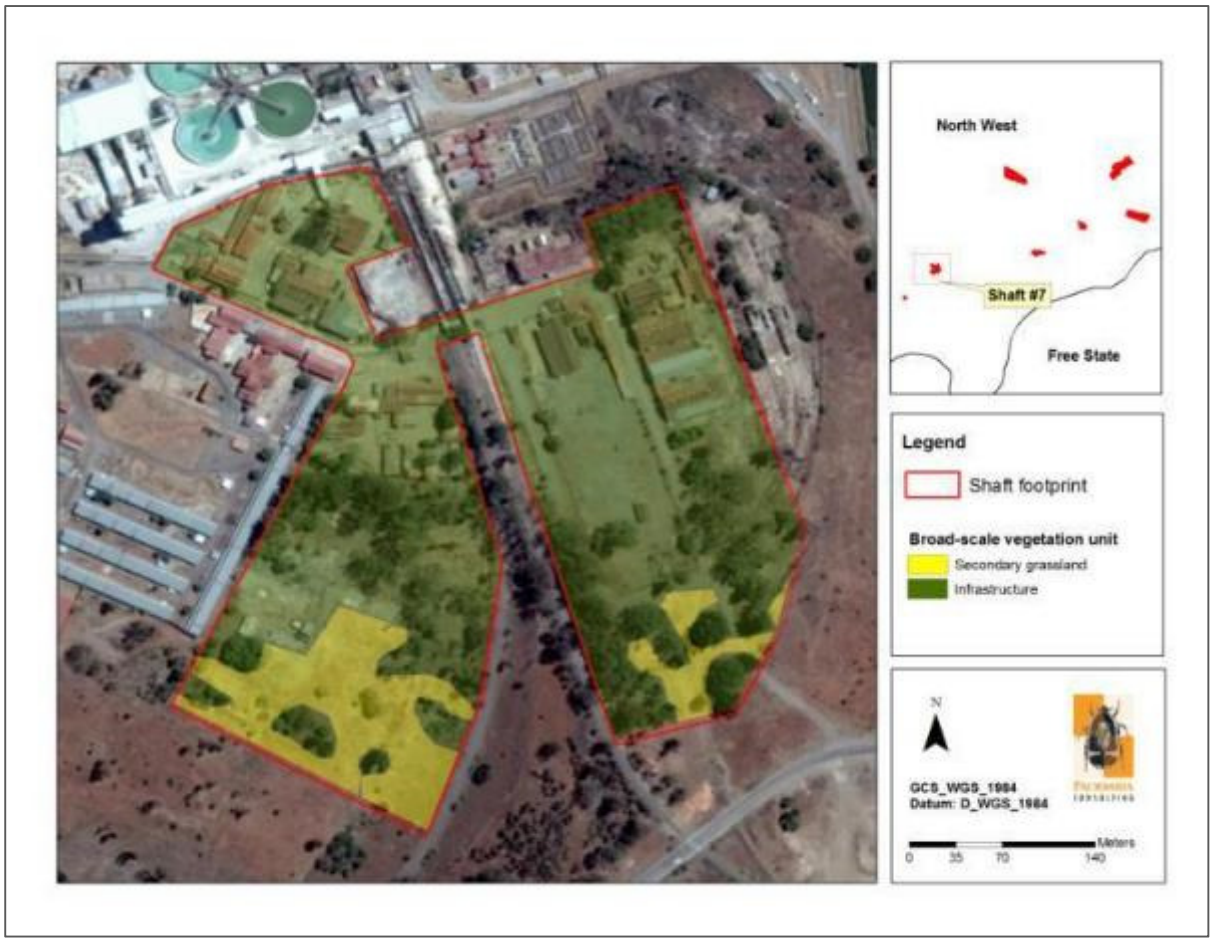

Figure 29: Broad-scale vegetation units associated with the No.7 Shaft (extracted from De Castro, 2015)

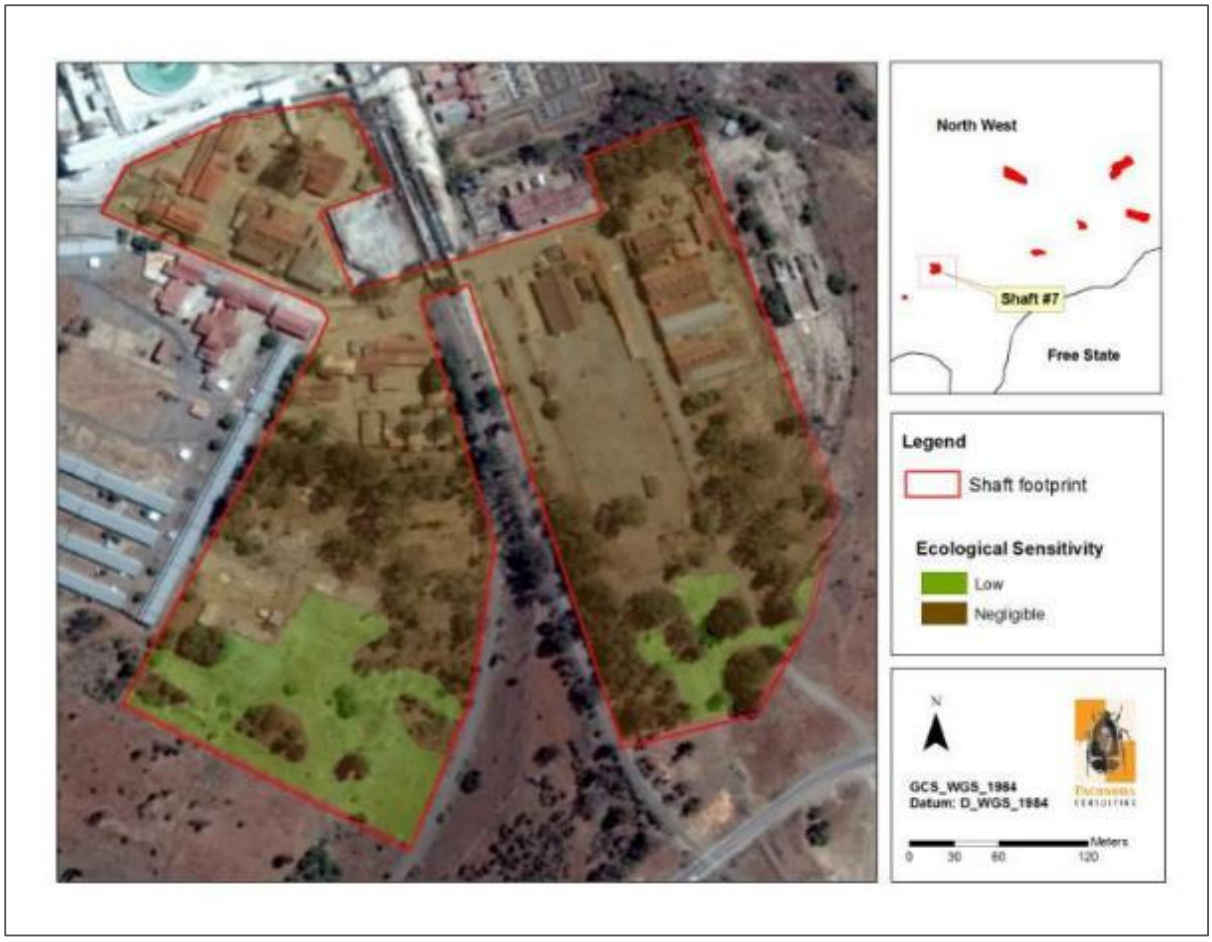

Figure 30: Ecological sensitivity associated with the No.7 Shaft (extracted from De Castro, 2015)

Chapter F: Fauna

1.1 Regional description

1.1.1 Mammal species

The study area provides potential habitat for 10 mammal taxa of conservation concern none of which were confirmed during the site survey. Historical records indicate that of these 10 mammal taxa, two are globally threatened species, one is a globally near threatened species, one species is regionally threatened, three species are regionally near threatened and five species are data deficient. Table 22 below presents these 10 mammal taxa which are of conservation concern.

Table 22: List of species of conservation concern which may occur within the study area (adapted from De Castro, 2015)

Scientific Name	Common Name	Global Conservation Status	National Conservation Status	Probability of Occurrence	Habitat
Atelerix frontalis	South African Hedgehog	Least Concern	Near threatened	High, could be present.	A widespread species that prefer dry habitat types and will often utilise urban gardens.
Crocidura cyanea	Reddish-Grey Musk Shrew	Least Concern	Data Deficient	High.	Dry terrain among rocks in dense scrub and grass, in moist places and in hedges.
Crocidura hirta	Lesser Red Musk Shrew	Least Concern	Data Deficient	High.	Wide habitat tolerance.
Crocidura mariquensis	Swamp Musk Shrew	Least Concern	Data Deficient	Moderate.	Moist habitats, e.g. thick grass along riverbanks, reedbeds and in swamps.
Felis nigripes	Black-footed Cat	Vulnerable	Least Concern	Low, habitat regarded as sub-optimal	Varied, partial to short grassland with high prey densities (e.g. small mammals and terrestrial birds) and old burrows/termitaria used for shelter.
Mellivora capensis	Honey Badger	Least Concern	Near threatened	Moderate, regarded as an irregular visitor	Catholic, widespread and tolerant to most habitat types.
Mystromys albicaudatus	White-tailed Rat	Endangered	Endangered	Low (optimal habitat was absent)	A species associated with "climax" or "sub-climax" grassland on black loamy soils with good cover.
Parahyaena brunnea	Brown Hyaena	Near threatened	Near threatened	Moderate (probably displaced by anthropogenic activities and persecution)	Varied and very catholic in habitat preference.
Suncus infinitesimus	Least Dwarf Shrew	Least Concern	Data Deficient	Low.	Varied, although commonly associated with termitaria.
Suncus varilla	Lesser Dwarf Shrew	Least Concern	Data Deficient	Low.	Varied, although commonly associated with termitaria.

Due to the widespread habitat transformation and anthropogenic displacement, the majority of the species listed in Table 22 above (with the exception of the South African Hedgehog and the Shrew taxa) are uncommon or absent from the study area.

The species that could occur within the area are:

- Brown Hyaena (*Parahyaena brunnea*).
    - Based on the high incidence of human activities in the area and the lack of any recent observations by citizen science projects (e.g. MammalMap) it is regarded as an occasional/irregular visitor to the area.
- Honey Badger (*Mellivora capensis*).
    - The regional conservation status of *M. capensis* is currently under revision, and supporting evidence suggests that it will be downgraded from near threatened to least concern
- South African Hedgehog (*Atelerix frontalis*).
    - It is considered a resident on areas consisting of untransformed vegetation on the study area.
- Data Deficient Taxa (all shrew taxa - *Crocidura* and *Suncus)*.
    - The regional conservation status of these taxa is currently under revision, and supporting evidence suggests that many taxa will be downgraded to least concern
- Black-footed Cat (*Felis nigripes*).
    - *F. nigripes* is considered to be irregular in occurrence in the study area.

1.1.2 Bird species

There are 26 species of conservation concern which may occur within the study area and of these 26 species, the Melodious Lark (*Mirafra cheniana*) was confirmed during the site survey. There are also only two other bird species of conservation concern that are likely to occur regularly within the study area and are the near threatened Abdim's Stork (*Ciconia abdimii*) and the vulnerable Lanner Falcon (*Falco biarmicus*). The remaining taxa are either irregular foraging visitors or are unlikely to be present on the study area due to the absence of suitable habitats

Table 23 below presents the bird species of conservation concern that could utilise the study area based on their known distribution range (SABAP1 and SABAP2) and the presence of a suitable habitat.

Table 23: bird species of conservation concern that could utilise the study area (adapted from De Castro, 2015)

Species	Global Conservation Status*	National Conservation Status**	Average SABAP1 reporting rate (n=441 cards)	Average SABAP2 Reporting rate (n=315 cards)	Preferred Habitat	Potential Likelihood of Occurrence on study area (shaft footprints)
Alcedo semitorquata (Half-collared Kingfisher)	-	Near threatened	0.45	-	Prefers fast-flowing and well-vegetated streams.	Unlikely to occur.
Anthropoides paradiseus (Blue Crane)	Vulnerable	Near threatened	2.27	-	Prefers open grasslands. Also forages in wetlands, pastures and agricultural land.	Vagrant to study area.
Charadrius pallidus (Chestnut-banded Plover)	Near threatened	Near threatened	1.36	-	Large ephemeral saline pans and depressions.	Unlikely to occur.
Ciconia abdimii (Abdim's Stork)	-	Near threatened	15.86	3.76	Open stunted grassland, fallow land and agricultural fields.	A fairly common summer foraging visitor to the area.
Ciconia nigra (Black Stork)	-	Vulnerable	2.26	-	Breeds on steep cliffs within mountain ranges; forages on ephemeral wetlands.	Unlikely to occur.
Circus maurus (Black Harrier)	Near threatened	Near threatened	1.82	-	Generally confined to the clay grasslands on the south-western parts of Mpumalanga.	Highly irregular and rare foraging visitor to untransformed grassland patches.

Species	Global Conservation Status*	National Conservation Status**	Average SABAP1 reporting rate (n=441 cards)	Average SABAP2 Reporting rate (n=315 cards)	Preferred Habitat	Potential Likelihood of Occurrence on study area (shaft footprints)
Circus ranivorus (African Marsh Harrier)	-	Endangered	1.36	-	Restricted to permanent wetlands with extensive reedbeds.	Unlikely to occur.
Coracias garrulous (European Roller)	Near threatened	Near threatened	2.0	-	Open woodland and bushveld.	An irregular to rare summer (non-breeding) visitor.
Eupodotis senegalensis (White-bellied Korhaan)	-	Vulnerable	1.13	-	Prefers transitional habitat between grassland and savanna (e.g. Bankenveld).	Unlikely to occur.
Falco biarmicus (Lanner Falcon)	-	Vulnerable	5.67	3.9	Varied, but prefers to breed in mountainous areas.	A regular foraging visitor to the area.
Glareola nordmanni (Black-winged Pratincole)	Near threatened	Near threatened	0.91	-	A species preferring extensive open grassland, usually near wetlands. Often forages over agricultural land and pastures.	An uncommon to rare summer foraging visitor.
Gyps africanus (White-backed Vulture)	Endangered	Endangered	1.13	-	Breeds on tall, flat-topped trees. Mainly restricted to large rural or game farming areas.	Vagrant to study area.

Species	Global Conservation Status*	National Conservation Status**	Average SABAP1 reporting rate (n=441 cards)	Average SABAP2 Reporting rate (n=315 cards)	Preferred Habitat	Potential Likelihood of Occurrence on study area (shaft footprints)
Leptoptilos crumeniferus (Marabou Stork)	-	Near threatened	6.36	-	Varied, from savanna to wetlands, pans and floodplains – dependant of game farming areas.	Vagrant to the study area.
Mirafra cheniana (Melodious Lark)	Near threatened	(Delisted)	-	1.64	A species with a preference for open dry "climax" *Themeda triandra* grassland or open primary grassland dominated by sour wiry grasses such as *Loudetia simplex, Tristachya rehmannii and Trachypogon spicatus* on well drained sandy substrates. Also secondary *Eragrostis*-dominated grassland.	Recorded from untransformed grassland (Shaft complex No.4)
Mycteria ibis (Yellow-billed Stork)	-	Endangered	1.36	-	Prefers shoreline habitat bordering large impoundments and extensive wetland systems.	Unlikely to occur.
Oxyura maccoa (Maccoa Duck)	Near threatened	Near threatened	4.09	-	Large saline pans and shallow impoundments.	Unlikely to occur.
Pelecanus onocrotalus (Great White Pelican)	-	Vulnerable	0.91	-	Forages on large impoundments, lakes and estuaries.	Unlikely to occur.

Species	Global Conservation Status*	National Conservation Status**	Average SABAP1 reporting rate (n=441 cards)	Average SABAP2 Reporting rate (n=315 cards)	Preferred Habitat	Potential Likelihood of Occurrence on study area (shaft footprints)
Pelecanus rufescens (Pink-backed Pelican)	-	Vulnerable	1.36	-	Forages on large impoundments, lakes and estuaries.	Unlikely to occur.
Phoeniconaias minor (Lesser Flamingo)	Near threatened	Near threatened	2.95	1.64	Restricted to large alkaline pans and other inland water bodies.	Unlikely to occur.
Phoenicopterus ruber (Greater Flamingo)	-	Near threatened	5.9	1.35	Restricted to large saline pans and other inland water bodies.	Unlikely to occur.
Polemaetus bellicosus (Martial Eagle)	Near threatened	Endangered	0.45	4.76	Varied, from open karroid shrub to lowland savanna.	Vagrant to study site.
Rhinoptilus africanus (Double-banded Courser)	-	Near threatened	2.5	-	Arid, open grassland and stunted karroid veld or open gravel plains.	Very rare to uncommon resident - probably absent.
Rostratula benghalensis (Greater Painted Snipe)	-	Vulnerable	0.45	2.7	Inundated grassland bordering seasonal wetlands and pans.	Unlikely to occur.
Sagittarius serpentarius (Secretarybird)	Vulnerable	Vulnerable	7.26	-	Prefers open grassland or lightly wooded habitat.	An irregular foraging visitor.
Sterna caspia (Caspian Tern)	-	Vulnerable	-	33.3	Large impoundments, large rivers and coastal (marine) habitat.	Unlikely to occur.

Species	Global Conservation Status*	National Conservation Status**	Average SABAP1 reporting rate (n=441 cards)	Average SABAP2 Reporting rate (n=315 cards)	Preferred Habitat	Potential Likelihood of Occurrence on study area (shaft footprints)
Tyto capensis (African Grass-owl)	-	Vulnerable	0.91	-	Prefers rank moist grassland that borders drainage lines or wetlands.	Highly irregular foraging visitor.

1.1.3 Amphibians and reptiles

There are currently no frog species that are of conservation concern, sympatric to the study area. Similarly, according to the recent conservation assessment, no reptile species of conservation concern are sympatric to the study area (refer to Annexure C3).

Chapter G: Surface Water

The information contained in this section of the document is extracted from the report titled: "*China African Precious Metals (Pty) Ltd. Orkney Gold Mine, Storm Water Management Plan*" dated March 2015 and compiled by Shangoni Management Services (Shangoni, 2015).

1.1 Regional and local Drainage

The CAPM Orkney Gold mine (and associated shaft areas) is situated in the primary catchments of the Vaal River and are located in the C24H and C24B quaternary catchments, as defined by the DWS. The applicable Water Management Area (WMA) is referred to the Middle Vaal Management Area. Figure 31 below presents the seven (7) shaft areas in relation to the two (2) quaternary catchment.

The Vaal River is situated to the south of the seven (7) CAPM shaft locations and flows westerly direction towards its confluence with the Orange River (approximately 12 km west of the town of Douglas in the Northern Cape). The No.2 Shaft is closest to the Vaal River at an approximate distance of 1.3 km.

The Schoonspruit is situated to the west of the CAPM shaft locations (closest to No.6 Shaft at distance of 1.38 km) and flows in a southerly direction between the towns of Orkney and Kanana, after which it converges with the Vaal River. The general drainage at the CAPM operations, taking into account all the shaft locations, is in a south-south western direction towards the Vaal River and Schoonspruit depression.

1.2 Surface Water Quantity

The annual run-off from the Orkney sub-catchment area is negligible compared to the existing flow of the Vaal River. Dry weather water flow in the Vaal River upstream of the mine is 17.9m³/s and is regulated by the DWA.

1.3 Surface water quality

During the Hydrocensus conducted, as part of the Geohydrological Assessment (Refer to Annexure C1), Seven (7) surface water samples were taken and subjected to chemical analysis. The descriptions of the samples taken is as follows:

- Three (3) samples on the Vaal River.

- Two (2) samples on the Schoonspruit up- and downstream from Orkney Town and the No.6 Shaft and the No.7 Shaft.
- Two (2) samples from the return water dam (not CAPM owned or operated) located within the study area.

These samples were taken in order to determine the baseline surface water quality of the study area. The results of the hydrochemical analysis is presented in Table 24 below. Refer also to Figure 32 below for the location of the sampling points.

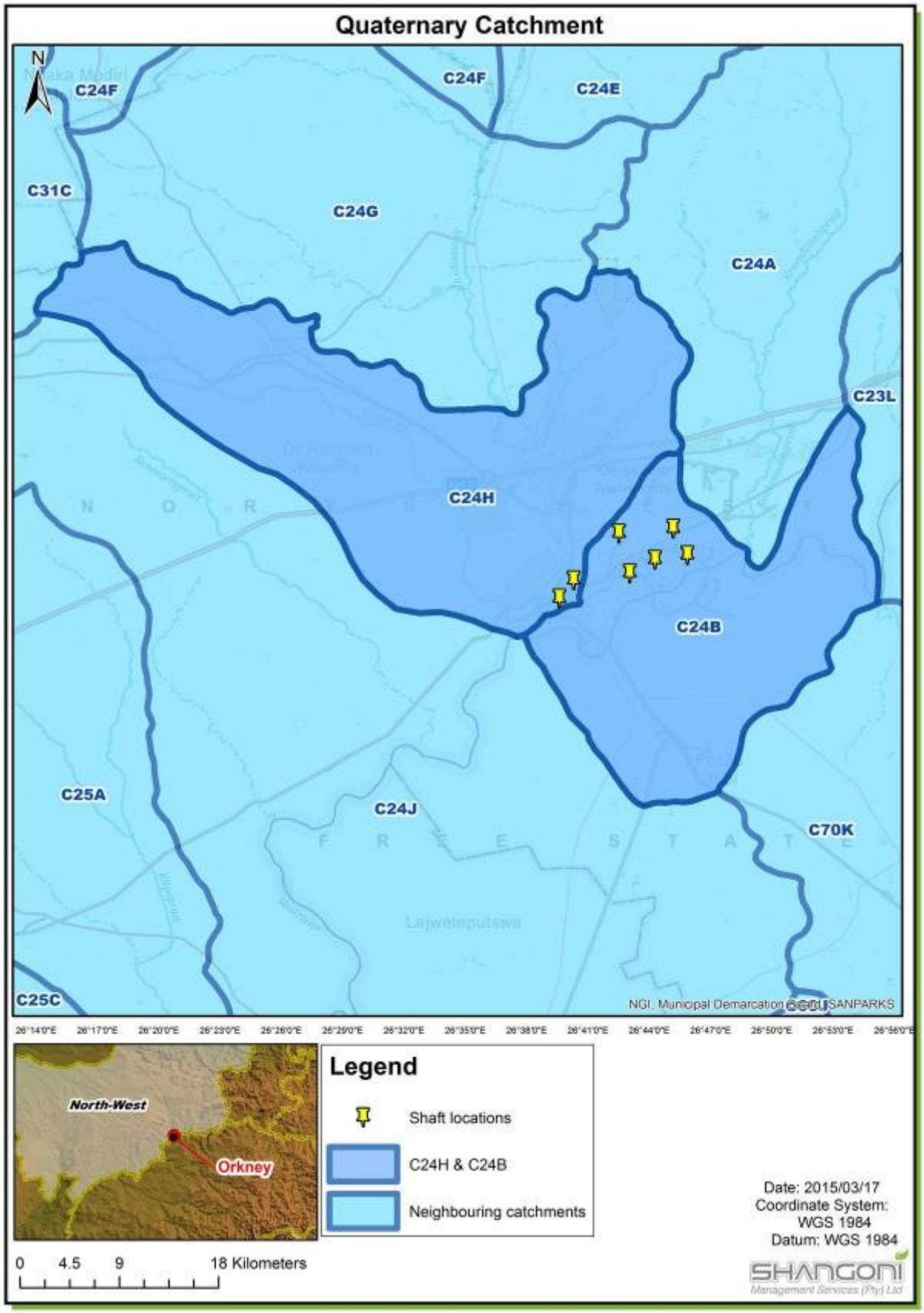

Figure 31: Quaternary Catchments in relation to the seven (7) CAPM shaft areas (extracted from Shangoni, 2015) (Refer also to Annexure A2).

Table 24: Results of the hydrochemical analysis (extracted from AquiScience, 2015)

SITE ID	SANS 241: 2011	Skoonspruit		Vaal River			Other	
		SW2 (u/s)	SW1 (d/s)	SW5	SW4	SW3	SW6	SW7
pH	5 – 9.7	7.09	7.94	9.34	9.42	9.1	8.18	8.45
EC mS/m	≤170	52.1	76.2	62.6	63.4	62.2	**309**	**205**
TDS mg/l	≤1200	338.65	495.3	406.9	412.1	404.3	**2008.5**	**1332.5**
Ca mg/l	-	41.7	49.2	53.7	56	54.4	316	197
Mg mg/l	-	16.8	19.6	20.3	21.1	20	117	47.7
Na mg/l	≤200	33.8	58.1	48.1	49.4	49.2	**288**	179
K mg/l	-	6.95	11.6	9.03	9.07	8.45	23.1	33.2
MALK mg/l	-	107	202	131	133	128	146	121
Cl mg/l	≤300	43.4	74	48.3	49.2	52.2	210	88.1
SO_4 mg/l	≤500	75.5	83.6	105	109	106	**1383**	**767**
NO_3 mg N/l	≤11	1.13	<0.017	<0.017	<0.017	<0.017	0.521	1.67
NH_4 mg N/l	≤1.5	**2.38**	**11.1**	0.028	0.065	0.04	**4.31**	**5.23**
Inorganic N mg/l	-	3.51	11.1	0.028	0.065	0.04	4.831	6.9
PO_4 mg P/l	-	0.333	1.66	0.151	0.135	0.148	<0.008	0.021
F mg/l	≤1.5	0.287	0.365	0.315	0.306	0.279	<0.055	0.253
Al mg/l	≤0.3	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fe mg/l	≤2.0	<0.003	0.208	<0.003	<0.003	<0.003	<0.003	<0.003
Mn mg/l	≤0.5	<0.001	0.471	<0.001	<0.001	<0.001	0.007	**5.85**
Cr mg/l	≤0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu mg/l	≤2.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.459
Ni mg/l	≤0.07	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.113
Zn mg/l	≤5.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Co mg/l	≤0.50	<0.001	<0.001	0.001	0.003	0.002	0.441	0.167
Cd mg/l	≤0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Pb mg/l	≤0.010	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.059
Classification		***Poor class 3***	***Unacceptable class 4***	***Ideal class 0***			***Unacceptable class 4***	**Poor class 3**
Worst parameter		**NH4**	**NH4**	**-**			**SO4**	**SO_4, Mn**

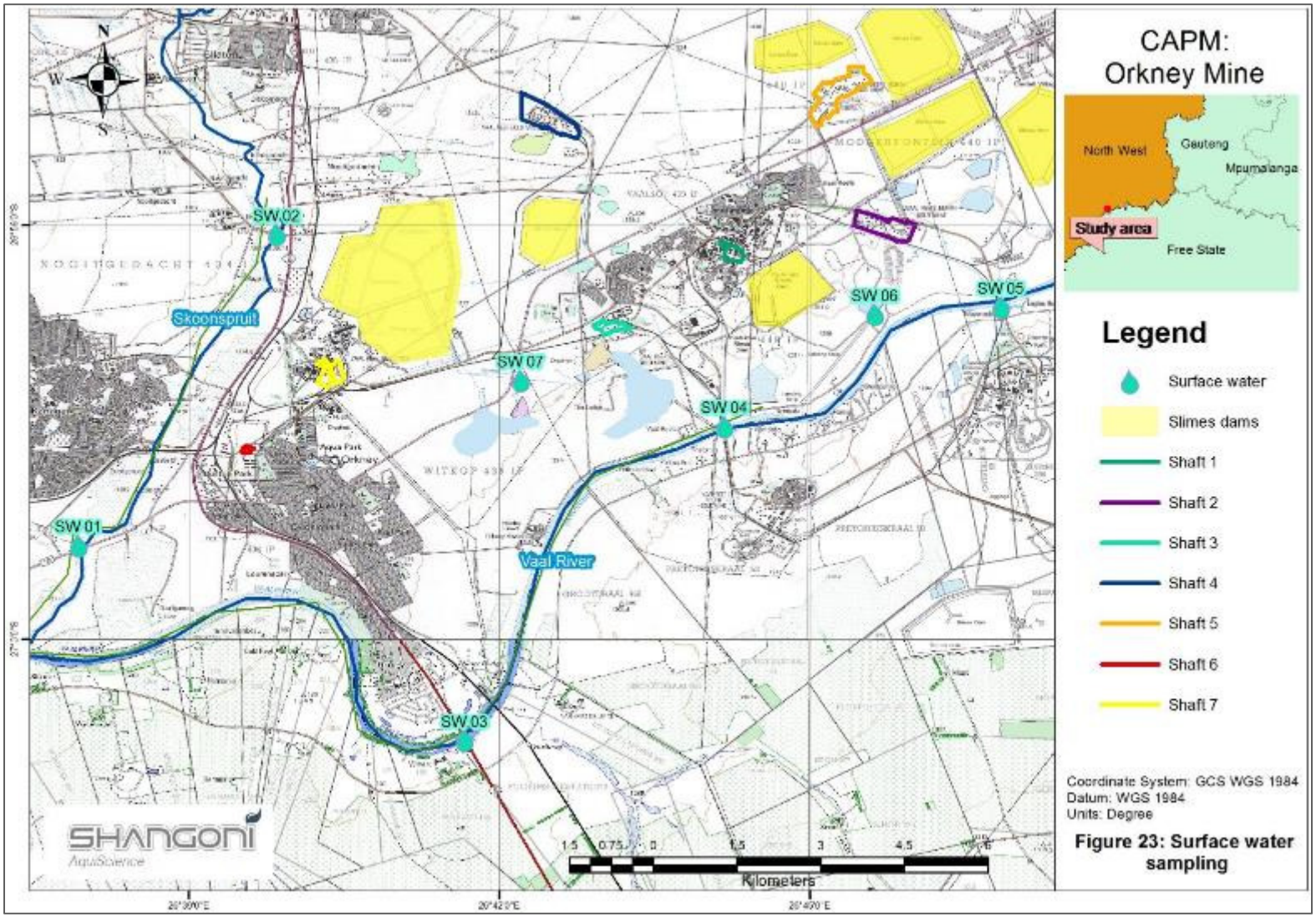

Figure 32: Locality of the seven (7) surface water monitoring points (extracted from AquiScience, 2015)

Chapter H: Wetlands and other surface water features

There are no wetlands within the surface area of the seven shafts of the CAPM Orkney Gold Mine. As described above in Chapter G, the closest surface water resources are the Vaal River (approximately 1.3 km to the south of the No.2 Shaft) and the Schoonspruit (approximately 1.38 km to the west of the No.6 Shaft).

An assessment was undertaken to determine the proximity of the seven (7) CAPM shaft areas in relation to the wetland Freshwater Ecosystem Priority Areas (NFEPA).

As seen in Figure 33 below, there are no wetlands that traverse the shaft areas. However, there is a high presence of artificial wetlands around the shaft areas, likely created by previous mining and mining related activities. There are also three natural wetlands, one south of the No.4 Shaft, one south of the No.3 Shaft and one to the north of the No.2 Shaft. The details of these wetlands are provided in Table ***25*** below.

Table 25: FEPA wetlands in close proximity to the No.2 Shaft, No.3 Shaft and No.4 Shaft

Shaft	FEPA Wetland Status	Wetland classification	Approximate proximity to shaft	Figure 33 description
No. 2 Shaft	Natural Wetland	Unchannelled valley bottom wetland	260 m to the north-east	The natural wetland as presented in the FEPA is situated to the south of a slimes dam and directly adjacent to and connecting to an artificial wetland.
No. 3 Shaft		Channelled valley bottom wetland	370 m to the south	The natural wetland as presented in the FEPA is situated approximately 370 m to the south of the No.3 Shaft and is classified as a channelled valley bottom wetland. Refer also to Section 1.3.3 of Chapter E for a description of the secondary Hygrophilous grasslands associated with the southern section of the No.3 Shaft. It is also important to note that no operational activities will be conducted at the No.3 Shaft, as the shaft area is in the process of being rehabilitated.
No. 4 Shaft		Flat wetland area	340 m to the south-west	The natural wetland as presented in the FEPA is situated 340 m to the south west of the No.4 Shaft. However, at closer inspection of the wetland FEPA map and the aerial imagery as

Shaft	FEPA Wetland Status	Wetland classification	Approximate proximity to shaft	Figure 33 description
				presented in Figure 33 below, it can be seen that the northern section of this wetland overlaps with the disposal facility adjacent to the No.4 Shaft (not owned or managed by CAPM).

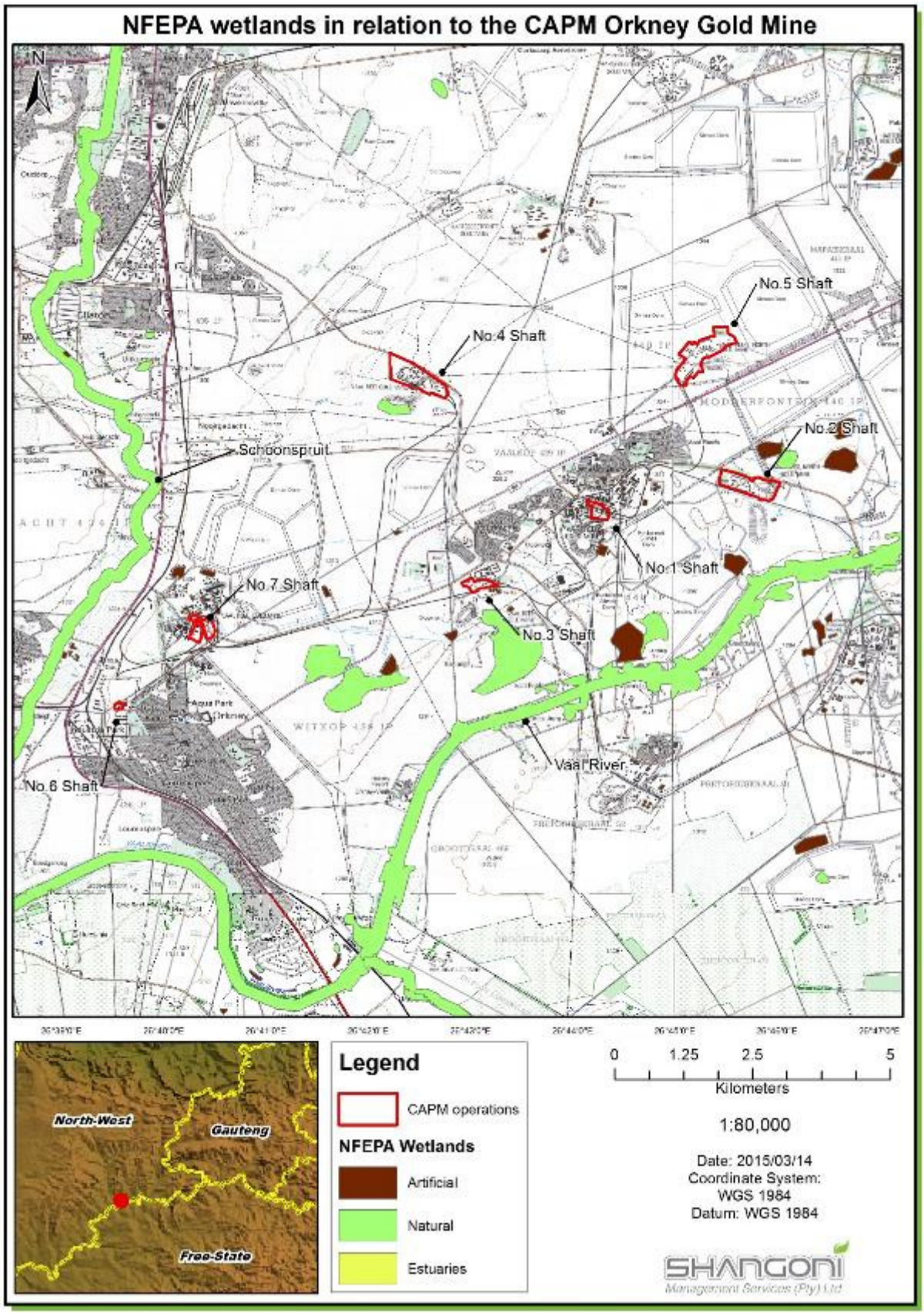

Figure 33: NFEPA wetlands in relation to the CAPM Orkney Gold Mine (Refer also to Annexure A3)

Chapter I: Groundwater

The information contained in this section of the document is extracted from the report titled: “China African Precious Metals: Orkney Gold Mine, Geohydrological Investigation as input to the EMPR” dated March 2015 (AquiScience, 2015). The report is attached hereto as Annexure C1).

1.1 Regional hydrogeology

The No.1 to No.5 Shafts are situated on the Chuniespoort dolomites (Malmani Subgroup), while the No.6 Shaft is directly underlain by the Platberg Group and specifically the Rietgat Formation belonging the Ventersdorp Supergroup which is comprised mostly of andesitic lava with interbedded shale, conglomerate and limestone. The No.7 Shaft is on the Chuniespoort dolomites and the Rietgat lava contact. Due to the act that no geological logs could be obtained for the study and the fact that this information was obtained from a GIS image developed from the 1: 250 000 geological map, it may be possible that the dolomite lava contact may extend further east and the No.7 Shaft may also be located on the Ventersdorp lavas. Figure 34 below presents a simplified hydrogeological map illustrating the typical groundwater occurrences for the study region.

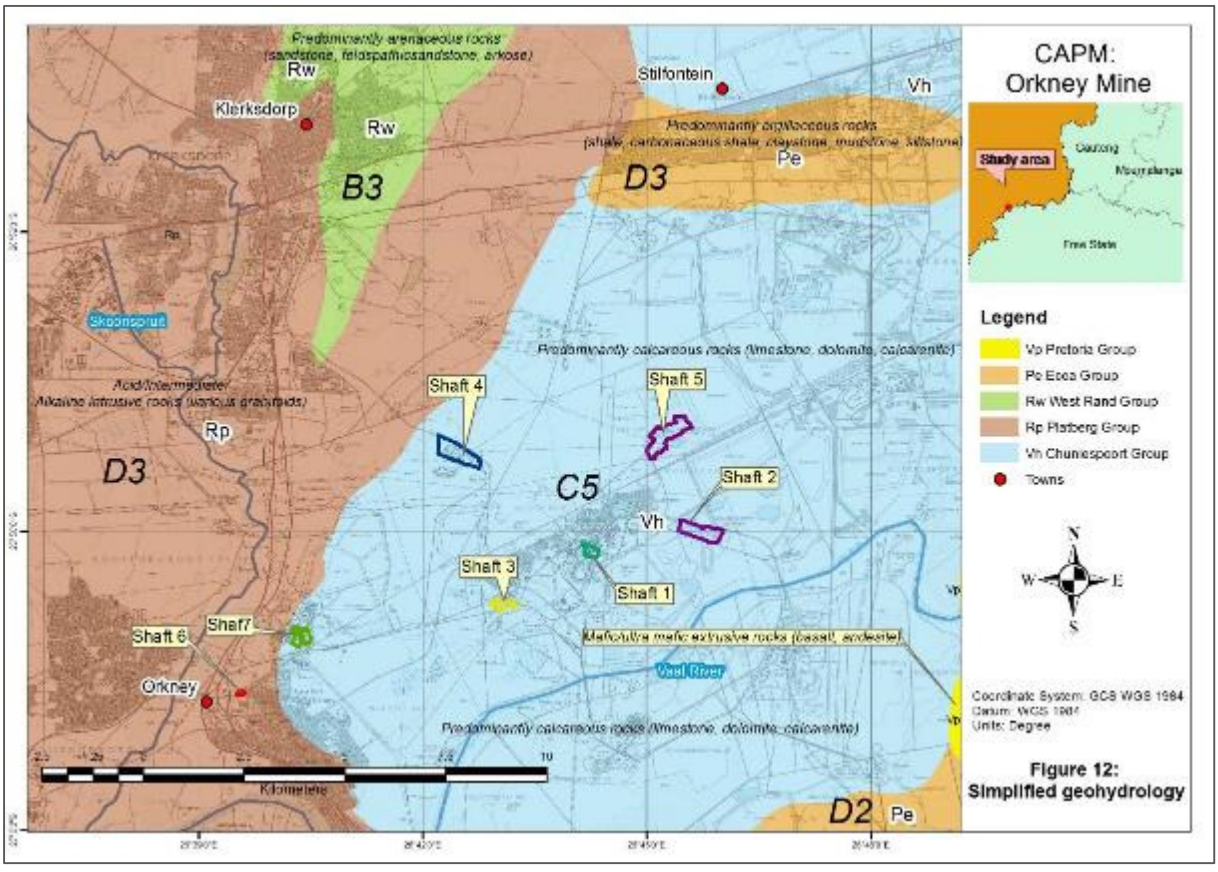

Figure 34: Simplified hydrogeological map (extracted from AquiScience, 2015)

1.1.1 Chuniespoort Group (Karst aquifer)

The Chuniespoort Group of rocks with approximate thickness of between 1 and 3 km directly underlies the No.1 to No.5 Shafts (refer to Figure 25) and is mostly composed of chemically derived carbonate sediments. These sediments alternate between chert-rich and chert-poor dolomite (AuiScience, 2015).

The dolomites of the Chuniespoort Group represent the most important aquifer in South Africa. This is due to the generally high to very high storativity and often highly permeable characteristics of this rock type. As infiltrating rainwater containing weak carbonic acid percolates through dolomite along planes of weakness such as faults, fractures and joints associated with intense deformation, it dissolves the dolomite. The soluble bicarbonates produced by the dissolution process are transported away in solution resulting in the development of open cavities and caves in extreme instances. The chemical weathering described by this process is referred to as karstification. Perhaps the most significant result of karstification, is its association with the development of sinkholes. The rate and extent of water level drawdown is one of the critical factors in the development of ground subsidence and sinkholes. The risk is greatest in areas where the groundwater level occurs closer to surface (<30 m) and where it fluctuates more than 6 m in response to pumping (refer to Annexure C1).

Studies by Enslin and Kriel (1967) in the Carletonville area indicated that that the storativity of dolomite in this vicinity decreases in increasing depth below surface. A decline from an estimated 9.1% at a depth of 61 mbs to 1.3% at a depth of 146 mbs is reported. According to Bredenkamp *et. al.* (1995), however the storativity of dolomitic aquifers generally varies between 15% and 5%.

The continuity of the dolomitic aquifer is interrupted by geological structures in the form of vertical and sub-vertical intrusive dykes. These low permeability or impermeable rocks serve as barriers to the movement of groundwater through the dolomite, resulting in the formation of compartments (Barnard, 2000). The groundwater yield potential is classed as excellent on the basis that 50% of the boreholes on record produce more than 5 l/s with a maximum of 126 l/s.

1.1.2 Rietgat formation (Platberg Group)

The Rietgat Formation (Platberg Group) of the Ventersdorp Supergroup is composed mainly of andesitic lava with interbedded shale, conglomerate and impure limestone. The Platberg Group overlies the Klipriviersberg Group which is composed of mainly andesitic lava and tuff. The Platberg Group and the Klipriviersberg Group together with the Allanridge (andesite) and Bothville Formations (conglomerate & sandstone), the latter two formations conformably overlying the Platberg Group, forms the Ventersdorp Supergroup. The Platbeg Group and the Klipriviersberg Group, overlying the VCR and the Vaal Reef of the Central Rabd Group, attains a maximum thickness of approximately 2 km (refer to Annexure C1).

The groundwater occurrence in the Rietgat Formation is associated with zones of weathering, brecciation and jointing as well as lithological and dyke contact zones. Nel *et. al.* (1939) considered the water-bearing properties of the lava to be controlled largely by their mode of extrusion, hypothesizing that all intermittent outpouring of lava resulted in the superimposition of several sheet flows, each sheet being compact in its centre and amygdaloidal toward its upper and lower margins. These differences resulted in variations in the degree, mode and depth of weathering. Water circulating along unconformable surfaces or joints caused contiguous rocks to decompose, the amygdaloidal phases being affected most in giving rise to spongy material with a high storage capacity. The classification of the groundwater yield potential as moderate is based on that 45% of boreholes on record produce more than 2 l/s with the groundwater rest level occurring between 10- and 30 mbs.

1.2 Aquifer recharge

Aquifer recharge was estimated through the utilisation of a software programme known as RECHARGE, and includes the use of qualified guesses that are guided by various schematic maps. The recharge values, as tabulated in Table 26, were inferred from the software programme.

Table 26: Recharge percentage inferred for the study area (extracted from AquiScience, 2015)

Method/reference	Ventersdorp Supergroup	Chuniespoort
Geology	4.0	8.0
Vegter	5.5	8.0
Acru	4.55	-
Harvest Potential Map	3.03	5.31
Cl method	3.33	-
Literature	1-3	8.0
Harmonic mean	**4.1**	**7.1**
Recharge mm/a	**27.675**	**47.925**

The No.6 Shaft and possibly the No.7 Shaft are directly underlain by rocks of the Rietgat Formation forming part of the Platberg Group of the Ventersdorp Supergroup Complex. The Rietgat Formation is composed mainly of andesitic lava with interbedded shale, conglomerate and impure limestone. The remaining shafts are underlain by rocks of the Malmani Subgroup belonging to the Chuniespoort Group of rocks of the Transvaal Supergroup. The Malmani Subgroup is mainly composed of dolomite with interbedded layers of chert.

According to the regional aquifer classification map of South Africa based on the Borehole Prospects map provided by JR Vegter, Hydrogeological Consultant and AJ Seymour, Department of Water and Sanitation (previously Department of Water Affairs), the surrounding rocks belonging to the Ventersdorp Supergroup and the Chuniespoort Group have been identified as minor and major aquifer types,

respectively. Based on the underlying hydrogeology of the project area the aquifers can be classified according to Parsons Classification System as follows:

- Ventersdorp Supergroup – Rietgat Formation
    - Minor aquifer
- Chuniespoort Group – Malmani Subgroup
    - Major aquifer

1.3 Aquifer vulnerability

The aquifer vulnerability was determined using the DRASTIC model. The DRASTIC model utilised seven base maps and includes; **D**epth to water, net **R**echarge, **A**quifer media, **S**oil media, **T**opography, **I**mpact of the vadose zone and hydraulic **C**onductivity. Table 27 below presents the aquifer DRASTIC vulnerability scores.

Table 27: Aquifer DRASTIC vulnerability scores (adapted from AquiScience, 2015)

Aquifer	DRASTIC Score	Susceptibility
Rietgat Formation	115	Medium to high
Malmani Subgroup	140	High

The Groundwater Quality Management index (or GQM index) was calculated through the utilisation of the points scoring system as presented in Table 28 and Table 29 below.

Table 28: Ratings for the Aquifer System Management and Second Variable Classifications (adapted from AquiScience, 2015)

Aquifer System Management Classification			
Class	**Points**	**Rietgat**	**Malmani**
Sole Source Aquifer System	6		
Major Aquifer System	4		4
Minor Aquifer System	2	2	
Non-Aquifer System	0		
Special Aquifer System	0-6		
Second Variable Classification (weathered/fractured)			
High	3		3
Medium	2		
Low	1	1	

Table 29: Ratings for the Groundwater Quality Management (GQM) Classification System (adapted from AquiScience, 2015)

Aquifer System Management Classification			
Class	**Points**	**Rietgat**	**Malmani**
Sole Source Aquifer System	6		

Aquifer System Management Classification			
Major Aquifer System	4		4
Minor Aquifer System	2	2	
Non-Aquifer System	0		
Special Aquifer System	0-6		
Aquifer Vulnerability Classification			
High	3	3	3
Medium	2		
Low	1		

Table 30 below presents the GQM index for the study area.

Table 30: GQM index for the study area (adapted from AquiScience, 2015)

GQM Index	Level of Protection	Rietgat	Malmani
<1	Limited		
1-3	Low level		
3-6	Medium level	6	
6-10	High level		
>10	Strictly non-degradation		12

The ratings for the Aquifer System Management Classification and Aquifer Vulnerability Classification yield a Groundwater Quality Management Index of a maximum of 12 for the study area, indicating that very high level of groundwater protection is required (refer to Annexure C1).

1.4 Hydrocensus and depth to water table

During the hydrocensus, 55 privately owned and Anglo Gold Vaal River Operations monitoring boreholes were located. The majority of the boreholes are located within close proximity of the No.6 Shaft and No.7 Shaft, while some scattered boreholes were surveyed in vicinity of the remaining shaft areas. The majority of boreholes function as monitoring boreholes while the remainder are privately owned boreholes mainly used for small scale irrigation/gardening purposes. Figure 35 below presents the locality of the boreholes identified during the hydrocensus.

The recorded water levels for the surveyed boreholes measured between 2.98 mbcl and 30.26 mbcl with an average of 10.19 mbcl. No springs were located within the surveyed area. All borehole water levels were deemed to be static water levels. It is also important to note that several monitoring boreholes were inaccessible during the survey and water levels could therefore not be obtained from all of the boreholes identified during the hydrocensus. Table 31 below presents all of the boreholes identified during the hydrocensus as well as the water levels obtained from the boreholes.

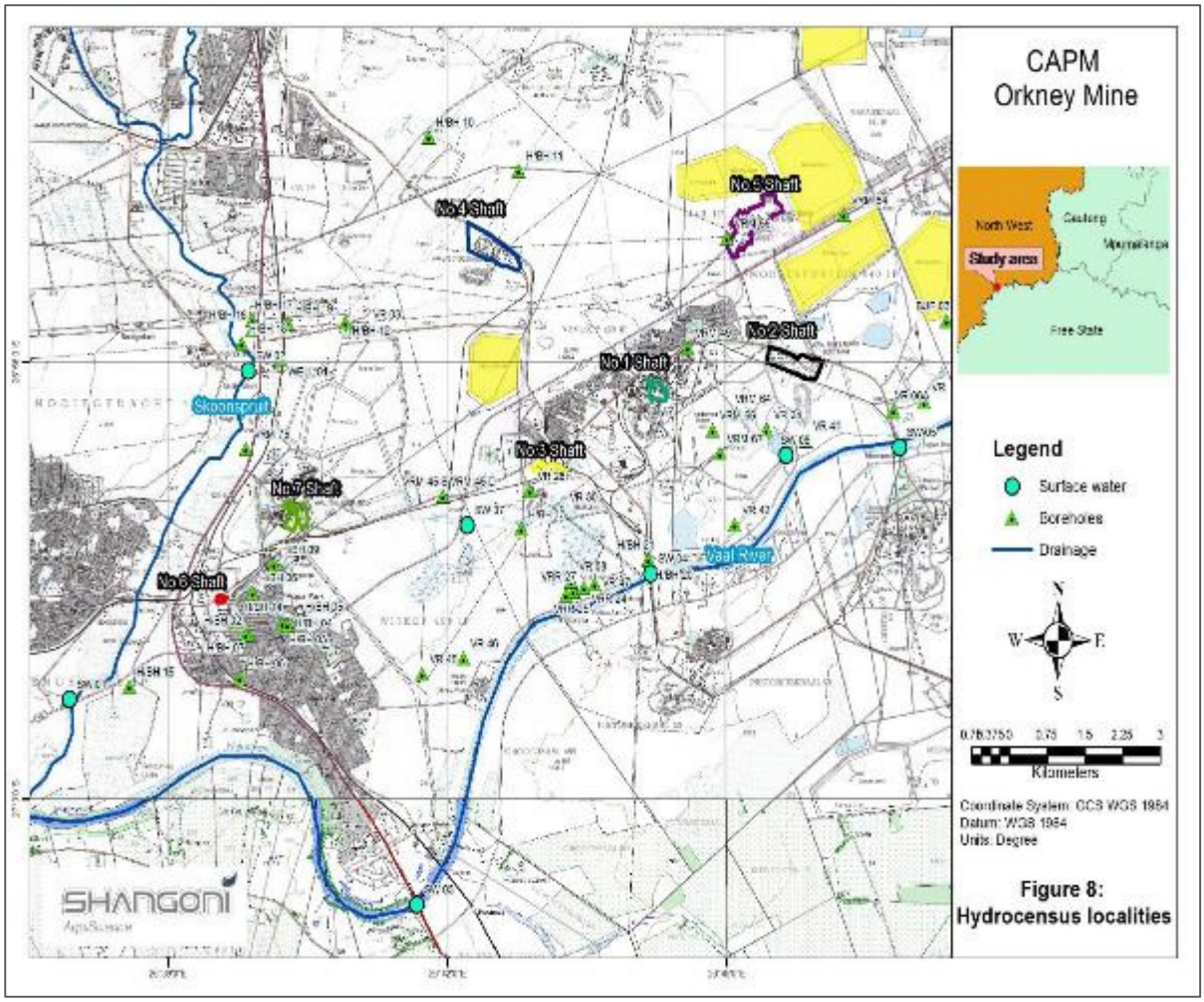

Figure 35: Hydrocensus localities (extracted from AquiScience, 2015)

Table 31: Boreholes identified during the hydrocensus (adapted from AquiScience, 2015)

SITE ID	Coordinates		Elevation	WATER LEVEL (mbs)	STATUS	OWNER	APPLICATION	SAMPLED
Privately owned								
H/BH 01	-26.97502	26.66445	1313	7.19	In use	Mr Bylefeld	Garden use	Yes
H/BH 02	-26.97499	26.66387	1313	NAWL	In use	Mr.Els	Garden use	Yes
H/BH 03	-26.97326	26.67033	1323	10.5	In use	Mr Swart	Garden use	Yes
H/BH 04	-26.97339	26.67132	1324	11.15	In use	Mr Smit	Garden use	Yes
H/BH 05	-26.97289	26.67321	1321	9.41	Not in Use	Mr Tretheweg	-	Yes
H/BH 06	-26.96847	26.66502	1316	10.5	In use	Mr Magakwe	Garden use	Yes
H/BH 07	-26.97922	26.66500	1310	6.61	In use	Mr Brits	Garden use	Yes
H/BH 08	-26.98153	26.66282	1308	10.97	In use	Mr Pringle	Domestic & Garden Use	Yes
H/BH 15	-26.98283	26.64301	1294	7.59	In use	World Wide Group (Bertus)	Domestic & Garden Use	Yes
H/BH 16	-26.92833	26.66501	1297		Not in Use	Mr Martin Brits	-	No
H/BH 17	-26.92682	26.66509	1298		Not in Use	Mr Martin Brits	-	No
H/BH 18	-26.93049	26.66319	1293	2.98	Not in Use	Mr Martin Brits	-	Yes
H/BH 19	-26.92731	26.67139	1303	5.24	In use	Mr A.S Smit	Garden use	Yes
WELL 01	-26.93285	26.67002	1304		Not in Use	Mr Tobie	-	N
Mine owned boreholes								
H/BH 09	-26.96416	26.66893	1315	9.42	Not in Use	Mine Property	-	Yes
H/BH 10	-26.89889	26.69661	1329	15.64	Not in Use	Mine Property	-	No
H/BH 11	-26.90403	26.71267	1344	21.87	In use	Mine Property	Monitoring	Yes
H/BH 12	-26.92724	26.68169	1321	11.88	Not in Use	Unknown	-	Yes
H/BH 13	-26.95879	26.71311	1307	8.67	In use	Mine Property	Monitoring	Yes

SITE ID	Coordinates		Elevation	WATER LEVEL (mbs)	STATUS	OWNER	APPLICATION	SAMPLED
H/BH 14	-26.97295	26.66224	1310	7.8	Not in Use	Municipality	-	No
H/BH 20	-26.96352	26.73587	1297	7.22	Not in Use	Mine Property	Old Production BH	Yes
H/BH 21	-26.96348	26.73587	1297	7.34	Not in Use	Mine Property	Old Production BH	Yes
VRM 49	-26.93113	26.74297	1328	30.26	In use	Mine Property	Monitoring BH	No
VRM 54	-26.91085	26.77090	1324	9.33	In use	Mine Property	Monitoring BH	Yes
VR 46	-26.97853	26.70277	1297	3.79	In use	Mine Property	Monitoring BH	Yes
FS 002	-26.96836	26.72253	1294	9.91	In use	Water Affairs - Mid Vaal	Monitoring BH	Yes
VR 03	-26.92828	26.68524	1327.00	Locked	In use	Mine Property	Monitoring BH	No
VRM 75	-26.94659	26.66390	1296.00	Locked	In use	Mine Property	Monitoring BH	No
VRM 45 S	-26.95381	26.69915	1314.00	Locked	In use	Mine Property	Monitoring BH	No
VRM 45 D	-26.95378	26.69914	1314.00	Locked	In use	Mine Property	Monitoring BH	No
VR 28	-26.95291	26.71474	1307.00	Locked	In use	Mine Property	Monitoring BH	No
VR 30	-26.95612	26.72046	1301.00	Locked	In use	Mine Property	Monitoring BH	No
VRM 56	-26.91433	26.74997	1330.00	Locked	In use	Mine Property	Monitoring BH	No
VRM 66	-26.94369	26.74738	1314.00	Locked	In use	Mine Property	Monitoring BH	No
VRM 67	-26.94730	26.74866	1308.00	Locked	In use	Mine Property	Monitoring BH	No
VR 42	-26.95811	26.75138	1296.00	Locked	In use	Mine Property	Monitoring BH	No
VRM 64	-26.94117	26.75163	1311.00	Locked	In use	Mine Property	Monitoring BH	No
VR 24	-26.94360	26.75704	1299.00	Locked	In use	Mine Property	Monitoring BH	No
VR 41	-26.94522	26.76407	1295.00	Locked	In use	Mine Property	Monitoring BH	No
VR 06A	-26.94071	26.77981	1297.00	Locked	In use	Mine Property	Monitoring BH	No
BUF 03	-26.92701	26.78926	1311.00	Locked	In use	Mine Property	Monitoring BH	No
VR	-26.93939	26.78525	1299.00	Locked	In use	Mine Property	Monitoring BH	No

SITE ID	Coordinates		Elevation	WATER LEVEL (mbs)	STATUS	OWNER	APPLICATION	SAMPLED
VR 45	-26.98091	26.69542	1302.00	Locked	In use	Mine Property	Monitoring BH	No
VRR 26	-26.96889	26.72115	1295.00	Locked	In use	Mine Property	Monitoring BH	No
VRR 25	-26.96820	26.72268	1294.00	Locked	In use	Mine Property	Monitoring BH	No
VRR 27	-26.96832	26.72250	1294.00	Locked	In use	Mine Property	Monitoring BH	No
VRR 24	-26.96772	26.72441	1293.00	Locked	In use	Mine Property	Monitoring BH	No
VR 47	-26.96716	26.72634	1294.00	Locked	In use	Mine Property	Monitoring BH	No
VR 08	-26.96674	26.72210	1297.00	Locked	In use	Mine Property	Monitoring BH	No
Surface Water								
SW 01	-26.98473	26.63229	1287	-	Skoonspruit d/s 6 & 7 Shaft	DWA	Various	Yes
SW 02	-26.93459	26.66422	1291		Skoonspruit u/s 6 & 7 shaft	DWA	Various	Yes
SW 03	-27.01612	26.69443	1289	-	Vaal River – d/s but u/s 6&7 shafts	DWA	Various	Yes
SW 04	-26.96552	26.73627	1292	-	Vaal River - Centre	DWA	Various	Yes
SW 05	-26.94627	26.78079	1293	-	Vaal River- u/s	Unknown	Various	Yes
SW 06	-26.94749	26.76051	1293	-	Return water dam	Unknown	Various	Yes
SW 07	-26.95814	26.70347	1311	-	Water from tailings - Return Water pond	Unknown	Various	Yes

NAWL – No access to water level

d/s – downstream

u/s - upstream

All water levels recorded were static levels

1.5 Groundwater quality

The groundwater quality results were interpreted based on the i) SANS 241: 2011, the ii) South African Water Quality Guidelines (WRC, 1998), iii) according to the indicator parameters (i.e. pH, TDC/EC, Sulphate and soluble heavy metals). Table 32 below present the hydrochemistry for the groundwater sampling localities located in close proximity to the No.6 Shaft and No.7 Shaft.

The hydrochemistry shown in Table 32 are for boreholes sampled and located in close proximity to No.6 Shaft and the No.7 Shaft. In general the data indicates relatively good water quality with all samples recording within the SANS 241:2011 drinking water standards. In addition neither of the indicator parameters recorded in high concentrations. The water is typical of unpolluted groundwater with either being of a Ca-HCO3- type typical of dolomitic areas or groundwater with no dominating cations or anions as illustrated by the Piper diagram and Stiff diagrams in Figure 36 and Figure 37, respectively.

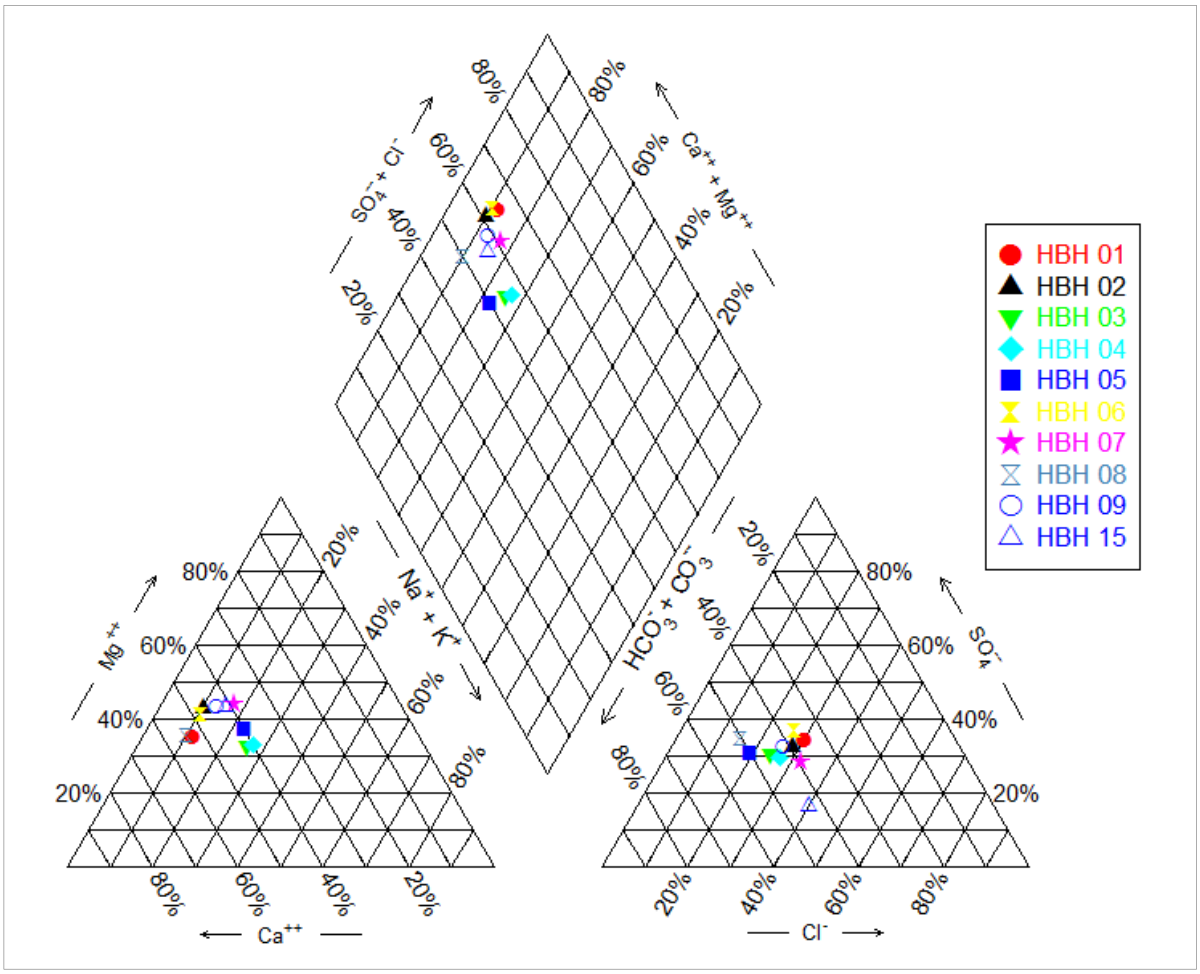

Figure 36: Piper diagram for boreholes in close proximity to the No.6 Shaft and the No.7 Shaft (extracted from AquiScience, 2015)

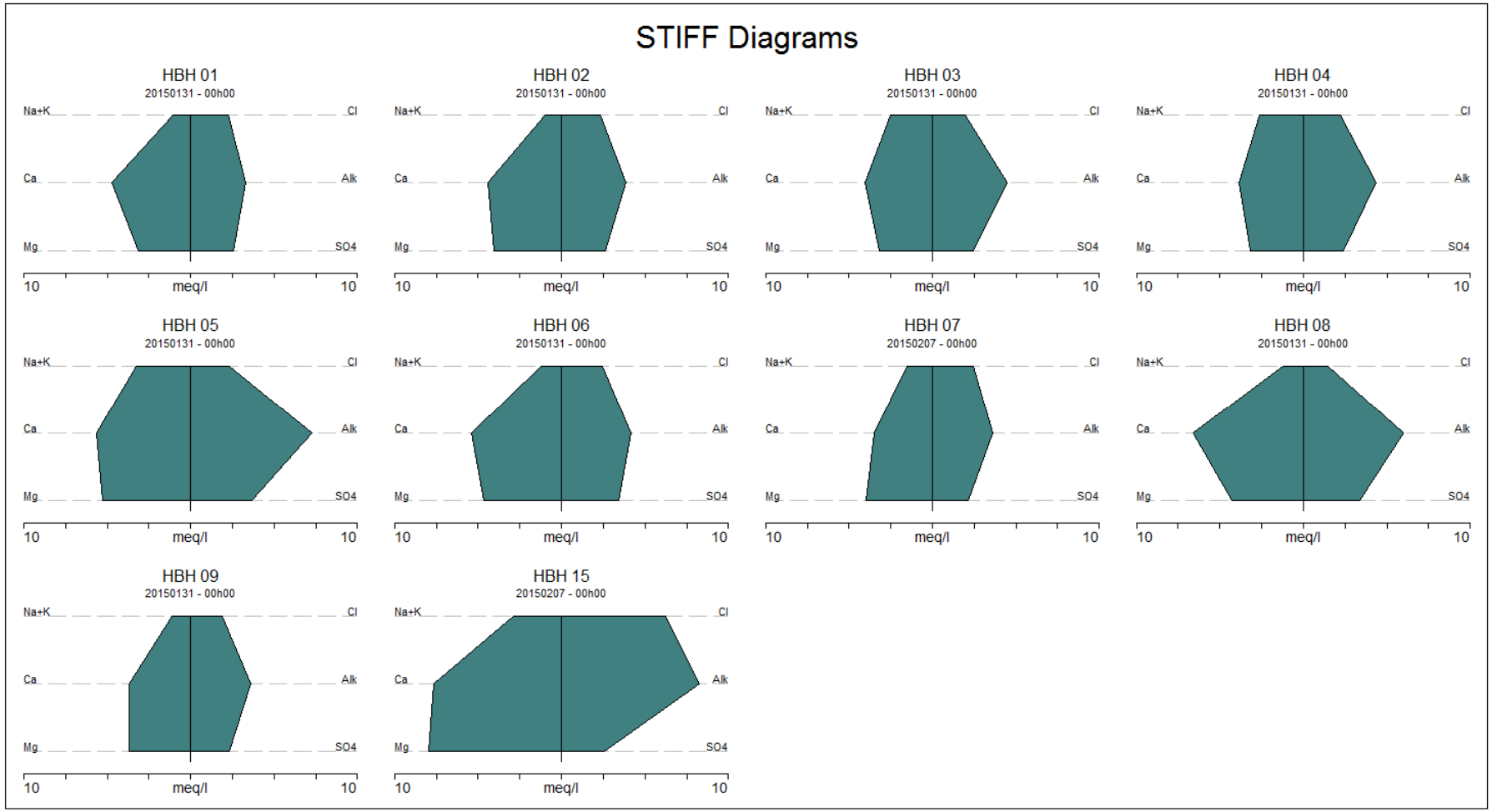

Figure 37: Stiff diagrams for boreholes in close proximity to the No.6 Shaft and the No.7 Shaft (extracted from AquiScience, 2015)

Table 32: Hydrochemistry for the boreholes in close to the No.6 Shaft and the No.7 Shaft (adapted from AquiScience, 2015)

SITE ID	SANS 241: 2011	HBH 01	HBH 02	HBH 03	HBH 04	HBH 05	HBH 06	HBH 07	HBH 08	HBH 09	HBH 15
pH	5 – 9.7	8.15	7.81	7.83	8.06	7.56	7.64	7.66	7.42	7.87	7.52
EC mS/m	≤170	82.7	82.2	87.1	84.5	118	101	81	111	72.1	**162**
TDS mg/l	≤1200	537.55	534.3	566.15	549.25	767	656.5	526.5	721.5	468.65	**1053**
Ca mg/l	-	94.8	88.2	80.8	77.4	113	108	69.9	133	74	**154**
Mg mg/l	-	38.1	49	38.5	38.4	64.3	56.3	48.4	52.3	44.8	97.2
Na mg/l	≤200	23.9	22.1	54.8	56.6	72.8	27.2	34.3	27.5	25.7	65.3
K mg/l	-	1.22	1.37	4.73	6.26	2.66	1	1.4	1.46	0.796	1.51
MALK mg/l	-	164	194	225	219	364	208	180	300	179	413
Cl mg/l	≤300	80.2	81.9	69.8	78.2	81.5	87.7	86.4	51.6	66.4	**222**
SO_4 mg/l	≤500	123	126	117	115	175	165	103	162	111	122
NO_3 mg N/l	≤11	1.32	2.36	2.03	<0.017	<0.017	3.46	5.6	7.09	1.48	**11**
NH_4 mg N/l	≤1.5	0.038	0.042	0.045	0.172	0.302	0.094	0.055	0.048	0.066	0.163
Inorganic N mg/l	-	1.358	2.402	2.075	0.172	0.302	3.554	5.655	7.138	1.546	11.16
PO_4 mg P/l	-	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
F mg/l	≤1.5	0.249	0.21	0.24	0.281	0.225	0.206	0.197	0.222	0.191	0.274
Al mg/l	≤0.3	<0.003	<0.003	0.174	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fe mg/l	≤2.0	<0.003	<0.003	<0.003	<0.003	0.163	<0.003	<0.003	<0.003	<0.003	<0.003
Mn mg/l	≤0.5	<0.001	<0.001	<0.001	0.055	0.116	<0.001	<0.001	<0.001	<0.001	<0.001
Cr mg/l	≤0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu mg/l	≤2.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006
Ni mg/l	≤0.07	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn mg/l	≤5.0	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.013	0.119
Co mg/l	≤0.50	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cd mg/l	≤0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Pb mg/l	≤0.010	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Classification		**Class 1 Good**								**Class 2 Marginal**
Worst parameter		**EC, Ca**					**EC**	**EC, Ca, NO_3**	**EC**	**EC/TDS, Ca, Cl,**

The nearest boreholes to the No.4 Shaft, nine (9) in total, are located approximately 1.5 km north and 3.5 km south-west towards the Skoonspruit, however, only four (4) of these were sampled. Table 33 below presents the results of the hydrochemistry analysis of these boreholes. The groundwater quality for the boreholes range from Ideal (class 0) to Unacceptable (class 4). Two boreholes, HBH 18 and HBH 19 recorded parameters exceeding the SANS 241: 2011 guidelines; total ammonia at HBH 18 (3.78 mg N/l); and EC (257 mS/m), TDS (1671 mg/l), and SO_4 (1084 mg/l) at HBH 19. HBH 18 and HBH 19 are classified as Poor (class 3) and Unacceptable (class 4), respectively. Good water quality in terms of drinking water standards was recorded for boreholes HBH 11 and HBH 12 with Good (class 1) and Ideal (class 0) classifications, respectively. The Piper diagram and Stiff diagrams (refer to Figure 38 and Figure 39) indicate that boreholes *HBH 11* and *HBH 18* display no mining related influence with Ca/Mg-HCO_3^- type waters while boreholes *HBH 12* and *HBH 19* have SO_4/Cl-HCO_3^- type characters indicating a probable mining related influence, which can most probably be sourced from a slimes dam situated upstream thereof. Very poor quality was recorded for *HBH 19* (mostly SO_4) situated directly downstream from the slimes dam, that is does not belong to CAPM Orkney Gold Mine.

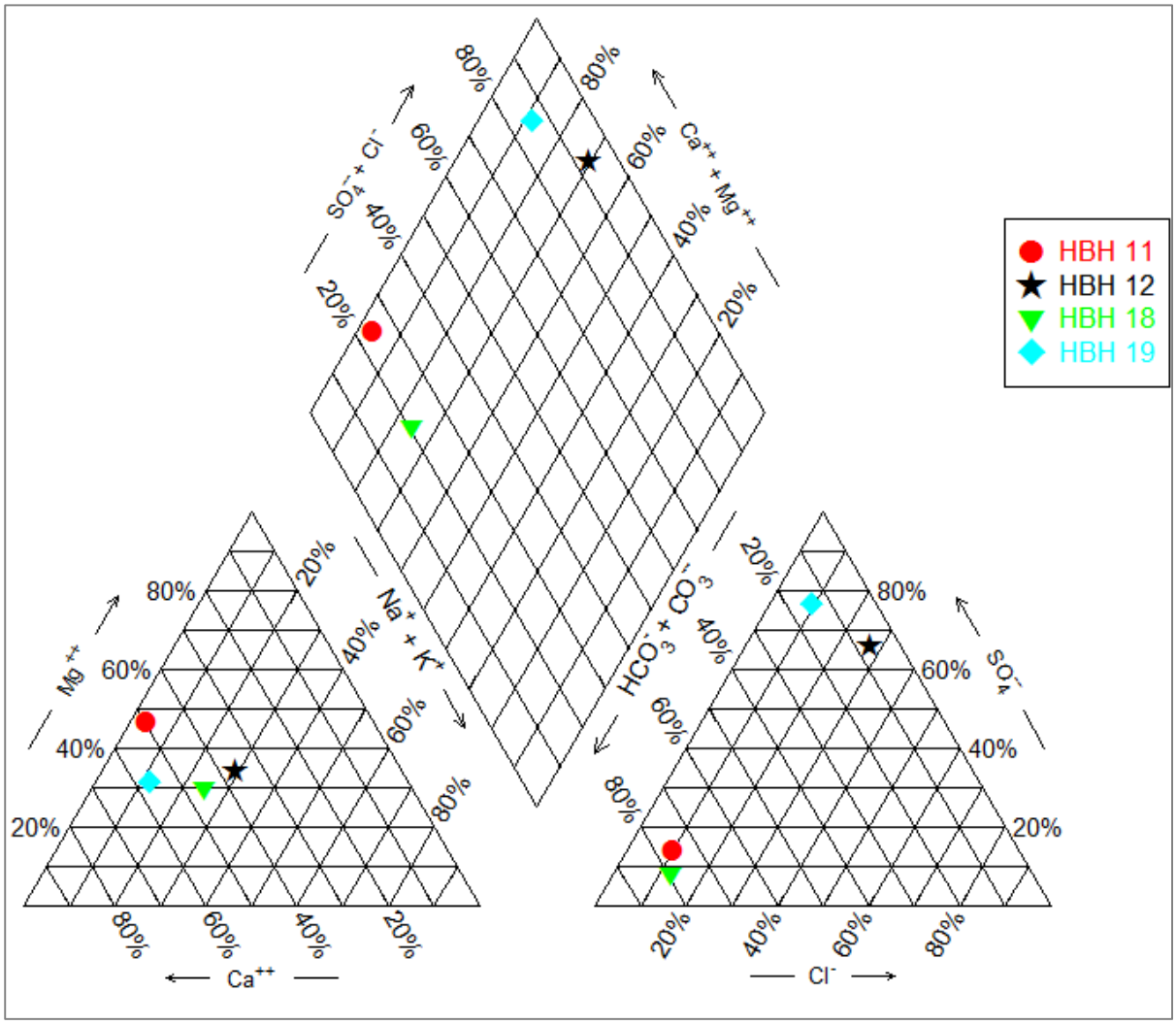

Figure 38: Piper diagram for the boreholes in close proximity to the No.4 Shaft (extracted from AquiScience, 2015)

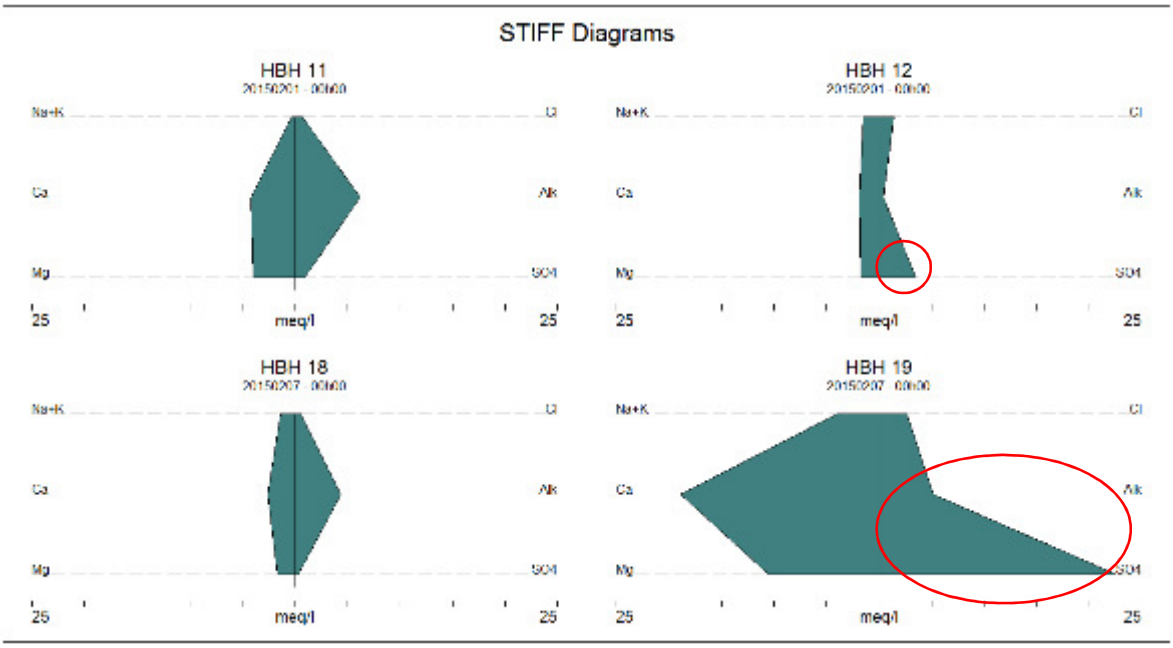

Figure 39: Stiff diagrams for the boreholes in close proximity to the No.4 Shaft (extracted from AquiScience, 2015)

Table 33: Hydrochemistry for the boreholes in close proximity to the No.4 Shaft (adapted from AquiScience, 2015)

SITE ID	SANS 241: 2011	HBH 11	HBH 12	HBH 18	HBH 19
pH	5 – 9.7	7.82	7.13	7.65	7.47
EC mS/m	≤170	68.7	55.8	52.2	**257**
TDS mg/l	≤1200	446.55	362.7	339.3	**1670.5**
Ca mg/l	-	83.3	37.7	51	**378**
Mg mg/l	-	47.7	21.4	20	**128**
Na mg/l	≤200	5.35	29.9	28.1	91.1
K mg/l	-	2.73	9.11	6.08	0.6
MALK mg/l	-	312	22.5	219	257
Cl mg/l	≤300	24.2	51.2	20.4	93.8
SO_4 mg/l	≤500	44.9	167	16.9	**1084**
NO_3 mg N/l	≤11	0.25	0.509	0.47	1.89
NH_4 mg N/l	≤1.5	0.089	1.03	**3.78**	0.054
Inorganic N mg/l	-	0.339	1.539	4.25	1.94
PO_4 mg P/l	-	<0.008	<0.008	<0.008	<0.008
F mg/l	≤1.5	0.203	0.126	0.215	0.122
Al mg/l	≤0.3	<0.003	<0.003	<0.003	<0.003
Fe mg/l	≤2.0	<0.003	<0.003	<0.003	<0.003

SITE ID	SANS 241: 2011	HBH 11	HBH 12	HBH 18	HBH 19
Mn mg/l	≤0.5	<0.001	<0.001	<0.001	<0.001
Cr mg/l	≤0.05	<0.001	<0.001	<0.001	<0.001
Cu mg/l	≤2.0	<0.001	<0.001	<0.001	<0.001
Ni mg/l	≤0.07	<0.001	<0.001	<0.001	<0.001
Zn mg/l	≤5.0	<0.002	<0.002	0.177	<0.002
Co mg/l	≤0.50	<0.001	<0.001	<0.001	0.067
Cd mg/l	≤0.003	<0.001	<0.001	<0.001	<0.001
Pb mg/l	≤0.010	<0.004	<0.004	<0.004	<0.004
Classification		**Class 1 Good**	**Class 0 Ideal**	**Class 3 Poor**	**Class 4 Unacceptable**
Worst parameter		**Ca**	**-**	**NH_4**	**EC/TDS, SO_4**

An additional four (4) boreholes were also sampled within the study area. These were *HBH 13* (downstream and to the south of the No.3 Shaft); *HBH 20* (3 km south of the No.1 Shaft on the Vaal River banks); *VR 46* (3.5 km southwest of the No.3 Shaft towards the Vaal River); and *VRM 54* (1.5 km east of the No.5 Shaft). The groundwater qualities from these boreholes are presented in Table 34 below.

Only one (1) borehole recorded water quality parameters to be within acceptable drinking water standards. The remaining three (3) water qualities' recorded *Unacceptable* quality with a subsequent class 4 classification. Very high salinities (EC and TDS) were recorded (SO_4 as the largest contributor) with EC ranging between 382 mS/m and 612 mS/m and SO_4 between 1916 mg/l and 2720 mg/l. Elevated inorganic N were also recorded for boreholes *HBH 13* and *VRM 54* with values of 24.51 mg N/l and 35.6 mg N/l, respectively while high to very high soluble Pb, Mn and Co were recorded for *HBH 13*, *VR 46* and *VRM 46*, respectively.

The Piper diagram and Stiff diagrams in Figure 40 and Figure 41, respectively indicate sodium enrichment and Na type water with no dominant anion activity for *HBH 20*. This may be due to groundwater that had been in contact with a source rich in Na or old stagnant NaCl dominated water that resides in Na rich host rock/material.

Groundwater quality from boreholes *HBH 13*, *VR 46* and *VRM 54* suggest mining related pollution and sulphate enrichment as indicated by their plot positions in the Piper diagram and the extended SO_4 tail on the anion side of the Stiff diagrams. The high SO_4 may indicate acid mine drainage reactions. These three boreholes are all located downstream or in close vicinity of slimes dams, that not operated or owned by the CAPM Orkney Gold Mine.

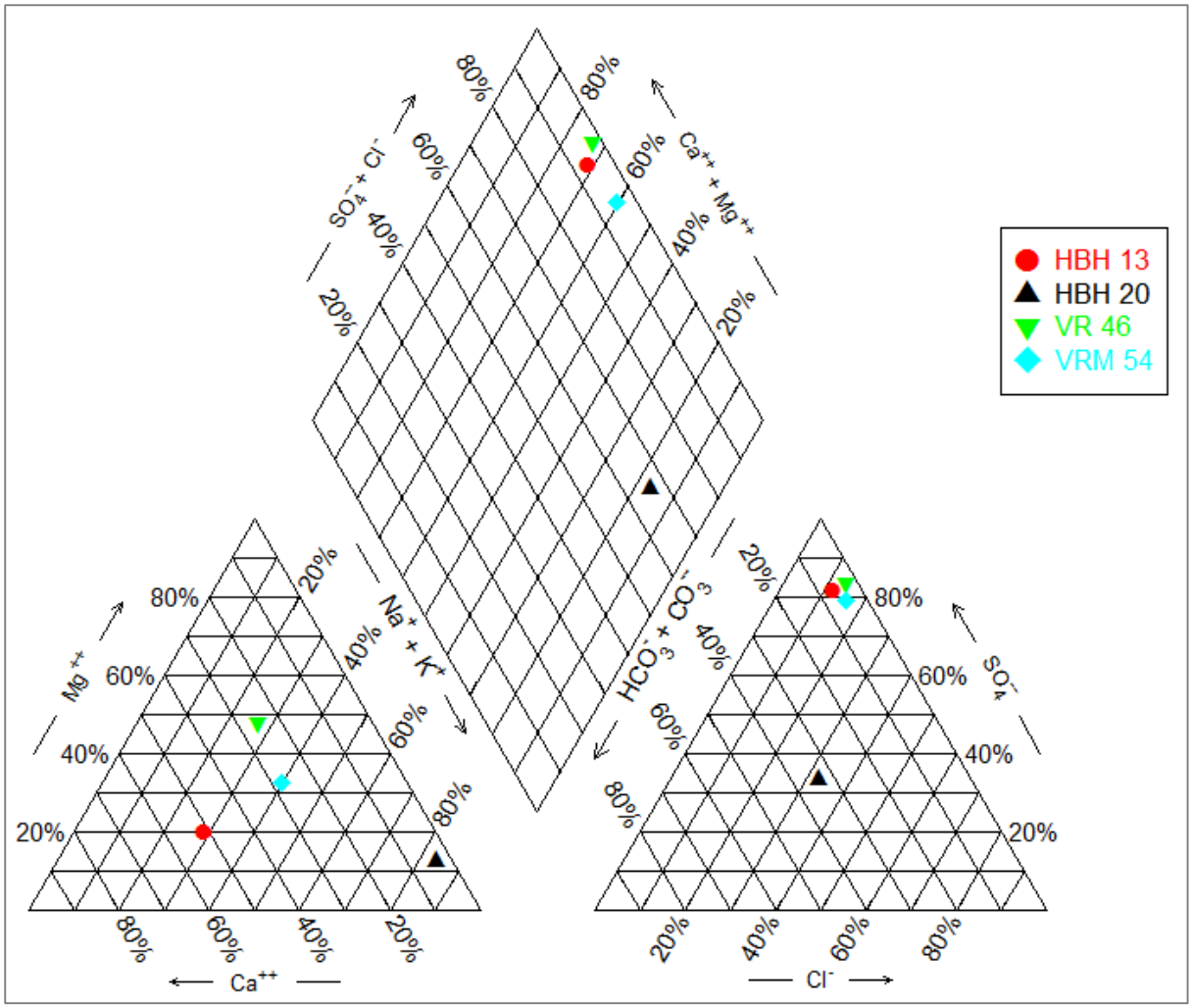

Figure 40: Piper diagram for the additional boreholes sampled within the study area (extracted from AquiScience, 2015)

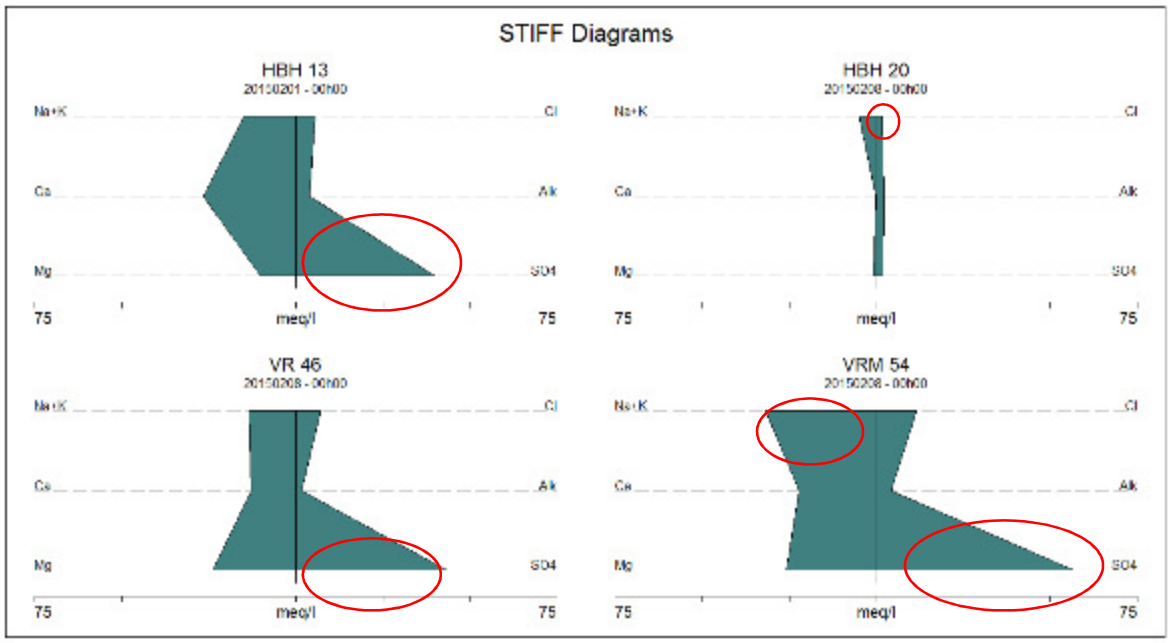

Figure 41: Stiff diagrams for the additional boreholes sampled within the study (extracted from AquiScience, 2015)

Table 34: Hydrochemistry for the additional boreholes sampled within the study area (adapted from AquiScience, 2015)

SITE ID	SANS 241: 2011	HBH13	HBH20	VR46	VRM54
pH	5 – 9.7	6.92	8.69	7.43	7.37
EC mS/m	≤170	**402**	59.6	**382**	**612**
TDS mg/l	≤1200	**2613**	387.4	**2483**	**3978**
Ca mg/l	-	**533**	4.08	**255**	**445**
Mg mg/l	-	**124**	8.71	**288**	**315**
Na mg/l	≤200	**316**	106	**305**	**715**
K mg/l	-	40.8	9.58	8.43	29.7
MALK mg/l	-	196	113	84.4	207
Cl mg/l	≤300	202	64.2	258	**414**
SO_4 mg/l	≤500	**1916**	88.4	**2077**	**2720**
NO_3 mg N/l	≤11	**23.7**	<0.017	<0.017	**17.1**
NH_4 mg N/l	≤1.5	0.812	0.65	0.779	**18.8**
Inorganic N mg/l	-	**24.51**	0.65	0.779	**35.9**
PO_4 mg P/l	-	<0.008	<0.008	<0.008	<0.008
F mg/l	≤1.5	<0.055	0.17	0.06	<0.055
Al mg/l	≤0.3	<0.003	<0.003	<0.003	<0.003
Fe mg/l	≤2.0	0.144	<0.003	0.466	<0.003
Mn mg/l	≤0.5	0.451	<0.001	**2.81**	0.172
Cr mg/l	≤0.05	<0.001	<0.001	<0.001	<0.001

SITE ID	SANS 241: 2011	HBH13	HBH20	VR46	VRM54
Cu mg/l	≤2.0	<0.001	<0.001	<0.001	<0.001
Ni mg/l	≤0.07	<0.001	<0.001	<0.001	<0.001
Zn mg/l	≤5.0	0.017	<0.002	<0.002	0.059
Co mg/l	≤0.50	0.171	<0.001	0.05	**1.24**
Cd mg/l	≤0.003	<0.001	<0.001	<0.001	<0.001
Pb mg/l	≤0.010	**0.016**	<0.004	<0.004	0.004
Classification		**Class 4 Unacceptable**	**Class 0 Ideal**	**Class 4 Unacceptable**	**Class 4 Unacceptable**
Worst parameter		**SO_4**	**-**	**SO_4**	**SO_4, N**

1.6 Fissure water quality

Fissure water samples were obtained from the No.6 Shaft and the No.7 Shaft for hydrochemical analysis. This was done in order to obtain an idea of the water quality draining into the shaft areas. The quality was evaluated according to the SANS 241: 2011 standards for drinking water and according to the General Limit applicable to discharge of wastewater into a water resource (Government Notice No. 399; Government Gazette 26187; DWAF, 2004). The hydrochemical data is shown in Table 35 and illustrated in terms of a Piper and Stiff diagrams in Figure 42 and Figure 43.

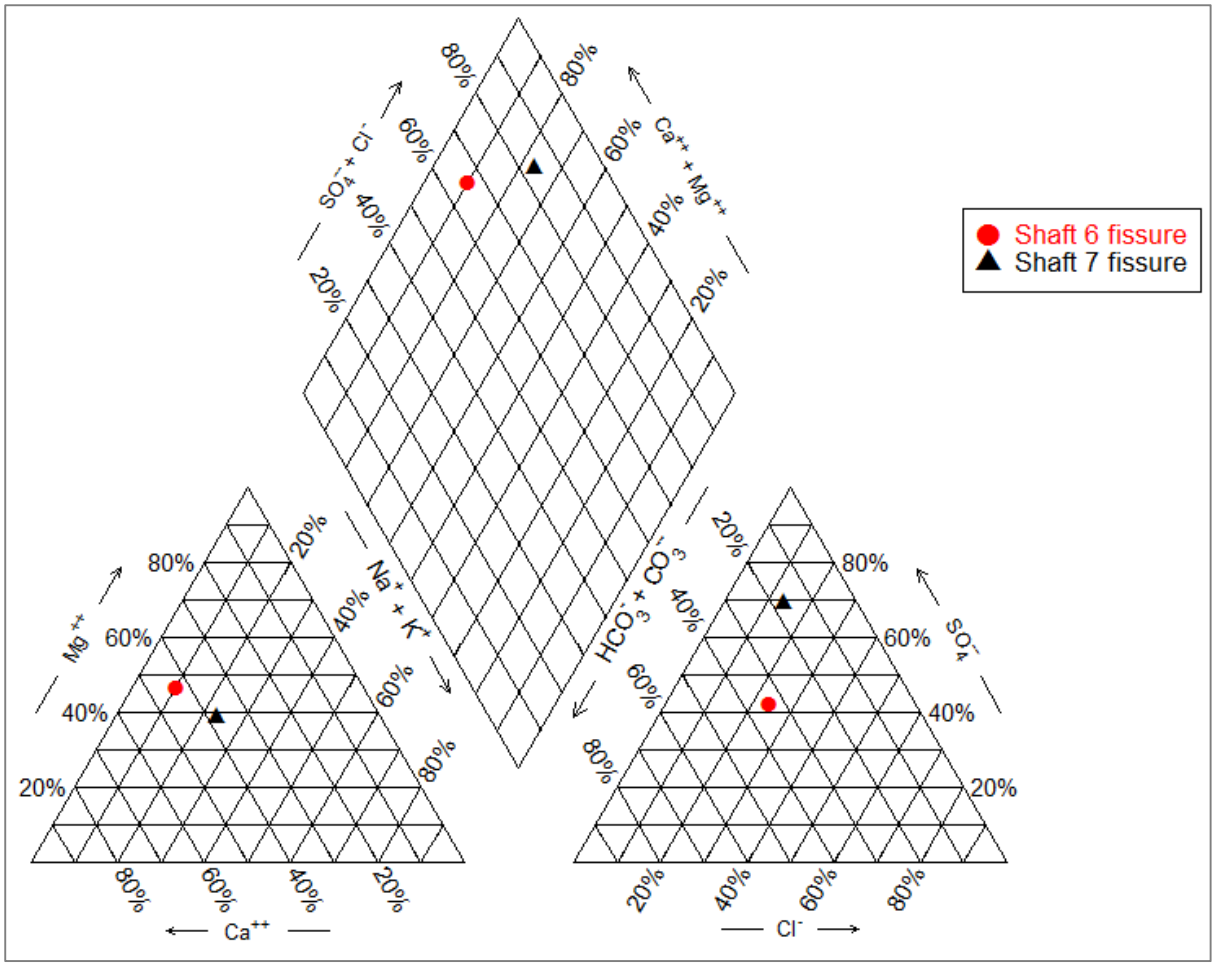

Figure 42: Piper diagram illustrating the ratios of major cation and anion activity for fissure water (extracted from AquiScience, 2015)

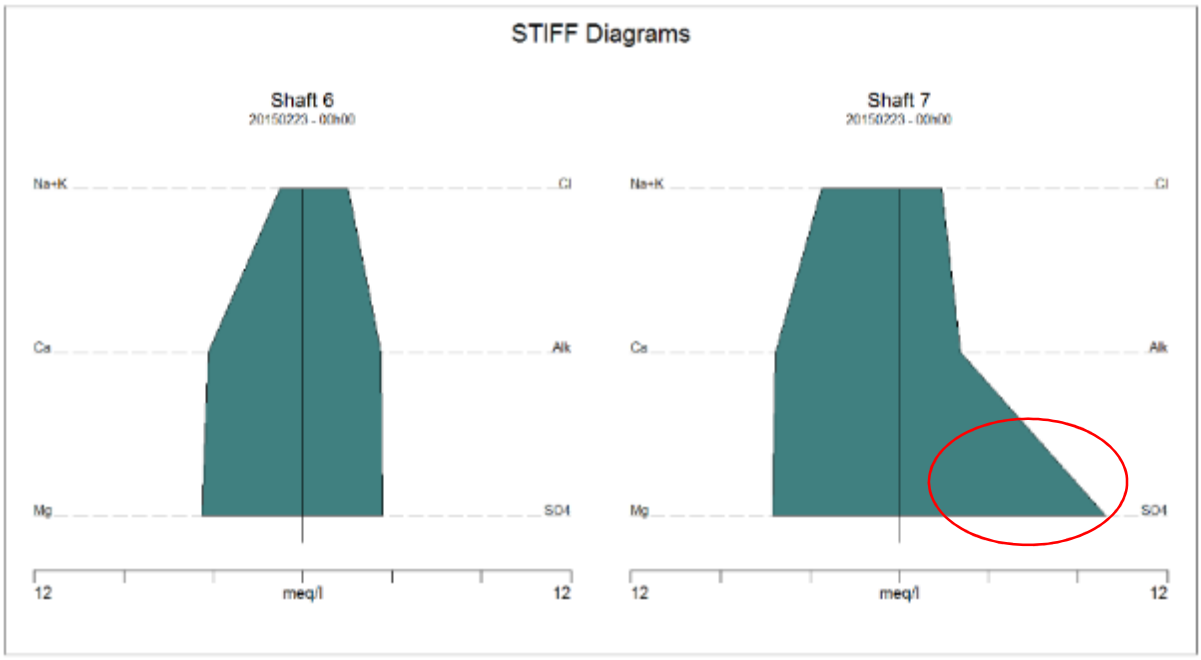

Figure 43: Stiff diagrams illustrating ratios of major cation and anion activity (in meq/l) for fissure water (extracted from AquiScience, 2015)

Table 35: Hydrochemical data for the No.6 Shaft and the No.7 Shaft fissure water (extracted from AquiScience, 2015)

SITE ID	SANS 241: 2011	General Limit*	No.6 Shaft (fissure)	No.7 Shaft (fissure)
pH	5 – 9.7		7.8	8.22
EC mS/m	≤170	≤150	90.4	125
TDS mg/l	≤1200	-	587.6	812.5
Ca mg/l	-	-	84.4	111
Mg mg/l	-	-	54.8	68.8
Na mg/l	≤200	-	21.8	77.5
K mg/l	-	-	2.11	3.91
MALK mg/l	-	-	176	137
Cl mg/l	≤300	-	72.1	66.7
SO_4 mg/l	≤500	-	**171**	**442**
NO_3 mg N/l			**6.99**	**9.64**
NO_3 + NO_2 mg N/l	≤11	≤15	7.05	9.70
NH_4 mg N/l	≤1.5	≤6	0.045	0.042
PO_4 mg P/l	-	≤10	0.023	0.023
F mg/l	≤1.5	≤1	0.275	0.255
Fe mg/l	≤2.0	-	<0.003	<0.003
Mn mg/l	≤0.5	-	<0.001	<0.001
Cr mg/l	≤0.05	-	<0.001	<0.001
Cu mg/l	≤2.0	≤0.01	<0.001	<0.001

SITE ID	SANS 241: 2011	General Limit*	No.6 Shaft (fissure)	No.7 Shaft (fissure)
Zn mg/l	≤5.0	≤0.1	<0.002	<0.002
Cd mg/l	≤0.003	≤0.005	<0.001	<0.001
Pb mg/l	≤0.010	≤0.01	<0.004	<0.004
As mg/l	≤0.010	≤0.02	<0.007	<0.007
Se mg/l	≤0.010	≤0.02	<0.007	<0.007
Hg mg/l	≤0.006	≤0.005	<0.007	<0.007
B mg/l	-	≤1	0.033	0.088
CN^- mg/l	≤0.070	≤0.02	<0.01	<0.01
Susp solids mg/l	-	≤25	2	7
COD mg/l	-	≤75	11.9	**94**
Faecal coliforms cfu/100 ml	0	≤1000	<1	**2**
Classification			**Class 1 Good**	**Class 2 Marginal**
Worst parameter			**EC, NO_3**	**SO_4, F. coliforms**

1.7 Hydraulic gradients and velocity

Static hydraulic head elevations were plotted against surface elevation/topography and are shown in Figure 44. A good Bayesian correlation of $r^2 = 0.93$ (n = 21) exists between the surface topography and the static hydraulic heads. Based thereupon an assumption can be made that groundwater flow paths mimic surface topography (refer to Annexure C1).

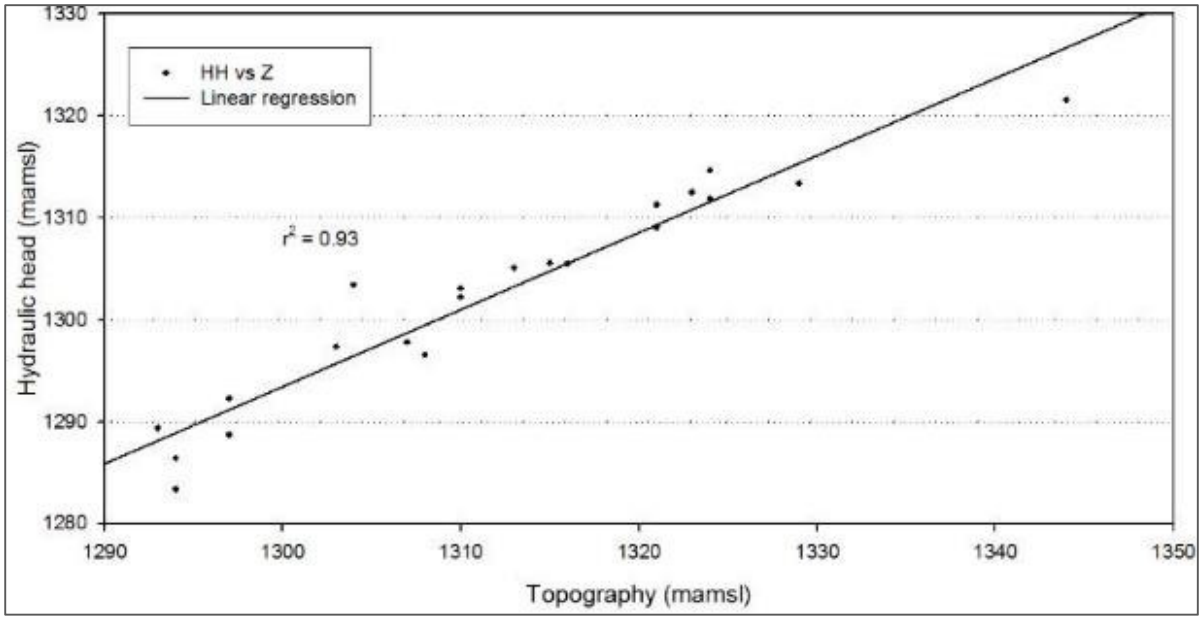

Figure 44: Bayesian correlation of groundwater levels (extracted from AquiScience, 2015)

Figure 45 below presents the interpolated (Kriging) topography and hydraulic head contour maps for the study area. Note that the topographical map excludes artificial surface features such as the slimes dams. The figures below show that groundwater flow in vicinity of the CAPM Orkney Gold Mine shaft areas are similar to the surface water drainage. Flow is predominantly towards the surface drainage features being west towards the Skoonspruit (for the No.6 Shaft and the No.7 Shaft) and south towards the Vaal River (for the No.1 to No.5 Shafts). A topographical high, functioning as a flow boundary is evident from the topography map which also functions as a groundwater flow boundary. This feature may be an indication of an igneous intrusion, possibly a dolerite dyke or could be a faulting zone.

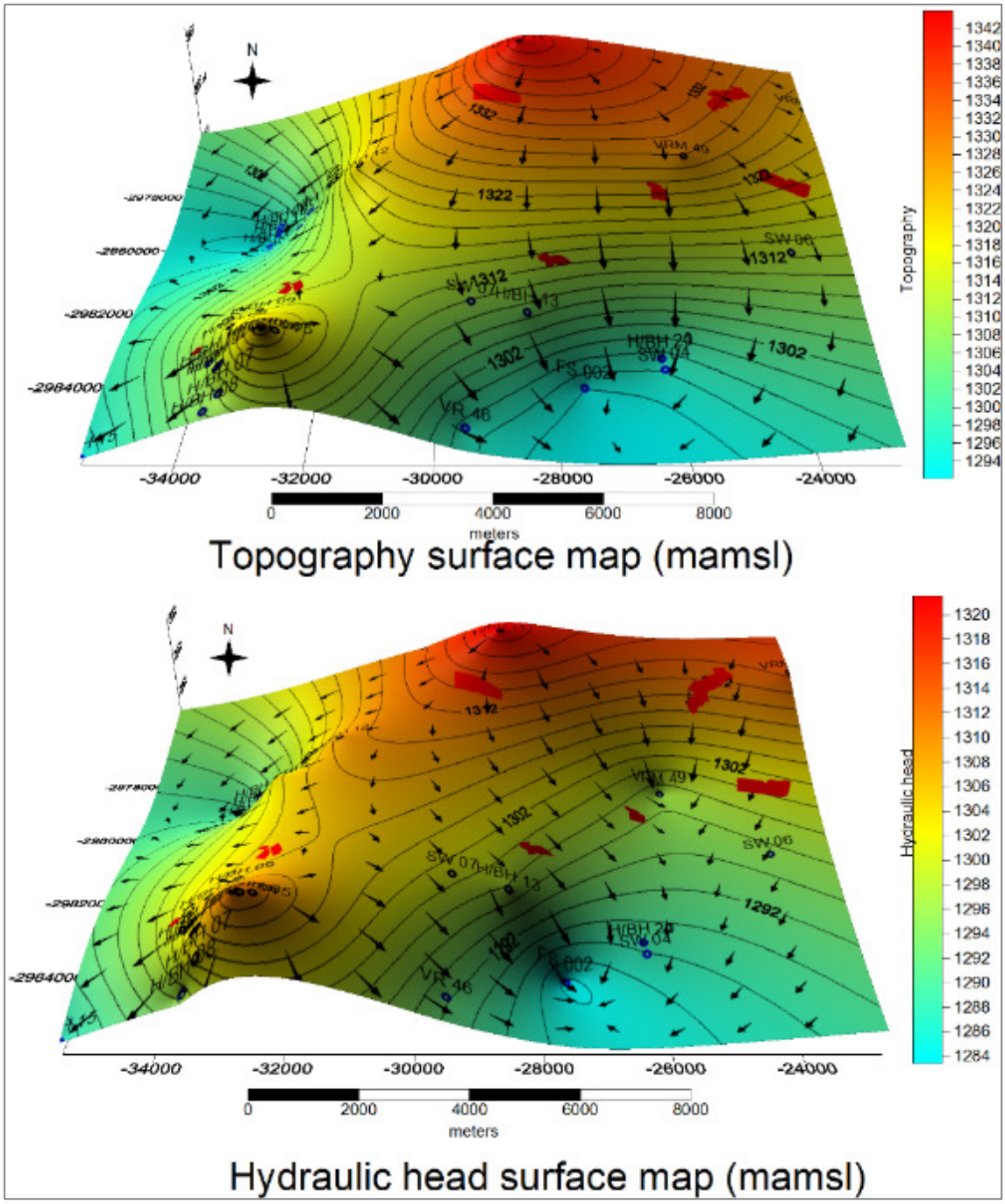

Figure 45: Interpolated topographical and hydraulic head contours (in mamsl) (extracted from AquiScience, 2015)

Table 36 below presents the expected groundwater seepage rates for the various geological zones within the study area.

Table 36: Groundwater gradients and seepage rates (adapted from AquiScience, 2015)

Aquifer	Hydraulic conductivity (m/d)	Hydraulic gradient	Effective porosity	Seepage velocity (m/d)	Seepage velocity (m/a)
Fractured Ventersdorp	0.01	0.01	0.05	0.002	0.72
Fractured/weathered Chuniespoort	0.1	0.01	0.1	0.01	3.6

1.8 Aquifer types and yields

Four (4) possible aquifers of note can be distinguished to be underlying the study area and are described below.

1.8.1 Shallow perched unconfined or semi-confined unconsolidated aquifer.

The first system is a shallow aquifer that occurs in the transitional soil and weathered bedrock zone or sub-outcrop horizon. This layer is sometimes also referred to as a perched aquifer. Usually this layer is poorly developed and is generally not considered as an aquifer given its inability to sustain reasonable or useful quantities of groundwater. Rainfall that infiltrates into the weathered rock soon reaches an impermeable layer of shale or clay underneath the weathered zone. The movement of groundwater on top of this shale is lateral and in the direction of the surface slope. The water discharges at surface in the forms of fountains and springs where the flow paths are obstructed by a barrier, such as a dolerite dyke, paleo-topographic highs in the bedrock, or where the surface topography cuts below the groundwater table at streams.

This aquifer generally has low yields, typically in the range of 0.1 l/s with phreatic water levels sometimes occurring on un-weathered bedrock or clayey layers. Where consideration of the shallow aquifer system becomes important is during seepage estimations into voids and mass transport simulations from mine-induced contamination sources, because a lateral seepage component in the shallow water table zone in the weathered zone often occurs. Because of its shallow position and direct interaction with the surface, this aquifer has most characteristics of a primary type aquifer.

This shallow unconfined system has very low hydraulic conductivities and transmissivities and will therefore yield very little groundwater and can as a result not be regarded as an aquifer or be exploited as such. Yields of less than 0.1 l/s are expected.

1.8.2 Fractured and weathered confined or semi-confined lava aquifer in the Rietgat Formation of the Ventersdorp Supergroup.

The second aquifer system is the double porosity lava aquifer of the Ventersdorp Supergroup where groundwater yields, although more heterogeneous, can be significantly higher than the weathered zone

aquifer. This aquifer system usually displays semi-confined or confined characteristics with piezometric heads often being significantly higher than the water-bearing fracture position. The aquifer forms in transmissive fractures in the consolidated and mostly impervious bedrock, and also on contact between diabase sills or dykes and the lava. Aquifer hydraulic parameters largely depend on the degree of fracturing within the host rock but hydraulic conductivity is mostly between 0.01 m/d and 0.0001 m/d. Rest water levels as recorded during the hydrocensus were between 3.98 mbs and 15.64 mbs with an average of 8.64 mbs.

1.8.3 A shallow weathered dolomite aquifer, associated with shallow fractures and weathering on top of the solid bedrock.

A fractured rock aquifer most probably exist within the dolomitic formations of the Chuniespoort. Aquifer yields largely depend on the degree of fracturing which can be significant in dolomite. Although no yield information could be obtained during the hydrocensus, boreholes drilled intersecting a good yielding fracture typically yield in excess of 5 l/s. The aquifer is however highly heterogeneous and hydraulic parameters and yields can differ substantially within the aquifer. Hydraulic conductivities typically range between 0.001 m/d and 1 m/d. Water levels recorded during the hydrocensus for the dolomitic aquifer were between 7.22 mbs and 30.26 mbs with an average of 13.0 mbs.

1.8.4 Alluvial aquifer related to the Vaal River and Skoonspruit.

A Tertiary alluvial aquifer related to the Vaal River, and possibly the Skoonspruit are also probably present. An alluvial aquifer comprises of unconsolidated material deposited by water, typically occurring adjacent to rivers and in buried paleo-channels. The aquifers are generally composed of clay, silt, sand, gravel or similar unconsolidated material deposited by running water. The depth of this aquifer is unknown but is usually not greater than 30 m-50 m. Two boreholes were surveyed within this aquifer with water levels of between 3.79 mbs and 7.34 mbs. Yields were not available during the time of the survey. Alluvial aquifers are generally shallower than sedimentary and fractured rock aquifers and water levels often fluctuate due to varying recharge and pumping rates. Due to their shallow and unconfined nature, alluvial aquifers are susceptible to contamination and pollution. These types of aquifers are of primary nature and mostly homogeneous. Hydraulic conductivity of this aquifer is generally between 0.01 m/d and 10 m/d.

1.9 Site conceptual model

The conceptual model consists of a set of assumptions that reduce the real problem and the real domain to simplified versions that are acceptable in view of the objectives of the modelling and of the associated management problem (AquiScience, 2015). In order to construct the conceptual model the following needs to be taken into account and includes: the Representative Elementary Volume (REV) and groundwater impacts and receptors.

1.9.1 Representative Elementary Volume.

The REV is a theoretical approach in which representative values for flow (and transport) parameters are averaged over an appropriate volume. On a larger scale (macroscopic scale) therefore, parameters are averaged and for a sufficiently large modelling cell size (representative elementary volume) a porous media approach can be adopted by specifying regional representative aquifer parameters.

The geohydrology and aquifers that could be affected by 7 Shaft's dewatering is located within the Platberg/Klipriviersberg Group consisting mostly of lava, shale and conglomerate. In general, lavas have very low effective porosity and hydraulic conductivity rendering groundwater yields and movement low and slow respectively. However, the study area are widely intruded by other igneous types of rocks such as dolerite and has been subjected to intense faulting. These intrusions and fault zones have resulted in large scale fracturing of the host lava and the development of preferential groundwater flow paths for the movement of groundwater. Some fractures are laterally extensive and form important local zones of groundwater flow within rocks of generally low permeability. The model would therefore constitute a series of interconnected vertical conduits where zones of higher hydraulic conductivity exist adjacent to zones of lesser conductivity, i.e. the host rock. The hydraulic parameters of these different zones could frequently be orders of magnitude different.

From the description of the geohydrology it is highly possible that the aquifer is highly heterogeneous in that the aquifer parameters could vary sharply over short distances. It is therefore clear that on a very small scale (microscopic scale or pore scale) a porous media approach of modelling will lead to an inadequate description of the modelling problem with resulting inaccuracies. The realistic alternative therefore is to move to a coarser scale of aquifer description by introducing measurable phenomenological coefficients such as hydraulic gradients. In the continuum approach, the concept of the REV is evoked.

1.9.2 Groundwater impacts and receptors

The site conceptual model was developed using a risk based approach, whereby impact source areas were identified, pathways characterised and potential receptors identified. Initially only the No.7 Shaft will be operational and dewatered and the raw materials will be transported by road to the Nicolor South Plant for processing. Therefore, the CAPM Orkney Gold Mine will not have any mine residue deposits or containment dams. Gold seams are however known to contribute to acid Mine/rock drainage (AMD/ARD). This is due to the mineral pyrite that is closely associated with gold-bearing strata and contributes between 10% and 30% of the VCR.

1.9.2.1 Acid Rock Drainage (ARD)

The VCR (refer also to Chapter A of Section 7.4.1) is associated with the iron sulphide mineral pyrite (FeS_2). Mining activity will expose the pyrite to oxidising agents such as oxygen and ferric iron (Fe^{3+}). A variety of mining wastes, most notably tailings, overburden and slimes contain sulphidic material (mostly pyrite) which may oxidise to produce acid rock drainage (ARD). The result is sulphuric acid generation which acidifies water it comes in contact with. This has a number of negative consequences and most notably includes the solubilisation of a variety of trace metals, radionuclides and metalloids. A number of factors control the generation of ARD, but the most important are the relative abundance of acid producing minerals (generally the sulphides) and acid consuming minerals (generally carbonates), moisture content/ingress and exposure to air. (Refer also to Part 6.2.1 of Annexure C1 for a full description of the reactions that take place in the formation of ARD).

Production of AMD within the shaft may continue for many years after mines are closed. The mechanism through which mine voids fill with water after closure or when pumping stops, is conceptually illustrated in Figure 46 and Figure 47.

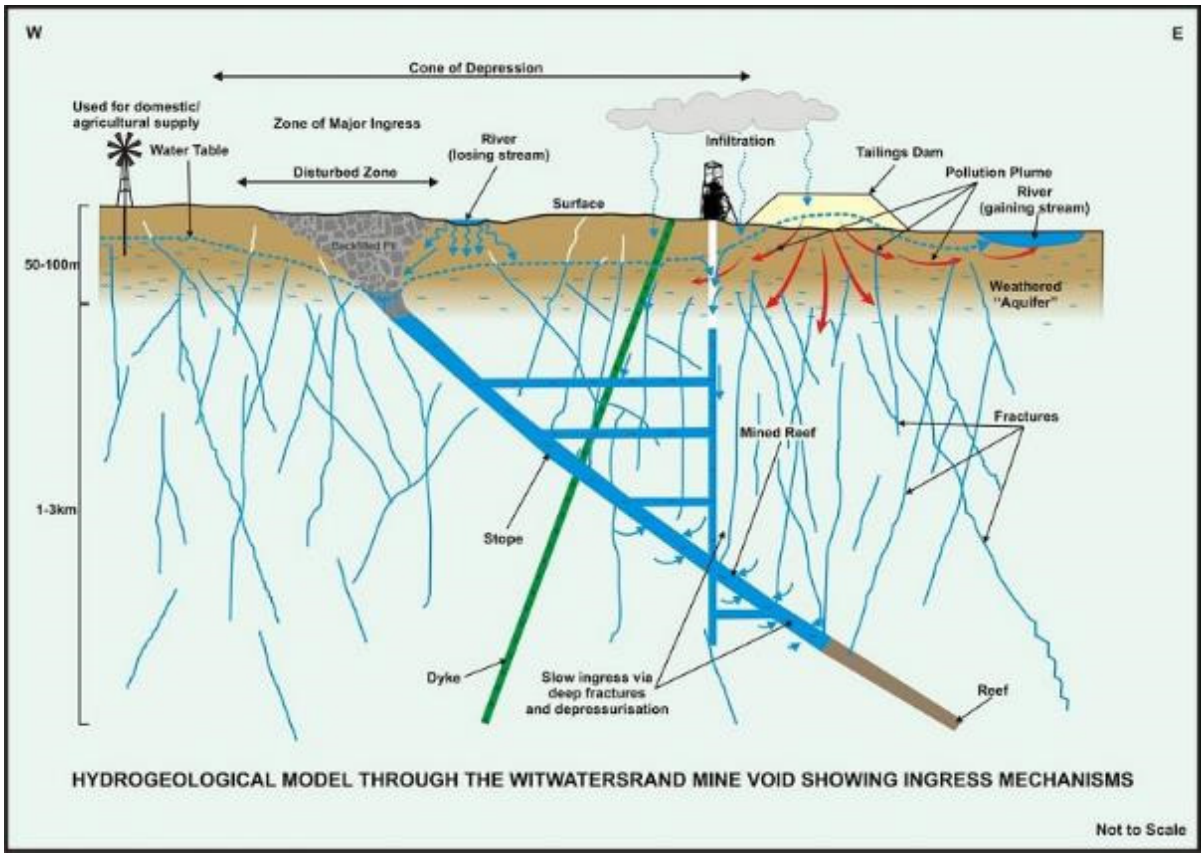

Figure 46: Conceptual model illustrating the recharge mechanisms for deep gold shaft in the Witwatersrand Goldfields (Extracted from AquiScience, 2015).

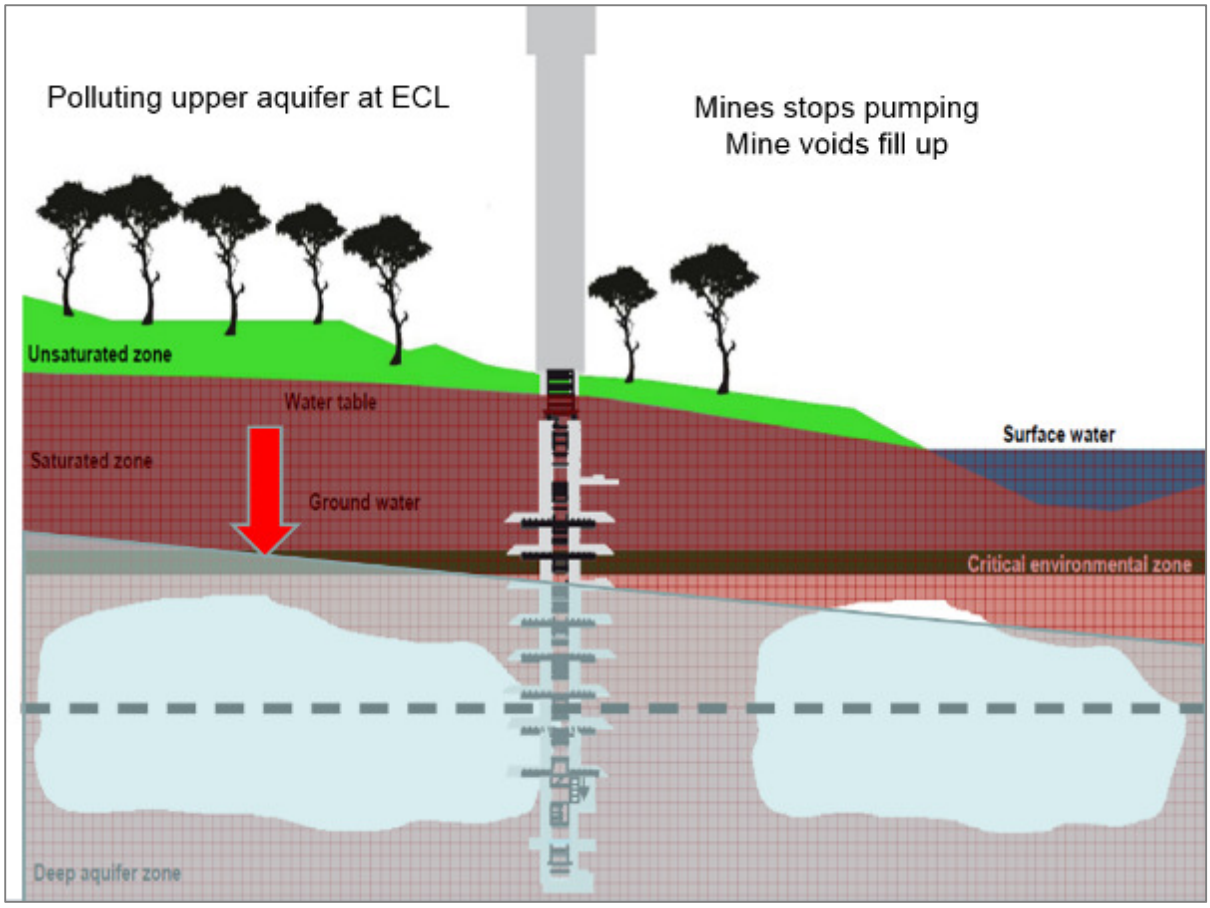

Figure 47: Conceptual illustration of the Environmental Critical Level (ECL) (Extracted from AquiScience, 2015)

1.9.2.2 Aquifer depletion

Initially during the operational phase, shaft dewatering could pose a groundwater depletion risk on the adjacent/overlying aquifers. Shaft dewatering will result in the formation of a cone of depression, the extent of which would largely depend on the aquifer hydraulic parameters and interconnectedness of the upper aquifers and lower groundwater. If these are interconnected the cone of depression will result in a systematic drawdown of aquifer/s and may pose aquifer depletion of privately owned boreholes. It is anticipated that groundwater drawdown will constitute the greatest groundwater risk during the operational phase from an environmental perspective, the significance of which will depend on the extent of the cone of depression and the positions of privately owned boreholes. However, given the mining depth the drawdown effect on receptors is anticipated to be small (AquiScience, 2015).

The water abstracted will be transported to the adjacent Anglo Gold Vaal River Operations to be used in their process. No borehole abstractions other than shaft dewatering is envisaged for the mine. The site conceptual model for the Operational Phase is presented in Figure 48 below.

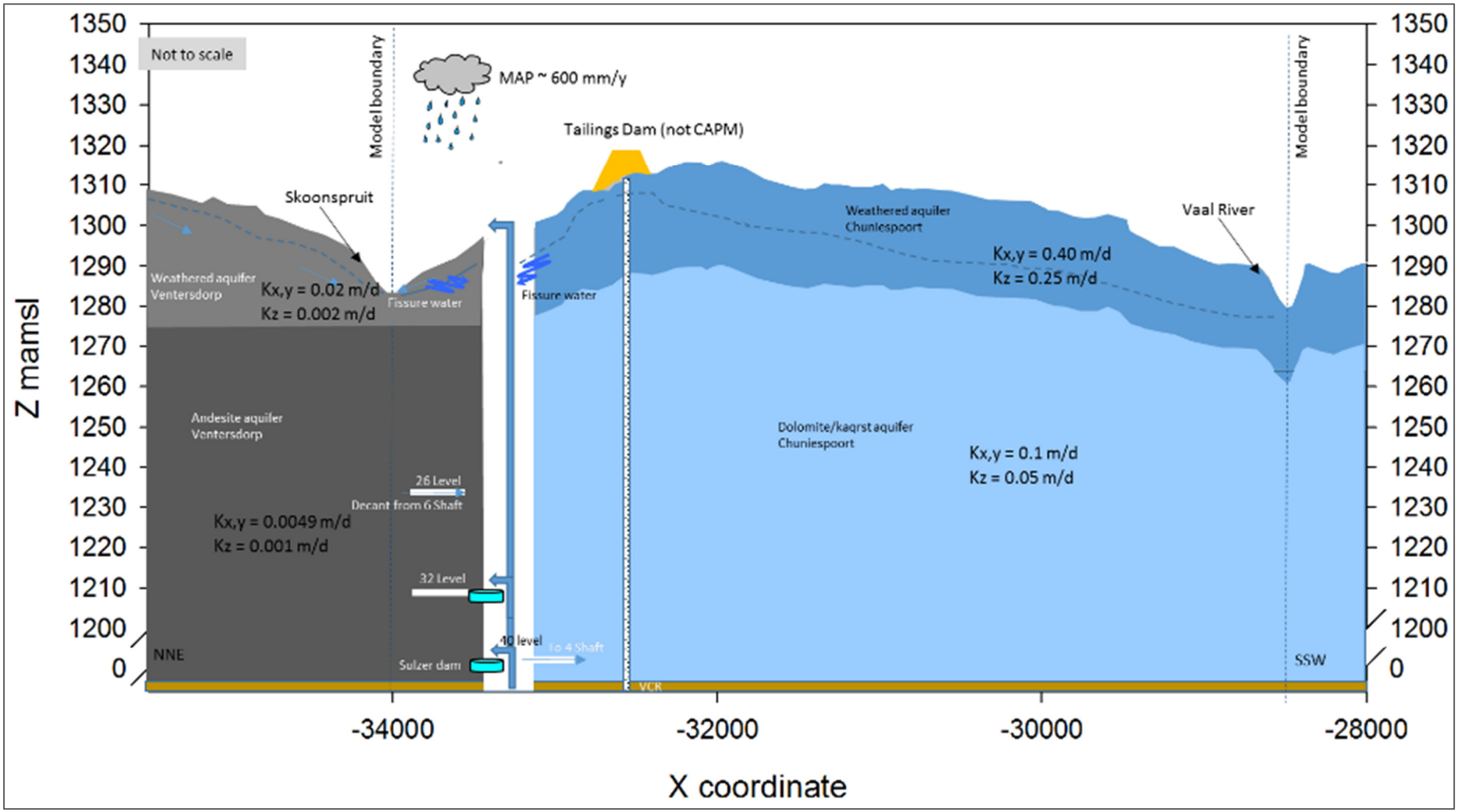

Figure 48: Site conceptual model for the Operational Phase (extracted from AquiScience, 2015)

1.10 Numerical groundwater model

A Finite Element (or FE) numerical ground water model was calculated using the FEFLOW software code and interface.

1.10.1 Aquifer delineation

The modelling area was selected based on the aquifer delineation method of usinghigh and low topographical areas over which flow is not possible (refer also to Annexure C1). As seen from the model domain delineation for the area (refer to Figure 49 below), he southern and western boundaries were chosen to be the Vaal River and the Skoonspruit, respectively which were assigned as hydraulic head boundaries. The north-western and north-eastern boundaries were selected based on topographical highs.

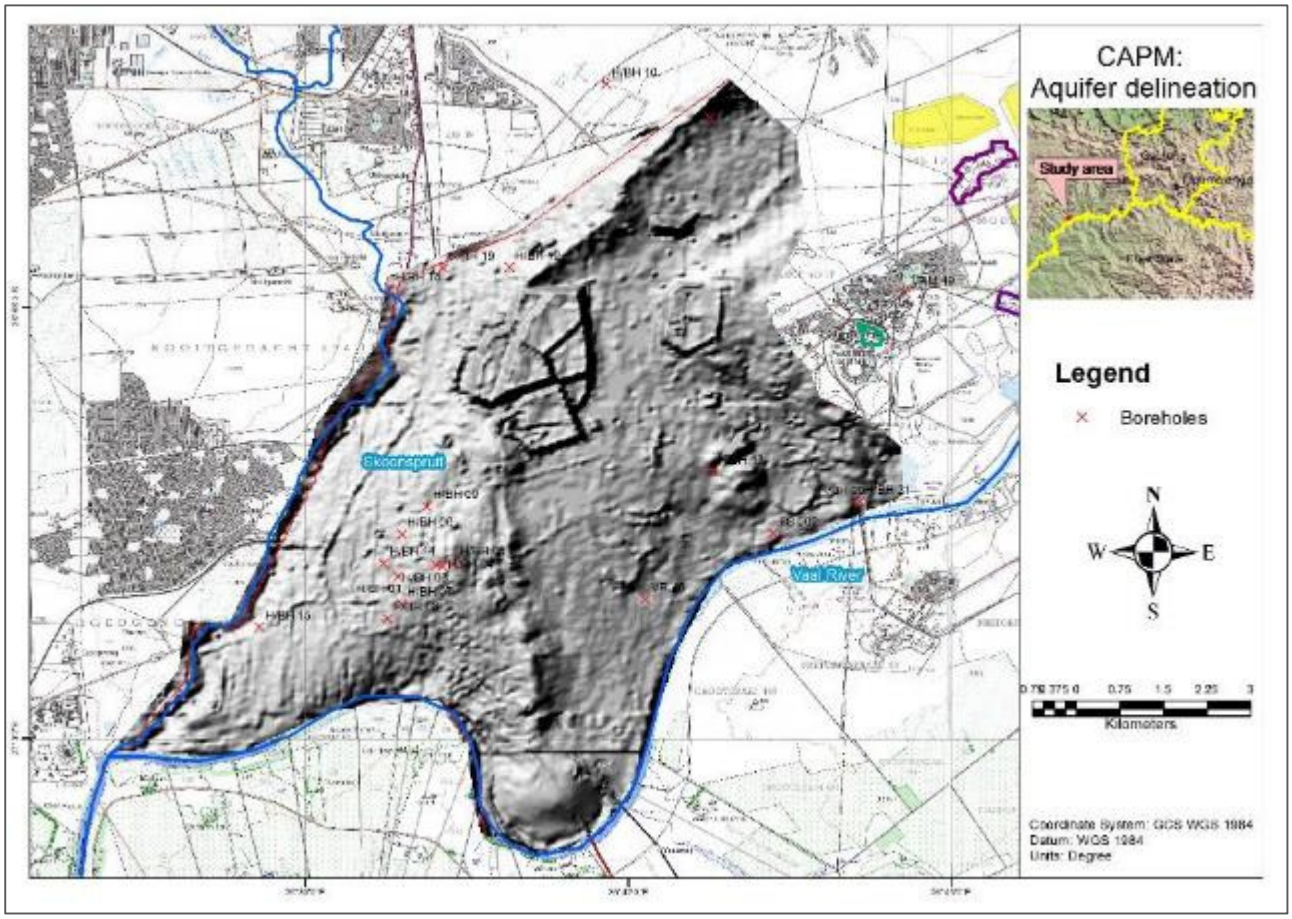

Figure 49: Model delineation (extracted from AquiScience, 2015)

1.10.2 Model Mesh

The model mesh was developed using 50 449 elements and 25 506 nodes with the model domain covering an area of 89.71 km2, and differentiated using the 'Triangle' finite element method (AquiScience, 2015). Figure 50 below presents the ground generated mesh.

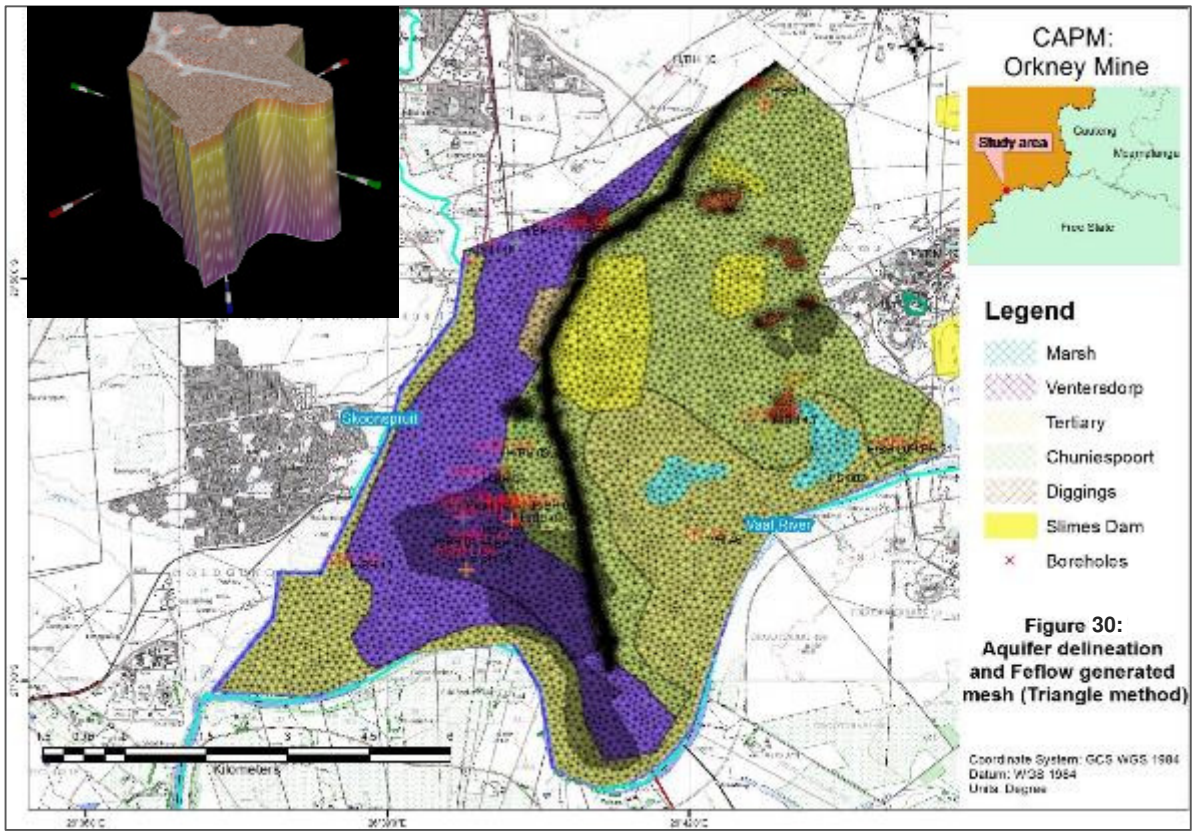

Figure 50: Aquifer delineation and FEFLOW generated mesh (extracted from AquiScience, 2015)

1.10.3 Simulation scenarios

Two (2) scenarios, a steady state and a transient scenario, were modelled in the 3-D FeFlow software and are described as follows:

- Scenario 1 – steady state:
  - Steady state pre-mining conditions. This scenario was used to calibrate the steady state groundwater flow model (day 0).
- Scenario 2 – transient flow:
  - Transient flow model to simulate the drawdown effects on the upper aquifer resulting from shaft dewatering, simulated for a period of 10 years.

1.10.3.1 Steady state model calibration and flow

The head elevation data from 18 observation boreholes located within the model domain were used to calibrate the steady-state flow model. Calculated head distribution versus observed heads can be viewed in Figure 51 and Figure 52. Refer to Part 7.6 of Annexure C1 for a detailed description of the steady state model calibration and flow.

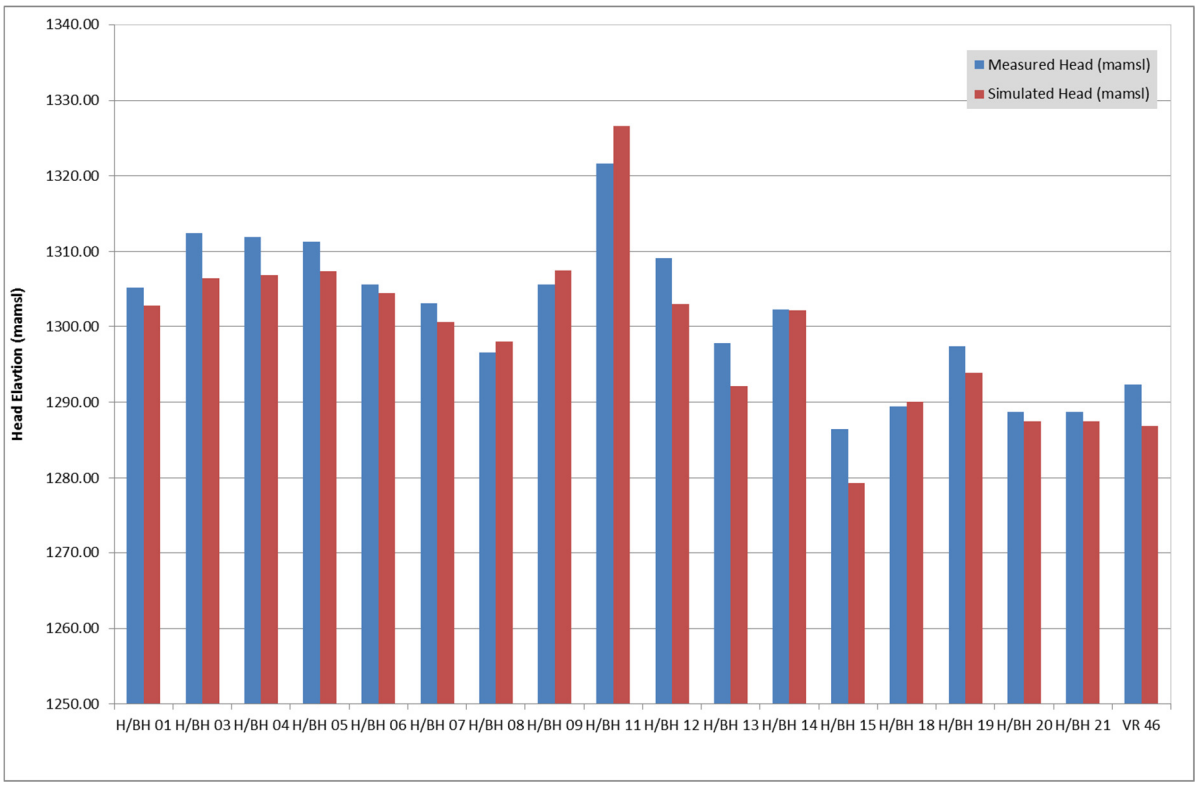

Figure 51: Simulated vs measured heads (extracted from AquiScience, 2015)

Observed groundwater levels were plotted against measured water levels and a correlation of 0.91 was achieved. The correlation indicates that the developed groundwater model will accurately represent on-site conditions.

The steady state flow patterns presented in Figure 53 below indicate that groundwater flow patterns follow the surface topography with recharge occurring at the higher elevations and discharging at lowest points, being the Skoonspruit and Vaal River drainage lines, with the dyke or faulting zone acting as a groundwater shed.

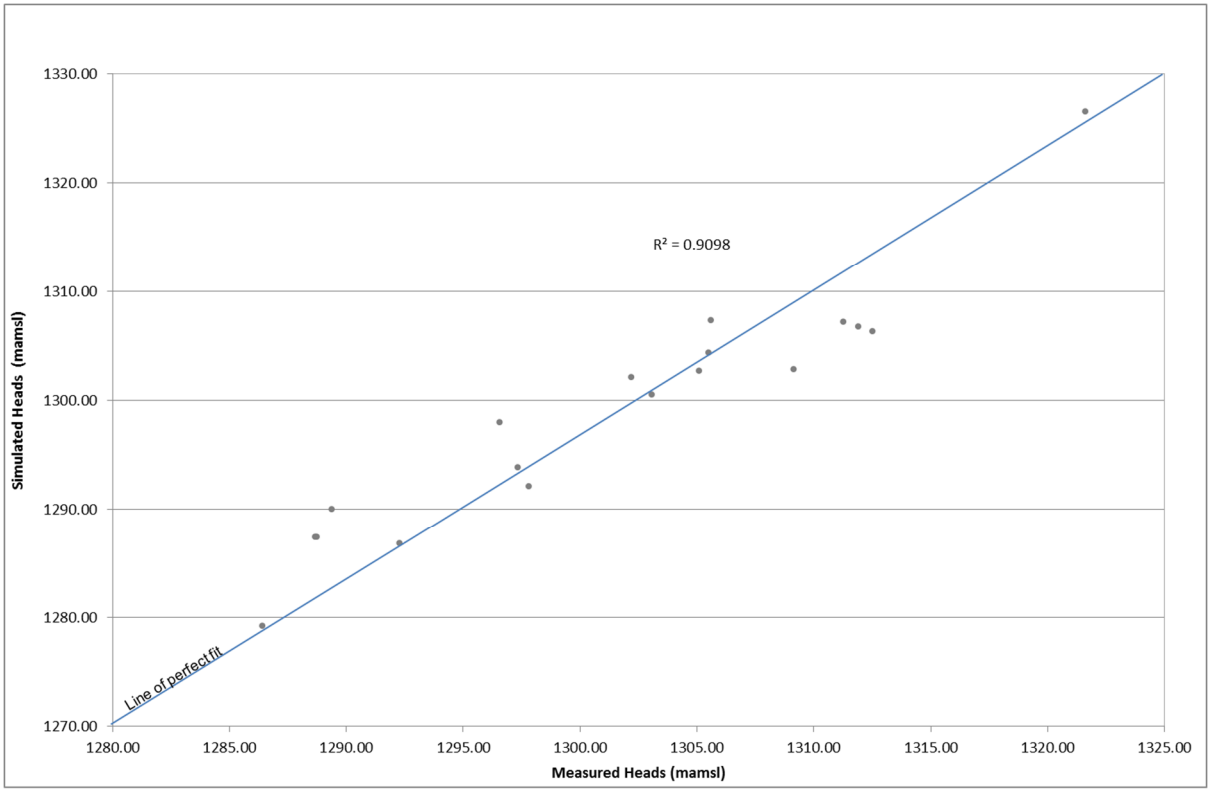

Figure 52: Correlation between calculated and observed hydraulic heads (extracted from AquiScience, 2015)

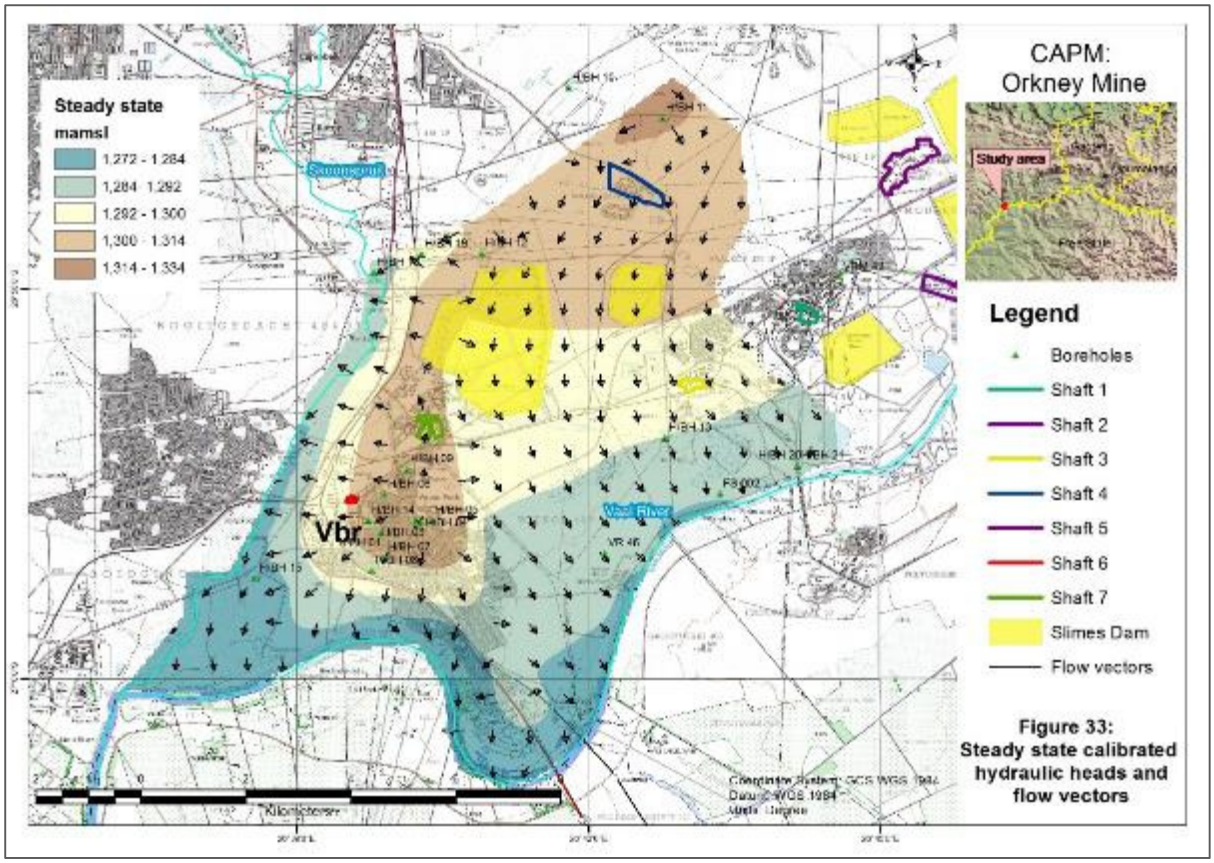

Figure 53: Steady state calibrated hydraulic head (extracted from AquiScience, 2015)

1.10.3.2 Transient model flow

The Life of Mine for the No.7 Shaft is planned to be approximately 10 years. Currently the mine is flooded and these flooded levels will have to be dewatered to allow for mining to continue, which will continue for the Life of Mine.

To simulate drawdown and the effect it will have on the groundwater table and receptor boreholes, an abstraction well was inserted into 7 Shaft. Abstraction rates (as received from CAPM) simulated for a period of 10 years are shown in the table below (Table 28):

Table 37: Dewatering rates for 7 Shaft inserted into the transient model

Well	Dewatering rate	
	l/s	l/d
Simulated dewatering well	11.59	1,330,560

Mine dewatering will have an impact on the groundwater volumes available in the aquifers surrounding the No.7 Shaft but will be limited in extent. As the dewatering initiates, the zone of influence of the groundwater level drawdown will migrate and expand as the groundwater system attempts to retain a state of equilibrium. The zone of influence will however be limited given the depth of mining. The radius

of influence, as shown in Figure 54 below, indicates that the shaft dewatering will influence significantly on groundwater levels in close proximity to the No.7 Shaft but will not extend towards any receptors.

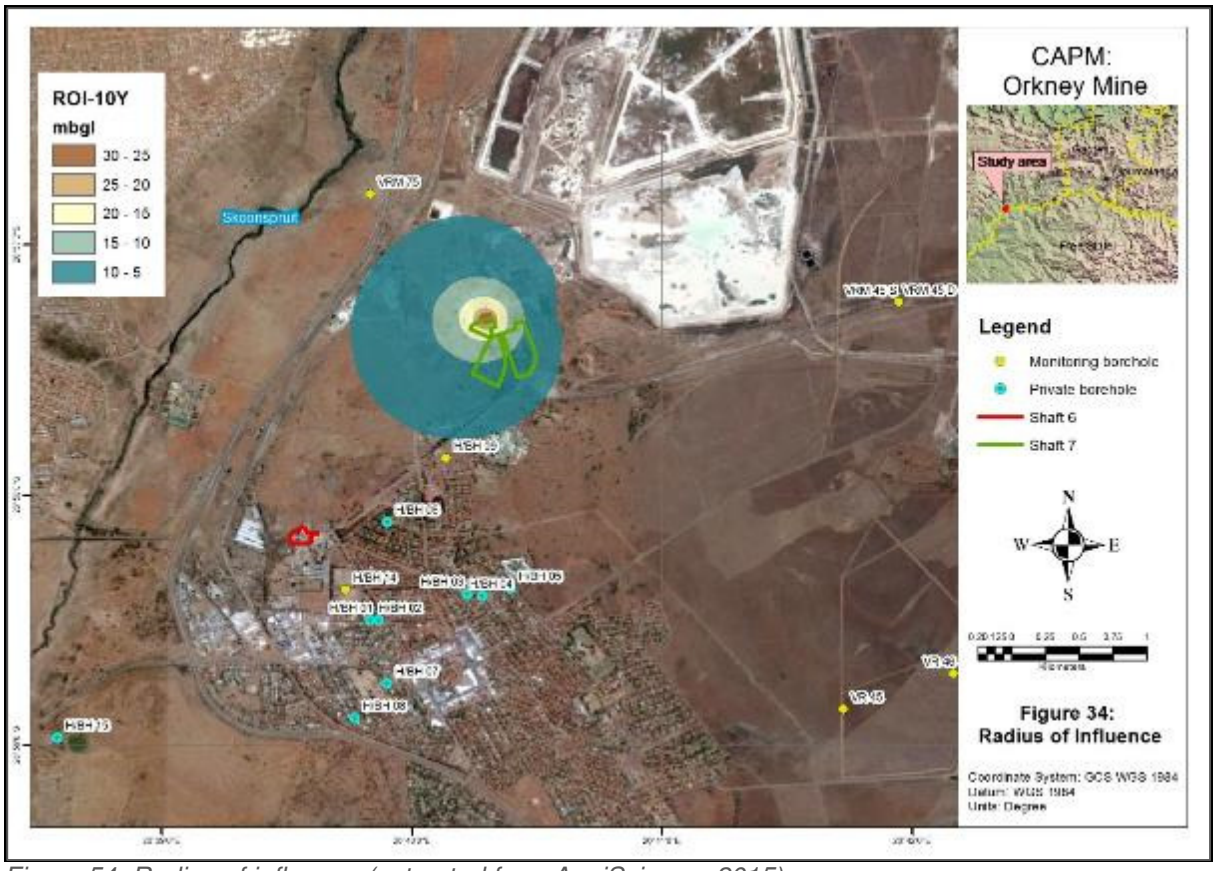

Figure 54: Radius of influence (extracted from AquiScience, 2015)

Chapter J: Air Quality

The CAPM Orkney Gold Mine and associated seven (7) shaft areas are currently under care maintenance with work re-commencing at the No.6 and No.7 Shafts. As previously mentioned, the CAPM Orkney Gold Mine is neighboured by other gold mine companies including AGA, and the Buffelsfontein Gold Mine. As a result, CAPM has been conducting monitoring in order to verify the baseline ambient air quality levels prior to the commencement of operations at the No.6 and No.7 Shafts.

The results of the air quality measurements conducted in December 2014 for the No.7 Shaft and the No.6 Shaft are presented in Table 38 and Table 39 below (refer also to Annexure C4).

Table 38: No.7 Shaft Air quality results

Type of test conducted	Occupational Exposure Limit (OEL)	Actual Measurement (Avg. over 2 days)	Remarks
Downcast 60 m below the surface			
Surface barometric pressure	N/A	87.59 kPa	-
Wet bulb (WB) temperature	May not exceed 32.5℃	8.8℃	-
Dry bulb (DB) temperature	May not exceed 37℃	17℃	-
Air velocity	N/A	4.9 m/s	-
Noise	May not exceed 85 dB	82.1 dB	Surface fan is source of noise
Carbon monoxide	May not exceed 30 ppm	0 ppm	-
Carbon dioxide	May not exceed 5000 ppm	600 ppm	-
Hydrogen sulphide	10 ppm	0 ppm	-
Methane	May not exceed 1.4%	0%	-
Oxygen	May not be less than 19%	20.8%	-
Surface fan			
Surface barometric pressure	N/A	89 kPa	-
Wet bulb (WB) temperature	May not exceed 32.5℃	17.5℃	-
Dry bulb (DB) temperature	May not exceed 37℃	18℃	-
Air velocity	N/A	12.8 m/s	-
Fan pressure	N/A	2.2 kPa	-
Noise	May not exceed 85 dB	89.2 dB	Surface fan is source of noise
Air Quantity	N/A	Approximately 110 m^3/s	-
Carbon monoxide	May not exceed 30 ppm	0 ppm	-
Carbon dioxide	May not exceed 5000 ppm	700 ppm	-
Hydrogen sulphide	10 ppm	0 ppm	-
Methane	May not exceed 1.4%	0%	-
Oxygen	May not be less than 19%	20.9%	-

Table 39: No.6 Shaft air quality results

Type of test conducted	Occupational Exposure Limit (OEL)	Actual Measurement (Avg. over 2 days)	Remarks
Downcast 60 m below the surface			
Surface barometric pressure	N/A	87.97 kPa	-
Wet bulb (WB) temperature	May not exceed 32.5℃	19.5℃	-
Dry bulb (DB) temperature	May not exceed 37℃	28.7℃	-
Air velocity	N/A	6.3 m/s	-
Noise	May not exceed 85 dB	54 dB	-
Carbon monoxide	May not exceed 30 ppm	0 ppm	-
Carbon dioxide	May not exceed 5000 ppm	500 ppm	-
Hydrogen sulphide	10 ppm	0 ppm	-
Methane	May not exceed 1.4%	0%	-
Oxygen	May not be less than 19%	20.9%	-
Surface fan			
Surface barometric pressure	N/A	88.12 kPa	-
Wet bulb (WB) temperature	May not exceed 32.5℃	18.1℃	-
Dry bulb (DB) temperature	May not exceed 37℃	23.1℃	-
Air velocity	N/A	11.9 m/s	-
Fan pressure	N/A	2.1 kPa	-
Noise	May not exceed 85 dB	86.7 dB	-
Air Quantity	N/A	Approximately 120 m^3/s	-
Carbon monoxide	May not exceed 30 ppm	0 ppm	-
Carbon dioxide	May not exceed 5000 ppm	600 ppm	-
Hydrogen sulphide	10 ppm	2-4 ppm	Definitely a high presence of Hydrogen Sulphide in the return air. This could be as a result of Fissures encountered underground.
Methane	May not exceed 1.4%	0%	-
Oxygen	May not be less than 19%	20.6%	-

Along with the measurements conducted at the two (2) shafts, measurements were also taken at the main offices, the rigger store and office, the lamproom, winder house, MG sets, driver cabins, fiter sets and the main fan building. The measurements from all these areas were within the respective OEL except for the noise level at the fan building which exceeded the OEL of 85 dB by 1 dB. The noise level, while the fan is operating, is that of 86 dB.

As the mine is currently not operational, air quality readings from the surface fans is not indicative of the readings that may obtained during the operational phase. It is therefore required that upon commencement of the mining activities, air quality monitoring is continued.

Chapter K: Noise

The information contained in this section of the document was obtained from the Baseline Environmental Noise survey report titled: “China African Precious Metals (Pty) Ltd. Orkney Gold Mine, Environmental Noise Impact Assessment Report” dated March 2015 and compiled by VARICON cc (VARICON, 2015). The report is attached hereto as Annexure C5.

According to VARICON cc, noise is defined as an unwanted, disturbing and/or physiologically damaging sound and personal exposure to noise levels equal to, or above 85 dBA for eight (8) hours can cause hearing loss. Noise levels can however be best described in terms of annoyance amongst the workers and the community and not in particular the cause of hearing damage. Annoyance can be described in terms of the following:

- As the intensity of the noise increase, the more annoying it will become.
- High frequencies are more annoying than lower frequencies.
- Noise that is intermittent, irregular or rhythmic or contains impulses or recognisable pure tones, may be considered as more annoying than a steady noise of the same intensity or perceived loudness.

Measurement locations were selected around the perimeters of the seven (7) shaft areas and are presented in Table 40 below.

Table 40: Noise measurement localities in relation to the respective shafts (extracted from VARICON, 2015)

Measurement localities
 
 
 


According to the SABS 0103 of 2008, it is possible that the noise generated by the CAPM Orkney Gold Mine will be annoying (as described above) or intrusive to members of the community if the rating level exceeds the typical rating levels for the ambient noise as provided in Table 41 below (refer also to Annexure C5).

Table 41: Rating levels for ambient noise in various district (adapted from VARICON, 2015)

Type of District	Equivalent Continuous Rating Level ($L_{Req.T}$) for Ambient Noise					
	Outdoors			Indoors, with open windows		
	Day-night	Day-time	Night-time	Day-night	Day-time	Night-time
(a) Rural Districts	45	45	35	35	35	25
(b) Suburban with little road traffic	50	50	40	40	40	30
(c) Urban Districts	55	55	45	45	45	35
(d) Urban districts with some workshops, business premises and with main roads.	60	60	50	50	50	40
(e) Central Business Districts	*65*	*65*	*55*	*55*	*55*	*45*
(f) Industrial Districts	70	70	60	60	60	50

The results of the ambient noise level monitoring for all of the measurements points at all seven (7) shafts are presented in Table 42 below. As identified from the results of the measurements, all of the noise levels were in accordance with the standards as set in SABS 0103 of 2008 under the guidance of SABS 0328:2008.

Table 42: Results of the ambient noise measurements (adapted from VARICON, 2015)

Measuring Positions (Co-ordinates)	AMBIENT NOISE (dB(A)) Day Time Levels			Remarks
	Average Measured Results	Typical Rating (SABS 0103) (Category E)	Excess $_{\Delta}L_{Req,T}$ (dBA)	
SHAFT COMPLEX No. 1				
Position 1: 26^{0}56'14.01"S 26^{0}44'15.11"E	49.7	65.0	+15.3	Close to the workers residential complex. At the main entrance to the shaft complex and old parking area. Vehicles and people traveling. No mining activities
Position 2: 26^{0}56'12.91"S 26^{0}44'20.66"E	48.7	65.0	+16.3	Main noise contributors were people talking and general background noise. Close to workshop areas not related to the old shaft complex.

Measuring Positions (Co-ordinates)	AMBIENT NOISE (dB(A))			Remarks
	Day Time Levels			
	Average Measured Results	Typical Rating (SABS 0103) (Category E)	Excess $_{\Delta}L_{Req,T}$ (dBA)	
Position 3: 26^{0}56'20.24"S 26^{0}44'10.16"E	45.7	65.0	+19.3	General background noise. Next to the old waste dump. Strong winds blowing. No mining activities.
SHAFT COMPLEX No. 2				
Position 1: 26^{0}55'59.51"S 26^{0}45'46.07"E	42.4	65.0	+22.6	At the main entrance to the shaft next to the main traveling road. Mainly vehicle noise contributing.
Position 2: 26^{0}56'04.67"S 26^{0}45'59.21:E	46.8	65.0	+18.2	Measuring point close to a salvage yard. Noise generation not relevant to the focus of this survey. No mining activities.
Position 3: 26^{0}56'03.60"S 26^{0}45'39.07"E	41.2	65.0	+23.8	At the back of the hostel and the shaft complex. Only general background noise.
SHAFT COMPLEX No. 3				
Position 1: 26^{0}56'55.33"S 26^{0}43'09.51"E	46.1	65.0	+18.9	This shaft complex has been completely demolished. There were no mining activities that could contribute to the noise levels. General noise from traffic on the distant main road was evident.
Position 2: 26^{0}56'59.49"S 26^{0}42'59.96"E	49.2	65.0	+15.8	Next to the main substation and close to the main road. Vehicle traffic was the main noise contributor.
SHAFT COMPLEX No. 4				
Position 1: 26^{0}54'56.07"S 26^{0}42'31.04"E	48.5	65.0	+16.5	At the old main entrance to the shaft complex. Close to the main road, but no alternative activities recorded.
Position 2: 26^{0}55'03.58"S 26^{0}42'46.27"E	41.6	65.0	+23.4	Remote from any activities and remote from the main road. General background noises.
Position 3: 26^{0}55'06.93"S	47.2	65.0	+17.8	Rehabilitation of old waste dumps ongoing. The noise generated not relevant to the

Measuring Positions (Co-ordinates)	AMBIENT NOISE (dB(A))			Remarks
	Day Time Levels			
	Average Measured Results	Typical Rating (SABS 0103) (Category E)	Excess $_{\Delta}L_{Req,T}$ (dBA)	
26^{0}42'33.58"E				focus of this survey. Directly behind the old shaft complex. No activities from within the shaft complex.
SHAFT COMPLEX No. 5				
Position 1: 26^{0}54'42.10"S 26^{0}45'09.48"E	50.5	65.0	+14.5	Close to the workers residence complex. Extensive vehicle and people movement which were the main contributing factors. The Shaft complex will be demolished and cleared in time, but the residential complex will be reserved.
Position 2: 26^{0}55'01.41"S 26^{0}45'05.39"E	42.7	65.0	+22.3	At the back of the old shaft, remote from the traffic. Distant noises from the main road and some general background noises.
Position 3: 26^{0}54'51.44"S 26^{0}45'11.80"E	34.8	65.0	+30.2	Moving around the shaft complex where the main fans used to be. Very quiet area. Only background and veld noises.
SHAFT COMPLEX No. 6				
Position 1: 26^{0}58'09.47"S 26^{0}39'37.68"E	51.1	65.0	+13.9	Close to the main entrance, next to the main substation and old parking area. Noise from the substation and road traffic were the main noise contributors. No noise from the shaft complex.
Position 2: 26^{0}58'06.46"S 26^{0}39'34.44"E	45.0	65.0	+20.0	Closer to the northern side of the head gear, outside of the main fence. General background noise and some people walking through the veld. This shaft complex will be re-opened and production will commence in the near future.
Position 3: 26^{0}58'10.12"S 26^{0}39'30.03"E	45.7	65.0	+19.3	Back of the shaft, next to main road and close to the residential areas. Also close to industrial areas. No noise from the mining area. General residential and industrial noise.

Measuring Positions (Co-ordinates)	AMBIENT NOISE (dB(A))			Remarks
	Day Time Levels			
	Average Measured Results	Typical Rating (SABS 0103) (Category E)	Excess $_{\Delta}L_{Req,T}$ (dBA)	
SHAFT COMPLEX No. 7				
Position 1: 26^{0}57'12.60"S 26^{0}40'08.23"E	56.6	65.0	+8.4	Northern corner of the complex, close to the reduction plant. Plant is still operating and used for the treatment of the raw material. Although the shaft is not active, the plants and yards are still active and generating noise.
Position 2: 26^{0}57'27.51"S 26^{0}40'12.41"E	51.7	65.0	+13.3	Towards the back of the existing residential complex of the workers. This shaft complex will be re-opened and production will commence in the near future. Currently only noise from the road traffic and from human traffic is evident.
Position 3: 26^{0}57'15.73"S 26^{0}40'30.54"E	48.2	65.0	+16.8	Back entrance to the shaft complex. Remote from the reduction plants. Some noise from material handling in the yards were noted.

Chapter L: Visual

The visual quality of the lease area is dominated by intrusions which are associated with mining activities such as shaft head gears, waste rock dumps, slimes dams, transmission lines and form/informal dwellings, of which the mine is responsible for head gears, cooling towers, buildings and associated infrastructure, within the shaft area.

As can be seen in Figure 11, that presents the DEM of the area, the most prominent feature within the study are the Mine Residue Deposits (not owned or managed by CAPM).

Chapter M: Protected areas and conservation planning

The CAPM Orkney Gold Mine is located in close proximity to the town of Orkney and there are no protected areas in the immediate surroundings of the seven (7) shaft areas. As described above in the Chapter E of Section 7.4.1 above, the Vaal Vet Sandy Grassland is classified as an endangered ecosystem. It is however important to note that the CAPM Orkney Gold Mine shaft areas fall outside of this area as the Vaal Vet Sandy Grassland is located to the west of the shaft areas (refer also to Annexure C3).

Chapter N: Cultural Heritage

The information contained in this section of the document is obtained from the Phase I Heritage Impact Assessment Report titled "1st Phase Cultural Heritage Impact Assessment for Shafts No.1 to No.7, Orkney, Northwest Province, South Africa, for CAPM Gold" dated March 2015 and compiled by Sidney Miller.

1.1 Historical background

Klerksdorp originated in the late 1830s when the first Voortrekkers settled on the banks of the Schoonspruit which flows through the present town. Prominent among the first settlers was C M du Plooy who appropriated a farm of some 16 000 ha and called it Elandsheuwel (refer to Annexure C6).

Other trekkers joined him there and, in exchange for help with the construction of a dam and irrigation canal were granted portions of the farm as well as communal grazing rights on the rest of the land. This collection of smallholdings was later given the name of Klerksdorp in honor of the first Landrost of the area, Jacob de Clercq. It was located on the west bank of the Schoonspruit in the centre of the present Klerksdorp.

The tranquillity of this rural paradise was shattered in August 1886 when A P Roos discovered gold on the farm Rietkuil and on the village's commonage. In the same year, what turned out to be the world's richest gold reef was discovered on the Witwatersrand about 160 km to the east. The world was in the grip of gold fever and the inevitable rush hit Klerksdorp as well. The 4 000 would be diggers who descended on the village were asked to draw lots for mining rights on public land.

A shanty town sprang up virtually overnight on the east bank of Schoonspruit and within three years of the first discovery the new town boasted about 70 taverns and a stock exchange of its own. Before the actual exchange was put up, high change was called at the Exchange Hotel. The diggers of Klerksdorp soon made the same sad discovery as those on the Witwatersrand, the gold was present but it demanded expensive and sophisticated equipment to recover. This lively prospecting in the area affected much excitement and in 1895 there was already seventeen companies registered as gold-mining syndicates on the Klerksdorp goldfields.

The first generation of deep level mines were established in the late 1930's around Klerksdorp (refer to Annexure C6). In 1938 Western Reefs mine was established on Witkoppen and the town of Orkney was founded in 1940. As in the case with the First World War, the Second World War again severely limited gold production and mining development at this locality.

After 1950 the second generation of deep-level mines were established by international companies and many of the old mines were upgraded to comply with modern mine safety regulations and laws. Most

of these mines were forced to close down or retire into maintenance phase owing to the decline in the gold price in the 1990's and the rising demand for increased wages by union driven workers' demands.

1.2 Findings of the site assessment

As part of the site assessment, each of the seven (7) Shaft areas were investigated. The shaft areas were walked, on foot, and photographic evidence was obtained. The on-foot route, photographic evidence and findings are presented below.

1.2.1 The No. 1 Shaft

The No. 1 Shaft has modern concrete headgear that is dated post 1960 and therefore falls outside of the protection of the National Heritage Act, 1999 (Act No. 25 of 1999) (NHA, 1999). Even so the mining objectives states that all of the existing infrastructure will be retained apart from two office buildings that are superfluous to mining objectives. Whether these will be demolished or not has not yet been finalised (refer also to Annexure C6).

Figure 55 below presents the on-foot track which was walked to assess the site and Table 43 below presents the photographic evidence obtained in walking the track.

Figure 55: On-foot track of the No.1 Shaft area (Extracted from Miller, 2015)

Table 43: Photographic evidence obtained at the No.1 Shaft area (Extracted from Miller, 2015)

No.1 Shaft – Photographic evidence
 Typical examples of the buildings and infrastructure found on site.
 Concrete Headgear of the No.1 Shaft
 Examples of rails, coc-pans and rope wheels found on site.

1.2.2 The No. 2 Shaft

The No. 2 Shaft has modern concrete headgear that is dated post 1960 and therefore falls outside of the protection of the NHA (1999). Even so the mining objectives states that all of the existing infrastructure will be retained. This infrastructure includes a large compound or living quarters for

labourers that will be maintained for the use of CAPM Gold either for its own labour or for rental to the public that may require accommodation (refer also to Annexure C6).

Figure 56 below presents the on-foot track which was walked to assess the site and Table 44: Photographic evidence obtained at the No.2 Shaft area below presents the photographic evidence obtained in walking the track.

Figure 56: On-foot track of the No.2 Shaft area (Extracted from Miller, 2015)

Table 44: Photographic evidence obtained at the No.2 Shaft area (Extracted from Miller, 2015)

No.2 Shaft – Photographic evidence

Typical examples of the buildings located on the No.2 Shaft area.

No.2 Shaft – Photographic evidence

Concrete headgear at the No.1 Shaft.

1.2.3 The No. 3 Shaft

The No. Shaft had traditional riveted steel headgear that is dated to the end of the 1930's. The site is therefore protected by section 34 (1) of the NHA (1999), and is rated as "General protection "A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or destructed without a demolition permit issued by the relevant heritage authorities. However, all infrastructure on this site has been demolished (refer also to Annexure C6).

Figure 57 below presents the on-foot track which was walked to assess the site and Table 45 below presents the photographic evidence obtained in walking the track.

Figure 57: On-foot track of the No.3 Shaft area (Extracted from Miller, 2015)

Table 45: Photographic evidence obtained at the No.3 Shaft area (Extracted from Miller, 2015)

No.3 Shaft – Photographic evidence

General view of the demolished sites at the No.3 Shaft area

No.3 Shaft – Photographic evidence

Images of the No.3 Shaft headgear – pre-demolishment (images supplied by CAPM)

1.2.4 The No. 4 Shaft

The No. 4 Shaft has modern concrete headgear that is dated post 1960 and therefore falls outside of the protection of the NHA (1999). The mining objectives states that all of the existing infrastructure will be retained. This infrastructure includes a large compound or living quarters for labourers that will be maintained for the use of CAPM Gold either for its own labour or for rental to the public that may require accommodation (refer also to Annexure C6).

Figure 58 below presents the on-foot track which was walked to assess the site and Table 46 below presents the photographic evidence obtained in walking the track.

Figure 58: On-foot track of the No.4 Shaft area (Extracted from Miller, 2015)

Table 46: Photographic evidence obtained at the No.4 Shaft area (Extracted from Miller, 2015)

No.4 Shaft – Photographic evidence

Typical examples of infrastructure located at the No. 4 Shaft.

No.4 Shaft – Photographic evidence

Concrete Headgear of the No.4 Shaft.

1.2.5 The No. 5 Shaft

The No. 5 Shaft has modern concrete headgear that is dated post 1960 and therefore falls outside of the protection of the NHA (1999). All infrastructure on site has been demolished, however when this occurred is not clear. The site all associated infrastructure also falls outside of the protection of the NHA (1999). The remaining infrastructure includes a large compound or living quarters for labourers that will be maintained for the use of CAPM Gold either for its own labour or for rental to the public that may require accommodation (refer also to Annexure C6).

Figure 59 below presents the on-foot track which was walked to assess the site and Table 47 below presents the photographic evidence obtained in walking the track.

Figure 59: On-foot track of the No.5 Shaft area (Extracted from Miller, 2015)

Table 47: Photographic evidence obtained at the No.5 Shaft area (Extracted from Miller, 2015)

No.5 Shaft – Photographic evidence

Concrete Headgear of the No.5 Shaft – Lone structure on site

1.2.6 The No.6 Shaft

The No. 6 Shaft has traditional riveted steel headgear that is dated to the mid 1930's, and reflects alterations and updating over time. The whole of the site and associated infrastructure is still intact as it will shortly be commissioned for operational activities. The mining objectives of CAPM Gold states that the site will be retained as-is. It will be maintained in its present format allowing for and according to modern mining safety regulations (refer also to Annexure C6).

Figure 60 below presents the on-foot track which was walked to assess the site and Table 48 below presents the photographic evidence obtained in walking the track.

Figure 60: On-foot track of the No.6 Shaft area (Extracted from Miller, 2015)

Table 48: Photographic evidence obtained at the No.6 Shaft area (Extracted from Miller, 2015)

No.6 Shaft – Photographic evidence

Typical examples of infrastructure located at the No.6 Shaft.

No.6 Shaft – Photographic evidence

Riveted steel headgear of the No.6 Shaft

1.2.7 The No.7 Shaft

The No. 7 Shaft has traditional riveted steel headgear that is dated to the mid 1930's but does however reflect alterations and updating over time. It is possibly the most representative of the early period of mining in the region. The mining objectives of CAPM Gold states that the site will mainly be retained as-is. It will be maintained in its present format allowing for and according to modern mining safety regulations. Five historic buildings on the eastern perimeter of the site (four steel framed and corrugated iron clad workshops and one brick walled, workshop with wooden trusses and corrugated iron roof). All five buildings are protected by section 34(1) of the NHA (1999). These are all rated as "General protection "A (Field Rating IV A) by the SAHRA minimum standards May 2007, (refer also to Annexure C6).

Figure 61 below presents the on-foot track which was walked to assess the site and Table 49 below presents the photographic evidence obtained in walking the track.

Figure 61: On-foot track of the No.7 Shaft area (Extracted from Miller, 2015)

Table 49: Photographic evidence obtained at the No.7 Shaft area (Extracted from Miller, 2015)

No.7 Shaft – Photographic evidence

Typical examples of the infrastructure located at the No.7 Shaft area.

No.7 Shaft – Photographic evidence

Steel headgear of the No.7 Shaft.

1.2.8 Office Complex

The office complex is located within the town of Orkney and clearly dates post-1960. The office complex and its associated infrastructure therefore falls outside of the protection of the NHA (1999). The office complex will be maintained for the use of CAPM Gold either for its own personnel or for rental to the public that may require office space. Alternatively it can also be changed into a public facility such as a school, clinic or old-age accommodation facility (refer also to Annexure C6).

Figure 62 below presents the on-foot track which was walked to assess the site and Table 50 below presents the photographic evidence obtained in walking the track.

Figure 62: On-foot track of the office complex (Extracted from Miller, 2015)

Table 50: Photographic evidence obtained at the office complex (Extracted from Miller, 2015)

Office complex – Photographic evidence

Typical infrastructure located at the office complex

Chapter O: Regional socio-economic structures

The information contained in this section of the document was obtained from the KKDM Integrated Development Plan (IDP) tilted: "*Dr Kenneth Kaunda District Municipality Integrated Development Plan, 2013/2014 review*".

The KKDM is situated in the southern part of the Northern Province and is one (1) of four (4) District Municipalities in the Northern Province. The KKDM is neighboured by the Free-State and Gauteng Provinces to the south and the east, respectively. The KKDM consists of four (4) Local Municipalities, namely:

- The Maquassi Hills Local Municipality.
- The Tlokwe Local Municipality.
- The Ventersdorp Local Municipality.
- The City of Matlosana Local Municipality (the local municipality in which the mine is located).

The KKDM is known for agriculture, especially maize and sunflower, as well as tourism attraction (such as hiking trails, mountain biking trails, canoeing, white water rafting, mountain climbing, abseiling, angling and fly-fishing) and Mining activities.

1.1 Population

The population of the KKDM has increased from 599 670 in the year 2001 to 695 993 individuals in the year 2011 (according to the 2011 census data). Table 51 below presents the population figure of the KKDM and the four (4) local municipalities. As seen in Table 51 below, the majority of the population (57.29%) of the KKDM resides within the City of Matlosana Local Municipality

Table 51: Population figures of the KKDM and the local municipalities (Adapted from IDP, 2014)

Municipality	Total Population		District Municipality Population (%)		Annual Growth (%)
	2001	2011	2001	2011	2001 - 2011
District Municipality					
Kenneth Kaunda DM (DC40)	599 670	695 933	100	100	1.49
Local Municipality					
Ventersdorp (NW401)	43 078	56 702	7.18	8.15	2.75
Tlokwe City Council (NW402)	128 353	162 762	21.40	23.39	2.38
City of Matlosana (NW403)	359 202	398 676	59.90	57.29	1.04
Maquassi Hills (NW404)	69 037	77 794	11.51	11.18	1.19

As seen in Table 51 above, the population of the KKDM in 2001 was that of 599 670 individuals and increased to 695 933 individuals in 2011. This indicates a population growth rate of 1.49% annually.

The total area of the KKDM is that of 14642.23 km^2. In 1995 the population density was 45 people per square kilometre and has increased to 47.53 people per square kilometre in 2011.

1.1.1 Gender

According to the 2011 census data, the distribution of gender across all four (4) local municipalities of the KKDM is generally fairly equal. Table 52 below indicates the percentage of females' across the local municipalities, the KKDM and the north West Province.

Table 52: Percentage females of the population (adapted from IDP, 2014)

Area	Percentage
North West Province	49.29%
Dr. Kenneth Kaunda District Municipality	50.10%
City of Matlosana Local Municipality	49.99%
Venterdorp Local Municipality	48.42%
Tlokwe City Local Municipality	50.87%
Maquassi Hills Local Municipality	50.28%

As can be seen in Table 52 above, the distribution of gender (male : female) within both the KKDM as a whole and the CMLM is generally a ratio of 50:50.

1.1.2 Age

The age distribution of the population of the KKDM indicates that the population is generally young with more individuals in the age groups of 0-4 years and 5-9 years, based on 2011 census data *(IDP, 2014)*. The majority of the population of the KKDM does however fall within the category of "Youth".

1.2 Education Levels

In the KKDM, a significant improvement of skills levels can be identified, most notably, a decrease of adult illiteracy. However, there has been very limited growth in terms of the portion of the population with tertiary degrees. An aspect of concern is the fact that the increase of the size of the population with the matric qualification is below the average of the North West Province and the Country, with only the Tlokwe City Local Municipality obtaining a better matric percentage than that of the province average.

1.3 Economic Profile

Most of the people who are employed in the CMLM are employed in the category "Elementary occupations". Elementary occupations include occupations such as domestic workers, street vendors, shoe cleaners, building caretakers, messengers, porters, garbage collectors, agricultural workers, mining and construction labourers, manufacturing labourers, transport labourers and freight handlers. This is followed by the category "craft and related trades workers" and "plant and machine operators and assemblers".

1.4 Employment Profile

According to the 2011 census data, the overall unemployment rate of the KKDM has decreased from 39.1% in 2001 to 29.7% in 2011 that indicates a decrease of 9.5%. This decrease in the unemployment rate stems from the performance of both the Tlokwe City Local Municipality and the CMLM as the decrease in the unemployment rates within these respective local municipalities is that of 15.5% and 7.3%. The unemployment rate of the Country is that of 29.8% and the unemployment rate of the North West Province is that of 31.5%. Therefore the unemployment rate of the KKDM are favourable in the broader context (IDP, 2014). The percentage of unemployed youth within the KKDM is that of 39.2% with the main contributors to this youth unemployment rate being the CMLM (43.1%) and the Maquassi Hills Local Municipality (42.6%). In a broader context, the unemployment rate of these two local municipalities is greater than that of the Provincial average of 40.6%. It is however important to note that the overall employment rate for the district and the province is declining.

1.5 Households

According to the KKDM IDP (2014) as well as the 2011 census data, the number of households within the KKDM is estimated at about 208 047 households, which is an increase from 153 560 households in 2001. 78.46% of the estimated 208 047 households within the KKDM are formal dwellings.

1.5.1 Household access to basic services

More than 80% of the households within the KKDM have access to some form of electricity and 98.65% of the dwellings have access to piped water in the house, the yard or a nearby access point. In terms of sanitation 84.92% of the estimated 208 047 households are connected to the formal municipal sewage network while 75.76% of the households are serviced by refuse removal. Refer also to Table 53 below.

Table 53: Access to basic services (Adapted from IDP, 2014)

Municipality	Refuse Removal (at least once per week)	Sanitation (Connected to Sewage System)	Piped Water	Formal Dwelling	Electricity for Cooking	Electricity for Heating	Electricity for Lighting
Dr Kenneth Kaunda	75.76%	84.92%	98.65%	78.46%	83.92%	81.36%	89.77%
Ventersdorp	36.52%	40.70%	97.80%	71.25%	68.87%	58.40%	77.94%
Tlokwe City Council	63.44%	81.44%	98.29%	77.36%	82.64%	79.84%	91.28%
City of Matlosana	89.64%	93.29%	98.96%	80.11%	86.75%	85.76%	91.28%
Maquassi Hills	53.31%	75.77%	98.19%	75.25%	78.42%	70.83%	83.19%

1.5.2 Income profile

Based on the data of the 2011 census, it can be seen that the majority of the households in the KKDM earn between R19 601 and R38 200 per annum followed by the households that earn between R9 601 and R19 600. The data also presented the fact that 6% of the households within the KKDM earned a monthly income which equates to R38 200 per annum. Table 54 below presents the household incomes of all four (local municipalities within the KKDM.

Table 54: Average household income per annum across all four (4) Local Municipalities of the KKDM District Municipality (Adapted from IDP, 2014)

Municipality	No income	1 – 4800	4801 – 9600	9601 - 19 600	19 601 - 38 200	38 201 - 76 400	76 401 - 153 800	153 801 - 307 600	307 601 - 614 400	614 001 – 1 228 800	1 228 801 - 2 457 600	2 457 601 or more
Dr Kenneth Kaunda	33 410	9 165	14 684	35 880	40 293	30 494	20 001	13 895	7 112	1 955	598	555
Ventersdorp	2 013	798	1 374	3 510	3 647	1 774	756	415	198	46	18	13
Tlokwe City Council	9 260	1 554	2 637	8 030	9 932	7 455	5 675	4 207	2 466	833	220	267
City of Matlosana	19 172	5 575	8 670	19 370	22 039	19 178	12 281	8 440	4 145	1 005	326	239
Maquassi Hills	2 966	1 238	2 004	4 970	4 675	2 087	1 289	834	303	71	34	36

1.6 Infrastructure

The area is well developed and there is existing infrastructure due to the presence of a number of towns in the area. According to the CMLM IDP there is a landfill site at Hartebeesfontein as well as a new regional landfill site that was to become operational in 2009. The sites at Orkney, Klerksdorp and Stilfontein were scheduled to close down in 2008.

There are approximately 18 water reservoirs and 13 water towers in the municipal area and most of them have sufficient capacity. The IDP has indicated that an additional 12% of spare capacity is required in the Orkney/ Kanana area. In terms of sanitation the Local Municipality has adopted a minimum level of sanitation service to be a sewer connection to each erven from water borne sewer reticulation, serving a flushing toilet system on the relevant erven. There are water waste treatment plants at Klerksdorp, Orkney, Stilfontein and Hartebeesfontein. Upgrades are being planned for the water waste treatment plants at Hartebeesfontein and Klerksdorp.

The CMLM manages the bulk purchase and distribution of electricity in all areas except for Kanana, Khuma and Tigane that is being managed by Eskom. All the substations have some spare capacity left. There are some electrification backlogs, mostly in the areas under the management of Eskom.

In terms of housing, the building of low cost housing in certain parts of Khuma, Jouberton and Tigane has been identified as a key issue for the municipality. There are nine libraries in the area, namely at Klerksdorp, Alabama, Manzilpark, Matlosana, Stilfontein, Khuma, Orkney, Kanana and Hartebeesfontein. There is also an airport, sports facilities and a number of parks in the area.

In terms of health care, there are about twelve clinics, a number of mobile clinics as well as about four community health centres in the area. These are only referring to municipal facilities and exclude private clinics and hospitals. There are also a number of schools and educational facilities in the area.

1.7 Key Economic Activities

Mining and quarrying is the main employment sector in the CMLM as it provides employment to just over a quarter of those of economically active age that have indicated that they are employed. The community, social and personal services sector and the Wholesale and retail trade sector are also large employment sectors in the area. Other mining companies in the area are AngloGold Ashanti.

7.4.2 Description of the current land uses

The past / historical land use of the area was that of agriculture but is however, at present, utilised and zoned for mining. All of the shafts of the CAPM Orkney Gold Mine are neighboured by other gold mines, processing plants and mine and plant residue deposits. Several residential areas as well as agricultural holdings are also located in close proximity to the seven (7) shafts of the CAPM Orkney Gold Mine and include the following:

- Kanana – approximately 3.5 km to the west of No.7 Shaft.
- The Town of Orkney – approximately 1.5 km to the south-east of No.6 Shaft.
- Uitkomsdal Agricultural Holdings – approximately 4.3 km to the west of No.4 Shaft.
- Vaal Reefs – approximately 800 m to the north of No.1 Shaft, 3 km to the west of Shaft No. 2, 2.3 km to the north-east of No.3 Shaft and 2.8 km to the south-west of No.5 Shaft.

Figure 63 below presents a topographical map that describes the land uses and environmental features in relation to the CAPM Orkney Gold Mine and adjacent areas.

7.4.3 Description of specific environmental features and infrastructure on the site

As previously mentioned, the CAPM Orkney Gold Mine consists of seven (7) shaft areas. The infrastructure on these shafts areas is presented in Table 55 below.

Table 55: Infrastructure associated with each of the shafts

Shaft	Infrastructure
No.1 Shaft	Shaft & associated infrastructure. Parking areas. Offices. Cooling plant. Water tower. Cement dam. Workshops.
No.2 Shaft	Shaft & associated infrastructure. Hostel buildings. Parking areas. Offices. Fans. Workshops.
No.3 Shaft	The area at Shaft 3 consists mainly of building rubble. No.3 Shaft is in the process of decommissioning and rehabilitation and the majority of the infrastructure has been demolished. The shaft has been plugged.
No.4 Shaft	Shaft & associated infrastructure. Hostel buildings. Parking areas.

Shaft	Infrastructure
	Offices. Plant buildings. Workshops.
No.5 Shaft	Shaft & associated infrastructure. Hostel buildings. Cooling plant.
No.6 Shaft	Shaft & associated infrastructure. Offices. Workshops. Parking area.
No.7 Shaft	Shaft & associated infrastructure. Offices. Workshops. Parking area.
Satellite office	Offices and associated infrastructure.
Fans	6 Shaft Veld Fan. Kanana Ventilation Duct. 7 Shaft Main Ventilation Fan.

There are no environmental features within the seven (7) shaft areas or in the direct vicinity of the shaft areas. The closest surface water body to the CAPM Orkney Gold Mine is that of the Schoonspruit and the Vaal River. The Schoonspruit is a tributary of the Vaal River and flows in a southerly direction towards the Vaal River. The Schoonspruit is situated between Kanana and Orkney, approximately 1.5 km to the west of No.6 Shaft. The Vaal River is situated to the south of the CAPM Orkney Gold Mine and forms the border between the North-West Province and the Free State Province. The Vaal River is situated approximately 1.5 km to the south of No.2 Shaft, 2.5 km to south of Shaft No. 3 and 2.7 km to the south of No.6 Shaft.

It is also important to note that according to the National Heritage Resources, 1999 (Act No. 25 of 1999), any structure, building older than 60 years is classified as a heritage resource. Therefore, several structure located at the No.7 Shaft can be classified as heritages resources. Refer also to Chapter N of Section 7.4.1 of this document.

7.4.4 Environmental and current land use map

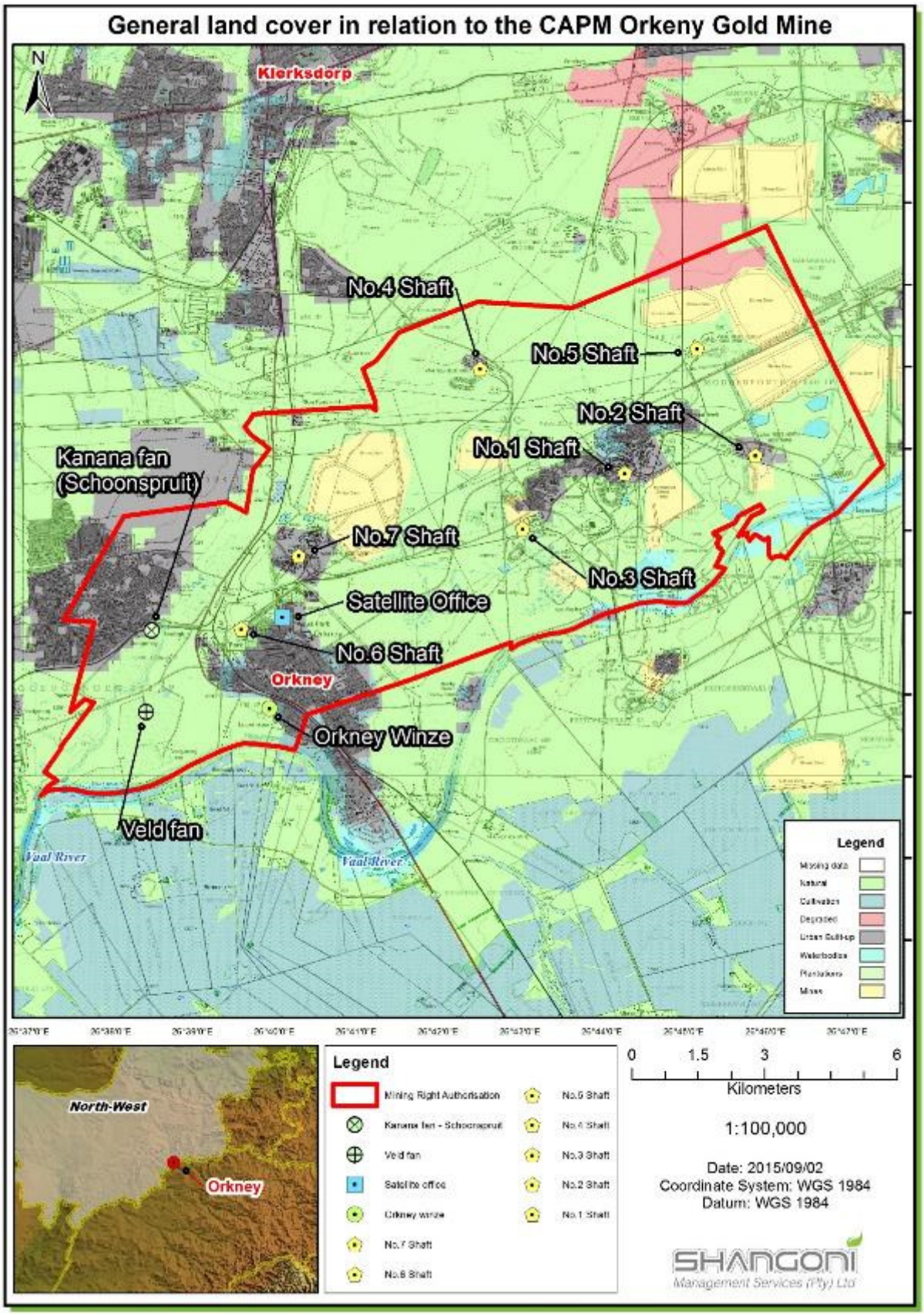

Figure 63: General land cover in relation to the CAPM Orkney Gold Mine

7.5 Impacts and risks identified

A detailed risk assessment has been undertaken, as contained in Annexure F. The following table contains all the potential impacts identified for the activities described in the initial site layout.

Environmental component	Activity	Impact description	Duration	Pre-mitigation			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
Geology	The underground deep level mining of gold bearing ore.	The underground deep level mining requires the blasting and removal of rock in the further sinking of the shafts as well as for the extraction of narrow generally flat dipping gold reefs. This, including the removal of the ore to the surface for processing at the Nicolor South Plant will lead to the permanent destruction of the localised geological strata.	Permanent	5	3	H	No	Yes	Managed
Soil	Commencement mining activities at within the various shaft areas.	Although the majority of the shaft areas are lined with cement, however there are areas within and adjacent to the shaft boundary which comprise of natural vegetation and secondary grasslands. The soil within these areas may therefore be negatively impacted upon should any mining related activities be conducted on these areas.	The duration will be long term for the Life of Mine	3	2	M	Yes	No	Avoided
	Hydrocarbon, chemical and waste materials spillages	Hydrocarbon and chemical spills may pollute soils within the area either through direct contact or indirectly through the contamination of surface water runoff. Similarly, unsorted and improper storage of general waste, building rubble or equipment contaminated with radioactive material may contaminated soil either through direct contact or indirectly through the contamination of surface water runoff.	Long term.	3	3	M	Yes	No	Managed
	Decommissioning of the shafts and related infrastructure and rehabilitation of the disturbed footprint areas.	The decommissioning of the shafts and removal of infrastructure will result in the exposure of soil to the elements, resulting in erosion of the soil. This will not only impact on the fertility of the soil but may have an impact on the surface water quality, fauna and flora and sensitive landscapes.	Long term.	3	3	M	Yes	Yes	Mitigated
Land use and land capability	Decommissioning and rehabilitation of all shaft areas and closure of the mine.	It is important to note that the CAPM Orkney Gold Mine is an existing gold mine and has previously been operational. Therefore, it is not anticipated that the re-commencement of the mining activities will have a further impact on the land use and land capability. However, during decommissioning and closure, all unnecessary infrastructure will be demolished and the surface area rehabilitated to the agreed upon end land use. Therefore a positive impact may be experienced as the land use may change from mining to agriculture or wilderness.	The positive impact will be long-term to permanent.	Positive			Yes	No	Enhanced
Flora	Operational activities and care and maintenance activities to be conducted at the No.6 and No.7 Shafts and the No.1 to No.5 Shafts, respectively.	*Boophone disticha* is a plant species with a conservation status of “Declining”. The habitat of this plant species is dry grasslands and rocky areas and is widespread in South Africa	Long term for the Life of Mine	2	2	L	Yes	Yes	Avoided

Environmental component	Activity	Impact description	Duration	Pre-mitigation			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		and extends up the eastern half of southern Africa to Uganda. This plant species was identified within the untransformed grassland areas adjacent to the No.7 Shaft. It was also identified that *Pearsonia bracteata* and *Drimia sanguinea* could also occur in this area owing to the presence of the suitable habitat. No mining activities will be conducted outside of the underground Mining Right area or the Surface Rights area of the shaft, therefore it is not anticipated that the proposed mining activity at the No.7 Shaft will impact on these species. However in the even that any activities are conducted outside of the shaft boundary area, these species may be impacted upon. Dust, generated from the loading and hauling of the ore, may also settle on the vegetation in this area and may impact on the growth and photosynthesis and transpiration processes of the vegetation. Only three species protected under Schedule 11 of the Transvaal Nature Conservation Act (No.12 of 1983), namely *Babiana hypogea*, *Gladiolus permeabilis* and *Crinum graminicola* were recorded from untransformed grassland (corresponding to shaft footprints No.4 and No.5) on the study area.							
		The decommissioning of the shafts and removal of infrastructure will result in the exposure of soil to the elements, resulting in erosion of the soil. This will not only impact on the fertility of the soil but may have an impact on the surface water quality, fauna and flora and sensitive landscapes.	Long-term for the Life of Mine.	2	4	M	Yes	Yes	Mitigated
		A number of weeds and invader plant species were identified within the study area. These weeds and invader plant species established on disturbed areas have a tendency to dominate or replace the canopy herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems.	Long-term for the Life of Mine.	3	3	M	Yes	Yes	Mitigated
Fauna	Operational activities and care and maintenance activities to be conducted at the No.6 and No.7 Shafts and the No.1 to No.5 Shafts, respectively.	The study area provides potential habitat for 10 mammal taxa of conservation concern, of which, the following species may occur: • Brown Hyaena. • Honey Badger. • South African Hedgehog. • Shrews.	Long term for the Life of Mine.	3	2	M	No	Yes	Avoided

Environmental component	Activity		Impact description	Duration	Pre-mitigation			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
					Probability	Magnitude	Significance			
			• Black-footed cat. Due to the increased human presence in the area and observation within the study area, both the Brown Hyaena and the Black-footed Cat are said to be irregular in occurrence within the study area. The Honey badger as well as the south African hedgehog are however expected to occur within the study area due to their tolerance to modified habitat types. The bird species of conservation concern are likely to occur within the study area and include: • The Melardious Lark (Mirafra cheniana). • The near threatened Abdim's stork (Ciconia abdimii). • The vulnerable Lanner Falcon (Falco biarmicus). The Abdims Stork and the Lanner Falcon were not recorded during the site survey but are classified as likely to occur within the study area. The Melardious Lark was however recorded within the study area during the site survey. 23 other species are sympatric to the study area however they are either irregular visitors to the area or unlikely to be present due to the absence of suitable habitats.						
			Animals within the study area and adjacent to the mine may be hunted and poached, by employees, for food.							
			Animal injury and / or death may result from animal life accessing the mine shaft areas as well as by collisions with vehicles and machinery on and off site.	Long term for the Life of Mine.	2	2	L	No	Yes	Avoided
			Noise generated from mining activities may scare animal life in the vicinity and lead to migration away from the area and possibly even injury and death.	Long term for the Life of Mine.	2	2	L	No	Yes	Avoided
Surface water	No.1 Shaft	Operation of winder cooling ponds.	The winder cooling ponds are concrete ponds situated next to one of the winder houses and in close proximity of the clean runoff channels. These ponds contain process water used for cooling purposes. Surface water quality: Overflow of winder cooling ponds may lead to affected water discharge into the clean surface runoff channels situated next to the cooling ponds and may result in deterioration in quality of surface water runoff from the No.1 Shaft area.	Operational phase	4	1	L	Yes	No	Avoided

Environmental component	Activity		Impact description	Duration	Pre-mitigation			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
					Probability	Magnitude	Significance			
		Storage and handling of hydrocarbon containers.	Surface water contamination may take place as a result of leaking hydrocarbon containers stored outside of designated areas.	Operational phase	2	2	L	Yes	No	Avoided
		Containment of affected water.	Overflow from the containment sump underneath the conveyor system may lead to deterioration of clean surface water quality in the immediate vicinity of the No.1 Shaft area.	Operational phase	2	2	L	Yes	No	Avoided
	No.2 Shaft	Uncontrolled surface water runoff.	There are no current diversion measures to prevent surface runoff from flowing into No.2 Shaft. Runoff retention also takes place inside previously constructed containment facilities.	During care and maintenance/decommissioning.	4	2	M	Yes	No	Avoided
	No.3 Shaft	Rehabilitation of the No.3 Shaft area.	Closure phase: Incorrect rehabilitation techniques may result in exposed areas and areas that will prevent drainage of storm water runoff towards the downstream environment.	During care and maintenance/decommissioning.	2	1	L	Yes	No	Avoided
	No.4 Shaft	Uncontrolled surface water runoff	There are no current diversion measures to prevent surface runoff from flowing into No.4 Shaft. Runoff retention also takes place inside previously constructed containment facilities within the shaft operations area.	During care and maintenance/operational phase.	4	2	M	Yes	No	Avoided
	No.5 Shaft	Sewage management	A sewage sump is located next to a clean storm water diversion channel downstream of the Shaft No.5 hostel area. Mine personnel has indicated that there were previous incidents in which the sump's capacity was reached and sewage entered the clean storm water conveyance channel.	Operational phase of sewage system.	4	3	H	No	Yes	Avoided
	No.6 Shaft	Uncontrolled storm water runoff	There are no current diversion measures to prevent surface runoff from flowing into No.6 Shaft.	During care and maintenance / operational phase	4	2	M	No	Yes	Avoided
		Wash bay operation	The wash bay will be used as a designated area to clean equipment and currently not fitted with an oil separator. This facility is not connected to a dirty water system and therefore wash water is pumped out and discharged into the adjacent veldt during operations. Surface water quality: Should any wash water be discharged from the wash bay in its current status, discharge of hydrocarbon contaminated water will take place in the surrounding clean water environment.	During operational phase.	5	3	H	No	Yes	Avoided
	No.7 Shaft	Chemical and hydrocarbon management	The main storm water channel is located next to a hydrocarbon and chemical storage area. Any chemical and hydrocarbon containers as well as equipment (operated using grease) stored outside of a designated area creates a risk of surface water pollution. Contaminated runoff as a result of poor housekeeping practises will enter the clean storm water diversion trench towards the adjacent veldt area.	During operational phase.	3	2	M	No	No	Avoided

Environmental component	Activity		Impact description	Duration	Pre-mitigation			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
					Probability	Magnitude	Significance			
			Surface water quality: The quality of surface runoff generated within the No.7 Shaft area may be deteriorated as a result of contact with hydrocarbons such as oil and grease.							
		Wash bay operation	The wash bay will be used as a designated area to clean radio-active contaminated equipment. This facility is connected to a dirty water system and wash water is pumped to the adjacent plant and used as part of the process water system. Should an incident occur, radio-active wash water may be discharged towards the clean storm water channel. Surface water quality: Discharge of contaminated water from the wash bay at No.7 Shaft may lead to a significant deterioration of surface water quality towards the downstream clean water environment.	During operational phase.	3	3	L	No	No	Avoided
		Sump operation underneath conveyor	A sump has been constructed underneath the conveyor system next to No.7 Shaft. The purpose of this sump is to contain any seepage from the damp ore material hoisted from underground. This sump is fitted with pumping infrastructure towards the adjacent plant as part of the process water system. There is a risk that overflow into the main storm water channel might occur as a result of pump failure. Surface water quality: Discharge of contaminated water from the sump may result in deterioration of clean surface water runoff towards the adjacent clean water environment.	During operational phase.	3	2	M	No	No	Avoided
Groundwater	Dewatering of the shafts for the safe continuation of mining.		During the operational phase groundwater will be dewatered to the bottom of the Vaal Contact Reef which will result in dewatering of the surrounding aquifer. However, the transient modelling exercise showed that the cone of depression is limited in extent with no boreholes included within its influence zone.	Lasting 1 – 5 years.	3	2	M	Yes	Yes	Managed
	The underground deep level mining of gold bearing ore, including the associated activities conducted on the surface.		The impacts on groundwater quality are primarily related to the management of materials, wastes and spills from drilling operations and unauthorised disposal of contaminated substances. Contamination of groundwater may also arise due to incorrect handling and disposal of waste materials, the physical drilling process (sludge contains oils and greases)	Lasting 1 – 5 years.	3	2	M	Yes	Yes	Mitigated

Environmental component	Activity	Impact description	Duration	Pre-mitigation			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		and oil leaks from drill rigs. This risk is considered low. Groundwater quality impacts may also arise from seepage from the recycle dam underground, although this is considered a low impact since the dam will be lined. The general risk towards groundwater quality deterioration is considered low.							
	Decommissioning and closure of the underground workings, shafts and associated infrastructure and well as the shaft surface area.	During the closure phases when all pumping within the region has ceased, the water in the shaft/s may rise towards the Environmentally Critical Level (ECL) where, if contaminated and affected by AMD reactions, may pollute aquifers or surface drainages. The rate at which, and up to which point the water will rise is highly complex and unknown given the multitude of parameters and dewatering schemes within the KOSH area. However previous studies in the KOSH area indicate a likely probability of decant and rise to pre-mining conditions and the ECL. However, at the CAPM 7 Shaft the groundwater table is not expected to return to pre - mining conditions. The reason being that decant will occur at 40 Level, creating a permanent dewatering cone towards 4 Shaft. The quality of the decant water is expected to be contaminated but will improve over time as existing areas of exposed sulphide mineralisation are flooded or oxidised.	Beyond life of Organization / Permanent impacts.	3	5	H	Yes	Yes	Mitigated
Sensitive landscapes	Mining and mining related activities conducted within the shaft areas.	An assessment was conducted against the NFEPA classified wetlands and the proximity of these wetlands to the CAPM Orkney Gold Mine shaft areas. As described in Chapter H of Section 7.4.1 (Part A – Environmental Impact Assessment) of the EIA and EMPr, three (3) NFEPA classified wetland areas have been identified to be in close proximity to the No.2 Shaft (unchannelled valley bottom wetland), the No.3 Shaft (channelled Valley Bottom Wetland) and the No.4 Shaft (flat wetland area). The operational activities to be conducted within the vicinity of shaft areas may impact on these wetland areas in terms of surface water quality, fauna, flora and soil aspects (refer also to Part 4.2, Part 4.5, Part 4.6 and Part 4.7). It is however important to note that these shafts are not currently operational as the No.7 and No.6 Shaft will be the first shafts to commence with operations and operations at the No.3 Shaft will not commence as the No.3 Shaft area is in the process of being rehabilitated.	Long-term for the Life of Mine.	2	3	M	Yes	Yes	Avoided
Air quality	The operation and utilization of the fans to remove stale air from the underground working.	The operation and utilisation of the Kanana Ventilation Duct, 6 Shaft Veld Fan and the 7 Shaft Main Ventilation Fan may result	Long-term for the Life of Mine.	3	4	H	No	Yes	Avoided

Environmental component	Activity	Impact description	Duration	Pre-mitigation			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
		in the release of potentially harmful pollutants and emissions into the air, from the underground workings. This may potentially affect the health of the residents in the area.							
	Hauling of mined ore to the Nicolor South Plant.	As described above, the ore mined at the CAPM Orkney Gold Mine will be transported, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road network. The transportation of the ore may therefore result in the generation dust that may have an impact on the local air quality.	Long-term for the Life of Mine.	3	2	M	No	No	Mitigated
		As described above, the ore mined at the CAPM Orkney Gold Mine will be transported, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road network. Emissions from the haulage trucks may have a minor impact on the localised air quality.	Long-term for the Life of Mine.	2	2	L	No	No	Mitigated
Noise	The reinstatement of operations at the CAPM Orkney Gold Mine No.7 Shaft and No.6.	Currently the shafts are not producing and the noise levels are from normal background noise and activities originating from human interaction and vehicle. In the not too distant future these shafts will be re-opened and the prepared for production. This will include activities such as pumping of water and replacing structures that are worn and damaged. Through this process there will be a great deal of workshop and Commissioning activities and vehicle movement while the shafts and underground workings are prepared. Once operational again the main noise sources will be from the main surface fans and the normal shaft noises.	Long-term.	3	2	M	Yes	No	Managed
	The care and maintenance of the No.1 to No.5 shafts until such a time that they are prepared from operations or decommissioned and rehabilitated.	These shaft will not be re-opened again for production. Normal care and maintenance will be carried on these shafts. Should there be any additional activities carried out, such as the breaking down of shaft structures and buildings, the noise levels should be monitored and the necessary control measures be introduced to minimise the impact on the community. Should operations commence at these shafts, the impacts as described above will apply.	Long-term.	1	1	L	Yes	No	Managed
Visual aspects	The reinstatement of operations at the CAPM Orkney Gold Mine Shaft areas.	Although the CAPM Orkney Gold Mine is an existing mine and the community and regular visitors of the area are likely to be desensitised to the mining related infrastructure, the mine has been under care and maintenance since the year 2010. Therefore, once operations at the shafts commence, the increased traffic and presence of employees as well as the increased generation of dust and emissions clouds from the	Long-term for the Life of Mine.	3	2	M	Yes	No	Managed

Environmental component	Activity		Impact description	Duration	Pre-mitigation			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
					Probability	Magnitude	Significance			
			machinery and vehicles may cause a visual disturbance. There are several sensitive receptors in both the foreground and middle ground that include residential areas and the town of Orkney.							
Site of archaeological and cultural importance	No.3 Shaft	The decommissioning and removal of infrastructure and the rehabilitation of the surface area of the No.3 Shaft.	This site with traditional riveted steel headgear is dated to the end of the 1930's. CAPM Orkney Gold Mine removed all infrastructure (including the headgear) at the No.3 Shaft, without being in possession of a demolition permit. This site was demolished between the period of 2011 and 2015. The site is protected by section 34 (1) of Act 25 of 1999, and is rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or destructed without a demolition permit issued by the relevant heritage authorities.	Permanent	High			No	Yes	Mitigated
	No.7 Shaft	The decommissioning and removal of infrastructure workshops at the No.7 Shaft.	This site with traditional riveted steel headgear is dated to the mid 1930's. It is possibly the most representative of the early period of mining in the region. Even so it reflects alterations and updating over time. Most of the site is still intact. The mining objectives of CAPM Gold states that the site will mainly be retained as-is. It will be maintained in its present format allowing for and according to modern mining safety regulations. It is the wish of CAPM Gold to demolish five historic buildings on the eastern perimeter of the site as these are superfluous to the proposed mining perspectives. It includes four steel framed and corrugated iron clad workshops and one brick walled, workshop with wooden trusses and corrugated iron roof. All five buildings are protected by section 34(1) of the National Heritage Act, Act 25 of 1999. These are all rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or demolished without a demolition permit issued by the relevant heritage authorities.	Permanent	Medium			No	Yes	Mitigated
Socio-economic aspects	The commencement of operations at the No.6 and the No.7 Shafts.		As described in the SLP (attached to the EIA and EMPr as Annexure G), upon commencement of operations at the No.7 and the No.6 Shaft the CAPM Orkney Gold Mine will employ 471 individuals (total in fourth year of production) of which a minimum of 95% (with the exception of specialists) will be sourced from the local communities. This is a positive impact in terms of socio-economic aspects as not only will 471 individuals be employed but the community will also benefit	Positive impact experienced over the long-term for the Life of Mine.	Postive			Yes	No	Enhancement of positive impact

Environmental component	Activity		Impact description	Duration	Pre-mitigation			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
					Probability	Magnitude	Significance			
			indirectly through the increased spending on goods and services, the use of local sub-contractors, as well as leading to a decrease in unemployment of the area.							
	Mine closure.		At the end of the Operational Phase of the Orkney Gold Mine, mining operations will cease and the mine will prepare for decommissioning and closure. Rehabilitation activities will commence, depending on the agreed upon end land, and infrastructure will be removed. During this phase a loss of jobs will occur as the amount of employees required during the Operational Phase will no longer be required.	Permanent	5	4	H	No	Yes	Managed
	The commencement of operations at the No.6 and the No.7 Shafts and eventually the No.4 Shaft and No.1 Shaft.		The commencement of operations at the CAPM Orkney Gold Mine may lead to an influx of job seekers to the area. As stipulated in the SLP of the mine, the mine will employ 471 individuals, of which the majority (a minimum of 95%) will be sourced from the local community. The influx of job seekers to the area may result in several social impacts due to the limited job supply and includes: • An increase in theft / crime. • An increase in informal settlements. • Potential spread of HIV / AIDS.	Long-term to permanent.	3	4	H	No	Yes	Managed
	Hazards to community	The commencement of operations at the No.6 and the No.7 Shafts and eventually the No.4 Shaft and No.1 Shaft.	Due to the close proximity of the shaft areas to residential areas (Orkney, Kanana, Stilfontein, Vaal Reefs), the storage of hazardous materials and chemicals, gas cylinders and welding and cutting equipment poses a hazard to the safety of the community.	Long-term for the Life of Mine.	3	2	M	No	Yes	Avoided
			The shaft areas pose a hazard to the community and fauna in the area as all operational shafts will be open until such a time that decommissioning commences and the shafts are sealed.	Long-term for the Life of Mine.	3	4	H	No	Yes	Avoided
			All ore mined at the CAPM Orkney Gold, as described above, will be transported approximately 18 km to the Nicolor South Plant for processing and treatment. There CAPM Orkney Gold Mine proposes to utilise haulage trucks for transportation purposes. This poses a hazard to the community and local residents as the number of mine vehicles will increase on the roads which are used by the local community and residents.	Long-term for the Life of Mine.	3	3	M	No	Yes	Avoided
			The generation of waste on the mine, including asbestos and potential radiation contaminated equipment may result in health hazard to the local community.	Long-term to permanent.	2	3	M	No	Yes	Avoided and Mitigated

7.6 Methodology used in determining and ranking potential environmental impacts and risks

The environmental risk of any aspect is determined by a combination of parameters associated with the impact. Each parameter connects the physical characteristics of an impact to a quantifiable value to rate the environmental risk.

Impact assessments should be conducted based on a methodology that includes the following:

- Clear processes for impact identification, predication and evaluation.
- Specification of the impact identification techniques.
- Criteria to evaluate the significance of impacts.
- Design of mitigation measures to lessen impacts.
- Definition of the different types of impacts (indirect, direct or cumulative).
- Specification of uncertainties.

After all impacts have been identified, the nature and scale of each impact can be predicted. The impact prediction will take into account physical, biological, socio-economic and cultural information and will then estimate the likely parameters and characteristics of the impacts. The impact prediction will aim to provide a basis from which the significance of each impact can be determined and appropriate mitigation measures can be developed.

The risk assessment methodology is based on defining and understanding the three basic components of the risk, i.e. the source of the risk, the pathway and the target that experiences the risk (receptor). Refer to Figure 64 below for a model representing the above principle (as contained in the DWA's Best Practice Guideline: G4 – Impact Prediction.

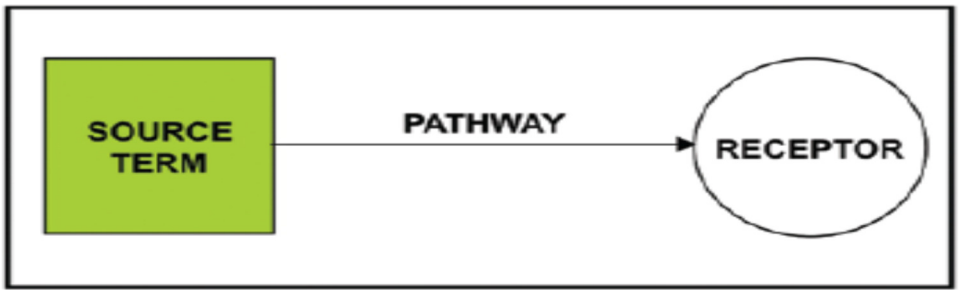

Figure 64: Impact prediction model

Table 56 and Table 57 below indicate the methodology to be used in order to assess the Probability and Magnitude of the impact, respectively, and Table 58 provides the Risk Matrix that will be used to plot the Probability against the Magnitude in order to determine the Severity of the impact.

Table 56: Determination of Probability of impact

SCORE	FREQUENCY OF ASPECT / UNWANTED EVENT	AVAILABILITY OF PATHWAY FROM THE SOURCE TO THE RECEPTOR	AVAILABILITY OF RECEPTOR
1	Never known to have happened, but may happen	A pathway to allow for the impact to occur is never available	The receptor is never available
2	Known to happen in industry	A pathway to allow for the impact to occur is almost never available	The receptor is almost never available
3	< once a year	A pathway to allow for the impact to occur is sometimes available	The receptor is sometimes available
4	Once per year to up to once per month	A pathway to allow for the impact to occur is almost always available	The receptor is almost always available
5	Once a month - Continuous	A pathway to allow for the impact to occur is always available	The receptor is always available

Step 1*: Determine the* ***PROBABILITY*** *of the impact by calculating the average between the Frequency of the Aspect, the Availability of a pathway to the receptor and the availability of the receptor.*

Table 57: Determination of Magnitude of impact

Score	SOURCE				RECEPTOR	
	Duration of impact	**Extent**	**Volume / Quantity / Intensity**	**Toxicity / Destruction Effect**	**Reversibility**	**Sensitivity of environmental component**
1	Lasting days to a month	Effect limited to the site. (metres);	Very small quantities / volumes / intensity (e.g. < 50L or < 1Ha)	Non-toxic (e.g. water) / Very low potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes will remain unaltered.	Current environmental component(s) are largely disturbed from the natural state. Receptor of low significance / sensitivity
2	Lasting 1 month to 1 year	Effect limited to the activity and its immediate surroundings. (tens of metres)	Small quantities / volumes / intensity (e.g. 50L to 210L or 1Ha to 5Ha)	Slightly toxic / Harmful (e.g. diluted brine) / Low potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes might be negligibly altered or enhanced / Still reversible	Current environmental component(s) are moderately disturbed from the natural state. No environmentally sensitive components.
3	Lasting 1 – 5 years	Impacts on extended area beyond site boundary (hundreds of metres)	Moderate quantities / volumes / intensity (e.g. > 210 L < 5000L or 5 – 8Ha)	Moderately toxic (e.g. slimes) Potential to create damage or destruction to the environment	Bio-physical and/or social functions and/or processes might be notably altered or enhanced / Partially reversible	Current environmental component(s) are a mix of disturbed and undisturbed areas. Area with some environmental sensitivity (scarce / valuable environment etc.).
4	Lasting 5 years to Life of Organisation	Impact on local scale / adjacent sites (km's)	Very large quantities / volumes / intensity (e.g. 5000 L –	Toxic (e.g. diesel & Sodium Hydroxide)	Bio-physical and/or social functions and/or processes might be considerably	Current environmental component(s) are in a natural state.

Score	SOURCE				RECEPTOR	
	Duration of impact	**Extent**	**Volume / Quantity / Intensity**	**Toxicity / Destruction Effect**	**Reversibility**	**Sensitivity of environmental component**
			10 000L or 8Ha–12Ha)		altered or enhanced / potentially irreversible	Environmentally sensitive environment / receptor (endangered species / habitats etc.).
5	Beyond life of Organisation / Permanent impacts	Extends widely (nationally or globally)	Very large quantities / volumes / intensity (e.g. > 10 000 L or > 12Ha)	Highly toxic (e.g. arsenic or TCE)	Bio-physical and/or social functions and/or processes might be severely/substantially altered or enhanced / Irreversible	Current environmental component(s) are in a pristine natural state. Highly Sensitive area (endangered species, protected habitats etc.)

*Step 2: Determine the **MAGNITUDE** of the impact by calculating the average of the factors above.*

Table 58: Determination of Severity of impact

ENVIRONMENTAL IMPACT RATING / PRIORITY					
SEVERITY	**MAGNITUDE**				
PROBABILITY	**1 Minor**	**2 Low**	**3 Medium**	**4 High**	**5 Major**
5 Almost Certain	Low	Medium	High	High	High
4 Likely	Low	Medium	High	High	High
3 Possible	Low	Medium	Medium	High	High
2 Unlikely	Low	Low	Medium	Medium	High
1 Rare	Low	Low	Low	Medium	Medium

*Step 3: Determine the **SEVERITY** of the impact by plotting the averages that were obtained above for Probability and Magnitude*

The need to review the initial site layout

As previously described, the CAPM Orkney Gold Mine was purchased from Pamodzi, in 2011, through a Section 11 purchase agreement. CAPM however, only took legal ownership of the assets in October 2012. The purchase of all associated infrastructure of the seven (7) shafts was included as part of the purchase agreement between CAPM and Pamodzi. Therefore, all sites and infrastructure is currently in place and the initial site layout plan cannot be reviewed. However, in light of this, mitigation measures to minimise, avoid and/or remedy the identified potential impacts have been described, put forward and will be put into practice upon commencement of operations at the various shafts of the CAPM Orkney Gold Mine.

CAPM Orkney Mine Gold, as mentioned above, will initially commence with operation at the No.7 and No.6 Shafts where after operations at the No.4 and No.1 Shafts will commence approximately 2 years later and at that point the investigation into the commencement of operations at the No. 2 Shaft will be conducted. CAPM Orkney Gold will not be continuing and for this reason, the No.3 Shaft area is in the process of being decommissioned and rehabilitated. At the time of compilation of this report, CAPM Orkney Gold Mine had commenced with the demolishing of structures, the headgear had been removed and the shaft had been capped. Similarly, CAPM Orkney Gold will not commence with operations at the No.5 Shaft and the shaft area will be decommissioned and rehabilitated as with the No. 3 Shaft.

7.7 Positive and negatives that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and community affected.

A full description on the positive and negative implications of both the proposed activity and the alternatives has been provided as part of the Alternative Assessment Report attached hereto as Annexure I as well as in Table 59 below. A detailed description the proposed activity is provided below.

The proposed activity is to reinstate the mining of gold bearing ore utilising the conventional scattered breast mining method consisting of the standard deep level underground stoping layout at the No.7 Shaft. The operations will initially commence at the No.7 Shaft through the dewatering of the shaft and the reconditioning of the shaft with depth. Once mining operations within the No.7 Shaft commence, the dewatering and shaft reconditioning of the No.6 Shaft will take place, where after mining within the No.6 Shaft will commence. All shaft water abstracted from the No.7 and the No.6 Shaft will be supplied to the AnglogoldAshanti Vaal River Operations (AGA) processing plant (an agreement between AGA and CAPM, for AGA to accept the water, is in the process negotiations). The ore mined within the No.7 and No.6 Shaft will be hoisted to surface and transported by haulage truck (utilising the formal road network) to the Nicolor South Plant, where the gold bearing ore will be processed. Therefore, CAPM does not and will not (for the time being) own and/or manage any mine and plant residue deposits.

Once operations at the No.7 and the No.6 Shafts are successfully underway, the CAPM Orkney Gold Mine will investigate the viability of re-commencing operations at the No.4 Shaft and the No.1 Shaft (approximately two (2) years after commencement at the No.6 Shaft).

The disadvantages and advantages of the proposed activity are described in detail below.

7.7.1 Disadvantages of the proposed activity

As described above, the CAPM Orkney Gold Mine will transport all ore, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road network. The reason for this is that the CAPM Orkney Gold Mine does not own or operate its own processing plant. Therefore, a high capital investment is required over the long term for transport costs as well as processing costs and resulting in a lower return on investment as compared to the alternative of CAPM Orkney Gold Mine operating its own processing plant.

The CAPM Orkney Gold Mine will dewater initially from the No.7 Shaft and once mining commences, dewatering will commence at the No.6 Shaft. As CAPM Orkney Gold Mine does currently not have the capacity to store the water or the infrastructure to utilise the water, all of the shaft water will be pumped to the surface, to the AGA metallurgical plant adjacent to the No.7 Shaft, shaft area. CAPM Orkney Gold Mine and AGA are currently in negotiations for AGA to take the abstracted water. Therefore,

should the AGA metallurgical plant not have the capacity to take the additional water, the water will need to be pumped to an AGA water containment facility. It is therefore possible that, should this be required as part of the agreement between CAPM Orkney Gold Mine and AGA, CAPM Orkney Gold Mine would be required to construct the necessary infrastructure to pump the water to the containment facility. This may therefore trigger a listed activity, depending on the thresholds, capacities and throughputs of the potential pipeline. CAPM would therefore also be required to obtain the necessary servitudes for the potential water pipeline.

7.7.2 Advantages of the proposed activity

The proposed activity allows for CAPM Orkney Gold to reinstate operations at the No.7 Shaft and the No.6 Shaft. Initially, only the No.7 Shaft will be dewatered and the shaft reconditioned with depth. This therefore allows for mining operations to commence while dewater of the No.6 Shaft is undertaken. As with the No.7 Shaft, the No.6 Shaft will be reconditioned with depth and mining will commence upon completing the reconditioning of the shaft. As the CAPM Orkney Gold Mine does not own or manage any plant or mine or plant residue stockpiles, all mined ore will be transported to the Nicolor South Plant for processing and treatment.

As only the No.7 shaft will initially commence with operations and then the No.6 Shaft, it will be an initial lower cost investment for CAPM as only two (2) shafts need to be reconditioned for operations. Several advantages from the scheduled approach will occur and include the following:

- An initial lower cost investment as only two (2) shafts will need to be reconditioned for full operations.
- An initial lower cost investment as the smaller labour force is required to commence with operations at the No.7 Shaft and the No.6 Shaft.
- The Nicolor South Plant will be able to process / treat the volumes of ore mined at the CAPM Orkney Gold Mine.
- The AGA metallurgical plant will be able accept the volumes of water pumped from the No.7 Shaft and the No.6 Shaft.
- The impacts experienced will be cumulatively less than in commencing operations at all of the shafts at once.

Table 59: Advantage and disadvantages of the proposed activity and associated alternatives

Alternative		Advantages	Disadvantages
Process alternatives	Utilisation of an existing processing plant to process the mined ore (preferred option).	The processing of the ore by an off-site plant owned and managed by another company is advantageous in a sense that the cost investment is low over the short term (in comparison to the cost involved in constructing and operating a processing plant). CAPM therefore does not need to own or manage any mine or plant residue deposits (including the associated environmental impacts).	It is a high cost investment over the long term due to the costs involved in terms of transport and as well as processing. Relatively low return on investment, when compared to operating your own processing plant.
	Construction of a processing plant to process the mined ore.	Relatively higher return on investment when compared to the costs involved in transport as well as paying another company to process the ore.	High initial cost investment in terms of construction. All plant residue deposits will need to manage (including all impacts on the biophysical and socio-economic environments).
Scheduling alternatives	The commencement of operations initially at the No.7 Shaft, then the No.6 Shaft and approximately after two (2) years operations will commence at the No.4 Shaft and No.1 Shaft (preferred option).	A relatively lower initial cost investment will be required when compared to commencing operations at all shafts at once. AGA will be able to accept the volume water abstracted from the No.7 Shaft and the No.	The period over which the potential impacts on the bio-physical and socio-economic environment are experienced, will occur over a longer period.

Alternative		Advantages	Disadvantages
		6 Shaft (agreement is still under negotiation between APM and AGA). Nicolor South Plant will be able to process the ore mined at the No.7 Shaft and the No.6 Shaft. The impacts may be cumulatively less than in commencing operations at all shafts at once.	
	The commencement of operations at all of the shafts at once.	The period over which the impacts on the bio-physical and socio-economic environment are experienced, will be of a shorter period.	A high initial cost investment in terms of dewatering all of the shafts and re-conditioning all of the shafts in order to ensure safety. High cost investment due to the labour force required to conduct mining activities at all shafts, at once. AGA may not be able to accept the large volume shaft water abstracted from all of shafts, at once (agreement is still under negotiation between APM and AGA).

Alternative		Advantages	Disadvantages
			Nicolor South Plant may not be able to process the larger volumes of ore mined from all the shafts, at once. The potential impacts may be cumulatively greater should operations at all shafts commence at once.
No-go option		The implementation of the no-go option would result in the current *status quo* of the area to remain the same. The implementation of the no-go option would also require CAPM Orkney Gold Mine to rehabilitate all surface area and cap all of the shafts. The shaft surface areas would therefore be rehabilitated for agricultural use or rehabilitated back to wilderness.	The implementation of the no-go option would result in the closure of the mine and the rehabilitation of all disturbed area. This would result in a very high loss for CAPM Orkney Gold Mine as the mine was purchased from Pamodzi Gold and operations and mining has yet commenced at the CAPM Orkney Gold Mine.

7.8 Possible mitigation measures that could be applied and the level of risk

No concerns have, to date, been raised by any I&AP's and stakeholders regarding the proposed project. It is however important to note that this Draft EMPr is made available for a period of thirty (30) days for I&AP's, stakeholders and members of the community to comment and raise any issues and concerns regarding the proposed project. Therefore, should any comments be received from the public comment period, they will be included in the Final EMPr, responses provided and the necessary mitigation measures identified.

7.9 Motivation where no alternative sites were considered

As described above in Section 4.2.1, The CAPM Orkney Gold Mine is an existing gold mine that was purchased, in terms of a Section 11 application, from Pamodzi. CAPM however, only took legal ownership of the assets in October 2012. As part of the purchase agreement, CAPM purchased all assets of the mine and includes the seven (7) shaft areas, the shafts itself as well as all associated infrastructure. As all of the infrastructure required is currently on site, no alternatives in terms of sites are applicable to the CAPM Orkney Gold Mine.

It is however important to note, as described above, that operation will commence at the No.7 Shaft and move onto the No.6 Shaft. Approximately two (2) years after the commencement of the operation at the No.6 and No.7 Shafts, operations at the No.4 and No.1 Shaft will commence. Thereafter the commencement of operations at the No.2 Shaft will be investigated. The No.3 Shaft is currently in the process of being decommissioned and the shaft area rehabilitated and the operations at the No.5 Shaft have been decommissioned (the only infrastructure remaining at the No.5 Shaft is that of the Shaft and associated infrastructure, cooling plant and the hostel).

7.10 Statement motivating the alternative development location within overall site

As described above in Section 4.1.3 and Section 7.9 above, the CAPM Orkney Gold Mine is an existing gold mine that was purchased in terms of a Section 11 application, from Pamodzi. CAPM however, only took legal ownership of the assets in October 2012. As part of the purchase agreement, CAPM purchased all assets of the mine and includes the seven (7) shaft areas, the shafts itself as well as all associated infrastructure. As all of the infrastructure required is currently on site, no alternatives in terms of sites are applicable to the CAPM Orkney Gold Mine.

It is however important to note that several other alternatives have been identified for the CAPM Orkney Gold Mine and are presented in the Alternatives Assessment Report attached hereto as Annexure I as well briefly described in Section 7.1 above.

8. Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity.

All impacts and risks as identified are contained within Section 7.5 (Impacts and risks identified). As further provided is an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures. The potential impacts and risks of the proposed activity were identified through consultation with the applicant regarding the proposed activities to be undertaken. Site visits were then conducted for orientation purposes and to understand the nature of the proposed activities off-set against the baseline environment of the area. Several internal workshops were held in order to determine the risks associated with the proposed project and to identify the knowledge gaps, information insufficiency as well as to identify the specialist studies that would be required to investigate these knowledge gaps and information insufficiencies.

The identified specialist studies were initiated to investigate the various biophysical aspects and include:

- A Geohydrological Assessment (refer to Annexure C1).
- A conceptual Storm Water Management Plan (refer to Annexure C2).
- An Ecological Assessment (refer to Annexure C3).
- A Noise Assessment (refer to Annexure C5).
- A Heritage Impact Assessment (refer to Annexure C6).

These specialist studies were initiated to assess the respective biophysical aspects, provide a baseline description of the environment as well as identify any risks and impacts on the biophysical aspects associated with the proposed project. Refer also to Section 7.6 (Methodology used in determining and ranking potential environmental impacts and risks) for the methodology applied in assessing and ranking the impacts and risks on the preferred site and associated preferred alternatives.

The results of the assessments are provided below, with the detailed Risk Assessment Report attached hereto as Annexure F.

9. Assessment of each identified potentially significant impact and risk

Environmental component	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
Geology	The underground deep level mining of gold bearing ore.	The underground deep level mining requires the blasting and removal of rock in the further sinking of the shafts as well as for the extraction of narrow generally flat dipping gold reefs. This, including the removal of the ore to the surface for processing at the Nicolor South Plant will lead to the permanent destruction of the localised geological strata.	Operational Phase	High	Control measures will be implemented to prevent the unnecessary destruction of geological strata.	High
Soil	Commencement mining activities at within the various shaft areas.	Although the majority of the shaft areas are lined with cement, there are areas within and adjacent to the shaft boundary which comprise of natural vegetation and secondary grasslands. The soil within these areas may therefore be negatively impacted upon should any mining related activities be conducted on these areas.	Operational and Decommissioning Phase	Medium	Control measures will be implemented to prevent activities from being undertaken within these areas.	Low
	Hydrocarbon, chemical and waste materials spillages	Hydrocarbon and chemical spills may pollute soils within the area either through direct contact or indirectly through the contamination of surface water runoff. Similarly, unsorted and improper storage of general waste, building rubble or equipment contaminated with radioactive material may contaminated soil either through direct contact or indirectly through the contamination of surface water runoff.	Operational, Decommissioning and Closure Phase	Medium	Remediation measures will be implemented to contain any spills	Medium
	Decommissioning of the shafts and related infrastructure and rehabilitation of the disturbed footprint areas.	The decommissioning of the shafts and removal of infrastructure will result in the exposure of soil to the elements, resulting in erosion of the soil. This will not only impact on the fertility of the soil but may have an impact on the surface water quality, fauna and flora and sensitive landscapes.	Decommissioning and Closure Phase	Medium	Control measures will be implemented to prevent / stop soil erosion.	Low
Flora	Operational activities and care and maintenance activities to be conducted at the No.6 and No.7 Shafts and the No.1 to No.5 Shafts, respectively.	*Boophone disticha* is a plant species with a conservation status of “Declining”. The habitat of this plant species is dry grasslands and rocky areas and is widespread in South Africa and extends up the eastern half of southern Africa to Uganda. This plant species was identified within the untransformed grassland areas adjacent to the No.7 Shaft. It was also identified that *Pearsonia bracteata* and *Drimia sanguinea* could also occur in this area owing to the presence of the suitable habitat. No mining activities will be conducted outside of the underground Mining Right area or the Surface Rights area of the shaft, therefore it is not anticipated that the proposed mining activity at the No.7 Shaft will impact on these species. However, in the even that any activities are conducted outside of the shaft boundary area, these species may be impacted upon. Dust, generated from the loading and hauling of the ore, may also settle on the	Operational and Decommissioning Phase	Low	Control measures will be implemented to prevent the disturbance and destruction of the natural vegetation and species of conservation concern.	Low

Environmental component	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
		vegetation in this area and may impact on the growth and photosynthesis and transpiration processes of the vegetation. Only three species protected under Schedule 11 of the Transvaal Nature Conservation Act (No.12 of 1983), namely *Babiana hypogea*, *Gladiolus permeabilis* and *Crinum graminicola* were recorded from untransformed grassland (corresponding to shaft footprints No.4 and No.5) on the study area.				
		The decommissioning of the shafts and removal of infrastructure will result in the exposure of soil to the elements, resulting in erosion of the soil. This will not only impact on the fertility of the soil but may have an impact on the surface water quality, fauna and flora and sensitive landscapes.	Decommissioning and Closure Phase	Medium	Control measures will be implemented to prevent / stop soil erosion.	Low
		A number of weeds and invader plant species were identified within the study area. These weeds and invader plant species established on disturbed areas have a tendency to dominate or replace the canopy herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems.	Operational, Decommissioning and Closure Phase	Medium	Control measure will be implemented to prevent the establishment and spread of weeds and invader species.	Low
Fauna	Operational activities and care and maintenance activities to be conducted at the No.6 and No.7 Shafts and the No.1 to No.5 Shafts, respectively.	The study area provides potential habitat for 10 mammal taxa of conservation concern, of which, the following species may occur: • Brown Hyaena. • Honey Badger. • South African Hedgehog. • Shrews. • Black-footed cat. Due to the increased human presence in the area and observation within the study area, both the Brown Hyaena and the Black-footed Cat are said to be irregular in occurrence within the study area. The Honey badger as well as the south African hedgehog are however expected to occur within the study area due to their tolerance to modified habitat types. The bird species of conservation concern are likely to occur within the study area and include: • The Melardious Lark (Mirafra cheniana). • The near threatened Abdim's stork (Ciconia abdimii). • The vulnerable Lanner Falcon (Falco biarmicus).	Operation, Decommissioning and Closure Phase	Medium	Control measure will be implemented to prevent the destruction of the natural habitats.	Low

Environmental component	Activity		Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
			The Abdims Stork and the Lanner Falcon were not recorded during the site survey but are classified as likely to occur within the study area. The Melardious Lark was however recorded within the study area during the site survey. 23 other species are sympatric to the study area however they are either irregular visitors to the area or unlikely to be present due to the absence of suitable habitats.				
			Animals within the study area and adjacent to the mine may be hunted and poached, by employees, for food.				
			Animal injury and / or death may result from animal life accessing the mine shaft areas as well as by collisions with vehicles and machinery on and off site.	Operational and Decommissioning Phase	Low	Control measure will be implemented to prevent unauthorised access to the site and to prevent animals from entering the site.	Low
			Noise generated from mining activities may scare animal life in the vicinity and lead to migration away from the area and possibly even injury and death.	Operational and Decommissioning Phase	Low	Control measure will be implemented to prevent the generation of noise and remediation measure will be implemented in the event that undesired noise is generated.	Low
Surface water	No.1 Shaft	Operation of winder cooling ponds.	The winder cooling ponds are concrete ponds situated next to one of the winder houses and in close proximity of the clean runoff channels. These ponds contain process water used for cooling purposes. Surface water quality: Overflow of winder cooling ponds may lead to affected water discharge into the clean surface runoff channels situated next to the cooling ponds and may result in deterioration in quality of surface water runoff from the No.1 Shaft area.	Operational Phase	Low	Storm water management measure will be implemented / upgraded to prevent the discharge of contaminated surface water.	Low
		Storage and handling of hydrocarbon containers.	Surface water contamination may take place as a result of leaking hydrocarbon containers stored outside of designated areas.	Operational and Decommissioning Phase	Low	Control and remediation measures will be implemented to prevent the contamination of surface water runoff.	Low
		Containment of affected water.	Overflow from the containment sump underneath the conveyor system may lead to deterioration of clean surface water quality in the immediate vicinity of the No.1 Shaft area.	Operational Phase	Low	Storm water management measure will be implemented / upgraded to prevent the discharge of contaminated water.	Low
	No.2 Shaft	Uncontrolled surface water runoff.	There are no current diversion measures to prevent surface runoff from flowing into No.2 Shaft. Runoff retention also takes place inside previously constructed containment facilities.	Operational and Decommissioning Phase	Medium	Storm water management measure will be implemented.	Low
	No.3 Shaft	Rehabilitation of the No.3 Shaft area.	Closure phase: Incorrect rehabilitation techniques may result in exposed areas and areas that will prevent drainage of storm water runoff towards the downstream environment.	Decommissioning and Closure Phase	Low	Control measures and rehabilitation monitoring programmes will be implemented to ensure that	Low

Environmental component	Activity		Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
						rehabilitation is conducted in the appropriate manner.	
	No.4 Shaft	Uncontrolled surface water runoff	There are no current diversion measures to prevent surface runoff from flowing into No.4 Shaft. Runoff retention also takes place inside previously constructed containment facilities within the shaft operations area.	Operational and Decommissioning Phase	Medium	Storm water management measure will be implemented.	Low
	No.5 Shaft	Sewage management	A sewage sump is located next to a clean storm water diversion channel downstream of the No.5 Shaft hostel area. Mine personnel has indicated that there were previous incidents in which the sump's capacity was reached and sewage entered the clean storm water conveyance channel.	Operational and Decommissioning Phase	High	Storm water management measures will be implemented to contain spillages from the sump and divert clean surface water runoff away from the area.	Low
	No.6 Shaft	Uncontrolled storm water runoff	There are no current diversion measures to prevent surface runoff from flowing into No.6 Shaft.	Operational Phase	Medium	Storm water management measures will be implemented.	Low
		Wash bay operation	The wash bay will be used as a designated area to clean equipment and currently not fitted with an oil separator. This facility is not connected to a dirty water system and therefore wash water is pumped out and discharged into the adjacent veldt during operations. Surface water quality: Should any wash water be discharged from the wash bay in its current status, discharge of hydrocarbon contaminated water will take place in the surrounding clean water environment.	Operational and Decommissioning Phase	High	Storm water management measure and control measures will be implemented to prevent the discharge of contaminated surface water runoff.	Low
	No.7 Shaft	Chemical and hydrocarbon management	The main storm water channel is located next to a hydrocarbon and chemical storage area. Any chemical and hydrocarbon containers as well as equipment (operated using grease) stored outside of a designated area creates a risk of surface water pollution. Contaminated runoff as a result of poor housekeeping practises will enter the clean storm water diversion trench towards the adjacent veldt area. Surface water quality: The quality of surface runoff generated within the No.7 Shaft area may be deteriorated as a result of contact with hydrocarbons such as oil and grease.	Operational and Decommissioning Phase	Medium	Control and storm water management measures will be implemented to prevent the contamination of clean surface water runoff	Low
		Wash bay operation	The wash bay will be used as a designated area to clean radio-active contaminated equipment. This facility is connected to a dirty water system and wash water is pumped to the adjacent plant and used as part of the process water system. Should an incident occur, radio-active wash water may be discharged towards the clean storm water channel.	Operational and Decommissioning Phase	Medium	Control and storm water management measures will be implemented	Low

Environmental component	Activity		Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
			Surface water quality: Discharge of contaminated water from the wash bay at No.7 Shaft may lead to a significant deterioration of surface water quality towards the downstream clean water environment.				
		Sump operation underneath conveyor	A sump has been constructed underneath the conveyor system next to No.7 Shaft. The purpose of this sump is to contain any seepage from the damp ore material hoisted from underground. This sump is fitted with pumping infrastructure towards the adjacent plant as part of the process water system. There is a risk that overflow into the main storm water channel might occur as a result of pump failure. Surface water quality: Discharge of contaminated water from the sump may result in deterioration of clean surface water runoff towards the adjacent clean water environment.	Operational Phase	Medium	Storm water management measures will be implemented / upgraded to prevent the discharge of contaminated water.	Low
Groundwater	Dewatering of the shafts for the safe continuation of mining.		During the operational phase groundwater will be dewatered to the bottom of the Vaal Contact Reef which will result in dewatering of the surrounding aquifer. However, the transient modelling exercise showed that the cone of depression is limited in extent with no boreholes included within its influence zone.	Operational Phase	Medium	Control measure will be implemented.	Medium
	The underground deep level mining of gold bearing ore, including the associated activities conducted on the surface.		The impacts on groundwater quality are primarily related to the management of materials, wastes and spills from drilling operations and unauthorised disposal of contaminated substances. Contamination of groundwater may also arise due to incorrect handling and disposal of waste materials, the physical drilling process (sludge contains oils and greases) and oil leaks from drill rigs. This risk is considered low. Groundwater quality impacts may also arise from seepage from the recycle dam underground, although this is considered a low impact since the dam will be lined. The general risk towards groundwater quality deterioration is considered low.	Operational and Decommissioning Phase	Medium	Control measures will be implemented to prevent the contamination of groundwater resources.	Medium

Environmental component	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
	Decommissioning and closure of the underground workings, shafts and associated infrastructure and well as the shaft surface area.	During the closure phases when all pumping within the region has ceased, the water in the shaft/s may rise towards the Environmentally Critical Level (ECL) where, if contaminated and affected by AMD reactions, may pollute aquifers or surface drainages. The rate at which, and up to which point the water will rise is highly complex and unknown given the multitude of parameters and dewatering schemes within the KOSH area. However previous studies in the KOSH area indicate a likely probability of decant and rise to pre-mining conditions and the ECL. However, at the CAPM 7 Shaft the groundwater table is not expected to return to pre - mining conditions. The reason being that decant will occur at 40 Level, creating a permanent dewatering cone towards 4 Shaft. The quality of the decant water is expected to be contaminated but will improve over time as existing areas of exposed sulphide mineralisation are flooded or oxidised.	Decommissioning and Closure Phase	High	Control measure will be implemented.	Medium
Sensitive landscapes	Mining and mining related activities conducted within the shaft areas.	An assessment was conducted against the NFEPA classified wetlands and the proximity of these wetlands to the CAPM Orkney Gold Mine shaft areas. As described in Chapter H of Section 7.4.1 (Part A – Environmental Impact Assessment) of the EIA and EMPr, three (3) NFEPA classified wetland areas have been identified to be in close proximity to the No.2 Shaft (unchannelled valley bottom wetland), the No.3 Shaft (channelled Valley Bottom Wetland) and the No.4 Shaft (flat wetland area). The operational activities to be conducted within the vicinity of shaft areas may impact on these wetland areas in terms of surface water quality, fauna, flora and soil aspects (refer also to Part 4.2, Part 4.5, Part 4.6 and Part 4.7). It is however important to note that these shafts are not currently operational as the No.7 and No.6 Shaft will be the first shafts to commence with operations and operations at the No.3 Shaft will not commence as the No.3 Shaft area is in the process of being rehabilitated.	Operational and Decommissioning Phase	Medium	Control and storm water management measures will be implemented.	Low
Air quality	The operation and utilization of the fans to remove stale air from the underground working.	The operation and utilisation of the Kanana Ventilation Duct, 6 Shaft Veld Fan and the 7 Shaft Main Ventilation Fan may result in the release of potentially harmful pollutants and emissions into the air, from the underground workings. This may potentially affect the health of the residents in the area.	Operational Phase	High	A monitoring programme will be implemented.	Medium
	Hauling of mined ore to the Nicolor South Plant.	As described above, the ore mined at the CAPM Orkney Gold Mine will be transported, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road network. The transportation of the ore may therefore result in the generation of dust that may have an impact on the local air quality.	Operational Phase	Medium	A monitoring programme and control measures will be implemented.	Low

Environmental component	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
		As described above, the ore mined at the CAPM Orkney Gold Mine will be transported, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road network. Emissions from the haulage trucks may have a minor impact on the localised air quality.	Operational Phase	Low	Control measure will be implemented.	Low
Noise	The reinstatement of operations at the CAPM Orkney Gold Mine No.7 Shaft and No.6.	Currently the shafts are not producing and the noise levels are from normal background noise and activities originating from human interaction and vehicle. In the not too distant future these shafts will be re-opened and the prepared for production. This will include activities such as pumping of water and replacing structures that are worn and damaged. Through this process there will be a great deal of workshop and construction activities and vehicle movement while the shafts and underground workings are prepared. Once operational again the main noise sources will be from the main surface fans and the normal shaft noises.	Implementation and Operational Phase	Medium	Control measure will be implemented.	Low
	The care and maintenance of the No.1 to No.5 shafts until such a time that they are prepared from operations or decommissioned and rehabilitated.	These shaft will not be re-opened again for production. Normal care and maintenance will be carried on these shafts. Should there be any additional activities carried out, such as the breaking down of shaft structures and buildings, the noise levels should be monitored and the necessary control measures be introduced to minimise the impact on the community. Should operations commence at these shafts, the impacts as described above will apply.	Operational and Decommissioning Phase	Low	Control measures will be implemented.	Low
Visual aspects	The reinstatement of operations at the CAPM Orkney Gold Mine Shaft areas.	Although the CAPM Orkney Gold Mine is an existing mine and the community and regular visitors of the area are likely to be desensitised to the mining related infrastructure, the mine has been under care and maintenance since the year 2010. Therefore, once operations at the shafts commence, the increased traffic and presence of employees as well as the increased generation of dust and emissions clouds from the machinery and vehicles may cause a visual disturbance. There are several sensitive receptors in both the foreground and middle ground that include residential areas and the town of Orkney.	Operational and Decommissioning Phase	Medium	Control measures will be implemented.	Low
Site of archaeological and cultural importance	No.3 Shaft — The decommissioning and removal of infrastructure and the rehabilitation of the surface area of the No.3 Shaft.	This site with traditional riveted steel headgear is dated to the end of the 1930's. CAPM Orkney Gold Mine removed all infrastructure (including the headgear) at the No.3 Shaft, without being in possession of a demolition permit. This site was demolished between the period of 2011 and 2015. The site is protected by section 34 (1) of Act 25 of 1999, and is rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or destructed without a demolition permit issued by the relevant heritage authorities.	Operational Phase	High	Mitigation measures will be implemented and the correct procedure will be requested and followed.	Unknown at present

Environmental component	Activity		Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
	No.7 Shaft	The decommissioning and removal of infrastructure workshops at the No.7 Shaft.	This site with traditional riveted steel headgear is dated to the mid 1930's. It is possibly the most representative of the early period of mining in the region. Even so it reflects alterations and updating over time. Most of the site is still intact. The mining objectives of CAPM Gold states that the site will mainly be retained as-is. It will be maintained in its present format allowing for and according to modern mining safety regulations. It is the wish of CAPM Gold to demolish five historic buildings on the eastern perimeter of the site as these are superfluous to the proposed mining perspectives. It includes four steel framed and corrugated iron clad workshops and one brick walled, workshop with wooden trusses and corrugated iron roof. All five buildings are protected by section 34(1) of the National Heritage Act, Act 25 of 1999. These are all rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or demolished without a demolition permit issued by the relevant heritage authorities.	Implementation and Operational Phase	Medium	Mitigation measures will be implemented by following the correct procedure and obtaining appropriate authorisations.	No Risk if proper procedures are applied and demolition permits are obtained
Socio-economic aspects	The commencement of operations at the No.6 and the No.7 Shafts.		As described in the SLP (attached to the EIA and EMPr as Annexure G), upon commencement of operations at the No.7 and the No.6 Shaft the CAPM Orkney Gold Mine will employ 471 individuals of which the majority (a minimum of 95%) will be sourced from the local communities. This is a positive impact in terms of socio-economic aspects as not only will 471 individuals be employed but the community will also benefit indirectly through the increased spending on goods and services, the use of local sub-contractors, as well as leading to a decrease in unemployment of the area.	Operational Phase	Positive	Enhancement measures will be implemented.	Positve
	Mine closure.		At the end of the Operational Phase of the Orkney Gold Mine, mining operations will cease and the mine will prepare for decommissioning and closure. Rehabilitation activities will commence, depending on the agreed upon end land, and infrastructure will be removed. During this phase a loss of jobs will occur as the amount of employees required during the Operational Phase will no longer be required.	Decommissioning and Closure Phase	High	Control measures will be implemented.	High
	The commencement of operations at the No.6 and the No.7 Shafts and eventually the No.4 Shaft and No.1 Shaft.		The commencement of operations at the CAPM Orkney Gold Mine may lead to an influx of job seekers to the area. As stipulated in the SLP of the mine, the mine will employ 471 individuals of which the majority (a minimum of 95%) will be sourced from the local community. The influx of job seekers to the area may result in several social impacts due to the limited job supply and includes: • An increase in theft / crime. • An increase in informal settlements. • Potential spread of HIV / AIDS.	Implementation and Operational Phase	High	Control measures will be implemented.	Medium

Environmental component	Activity		Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
	Hazards to community	The commencement of operations at the No.6 and the No.7 Shafts and eventually the No.4 Shaft and No.1 Shaft.	Due to the close proximity of the shaft areas to residential areas (Orkney, Kanana, Stilfontein, Vaal Reefs), the storage of hazardous materials and chemicals, gas cylinders and welding and cutting equipment poses a hazard to the safety of the community.	Operational and Decommissioning Phase	Medium	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Low
			The shaft areas pose a hazard to the community and fauna in the area as all operational shafts will be open until such a time that decommissioning commences and the shafts are sealed.	Implementation, Operational and decommissioning Phase	High	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Medium
			All ore mined at the CAPM Orkney Gold, as described above, will be transported approximately 18 km to the Nicolor South Plant for processing and treatment. There CAPM Orkney Gold Mine proposes to utilise haulage trucks for transportation purposes. This poses a hazard to the community and local residents as the number of mine vehicles will increase on the roads which are used by the local community and residents.	Operational Phase	Medium	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Low
			The generation of waste on the mine, including asbestos and potential radiation contaminated equipment may result in health hazard to the local community.	Implementation, Operational and Decommissioning Phase	Medium	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Low

10. Summary of specialist reports

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
Geohydrological Impact Assessment	• Intercept drainage around the shaft. • The dewatering of the aquifer system cannot be prevented. If the monitoring program indicates that nearby groundwater users are affected by the dewatering, the users need to be compensated for the loss. • Conduct regular inspections on the storm water control measures and dam liners. • Monthly inspections of the surface concrete work should be undertaken during the operational phase to ensure any ingress of rainwater into the shaft is prevented. • Implement ongoing post-closure monitoring, maintenance and operation of water treatment systems (if required). • Develop a regional mine closure strategy with all mines in the KOSH region. • Close or plug openings providing direct connections to surface water. • Allow for joint flooding to the ECL at mine closure to reduce the oxidation of pyrite and pump to waste water treatment facilities. • Short term actions could include partial treatment with neutralising minerals, but pump and treat should be a long-term goal for all mines in the KOSH region.	**X**	Refer to the Risk Assessment Report attached hereto as Annexure F as well as Section 7.5 above.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• It is recommended that monitoring be initiated at least three months prior to commencement of the project to allow for seasonal fluctuations and to establish baseline conditions. • It is recommended that the shaft water qualities be analysed frequently during mining and even more so if discharge into the environment remains an option.		
Storm Water Management Plan	• Clean water conveyance networks at the shaft locations should be serviced on a regular basis, especially No.6 Shaft, No.7, No.1 and No.4, during the operational phase to maintain the integrity of the diversion channels. It is essential to monitor the outflows from the shaft areas to determine the effectiveness of the conveyance channels as well as surface water quality discharging from the sites. • Good housekeeping practises should be implemented to prevent and minimise dirty areas within the intended operational shafts. It includes the storage and handling of chemicals and hydrocarbon containers. This strategy aims to avoid the need to construct dirty water containment facilities to comply with GN 704, Regulation 7(a). • A maintenance schedule should be implemented during the operational phase of the intended operational shafts to ensure the integrity of sumps and cooling ponds (dirty water containment facilities). Pumping infrastructure should be in	**X**	Refer to the Risk Assessment Report attached hereto as Annexure F as well as Section 7.5 above.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	working order at all times to prevent any overflow of affected water into the shaft and surrounding area – GN 704, Regulation 7(a). • Investigations should be conducted to divert surface runoff away and prevent surface runoff from flowing into the shafts, especially the shafts where operations are not to be continued – GN 704, Regulation 7(c). This strategy aims to reduce impact on the catchment yield. • A maintenance schedule should be implemented to ensure that storm water conveyance channels are free draining, with no impeding structures. Areas where ponding of storm water takes place should be minimised – GN 704, Regulation 7(g). • Ensure that rehabilitated areas, such as the No.3 Shaft area are free draining in terms of storm water management. No materials with leaching potential should be left at the site. Vegetation growth should be encouraged on exposed areas to limit erosion. • It is recommended, as an additional measure, to construct a berm between the sewage sump and the clean runoff diversion channel at the No.5 Shaft area. This strategy aims to prevent sewage from flowing into the clean runoff diversion trench during possible overflow – GN 704, Regulation 7(a). • Of concern is the absence of an oil separator at the wash bay at the No.6 Shaft area to prevent hydrocarbon contaminated wash water discharge into the		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	surrounding clean water environment. It is recommended to install an oil separator and conduct regular inspections to ensure that the oil separator is in working order at all times. Monitoring of discharge water should take place and verified against the discharge limits as required by the Department of Water Affairs and Sanitation. If wash water is found to be inadequate for discharge, it is recommended to implement a containment and evaporation facility. This strategy aims to comply with GN 704, Schedule 7(a).		
Environmental Noise Impact Assessment	• Effective maintenance of the vehicle engines and exhaust systems. • Hearing conservation programme as per DMR guidelines on Noise Control. • Zoning of high noise areas. • The use of approved hearing protection devices for personnel working in close proximity of the workings. • Incorporate sound attenuation measures to any equipment that could generate noise levels in excess of the statutory limits as published by the Department of Mineral and Energy. • From an occupational perspective the mine workers should be protected through standards and procedures and the personal exposure levels should be monitored as part of the legal requirements of Section 12 of the MHSA.	**X**	Refer to the Risk Assessment Report attached hereto as Annexure F as well as Section 7.5 above.
Ecological Assessment	• The attached sensitivity maps should be used to guide the layout design. Construction and operational activities should preferably be restricted to areas	**X**	Refer to the Risk Assessment Report

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	identified with **negligible or low conservation importance**. Construction and operation activities on areas of **high or medium-high conservation importance** and/or **untransformed grassland** should be avoided. • An overspill of construction and operational activities into areas consisting of untransformed grassland should be prohibited, unless environmental authorisation has been obtained. The extent of the construction site/laydown areas should be demarcated on site layout plans (restricted to areas identified with low conservation importance), and no construction personnel or vehicles may leave the demarcated area except those authorised to do so. Those areas surrounding the construction site that are not part of the demarcated development area should be considered as "no-go" areas for employees, machinery or even visitors. • In order to confirm the presence of Near Threatened species, it is recommended that prior to any development, additional brief follow-up surveys should be conducted focusing on searching the untransformed portions of the study area for *Drimia sanguinea*. These should be done in September/October. The brief additional surveys will serve to fill in seasonal gaps in the field surveys conducted for the current study, expand the species list provided in Appendix 1 and confirm the absence of any additional threatened plant species within the study area. In the event of any 'species of conservation concern' being recorded		attached hereto as Annexure F as well as Section 7.5 above.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	during such follow-up surveys, appropriate *in situ* and / or *ex situ* conservation measures should be developed and implemented. • In the event that the development of the study area is approved, permission for the removal of Declining species should be obtained from the relevant authority, and if necessary appropriate in situ and / or ex situ conservation measures should be developed and implemented. Illegal harvesting of Declining medicinal plants should be monitored and discouraged through control of access to the study area. • It is recommended that where untransformed habitats are to be affected by any approved development, protected/declining species are to be rescued and placed in a nursery or donated to a research institute (e.g. SANBI or regional botanical garden) prior to development. Where possible, viable sub-populations of such species can also be translocated to transformed or degraded areas within the study area which provide potentially suitable habitats and which are not earmarked for development (translocations will have to be carried out in a manner that ensures that no ecological degradation of the host habitat occurs), and will have to be evaluated by a botanist for each species and each potential host area. A permit must be obtained prior to removal or destruction of any protected plant species.		

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• An alien and invasive plant eradication and control programme must be implemented along with a follow-up programme. The programme must be compiled by a qualified botanist/ecologist and the implementation thereof should be supervised by a qualified botanist/ecologist. • To ensure the long-term viability and to promote species diversity of the untransformed grassland units (including adjacent grassland areas that are not part of the shaft footprints), a basic fire and grazing management plan should be drafted and implemented (along with monitoring).		
Phase I Heritage Impact Assessment	• It is recommended that the mining objectives of CAPM Gold are adhered to and that historical infrastructure is retained and maintained and reused in modern mining context. Structures are only to be altered if so required by modern mining safety regulations. • It is recommended that the request by CAPM Gold to demolish five superfluous workshops is investigated. The normal procedure of a second phase study must be followed and a demolition permit must be applied for and granted by the appropriate heritage authorities before the requested demolition proceeds. • It is recommended that CAPM Gold must comment on the demolition of site No.3 and that this comment must be evaluated by the appropriate heritage authorities.	**X**	Refer to the Risk Assessment Report attached hereto as Annexure F as well as Section 7.5 above.

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report (Mark with an X where applicable)	Reference to applicable section of report where specialist recommendations have been included
	• It is recommended that a Heritage Management plan is compiled so that heritage resources can be monitored during periodical environmental auditing processes.		

The above mentioned specialist reports are attached hereto in Annexure C.

11. Environmental Impact Statement

11.1 Summary of the key findings of the environmental impact assessment

A detailed description of the methodology utilised to determining the environmental impacts and their respective probability, magnitude and severity is provided in Section 7.6 above. As part of the EIA process, a number of alternatives applicable to the proposed project were identified (refer to Annexure I for the detailed quantitative Alternatives Assessment Report) and therefore (as per the requirements of the EIA Regulations GNR.982, dated 04 December 2014) the risks associated with the proposed activity, as well as the identified alternatives, were assessed (refer also to the Part 5 of the Risk Assessment Report attached hereto as Annexure F).

Significant environmental impacts

During the risk assessment process (refer to Annexure F) it was found that the proposed project would result in a limited number of impacts with a "High" severity rating, and these impacts include impacts on geology, surface and groundwater, air quality, site of cultural and archaeological importance and socio-economic aspects (mine closure, influx of job seekers and hazards to the community). The impact on geology will be permanent in nature and is inevitable consequence of mining. The impact will however be local (within Mining Rights area) and control mechanisms (to limit the disturbance of geological strata) will be implemented.

Surface water is may be impacted upon at the No.5 Shaft, in the event that the sewerage sump overflows and enters the surrounding environment. Similarly, contaminated surface water runoff from all of the shaft areas may enter and pollute the surrounding environment. Control measure will be put in place to prevent the contamination of surface water runoff as well as preventing contaminated surface water runoff from entering the receiving environment.

During closure, pumping activities will be ceased and the water in the shafts may rise towards the Environmentally Critical Level (ECL) where, if contaminated and affected by AMD reactions, may pollute aquifers or surface drainages. However, at the No.7 Shaft, the groundwater table is not expected to return to pre-mining conditions. The reason being that decant will occur at 40 Level, creating a permanent dewatering cone towards the No.4 Shaft. The quality of the decant water is expected to be contaminated but will improve over time as existing areas of exposed sulphide mineralisation are flooded or oxidised. Control measure will be implemented to maintain the water level, within the basin, below the ECL. Monitoring will also be implemented to determine the quality of the groundwater and provide a trend analysis overtime.

Potentially harmful emissions and pollutants may be released into the atmosphere from the Kanana Ventilation Duct, 6 Shaft Veld Fan and the 7 Shaft Main Ventilation Fan from the removal of stale air in the underground workings. The impact is likely to be local to regional extent however control measures and monitoring programmes will be implemented to determine the quality of the air being released.

As described in Chapter N of Section 7.4.1 above, it was found that the headgear of the No.3 Shaft was protected by section 34 (1) of Act 25 of 1999, and is rated as “General protection” A (Field Rating IV A) by the SAHRA minimum standards May 2007. However the headgear was decommissioned and removed without being in possession of demolition permit. It is however important to note that the demolition activities occurred between the years of 2011 to 2015, during which CAPM only took ownership of the properties and infrastructure in August 2014. Therefore, it is required that the Heritage Authority is approached and appropriate mitigation procedure obtained and followed. Similarly, The No.7 Shaft headgear as well as workshops at the shaft area are all rated as “General protection” A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or demolished without a demolition permit issued by the relevant heritage authorities. It is however the mining objectives of CAPM to maintain the sites as-is. Should any infrastructures be identified for decommissioning and removal, the appropriate permits will be obtained from the Heritage Authority.

During the risk assessment process, it was further determined that impacts with a “High" severity rating are likely to occur on socio-economic aspects. During the Closure Phase of the mine, a loss of jobs will occur as the amount of employees, required during the Operational Phase, will no longer be required. Mitigation measures are however put forward in the mines SLP (refer to Annexure G) and include: education, training, skills development and training (potable skills, core business skills), mentorships, learnerships, bursaries (internal and external). Furthermore, the re-commencement of the mining operations may lead to an influx of jobseekers to the area. As previously described, the mine will employ approximately 471 employees of which the majority (a minimum of 95%) will be sourced from the local community. Control measures will be implemented to limit impact of the influx of jobseekers (refer to the Risk Assessment Report attached hereto as Annexure F).

Several other impacts on the bio-physical and socio-economic environment have been identified and assessed (refer to Part 5 of the Risk Assessment Report attached hereto as Annexure F), and include impacts on the following:

- Soil.
- Flora and fauna
- Sensitive landscapes.
- Air quality.
- Noise.
- Visual aspects.

Refer also to Section 11.3 below for a summary of the negative and positive environmental impacts, after mitigation.

Concerns raised by I&APs

Because of the fact that Shangoni has no interest in this activity other than the fair remuneration for the work done by it and the fact that payment for the work done by Shangoni is not subject to a positive outcome of the application, no circumstances exist that may compromise the objectivity of the EAP (as required per the definition of "independence"). Due attention and consideration have been placed to consider the inputs from I&AP's within this EMPr, and the comments/concerns received from I&AP's are highly regarded for the value and merit in compiling of this EIR.

11.2 Final Site Map

Refer Annexure A4.

11.3 Summary of the positive and negative implications and risks of the proposed activity and identified alternatives

Table 60: Summary of negative and positive environmental impacts, after mitigation.

Geology	
Blasting, drilling and extraction of rock will lead to the permanent destruction of the localised geological strata.	High
Soil	
The soil within the natural vegetation and secondary grasslands area may be negatively impacted upon should any mining related activities be conducted on these areas.	Low
Hydrocarbon and chemical as well as general waste, building rubble and radioactive contaminated equipment spills may pollute soils within the area either through direct contact or indirectly through the contamination of surface water runoff.	Medium
The decommissioning of the shafts and removal of infrastructure will result in the exposure of soil to the elements, resulting in erosion of the soil. This will not only impact on the fertility of the soil but may have an impact on the surface water quality, fauna and flora and sensitive landscapes.	Low
Land use and land capability	
Therefore, a positive impact may be experienced as the land use may change from mining to agriculture or wilderness, depending on the results of consultation with the DMR and municipalities.	High
Flora	
Boophone disticha is a plant species with a conservation status of "Declining" and was identified within the untransformed grassland areas adjacent to the No.7 Shaft. It was also identified that *Pearsonia bracteata* and *Drimia sanguinea* could also occur in this area owing to the presence of the suitable habitat. No mining activities will be conducted outside of the	Low

underground Mining Right area or the Surface Rights area of the shaft, therefore it is not anticipated that the proposed mining activity at the No.7 Shaft will impact on these species. However, in the event that any activities are conducted outside of the shaft boundary area, these species may be impacted upon. Dust, generated from the loading and hauling of the ore, may also settle on the vegetation in this area and may impact on the growth and photosynthesis and transpiration processes of the vegetation. Only three species protected under Schedule 11 of the Transvaal Nature Conservation Act (No.12 of 1983), namely *Babiana hypogea*, *Gladiolus permeabilis* and *Crinum graminicola* were recorded from untransformed grassland (corresponding to shaft footprints No.4 and No.5) on the study area.	
The decommissioning of the shafts and removal of infrastructure will result in the exposure of soil to the elements, resulting in erosion of the soil. This will not only impact on the fertility of the soil but may have an impact on the surface water quality, fauna and flora and sensitive landscapes.	Low
A number of weeds and invader plant species were identified within the study area. These weeds and invader plant species established on disturbed areas have a tendency to dominate or replace the canopy herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems.	Low
Fauna	
The study area provides potential habitat for 10 mammal taxa of conservation concern, of which, the following species may occur: • Brown Hyaena. • Honey Badger. • South African Hedgehog. • Shrews. • Black-footed cat. Due to the increased human presence in the area and observation within the study area, both the Brown Hyaena and the Black-footed Cat are said to be irregular in occurrence within the study area. The Honey badger as well as the south African hedgehog are however expected to occur within the study area due to their tolerance to modified habitat types. The bird species of conservation concern are likely to occur within the study area and include: • The Melardious Lark (Mirafra cheniana). • The near threatened Abdim's stork (Ciconia abdimii). • The vulnerable Lanner Falcon (Falco biarmicus). The Abdims Stork and the Lanner Falcon were not recorded during the site survey but are classified as likely to occur within the study area. The Melardious Lark was however recorded within the study area during the site survey. 23 other species are sympatric to the study area however they are either irregular visitors to the area or unlikely to be present due to the absence of suitable habitats.	Low

Animals within the study area and adjacent to the mine may be hunted and poached, by employees, for food.	
Animal injury and / or death may result from animal life accessing the mine shaft areas as well as by collisions with vehicles and machinery on and off site.	Low
Noise generated from mining activities may scare animal life in the vicinity and lead to migration away from the area and possibly even injury and death.	Low
Surface water	
Surface water quality: Overflow of winder cooling ponds may lead to affected water discharge into the clean surface runoff channels situated next to the cooling ponds and may result in deterioration in quality of surface water runoff from the No.1 Shaft area.	Low
Surface water contamination may take place as a result of leaking hydrocarbon containers stored outside of designated areas.	Low
Overflow from the containment sump underneath the conveyor system may lead to deterioration of clean surface water quality in the immediate vicinity of the No.1 Shaft area.	Low
There are no current diversion measures to prevent surface runoff from flowing into No.2 Shaft. Runoff retention also takes place inside previously constructed containment facilities.	Low
Closure phase: Incorrect rehabilitation techniques may result in exposed areas and areas that will prevent drainage of storm water runoff towards the downstream environment.	Low
There are no current diversion measures to prevent surface runoff from flowing into No.4 Shaft. Runoff retention also takes place inside previously constructed containment facilities within the shaft operations area.	Low
A sewage sump is located next to a clean storm water diversion channel downstream of the No.5 Shaft hostel area. Mine personnel has indicated that there were previous incidents in which the sump's capacity was reached and sewage entered the clean storm water conveyance channel.	Low
There are no current diversion measures to prevent surface runoff from flowing into No.6 Shaft.	Low
Surface water quality: Should any wash water be discharged from the wash bay in its current status, discharge of hydrocarbon contaminated water will take place in the surrounding clean water environment.	Low
The quality of surface runoff generated within the No.7 Shaft area may be deteriorated as a result of contact with hydrocarbons such as oil and grease.	Low
Discharge of contaminated water from the wash bay at No.7 Shaft may lead to a significant deterioration of surface water quality towards the downstream clean water environment.	Low
Discharge of contaminated water from the sump may result in deterioration of clean surface water runoff towards the adjacent clean water environment.	Low
Groundwater	
During the operational phase groundwater will be dewatered to the bottom of the Vaal Contact Reef which will result in dewatering of the surrounding aquifer. However, the transient modelling exercise showed that the cone of depression is limited in extent with no boreholes included within its influence zone.	Medium
The impacts on groundwater quality are primarily related to the management of materials, wastes and spills from drilling operations and unauthorised disposal of contaminated	Medium

substances. Contamination of groundwater may also arise due to incorrect handling and disposal of waste materials, the physical drilling process (sludge contains oils and greases) and oil leaks from drill rigs. This risk is considered low. Groundwater quality impacts may also arise from seepage from the recycle dam underground, although this is considered a low impact since the dam will be lined. The general risk towards groundwater quality deterioration is considered low.	
During the closure phases when all pumping within the region has ceased, the water in the shaft/s may rise towards the Environmentally Critical Level (ECL) where, if contaminated and affected by AMD reactions, may pollute aquifers or surface drainages. The rate at which, and up to which point the water will rise is highly complex and unknown given the multitude of parameters and dewatering schemes within the KOSH area. However previous studies in the KOSH area indicate a likely probability of decant and rise to pre-mining conditions and the ECL. However, at the CAPM 7 Shaft the groundwater table is not expected to return to pre - mining conditions. The reason being that decant will occur at 40 Level, creating a permanent dewatering cone towards 4 Shaft. The quality of the decant water is expected to be contaminated but will improve over time as existing areas of exposed sulphide mineralisation are flooded or oxidised.	Medium
Sensitive landscapes	
, three (3) NFEPA classified wetland areas have been identified to be in close proximity to the No.2 Shaft (unchannelled valley bottom wetland), the No.3 Shaft (channelled Valley Bottom Wetland) and the No.4 Shaft (flat wetland area). The operational activities to be conducted within the vicinity of shaft areas may impact on these wetland areas in terms of surface water quality, fauna, and flora and soil aspects.	Low
Air quality	
The operation and utilisation of the Kanana Ventilation Duct, 6 Shaft Veld Fan and the 7 Shaft Main Ventilation Fan may result in the release of potentially harmful pollutants and emissions into the air, from the underground workings. This may potentially affect the health of the residents in the area.	Medium
As described above, the ore mined at the CAPM Orkney Gold Mine will be transported, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road network. The transportation of the ore may therefore result in the generation of dust that may have an impact on the local air quality.	Low
As described above, the ore mined at the CAPM Orkney Gold Mine will be transported, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road network. Emissions from the haulage trucks may have a minor impact on the localised air quality.	Low
Noise	
Once operational again the main noise sources will be from the main surface fans and the normal shaft noises.	Low
Should there be any additional activities carried out at the No.1-5 Shafts, such as the breaking down of shaft structures and buildings, the noise levels should be monitored and the necessary control measures be introduced to minimise the impact on the community. Should operations commence at these shafts, the impacts as described above will apply.	Low
Visual aspects	

Although the CAPM Orkney Gold Mine is an existing mine and the community and regular visitors of the area are likely to be desensitised to the mining related infrastructure, the mine has been under care and maintenance since the year 2010. Therefore, once operations at the shafts commence, the increased traffic and presence of employees as well as the increased generation of dust and emissions clouds from the machinery and vehicles may cause a visual disturbance. There are several sensitive receptors in both the foreground and middle ground that include residential areas and the town of Orkney.	Low
Site of archaeological and cultural importance	
This site with traditional riveted steel headgear is dated to the end of the 1930's. CAPM Orkney Gold Mine removed all infrastructure (including the headgear) at the No.3 Shaft, without being in possession of a demolition permit. This site was demolished between the period of 2011 and 2015. The site is protected by section 34 (1) of Act 25 of 1999, and is rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or destructed without a demolition permit issued by the relevant heritage authorities.	Unknown at present
This site with traditional riveted steel headgear is dated to the mid 1930's. It is possibly the most representative of the early period of mining in the region. Even so it reflects alterations and updating over time. Most of the site is still intact. The mining objectives of CAPM Gold states that the site will mainly be retained as-is. It will be maintained in its present format allowing for and according to modern mining safety regulations. It is the wish of CAPM Gold to demolish five historic buildings on the eastern perimeter of the site as these are superfluous to the proposed mining perspectives. It includes four steel framed and corrugated iron clad workshops and one brick walled, workshop with wooden trusses and corrugated iron roof. All five buildings are protected by section 34(1) of the National Heritage Act, Act 25 of 1999. These are all rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or demolished without a demolition permit issued by the relevant heritage authorities.	No Risk if proper procedures are applied and demolition permits are obtained
Socio-economic aspects	
CAPM Orkney Gold Mine will employ 471 individuals, the majority of which (a minimum of 95%) will be sourced from the local communities.	Positive
During Decommissioning and Closure, a loss of jobs will occur as the amount of employees required during the Operational Phase will no longer be required.	High
The commencement of operations at the CAPM Orkney Gold Mine may lead to an influx of job seekers to the area.	Medium
Due to the close proximity of the shaft areas to residential areas (Orkney, Kanana, Stilfontein, Vaal Reefs), the storage of hazardous materials and chemicals, gas cylinders and welding and cutting equipment poses a hazard to the safety of the community.	Low
The shaft areas pose a hazard to the community and fauna in the area as all operational shafts will be open until such a time that decommissioning commences and the shafts are sealed.	Medium
CAPM Orkney Gold Mine proposes to utilise haulage trucks for transportation purposes. This poses a hazard to the community and local residents as the number of mine vehicles will increase on the roads which are used by the local community and residents.	Low

The generation of waste on the mine, including asbestos and potential radiation contaminated equipment may result in health hazard to the local community.	Low

12. Proposed impact management objectives and the impact management outcomes for inclusion into the EMPr

Based on the assessment and where applicable the recommendations form specialist reports, the table below summarises the impact management objectives and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.

Table 61: Impact management objectives and the impact management outcomes

Environmental aspect	Objective	Summary of impact management outcome
Geology	To minimise the destruction of the geological strata and to prevent the unnecessary loss of geology.	Monitoring of Mineral Resources and Reserves.
Soil	To prevent the loss of soil and soil fertility during the mining and mining activities.	Site inspection and monitoring programmes.
Soil erosion	To prevent the loss of soil and soil fertility during decommissioning and rehabilitation activities.	Rehabilitation monitoring programme.
Land use and capability	To restore the land use and land capability to the agreed upon end land use, taking the recommendations of the DMR and municipalities into account.	Returning the land use of the area to agriculture and wilderness, depending of the outcome of the discussions with the DMR and the municipalities.
Flora	Prevent the destruction of vegetation and subsequent impacts species of conservation concern and protected species.	Implementation of a declared weed and invader plant species management programme. Site inspection and monitoring programme.
Fauna	To minimise the destruction of faunal habitat and prevent fragmentation as far as possible.	Implementation of access control measures and training programmes.
Surface water	To prevent quality deterioration of surface runoff generated and within the No.1 Shaft area.	Implementation and upgrading of storm water management programme and infrastructure.

Environmental aspect	Objective	Summary of impact management outcome
	To prevent a decrease in catchment yield towards the Vaal River.	Surface water monitoring programme.
	To prevent a decrease in surface water quality reporting to the downstream clean water environment.	
	To prevent a decrease in surface water quality generated and discharged from the No.7 Shaft area.	
	To prevent discharge of radio-active contaminated wash water into the clean water environment.	
	To prevent discharge of contaminated water into the clean water environment.	
Groundwater	To minimise the extent of disturbance of the aquifer	Groundwater level monitoring programme.
	To minimise the extent of disturbance of the aquifer and deterioration of groundwater quality.	
Sensitive Landscapes	Prevent the discharge of contaminated surface water runoff and to prevent the degradation of sensitive landscapes (including wetland areas).	Implementation and upgrading of the storm water management programme and infrastructure.
Air quality	Prevent the deterioration of air quality and indirect effects on floral, faunal and human health	Air quality monitoring programme.
Noise	Prevent and mitigate against the effects of noise on sensitive receptors (including employees and surrounding communities and towns).	Noise monitoring programme.
Visual aspects	Prevent visual intrusions on sensitive receptors	Implementation of control measures to mitigate against visual intrusions.
Sites of archaeological and cultural importance	Re-assess the impact and identify the mitigation process to be followed	Obtaining of appropriate authorisations and permits should any demolition be undertaken
	Prevent the destruction of National Heritage Resources	
Socio-economic aspects	Enhance the positive impact on the socio-economic aspects.	Sourcing of employees from the local community and surrounding areas.
	To mitigate against the effects of job loss.	Implementation of measures to train employees to ensure future employment opportunities.

Environmental aspect	Objective	Summary of impact management outcome
	To mitigate the effects of the influx of job seekers to the area.	Sourcing of employees from the local community and surrounding areas. Implementation of measures indicated in the SLP.
	To prevent and / or limit public exposure to unacceptable health risks.	Implement control measures both on-site and off-site.

13. Final proposed alternatives

As previously described, the CAPM Orkney Gold Mine is an existing gold mine that formed part of the purchase agreement between CAPM and Pamodzi Gold. The purchase agreement included the purchase of all assets and the Section 11 application, as part of the purchase, was submitted to the DMR in August 2011. CAPM did however only take full legal ownership of the assets in October 2012.

As a result of the mine being an existing gold mine with existing infrastructure, no alternatives in terms of location of the sites and infrastructure could be identified. However, alternatives in terms of activity (transport), scheduling and process alternatives were identified (refer also to Section 7 of Part A above as well as the Alternatives Assessment report attached hereto as Annexure I). Based on the findings of the Quantitative Alternatives Assessment, it was found that the proposed activity is most favourable in terms of economic and technical aspects (in comparison to the no-go options). It was also found, in terms of the transport, scheduling and process alternatives, that the proposed activity is more favourable (refer to the Alternatives Assessment Report attached hereto as Annexure I).

14. Aspects for inclusion as conditions of Authorisation

Section 26 of the EIA Regulations GNR. 982, dated 04 December 2014 specifies the requirements and content of an environmental authorisation. The content requirements of the environmental authorisation is described in Table 62 below, and where applicable, a reference to the section as to where the requirement has been addressed as part of the EIR/:EMPr has been included.

Table 62: Content of environmental authorisation as per Section 26 of the EIA Regulation GNR.982, dated 04 December 2015.

Ref. No.			Requirement as per Section 26	Reference to EIR/EMPr (where applicable)
a			the name, address and contact details of the person to whom the environmental authorisation is issued	Refer to Section 1 of Part A for details.
b			a description of the activity that is authorised;	Section 4 of Part A for details.
c			a description of the location of the activity, including	
	(i)		the 21 digit Surveyor General code of each cadastral land parcel,	Section 2 of Part A for details.
	(ii)		where available, the physical address or farm name,	Section 2 of Part A for details.
	(iii)		where the required information in sub-regulation (i) and (ii) is not available, the coordinates of the boundary of the property or properties,	-
	(iv)		a plan which locates the proposed activity or activities authorised at an appropriate scale, or, if it is-	Refer to **Error! Reference source not found.** for the plan.
		(aa)	a linear activity, a description and coordinates of the approved corridor of the activity or activities; or	-
		(bb)	on land where the property has not been defined, the coordinates of the area within which the activity is to be undertaken;	-
d			the conditions subject to which the activity may be undertaken, including conditions determining-	-
	(i)		the period within which commencement must occur, which period may not exceed 10 years and may not be extended beyond such 10 year period, unless the process to amend the environmental authorisation contemplated in regulation 32 is followed;	As determined by the competent authority.
	(ii)		the period for which the environmental authorisation is granted and the date on which the activity is deemed to have been concluded, where the environmental authorisation does not include operational aspects;	As determined by the competent authority.
	(iii)		a distinction between the portions of the environmental authorisation that deal with operational and non- operational aspects respectively and the respective periods for which the distinct portions of the environmental authorisation is granted, where the environmental authorisation contains operational and non- operational aspects;	As determined by the competent authority.

Ref. No.		Requirement as per Section 26	Reference to EIR/EMPr (where applicable)
	(iv)	requirements for the avoidance, management, mitigation, monitoring and reporting of the impacts of the activity on the environment throughout the life of the activity. additional to those contained in the approved EMPr, and where applicable the closure plan; and	As determined by the competent authority.
e		the frequency of auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMPr, and where applicable the closure plan, in order to determine whether such EMPr and closure plan continuously meet mitigation requirements and addresses environmental impacts, taking into account processes for such auditing prescribed in terms of these Regulations: provided that the frequency of the auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMPr may not exceed intervals of five years;	Refer to Section 1.8 and Section 1.11 of Part B for details and / or as determined by the competent authority.
f		the frequency of submission of an environmental audit report to the competent authority, including the timeframe within which a final environmental audit report must be submitted to the competent authority;	Refer to Section 1.11 of Part B details and / or as determined by the competent authority.
g		the frequency of updating the EMPr, and where applicable the closure plan, and the manner in which the updated EMPr and closure plan will be approved, taking into account processes for such amendments prescribed in terms of these Regulations;	As determined by the competent authority.
h		a requirement that the environmental authorisation, EMPr, any independent assessments of financial provision for rehabilitation and environmental liability, closure plans, where applicable, audit reports including the environmental audit report contemplated by regulation 34, and all compliance monitoring reports be made available for inspection and copying-	-
	(i)	at the site of the authorised activity;	-
	(ii)	to anyone on request; and	-
	(iii)	where the holder of the environmental authorisation has a website, on such publicly accessible website; and	-
i		any relevant conditions which the competent authority deems appropriate.	As determined by the competent authority.

Furthermore, should the Mining Right and Environmental authorisation be granted, the following condition should be included and / or taken into account:

- The project should remain in full compliance with the requirements of the EMP and with all regulatory requirements.
- The EMP should be implemented by qualified environmental personnel who have the competency and credibility to interpret the requirements of the EIA and the EMP. Such persons must be issued with a written mandate by CAPM management to provide guidance and instructions to employees and contractors.
- Stakeholder engagement must be maintained during the Construction, Operational and Closure / Rehabilitation Phases of the project, with the emphasis on the continuing provision of information.

15. Description of any assumptions, uncertainties and gaps in knowledge

In terms of Section 3(p) of Appendix 3 to the EIA Regulations GN 982, the Environmental Impact Assessment Practitioner (EAP) must provide a description of any assumptions, uncertainties and gaps in knowledge upon which the impact assessment has been based. The table below provides the assumptions and limitations applicable to the various specialist assessments.

Table 63: Specialist assumptions and limitations

Specialist	Assumptions and limitations
Geohydrological Assessment	• The modelling concentrated on the mining development, current and foreseen, as currently occurring within the model boundary and for CAPM only. The model is based upon gathered data and scientific assumptions, especially with regards to the assumption of a homogenous porous medium, albeit not the real world situation. However, within the larger viewpoint and perspective, the Representative Elemental Volume (REV) should suffice well enough. • The investigation relied on existing data that were collected as a snapshot of field surveys conducted. • A limited amount of boreholes were tested within the model domain and did not include for all the geological or hydrogeological zones. Where data was insufficient, other hydrogeological zones within the modelling catchment were assigned conservative hydraulic parameter values based on literature reviews (Freeze and Cherry, 1979; Younger, 2007). • Aquifer parameters assigned were sourced from historical data, however it should be noted that data variability is high and the model is a simplified representation of a complex aquifer system. • The groundwater model was calibrated in steady state. • The groundwater model was based on a three dimensional approximation of horizontal groundwater flow.

Specialist	Assumptions and limitations
	• To simulate dewatering, pumping well was included in the model at rates obtained from the mine. • Conservative approaches were followed with regards to assigning hydraulic and physical parameters to the steady state calibration and the transient flow model. • Where field data was lacking for assigning of parameters, relevant data from literature was sourced. • Except for the alluvial aquifers, stratigraphical units, delineated from surface geology within the model domain, are assumed to occur throughout the entire thickness of the model and were incorporated as such. • Wetlands/marshes identified and delineated were assumed to be groundwater driven and flux boundaries (Neumann Type) were therefore assigned thereupon. • Wetlands/marshes were delineated based on a desktop study and 1: 50 000 topographical maps. • Drainages were assigned specified head (Dirichlet Type) boundary conditions allowing the system to be drained.
Storm Water Management Plan	• Whilst every endeavour has been made by Shangoni to ensure that information provided is correct and relevant, this technical report is, of necessity, based on information that could reasonably have been sourced within the time period allocated to the assessment, and is, furthermore, of necessity, dependent on information provided by management and/or its representatives during the course of the project. • It is assumed that the Client provided all information to Shangoni that is relevant to the scope of work included in this technical report and that no important information has been withheld. Should additional information become available, Shangoni reserves the right to amend this technical report. • The relevant information received from the Client during the course of this project will be deemed true and correct. If such information reflected in any documentation relevant to this project is discovered to be misleading, Shangoni does not take any responsibility for the implications of such misrepresentations made by the Client. • Any reference to legislation in this technical report should not be perceived as a substitute for the provisions of such legislation. In the event of any inconsistency between this document and such legislation, the latter would prevail. • Shangoni is under no obligation to the Client and others to conduct work not specified in the scope of work as agreed in the relevant proposal. • Flood peak calculations assume rainfall intensity is uniform throughout the duration of the storm. Analysis does not account for runoff retention or artificial acceleration within the catchment. • Calculations are done for complete catchment areas and should be distributed where there is more than one drainage point within the same built up catchment. • Storm water control recommendations are based on industry experience and best practice. Final designs for construction should be authorised by an approved engineer. • Contour and elevation data as provided during the analysis are assumed to be accurate and representative of the site and catchment areas.

Specialist	Assumptions and limitations
	• Upstream catchment activities are interpreted according to common practices and no detailed insight is available on possible storm water measures beyond the site. The assessment does not guarantee the integrity of downstream infrastructure in the event of release or discharge from site. • The SWMP does not impose preference over existing or proposed measures as this is an operational document to assist in the complete management of all storm water measures. • This storm water management plan does not specifically cover considerations relevant to storm water management for the purpose of safety, like mine flooding and loss of life, the primary focus being environmental management. • Recommendations represented in this report apply to the site conditions and features as they existed at the time of Shangoni's investigations, and those reasonable foreseeable. The recommendations do not necessarily apply to conditions and features that may arise after the date of this SWMP, for which Shangoni had no prior knowledge nor had the opportunity to evaluate.
Ecological assessment	• In order to obtain a comprehensive understanding of the dynamics of the floristic and faunal communities on the study area, as well as the status of endemic, rare or threatened species in any area, ecological surveys should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints such long-term studies were not feasible. • **Please note that the inventories listed in this document is by no means complete, and is merely a reflection of the dominant taxa on the study area obtained during series of instantaneous sampling sessions**. A comprehensive inventory, irrespective of the taxon or group of taxa could only be achieved during long-term temporal sampling. Therefore a comprehensive species list of the untransformed parts of the footprints cannot be compiled on the basis of a brief, once-off field survey. • The information as presented in this document only has reference to the investigated shaft boundaries and cannot be applied to any other area without prior investigation. This company, the consultants and/or specialist investigators do not accept any responsibility for conclusions, suggestions, limitations and recommendations made in good faith, based on the information presented to them, obtained from the surveys or requests made to them at the time of this report.

The impact assessments have assumed that all specialist assessments are essentially correct.

Further gaps in knowledge:

The following additional knowledge gaps have been identified:

- A Rehabilitation Plan has not yet been developed for the CAMP Orkney Gold Mine.
- A Closure Plan has not yet been developed for the CAPM Orkney Gold Mine.

16. Reasoned opinion as to whether the proposed activity should or should not be authorised.

16.1 Reasons why the activity should be authorised or not

In accordance with Section 3(q) of Appendix 3 to the EIA Regulations GN R982, the Environmental Impact Assessment Practitioner (EAP) must provide an 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 must be stated.

An impact assessment has been undertaken using qualified specialists, which has incorporated extensive consultation with and participation of interested and affected parties. Applying the hierarchical approach to impact management, alternatives were firstly considered to avoid negative impacts, but where avoidance was not possible, to better mitigate and manage negative impacts. Where impacts were found to be potentially significant, various mitigation measures to manage and monitor the impacts of the project have been proposed. As a final option, offset strategies were considered.

In terms of collectively considering ecological, social and economic impacts it is important to remember that while there might be some trade-offs between the considerations, in South Africa all development must in terms of Section 24 of the Constitution be ecologically sustainable, while economic and social development must be justifiable. There are therefore specific "trade-off" rules that apply. Environmental integrity may never be compromised and the social and economic development must take a certain form and meet certain specific objectives in order for it to be considered justifiable.[37]

The EAP is of the opinion that economic benefit, on both a local and national level, will be derived from the proposed project and recommencement of mining at the Orkney Gold Mine. As previously described above and as per the mines SLP (attached hereto as Annexure G), approximately 471 individuals will be employed by the mine, the majority of which (a minimum of 95%) will be sourced from the local community. The recommencement of the mining activities will also likely benefit the local, regional and national economy, not only through the creation of employment, but also through the use of external contractors as well as the production and sale of gold. It is however important to note that a socio-economic assessment has to date not been conducted and therefore a quantitative assessment of the positive and negative impacts has not been undertaken.

[37] Guideline on need and desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010 (GN 891 of 20 October 2014);

Furthermore, the mine is an existing mine with CAPM taking ownership of the mine and all related assets in August 2014. Therefore, a Construction Phase is not applicable to the proposed project. All impacts, with a limited number of impacts with a “High” severity rating, will be associated with the Operational and Closure Phases of the proposed project. A number of the “High” significant impacts are reversible and may not lead to irreplaceable loss, if the recommended mitigation measures are effectively implemented. As a result of the above description and the results of the impact assessment, the EAP is of the opinion that the proposed project be allowed to commence, with the condition that the management objectives and management measures as presented in the EIR/EMPr be implemented to effectively manage, prevent, control and / or stop environmental impacts from occurring.

16.2 Conditions that must be included in the authorisation

16.2.1 Specific conditions to be included into the compilation and approval of the EMPr

Should the DMR grant authorisation for this project, it should be subject to the following conditions:

- The project should remain in full compliance with the requirements of the EMPr and with all regulatory requirements.
- The EMPr should be implemented by qualified environmental personnel who have the competence and credibility to interpret the requirements of the EMPr. Such persons must be issued with a written mandate by CAPM management to provide guidance and instructions to employees and contractors.
- Stakeholder engagement must be maintained during the operational and closure/rehabilitation phases of the project, with the emphasis on the continuing provision of information.

16.2.2 Rehabilitation requirements

As described in Section 15 above, a Rehabilitation Plan and Closure Plan have not yet been developed for the CAPM Orkney Gold Mine. As the CAPM Orkney Gold Mine is currently in the Implementation Phase to once again commence with mining at the No.7 Shaft and the No.6 Shaft, a Rehabilitation Plan and Closure Plan will be developed during the Operational Phase. However, the strategy to be implemented by CAPM Orkney Gold Mine involves the following:

- Removal of all redundant infrastructure.
- Sealing of shafts (including ventilation shafts).
- Identification of structures that may be left to the community:
    - Hostels at the No.2, No.4 and No.5 Shafts.
    - Satellite offices.
    - Recreational Club.
- Ripping of cement lining and compacted soils.

- Re-establishment of indigenous vegetation on disturbed areas (dependent on agreed upon end land use).

17. Period for which the authorisation is required

The total period for which authorisation is required, is approximately 11 years, with a breakdown as provided in the table below.

Stages of operation	Timeframe (Years)
Planning	N/A
Construction	N/A
Commissioning	0.5 years
Operation	9 years
Closure	1.5 year
TOTAL Period	**11 years**

18. Undertaking

The undertaking by the EAP is provided in Section 2 of Part B (Environmental Management Programme) below. This undertaking confirms: the correctness of the information provided in the reports, the inclusion of comments and inputs from stakeholders and I&APs, the inclusion of inputs and recommendations from the specialist reports where relevant and the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

19. Financial Provision

An amount of **R43 296 259.90** is currently provided for in a trust fund. The DMR rates have been. Applying the DMR rates the premature closure quantum has been calculated in 2015 at **R206 552 739.20.** The trust fund shortfall therefore amounts to **R163 256 497.30**. A detailed calculation of the quantum in accordance with the applicable guideline is contained in Annexure H.

19.1 Explain how the aforesaid amount was derived.

A detailed description of the derivation and calculation of quantum is included in the document titled: "*China African Precious Metals: Orkney Gold Mine Closure Liability Update*" dated February 2015 and compiled by Shangoni Management Services (Pty) Ltd. (Shangoni FinPro, 2015). The report is attached hereto as Annexure H.

A brief description of the process followed in deriving and calculating the quantum is provided below.

19.1.1 Process followed

A detailed site assessment was conducted on the 22nd of January 2015 to identify all the relevant infrastructure and actions that would need to be included in the calculation of the financial provision. Survey plans were used to identify and mark the shafts and related infrastructure. Once this was complete, a list of infrastructure was compiled. The infrastructure was classified in accordance with the tariffs list and the surface areas of the infrastructure were calculated to determine the volume or surface requiring rehabilitation or demolition.

19.1.2 Tariffs

The 2005 tariffs, as obtained from the DMR guideline were escalated by 6% every year to determine the 2015 rates (refer to Table 64 below), hereafter the quantum could be calculated. Refer to the Mine Closure Liability Update Report attached hereto as Annexure H.

Table 64: DMR Tariffs used for quantum determination (2005 escalated rates to 2015)

	Description	Rate
1	Dismantling of processing plant and related structures (Including overland conveyors and power lines)	R12.94
2a	Demolition of steel buildings and structures	R180.34
2b	Demolition of reinforced concrete buildings and structures	R265.75
3	Rehabilitation of access roads	R32.26
4a	Demolition and rehabilitation of electrified railway lines	R313.35
4b	Demolition and rehabilitation of non-electrified railway lines	R170.85
5	Demolition of housing and/or administration facilities	R360.68
6	Opencast rehabilitation including final voids and ramps	R189,070.54
7	Sealing of shafts, adits and inclines	R96.81
8a	Rehabilitation of overburden and spoils	R126,047.02
8b	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	R156,989.29
8c	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	R455,971.31
9	Rehabilitation of subsided areas	R105,545.37
10	General surface rehabilitation	R99,850.51
11	River diversions	R99,850.51
12	Fencing	R113.89
13	Water management	R5,300.00
14	2 to 3 years of maintenance and aftercare	R13,288.08

19.2 Confirm that this amount can be provided for from operating expenditure

An amount of **R43 296 259.90** is currently provided for in a trust fund. Applying the DMR rates the premature closure quantum has been calculated in 2015 at **R206 552 739.20.** The trust fund shortfall therefore amounts to **R163 256 497.30**. A detailed calculation of the quantum in accordance with the applicable guideline is contained in Annexure H. This shortfall will be provided for and included into the trust.

20. Deviations from the approved scoping report and plan of study

20.1 Deviations from the methodology used in determining the significance of potential environmental impacts and risks.

This EIA and EMPr serves the purpose of updating the approved EMPr for CAPM Orkney Gold Mine. As previously described, the CAPM Orkney Gold Mine was purchased from Pamodzi Gold through a Section 11 application and purchase agreement. CAPM however, only took legal ownership of the assets in October 2012. Therefore, the EMPr under Pamodzi Gold would hold valid for the CAPM Orkney Gold Mine. It was however identified, through the EMP Performance Assessment conducted in November 2011 that certain activities and information contained within the approved EMPr are no longer valid and an update of the EMPr was required. It is for this reason that this EIA and EMPr, compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), the Environmental Impact Assessment Regulations GN.R. 982 dated 04 December 2014 as well as the new DMR EIA and EMPr template, has been updated to:

- Change the name of the holder of the EMPr.
- Include updated baseline information.
- Revise the activities, and planned schedule, to be conducted by CAPM at the Orkney Gold Mine.
- Conduct an Environmental Impact Assessment based on the proposed activities.
- Update and present the proposed mitigation measures for the identified potential impacts.

It is for this reason that no Scoping Report has been compiled as this report constitutes a revision of the EMPr and therefore there is no deviation from the Scoping Report for the proposed project.

20.2 Motivation for the deviation.

Refer to Section 20.1 above for an explanation as to why there is no deviation of activities of the Scoping Report.

21. Other information required by the competent Authority

21.1 Compliance with the provisions of section 24(4)(a) and (b) read with section 24(3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the:-

21.1.1 Impact on the socio-economic conditions of any directly affected person.

Results of investigation, assessment and evaluation of impact on any directly affected person[38]	Reference to where mitigation is reflected
The CAPM Orkney Gold Mine is an existing gold mine situated in close proximity to the town of Orkney in the North West Province. As previously described, Pamodzi Gold entered into a sales agreement with CAPM with the Section 11 application being submitted in August 2011. The sales agreement with CAPM included the full acquisition of all assets of the Orkney Gold Mine. CAPM however, only took legal ownership of the assets in October 2012. As the mine is an existing mine, the surrounding landowners, stakeholders and community are likely to be desensitised to the activities conducted by the mine as well as the visual intrusion imposed by the mine. However, upon the mine become fully operational (with specific reference to the No.7 and the No.6 Shaft) several socio-economic impacts as well as hazards to the community may be experienced and include (refer to the Risk Assessment Report attached hereto as Annexure F): • Employment opportunities: ○ CAPM Orkney Gold Mine will employ approximiately 471 individuals of which a minimum of 95% will sourced from the local community. • Job losses.	Refer to the Risk Assessment Report attached hereto as Annexure F.

[38] Note: It is important to note that, to date, no Socio-economic Impact Assessment Study has been conducted for the mine and its proposed operations and therefore the assessment provided is based on identified potential impacts that may occur.

Results of investigation, assessment and evaluation of impact on any directly affected person[38]	Reference to where mitigation is reflected
○ During the decommissioning and closure phase of the project, a loss of jobs will occur as the amount of employees required during this phase will decrease. • Influx of job seekers to the area. ○ The opportunity for employment, as a result of the mine, may lead to an influx of job seekers to the area. • Hazards to the community: ○ Storage of hazardous chemicals and materials. ○ Shafts pose a risk to humans, and fauna. ○ Transportation via haulage truck may pose safety risk. ○ Health hazards to community due to generation of waste (Asbestos, hazardous waste).	

21.1.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

Results of investigation, assessment and evaluation of impact on any national estate	Reference to where mitigation is reflected
As described in Chapter N or Section 7.4.1 above, it has been identified that the shaft areas associated with the No.3 Shaft and the No.7 Shaft are protected by section 34 (1) of the NHA, 1999, and are rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or destructed without a demolition permit issued by the relevant heritage authorities. However, all of the infrastructure (including the headgear) associated with the No.3 Shaft has been decommissioned and removed, under the ownership of both the previous mine owner as well as CAPM Orkney Gold Mine, without a demolition permit (refer to the Heritage Impact Assessment report attached hereto as Annexure C6). Therefore, the appropriate action to be undertaken is to consult with the Heritage Authority and determine the approach to be followed to mitigate this impact.	Refer to the Risk Assessment Report attached hereto as Annexure F.

The detailed heritage impact report is contained in Annexure C6.

22. Other matters required in terms of section 24(4)(a) and (b) of the Act.

Section 24(4)(b)(i) of the NEMA (1998) states that the following:

"24(4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment -

(b) must include, with respect to every application for an environmental authorisation and where applicable-

(i) investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity;"

An Alternative Assessment Report has been compiled and is attached hereto as Annexure I. The Alternative Assessment Report has been compiled to include the following:

- Brief description of the proposed project.
- A description of the proposed activities to be undertaken.
- A description of the proposed alternatives.
- An assessment of the positive and negative implications of each of the alternatives.
- A description of the method followed in quantitatively assessing alternatives.
- The results of the quantitative assessment of the alternatives.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Draft environmental management programme.

1.1 Details of the EAP.

The requirements for the provision of the detail and expertise of the EAP are included in Part A, Section 1.1.

1.2 Description of the Aspects of the Activity.

The requirement to describe the aspects of the activity that are covered by the draft environmental management programme is included in Part A, Section 8.

1.3 Composite Map.

Refer to Figure 65 as well as Annexure A4 for a map that superimposes the proposed activity, its associated structures and infrastructures on the environmental sensitivities of the preferred sites.

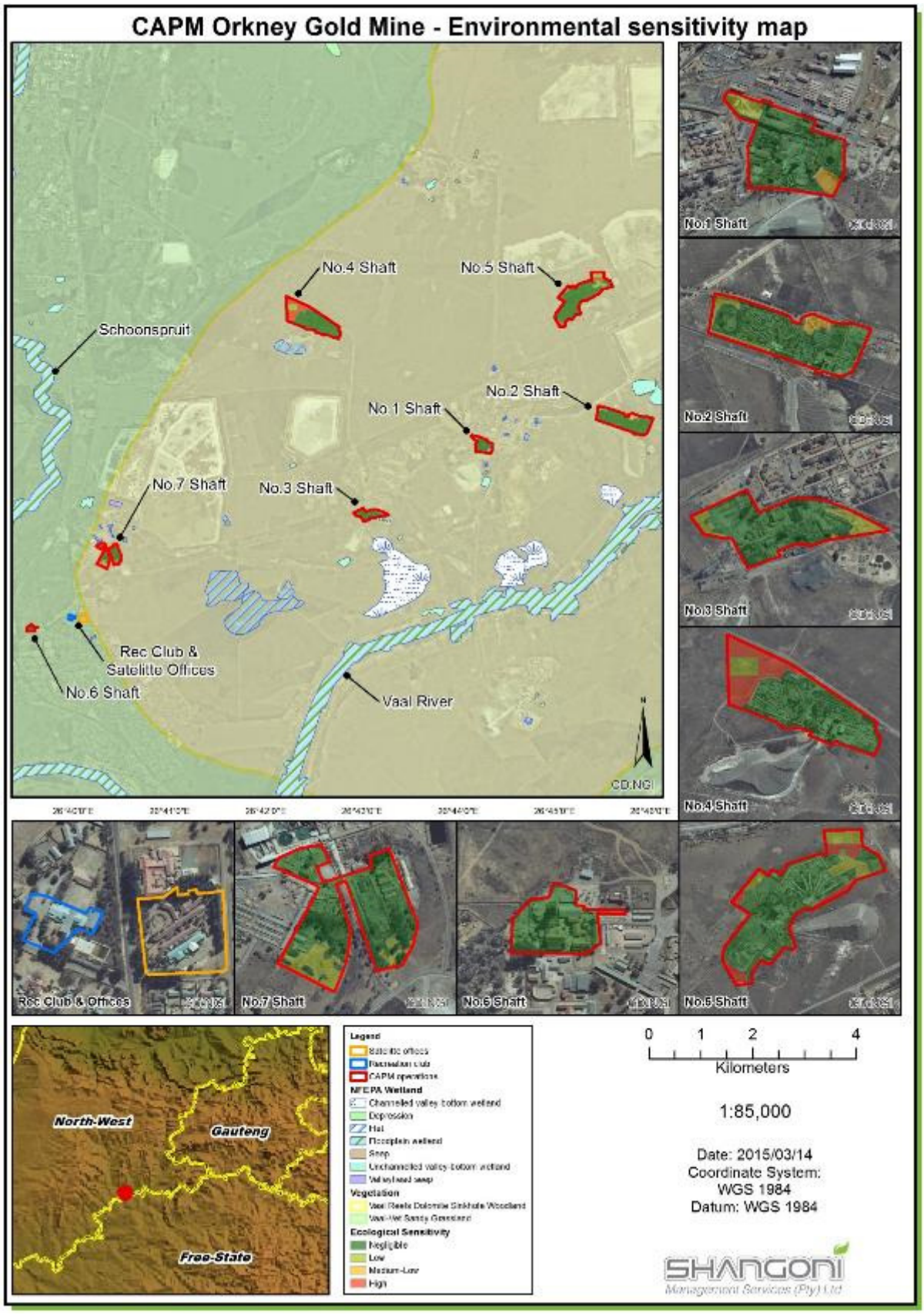

Figure 65: Environmental features in relation to the CAPM Orkney Gold Mine

1.4 Description of Impact management objectives including management statements.

1.4.1 Determination of closure objectives

Table 65 below presents the closure objectives of the CAPM Orkney Gold Mine. Refer to the Section 1.7.1 of Part B below for a description of the closure objectives as compared to the baseline environment as well as the Mine Closure Liability Update Report attached hereto as Annexure H.

Table 65: Mine closure objectives of the CAPM Orkney Gold Mine

Closure Objective
General closure objectives
To achieve the optimal form of land use for the mining right area commensurate with the needs of local communities and South Africa as a whole.
To achieve closure within a realistic financial framework which is acceptable to the stakeholders involved.
To leave behind a land use and infrastructure assets which meets the needs of the present without compromising the ability of future generations to meet their own needs.
To ensure that all arable land, grazing land, wetland and wilderness areas are left behind as self-sustaining land assets for the use of future generations.
To ensure, as far as is practically possible, that all mining infrastructure, which cannot be used or demolished, is rendered safe to humans and animals alike.
Geology and the mineral resource
The removal of ore from underground shall not adversely affect the geology.
Topography
To reduce the visual impact of the altered topography through the removal of infrastructure and rehabilitation of the disturbed area.
To dispose of saleable assets.
Soils
To treat all soil pollution found during rehabilitation.
To treat soil allowing vegetation to sow itself in areas not implemented for other use.
Land capability, surrounding land use and landscape character
To identify alternate use of as much of the infrastructure as possible and investigate the possibility of donating or selling the infrastructure / land.
To the extent to which it is reasonably feasible to do, to remove infrastructure not required in situ and restore the land to grassland.
Remove all un-saleable infrastructures where it is reasonably feasible to do so.
Natural vegetation
To achieve self- sustaining vegetation on all rehabilitated areas.
To the extent to which it is reasonably feasible to do so, restore the land to grassland utilising vegetation endemic to the area.
Surface water
To minimise the risk of escape of polluted water from the mine property into natural watercourses.

Closure Objective
To reduce, as far as reasonably feasible, the contamination of surface water thus obviating the need to treat excessive quantities of polluted water.
To measure water quality chemical/bacteriological and submit reports – action any anomalies.
Groundwater
Minimise all long term affects which individual facilities may have in terms of quality on other groundwater users.
To measure water quality chemical/bacteriological and submit reports – action any anomalies.
Air quality
Dust emanating from rehabilitated land should not exceed normal levels associated with agricultural and residential areas.
To remove the surface fans and seal off the up and down cast shafts.
Noise
To remove all sources with noise levels above 85 dBA.
Visual aspects
Limit long term visual impact of mining activities.
Regional socio-economic aspects
To hold meetings with I&APs and communicate any changes.
To identify alternate use of as much of the infrastructure as possible and investigate the possibility of donating or selling the infrastructure / land.

1.4.2 The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

The potential impacts that may result from the commissioning of the shafts and the re-instatement of mining activities at the No.7 Shaft, No.6Shaft, No.4 Shaft, No.1 Shaft and the No.2 Shaft have been presented in the Risk Assessment Report (attached hereto as Annexure F). The impacts were identified through the input from various specialists and their resultant specialist reports (attached hereto in Annexure C). The impacts were identified, described, assessed and their significance ranked. Mitigation measures were then put forward to prevent these impacts from occurring, and where they could not be prevented, mitigation measures were put forward to minimise, remedy and / or avoid the impacts.

1.4.3 Potential risk of Acid Mine Drainage.

As described above in Chapter I, Section 7.4.1 of Part A (EIA), the CAPM Orkney Gold Mine will not make use of any mine residue deposits or contaminated dams s the ore mined by CAPM will not be processed by CAPM, but rather by the Nicolor South Plant. Therefore the risk towards groundwater pollution will be minimal.

It is however important to note that gold seams are known to contribute to acid Mine/rock drainage (AMD/ARD). This is due to the mineral pyrite that is closely associated with gold-bearing strata and contributes between 10% and 30% of the VCR.

1.4.4 Steps taken to investigate, assess, and evaluate the impact of acid mine drainage

A Geohydrological Assessment was conducted for the CAPM Orkney Gold Mine and is attached hereto as Annexure C1. A full description of the potential risks of acid mine drainage is provided in Part 6.2.1 of Annexure C1. Refer also to the Risk Assessment Report attached hereto as Annexure F.

1.4.5 Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage

The mitigation measures to be put in place to remedy and or minimise the effects of Acid Mine Drainage (AMD) are presented in Part 4.7 of the Risk Assessment Report (attached hereto as Annexure F).

1.4.6 Measures that will be put in place to remedy any residual or cumulative impacts that may result from acid mine drainage

The mitigation measures to be put in place to remedy and or minimise the effects of Acid Mine Drainage (AMD) are as follows (refer also to Part 4.7 of the Risk Assessment Report attached hereto as Annexure F):

- A long-term goal may entail the establishment of a joint water management strategy with mines in the region and possible treatment capacity.
- Reduce water inflow into shafts through efficient storm water management.
- Water levels within the basins should be held at or below the relevant environmental critical levels (ECLs) through pumping of water.
- Improved monitoring of mine water, groundwater, surface water, subsidence and other geotechnical impacts of mine flooding and seismicity is required.

1.4.7 Volumes and rate of water use required for the mining, trenching or bulk sampling operation

The CAPM Orkney Gold Mine will initially be dewatering the No.6 Shaft and the No. 7 Shaft at a volume of approximately 1.5 Megalitres/day. This water will be supplied to the AGA metallurgical plant. An agreement with AGA is still under negotiations and will be in place with AGA for the acceptance of this water.

1.4.8 Has a water use licence been applied for

A Water Use Licence will be applied for and will be submitted to the Department of Water and Sanitation (DWS) in conjunction with this EMPr.

1.4.9 Impacts to be mitigated in their respective phases.

Table 66: Measures to rehabilitate the environment affected by the undertaking of any listed activity

Environmental component	Activity	PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Geology	The underground deep level mining of gold bearing ore.	Operational Phase	Mining Right area = 10 561.7 ha	• The mining activities will be limited to within the Mining Rights boundary area and only to what is required in the mine plan.	In compliance with the Mining Right issued in terms of the MPRDA (2002) and the Environmental management Programme.	Operational Phase
				• The correct stooping width should be maintained.		
Soil	Commencement mining activities within the various shaft areas.	Operational and Decommissioning Phase	Mining Right area = 10 561.7 ha Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha Shaft 5 = 40.3 ha Shaft 4 = 35.0 ha Shaft 3 = 7.5 ha Shaft 2 = 29.0 ha Shaft 1 = 7.6 ha	• Prevent the release of contaminated surface water runoff.	The prevention of the release of contaminated surface water is in line with the objectives of the DWS Best Practices Guideline H2: Pollution Prevention and Minimization of Impacts	Commissioning and Operational Phase
				• Demarcate all areas, within the shaft surface areas, in which no unauthorised activities should take place.	The demarcation will allow for these areas to remain undisturbed thereby keeping the dirty water management areas as small as possible. This is in line with the DWS Best Practice Guideline G1: Storm Water Management.	
				• All spillages should be identified, cleaned and remediated as soon as possible.	In compliance with the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) and the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GNR.331 of 2014), thereunder.	Life of mine
	Hydrocarbon, chemical and waste materials spillages	Operational, Decommissioning and Closure Phase	-	• Prevent the release of contaminated surface water runoff.	The prevention of the release of contaminated surface water is in line with the objectives of the DWS Best Practices Guideline H2: Pollution Prevention and Minimization of Impacts	Commissioning and Operational Phase
				• Demarcate all area, within the shaft surface areas, in which no unauthorised activities should take place.	The demarcation will allow for these areas to remain undisturbed thereby keeping the dirty water management areas as small as possible. This is in line with the DWS Best Practice Guideline G1: Storm Water Management.	
				• All spillages should be identified, cleaned and remediated as soon as possible.	In compliance with the Nation Environmental Management Waste Act, 2008 (Act No. 59 of 2008) and the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GNR.331 of 2014), thereunder.	Life of Mine
				• The Emergency Prepared Response Procedure as well as other related Standard Operating	In compliance with the Mine Health and Safety Act, 1996 (Act No. 29 of 1996).	Commissioning and Operational Phase

Environmental component	Activity	PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Procedures (SOPs) will be implemented prior to the commencement of mining and mining related activities.		
				• All hydrocarbon and chemical substances should be stored in lined, bunded and demarcated areas.	In compliance with the DWS Best Practice Guideline H2 Pollution Prevention and minimisation.	Life of Mine, as required
	Decommissioning of the shafts and related infrastructure and rehabilitation of the disturbed footprint areas.	Decommissioning and Closure Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha Shaft 5 = 40.3 ha Shaft 4 = 35.0 ha Shaft 3 = 7.5 ha Shaft 2 = 29.0 ha Shaft 1 = 7.6 ha	• Allow vegetation to re-establish on all rehabilitated areas.	In line with Regulation 70 of the Mineral and Petroleum Resources Development Regulation, GNR587 (2004).	Rehabilitation Phase, upon cessation of infrastructure removal.
				• All rehabilitated areas should be monitored on a regular basis to ensure that no erosion is occurring, until such a time that rehabilitation is complete and the agreed upon end land use achieved.	In line with Regulation 70 of the Mineral and Petroleum Resources Development Regulation, GNR587 (2004).	At the onset of rehabilitation activities.
				• The weed and declared invader management plan should continue to be implemented during the rehabilitation phase.	The continued implementation of the declared weed and alien invader management plan is in compliance with the NEM:BA (2004) and the regulations thereunder.	Life of mine and throughout the Rehabilitation Phase
Land use and land capability	Decommissioning and rehabilitation of all shaft areas and closure of the mine.	Decommissioning and Closure Phase		• The positive impact should be enhanced by rehabilitating as much of the disturbed surface area as possible, depending on the agreed upon end land use and taking the DMR and the municipalities requirements into account.	By rehabilitation as much of the disturbed area as possible, the dirty water management area is reduced. This is in line with the DWS Best Practice Guidelines for the isolation of clean and dirty water management areas, and reducing the size of the dirty water management areas.	On set of Rehabilitation Phase
Flora	Operational activities and care and maintenance activities to be conducted at the No.6 and No.7 Shafts and the No.1 to No.5 Shafts, respectively.	Operational, Decommissioning and Closure Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha Shaft 5 = 40.3 ha Shaft 4 = 35.0 ha Shaft 3 = 7.5 ha Shaft 2 = 29.0 ha Shaft 1 = 7.6 ha	• The shaft areas will be fenced in to prevent unauthorised access.	This is in compliance with section 5 of the Mine Health and Safety Act (1996).	Commissioning and Operational Phase
				• All areas within which activities can take place should be demarcated.		
				• Access control, to prevent unauthorised access to the secondary grassland areas, should be implemented.		Commissioning and Operational Phase for the Life of Mine
				• An air quality and dust fallout monitoring programme will be implemented	Air quality and dust fallout monitoring will determine if the minimum thresholds as stipulated in the NEM:AQA (2004) and regulation thereunder are not exceeded. Should they be exceeded the appropriate actions will be undertaken an	Commissioning and Operational Phase

Environmental component	Activity	PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• All loaded haul trucks are to remain covered during the transportation.	Atmospheric Emissions Licence will be applied for. This is in compliance with the MPRDA (2002), the NEM:AQA (2004) and the Mine Health and Safety Act (1996).	Operational Phase
				• All machinery, vehicles and haul trucks should be inspected and serviced on a regular basis.		
				• Implement good housekeeping practices to limit the generation of dirty areas within the No.7 Shaft area.	Keeping the dirty water management areas as small as possible is in line with the DWS Best Practice Guideline G1: Storm Water Management.	Life of Mine commencing from the Commissioning and Operational Phase
				• It is recommended that protected plants in danger of becoming destroyed during any of the planned activities be removed (rescued) prior to the commencement of Commissioning activities and trans-located to transformed or degraded habitat of potentially suitable habitat within the study area, or used during the rehabilitation phase.	The commissioning of these mitigation measures are in compliance with the NEM:BA (2004) and the regulations thereunder.	
				• A permit would be required to remove or disturb the protected plant species.		
				• A weed and declared invader management plan will be implemented to monitor and remove all weeds and declared invaders identified on site.		
				• The weed and declared invader management plan should be continued with during the Decommissioning and Closure Phase and all of the rehabilitated areas should continue to be inspected to ensure the removal and management of weeds and declared invader plants.		Life of Mine through Decommissioning Phase and Rehabilitation Phase
				• Areas of disturbance will be limited to only what is required within the mine plan and will be limited to the shaft footprint areas.	In Compliance with the Mining Right.	Commissioning and Operational Phase for the Life of Mine
Fauna	Operational activities and care and maintenance activities to be conducted at the No.6 and No.7 Shafts and the No.1 to No.5 Shafts, respectively.	Operational and Decommissioning Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha Shaft 5 = 40.3 ha Shaft 4 = 35.0 ha Shaft 3 = 7.5 ha Shaft 2 = 29.0 ha	• All employees should be trained on the importance of all aspects of the environment (including fauna and flora).	The development and implementation of an Environmental Awareness Plan and the training of employees regarding the importance of the environment and potential impacts to the environment is in compliance with Regulation 51 of the MPRDA (2002).	Commissioning and Operational Phase throughout the Life of Mine.

Environmental component	Activity		PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Shaft 1 = 7.6 ha	• No employees will be allowed to hunt or poach animals within or around the CAPM Orkney Gold Mine area.	This is in compliance with the NEM:BA (2004) and the regulations thereunder.	
					• All shaft areas will be fenced to not only prevent unauthorized access but also to prevent animal life from entering the shaft areas.	This is in compliance with section 5 of the Mine Health and Safety Act (1996).	
					• Mitigation measure in terms of noise, will be implemented to prevent and minimize the effects of noise on animal life.	In compliance with the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) and the DMR guidelines for noise control.	
Surface water	No.1 Shaft	Operation of winder cooling ponds.	Operational Phase	Shaft 1 = 7.6 ha	• An operational procedure should be implemented to maintain sufficient free-board and limit process water spillages into the clean water system.	This is line with the DWS Best Practice Guidelines, to prevent and minimise impacts and to ensure the separation of clean and dirty water management areas.	Commissioning and Operational Phase
		Storage and handling of hydrocarbon containers.	Operational and Decommissioning Phase		• Implement good house-keeping practises and implement a procedure for the storage and handling of hydrocarbon containers and spillages.		Commissioning and Operational Phase throughout the Life of Mine.
					• Hydrocarbon containers should be stored within designated areas, preferably bunded and roofed.		
		Containment of affected water.	Operational Phase		• Implement regular inspections and a maintenance schedule to ensure pumping infrastructure is functional at all times to limit possible sump overflow.		
	No.2 Shaft	Uncontrolled surface water runoff.	Operational and Decommissioning Phase	Shaft 2 = 29.0 ha	• Implement storm water diversion measures at the shaft area to prevent ingress of surface runoff into the shaft during heavy rainfall events.		Commissioning and Operational Phase
					• Areas where surface water retention takes place should be minimised to encourage free drainage of surface water towards the downstream environment.		Life of mine
					• Obstructions within current storm water trenches should be removed to promote free drainage of the No.2 Shaft area.		Commissioning and Operational Phase and maintained throughout the Life of Mine
	No.3 Shaft	Rehabilitation of the No.3 Shaft area.	Decommissioning and Closure Phase	Shaft 3 = 7.5 ha	• It is imperative that the No.3 Shaft area be rehabilitated to ensure free drainage of surface flow towards the downstream environment.		Commence from the on-set of the Decommissioning

Environmental component	Activity		PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
							Phase throughout the Rehabilitation Phase
					• Vegetation growth should be promoted to reduce the possibility of erosion of exposed areas.		Onset of Rehabilitation Phase
					• Obstructions within current storm water trenches should be removed to promote free drainage of the No.3 Shaft area.		Commissioning and Operational Phase and maintained throughout the Life of Mine
	No.4 Shaft	Uncontrolled surface water runoff	Operational and Decommissioning Phase	Shaft 4 = 35.0 ha	• Implement storm water diversion measures at the shaft area to prevent ingress of surface runoff into the shaft during heavy rainfall events.		Commissioning and Operational Phase
					• Areas where surface water retention takes place should be minimised to encourage free drainage of surface water towards the downstream environment.		Commissioning and Operational Phase and maintained throughout the Life of Mine
					• Obstructions within current storm water trenches should be removed to promote free drainage of the No.4 Shaft area.		
	No.5 Shaft	Sewage management	Operational and Decommissioning Phase	Shaft 5 = 40.3 ha	• Implement regular inspections and ensure that the sump is serviced on a daily basis.		Commissioning and Operational Phase
					• As an additional measure, construct a berm between the sewage sump and the clean storm water channel to prevent sewage from entering the channel during possible overflow.		
	No.6 Shaft	Uncontrolled storm water runoff	Operational Phase	Shaft 6 = 1.4 ha	• Implement storm water diversion measures at the shaft area to prevent ingress of surface runoff into the shaft during heavy rainfall events.		
					• Areas where surface water retention takes place should be minimised to encourage free drainage of surface water towards the downstream environment.		Commissioning and Operational Phase and maintained throughout the Life of Mine
					• Obstructions within current storm water trenches should be removed to promote free drainage of the No.6 Shaft area.		

Environmental component	Activity		PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
		Wash bay operation	Operational and Decommissioning Phase		• Implement an oil separator system at the wash bay to lower the hydrocarbon content of wash water to be discharged into the clean environment.		Commissioning and Operational Phase
					• Regular inspections should be conducted to ensure that the oil separator is in working order at all times.		Commissioning and Operational Phase throughout the Life of Mine
					• Conduct regular monitoring of discharge of wash water to comply with the DWS general limit standards for discharge.		
					• Obstructions within current storm water trenches should be removed to promote free drainage of the No.6 Shaft area.		
	No.7 Shaft	Chemical and hydrocarbon management	Operational and Decommissioning Phase	Shaft 7 = 11.7 ha	• Implement good housekeeping practises to limit the generation of dirty areas with the No.7 Shaft area.		
		Wash bay operation	Operational and Decommissioning Phase		• Construct containment walls around the wash bay as a measure to contain possible overflow from the sump.		Commissioning and Operational Phase
					• Implement regular inspections and a maintenance schedule to ensure that pumping infrastructure is in working order during operations.		Commissioning and Operational Phase throughout the Life of Mine
		Sump operation underneath conveyor	Operational Phase		• Implement regular inspections and a maintenance schedule to ensure that pumping infrastructure is in working order during operations.		
Groundwater	Dewatering of the shafts for the safe continuation of mining.		Operational Phase	1Ml per day	• Intercept drainage around the shaft.	This is in compliance with GN.704 under the NWA (1998) as well as the DWS Best practice Guideline G1: Storm Water Management.	Commissioning and Operational Phase throughout the Life of Mine until such a time that the shaft is sealed.
					• The dewatering of the aquifer system cannot be prevented. If the monitoring program indicates that nearby groundwater users are affected by the dewatering, the users need to be compensated for the loss.	In line with the DWS Best Practice Guideline A6: Water Management for Underground Mines.	Commissioning and Operational Phase throughout the Life of Mine and after closure
	The underground deep level mining of gold bearing ore, including the associated activities conducted on the surface.		Operational and Decommissioning Phase	Mining Right area = 10 561.7 ha	• During the operational phase appropriate temporary storm water infrastructure must be developed and implemented, in accordance to Regulation 704.	This is in compliance with GN.704 under the NWA (1998) as well as the DWS Best practice Guideline G1: Storm Water Management.	Commissioning and Operational Phase

Environmental component	Activity	PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• Prevent or contain contamination from spilling and oil leaks from vehicles, equipment and drill rigs.	In compliance with the DWS Best Practise Guidelines with specific reference to BPG H2 Pollution Prevention and Minimisation of Impacts.	Throughout the Life of Man
				• Commissioning activity management should ensure that any materials handling does not pose a material risk to soil, surface water and groundwater pollution.		Commissioning and Operational Phase throughout the Life of Mine
	Decommissioning and closure of the underground workings, shafts and associated infrastructure and well as the shaft surface area.	Decommissioning and Closure Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha Shaft 5 = 40.3 ha Shaft 4 = 35.0 ha Shaft 3 = 7.5 ha Shaft 2 = 29.0 ha Shaft 1 = 7.6 ha	• A long-term goal may entail the establishment of a joint water management strategy with mines in the region and possible treatment capacity.	-	Life of Mine and after Closure
				• Reduce water inflow into shafts through efficient storm water management.	This is in compliance with GN.704 under the NWA (1998) as well as the DWS Best practice Guideline G1: Storm Water Management.	Commissioning and Operational Phase throughout the Life of Mine until such a time that the shaft is sealed.
				• Water levels within the basins should be held at or below the relevant environmental critical levels (ECLs) through pumping of water.	In compliance with the DWS Best Practise Guidelines with specific reference to BPG H2 Pollution Prevention and Minimisation of Impacts.	Life of Mine continuing after Closure
				• Improved monitoring of mine water, groundwater, surface water, subsidence and other geotechnical impacts of mine flooding and seismicity is required.	In line with the DWS Best Practice Guideline A6: Water Management for Underground Mines as well as the MPRDA (2002).	Life of Mine continuing after Closure
Sensitive landscapes	Mining and mining related activities conducted within the shaft areas.	Operational and Decommissioning Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha Shaft 5 = 40.3 ha Shaft 4 = 35.0 ha Shaft 3 = 7.5 ha Shaft 2 = 29.0 ha Shaft 1 = 7.6 ha	• No.2 Shaft: ○ Implement storm water diversion measures at the shaft area to prevent ingress of surface runoff into the shaft during heavy rainfall events. ○ Areas where surface water retention takes place should be minimised to encourage free drainage of surface water towards the downstream environment. ○ Obstructions within current storm water trenches should be removed to promote free drainage of the No.2 Shaft area.	This is line with the DWS Best Practice Guidelines G1 and H2, for storm water management, to prevent and minimise impacts and to ensure the separation of clean and dirty water management areas.	Commissioning and Operational Phase continuing for the Life of Mine

Environmental component	Activity	PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• No.3 Shaft: ○ It is imperative that the No.3 Shaft area be rehabilitated to ensure free drainage of surface flow towards the downstream environment. ○ Vegetation growth should be promoted to reduce the possibility of erosion of exposed areas. ○ Obstructions within current storm water trenches should be removed to promote free drainage of the No.3 Shaft area.		
				• No.4 Shaft: ○ Implement storm water diversion measures at the shaft area to prevent ingress of surface runoff into the shaft during heavy rainfall events. ○ Areas where surface water retention takes place should be minimised to encourage free drainage of surface water towards the downstream environment. ○ Obstructions within current storm water trenches should be removed to promote free drainage of the No.4 Shaft area.		
				• Prior to the commencement of operations at the No.2 Shaft, the No.3 Shaft and the No.4 Shaft, a wetland delineation and Impact Assessment should be conducted to accurately delineate any wetlands within the vicinity, determine the Present Ecological Status (PES) and the Ecological Importance and Sensitivity (EIS) of the wetlands, to determine the potential impacts that may occur and to present possible mitigation measures for these impacts.	This is in compliance with the National Water Act, 1998 (Act No. 36 of 1998) and GN 704 (1999) thereunder.	Commissioning Phase, prior to the commencement of the Operational Phase
Air quality	The operation and utilization of the fans to remove stale air from the underground working.	Operational Phase	Approximate combined surface area of all fan surface areas: 2 750 m².	• An air quality monitoring programme should be implemented to determine the quality of the air being released from the fans. This will also aid in determining the necessity for an Air Emissions Licence in terms of the National Environmental	Air quality and dust fallout monitoring will determine if the minimum thresholds as stipulated in the NEM:AQA (2004) and regulation thereunder are not exceeded. Should they be exceeded the appropriate actions will be undertaken an	Commence prior to the Commissioning and Operational Phase, for the Life of Mine

Environmental component	Activity	PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			7 Shaft Main Ventilation Fan: 700 m². 6 Shaft Veld Fan: 450 m². Kanana Ventilation Duct: 1600 m².	Management: Air Quality Act, 2004 (Act No. 39 of 2004).	Atmospheric Emissions Licence will be applied for. This is in compliance with the MPRDA (2002), the NEM:AQA (2004) and the Mine Health and Safety Act (1996).	
				• Should it be found that potentially harmful emissions are being released from the fans, operations of the fans should cease and the appropriate actions taken.		Immediate action to be conducted if necessary
	Hauling of mined ore to the Nicolor South Plant.	Operational Phase	18 km	• All loaded haul trucks are to remain covered during the transportation.	In compliance with the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) and the National Dust Control regulations thereunder.	Operational Phase
				• All machinery, vehicles and haul trucks should be inspected and serviced on a regular basis.		Throughout the Life of Mine
				• An air quality and dust fallout monitoring programme will be implemented and will be continued through the Decommissioning and Rehabilitation Phases.	Air quality and dust fallout monitoring will determine if the minimum thresholds as stipulated in the NEM:AQA (2004) and regulation thereunder are not exceeded. Should they be exceeded the appropriate actions will be undertaken an Atmospheric Emissions Licence will be applied for. This is in compliance with the MPRDA (2002), the NEM:AQA (2004) and the Mine Health and Safety Act (1996).	Commissioning and Operational Phase throughout the Life of Mine until Closure
				• Rehabilitated areas will be inspected on a regular basis for evidence of erosion and should erosion occur, the appropriate actions will be taken.	In line with Regulation 70 of the Mineral and Petroleum Resources Development Regulation, GNR587 (2004).	On-set of Rehabilitation until rehabilitation is complete
				• The declared weed and invader plant management plan will continue to be implemented during the Decommissioning and Rehabilitation Phase.	In compliance with the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	Commissioning and Operational Phase throughout the Life Mine until rehabilitation is complete
Noise	The reinstatement of operations at the CAPM Orkney Gold Mine No.7 Shaft and No.6.	Commissioning and Operational Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha	• Effective maintenance of the vehicle engines and exhaust systems.	In compliance with the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).	
				• Hearing conservation programme as per DMR guidelines on Noise Control.	In compliance with the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) and the DMR guidelines for noise control.	Commissioning and Operational Phase throughout the Life Mine until mine closure

Environmental component	Activity	PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• Zoning of high noise areas.		Commissioning and Operational Phase
				• The use of approved hearing protection devices for personnel working in close proximity of the workings.		Commissioning and Operational Phase for the Life of Mine
				• Incorporate sound attenuation measures to any equipment that could generate noise levels in excess of the statutory limits as published by the Department of Mineral and Energy.		Commissioning and Operational Phase, and as required
	The care and maintenance of the No.1 to No.5 shafts until such a time that they are prepared from operations or decommissioned and rehabilitated.	Operational and Decommissioning Phase	Shaft 5 = 40.3 ha Shaft 4 = 35.0 ha Shaft 3 = 7.5 ha Shaft 2 = 29.0 ha Shaft 1 = 7.6 ha	• From an occupational perspective the mine workers should be protected through standards and procedures and the personal exposure levels should be monitored as part of the legal requirements of Section 12 of the MHSA.		Commissioning and Operational Phase
Visual aspects	The reinstatement of operations at the CAPM Orkney Gold Mine Shaft areas.	Operational and Decommissioning Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha Shaft 5 = 40.3 ha Shaft 4 = 35.0 ha Shaft 3 = 7.5 ha Shaft 2 = 29.0 ha Shaft 1 = 7.6 ha	• Reduce the visual intrusion as far as possible.	-	Commissioning and Operational Phase
Site of archaeological and cultural importance	No.3 Shaft: The decommissioning and removal of infrastructure and the rehabilitation of the surface area of the No.3 Shaft.	Operational Phase	Shaft 3 = 7.5 ha	• The Heritage authorities should be approached to evaluate the impact and to provide the appropriate mitigation procedures to be followed.	In compliance with the National Heritage Resources Act, 1999 (Act No. 25 of 1999).	Immediate action required
	No.7 Shaft: The decommissioning and removal of infrastructure workshops at the No.7 Shaft.	Commissioning and Operational Phase	Five (5) workshops	• Proposed impact must be mitigated by application for demolition permit/s.		Prior to the decommissioning of any infrastructure protected under the NHA, 1999.
Socio-economic aspects	The commencement of operations at the No.6 and the No.7 Shafts.	Operational Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha	• As many skilled and unskilled workers, as possible, should be sourced from the local communities, towns and surrounding areas.	In compliance with the mines SLP and the DMR guideline for a SLP.	Commissioning and Operational Phase continuing as and when required.
	Mine closure.	Decommissioning and Closure Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha Shaft 5 = 40.3 ha	• Several mitigations against the effects of job loss have been provided for in the CAPM Orkney Gold		During the operational Phase to prepare employees for Closure

Environmental component	Activity		PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				Shaft 4 = 35.0 ha Shaft 3 = 7.5 ha Shaft 2 = 29.0 ha Shaft 1 = 7.6 ha Loss of 471 jobs	Mines SLP (attached to the EIA and EMPr as Annexure G), and include the following: ○ Education. ○ Training. ○ Skills development and training (potable skills, core business skills). ○ Mentorships. ○ Learnerships. ○ Bursaries (internal and external).		
	The commencement of operations at the No.6 and the No.7 Shafts and eventually the No.4 Shaft and No.1 Shaft.		Commissioning and Operational Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha Shaft 4 = 35.0 ha Shaft 2 = 29.0 ha Shaft 1 = 7.6 ha	• As many skilled and unskilled workers, as possible, should be sourced from the local communities, towns and surrounding areas.		Commissioning and Operational Phase continuing as and when required.
	Hazards to community	The commencement of operations at the No.6 and the No.7 Shafts and eventually the No.4 Shaft and No.1 Shaft.	Operational and Decommissioning Phase	Shaft 7 = 11.7 ha Shaft 6 = 1.4 ha Shaft 4 = 35.0 ha Shaft 2 = 29.0 ha Shaft 1 = 7.6 ha	• Only trained employees will operate machinery and equipment.	In compliance with the Mine Health and Safety Regulations under the Mine Health and Safety Act (1996).	Life of Mine
					• The Emergency Preparedness and Response Procedure, as well as all other related procedures will be in place prior to the commencement of any activities.		Commissioning Phase, prior to the commencement of Operational Phase activities
					• All employees will be trained on the possible hazards of the tasks to undertaken, be aware of the contents of all related Standard Operating Procedures and be trained on the appropriate action to be conducted in the event of an emergency.		Prior to the commencement of Operational Phase activities and on a regular basis for the Life of Mine
					• Firefighting equipment will be readily available on all sites.		Commissioning Phase, for the Life of Mine.
					• All hazardous substances, chemicals and hydrocarbon material shall be stored in designated facilities and access controlled in order to prevent unauthorized access.	In line with the DWS Best Practice Guideline H2 for Pollution Prevention and Minimisation of Impacts.	
					• All areas in which hazardous substances, chemical and hydrocarbon materials are stored will be inspected on regular basis.		

Environmental component	Activity	PHASE (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.)	SIZE AND SCALE OF DISTURNABCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
				• All explosives (to be stored under underground) shall be stored in designated facilities with strict access control.	In compliance with the Mine Health and Safety Regulations under the Mine Health and Safety Act (1996).	
		Commissioning, Operational and decommissioning Phase		• All shaft surface areas will have strict access control in the form of fences, gates and security and warning signs indicating the hazard of entering the site will be placed at all shafts.	This is in compliance with section 5 of the Mine Health and Safety Act (1996).	Commissioning and Operational Phase and remain for the Life of Mine
				• During the Decommissioning Phase, the shafts will be appropriately plugged and sealed.	-	
		Operational Phase		• All mine vehicles, including the haulage trucks, will be inspected and service on a regular basis to ensure roadworthiness.	In compliance with the National Road Traffic Act, 1996 (Act No. 93 of 1996) and the regulations thereunder.	Operational Phase for the Life of Mine
				• All drivers of the vehicles shall be possession of a valid driver's licence, specifically for the class of vehicle being operated.		
				• The general traffic rules and speed limits shall be obeyed when utilising public roads.		
				• All traffic rules and speed limits within the shaft areas shall be obeyed.		
		Commissioning, Operational and Decommissioning Phase		• A detailed asbestos survey shall be kept at all times.	In line with the Asbestos Regulations R155 (2002) under the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).	Life of Mine
				• A detailed asbestos handling, storage and disposal procedure shall be compiled an implemented.		Commissioning Phase
				• An appropriate monitoring programme shall be developed and implemented to ensure that the handling, storage and disposal of radio-active contaminated materials and equipment complies with the conditions of the Nuclear Licence.	In compliance with the Hazardous Substances Act, 1973 (Act No. 15 of 1973), the Nuclear Energy Act, 1999 (Act No. 46 of 1999) and the Nuclear Licence.	Commissioning Phase prior to the commencement of Operational Phase activities
				• All information shall be reflected within the quarterly NNR Report.		On-going basis for the Life of Mine

1.5 Impact Management Outcomes.

Table 67: Impact management outcomes, identifying the stand of impact management required for the identified aspects

Aspects affected	Activity	Potential impact	Phase (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure)	Mitigation type	Standards to be achieved
Geology	The underground deep level mining of gold bearing ore.	The underground deep level mining requires the blasting and removal of rock in the further sinking of the shafts as well as for the extraction of narrow generally flat dipping gold reefs. This, including the removal of the ore to the surface for processing at the Nicolor South Plant will lead to the permanent destruction of the localised geological strata.	Operational Phase	Control measures will be implemented to prevent the unnecessary destruction of geological strata.	Avoid the further destruction of the geological strata.
Soil	Commencement mining activities at within the various shaft areas.	Although the majority of the shaft areas are lined with cement, there are areas within and adjacent to the shaft boundary which comprise of natural vegetation and secondary grasslands. The soil within these areas may therefore be negatively impacted upon should any mining related activities be conducted on these areas.	Operational and Decommissioning Phase	Control measures will be implemented to prevent activities from being undertaken within these areas.	Avoid impacts on the soil, associated with and adjacent to, the shaft areas.
	Hydrocarbon, chemical and waste materials spillages	Hydrocarbon and chemical spills may pollute soils within the area either through direct contact or indirectly through the contamination of surface water runoff. Similarly unsorted and improper storage of general waste, building rubble or equipment contaminated with radioactive material may contaminate soil either through direct contact or indirectly through the contamination of surface water runoff.	Operational, Decommissioning and Closure Phase	Storm water control measures will be upgraded or implemented and remediation measures will be implemented to contain any spills	Avoid impacts on soil and should they occur, remediate the spill and resultant impact.
	Decommissioning of the shafts and related infrastructure and rehabilitation of the disturbed footprint areas.	The decommissioning of the shafts and removal of infrastructure will result in the exposure of soil to the elements, resulting in erosion of the soil. This will not only impact on the fertility of the soil but may have an impact on the surface water quality, fauna and flora and sensitive landscapes.	Decommissioning and Closure Phase	Control measures will be implemented to prevent / stop soil erosion.	The impact will be avoided and stopped should it occur.
Land use and land capability	Decommissioning and rehabilitation of all shaft areas and closure of the mine.	It is important to note that the CAPM Orkney Gold Mine is an existing gold mine and has previously been operational. Therefore it is not anticipated that the re-commencement of the mining activities will have a further impact on the land use and land capability. However, during decommissioning and closure, all unnecessary infrastructure will be demolished and the surface area rehabilitated to the agreed upon end land use. Therefore a positive impact may be experienced as the land use may change from mining to agriculture or wilderness.	Decommissioning and Closure Phase	Remediation measures will be implemented to return the land to an agreed upon end land use.	Land use to be returned to, depending on final agreements with the DMR and municipalities, agricultural or wilderness.
Flora	Operational activities and care and maintenance activities to be conducted at the No.6 and No.7 Shafts and the No.1 to No.5 Shafts, respectively.	*Boophone disticha* is a plant species with a conservation status of "Declining". The habitat of this plant species is dry grasslands and rocky areas and is widespread in South Africa and extends up the eastern half of southern Africa to Uganda. This plant species was identified within the untransformed grassland areas adjacent to the No.7 Shaft. It was also identified that *Pearsonia bracteata* and *Drimia sanguinea* could also	Operational and Decommissioning Phase	Control measures will be implemented to prevent the disturbance and destruction of the natural vegetation and species of conservation concern.	Impacts on the surrounding vegetation will be avoided.

Aspects affected	Activity	Potential impact	Phase (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure)	Mitigation type	Standards to be achieved
		occur in this area owing to the presence of the suitable habitat. No mining activities will be conducted outside of the underground Mining Right area or the Surface Rights area of the shaft, therefore it is not anticipated that the proposed mining activity at the No.7 Shaft will impact on these species. However in the even that any activities are conducted outside of the shaft boundary area, these species may be impacted upon. Dust, generated from the loading and hauling of the ore, may also settle on the vegetation in this area and may impact on the growth and photosynthesis and transpiration processes of the vegetation. Only three species protected under Schedule 11 of the Transvaal Nature Conservation Act (No.12 of 1983), namely *Babiana hypogea*, *Gladiolus permeabilis* and *Crinum graminicola* were recorded from untransformed grassland (corresponding to shaft footprints No.4 and No.5) on the study area.			
		The decommissioning of the shafts and removal of infrastructure will result in the exposure of soil to the elements, resulting in erosion of the soil. This will not only impact on the fertility of the soil but may have an impact on the surface water quality, fauna and flora and sensitive landscapes.	Decommissioning and Closure Phase	Control measures will be implemented to prevent / stop soil erosion.	Impacts will be avoided through the prevention and remediation of soil erosion.
		A number of weeds and invader plant species were identified within the study area. These weeds and invader plant species established on disturbed areas have a tendency to dominate or replace the canopy herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems.	Operational, Decommissioning and Closure Phase	Control measure will be implemented to prevent the establishment and spread of weeds and invader species.	Impacts will be avoided through the establishment of management programmes.
Fauna	Operational activities and care and maintenance activities to be conducted at the No.6 and No.7 Shafts and the No.1 to No.5 Shafts, respectively.	The study area provides potential habitat for 10 mammal taxa of conservation concern, of which, the following species may occur: • Brown Hyaena. • Honey Badger. • South African Hedgehog. • Shrews. • Black-footed cat. Due to the increased human presence in the area and observation within the study area, both the Brown Hyaena and the Black-footed Cat are said to be irregular in occurrence within the study area. The Honey badger as well as the south African hedgehog are however expected to occur within the study area due to their tolerance to modified habitat types.	Operation, Decommissioning and Closure Phase	Control measure will be implemented to prevent the destruction of the natural habitats.	The impacts will be avoided.

Aspects affected	Activity		Potential impact	Phase (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure)	Mitigation type	Standards to be achieved
			The bird species of conservation concern are likely to occur within the study area and include: • The Melardious Lark (Mirafra cheniana). • The near threatened Abdim's stork (Ciconia abdimii). • The vulnerable Lanner Falcon (Falco biarmicus). The Abdims Stork and the Lanner Falcon were not recorded during the site survey but are classified as likely to occur within the study area. The Melardious Lark was however recorded within the study area during the site survey. 23 other species are sympatric to the study area however they are either irregular visitors to the area or unlikely to be present due to the absence of suitable habitats.			
			Animals within the study area and adjacent to the mine may be hunted and poached, by employees, for food.			
			Animal injury and / or death may result from animal life accessing the mine shaft areas as well as by collisions with vehicles and machinery on and off site.	Operational and Decommissioning Phase	Control measure will be implemented to prevent unauthorised access to the site and to prevent animals from entering the site.	The impacts on animal life will be avoided.
			Noise generated from mining activities may scare animal life in the vicinity and lead to migration away from the area and possibly even injury and death.	Operational and Decommissioning Phase	Control measure will be implemented to prevent the generation of noise and remediation measure will be implemented in the event that undesired noise is generated.	Noise levels will be managed and reduced as far as possible.
Surface water	No.1 Shaft	Operation of winder cooling ponds.	The winder cooling ponds are concrete ponds situated next to one of the winder houses and in close proximity of the clean runoff channels. These ponds contain process water used for cooling purposes. Surface water quality: Overflow of winder cooling ponds may lead to affected water discharge into the clean surface runoff channels situated next to the cooling ponds and may result in deterioration in quality of surface water runoff from the No.1 Shaft area.	Operational Phase	Storm water management measure will be implemented / upgraded to prevent the discharge of contaminated surface water.	Impact will be avoided through the implementation of appropriate storm water management measures.
		Storage and handling of hydrocarbon containers.	Surface water contamination may take place as a result of leaking hydrocarbon containers stored outside of designated areas.	Operational and Decommissioning Phase	Control and remediation measures will be implemented to prevent the contamination of surface water runoff.	Spillages will be avoided and remediation activities implemented where spillages have occurred.

Aspects affected	Activity		Potential impact	Phase (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure)	Mitigation type	Standards to be achieved
		Containment of affected water.	Overflow from the containment sump underneath the conveyor system may lead to deterioration of clean surface water quality in the immediate vicinity of the No.1 Shaft area.	Operational Phase	Storm water management measure will be implemented / upgraded to prevent the discharge of contaminated water.	Impacts will be avoided through the implementation of appropriate storm water management infrastructure.
	No.2 Shaft	Uncontrolled surface water runoff.	There are no current diversion measures to prevent surface runoff from flowing into No.2 Shaft. Runoff retention also takes place inside previously constructed containment facilities.	Operational and Decommissioning Phase	Storm water management measure will be implemented.	Impacts will be avoided through the implementation of appropriate storm water management infrastructure.
	No.3 Shaft	Rehabilitation of the No.3 Shaft area.	Closure phase: Incorrect rehabilitation techniques may result in exposed areas and areas that will prevent drainage of storm water runoff towards the downstream environment.	Decommissioning and Closure Phase	Control measures and rehabilitation monitoring programmes will be implemented to ensure that rehabilitation is conducted in the appropriate manner.	Appropriate rehabilitation strategies to be implemented. Storm water management infrastructure will remain until all dirty water management areas are rehabilitated.
	No.4 Shaft	Uncontrolled surface water runoff	There are no current diversion measures to prevent surface runoff from flowing into No.4 Shaft. Runoff retention also takes place inside previously constructed containment facilities within the shaft operations area.	Operational and Decommissioning Phase	Storm water management measure will be implemented.	Impacts will be avoided through the implementation of appropriate storm water management infrastructure.
	No.5 Shaft	Sewage management	A sewage sump is located next to a clean storm water diversion channel downstream of the No.5 Shaft hostel area. Mine personnel has indicated that there were previous incidents in which the sump's capacity was reached and sewage entered the clean storm water conveyance channel.	Operational and Decommissioning Phase	Storm water management measures will be implemented to contain spillages from the sump and divert clean surface water runoff away from the area.	The impacts will be avoided through the implementation of monitoring programmes (monitoring of capacity of the sump) and the implementation and upgrading of the Storm water management infrastructure.
	No.6 Shaft	Uncontrolled storm water runoff	There are no current diversion measures to prevent surface runoff from flowing into No.6 Shaft.	Operational Phase	Storm water management measures will be implemented.	Impacts will be avoided through the implementation of appropriate storm water management infrastructure.
		Wash bay operation	The wash bay will be used as a designated area to clean equipment and currently not fitted with an oil separator. This facility is not connected to a dirty water system and therefore wash water is pumped out and discharged into the adjacent veldt during operations. Surface water quality: Should any wash water be discharged from the wash bay in its current status, discharge of hydrocarbon contaminated water will take place in the surrounding clean water environment.	Operational and Decommissioning Phase	Storm water management measures and control measures will be implemented to prevent the discharge of contaminated surface water runoff.	Impacts will be avoided through the implementation of appropriate storm water management infrastructure.
	No.7 Shaft	Chemical and hydrocarbon management	The main storm water channel is located next to a hydrocarbon and chemical storage area. Any chemical and hydrocarbon containers as well as equipment (operated using grease) stored outside of a designated area creates a risk of surface water pollution. Contaminated	Operational and Decommissioning Phase	Control and storm water management measures will be implemented to prevent the contamination of clean surface water runoff	Impacts will be avoided through the implementation of appropriate storm water management infrastructure.

Aspects affected	Activity		Potential impact	Phase (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure)	Mitigation type	Standards to be achieved
			runoff as a result of poor housekeeping practises will enter the clean storm water diversion trench towards the adjacent veldt area. Surface water quality: The quality of surface runoff generated within the No.7 Shaft area may be deteriorated as a result of contact with hydrocarbons such as oil and grease.			
		Wash bay operation	The wash bay will be used as a designated area to clean radio-active contaminated equipment. This facility is connected to a dirty water system and wash water is pumped to the adjacent plant and used as part of the process water system. Should an incident occur, radio-active wash water may be discharged towards the clean storm water channel. Surface water quality: Discharge of contaminated water from the wash bay at No.7 Shaft may lead to a significant deterioration of surface water quality towards the downstream clean water environment.	Operational and Decommissioning Phase	Control and storm water management measures will be implemented	Impacts will be avoided through the implementation of appropriate storm water management infrastructure.
		Sump operation underneath conveyor	A sump has been constructed underneath the conveyor system next to No.7 Shaft. The purpose of this sump is to contain any seepage from the damp ore material hoisted from underground. This sump is fitted with pumping infrastructure towards the adjacent plant as part of the process water system. There is a risk that overflow into the main storm water channel might occur as a result of pump failure. Surface water quality: Discharge of contaminated water from the sump may result in deterioration of clean surface water runoff towards the adjacent clean water environment.	Operational Phase	Storm water management measures will be implemented / upgraded to prevent the discharge of contaminated water.	Impacts will be avoided through the implementation of appropriate storm water management infrastructure.
Groundwater	Dewatering of the shafts for the safe continuation of mining.		During the operational phase groundwater will be dewatered to the bottom of the Vaal Contact Reef which will result in dewatering of the surrounding aquifer. However, the transient modelling exercise showed that the cone of depression is limited in extent with no boreholes included within its influence zone.	Operational Phase	Control measure will be implemented.	Impacts will be avoided through the supply of water to those affected, should it be required.
	The underground deep level mining of gold bearing ore, including the associated activities conducted on the surface.		The impacts on groundwater quality are primarily related to the management of materials, wastes and spills from drilling operations and unauthorised disposal of contaminated substances. Contamination of groundwater may also arise due to incorrect handling and disposal of waste materials, the physical drilling process (sludge contains oils and greases) and oil leaks from drill rigs. This risk is considered low.	Operational and Decommissioning Phase	Control measures will be implemented to prevent the contamination of groundwater resources.	The impacts will be avoided and where spillages have occurred, will be remediate as a soon as possible.

Aspects affected	Activity	Potential impact	Phase (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure)	Mitigation type	Standards to be achieved
		Groundwater quality impacts may also arise from seepage from the recycle dam underground, although this is considered a low impact since the dam will be lined. The general risk towards groundwater quality deterioration is considered low.			
	Decommissioning and closure of the underground workings, shafts and associated infrastructure and well as the shaft surface area.	During the closure phases when all pumping within the region has ceased, the water in the shaft/s may rise towards the Environmentally Critical Level (ECL) where, if contaminated and affected by AMD reactions, may pollute aquifers or surface drainages. The rate at which, and up to which point the water will rise is highly complex and unknown given the multitude of parameters and dewatering schemes within the KOSH area. However previous studies in the KOSH area indicate a likely probability of decant and rise to pre-mining conditions and the ECL. However, at the CAPM 7 Shaft the groundwater table is not expected to return to pre - mining conditions. The reason being that decant will occur at 40 Level, creating a permanent dewatering cone towards 4 Shaft. The quality of the decant water is expected to be contaminated but will improve over time as existing areas of exposed sulphide mineralisation are flooded or oxidised.	Decommissioning and Closure Phase	Control measure will be implemented.	Impacts will be avoided through the implementation of control measures.
Sensitive landscapes	Mining and mining related activities conducted within the shaft areas.	An assessment was conducted against the NFEPA classified wetlands and the proximity of these wetlands to the CAPM Orkney Gold Mine shaft areas. As described in Chapter H of Section 7.4.1 (Part A – Environmental Impact Assessment) of the EIA and EMPr, three (3) NFEPA classified wetland areas have been identified to be in close proximity to the No.2 Shaft (unchannelled valley bottom wetland), the No.3 Shaft (channelled Valley Bottom Wetland) and the No.4 Shaft (flat wetland area). The operational activities to be conducted within the vicinity of shaft areas may impact on these wetland areas in terms of surface water quality, fauna, flora and soil aspects (refer also to Part 4.2, Part 4.5, Part 4.6 and Part 4.7). It is however important to note that these shafts are not currently operational as the No.7 and No.6 Shaft will be the first shafts to commence with operations and operations at the No.3 Shaft will not commence as the No.3 Shaft area is in the process of being rehabilitated.	Operational and Decommissioning Phase	Control and storm water management measures will be implemented.	The impacts will be avoided through the implementation of appropriate storm water management measures.
Air quality	The operation and utilization of the fans to remove stale air from the underground working.	The operation and utilisation of the Kanana Ventilation Duct, 6 Shaft Veld Fan and the 7 Shaft Main Ventilation Fan may result in the release of potentially harmful pollutants and emissions into the air, from the	Operational Phase	A monitoring programme will be implemented.	Impact will be identified through the monitoring of the air quality and dust and therefore avoiding potential

Aspects affected	Activity	Potential impact	Phase (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure)	Mitigation type	Standards to be achieved
		underground workings. This may potentially affect the health of the residents in the area.			impacts through the implementation of appropriate actions.
	Hauling of mined ore to the Nicolor South Plant.	As described above, the ore mined at the CAPM Orkney Gold Mine will be transported, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road network. The transportation of the ore may therefore result in the generation of dust that may have an impact on the local air quality.	Operational Phase	A monitoring programme and control measures will be implemented.	
		As described above, the ore mined at the CAPM Orkney Gold Mine will be transported, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road network. Emissions from the haulage trucks may have a minor impact on the localised air quality.	Operational Phase	Control measure will be implemented.	
Noise	The reinstatement of operations at the CAPM Orkney Gold Mine No.7 Shaft and No.6.	Currently the shafts are not producing and the noise levels are from normal background noise and activities originating from human interaction and vehicle. In the not too distant future these shafts will be re-opened and the prepared for production. This will include activities such as pumping of water and replacing structures that are worn and damaged. Through this process there will be a great deal of workshop and Commissioning activities and vehicle movement while the shafts and underground workings are prepared. Once operational again the main noise sources will be from the main surface fans and the normal shaft noises.	Implementation and Operational Phase	Control measure will be implemented.	Noise levels will monitored and control measure implemented to reduce the noise generation as far as possible.
	The care and maintenance of the No.1 to No.5 shafts until such a time that they are prepared from operations or decommissioned and rehabilitated.	These shaft will not be re-opened again for production. Normal care and maintenance will be carried on these shafts. Should there be any additional activities carried out, such as the breaking down of shaft structures and buildings, the noise levels should be monitored and the necessary control measures be introduced to minimise the impact on the community. Should operations commence at these shafts, the impacts as described above will apply.	Operational and Decommissioning Phase	Control measures will be implemented.	Noise levels will monitored and control measure implemented to reduce the noise generation as far as possible.
Visual aspects	The reinstatement of operations at the CAPM Orkney Gold Mine Shaft areas.	Although the CAPM Orkney Gold Mine is an existing mine and the community and regular visitors of the area are likely to be desensitised to the mining related infrastructure, the mine has been under care and maintenance since the year 2010. Therefore, once operations at the shafts commence, the increased traffic and presence of employees as well as the increased generation of dust and emissions clouds from the machinery and vehicles may cause a visual disturbance. There are several sensitive receptors in both the foreground and middle ground that include residential areas and the town of Orkney.	Operational and Decommissioning Phase	Control measures will be implemented.	Visual Impacts will be avoided through the control of the generation of dust and emissions.

Aspects affected	Activity		Potential impact	Phase (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure)	Mitigation type	Standards to be achieved
Site of archaeological and cultural importance	No.3 Shaft	The decommissioning and removal of infrastructure and the rehabilitation of the surface area of the No.3 Shaft.	This site with traditional riveted steel headgear is dated to the end of the 1930's. CAPM Orkney Gold Mine removed all infrastructure (including the headgear) at the No.3 Shaft, without being in possession of a demolition permit. This site was demolished between the period of 2011 and 2015. The site is protected by section 34 (1) of Act 25 of 1999, and is rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or destructed without a demolition permit issued by the relevant heritage authorities.	Operational Phase	Mitigation measures will be implemented and the correct procedure will be requested and followed.	The impact will be controlled through the following of the appropriate action as obtained of the Heritage Resource Authority.
	No.7 Shaft	The decommissioning and removal of infrastructure workshops at the No.7 Shaft.	This site with traditional riveted steel headgear is dated to the mid 1930's. It is possibly the most representative of the early period of mining in the region. Even so it reflects alterations and updating over time. Most of the site is still intact. The mining objectives of CAPM Gold states that the site will mainly be retained as-is. It will be maintained in its present format allowing for and according to modern mining safety regulations. It is the wish of CAPM Gold to demolish five historic buildings on the eastern perimeter of the site as these are superfluous to the proposed mining perspectives. It includes four steel framed and corrugated iron clad workshops and one brick walled, workshop with wooden trusses and corrugated iron roof. All five buildings are protected by section 34(1) of the National Heritage Act, Act 25 of 1999. These are all rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or demolished without a demolition permit issued by the relevant heritage authorities.	Implementation and Operational Phase	Mitigation measures will be implemented by following the correct procedure and obtaining appropriate authorisations.	The impact will be avoided by obtaining the relevant permits.
Socio-economic aspects	The commencement of operations at the No.6 and the No.7 Shafts.		As described in the SLP (attached to the EIA and EMPr as Annexure G), upon commencement of operations at the No.7 and the No.6 Shaft the CAPM Orkney Gold Mine will employ 471 individuals (total in fourth year of production) of which a minimum of 95% (with the exception of specialists) will be sourced from the local communities. This is a positive impact in terms of socio-economic aspects as not only will 471 individuals be employed but the community will also benefit indirectly through the increased spending on goods and services, the use of local sub-contractors, as well as leading to a decrease in unemployment of the area.	Operational Phase	Enhancement measures will be implemented.	The positive impact will be enhanced.
	Mine closure.		At the end of the Operational Phase of the Orkney Gold Mine, mining operations will cease and the mine will prepare for decommissioning and closure. Rehabilitation activities will commence, depending on the agreed upon end land, and infrastructure will be removed. During this	Decommissioning and Closure Phase	Control measures will be implemented.	The impact will be controlled through the implementation of the activities as stipulated in the SLP.

Aspects affected	Activity		Potential impact	Phase (Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure)	Mitigation type	Standards to be achieved
			phase a loss of jobs will occur as the amount of employees required during the Operational Phase will no longer be required.			
	The commencement of operations at the No.6 and the No.7 Shafts and eventually the No.4 Shaft and No.1 Shaft.		The commencement of operations at the CAPM Orkney Gold Mine may lead to an influx of job seekers to the area. As stipulated in the SLP of the mine, the mine will employ 471 individuals (total in the fourth year of production), of which a minimum of 95% (with the exception of specialists) will be sourced from the local community. The influx of job seekers to the area may result in several social impacts due to the limited job supply and includes: • An increase in theft / crime. • An increase in informal settlements. • Potential spread of HIV / AIDS.	Commissioning and Operational Phase	Control measures will be implemented.	
	Hazards to community	The commencement of operations at the No.6 and the No.7 Shafts and eventually the No.4 Shaft and No.1 Shaft.	Due to the close proximity of the shaft areas to residential areas (Orkney, Kanana, Stilfontein, Vaal Reefs), the storage of hazardous materials and chemicals, gas cylinders and welding and cutting equipment poses a hazard to the safety of the community.	Operational and Decommissioning Phase	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Impact will be avoided through the implementation of control measures.
			The shaft areas pose a hazard to the community and fauna in the area as all operational shafts will be open until such a time that decommissioning commences and the shafts are sealed.	Commissioning, Operational and decommissioning Phase	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Impact will be avoided through the implementation of control measures.
			All ore mined at the CAPM Orkney Gold, as described above, will be transported approximately 18 km to the Nicolor South Plant for processing and treatment. There CAPM Orkney Gold Mine proposes to utilise haulage trucks for transportation purposes. This poses a hazard to the community and local residents as the number of mine vehicles will increase on the roads which are used by the local community and residents.	Operational Phase	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Impact will be avoided through the implementation of control measures.
			The generation of waste on the mine, including asbestos and potential radiation contaminated equipment may result in health hazard to the local community.	Commissioning, Operational and Decommissioning Phase	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Impact will be avoided through the implementation of control measures.

1.6 Impact Management Actions

Table 68: Impact management actions, identifying the manner in which the impact management objectives and outcomes will be achieved.

Activity	Potential Impact	Mitigation type	Time period for implementation	Compliance with standards
The underground deep level mining of gold bearing ore.	The underground deep level mining requires the blasting and removal of rock in the further sinking of the shafts as well as for the extraction of narrow generally flat dipping gold reefs. This, including the removal of the ore to the surface for processing at the Nicolor South Plant will lead to the permanent destruction of the localised geological strata.	Control measures will be implemented to prevent the unnecessary destruction of geological strata.	Commissioning and Operational Phase throughout the Life of Mine.	In compliance with the Mining Right issued in terms of the MPRDA (2002) and the Environmental management Programme.
Commencement mining activities at within the various shaft areas.	Although the majority of the shaft areas are lined with cement, there are areas within and adjacent to the shaft boundary which comprise of natural vegetation and secondary grasslands. The soil within these areas may therefore be negatively impacted upon should any mining related activities be conducted on these areas.	Control measures will be implemented to prevent activities from being undertaken within these areas.	Commissioning and Operational Phase	The prevention of the release of contaminated surface water is in line with the objectives of the DWS Best Practices Guideline H2: Pollution Prevention and Minimization of Impacts The demarcation will allow for these areas to remain undisturbed thereby keeping the dirty water management areas as small as possible. This is in line with the DWS Best Practice Guideline G1: Storm Water Management. In compliance with the Nation Environmental Management Waste Act, 2008 (Act No. 59 of 2008) and the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GNR.331 of 2014), thereunder.
Hydrocarbon, chemical and waste materials spillages	Hydrocarbon and chemical spills may pollute soils within the area either through direct contact or indirectly through the contamination of surface water runoff. Similarly unsorted and improper storage of general waste, building rubble or equipment contaminated with radioactive material may contaminate soil either through direct contact or indirectly through the contamination of surface water runoff.	Storm water control measures will be upgraded or implemented and remediation measures will be implemented to contain any spills	Prior to the commencement of Operational Phase and activities with remediation activities being conducted as and when required.	The prevention of the release of contaminated surface water is in line with the objectives of the DWS Best Practices Guideline H2: Pollution Prevention and Minimization of Impacts The demarcation will allow for these areas to remain undisturbed thereby keeping the dirty water management areas as small as possible. This is in line with the DWS Best Practice Guideline G1: Storm Water Management. In compliance with the Nation Environmental Management Waste Act, 2008 (Act No. 59 of 2008) and the National Norms and Standards for the Remediation of Contaminated Land and

Activity	Potential Impact	Mitigation type	Time period for implementation	Compliance with standards
				Soil Quality (GNR.331 of 2014), thereunder.
				In compliance with the Mine Health and Safety Act, 1996 (Act No. 29 of 1996).
				In compliance with the DWS Best Practice Guideline H2 Pollution Prevention and minimisation.
Decommissioning of the shafts and related infrastructure and rehabilitation of the disturbed footprint areas.	The decommissioning of the shafts and removal of infrastructure will result in the exposure of soil to the elements, resulting in erosion of the soil. This will not only impact on the fertility of the soil but may have an impact on the surface water quality, fauna and flora and sensitive landscapes.	Control measures will be implemented to prevent / stop soil erosion.	Decommissioning Phase through the Rehabilitation Phase until Closure has been obtained	In line with Regulation 70 of the Mineral and Petroleum Resources Development Regulation, GNR587 (2004).
				The continued implementation of the declared weed and alien invader management plan is in compliance with the NEM:BA (2004) and the regulations thereunder.
Decommissioning and rehabilitation of all shaft areas and closure of the mine.	It is important to note that the CAPM Orkney Gold Mine is an existing gold mine and has previously been operational. Therefore it is not anticipated that the re-commencement of the mining activities will have a further impact on the land use and land capability. However, during decommissioning and closure, all unnecessary infrastructure will be demolished and the surface area rehabilitated to the agreed upon end land use. Therefore a positive impact may be experienced as the land use may change from mining to agriculture or wilderness.	Remediation measures will be implemented to return the land to an agreed upon end land use.	Decommissioning Phase through the Rehabilitation Phase until Closure has been obtained	By rehabilitation as much of the disturbed area as possible, the dirty water management area is reduced. This is in line with the DWS Best Practice Guidelines for the isolation of clean and dirty water management areas, and reducing the size of the dirty water management areas.
Operational activities and care and maintenance activities to be conducted at the No.6 and No.7 Shafts and the No.1 to No.5 Shafts, respectively.	*Boophone disticha* is a plant species with a conservation status of "Declining". The habitat of this plant species is dry grasslands and rocky areas and is widespread in South Africa and extends up the eastern half of southern Africa to Uganda. This plant species was identified within the untransformed grassland areas adjacent to the No.7 Shaft. It was also identified that *Pearsonia bracteata* and *Drimia sanguinea* could also occur in this area owing to the presence of the suitable habitat. No mining activities will be conducted outside of the underground Mining Right area or the Surface Rights area of the shaft, therefore it is not anticipated that the proposed mining activity at the No.7 Shaft will impact on these species. However in the even that any activities are conducted outside of the	Control measures will be implemented to prevent the disturbance and destruction of the natural vegetation and species of conservation concern.	Commissioning Phase, prior to the commencement of Operational activities.	In compliance with section 5 of the Mine Health and Safety Act (1996).

Activity	Potential Impact	Mitigation type	Time period for implementation	Compliance with standards
	shaft boundary area, these species may be impacted upon. Dust, generated from the loading and hauling of the ore, may also settle on the vegetation in this area and may impact on the growth and photosynthesis and transpiration processes of the vegetation. Only three species protected under Schedule 11 of the Transvaal Nature Conservation Act (No.12 of 1983), namely *Babiana hypogea*, *Gladiolus permeabilis* and *Crinum graminicola* were recorded from untransformed grassland (corresponding to shaft footprints No.4 and No.5) on the study area.			Air quality and dust fallout monitoring will determine if the minimum thresholds as stipulated in the NEM:AQA (2004) and regulation thereunder are not exceeded. Should they be exceeded the appropriate actions will be undertaken an Atmospheric Emissions Licence will be applied for. This is in compliance with the MPRDA (2002), the NEM:AQA (2004) and the Mine Health and Safety Act (1996). In Compliance with the Mining Right.
	The decommissioning of the shafts and removal of infrastructure will result in the exposure of soil to the elements, resulting in erosion of the soil. This will not only impact on the fertility of the soil but may have an impact on the surface water quality, fauna and flora and sensitive landscapes.	Control measures will be implemented to prevent / stop soil erosion.	Decommissioning Phase through the Rehabilitation Phase until Closure has been obtained	Keeping the dirty water management areas as small as possible is in line with the DWS Best Practice Guideline G1: Storm Water Management.
	A number of weeds and invader plant species were identified within the study area. These weeds and invader plant species established on disturbed areas have a tendency to dominate or replace the canopy herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems.	Control measure will be implemented to prevent the establishment and spread of weeds and invader species.	Commencement prior to the Operational Phase, throughout the Life of until Closure is obtained.	The implementation of these mitigation measures are in compliance with the NEM:BA (2004) and the regulations thereunder.
Operational activities and care and maintenance activities to be conducted at the No.6 and No.7 Shafts and the No.1 to No.5 Shafts, respectively.	The study area provides potential habitat for 10 mammal taxa of conservation concern, of which, the following species may occur: • Brown Hyaena. • Honey Badger. • South African Hedgehog. • Shrews. • Black-footed cat. Due to the increased human presence in the area and observation within the study area, both the Brown Hyaena and the Black-footed Cat are said to be irregular in occurrence within the study area. The Honey badger as well as the south African hedgehog are however expected to occur within the study area due to their tolerance to modified habitat types.	Control measure will be implemented to prevent the destruction of the natural habitats.	Prior to the commencement of Operational Activities, for the Life of Mine.	The development and implementation of an Environmental Awareness Plan and the training of employees regarding the importance of the environment and potential impacts to the environment is in compliance with Regulation 51 of the MPRDA (2002). This is in compliance with the NEM:BA (2004) and the regulations thereunder.

Activity		Potential Impact	Mitigation type	Time period for implementation	Compliance with standards
		The bird species of conservation concern are likely to occur within the study area and include: • The Melardious Lark (Mirafra cheniana). • The near threatened Abdim's stork (Ciconia abdimii). • The vulnerable Lanner Falcon (Falco biarmicus). The Abdims Stork and the Lanner Falcon were not recorded during the site survey but are classified as likely to occur within the study area. The Melardious Lark was however recorded within the study area during the site survey. 23 other species are sympatric to the study area however they are either irregular visitors to the area or unlikely to be present due to the absence of suitable habitats.			This is in compliance with section 5 of the Mine Health and Safety Act (1996).
		Animals within the study area and adjacent to the mine may be hunted and poached, by employees, for food.			In compliance with the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) and the DMR guidelines for noise control.
		Animal injury and / or death may result from animal life accessing the mine shaft areas as well as by collisions with vehicles and machinery on and off site.	Control measure will be implemented to prevent unauthorised access to the site and to prevent animals from entering the site.		This is in compliance with the NEM:BA (2004) and the regulations thereunder.
		Noise generated from mining activities may scare animal life in the vicinity and lead to migration away from the area and possibly even injury and death.	Control measure will be implemented to prevent the generation of noise and remediation measure will be implemented in the event that undesired noise is generated.	Operational Phase, for the Life of Mine	In compliance with the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) and the DMR guidelines for noise control.
No.1 Shaft	Operation of winder cooling ponds.	The winder cooling ponds are concrete ponds situated next to one of the winder houses and in close proximity of the clean runoff channels. These ponds contain process water used for cooling purposes. Surface water quality: Overflow of winder cooling ponds may lead to affected water discharge into the clean surface runoff channels situated next to the cooling ponds and may result in deterioration in quality of surface water runoff from the No.1 Shaft area.	Storm water management measure will be implemented / upgraded to prevent the discharge of contaminated surface water.	Commissioning Phase.	This is line with the DWS Best Practice Guidelines, to prevent and minimise impacts and to ensure the separation of clean and dirty water management areas.
	Storage and handling of hydrocarbon containers.	Surface water contamination may take place as a result of leaking hydrocarbon containers stored outside of designated areas.	Control and remediation measures will be implemented to prevent the contamination of surface water runoff.	Life of Mine	
	Containment of affected water.	Overflow from the containment sump underneath the conveyor system may lead to deterioration of clean surface water quality in the immediate vicinity of the No.1 Shaft area.	Storm water management measure will be implemented / upgraded to prevent the discharge of contaminated water.	Commissioning Phase	
No.2 Shaft	Uncontrolled surface water runoff.	There are no current diversion measures to prevent surface runoff from flowing into No.2 Shaft. Runoff retention also takes place inside previously constructed containment facilities.	Storm water management measure will be implemented.	Commissioning Phase	

Activity		Potential Impact	Mitigation type	Time period for implementation	Compliance with standards
No.3 Shaft	Rehabilitation of the No.3 Shaft area.	Closure phase: Incorrect rehabilitation techniques may result in exposed areas and areas that will prevent drainage of storm water runoff towards the downstream environment.	Control measures and rehabilitation monitoring programmes will be implemented to ensure that rehabilitation is conducted in the appropriate manner.	Commissioning Phase	
No.4 Shaft	Uncontrolled surface water runoff	There are no current diversion measures to prevent surface runoff from flowing into No.4 Shaft. Runoff retention also takes place inside previously constructed containment facilities within the shaft operations area.	Storm water management measure will be implemented.	Commissioning Phase	
No.5 Shaft	Sewage management	A sewage sump is located next to a clean storm water diversion channel downstream of the No.5 Shaft hostel area. Mine personnel has indicated that there were previous incidents in which the sump's capacity was reached and sewage entered the clean storm water conveyance channel.	Storm water management measures will be implemented to contain spillages from the sump and divert clean surface water runoff away from the area.	Commissioning Phase	
No.6 Shaft	Uncontrolled storm water runoff	There are no current diversion measures to prevent surface runoff from flowing into No.6 Shaft.	Storm water management measures will be implemented.	Commissioning Phase	
	Wash bay operation	The wash bay will be used as a designated area to clean equipment and currently not fitted with an oil separator. This facility is not connected to a dirty water system and therefore wash water is pumped out and discharged into the adjacent veldt during operations. Surface water quality: Should any wash water be discharged from the wash bay in its current status, discharge of hydrocarbon contaminated water will take place in the surrounding clean water environment.	Storm water management measures and control measures will be implemented to prevent the discharge of contaminated surface water runoff.	Commissioning Phase	
No.7 Shaft	Chemical and hydrocarbon management	The main storm water channel is located next to a hydrocarbon and chemical storage area. Any chemical and hydrocarbon containers as well as equipment (operated using grease) stored outside of a designated area creates a risk of surface water pollution. Contaminated runoff as a result of poor housekeeping practises will enter the clean storm water diversion trench towards the adjacent veldt area. Surface water quality: The quality of surface runoff generated within the No.7 Shaft area may be deteriorated as a result of contact with hydrocarbons such as oil and grease.	Control and storm water management measures will be implemented to prevent the contamination of clean surface water runoff	Commissioning Phase	
	Wash bay operation	The wash bay will be used as a designated area to clean radio-active contaminated equipment. This facility is connected to a dirty water system and wash water is pumped to the adjacent plant and used as part of the process water system. Should an incident occur, radio-active wash water may be discharged towards the clean storm water channel. Surface water quality: Discharge of contaminated water from the wash bay at No.7 Shaft may lead to a significant deterioration of surface water quality towards the downstream clean water environment.	Control and storm water management measures will be implemented	Commissioning Phase	
	Sump operation underneath conveyor	A sump has been constructed underneath the conveyor system next to No.7 Shaft. The purpose of this sump is to contain any seepage from the damp ore material hoisted from underground. This sump is fitted with pumping infrastructure towards the adjacent plant	Storm water management measures will be implemented / upgraded to prevent the discharge of contaminated water.	Commissioning Phase	

Activity		Potential Impact	Mitigation type	Time period for implementation	Compliance with standards
		as part of the process water system. There is a risk that overflow into the main storm water channel might occur as a result of pump failure. Surface water quality: Discharge of contaminated water from the sump may result in deterioration of clean surface water runoff towards the adjacent clean water environment.			
Dewatering of the shafts for the safe continuation of mining.		During the operational phase groundwater will be dewatered to the bottom of the Vaal Contact Reef which will result in dewatering of the surrounding aquifer. However, the transient modelling exercise showed that the cone of depression is limited in extent with no boreholes included within its influence zone.	Control measure will be implemented.	Operational Phase	This is in compliance with GN.704 under the NWA (1998) as well as the DWS Best practice Guideline G1: Storm Water Management. In line with the DWS Best Practice Guideline A6: Water Management for Underground Mines.
The underground deep level mining of gold bearing ore, including the associated activities conducted on the surface.		The impacts on groundwater quality are primarily related to the management of materials, wastes and spills from drilling operations and unauthorised disposal of contaminated substances. Contamination of groundwater may also arise due to incorrect handling and disposal of waste materials, the physical drilling process (sludge contains oils and greases) and oil leaks from drill rigs. This risk is considered low. Groundwater quality impacts may also arise from seepage from the recycle dam underground, although this is considered a low impact since the dam will be lined. The general risk towards groundwater quality deterioration is considered low.	Control measures will be implemented to prevent the contamination of groundwater resources.	Operational Phase	This is in compliance with GN.704 under the NWA (1998) as well as the DWS Best practice Guideline G1: Storm Water Management. In compliance with the DWS Best Practise Guidelines with specific reference to BPG H2 Pollution Prevention and Minimisation of Impacts.
Decommissioning and closure of the underground workings, shafts and associated infrastructure and well as the shaft surface area.		During the closure phases when all pumping within the region has ceased, the water in the shaft/s may rise towards the Environmentally Critical Level (ECL) where, if contaminated and affected by AMD reactions, may pollute aquifers or surface drainages. The rate at which, and up to which point the water will rise is highly complex and unknown given the multitude of parameters and dewatering schemes within the KOSH area. However previous studies in the KOSH area indicate a likely probability of decant and rise to pre-mining conditions and the ECL. However, at the CAPM 7 Shaft the groundwater table is not expected to return to pre - mining conditions. The reason being that decant will occur at 40 Level, creating a permanent dewatering cone towards 4 Shaft. The quality of the decant water is expected to be contaminated but will improve over time as existing areas of exposed sulphide mineralisation are flooded or oxidised.	Control measure will be implemented.	Closure Phase	This is in compliance with GN.704 under the NWA (1998) as well as the DWS Best practice Guideline G1: Storm Water Management. In compliance with the DWS Best Practise Guidelines with specific reference to BPG H2 Pollution Prevention and Minimisation of Impacts.
Mining and mining related activities conducted within the shaft areas.		An assessment was conducted against the NFEPA classified wetlands and the proximity of these wetlands to the CAPM Orkney Gold Mine shaft areas. As described in Chapter H of Section 7.4.1 (Part A – Environmental Impact Assessment) of the EIA and EMPr, three (3) NFEPA classified wetland areas have been identified to be in close proximity to the No.2 Shaft (unchannelled valley bottom wetland), the No.3 Shaft (channelled Valley Bottom Wetland) and the No.4 Shaft (flat wetland area). The operational activities to be	Control and storm water management measures will be implemented.	Commissioning of the various shaft areas.	This is line with the DWS Best Practice Guidelines G1 and H2, for storm water management, to prevent and minimise impacts and to ensure the separation of clean and dirty water management areas.

Activity	Potential Impact	Mitigation type	Time period for implementation	Compliance with standards
	conducted within the vicinity of shaft areas may impact on these wetland areas in terms of surface water quality, fauna, flora and soil aspects (refer also to Part 4.2, Part 4.5, Part 4.6 and Part 4.7). It is however important to note that these shafts are not currently operational as the No.7 and No.6 Shaft will be the first shafts to commence with operations and operations at the No.3 Shaft will not commence as the No.3 Shaft area is in the process of being rehabilitated.			This is in compliance with the National Water Act, 1998 (Act No. 36 of 1998) and GN 704 (1999) thereunder.
The operation and utilization of the fans to remove stale air from the underground working.	The operation and utilisation of the Kanana Ventilation Duct, 6 Shaft Veld Fan and the 7 Shaft Main Ventilation Fan may result in the release of potentially harmful pollutants and emissions into the air, from the underground workings. This may potentially affect the health of the residents in the area.	A monitoring programme will be implemented.	Operational Phase	Air quality and dust fallout monitoring will determine if the minimum thresholds as stipulated in the NEM:AQA (2004) and regulation thereunder are not exceeded. Should they be exceeded the appropriate actions will be undertaken an Atmospheric Emissions Licence will be applied for. This is in compliance with the MPRDA (2002), the NEM:AQA (2004) and the Mine Health and Safety Act (1996).
Hauling of mined ore to the Nicolor South Plant.	As described above, the ore mined at the CAPM Orkney Gold Mine will be transported, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road network. The transportation of the ore may therefore result in the generation of dust that may have an impact on the local air quality.	A monitoring programme and control measures will be implemented.	Operational Phase	In compliance with the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) and the National Dust Control regulations thereunder.
				Air quality and dust fallout monitoring will determine if the minimum thresholds as stipulated in the NEM:AQA (2004) and regulation thereunder are not exceeded. Should they be exceeded the appropriate actions will be undertaken an Atmospheric Emissions Licence will be applied for. This is in compliance with the MPRDA (2002), the NEM:AQA (2004) and the Mine Health and Safety Act (1996).
				In line with Regulation 70 of the Mineral and Petroleum Resources Development Regulation, GNR587 (2004).
				In compliance with the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
	As described above, the ore mined at the CAPM Orkney Gold Mine will be transported, via haulage trucks, to the Nicolor South Plant for processing utilising the formal road	Control measure will be implemented.	Operational Phase for the Life of Mine	Air quality and dust fallout monitoring will determine if the minimum thresholds as

Activity	Potential Impact	Mitigation type	Time period for implementation	Compliance with standards
	network. Emissions from the haulage trucks may have a minor impact on the localised air quality.			stipulated in the NEM:AQA (2004) and regulation thereunder are not exceeded. Should they be exceeded the appropriate actions will be undertaken an Atmospheric Emissions Licence will be applied for. This is in compliance with the MPRDA (2002), the NEM:AQA (2004) and the Mine Health and Safety Act (1996).
The reinstatement of operations at the CAPM Orkney Gold Mine No.7 Shaft and No.6.	Currently the shafts are not producing and the noise levels are from normal background noise and activities originating from human interaction and vehicle. In the not too distant future these shafts will be re-opened and the prepared for production. This will include activities such as pumping of water and replacing structures that are worn and damaged. Through this process there will be a great deal of workshop and Commissioning activities and vehicle movement while the shafts and underground workings are prepared. Once operational again the main noise sources will be from the main surface fans and the normal shaft noises.	Control measure will be implemented.	Operational Phase	In compliance with the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).
The care and maintenance of the No.1 to No.5 shafts until such a time that they are prepared from operations or decommissioned and rehabilitated.	These shaft will not be re-opened again for production. Normal care and maintenance will be carried on these shafts. Should there be any additional activities carried out, such as the breaking down of shaft structures and buildings, the noise levels should be monitored and the necessary control measures be introduced to minimise the impact on the community. Should operations commence at these shafts, the impacts as described above will apply.	Control measures will be implemented.	Care and Maintenance Phase	In compliance with the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) and the DMR guidelines for noise control.
The reinstatement of operations at the CAPM Orkney Gold Mine Shaft areas.	Although the CAPM Orkney Gold Mine is an existing mine and the community and regular visitors of the area are likely to be desensitised to the mining related infrastructure, the mine has been under care and maintenance since the year 2010. Therefore, once operations at the shafts commence, the increased traffic and presence of employees as well as the increased generation of dust and emissions clouds from the machinery and vehicles may cause a visual disturbance. There are several sensitive receptors in both the foreground and middle ground that include residential areas and the town of Orkney.	Control measures will be implemented.	Commissioning Phase	-
No.3 Shaft — The decommissioning and removal of infrastructure and the rehabilitation of the surface area of the No.3 Shaft.	This site with traditional riveted steel headgear is dated to the end of the 1930's. CAPM Orkney Gold Mine removed all infrastructure (including the headgear) at the No.3 Shaft, without being in possession of a demolition permit. This site was demolished between the period of 2011 and 2015. The site is protected by section 34 (1) of Act 25 of 1999, and is rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or destructed without a demolition permit issued by the relevant heritage authorities.	Mitigation measures will be implemented and the correct procedure will be requested and followed.	As soon as possible	In compliance with the National Heritage Resources Act, 1999 (Act No. 25 of 1999).
No.7 Shaft — The decommissioning and removal of infrastructure workshops at the No.7 Shaft.	This site with traditional riveted steel headgear is dated to the mid 1930's. It is possibly the most representative of the early period of mining in the region. Even so it reflects alterations and updating over time. Most of the site is still intact. The mining objectives of CAPM Gold states that the site will mainly be retained as-is. It will be maintained in its present format allowing for and according to modern mining safety regulations. It is the	Mitigation measures will be implemented by following the correct procedure and obtaining appropriate authorisations.	Prior to demolition of any heritage resources	

Activity		Potential Impact	Mitigation type	Time period for implementation	Compliance with standards
		wish of CAPM Gold to demolish five historic buildings on the eastern perimeter of the site as these are superfluous to the proposed mining perspectives. It includes four steel framed and corrugated iron clad workshops and one brick walled, workshop with wooden trusses and corrugated iron roof. All five buildings are protected by section 34(1) of the National Heritage Act, Act 25 of 1999. These are all rated as "General protection" A (Field Rating IV A) by the SAHRA minimum standards May 2007, therefore cannot be altered or demolished without a demolition permit issued by the relevant heritage authorities.			
The commencement of operations at the No.6 and the No.7 Shafts.		As described in the SLP (attached to the EIA and EMPr as Annexure G), upon commencement of operations at the No.7 and the No.6 Shaft the CAPM Orkney Gold Mine will employ 471 individuals of which the majority (a minimum of 95%) will be sourced from the local communities. This is a positive impact in terms of socio-economic aspects as not only will 4771 individuals be employed but the community will also benefit indirectly through the increased spending on goods and services, the use of local sub-contractors, as well as leading to a decrease in unemployment of the area.	Enhancement measures will be implemented.	Operational Phase	In compliance with the mines SLP and the DMR guideline for a SLP.
Mine closure.		At the end of the Operational Phase of the Orkney Gold Mine, mining operations will cease and the mine will prepare for decommissioning and closure. Rehabilitation activities will commence, depending on the agreed upon end land, and infrastructure will be removed. During this phase a loss of jobs will occur as the amount of employees required during the Operational Phase will no longer be required.	Control measures will be implemented.	Operational Phase	
The commencement of operations at the No.6 and the No.7 Shafts and eventually the No.4 Shaft and No.1 Shaft.		The commencement of operations at the CAPM Orkney Gold Mine may lead to an influx of job seekers to the area. As stipulated in the SLP of the mine, the mine will employ 471 individuals, of which the majority, (a minimum of 95%) will be sourced from the local community. The influx of job seekers to the area may result in several social impacts due to the limited job supply and includes: • An increase in theft / crime. • An increase in informal settlements. • Potential spread of HIV / AIDS.	Control measures will be implemented.	Commissioning Phase	
Hazards to community	The commencement of operations at the No.6 and the No.7 Shafts and eventually the No.4 Shaft and No.1 Shaft.	Due to the close proximity of the shaft areas to residential areas (Orkney, Kanana, Stilfontein, and Vaal Reefs), the storage of hazardous materials and chemicals, gas cylinders and welding and cutting equipment poses a hazard to the safety of the community.	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Commissioning Phase	In line with the DWS Best Practice Guideline H2 for Pollution Prevention and Minimisation of Impacts.
		The shaft areas pose a hazard to the community and fauna in the area as all operational shafts will be open until such a time that decommissioning commences and the shafts are sealed.	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Operational Phase	
		All ore mined at the CAPM Orkney Gold, as described above, will be transported approximately 18 km to the Nicolor South Plant for processing and treatment. There CAPM Orkney Gold Mine proposes to utilise haulage trucks for transportation purposes. This poses a hazard to the community and local residents as the number of mine vehicles will increase on the roads which are used by the local community and residents.	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Operational Phase	In compliance with the Mine Health and Safety Regulations under the Mine Health and Safety Act (1996). This is in compliance with section 5 of the Mine Health and Safety Act (1996).

Activity		Potential Impact	Mitigation type	Time period for implementation	Compliance with standards
					In compliance with the National Road Traffic Act, 1996 (Act No. 93 of 1996) and the regulations thereunder.
					In line with the Asbestos Regulations R155 (2002) under the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).
		The generation of waste on the mine, including asbestos and potential radiation contaminated equipment may result in health hazard to the local community.	Control measures will be implemented to prevent the exposures of the community to unnecessary hazards.	Commissioning Phase, for the Life of Mine	In compliance with the Hazardous Substances Act, 1973 (Act No. 15 of 1973), the Nuclear Energy Act, 1999 (Act No. 46 of 1999) and the Nuclear Licence.

1.7 Financial Provision

1.7.1 Describe the closure objectives and the extent to which they have been aligned with the baseline environment described under Regulation 22(2)(d) as described in Section 7.4.1

Ref. No.	Closure Objective	Alignment with baseline environment
1	**General closure objectives**	
1.1	To achieve the optimal form of land use for the mining right area commensurate with the needs of local communities and South Africa as a whole.	During the operational and closure phase, an investigation will be conducted to identify any infrastructure that may be sold or donated to interested persons, the community and / or Non-Profit Organisations (NPO's) such as the satellite offices, the Recreational Club and the Hostels located at the No.2 Shaft, No.4 Shaft and No.5 Shaft. All other redundant infrastructure will be removed the shafts sealed and capped, the soil ripped and disturbed surface area rehabilitated.
1.2	To achieve closure within a realistic financial framework which is acceptable to the stakeholders involved.	The quantum of the financial provisioning has been determined as described in Section 1.7.5 below (refer also to Annexure H). As described in Section 1.7.5, an amount of R43 296 259.90 is currently provided for in a trust fund. The DMR rates for the calculation of quantum have been escalated by 6% per annum to obtain the 2015 rates. Applying the DMR rates the premature closure, the quantum has been calculated in 2015 at R206 552 739.20. The trust fund shortfall therefore amounts to R163 256 497.30.
1.3	To leave behind a land use and infrastructure assets which meets the needs of the present without compromising the ability of future generations to meet their own needs.	As described in Reference no. 1.1 above, during the operational and closure phase, an investigation will be conducted to identify any infrastructure that may be sold or donated to interested persons, the community and / or Non-Profit Organisations (NPO's) such as the satellite offices, the Recreational Club and the Hostels located at the No.2 Shaft, No.4 Shaft and No.5 Shaft.

Ref. No.	Closure Objective	Alignment with baseline environment
		All other redundant infrastructure will be removed the shafts sealed and capped, the soil ripped and disturbed surface area rehabilitated.
1.4	To ensure that all arable land, grazing land, wetland and wilderness areas are left behind as self-sustaining land assets for the use of future generations.	All disturbed areas will be rehabilitated and indigenous vegetation endemic to the area will be planted. The rehabilitated areas will be monitored on an on-going basis for a period of approximately five (5) years to ensure that the vegetation is self-sustaining and that there are no areas of soil erosion.
1.5	To ensure, as far as is practically possible, that all mining infrastructure, which cannot be used or demolished, is rendered safe to humans and animals alike.	As described in Reference no. 1.1 above, an investigation will be conducted to identify any infrastructure that may be sold or donated to interested persons, the community and / or Non-Profit Organisations (NPO's) such as the satellite offices, the Recreational Club and the Hostels located at the No.2 Shaft, No.4 Shaft and No.5 Shaft. A Heritage Impact assessment has also been conducted (refer to Chapter N of Section 7.4.1 of Part A above) that identified infrastructure at the No.7 that constitutes National Heritage features. Prior to the removal / demolition of this infrastructure, the appropriate demolition permits from the governing authority will be obtained.
2	**Geology and the mineral resource**	
2.1	The removal of ore from underground shall not adversely affect the geology.	The geological strata within the Mining Right area, will be, and has been, destroyed by past and future underground mining activities, an inevitable consequence of mining.
3	**Topography**	
3.1	To reduce the visual impact of the altered topography through the removal of infrastructure and rehabilitation of the disturbed area.	The CAPM Orkney Gold Mine is an existing mine that has been operational near the town of Orkney. Decommissioning and rehabilitation activities will not only remove the direct visual impact as a result of the CAPM Orkney Gold Mine infrastructure but will also reduce the cumulative impact which the CAPM Orkney Gold Mine and other gold mining operations have on visual aspects.

Ref. No.	Closure Objective	Alignment with baseline environment
3.2	To dispose of saleable assets.	The disposal of saleable assets will aid in reducing the visual intrusion and rehabilitating as much of the disturbed surface area, to be in line with the topography of the adjacent areas.
4	**Soils**	
4.1	To treat all soil pollution found during rehabilitation.	The treating of all soil pollution found during rehabilitation will ensure that surface water runoff will not become contaminated. It will also ensure soil fertility and productivity for the reinstatement of grassland and vegetation
4.2	To treat soil allowing vegetation to sow itself in areas not implemented for other use.	In areas where vegetation has not established in one growing season, soil amelioration and fertilisation maybe required to allow vegetation growth to become self-sustaining.
5	**Land capability, surrounding land use and landscape character**	
5.1	To identify alternate use of as much of the infrastructure as possible and investigate the possibility of donating or selling the infrastructure / land.	As described in reference no. 1.1 above, during the operational and closure phase, an investigation will be conducted to identify any infrastructure that may be sold or donated to interested persons, the community and / or Non-Profit Organisations (NPO's) such as the satellite offices, the Recreational Club and the Hostels located at the No.2 Shaft, No.4 Shaft and No.5 Shaft.
5.2	To the extent to which it is reasonably feasible to do, to remove infrastructure not required in situ and restore the land to grassland.	As described in Reference no. 1.4 above, All disturbed areas will be rehabilitated and indigenous vegetation endemic to the area will be planted. The rehabilitated areas will be monitored on an on-going basis for a period of approximately five (5) years to ensure that the vegetation is self-sustaining and that there are no areas of soil erosion.
5.3	Remove all un-saleable infrastructures where it is reasonably feasible to do so.	As described above in Reference no. 1.1 and 3.1 above, during the operational and closure phase, an investigation will be conducted to identify any infrastructure that may be sold or donated to interested persons, the community and / or Non-Profit Organisations (NPO's) such as the satellite offices, the Recreational Club and the Hostels located at the No.2 Shaft, No.4 Shaft and No.5 Shaft. All other redundant infrastructure will be

Ref. No.	Closure Objective	Alignment with baseline environment
		removed the shafts sealed and capped, the soil ripped and disturbed surface area rehabilitated. Furthermore, decommissioning and rehabilitation activities will not only remove the direct visual impact as a result of the CAPM Orkney Gold Mine infrastructure but will also reduce the cumulative impact which the CAPM Orkney Gold Mine and other gold mining operations have on visual aspects.
6	**Natural vegetation**	
6.1	To achieve self- sustaining vegetation on all rehabilitated areas.	As described above in Chapter E of Section 7.4.1 (Part A), the No.1 Shaft, No.2 Shaft, No.3 Shaft and the No.4 Shaft all have areas that constitute secondary grassland areas. The No.4 Shaft and No.5 Shaft also have areas that constitute secondary grassland areas as well as areas that constitute untransformed grassland areas. Rehabilitating the disturbed areas to achieve self-sustaining vegetation will allow for the propagation of vegetation within these communities as well as provide suitable habitats for animal life. The self-sustaining vegetation will also prevent soil erosion and indirectly minimise impacts on air quality and surface water quality.
6.2	To the extent to which it is reasonably feasible to do so, restore the land to grassland utilising vegetation endemic to the area.	
7	**Surface water**	
7.1	To minimise the risk of escape of polluted water from the mine property into natural watercourses.	The implementation and upgrading of the storm water management infrastructure of the mine will ensure that no contaminated water is allowed to leave the shaft areas. As described in Chapter H of Section 7.4.1 of Part A above, there are no wetlands within the surface area of the seven shafts of the CAPM Orkney Gold Mine with the closest surface water resources being the Vaal River (approximately 1.3 km to the south of the No.2 Shaft) and the Schoonspruit (approximately 1.38 km to the west of the No.6 Shaft). There is however a high presence of artificial wetlands around the shaft areas, likely created by previous mining and mining related activities.
7.2	To reduce, as far as reasonably feasible, the contamination of surface water thus obviating the need to treat excessive quantities of polluted water.	

Ref. No.	Closure Objective	Alignment with baseline environment
		There are also three natural wetlands, one south of the No.4 Shaft, one south of the No.3 Shaft and one to the north of the No.2 Shaft. Therefore, by preventing contaminated surface water runoff from leaving the premises, any impacts on the surrounding wetland areas and surface water resources are mitigated.
7.3	To measure water quality chemical/bacteriological and submit reports – action any anomalies.	The implementation of a water quality monitoring programme will allow the mine to identify the potential sources of pollution and in doing so will allow for the determination of whether or not the mine and mining related activities are having an impact on the water quality of water resources. The implementation and continuation of a water monitoring programme will also allow for a trend analysis over time and aid in the identification of the correct mitigation measures and remediation actions to be implemented.
8	**Groundwater**	
8.1	Minimise all long term affects which individual facilities may have in terms of quality on other groundwater users.	As previously described, the CAPM Orkney Gold Mine does not own, operate or manage any tailings facilities or processing plant. Therefore no impacts in terms of groundwater quality are expected during the Operational Phase. However, as the groundwater is allowed to recharge and flood the shafts, it may become contaminated and acidic and upon reaching the Environmental Critical Level (ECL), the aquifers will become contaminated.
8.2	To measure water quality chemical/bacteriological and submit reports – action any anomalies.	During closure and for approximately five (5) years after closure, surface and groundwater monitoring will continue to be conducted on an annual basis. This is to ensure that the rehabilitation has been sufficiently conducted and no further impacts to surface and groundwater are occurring as a result of past mining activities.
9	**Air quality**	
9.1	Dust emanating from rehabilitated land should not exceed normal levels associated with agricultural and residential areas.	In limiting the generation of dust emanating from rehabilitated land, the impacts on air quality will be minimised. This will also minimise the impact on soil erosion as well impacts on the surrounding

Ref. No.	Closure Objective	Alignment with baseline environment
		secondary and untransformed grassland areas. The impact on I&APs, adjacent landowners as well as the community will also be minimised by preventing excessive dust generation.
9.2	To remove the surface fans and seal off the up and down cast shafts.	The closure and decommissioning of the mine will result in the cessation of the use of the surface fans. Stale air, from underground, will therefore no longer be released into the atmosphere. Furthermore, the fans will be removed, the shafts sealed and capped and the disturbed area rehabilitated. Refer also to Reference no. 6 above.
10	**Noise**	
10.1	To remove all sources with noise levels above 85 dBa.	The CAPM Orkney Gold Mine is situated in close proximity to the town of Orkney. Therefore the removal of all sources of noise above 85 dBa will remove and remedy the impact of noise on I&APs, surrounding landowners and communities.
11	**Visual aspects**	
11.1	Limit long term visual impact of mining activities.	The decommissioning and rehabilitation activities will not only remove the direct visual impact as a result of the CAPM Orkney Gold Mine infrastructure but will also reduce the cumulative impact which the CAPM Orkney Gold Mine and other gold mining operations have on visual aspects.
12	**Regional socio-economic aspects**	
12.1	To hold meetings with I&APs and communicate any changes.	I&AP and stakeholder engagement will be ongoing throughout the operational and closure phases of the mine. This will aid in the identification of potential impacts as well as areas where further mitigation measures and remediation action need to be undertaken.
12.2	To identify alternate use of as much of the infrastructure as possible and investigate the possibility of donating or selling the infrastructure / land.	As described in reference no. 1.1 above, during the operational and closure phase, an investigation will be conducted to identify any infrastructure that may be sold or donated to interested persons, the community and / or Non-Profit Organisations (NPO's) such as the satellite offices, the Recreational Club and the Hostels located at the No.2 Shaft, No.4 Shaft and No.5 Shaft.

1.7.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowners and interested and affected parties.

This EIR and EMPr will be made available to the public for comment for a period thirty (30) days. The public are also encouraged to comment on sections of this report (with specific reference to the closure objectives as presented in Section 1.7.1 above), any aspect of the proposed project and raise any concerns and / or issues they may have. The comments, concerns and / or issues will be addressed and responded to and will be taken into consideration in finalising this EIR and EMPr.

1.7.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

As previously described in Section 16.2.2 of Part A above, a Rehabilitation Plan as not yet been developed for the CAPM Orkney Gold Mine. A Rehabilitation Plan and Closure Plan will be developed during the Operational Phase of the mine, at least five (5) years prior to closure. A Closure and Rehabilitation Monitoring Plan will further be developed, in conjunction with the Closure Plan.

1.7.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

As previously described above, a Rehabilitation Plan as not yet been developed for the CAPM Orkney Gold Mine. A Rehabilitation Plan and Closure Plan will be developed during the Operational Phase of the mine, at least five (5) years prior to closure. A Closure and Rehabilitation Monitoring Plan will further be developed, in conjunction with the Closure Plan.

During the Operational Phase of the mine and closer to Closure, the mine will investigate possible alternative uses for all infrastructure such as:

- The hostels located at the No.2 Shaft, the No.4 Shaft and the No.5 Shaft.
- The Recreational Club.
- The Satellite Offices.
- Other infrastructure including mine offices and workshops.

All redundant infrastructure where no alternative use can be identified, will be decommissioned and removed and all saleable assets will be sold. As described in Chapter N of Section 7.4.1 of Part A, several structures (shaft headgear at the No.6 Shaft and No.7 Shaft and workshops located at the No.7 Shaft) were found to be protected by section 34(1) of the NHA (1999). These are all rated as “General protection “A (Field Rating IV A) by the SAHRA minimum standards May 2007. CAPM Orkney Gold Mine intends to retain the sites as-is and will be maintained according to mining and safety standards. During closure, should it be the intention of CAPM to remove this infrastructure, a demolition permit will first be obtained from the governing authority.

The remainder of the shaft surface areas (cement lining, storm water infrastructure, mine offices) will be removed, the soil ripped and the disturbed area rehabilitated. Only indigenous vegetation, endemic to the area, will be planted and allowed to re-establish. All rehabilitated areas will inspected as per the Rehabilitation Monitoring Programme (to be developed) to ensure no erosion or deterioration to the re-established vegetation is taking place. Should it be found that erosion or vegetation deterioration is occuring, the appropriate actions will be implemented (for example; soil fertilisation, seeding, construction of erosion control measures).

The intended rehabilitation of the shaft areas is therefore compatible with the closure objectives as:

- All saleable assets will be disposed of.
- Alternative uses for infrastructure will, as far as possible, be identified.
- Depending on the agreed upon end land use, as much of the disturbed surface areas as possible, will be rehabilitated to resemble the surrounding natural environment.
- Visual impact will be reduced through rehabilitation.
- All shafts will be sealed and capped (including surface fans).

1.7.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

An amount of **R43 296 259.90** is currently provided for in a trust fund. The DMR rates for the calculation of quantum have been escalated by 6% per annum to obtain the 2015 rates. Applying the DMR rates the premature closure, the quantum has been calculated in 2015 at **R206 552 739.20.** The trust fund shortfall therefore amounts to **R163 256 497.30**. A detailed calculation of the quantum in accordance with the applicable guideline is contained in Annexure H.

1.7.6 Confirm that the financial provision will be provided as determined.

As described above, an amount of **R43 296 259.90** is currently provided for in a trust fund with a shortfall of **R163 256 497.30**. At the time of compilation of this EIA and EMPr, the Surface Right Permit for the No.6 Shaft has not yet been transferred to CAPM. Therefore, the CAPM Orkney Gold Mine has committed to investigating the methodology in addressing the quantum shortfall upon the resolution and transfer of the No.6 Shaft Surface Right Permit.

1.8 Mechanisms for monitoring compliance with and performance assessments against the environmental management programme.

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

- Monitoring of Impact Management Actions
- Monitoring and reporting frequency
- Responsible persons
- Time period for implementing impact management actions
- Mechanism for monitoring compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Pumping of water, found underground, to the surface.	The pumping of groundwater may result in the development of a cone of depression.	A groundwater monitoring programme is to be developed and implemented to determine if there are any impacts on groundwater quantity and quality.	The Environmental Manager is to ensure that groundwater monitoring is taking place. The resultant groundwater monitoring reports need to be submitted to the DWS and kept on record. The Mine Manager does however take full responsibility to ensure that the monitoring programme is being implemented.	Groundwater quality monitoring to be conducted on a monthly basis and groundwater level monitoring to be conducted on a quarterly basis. The reports will submitted to the DWS on a monthly (quality) and quarterly (level) basis.
Mining of gold bearing ore.	Groundwater quality may be impacted upon as a result of spillages and unauthorised disposal of contaminated substances as well as seepage from the underground dams.			

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Mining and mining related activities conducted at the shaft surface areas (including workshops, stores, washbays).	Surface water runoff may become contaminated should it come into contact with pollutants (chemicals, hydrocarbons, general waste, and sewage).	A surface water monitoring programme is to be developed and implemented to determine the quality of the water within the dirty water containment facilities (sumps, cooling ponds) as well the quality of the water within the adjacent surface water bodies, both upstream and downstream.	The Environmental Manager is to ensure that the surface water monitoring is taking place. The resultant surface water monitoring reports need to be submitted to the DWS and kept on record. The Mine Manager does however take full responsibility to ensure that the monitoring programme is being implemented.	Surface water monitoring to be conducted on a monthly basis and the reports submitted to the DWS on a monthly basis.
Activities that may result in the generation of waste.	Waste will be generated at the various departments on the mine (offices, ablutions, workshops, stores) which may result in the contamination of surface water runoff, groundwater resources, and soil and may impact on fauna, flora and visual aspects.	A waste monitoring programme is to be developed and implemented as per Regulation GNR 634 of 23 August 2013 under the NEM:WA (2008). Sub-regulation 10 of GNR 634 requires the following: 1) Waste generators must keep accurate and up to date records of the management of the waste they generate, which records must reflect- a) the classification of the wastes.	The Environmental Manager is to ensure that all departments at the Mine are keeping accurate and up to date records of the waste generated. The Environmental Manager will ensure that all waste reports are combined and kept on record. The Mine Manager does however take full responsibility to ensure that the monitoring programme is being implemented.	Annual internal and external audits will be conducted on the commitments as stipulated in the IWWMP and the Water Use Licence and will be submitted to the DWS.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		b) the quantity of each waste generated, expressed in tons or cubic metres per month. c) the quantities of each waste that has either been re-used, recycled, recovered, treated or disposed of. d) by whom the waste was managed. 2) The records contemplated above must be- a) retained for a period of at least five (5) years. b) made available to the Department upon request.		
Mining and Mining related activities at the CAPM Orkney Gold Mine.	Potential environmental impacts resulting from the non-compliance with legislation.	Environmental legal compliance audits are to be conducted to ensure compliance against all applicable environmental legislation and policies.	The Environmental Manager is to ensure that the Environmental Legal Compliance audit is to be conducted by an independent and suitably qualified individual. The Mine Manager does however take full responsibility to ensure that the monitoring programme is being implemented.	The Environmental Legal Compliance audit is to be conducted on a biennial basis (unless otherwise instructed by the DMR), kept on record and submitted to the DMR.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Mining related activities including the transportation of mined ore to the Nicolor South Plant.	Dust may generated as a result of mining related activities conducted on the surface. Air quality within the surrounding areas may be impacted upon as a result of the mining related activities conducted at the CAPM Orkney Gold Mine as well as operation of the surface fans (Kanana Ventilation Duct, 6 Shaft Veld Fan and the 7 Shaft Main Ventilation Fan).	A dust fallout and air quality monitoring plan (as currently conducted at the CAPM Orkney Gold Mine) will be continued throughout the Life of Mine in order to determine potential impacts and sources of dust.	The Environmental Manager is to ensure that the dust fallout and air quality monitoring is conducted by a suitably qualified individual. The dust fallout monitoring programme must establish a network of monitoring points using method AST D1739 (1970) or equivalent. The Mine Manager does however take full responsibility to ensure that the monitoring programme is being implemented.	The dust fallout and air quality monitoring reports are to be submitted annually to the DMR and the North West Department of Economic Development, Environment, Conservation and Tourism.
Underground mining of gold bearing ore	Materials and equipment utilised underground during the mining process may become contaminated by radiation. Should these materials and equipment	The CAPM Orkney Gold Mine will implement a Radioactive Waste Management Programme in which it indicates that all materials, equipment and waste will be characterised and classified.	The Environmental Manager will ensure that the record keeping and monitoring of radioactive waste is being conducted. It is the responsibility of an appointed Radiation Protection Manager to screen waste for transportation to relevant sites and	Quarterly Waste Reports will be submitted on the following months of every year: • Quarter One Report – April • Quarter Two Report – July • Quarter Three Report – October • Quarter Four Report – January

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	be brought to the surface and not be handled or stored in the correct manner, they may contaminate the surrounding environment and promote hazards to employees and the local community.	Waste records will be retained for a period of 5 years. These records should include: a) The data needed for waste characterization. b) The monitoring records (See Appendix A for the radiation survey sheet). c) The content of all packages of radioactive waste. d) The nature of the packaging material; e) Where the material is stored or disposed of. f) Quantification of radioactive waste.	an appointed Radiation Protection Specialist will review and audit the waste management program. The Mine Manager does however take full responsibility to ensure that the monitoring programme is being implemented.	• Annual Waste Report – January
Decommissioning and rehabilitation activities.	Impacts such as soil erosion, deterioration of vegetation and dust may result in the event that the rehabilitation techniques were incorrectly implemented	The rehabilitation monitoring programme will be implemented to ensure that the rehabilitation techniques that were implemented are sufficient for the rehabilitation of the CAPM Orkney Gold Mine and that no significant impact (soil erosion, dust, weed and invasive plant species establishment) are occurring on the rehabilitated areas.	The Environmental Manager will ensure that the rehabilitation monitoring programme is being implemented, the monitoring techniques were implemented correctly and that no impacts occurring on the rehabilitated areas. The Mine Manager does however take full responsibility to ensure that the monitoring programme is being implemented.	Monitoring of the rehabilitation success will take place for at least 3 years and will include corrective follow-up action. The rehabilitation monitoring reports will be submitted to the DMR on an annual basis.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Mining related and decommissioning and rehabilitation activities	Mining related activities as well as the decommissioning and infrastructure removal activities may result in the generation of noise that may impact on the I&APS, surrounding communities and animal life.	A noise monitoring programme will be implemented in order to determine the ambient noise levels generated as part of the activities conducted on site and to ensure that a constant noise contour of 85 dBA within the mine boundary area is not exceeded, as required by the Mine Health and Safety Act (1996) and the DMR.	The Environmental Manager will ensure that the noise monitoring programme is being implemented, and that all reports are kept on record and made available upon request by the DMR and during audits.	Noise monitoring will be conducted on a monthly basis and the reports kept on record.

1.9 Indicate the frequency of the submission of the performance assessment report.

Unless otherwise instructed by the DMR or as a condition to the authorisation, the Environmental Management Programme Performance assessments will be under taken on a biennial basis, and the resultant Performance Assessment Reports will be submitted to the DMR.

1.10 Environmental Awareness Plan.

1.10.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

Formal training will be provided to all employees regarding the hazards of the duties to be performed to both their health as well as the surrounding environment. It is the responsibility of the Mine Manager and the Health and safety officer to ensure that adequate training is provided to all employees. It is also the responsibility of the relevant Head of Departments to identify the need for further training. As part of the mandatory training provided to all employees and contractors, environmental awareness training will be provided, as described in Section 1.10.2 below.

1.10.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

The following Environmental Awareness Training will be implemented by CAPM Orkney Gold Mine in order to inform employees and contractors of the environmental risk that may result from their work, or the risk of their interaction with the sensitive environment. The training will be conducted as part of the induction process for all new employees (including contractors) that will perform work in terms of the proposed activities. Proof of all training provided must be kept on-site.

The Environmental Awareness Training will, as a minimum cover the following topics:

- Air Quality
    - Activities that may result or mitigate impact on air quality; speeding on roads, covering of haul trucks etc.
    - Negative impacts on the receiving environment if mitigation measures are not implemented.
- Surface and groundwater
    - Risks to surface and groundwater, e.g. fuel and chemical handling and further risks of erosion or damage to riparian vegetation.
    - How incidents should be reported, and emergency requirements.
    - The importance of storm water control, maintenance of pollution control infrastructure.
    - The importance to reuse water and to prevent spillages.
- Cultural Heritage

  - To respect all cultures and believes.
  - To remain within working areas and not to enter or interfere with any cultural heritage.
  - How to report any sightings as identified during operation activities (e.g. fossils).
- Fauna
  - Overview of the fauna found on site and the uniqueness thereof.
  - Mitigation measures that all contractors and employees need to abide by.
  - No contractor or personnel allowed to catch or kill any species, and how any sightings should be reported if further actions are required (e.g. to catch and release).
- Flora
  - Overview of the flora diversity on site, and the rare and endangered nature thereof.
  - Measures taken by the mine to protect species.
  - No contractor or personnel allowed to remove, harvest or destroy any flora species unless clearly instructed based on the construction and operational plans.
- Waste management
  - The correct segregation of general and hazardous waste.
  - Do's and don'ts with respect to waste disposal.
  - Measures to avoid waste generation and to participate in waste minimisation/reduction strategies.
- Traffic
  - Abide by traffic rules, no speeding allowed.
  - To stay on designated roads (and not to drive on areas that are not fit and designed for this purpose).
  - To be aware of the fauna species and to be on the lookout and avoid collisions.
- Natural Resource Consumption
  - Minimise unnecessary use of energy by making use of energy saving devices, switching off non-essential appliances etc.
  - Optimise utilisation of mining and plant equipment, travelling routes etc.
- Emergency Preparedness and Response
  - Designated smoking areas.
  - How to report any emergency or incident.
  - How to respond when emergency alarm goes off.
- General rules and conduct
  - Respect for the sensitive environment.
  - Do not litter.
  - HIV/AIDS awareness.
  - Respect for each other and for different cultures.
  - Safety and health requirements.

1.11 Specific information required by the Competent Authority.

The following information will be required by the competent authority.

Information	Frequency of submission
Quantum of Financial Provision	Annually
Performance Assessment Report	Biennially
Surface water monitoring	Monthly
Groundwater quality monitoring	Quarterly
Groundwater level monitoring	Quarterly
Air quality	Monthly
Ambient noise level monitoring	Monthly

2. Undertaking

The EAP herewith confirms

a) the correctness of the information provided in the reports ☒

b) the inclusion of comments and inputs from stakeholders and I&APs ; ☒

c) the inclusion of inputs and recommendations from the specialist reports where relevant; ☒and

d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed; ☒

_____ _____

Signature of EAP Date

-END-