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Witwatersrand Consolidated Gold Resources Ltd (Wits Gold): Southern Free State (SOFS) Mining Operation

Final for Public & Authority Review

Environmental Scoping Report

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) and National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)

October 2012

Client Name: Wits Gold

DEA Reference Number: 14/12/16/3/3/3/58
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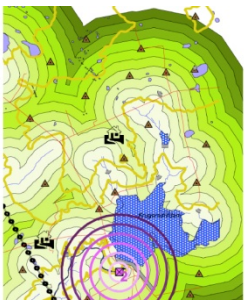


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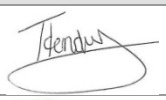
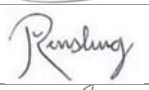
Author	Tarryn Hendry		November 2012
Document Reviewer	Renee Janse van Rensburg		November 2012
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DISCLAIMER

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EXECUTIVE SUMMARY

Background

Witwatersrand Consolidated Gold Resources ("Wits Gold") was granted New Order Prospecting Rights by the Department of Mineral Resources (DMR), covering a combined total of 119,586 hectares (ha) in three goldfields, namely the Southern Free State (SOFS), Potchefstroom and Klerksdorp goldfields. Phase 1 of the SOFS Mining Operation (DBM Project), is situated in the Free State Province of central South Africa, South of the town of Virginia (28°70"S, 26°54"E) on various farms which covers an area of 4,024 ha over a portion of two of their New Order Prospecting Rights.

Most of the mining operation will be carried out underground with a minimal area required for surface infrastructure such as shafts, offices and metallurgical plant. Presently, studies indicate the optimal site for this infrastructure to be situated on portions of either the farms Welgelegen and/or Florida, while no new ground will be required for tailings facilities, as the use of adjacent existing facilities with sufficient life of mine capacity has been secured. The area has hosted numerous mining operations since the 1950's, with many of these mines now reaching the end of their economic lives. The proposed Wits Gold operations will inject significant new capital and development to residents and business in the vicinity, especially the towns of Virginia and Welkom, and the townships of Meloding and Merriespruit.

The proposed project is located within the following District and Local Municipalities:

- Lejweleputswa District Municipalities;
- Matjhabeng Local Municipality; and
- Masilonyana Local Municipality.

Project Description

Phase 1 of the SOFS Mining Operation, namely the DBM Project, is situated in the Free State Province of central South Africa and is south of the town of Virginia (28°70"S, 26°54"E); whilst the closest major towns to Virginia are Welkom (24 km North-West) and Bloemfontein (136 km South-West), Virginia is approximately 270 km by national road from Johannesburg. It is important to note that the DBM Project extends over numerous farms and/or Prospecting Rights and a portion of the area used to form part of the Harmony Merriespruit Mine lease area that was unmined. This area will be included in the Mining Right Application area once transfer the properties to Wits Gold is notarially executed.

Application for ministerial consent in terms of Section 102 of the MPRDA has been granted and the regional office of the DMR is processing the necessary documentation in order to give effect to the transfer of the rights to Wits Gold. Underground mining methods will be implemented at depths starting from 480 metres below surface. Mining is currently planned to be undertaken using narrow reef breast mining approach common to the gold mines of South Africa. Support for the mining will be from a trackless footwall infrastructure below the Leader Reef (bottom reef horizon). This is less common but not unique in underground South African gold mines.

The primary access route to the DBM Project is the N1 national road or freeway; with tarred, main roads (R73, R70 and R34) branching off this freeway. The Wits Gold properties are intersected approximately 86 km from the N1/R34 turnoff (or 21 km via a direct gravel road from the same junction).

The project zone of influence will extend to the township of Meloding, which is approximately 1.8 km from the proposed shaft area. The TSF location is proposed to be situated on an existing Brownfield Tailings Storage Facility (TSF) in the area. The final option will depend on agreements between all affected parties and relevant government approvals. This aspect will be assessed and discussed in more detail during the EIA phase of the project. Access to the mine will probably be via a portal decline and vertical shaft combination, or a twin vertical shaft system. The Engineering Scoping Study envisaged that the decline would be used to transport all rock to surface while men and materials would be transported via the vertical shaft. This mine design was refined and modified in the pre-feasibility study, where a twin vertical shaft system is proposed.

Proposed infrastructure that will form part of Phase 1 of the SOFS Mining Operation, namely the DBM Project will include:

WATER	**BULK POWER SUPPLIES**
Bulk water supplies;	Bulk power supplies;
Surface supply reticulation;	Main Eskom yard;
Underground supply reticulation;	Surface reticulation;
Dirty water pumping and settling; and	Underground reticulation; and
Sewage treatment.	Emergency generators.
SURFACE INFRASTRUCTURE	**UNDERGROUND INFRASTRUCTURE**
Buildings and offices;	Workshops;
Workshops;	First aid facility;
Clinic;	Fire detection;
Stores and marshalling yard;	Rescue chambers;
Core yard;	Stores; and
Sewage treatment and waste disposal;	Pump chambers.

Roads and storm water handling;	
Tailing storage facilities & waste rock dump;	
Rock handling & conveyors;	
Change house;	
Main fans;	
Shaft headgears;	
Winders;	
Ice plant & cooling towers; and	
Metallurgical plant.	

Farm Portions

The proposed SOFS Phase 1 (DBM project) mining operation surface infrastructure is currently envisaged to be located on the following farm portions:

LAND OWNER	FARM	MAGISTERIAL DISTRICT	PORTION	TITLE DEED	SG CODE
Andries Benjamin Pienaar	Florida 633	Ventersburg	1	T11996/1979	F03500000000063300001
Andries Benjamin Pienaar	Florida 633	Ventersburg	4	T28107/1998	F03500000000063300004
Johan van Huysteen	Welgeleggen	Theunissen	RE2	T1072/1986	F03300000000038200002
Piet Nieman	Welgeleggen	Theunissen	24	T5581/1997	F03300000000038200024

Environmental Authorisation Process

GCS (Pty) Ltd (GCS) have been appointed as the independent environmental consultants to undertake the environmental processes required in obtaining approval for the proposed activities, as requested by the authorities. The project requires authorisations in respect of the following Acts:

- The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA);
- The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA); and
- The National Water Act, 1998 (Act No. 36 of 1998) (NWA).

As part of the environmental authorisation processes, an Environmental Scoping Report (ESR) and Environmental Impact Assessment (EIA) / Environmental Management Programme (EMP) Report are to be compiled and submitted in terms of the NEMA, NEM:AQA, NEM:WA

and the. The ESR and EIA/EMP in respect of the MPRDA process have been submitted to the Department of Mineral Resources (DMR) in Welkom on 14 March 2012 and 7 August 2012 respectively.

This ESR, developed in support of the environmental authorisation process required for the NEMA, NEM:AQA and NEM:WA, provides an overview of the project and details the issues identified to date. It also recommends specialist investigations to be undertaken. The objectives of the Environmental Scoping Phase are to:

- Identify the issues associated with the proposed activity at SOFS Mining Operation, which are most likely to affect the biophysical and socio-economic aspects of the surrounding environment;
- Conduct a review of the applicable environmental legislation; and
- Determine and document the aspects of the project, which will require further investigations.

A brief description of the environmental setting including the geology, climate, topography, soils, land use, vegetation, animal life, surface water, groundwater, air quality, noise, sites of archaeological and cultural interest, sensitive landscapes and visual aspects associated with the SOFS Mining operation are detailed in this ESR.

The report also provides information regarding the environmental application process that has been followed to date and the processes that will be followed during the remainder of the project, including consultation with Interested and Affected Parties (I&APs) and Authorities. Issues and concerns raised during the Environmental Scoping Phase have been listed in this report, and proposed mitigatory measures have been provided.

Public Participation Process

The Public Participation Process (PPP) has been initiated as part of the requirements of the MPRDA, NEMA, NEM:AQA, NEM:WA and NWA.

The public participation that will be undertaken will be included in the final Environmental Scoping Report.

Specialist Studies Required

The following specialist investigations have been undertaken in the MPRDA phase and will be included in the NEMA EIA/EMP for the proposed development and the associated listed activities according to NEMA, NEM:AQA, NEM:WA and NWA:

- Soil, Land Use and Land Capability Assessment;
- Ecology (Fauna & Flora) Impact Assessment;
- Hydrological Impact Assessment;
- Geohydrological Impact Assessment;
- Wetland and Aquatics Impact Assessment;
- Archaeological Assessment;
- Radiation Impact Assessment;
- Social Impact Assessment Impact Assessment;
- Air Quality Assessment; and
- Traffic Assessment Impact Assessment.

The following specialist studies were identified as gaps in the MPRDA EIA/EMP and are currently being undertaken for inclusion in the final NEMA/NEM:AQA/NEM:WA EIA/EMP:

- Blast and Vibrations Impact Assessment;
- Visual Impact Assessment;
- Noise Impact Assessment; and
- Sustainable Development Investigation.

ABBREVIATIONS

DMR	Department of Mineral Resources
DWA	Department of Water Affairs
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
ESR	Environmental Scoping Report
I&AP	Interested and Affected Party
IWULA	Integrated Water Use License
IWWMP	Integrated Water and Waste Management Plan
DETEA	Department of Economic Development, Tourism and Environmental Affairs
MPRDA	Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)
NDA	National Department of Agriculture
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEM:WA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NWA	National Water Act (Act No. 36 of 1998)
PPP	Public Participation Process
SAHRA	South African Heritage Resources Agency
SOFS	Southern Free State

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1 BACKGROUND AND INTRODUCTION

1.1 Background

Witwatersrand Consolidated Gold Resources ("Wits Gold") was granted New Order Prospecting Rights by the Department of Mineral Resources (DMR), covering a combined total of 119,586 hectares (ha) in three goldfields, namely the Southern Free State (SOFS), Potchefstroom and Klerksdorp goldfields. Phase 1 of the SOFS Mining Operation (DBM Project), is situated in the Free State Province of central South Africa, South of the town of Virginia (28°70"S, 26°54"E) on various farms which covers an area of 4,024 ha over a portion of two of their New Order Prospecting Rights.

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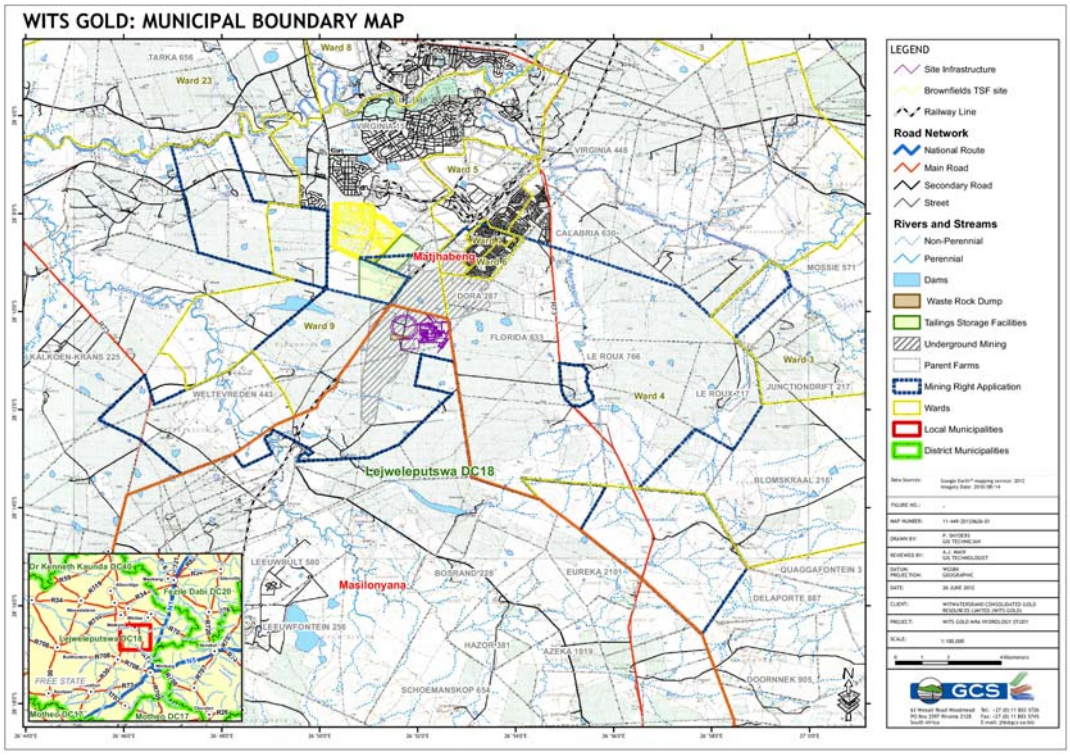
The proposed project is located within the following District and Local Municipalities (Figure 1.1)::

- Lejweleputswa District Municipalities;
- Matjhabeng Local Municipality; and
- Masilonyana Local Municipality.



(Figure not to scale – please refer to Appendix A for the A3 figure)

Figure 1.1: Municipal Map of the Proposed SOFS Mining Operation.

1.2 Brief Project Description

Phase 1 of the SOFS Mining Operation, namely the DBM Project, is situated in the Free State Province of central South Africa and is south of the town of Virginia (28°70"S, 26°54"E); whilst the closest major towns to Virginia are Welkom (24 km North-West) and Bloemfontein (136 km South-West), Virginia is approximately 270 km by national road from Johannesburg. It is important to note that the DBM Project extends over numerous farms and/or Prospecting Rights and a portion of the area used to form part of the Harmony Merriespruit Mine lease area that was unmined. This area will be included in the Mining Right Application area once transfer the properties to Wits Gold is notarially executed. Application for ministerial consent in terms of Section 102 of the MPRDA has been granted and the regional office of the DMR is processing the necessary documentation in order to give effect to the transfer of the rights to Wits Gold. Underground mining methods will be implemented at depths starting from 480 metres below surface. Mining is currently planned to be undertaken using narrow reef breast mining approach common to the gold mines of South Africa. Support for the mining will be from a trackless footwall infrastructure below the Leader Reef (bottom reef horizon). This is less common but not unique in underground South African gold mines.

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The project zone of influence will extend to the township of Meloding, which is approximately 1.8 km from the proposed shaft area. The TSF location is proposed to be situated on an existing Brownfield Tailings Storage Facility (TSF) in the area. The final option will depend on agreements between all affected parties and relevant government approvals. This aspect will be assessed and discussed in more detail during the EIA phase of the project. Access to the mine will probably be via a portal decline and vertical shaft combination, or a twin vertical shaft system. The Engineering Scoping Study envisaged that the decline would be used to transport all rock to surface while men and materials would be transported via the vertical shaft. This mine design was refined and modified in the pre-feasibility study, where a twin vertical shaft system is proposed.

Proposed infrastructure that will form part of Phase 1 of the SOFS Mining Operation is detailed in Table 1.1.

Table 1.1: Proposed infrastructure

WATER	**BULK POWER SUPPLIES**
Bulk water supplies;	Bulk power supplies;
Surface supply reticulation;	Main Eskom yard;
Underground supply reticulation;	Surface reticulation;
Dirty water pumping and settling; and	Underground reticulation; and
Sewage treatment.	Emergency generators.
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Core yard;	Stores; and
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Roads and storm water handling;	
Tailing storage facilities & waste rock dump;	
Rock handling & conveyors;	
Change house;	
Main fans;	
Shaft headgears;	
Winders;	
Ice plant & cooling towers; and	
Metallurgical plant.	

1.3 Contact Details

The contact details of the applicant are provided in Table 1.2.

Table 1.2: Name and Address of Applicant

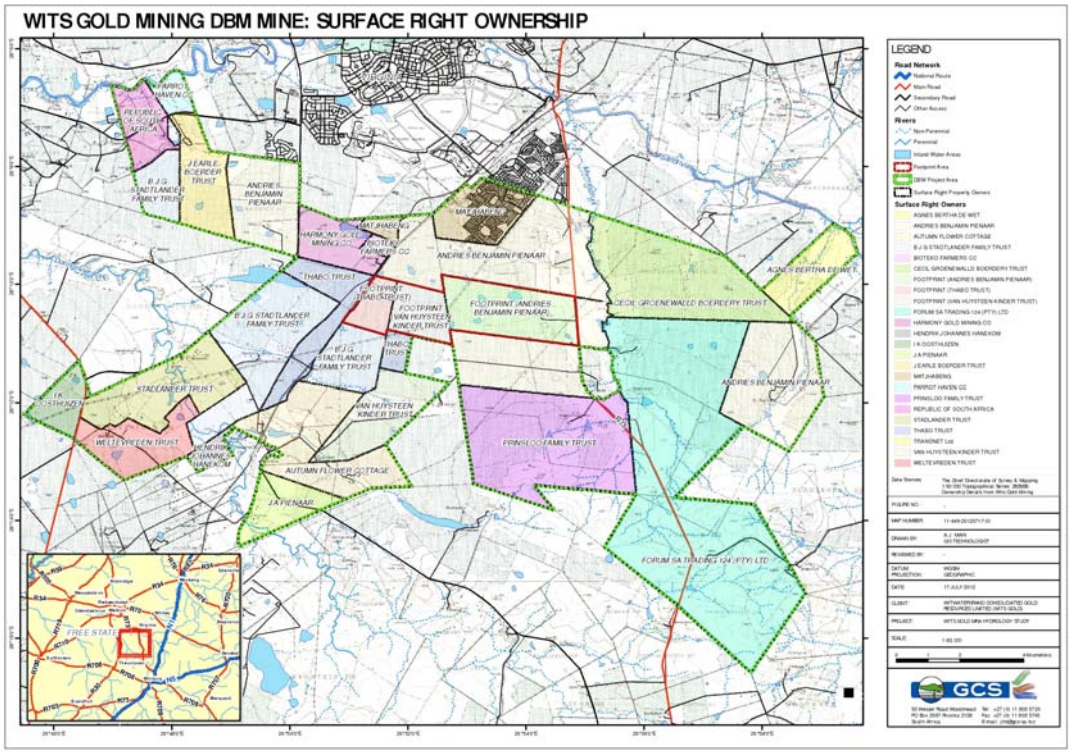
ITEM	COMPANY CONTACT DETAILS
Name	Mr. Hethen Hira (On behalf of Witwatersrand Consolidated Gold Resource Limited)
Tel no.	011 832 1749
Fax no:	011 838 3208
Cellular no	083 300 2222
E-mail address	hethenh@witsgold.com
Postal address	PO Box 61147, Marshalltown, Johannesburg, 2107

1.4 Description of Land

The proposed SOFS mining operation project infrastructure will be situated on the farm portions detailed in Table 1.3, whilst the farms relating to the entire mining right area is presented in Figure 1.2.

Table 1.3: Property Owners and Farm Portions

Land owner	Farm	Magisterial District	Portion	Title Deed	SG Code
Andries Benjamin Pienaar	Florida 633	Ventersburg	1	T11996/1979	F0350000000063300001
Andries Benjamin Pienaar	Florida 633	Ventersburg	4	T28107/1998	F0350000000063300004
Johan van Huysteen	Welgeleggen	Theunissen	RE2	T1072/1986	F0330000000038200002
Piet Nieman	Welgeleggen	Theunissen	24	T5581/1997	F0330000000038200024



(Figure not to scale – please refer to Appendix A for the A3 figure)

Figure 1.2: Farm Portions

1.5 Environmental Processes

GCS (Pty) Ltd (GCS) have been appointed as the independent environmental consultants to undertake the environmental processes required in obtaining approval for the proposed activities, as requested by the authorities. The project requires authorisations in respect of the following Acts:

- The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA);
- The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA); and
- The National Water Act, 1998 (Act No. 36 of 1998) (NWA).

1.5.1 Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA) process

The Minerals and Petroleum Resources Development Act of 2002 (MPRDA) makes provision for equitable access to and sustainable development of the nation's mineral and petroleum resources; and to provide for matters connected therewith by:

- Recognizing that minerals and petroleum are non-renewable natural resources;
- Acknowledging that South Africa's mineral and petroleum resources belong to the nation and that the State is the custodian thereof;
- Affirming the State's obligation to protect the environment for the benefit of present and future generations, to ensure ecologically sustainable development of mineral and petroleum resources and to promote economic and social development;
- Recognizing the need to promote local and rural development and the social upliftment of communities affected by mining;
- Reaffirming the State's commitment to reform to bring about equitable access to South Africa's mineral and petroleum resources;
- Being committed to eradicating all forms of discriminatory practices in the mineral and petroleum industries;
- Considering the State's obligation under the Constitution to take legislative and other measures to redress the results of past racial discrimination;
- Reaffirming the State's commitment to guaranteeing security of tenure in respect of prospecting and mining operations; and
- Emphasizing the need to create an internationally competitive and efficient administrative and regulatory regime.

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

Section 24 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that activities (e.g. construction) which may impact on the environment must obtain an environmental authorization from a relevant authority before commencing with the activities. Such activities are listed under Regulations 544 and 545 (dated 2 August 2010) of NEMA.

The activities which are triggered by the proposed new mining operation is listed under Regulations R544 and R545, and as such requires an application for an Environmental Authorization in the form of an Environmental Impact Assessment (EIA) process., All

activities under R544 which requires a Basic Assessment will be included as part of the full EIA process to the Department of Environmental Affairs (DEA).

The listed activities that will require authorisation in terms of the environmental process for the development of the proposed SOFS mining operation is shown in Table 1.4.

Table 1.4: Listed Activities according to NEMA, GNR 544 and GNR 545

Number and date of the relevant notice	Activity No(s) (in terms of the relevant notice)	Listed Activity	Mining Activity
National Environmental Management Act, 1998 (Act No.107 of 1998) Environmental Impact Assessment Regulations Listing Notice 1 of 2012			
GN R 544, GG No. 33306 of 02/08/2010	2	The construction of facilities or infrastructure for the storage of ore or coal that requires an atmospheric emissions license in terms of the National Environmental Management: Air Quality Act (Act 39 of 2004)	See Air Quality Listed Activities below 12 Cat 3 (1) Subcat 3.1 and 13 Cat 4 (17) Subcat 4.17.
GN R 544, GG No. 33306 of 02/08/2010	9	The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water- i. With an internal diameter of 0,36 metres or more; or ii. With a peak throughout of 120 litres per second or more,	Storm water drains Water for/from underground Water to be utilised by the plant
GN R 544, GG No. 33306 of 02/08/2010	10(i)	The construction of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.	The mine has requested a bulk supply from Eskom at 11 kV, the mine reticulation will be performed at this level. The proposal is for Eskom to construct a 132kV line from their Thesues substation to the mine site, using an existing transmission line servitude. The 35 MVA, 132/11kV substation will be constructed on the mine site. Feasibility quotation has been received from Eskom for the bulk supply - dated 08/11/2011
GN R 544, GG No. 33306 of 02/08/2010	11	The construction of: i. canals; ii. channels; iii. bridges; iv. dams; v. weirs; vi. bulk storm water outlet structures; vii. marinas;	Proposed infrastructure may be within 32 metres of a wetland.

		viii. jetties exceeding 50 square metres in size; ix. slipways exceeding 50 square metres in size; or x. infrastructure or structures covering 50 square metres or more, where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	
GN R 544, GG No. 33306 of 02/08/2010	12	The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010.	Pollution control storage dam 26 Ml capacity.
GN R 544, GG No. 33306 of 02/08/2010	13	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	Explosive cartridge and detonator magazine, fuel storage bay, gas and chemical store. Hydrocarbons
GN R 544, GG No. 33306 of 02/08/2010	22	The construction of a road, outside urban areas- i. with a reserve wider than 13,5 metres or; ii. where no reserve exists where the road is wider than 8 metres; or iii. for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	Main Access road into the mine property. Depends on the final plan of infrastructure placement. Existing roads to be upgraded for use and maintained in good standing
GN R 544, GG No. 33306 of 02/08/2010	47	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- i. where the existing reserve is wider than 13,5 meters; or ii. where no reserve exists, where the existing road is wider than 8 metres,	

		iii. excluding inside urban areas.	
National Environmental Management Act, 1998 (Act No.107 of 1998) Environmental Impact Assessment Regulations Listing Notice 2 of 2012			
GN R 545, GG No. 33306 of 02/08/2010	2	The construction of facilities or infrastructure for nuclear reaction including energy generation, the production, enrichment, processing, reprocessing, storage or disposal of nuclear fuels, radioactive products and nuclear and radioactive waste.	Uranium process. It is not planned to process uranium at this stage. Uranium by-product will be deposited with the tailings as per current practice in surrounding operations
GN R 545, GG No. 33306 of 02/08/2010	3	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	Uranium process (see above) Explosives Magazine
GN R 545, GG No. 33306 of 02/08/2010	5	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) in which case that Act will apply.	See Waste Act Listed Activities listed below Schedule 19(1)Cat A 3(11); Schedule 19(1)Cat B 4(1); (7); (9) and (11)
GN R 545, GG No. 33306 of 02/08/2010	19	The construction of a dam, where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.	

Activity 20 was excluded from the applied activities listed in Listing Notice 2 due to the fact that it was not yet promulgated prior to the development of this project.

1.5.3 National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)

Refer to **Error! Reference source not found.** for the listed activities according to NEM:AQA.

Table 1.5: Listed Activities according to NEM:AQA

Number and date of the relevant notice	Activity No(s) (in terms of the relevant notice) :	Listed Activity	Mining Activity
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)			
GN No. 248 GG No. 33064 of 21/03/2010	12 Cat 3 (1) Subcat 3.1	Combustion installations not used primarily for steam raising or electricity generation.	The eluted carbon is reactivated in a reactivation kiln at a temperature of 750 °C to drive off any organics which have adsorbed on to the carbon. The reactivated carbon is then acid washed with diluted hydrochloric acid to remove adsorbed lime. The acid washed carbon is then returned to the CIL tanks.
GN No. 248 GG No. 33064 of 21/03/2010	13 Cat 4 (17) Subcat 4.17	The precious and base metal production and refining.	Precious Metal Production: Gold. Precious Metal Refining: All core gold produced in the plant will be sold to Rand Refinery in South Africa for refining.

1.5.4 National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) process

A person who wishes to commence, undertake or conduct an activity listed under Category B, must conduct an environmental impact assessment process, as stipulated in the environmental impact assessment regulations made under section 24(5) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) as part of a waste management license application. The following environmental authorisation process will be undertaken for the development of the proposed SOFS Mining Operation.

Table 1.6: Listed Activities according to NEM:WA

Number and date of the relevant notice	Activity No(s) (in terms of the relevant notice)	Listed Activity	Mining Activity
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)			
GN No. 718 GG No. 32368	Schedule 19(1)Cat B 4(1)	The storage including the temporary storage of hazardous waste in lagoons.	Clarity required whether the TSF constitutes being a lagoon. However, the TSF facility already exists and falls under a mine rehabilitation liability, the relevant portion of which will be taken over by Wits Gold The act says a lagoon 'means the containment of waste in excavations and includes evaporation dams, earth cells sewage treatment facilities and sludge farms"
GN No. 718 GG No. 32368	Schedule 19(1)Cat B 4 (7)	The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic metres or more.	Sewage treatment plant and excess mine water treatment.
GN No. 718 GG No. 32368	Schedule 19(1)Cat B 4 (9)	The disposal of any quantity of hazardous waste to land,	Tailings Storage Facility (TSF)
GN No. 718 GG No. 32368	Schedule 19(1)Cat B 4 (11)	The construction of facilities for activities listed in Category B of this Schedule (not in isolation to associated activity),	

1.5.5 Integrated Water Use Licence Application

According to NWA, water may not be used without prior authorisation from the leading authority, in this case the Department of Water Affairs (DWA). Due to the requirements of the NWA, an Integrated Water Use License Application needs to be compiled and handed in at the DWA to ensure the legality of the SOFS Mining Operation's water uses. GCS will be undertaking the development of the required Water Use Licenses as per the NWA.

The following water uses in terms of Section 21 of the NWA will be applied for at the Free State Regional Office of the DWA:

- (a): Taking water from a water resource;
- (b): Storing water;
- (c): Impeding or diverting the flow of water in a watercourse;
- (f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit
- (g): Disposing of waste in a manner which may detrimentally impact on a water resource;

- (i) Altering the bed, banks, course or characteristics of a watercourse; and
- (j): Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

A pre-consultation meeting with the DWA was held on Monday 15 October 2012. During this meeting the relevant Section 21 water uses were confirmed.

1.5.6 Other Related Legislation

The environmental component of the project will also comply with the requirements of *inter alia*, the following Legislation (and the Regulations promulgated hereunder):

- Constitution of South Africa, 1996 (Act No. 108 of 1996);
- The Environment Conservation Act, 1989 (Act No. 73 of 1989);
- The Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965);
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004);
- The Hazardous Substances Act, 1973 (Act No. 15 of 1973);
- The Occupational Health and Safety Act, 1993 (Act No. 85 of 1993);
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999); and
- The National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) .

1.5.7 Environmental Process Objectives

In order to mitigate potentially negative impacts and to identify any potential fatal flaws that may render the project environmentally unacceptable, GCS have adopted an integrated, step-by-step process to identify issues of concern and to thoroughly investigate these issues.

The proposed environmental investigations undertaken will address all phases related to the proposed project. These phases will include the:

- Pre-Construction phase;
- Construction phase;
- Operation phase; and
- Closure and Decommissioning phase.

To ensure that the negative impacts are identified and mitigated in the early stages of the project, and that the positive impacts are maximised, it will be necessary for the environmental study to meet the following aims:

- Follow the guideline process as outlined by the NEMA and the MPRDA;

- Provide input in the feasibility phases to ensure that the most technically feasible, and environmentally sound options are selected;
- Ensure that impacts are identified early through investigations to minimise environmental damage and maximise benefits;
- Conduct thorough special investigations that will allow the project team to develop an adequate understanding of the issues to be dealt with;
- Compile an EIA that will identify, evaluate and address the potential impacts;
- Provide ongoing environmental input into the project planning and development;
- Compile an EMP that will limit the significance of the negative impacts and maximise the positive aspects; and
- Ensure that all relevant I&APs / Stakeholders are consulted and involved throughout the project.
- Ensure that an open and transparent communication structure is in place during the life of the mine.
- Strong emphasis will be placed on the NEMA, MPRDA and NWA process to ensure that the three (3) processes will be able to run concurrently, and will easily be comparable with no confusion between the different processes.

1.5.8 Environmental Assessment Practitioner

In terms of Section 17 of the NEMA, Wits Gold has to appoint environmental assessment practitioners (EAPs) before applying for an environmental authorisation of any activity listed in terms of GNR 544 and 545 (previously GN 386 and 387). For this purpose Wits Gold has appointed GCS (Pty) Ltd to undertake the necessary environmental assessments and to ensure that all legislative requirements are adhered to as part of the environmental authorisation process.

GCS (Pty) Ltd, is an independent environmental consulting firm and will undertake the EIA and has co-ordinated the specialist investigations which form part of the EIA. GCS is also be responsible for the relevant public participation process related to the proposed project. Refer to Appendix G for the GCS Company Profile.
Refer to
Table 1.7 for a list of the Environmental Consultants from GCS (Pty) Ltd working on this project.

Table 1.7: Environmental Consultants from GCS (Pty) Ltd

Name	Position	General Qualifications	Experience

Tanja Bekker	Environmental Unit Manager	MSc Environmental Management (Pr.Sci.Nat)	9
Renee Janse van Rensburg	Senior Project Manager	MSc Environmental Management (Pr.Sci.Nat)	11
Jessica De Beer	Social Scientist	(Hons) Social Scientist	6
Tarryn Hendry	Environmental Consultant	B. Sc (Hons) Zoology	2

1.5.9 Environmental Scoping Process

The Environmental Scoping Phase involves the investigation of the current environmental status by means of desktop investigations and reconnaissance investigations and the identification of potential impacts and issues that need to be investigated in more detail.

Public involvement, through notification and consultation with Interested and Affected Parties (I&APs) is a key component of this phase. The Environmental Scoping Phase is concluded when the Environmental Scoping Report (ESR) is submitted to the DEA. The ESR describes the existing status of the environment prior to the proposed project activities.

Desktop investigations and a review of existing information have been undertaken by various specialists and project team members in order to provide a broad understanding of the environment. Based on the issues and concerns raised by I&APs and the authorities, as well as the issues identified by specialists, the ESR has been compiled and submitted to the relevant authority for comment and review.

The ESR identifies the potential impacts and concerns associated with the project, which should be investigated by the relevant specialists and be addressed in the EIA and draft EMP. The results of the Environmental Scoping Phase, as detailed in the ESR, will determine the nature and extent of the specialist investigations that need to be undertaken in the EIA.

Comments obtained from the I&APs during the draft Environmental Scoping Phase and the 30 day review period will be addressed in detail in the Scoping Report to be submitted to DEA that will in turn also be addressed in detail in the EIA/EMP phase.

The Environmental Scoping Phase methodology is based on the Regulations under the MPRDA and NEMA. The objectives of the Environmental Scoping Phase are to:

- Identify I&APs / Stakeholders through communication of the project details and to provide opportunities for expression and incorporation of I&APs concerns and views into the required documentation;
- Identify relevant Government Authorities and other institutions, and inform them of the project to enable them to express their concerns and issues, which they would like to see addressed as part of the process;
- Identify the potential issues associated with the project, which are most likely to affect the biophysical and socio-economic aspects of the surrounding environment;
- Conduct a review of the applicable environmental legislation; and
- Determine and document the aspects of the project, which will require further investigations.

1.5.10 Report Structure

This ESR has been compiled to identify the impacts associated with the mining activities, which should be investigated by the relevant specialists and addressed in the EIA and the EMP Report. The results of this report will determine the nature and extent of investigations that need to be undertaken in the EIA.

Chapter 1: Background and Introduction

- This chapter provides a description of the location and the land ownership of the mine, as well as the purpose, approach and methodology followed for the completion of this project.

Chapter 2: Project Description

- This chapter provides a description of the proposed project and how it is planned to be initiated and operated should the environmental investigations be sufficient.

Chapter 3: Project Alternatives

- This chapter details the project alternatives considered for the project and conducts a comparative assessment to indicate why the final option was selected if required.

Chapter 4: Baseline Environmental Description

- This chapter provides a description of the current environment (which includes the bio-physical and socio-economic components) prior to the commencing of the proposed project.

Chapter 5: Public Participation Process

- This chapter details the process undertaken for stakeholder engagement and provides a discussion on the issues raised and how these will be addressed.

Chapter 6: Potential Impacts and Issues

- This chapter assesses the potential impacts on the environment, without considering the necessary management measures, and identifying which specialist studies must be commissioned.

Chapter 7: Plan of Study for EIA and draft EMP

- This chapter outlines the plan for the EIA and draft EMP, all aspects that must be included into the EIA and draft EMP, and the associated timeframes.

Chapter 8: Conclusion

- The conclusion provides a brief discussion on the findings in the report and the way forward for the project investigations.

Appendices

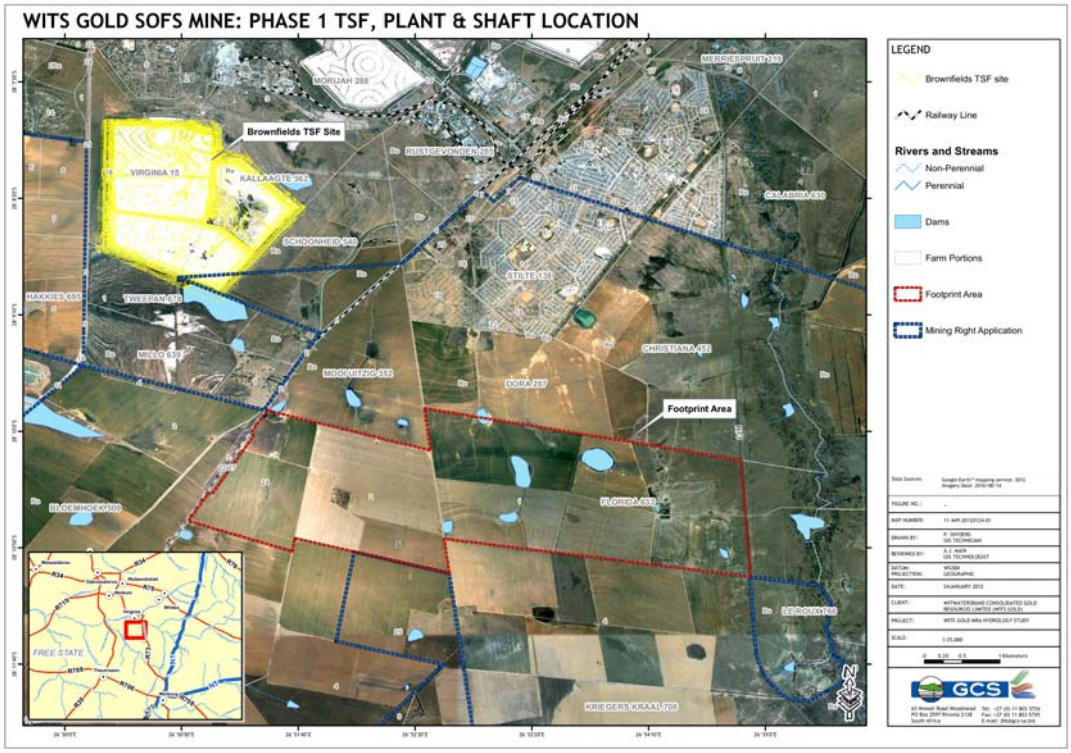
- All supporting documentation is provided in appendices and on CD.

2 PROPOSED SCOPING PROJECT DESCRIPTION

Phase 1 of the SOFS Mining Operation, namely the DBM Project (Figure 2.1), is situated in the Free State Province of central South Africa and is south of the town of Virginia (28°70"S, 26°540"E); whilst the closest major towns to Virginia are Welkom (24 km North-West) and Bloemfontein (136 km South-West) Virginia is approximately 270 km by national road from Johannesburg. It is important to note that the DBM Project extends over numerous farms and/or Prospecting Rights and the northern portion of the area used to form part of the Harmony Merriespruit Mine lease area that was unmined. This area will be included in the Mining Right application area once transfer the properties to Wits Gold is notarially executed. Application for ministerial consent terms of Section 102 of the MPRDA has been granted and the regional office of the DMR is processing the necessary documentation in order to effect the transfer of the rights to Wits Gold.

Ore body mining will be entirely underground at depths starting from 480 metres below surface. Mining is currently planned to be undertaken using narrow reef breast mining approach common to the gold mines of South Africa. Support for the mining will be from a trackless footwall infrastructure below the Leader Reef (bottom reef horizon). This is less common but not unique in underground South African gold mines.

As part of the environmental approval process for a Mining Right application, an ESR and EIA/EMP in respect of the MPRDA have been submitted to the Department of Mineral Resources (DMR) in Welkom on 14 March 2012 and 7 August 2012 respectively.



(Figure not to scale – please refer to Appendix A for the A3 figure)

Figure 2.1: Locality Map

2.1 Project Area Infrastructure

Existing Infrastructure

There is no underground mining infrastructure on the site. There is however a gravel access road that comes off the R73 Provincial road. The road will be upgraded for 30 tonne delivery trucks.

Initially process, service and potable water will be sourced from Sedibeng Municipality until the mine underground workings are established and able to provide the required service and process water.

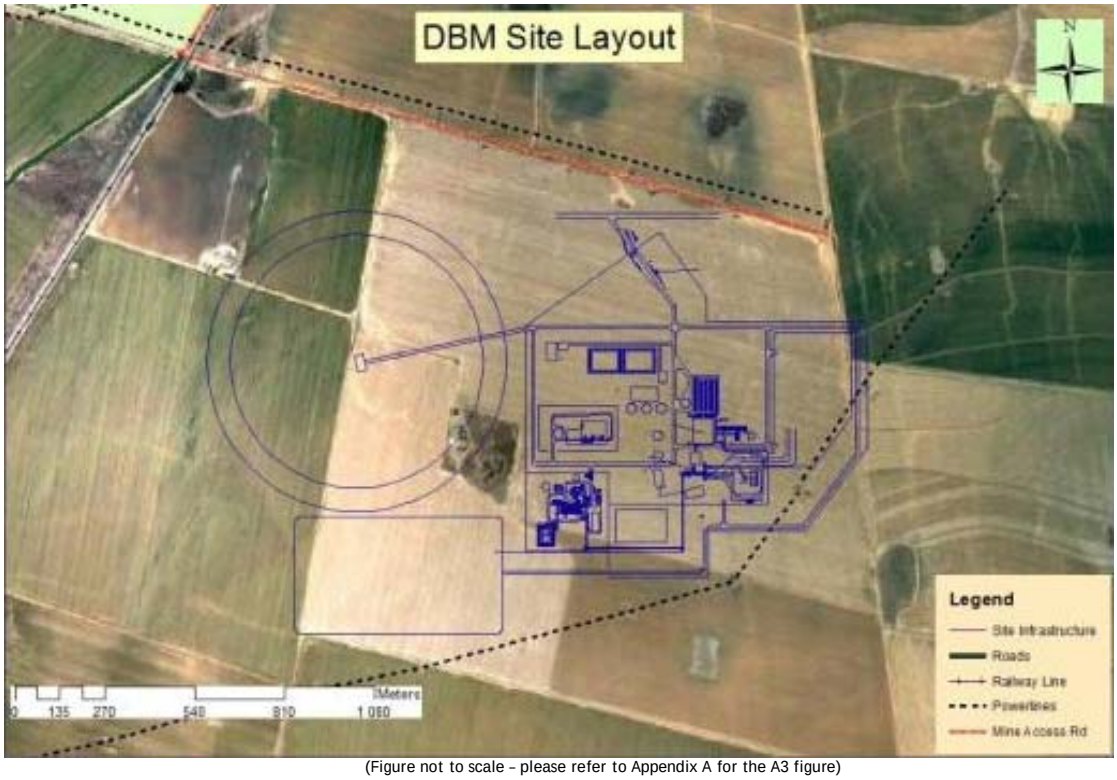
Harmony Gold has an existing brownfields Tailings Facility which Wits Gold is in discussions with Harmony to acquire (Appendix F).

Required Infrastructure

The SOFS Mining Operation (Figure 2.2) will consist of underground mining operations, associated workshops and stores. All infrastructure required to support the planned mining operation has been included and allowed for in the capital and operating costs. Infrastructure allowed for includes:

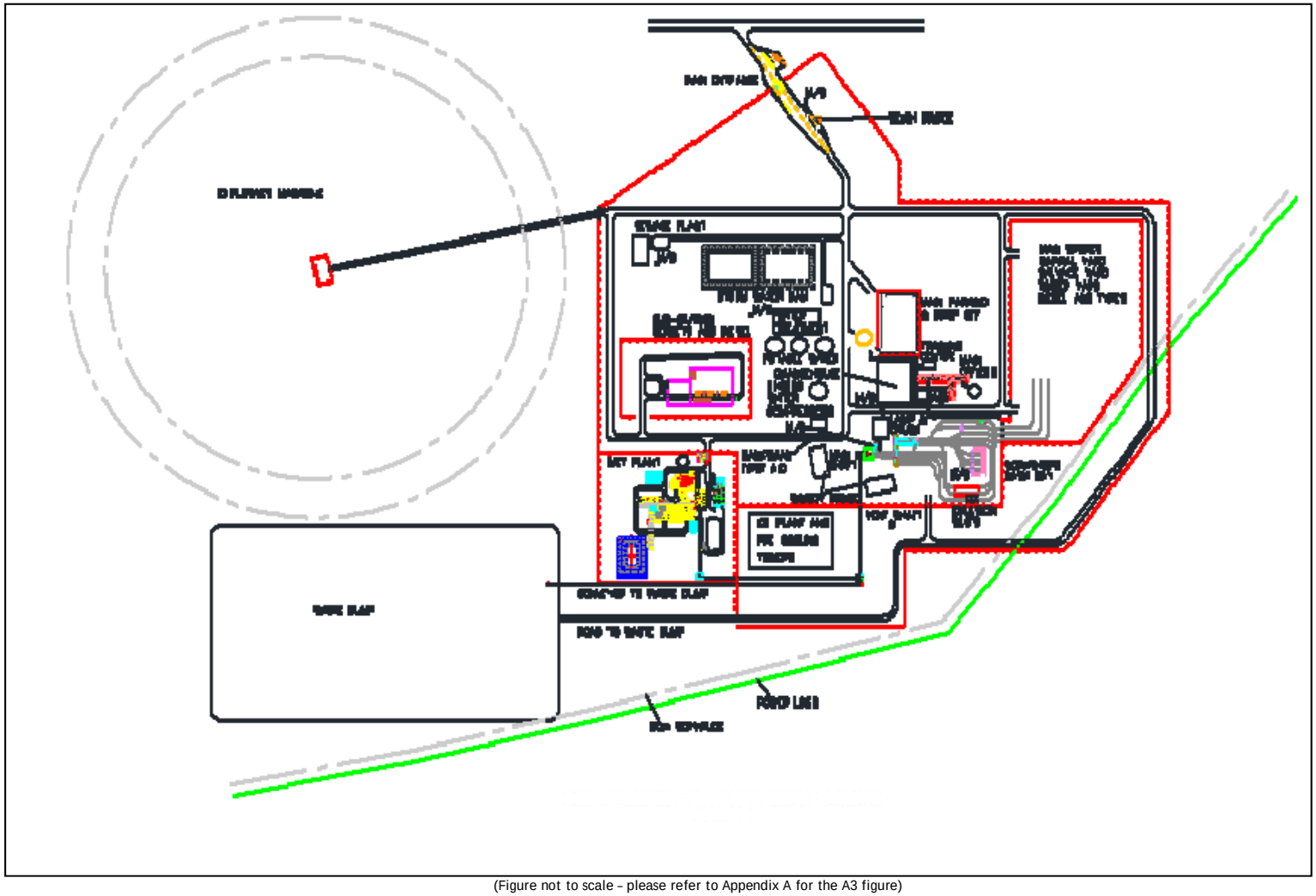
- Water:
    - Bulk water supplies;
    - Surface supply reticulation;
    - Underground supply reticulation;
    - Dirty water pumping and settling;
    - Sewage treatment;
    - Water treatment plant to potable quality; and
    - Brine storage dams.
- Bulk power supplies:
    - Bulk power supplies;
    - Main Eskom yard;
    - Surface reticulation;
    - Underground reticulation; and
    - Emergency generators.
- Surface infrastructure:
    - Buildings;
    - Workshops;
    - Change houses and lamp room;
    - Clinic;
    - Stores and Salvage yard;
    - Core yard/shed;
    - Sewage treatment and disposal;
    - Roads and storm water handling;
    - Ice plant and cooling towers;
    - Metallurgical plant;
    - Rock handling;
    - Tailings disposal facilities; and
    - Waste rock dump.
- Underground infrastructure
    - Workshops;
    - First aid facility;
    - Fire detection;
    - Rescue chambers;
    - Pump station;
    - Trackless footwall development; and
    - Stores.

Refer to **Figure 2.2** for the proposed DBM site layout and **Figure 2.3** for the proposed plant layout.



(Figure not to scale – please refer to Appendix A for the A3 figure)

Figure 2.2: DBM site layout



(Figure not to scale – please refer to Appendix A for the A3 figure)

Figure 2.3: Proposed Surface Infrastructure Layout for the DBM Gold Mine

2.2 Roads, Railway Lines and Power Lines

2.2.1 *Roads*

Existing Infrastructure

The Wits Gold DBM Mine will obtain access from the S239 Road. Currently, this access can be considered as an informal access and might require a formal approval. The adequacy of this access needs to be investigated further as currently the access is an uncontrolled railway crossing (Figure 2.4).

The major routes in the study area are described in **Table 2.1** below:

Table 2.1: Overview of the existing road network and jurisdiction

ROAD LINK	JURISDICTION	CLASS OF ROAD	FUNCTION OF THE ROAD	ROAD SURFACING	CROSS SECTION (TYPICAL WIDTH OF THE ROAD)
R30	Free State Department of Public Works, Roads and Transport (FDPWRT)	R3	The road is a Provincial Class 3 road with a collector-distributor function. The road runs in the north-south direction. The R30 connects Odendaalsrus with Theunissen.	The road is paved and the surface condition is fairly adequate.	Single carriageway (2 lanes: one lane per direction)
R73	Free State Department of Public Works, Roads and Transport (FDPWRT)	R3	The road is a Provincial Class 3 road with a collector-distributor function. The road runs in the north-south direction. The R73 connects Welkom with the R30.	The road is recently paved and the surface condition is adequate.	Single carriageway (2 lanes: one lane per direction)
S1279	Free State Department of Public Works, Roads and Transport (FDPWRT)	R4	The road is a Provincial Rural Road. The road runs in the north-south direction. The S1279 Road connects with the S239 Road.	The road is a gravel road	Single carriageway (2 lanes: one lane per direction)
S239 (Theunissen Street)	Free State Department of Public Works, Roads and Transport (FDPWRT)	R4	The road is a Provincial Rural Road. The road runs in the east-west direction. The S239 Road becomes Theunissen Street and connects with the R73 Road.	The road is mostly gravel road	Single carriageway (2 lanes: one lane per direction)
Jan Hofmeyer	Free State Department of	R3	The road is a Provincial Class 3 road with a collector-distributor	The road is paved and the surface	Single carriageway (2 lanes: one lane per direction)

ROAD LINK	JURISDICTION	CLASS OF ROAD	FUNCTION OF THE ROAD	ROAD SURFACING	CROSS SECTION (TYPICAL WIDTH OF THE ROAD)
Street	Public Works, Roads and Transport (FDPWRT)		function. The road runs in the north-south direction. Jan Hofmeyer Street becomes the R73 further south and connects to the N1.	condition is fairly adequate.	

Required Infrastructure

Approximately 2 km of access tarred road 10 m wide will be required as the main access to site. The road will consist of 2 x 150 mm layers of roadbed from borrow pit material (G7), a 200 mm thick stabilized sub-base layer (G5) from commercial sources and a 150 mm thick base layer, finishing off with a layer of bitumen, as well as storm water drainage channels.

Internal roads will be of a similar design to the access road, except that they are compacted gravel and are about 9 km long.

These roads are specifically designed for use by surface support vehicles, such as stores delivery trucks and light service trucks.

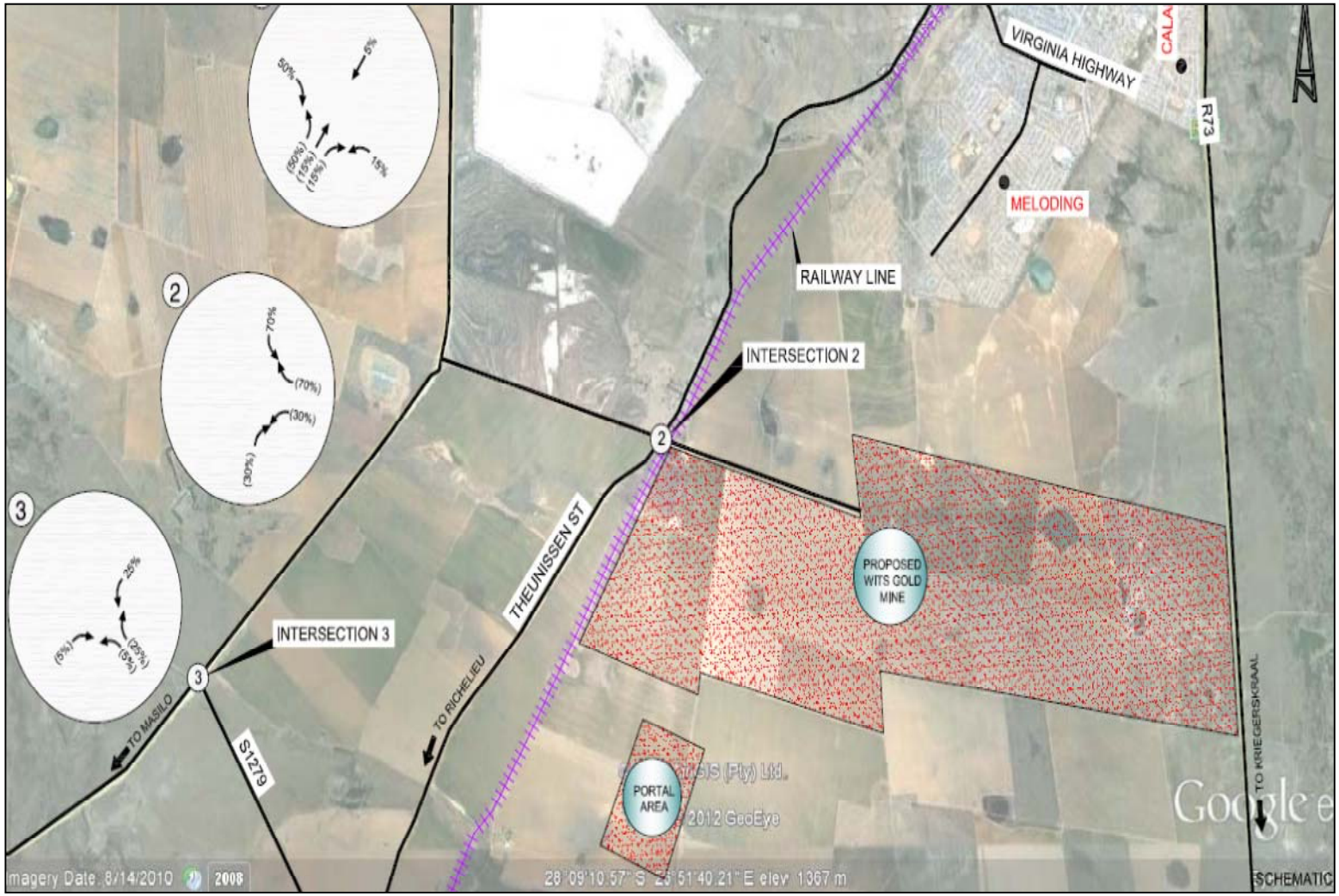


Figure 2.4: Road and Railway routes associated with the study area

2.2.2 Railway Lines

No transport of product by rail takes place, and it is not envisaged that any railway lines will be constructed for the proposed new infrastructure.

2.2.3 Power Lines

Required Infrastructure

The mine has requested a bulk supply from Eskom at 11 kV, as the mine reticulation will be performed at this level. The proposal is for Eskom to construct a 132 kV line from their Thesues substation to the mine site, using an existing transmission line servitude. The 35 MVA, 132/11kV substation will be constructed on the mine site.

2.3 Workshops, Administration and Other Buildings

2.3.1 Workshops and Offices

2.3.1.1 Workshops

Workshops catering for the following have been proposed:

- Electrical repairs and production;
- Mechanical fitting, machining and production;
- Boiler making;
- Rigging;
- Hydropower repairs workshop;
- Riggers workshop;
- Instrumentation workshop;
- Light vehicles repair workshop; and
- Skip gantry.

The proposed workshops will be of steel construction with corrugated galvanised iron cladding on the sides and similar sheets for roof cover. All workshop structures can be dismantled and re-located at mine closure. The concrete pad upon which the workshop complex sits will be about 435 m^3. The workshops will be located just east of the shaft position. Refer to Figure 2.3. Lean-to type structures will be constructed within the workshop complex to provide office accommodation for foremen.

All workshops will be in place by Year 6.

2.3.2 Offices

The administration offices will be of pre-fabricated design consisting of steel columns and top rails manufactured from 1.6 mm mild steel plate. All steel components will be corrosion protected.

External walls will be from a 9 mm fibre board panel with a fire retarding skin bonded to a 40 mm polystyrene core covered by a 12.5 mm Rhino board on the inside.

The internal walls between offices will be drywall. Two 12.5 mm Rhino board will be installed using the galvanized track and stud method of partitioning. The roof is of timber trusses and 0.5 mm galvanized corrugated sheeting covering. The ceiling will be of 6.4 mm Rhino board. Office floors and corridors will be of carpet tiles while kitchens and bathrooms will have vinyl tiles.

The total office foot print has a concrete pad of about 1,609 m^2.

All offices to be in place by Year 6 of the project.

2.3.3 Change House and Lamp Room

The change house will be located adjacent to the shaft administration offices. It is a planned to be a pre-fabricated structure with galvanized steel columns and Chromadek sheet panels, insulated with 60 mm polystyrene. There will not be a ceiling due to the amount of steam normally generated in such a facility, although there will be whirlybird fans in the roof to exhaust steam. Timber trusses will be enamel painted and sisalation will be laid under the roof sheets. The roof sheets will be of the IBR type galvanized sheets.

The change house will occupy a concrete pad of about 1,475 m^2.

The first of the two modules will be installed in Year 1 and the second one in Year 7.

2.3.4 Stores and Salvage Yard

The store building is a steel structure similar to the workshop buildings with a floor space of 483 m^2 and a concrete volume of about 145 m^3.

The fuel storage facility is also within the stores area. It is sized to service all surface mine vehicles and the standby generator sets (gensets) which will be required if Eskom power is unavailable. The vehicles are estimated to consume about 1.4 kl of fuel per day and the

gensets about 2.9 kl when required to run. The underground operations will consume about 16.5 kl per day. The quantity stored is 183 kl, which is about 7 days consumption if all gensets are running at 60 percent diversity.

The proposed tank is a self-bunded unit complete with fuel dispensing pumps, flow meter, inlet and outlet fittings, overfill protection, anti-siphon valve, access manhole, level indicator, air breather and safety valve. There will be 8 for the 80,000 120,000 tpm option) units of 46 kl capacity each. They will be placed on a specially prepared concrete pad.

The cost of the tanks and the civil costs to prepare the depot surface have been included. This infrastructure is to be installed by Year 3 of the project.

2.3.5 Core Shed

A Core shed has been provided for and is of the same design as the workshops and stores buildings. It occupies a pad of 450 m^3 concrete volume.

This infrastructure is to be installed by Year 1 of the project.

2.3.6 Fire Detection and Suppression

Provision for fire pumps, fire water tanks, fire hydrants and hydrant reticulation, fire extinguishers hose reels and alarms has been made. Fire water is drawn from the potable water system. Water supply pipes will be sized to be able to charge fire water tanks in reasonable time. All facilities and major fixed equipment, such as offices, stores, timber yard, winder houses and fuel depot are protected. Provision has been made for a light diesel vehicle, equipped with water and foam tanks and pumps to fight small veldt fires around the site. Mobile equipment will have fire extinguishers on board.

2.4 Mineral Processing Plant

2.3.1 Mining Method

2.3.1.1 Conventional Stoping Method:

The mining method selected for application at the DBM Project is a conventional labour intensive breast mining method supported by a trackless footwall infrastructure.

The conventional breast mining method is commonly used on the gold deposits of the Witwatersrand. This method lends itself to selective mining in an ore body which is known to be highly channelised. In addition, this method has the advantage of being able to negotiate faulting thus minimising the risk of high dilution and associated losses.

Use of a trackless footwall infrastructure is less common, though not unique in South African gold mines. The use of a trackless supporting infrastructure has been driven by the selection of the primary access method. Based on the Scoping Study, the short shaft and decline combination was proposed with the primary consideration being time to early ore recovery. The flexibility of trackless equipment in the off reef development assists the negotiation of major and minor faulting and the ability to generate excess pre-developed ore reserves for selective mining.

A number of trade-off studies have been undertaken in the PFS. Eventually the option of a conventional deep shaft with tracked haulages and belt conveyors to replace trackless rock hauling was pursued.

2.3.1.2 Stoping Design

The stoping method applied to the reefs (Figure 2.5) at the DBM Project is a conventional breast mining approach. Mining is complicated by the fact that there are three reef horizons in relatively close proximity to each other, meaning a strict mining sequence must be applied as discussed previously. For purposes of this study, the B Reef horizon which is situated between the Kalkoenkrans/Beatrix and Leader Reef horizons is ignored due to the minimal amount of payable reef and the sporadic nature of this ore body.

The mining method consists of a reef access centre gully developed in a true dip direction in the plane of the reef between mining levels, a dip distance of approximately 225 m. The reef is carried in the hanging wall of the centre gully with footwall waste mined to give additional height. Centre gully dimensions are typically 2.4 m high by 1.5 m wide.

Mining panels of approximately 30 m in length including pillars (in the dip direction) are then established from this centre gully and mined in a strike direction. The height of these panels is planned to be kept at 1.0 m plus an allowance of 0.2 m for dilution. There will be 7 panels each side of the centre gully between mining levels.

On the down dip edge of each mining panel a secondary gully or strike gully is carried slightly in advance of the face. This Advanced Strike Gully (ASG) will be 2.2 m deep and 1.5 m wide excluding additional unplanned dilution.

A centre gully is developed every 180 m on strike meaning that mining advances a maximum of 90 m from the centre gully in either direction.

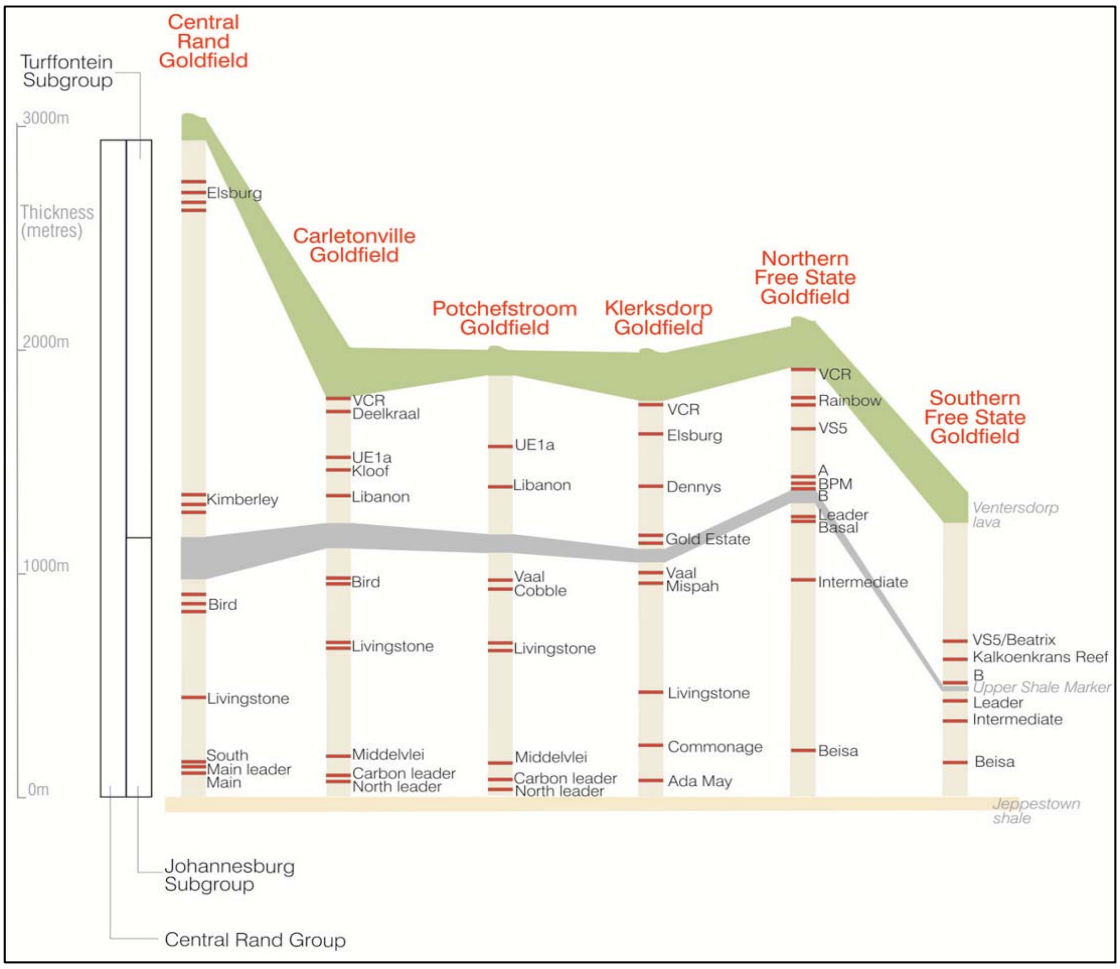


Figure 2.5: Principal Conglomerate Reefs In The Central Rand Group, Western Figure Witwatersrand Basin (Adapted By Muntingh D.J., 2007)

2.5 Processing Method

2.5.1 Rock handling

2.5.1.1 Ore Handling

Stope cleaning will be done with conventional winches and scraper. Hydro powered water jets will be utilised in the cleaning of stope panels. Conventional gully and centre gully scraping will be done to stope ore passes.

Reef will be collected in the cross-cuts utilising 30 ton dump trucks and hauled to the main decline ore passes. Ore will be hauled to the main shaft in the main declines utilising 50 ton dump trucks.

2.5.2 Mineral Processing

The tonnage throughput rate for the DBM plant has been set at 120,000 tons per month, based on the mine design.

2.5.2.1 Metallurgical Testwork

Based on the mining plan from the Concept Study, over the life of mine, ore will be mined in varying proportions from four reefs – the Kalkoenkrans reef, Beatrix reef, B reef and the Leader reef. The Leader reef has high and low carbon areas. The Kalkoenkrans reef made up more than 50% of the ore to be mined.

No metallurgical testwork was carried out prior to the commencement of the pre-feasibility study.

Samples of leach tailings will be available for tailings dam design testwork and for various groundwater studies.

2.5.2.2 Selection of Process Route

For the purposes of process and plant design for the pre-feasibility study, it was assumed that the ore to be processed will be similar in mineralogy and ore processing characteristics to the ores which are currently being mined in the area. The closest metallurgical plants to the DBM area are the old Harmony Merriespruit plant, the Joel plant and the Beatrix plant. As the Harmony plant was designed many years ago, its processing route was not considered. Joel plant uses run-of-mine (ROM) milling followed by cyanide leaching and carbon-in-pulp (CIP). Beatrix also uses ROM milling followed by carbon-in-leach (CIL). The Beatrix ore contains smectite type clays, which are preg-robbing, so CIL is well suited to this ore. Neither Joel nor Beatrix make use of gravity concentration.

Based on the above it was decided that the process route would be ROM milling, followed by CIL, with the gold being recovered by elution, carbon reactivation, electrowinning and smelting. Should the testwork show that gravity concentration could make a significant contribution to gold recovery, it could then be included in the flowsheet. Similarly, if the ores do not contain any preg-robbing minerals, then CIP could be considered. A consideration is that a number of gold plants around the world which have not identified preg-robbing minerals in their ores, still elect to use the CIL process over CIP as it is lower capital cost and has a simpler flowsheet (no CIP tanks). CIL does result in a lower gold loading on the activated carbon than CIP plants, which then requires a larger elution plant. Overall, a CIL plant is lower capital cost than a CIP plant and installing a CIL plant ensures that no gold will be lost to preg-robbing minerals.

This process route utilises technology and equipment that is well proven on the metallurgical plants on the gold mines of the Witwatersrand and Free State.

2.5.2.3 Evaluation of Viability of Uranium Recovery

A study was carried out to determine whether it would be viable to recover uranium from any or all of the DBM reefs.

During the DBM Concept Study the various reefs were analysed for uranium (as U_3O_8). The High Carbon Leader reef showed the highest uranium grade, at 280 ppm. The highest uranium content of the other reefs was 140ppm. Based on the planned mining rates from the various reefs a uranium plant feed rate of 15 000 tons per month of High Carbon Leader Reef was assumed. The capital and operating costs for a plant of this capacity were determined, and the revenue calculated, all in current money terms.

The study showed that treating ore from the High Carbon leader Reef, the highest grade reef in terms of uranium content, will require a uranium price of $85 per pound of uranium (in current money terms) to make the process viable. This compares to the current uranium price of $55 per pound. It is therefore unlikely that uranium recovery will be viable in the near future from any of the DBM reefs..

2.5.2.4 Process Description

The proposed plant flowsheet is shown in Figure 2.6.

ROM ore is withdrawn from the shaft headgear bin with vibrating feeders onto the conveyor that transfers the ore to the mill silos. No crushers are included in the circuit as the ore from underground will have a top size of 400mm, which is an ideal feed size for ROM milling. It is possible that the ore produced by the Long Hole Stoping mining method may be finer than this, but 400mm is the preferred top size. In ROM milling, the large rock particles are used for grinding in the mill. An absence of these sized particles will result in increased steel ball consumption.

Ore is withdrawn from the mill silos with vibrating feeders and fed to the ROM mills. The mill discharge is pumped to the cyclones where classification by particle size takes place. The cyclone underflow containing the coarse particles is returned to the mill for regrinding while the cyclone overflow containing the fine particles passes to the thickener. A linear screen on the thickener feed removes woodchips and any tramp material such as plastic particles. These particles, if not removed, will blind the carbon screens in the CIL circuit.

If gravity concentration is included in the flowsheet, a portion of the cyclone underflow will be fed into the gravity concentrator. The tailings from the gravity concentrator will be returned to the mill, while the gravity concentrate will pass to the smelthouse for further upgrading and smelting.

Lime and flocculant are added to the thickener feed to aid settling of the finer particles. The lime addition is controlled to provide the optimum pH in the CIL for gold leaching. Thickener underflow is pumped to the CIL circuit. Thickener overflow water is returned to the mill process water tank. The plant feed sample for gold accounting purposes will be taken from the feed to the CIL tanks using an automatic cross cut sampler.

Sodium cyanide is added to the CIL tanks to dissolve the gold. Granular activated carbon made from coconut shells is added into the last CIL tank to absorb the dissolved gold. The carbon is pumped up the CIL circuit counter current to the pulp flow using recessed impeller pumps that minimise abrasion of the carbon. Carbon from the first (head) CIL tank is pumped to the loaded carbon screen. The screen underflow (pulp) flows back into the CIL tank and the loaded carbon is washed on the loaded carbon screen.

The loaded carbon then passes to the loaded carbon tank, from where it is fed into the elution column. The loaded carbon tank is also used as an elutriator, to wash any remaining woodchip and plastic particles out of the loaded carbon. There are two elution processes commonly used in the gold industry, the Zadra process and the Anglo American Research Laboratories (AARL) process. In the Zadra process, eluting solution (eluate) containing sodium cyanide and sodium hydroxide (caustic soda) at 120°C is passed through the elution column to strip the gold off of the carbon. The solution then passes to the electrowinning cells where the gold is electrolytically plated from the solution. From the electrowinning cells the solution returns to the elution column to strip more gold off of the carbon. This circulation of eluate through the elution column, to the electrowinning cell and back to the elution column typically takes approximately 16 hours, until the gold has been virtually completely eluted off of the carbon.

In the AARL process, the eluate does not pass directly to the electrowinning cell but is stored in the eluate tank. Fresh eluate is passed through the elution column until the elution process is complete. The eluate is then passed through the electrowinning cell to electroplate the gold.

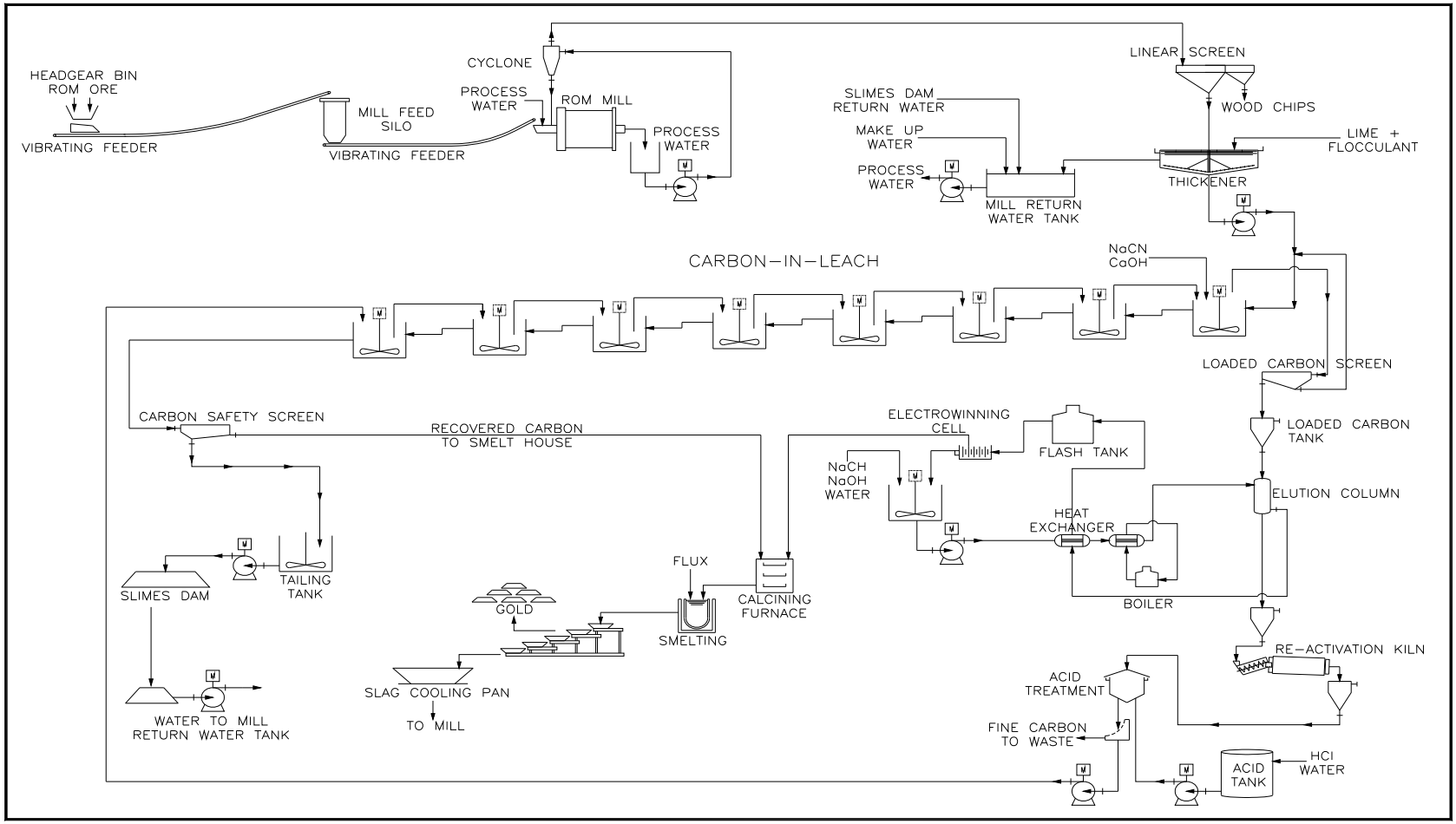
The Zadra process is considered to be simpler to operate than the AARL process, so the Zadra process has been selected for the DBM plant.

In the electrowinning cells, the gold is plated onto steel wool cathodes. Once electroplating is complete, the cathodes are removed from the cells, washed and calcined in a furnace. The product from calcining is then mixed with fluxes and smelted, to produce gold bullion bars containing approximately 90% gold. The slag resulting from smelting is crushed, milled and tabled on a gravity table to recover any gold prills from the slag. The gold concentrate is added to the smelt, while the slag is returned to the plant ROM mill.

Once the elution process is complete, the eluted carbon is washed and transferred to the regeneration kiln feed tank. The carbon is fed into the regeneration kiln. At a temperature of 750°C any volatile organic matter is distilled from the carbon. This process reactivates the carbon. The carbon exits the kiln into a quench tank. From the quench tank the carbon is screened to remove fines, and is then acid treated with dilute hydrochloric acid to dissolve any calcium and base metals which have adsorbed onto the carbon during the gold adsorption process. The acid washed regenerated carbon is then washed to remove residual traces of acid and returned to the last CIL tank for the adsorption process to be repeated. A quantity of fresh activated carbon needs to be added to the plant on a regular basis to make up for carbon losses caused by abrasion of the carbon in the CIL agitators and pumps. Fresh carbon, receive in bulk bags, is poured into an agitated tank to which water has been added. The carbon is agitated in the tank to remove the rough edges on the carbon particles. If this is not carried out, these rough edges will be abraded off shortly after the carbon has been added to the CIL tanks and will leave the CIL tanks in the tailings, but having adsorbed some gold, resulting in gold losses.

The pulp passes from tank to tank down the CIL train of tanks, counter currently to the carbon. When the pulp exits the last CIL tank, it passes to the carbon safety screen. Here the pulp passes through the screen to the cyanide detoxification tanks, and any carbon particles that have passed through the last interstage screen due to a hole in the screen will be recovered on the safety screen. This recovered carbon will either be smelted or sent to a by-product smelter to recover contained gold.

The CIL tailings then passes to the tailings tank prior to be pumped to the tailings dam. On the tailings dam, water is recovered through a penstock system and flows to the return water dam, from where it is pumped back to the plant for re-use.



(Figure not to scale – please refer to Appendix A for the A3 figure)

Figure 2.6: Proposed plant flowsheet

2.6 Solid Waste (Domestic, Industrial, Mine and Hazardous)

More information with regards to the detailed description of the infrastructure capacities, volumes, sizes and requirements will be included in the EIA/EMP phase.

2.6.1 Waste Handling

Domestic and hazardous industrial waste is to be disposed of off-site.

Domestic waste will be disposed of by an appointed contractor who shall be responsible for the collection and legal disposal of all domestic waste at an approved site.

Hazardous waste will be disposed of off-site. A suitable contractor will be appointed to regularly load the hazardous waste from a dedicated site on-mine, and transport it to a legally compliant disposal facility. The waste will need to be stored in sealed drums temporarily, before being transported away for disposal. This will require a temporary storage facility on-site. The on-site facility is bunded so that any spillage that occurs is contained within the bunded area. A wash facility is also provided for to wash the materials salvaged from underground of any contaminated dust before they can be handled further.

A bioremediation site has also been allowed for in order to rehabilitate soil contaminated by hydrocarbons through mining activities.

The infrastructure is required in the first year of the project.

2.6.2 Tailings Storage Facility (TSF)

Thickened slurry will be discharged through day and night delivery stations in order to form beaches that slope downwards away from the day walls. This will create top surface geometries that will result in supernatant pools that are maintained in the immediate vicinity of the penstock intake towers. An average beach angle of approximately 0.5% is expected for the segregated tailings material. The supernatant will be decanted from the top surfaces of the compartments because retained water could:

- Reduce the freeboard and the storm water storage capacity, and so increase the potential for overtopping.
- Increase the potential for slurry flows in the event of a breach.
- Increase the hydraulic gradient of seepage and pore water pressures, which could lead to lower factors of safety for side slope stability.
- Inhibit consolidation and so reduce the strength and storage capacity of the facility.

- Increase water losses through evaporation and seepage and so increase the environmental impacts on water consumption and groundwater.

In view of the above, it is strongly recommended that decant return should be maximized at all times in order to ensure minimum storage of supernatant. Excess water will therefore only be temporarily stored during high rainfall periods.

The consolidation of the tailings is important in enhancing stability and reducing the probability of a flow failure should structural instability occur. It also ensures the best utilisation of the volume capacity by increasing the stored tons of tailings per cubic metre. The expected low permeability of the non-segregated tailings material implies that there will be virtually no drainage of entrained water by normal consolidation processes during the life of the facility. The effective operation of the facility therefore depends on the consolidation of the tailings by drying, which is a very efficient method. The drying consolidation of the tailings can be inhibited by several factors:

- A large decant pool, preventing drying in the supernatant pool area.
- Concentrated deposition in one area.
- Low slurry densities.
- High rainfall periods.
- High rates of rise.

It is considered that these problems can be overcome by good operation management practice (i.e. thin layer deposition through the implementation of optimised tipping cycles etc.).

2.7 Clean and Dirty Water Processes

2.7.1 Sewerage Facilities

The sewage treatment plant proposed is a self contained vendor supplied system designed to handle raw sewage generated by about 3,300 people, at a maximum flow rate of about 600 kl per day at the steady state operation of the mine. The plant will be installed in three modules of 200 kl per day each to allow phasing in as the mine ramps up to full production. Effluent will be treated to DWA standards for use as irrigation water for the gardens around the site. Treated humus will be drawn out of the humus tank (once per year) and be transported to the nearest municipality sewage treatment works for disposal, by arrangement.

Sewerage pipes will be PVC and will be buried about 1 m below ground to protect them from inadvertent damage and ultraviolet light. PVC pipes are more cost effective than steel pipes. As the site is fairly flat raw sewage from areas where it cannot flow by gravity will be pumped to the treatment plant. Provision has been made in the costs for transfer pump stations.

The first of the three modules will be installed in Year 1 and the second one in Year 5 and the final one in Year 7.

2.7.2 Clean and Dirty Water Separation Infrastructure

Storm water control measures will be constructed and implemented within the proposed project area. All the storm water control measures will adhere to the following minimum standards:

- All clean water systems will be designed and operated in such a manner that they are at all times capable of handling the 1:50 year flood event on top of their mean operation level without spilling;
- Any water arising from an area, which causes, has caused or is likely to cause pollution of a water resource, including polluted storm water, must be contained within a dirty water system. In order to reduce the volume of polluted water, contaminated areas should be minimised. While clean water should be diverted to natural water courses, polluted water should be re-used wherever possible, thereby reducing the use of clean water; and
- All dams and/or discard facilities that form part of the dirty water system will be designed, constructed, maintained and operated to have a minimum freeboard of 0.8 m above full supply level.

2.7.3 Design of the Pollution Control Dam

Any dam which contains dirty water runoff should be appropriately lined to ensure that contaminants do not seep into the ground and pollute surface or groundwater resources. As mentioned previously, in this case the Mine has opted to treat contaminated runoff and to then discharge the treated water into the environment. This has significantly decreased the storage capacity required for a Pollution Control Dam.

2.7.3.1 PCD Simulation

According to the Turgis Report (Turgis Mining Consultants, 2012), the proposed PCD was designed for a peak 1:50 year 24 hour storm event. GCS simulated a water balance around the storage volume as proposed by Turgis (68 Ml) to ensure that storm peaks, combined

with the operational philosophy as proposed by Turgis, will not result in any spills from this facility more than once, on average, in 50 years.

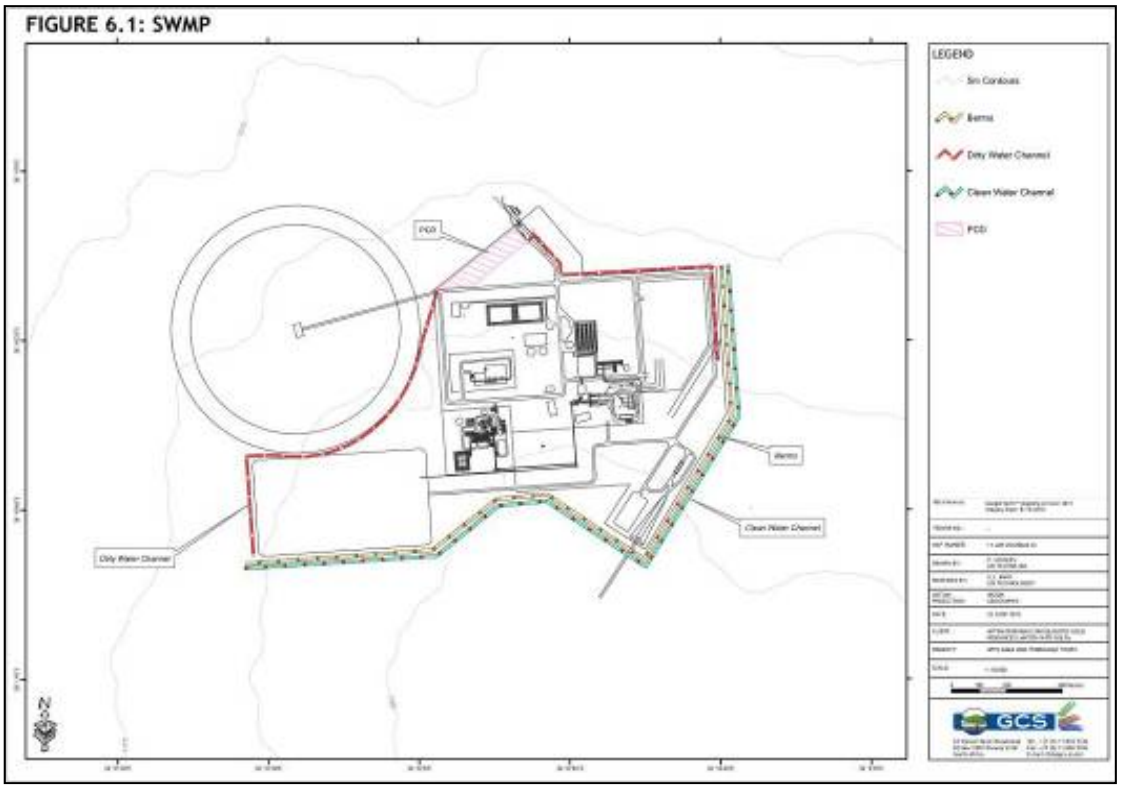
In this water balance simulation, two scenarios were assumed. The first scenario assumed that the stormwater dams (Pollution Control Dam (PCD)) volume is fixed at 68 000 m^3 and calculates the treatment capacity required to ensure that the PCD does not spill more than once, on average, in 50 years while also taking into account operational treatment requirements.

The second scenario assumes that the PCD volume could be adjusted in order to ensure that the treatment requirements can be limited as far as possible. The second scenario will therefore attempt to ensure that larger runoff events could be more effectively balanced; ensuring reduced operational costs from a smaller treatment works.
The following assumptions apply to both scenarios:

- Dirty water catchment of 120 ha;
- Runoff as calculating using WR2005 rainfall data and runoff simulation;
- An additional 139,000m3/month treatment capacity from excess water from mining processes, over and above the treatment capacity required for stormwater handling;
- Monthly evaporation figures as given in the hydrology section were used to calculate average monthly evaporation from the PCD surface area;
- An average depth of 2 m was assumed for the PCD;
- Rainfall directly onto the PCD surface area was taken into account; and
- Dust suppression of 12,000m3/month from the PCD was assumed.

2.7.4 Storm Water Drainage

Figure 2.7 shows the conceptual locations for the clean water diversion channels, the clean water diversion berms and the dirty water channels. The proposed infrastructure must be designed by a registered Engineer.



(Figure not to scale. Please refer to Appendix A for the A3 figure.)

Figure 2.7: Storm water management system

Storm water run-off from other areas apart from the ones described in the above section constitutes clean storm water. Clean water run-off will be diverted around the dirty water areas by means of berms and diversion drains. The water will end up in natural water courses around the area. An allowance has been made for the berms and drains.
The infrastructure is required in the first year of the project.

2.8 Potable Water Supply

The potable water usage was estimated at 202 Ml per month, made up of 65 Ml for domestic use and 137 Ml for the Ice Plant. A cost provision based on a quotation received from the municipality was made for the connection.

Water will be stored in three 2.4 Ml tanks (about a day's consumption), located north of the shaft. The tanks are of galvanised steel construction, mounted on concrete pads. These can be translocated at mine closure.

One tank is required in Year 1, the next in Year 6 and the third in Year 7.

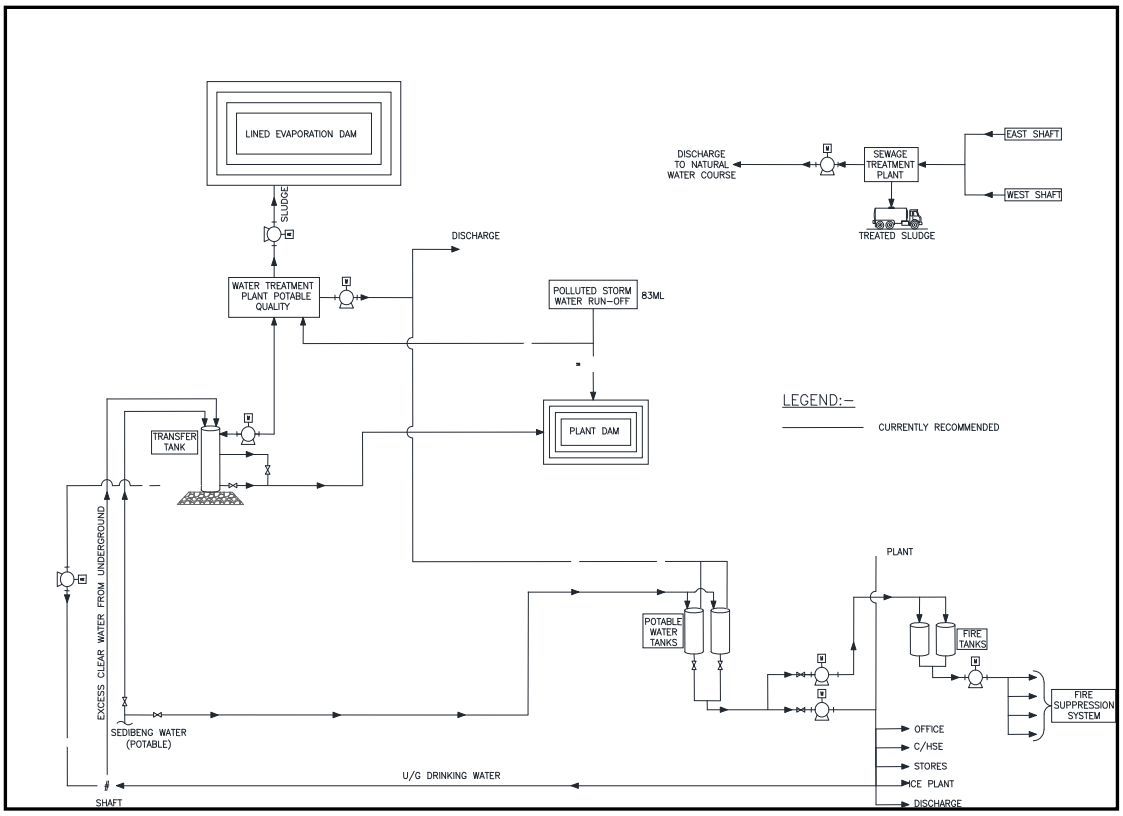
2.9 Process Water Supply

Clarified water excess to the requirements of the underground workings will be pumped to an excess water transfer tank on surface, and distributed to the plant. Water not required for the plant will be treated to potable water quality for use on the mine. Any excess water after treatment will be discharged into natural water courses.

The residue (Brine) will be stored in 6 x dams, specially constructed and triple lined to prevent seepage of contaminated water into the ground water table.

Two dams are required in Year 1, the next two in Year 8 and the third pair in Year 15.

The schematic in **Figure** 2.8 shows the proposed water reticulation.



(Figure not to scale. Please refer to Appendix A for the A3 figure.)

Figure 2.8: Water reticulation diagram

2.10 Project Planning and Associated Activities

2.10.1 Pre-Construction Phase

The pre-construction phase has been included as a project phase to afford the applicant sufficient time to address all the environmental authorisations required for the proposed operation.

2.10.2 Construction Phase

The following activities are proposed:

- Construction of service roads;
- Construction of power lines where necessary;
- Construction of access roads where necessary;
- Water pollution control structures;
- Construction of shaft access;
- Construction of ancillary infrastructure; and
- Clean and dirty water infrastructure.

During the construction phase, the following activities could impact on the bio-physical environment and the cultural/social setting:

- Stripping of vegetation;
- Stripping of topsoil and subsoil as the construction activities start on site;
- Impact on water system and associated wetlands due to the construction activities;
- Construction of the clean and dirty water systems;
- Possible compaction of soils by the establishment of topsoil stockpiles and berms; and
- Dust dispersion from infrastructure construction and boxcut construction activities.

2.10.3 Operational Phase

During the operational phase, the following activities could impact on the bio-physical environment and the cultural/social setting:

- Underground Mining Activities;
- Possible compaction of soils and erosion of soil stockpiles and berms by wind and water;
- Impact on surface- and groundwater system due to the operational activities;
- Dust dispersion from workings;
- Clean and dirty water control and maintenance;
- Sewage management; and
- Ancillary activities (workshops, offices, etc) .

2.10.4 Decommissioning and Closure Phase

When the decision is taken to decommission the mine, the following objectives and proposed actions for the decommissioning and closure phase of the mine could be considered depending on the outcomes of the EIA and draft EMP:

- Recovery of all saleable infrastructure;
- Demolition of structures;
- Ripping of all compacted areas, which will be followed with amelioration and vegetation;
- Ensure that all remaining dumps, piles and slopes are sufficiently shaped to blend in with the surrounding infrastructure;
- Amelioration and vegetation of all disturbed areas;
- Maintenance of all re-vegetated areas up until such areas initiate succession and create a sustainable cover;
- Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and
- surface water) in order to demonstrate stability of rehabilitated areas;
- Weed management after closure, limited to areas disturbed by mining or included in the mining area.
- Monitoring will be undertaken for a specific period after closure or up until such time that all areas create a sustainable cover and ecosystem.

3 PROJECT ALTERNATIVES

A number of alternative options have been evaluated during the mine design. A high-level qualitative risk assessment was performed to determine the most preferred option from an environmental perspective.

3.1 Mining Methodology

3.1.1 Tailings Facility Site Alternatives

At the onset of the environmental impact assessment process, the EAP was advised that a Greenfields TSF site would be located within the proposed infrastructure footprint area. The option to switch from the proposed Greenfields TSF option to that of a Brownfields TSF option occurred after consultation between the applicant and the current owner of the Brownfields TSF site. Due to the nature of this project it was anticipated that the potential impacts associated with the Greenfields TSF site would be more significant than that of the Brownfields TSF site and for that reason the Brownfields TSF site was deemed the preferred option. Further discussion on the Greenfields and Brownfields sites (Figure 3.1) are included in the sections that follow.

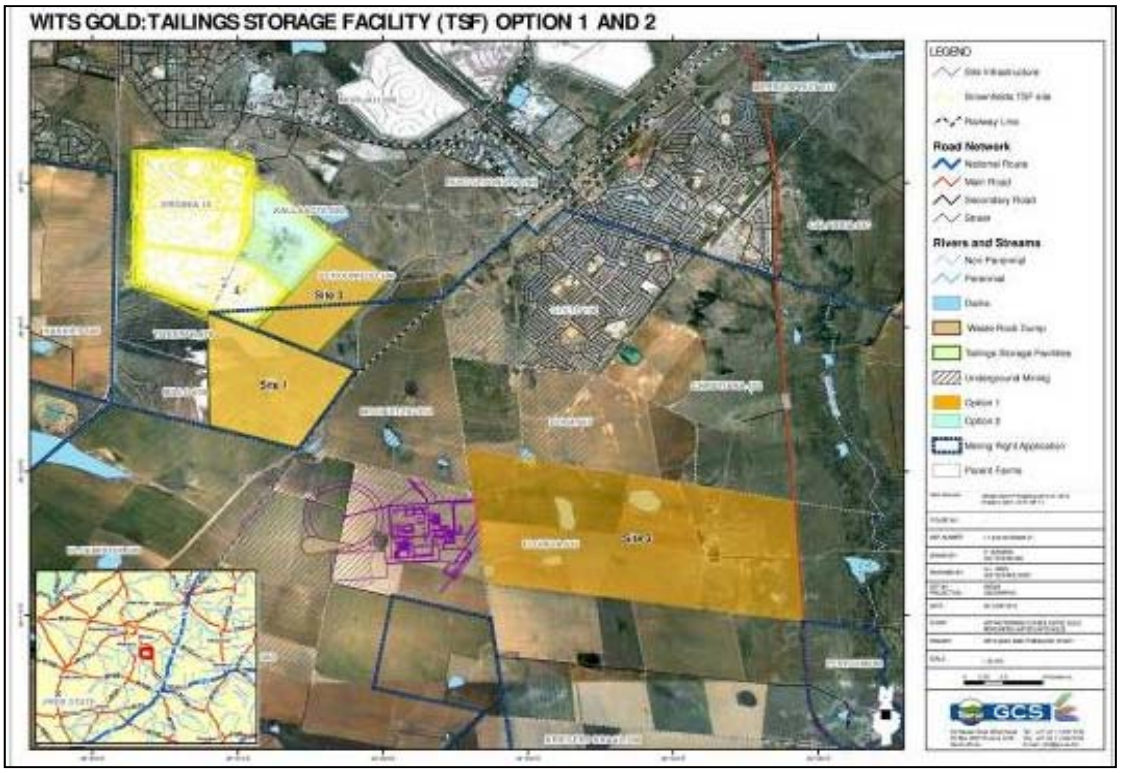
3.1.1.1 Option One (Greenfield Options Site 1-3)

This area is adjacent to Merriespruit tailings dam - No agricultural activities in the form of cultivation is taking place on the land, however the area is used for livestock grazing. Proximity to Meloding township and the influence of dust and noise remains the most compromising factors.

3.1.1.2 Option Two – Preferred (Brownfields Site)

The area is highly disturbed and does not reflect any agricultural and natural land use. The area is furthest from Meloding township and social receptors. Current land use comprises a highly disturbed historical mining area thereby rendering it most suitable for a tailings dam facility (Refer to Appendix F).

The existing rehabilitation liabilities associated with the Brownfields TSF site will be taken over by the applicant, if agreement to make use of this site is reached. This will only be undertaken after a full assessment of the current rehabilitation liabilities pertaining to the Brownfields TSF site has been undertaken by an independent assessor and a full reconciliation of the fund completed.



(Figure not to scale. Please refer to Appendix A for the A3 figure.)

Figure 3.1: Tailings Storage Facility (TSF) Option 1 and 2

3.2 Land Use Alternatives

Primarily the mine project infrastructure area is utilized for agricultural purposes in the form of dry-land, livestock, maize, sunflower and wheat farming. The area of the preferred tailings dam site (Option 2) has been previously utilized for mining purposes. The alternative area (Option 1) is barren natural land, adjacent to Harmony's Merriespruit tailings dam. Land use has been taken into account.

3.3 Benefits of the Project

Following initial consultation with the Matjhabeng and Masilonyana Local Municipalities, regarding needs and priorities, as identified by their Integrated Development Plans (IDPs), the following projects were put forward as requiring further investigation:

- Virginia Farm; and
- Tikwe Lodge to be turned into Eco Tourism, Events Hosting and Agricultural Training.

Wits Gold has also investigated the possibility of taking over certain SLP projects that are currently being phased out by Harmony Gold (Appendix F) and the Beatrix operations of Gold Fields.

The DMR has offered to co-ordinate the prioritisation of Local Economic Development (LED) projects with Wits Gold, the relevant municipalities and existing mines in the area. The DMR further requested that additional projects be identified based on new IDP documents that are being finalised by the abovementioned Local Municipailities. Meetings have been initiated with the Matjhabeng Municipality for discussions based on their recently released draft IDP document for the 2012-2016 period.

Once the DMR has, in principle, approved of the proposed Local Economic Development (LED) projects, further consultation with the Local Municipalities and relevant stakeholders will take place to finalise the project implementation requirements as well as the way forward once the Mining Right has been granted.

3.3.1 Small, Micro and Medium Enterprises (SMME) development

Wits Gold will contribute towards mine community economic development by using available Black Economic Empowerment (BEE) compliant companies for the provision of goods and services to the mine. Wits Gold is committed to awarding procurement contracts to local companies which demonstrate suitable Historically Disadvantaged South Africans (HDSAs) participation in Management (and general employment) as well as local companies in order to sustain the local economy of the area.

Wits Gold intends to support Small, Micro and Medium Enterprises (SMMEs), where possible, which will be able to provide them with the relevant services. These SMMEs will be appointed on a contractual basis, on the condition that their services are relevant and the quality thereof, acceptable.

3.3.2 Housing and living conditions

In order to reduce single sex accommodation and to prevent the establishment of hostel accommodation, Wits Gold proposes to use local labour to construct houses on available land for purchase by the mine's employees. Housing allowances will be provided to staff and local housing within the towns of Virginia, Theunissen, Meloding and Welkom will be used as far as possible.

The Applicant will promote home ownership; therefore employees will be afforded the opportunity to participate in wealth accumulation through the ownership of property. It is believed that this will in the long term ensure that housing is sustainable even after mine

closure. The Company will facilitate housing development in the host municipality area to ensure adequate and acceptable housing and living conditions of the employees. It is believed that this will build a sustainable economy and quality of life of the host community through integration of employees housing needs into the host municipality's housing and settlement plans.

The Company aims to improve the quality of life of all employees and restore the self-respect and dignity of employees in line with the Mining Charter and the aspirations of employees through:

- Conducting individual assessments with employees to determine their current and aspired housing conditions;
- Encouraging employees to take home ownership in existing sustainable areas;
- Establishing an open communication process whereby employees may communicate any problems and suggestions with regards to their housing needs;
- Facilitating the development of housing options that will accommodate employees housing needs;
- Providing programmes to educate employees with regard to home ownership and budgeting; and
- Facilitating private investment from developers and/or banks for home owners.

Provision will be made for a R 10,000,000.00 investment over 5 years to improve on the housing conditions of mine workers.

3.3.2.1 Nutrition

In order to ensure that employees are aware of the advantages of a balanced diet, nutrition awareness will be promoted through a Wellness Programme.

The Company will adopt a comprehensive approach to address nutrition and this will be addressed in the employee Wellness Programme, which will be developed as part of the implementation plan of the Social and Labour Plan (SLP). It is envisaged that the employee Wellness Programme will enhance the standard of living of all employees.

The employee Wellness Programme will focus on:

- Nutrition, where staff will be advised on healthier eating habits which will include:
    - Measures to improve nutrition, which will be done in accordance with the standards set out by the Chamber of Mines of South African Health Standards Authorities;

  - Inducting and informing all employees on the National food based dietary guidelines. The intention will be that employees themselves acknowledge that each one has a role to be conscious of healthy eating habits;
- Educating employees and their families with regard to nutrition and wellness programmes with emphasis on HIV/AIDS and Tuberculosis, and provide information on common injuries that cause back pains;
- Wellness workshops which will include nutrition, exercise, stress management etc;
- Wellness incentive programme: Reward employees for making positive choices; and
- Providing health supplements to employees.

The Company will retain the services of a specialist healthcare services provider in order to compile a comprehensive wellness strategy which will integrate with community health issues. The strategy will include a health improvement programme that will address nutritional wellness, body wellness, emotional wellness and social issues.

3.4 No-Go Principle

If the no-go principle were applied, then the area in which the proposed SOFS Phase 1 (DBM Project) Mining Operation is located would continue with the land use and activities that are currently in place, namely commercial agriculture activities. The potential job creation benefit of the project (±1,635 jobs over the life of mine) would not materialise and the opportunity to employ women in mining, as per the requirements of the MPRDA, would also not occur. In addition the potential loss of contribution to economic development in the project area as well as compliance with the regions IDP, based on the SLP developed for the project, would be limited.

The no-go option would ensure that there would be significantly less environmental impacts in the area as a result of mining operations. Impacts would only be related to the existing mining operations within the Virginia area, specifically the Harmony gold mining operation located to the north west of the proposed project area. In addition to this, the existing Harmony Merriespruit TSF would remain as is, with minimal rehabilitation potential.

The continuation of commercial agriculture activities, as are currently taking place, would ensure that the current status quo in terms of revenue, economic contributions, employment and housing would continue. The potential expansion of these commercial agriculture enterprises would be limited to the areas currently being used specifically since the establishment of informal housing within the area is already evident.

If mining was not undertaken in the project area, the area could be utilised for housing developments and, potentially, other small, medium and large scale commercial opportunities. Alternatively, small-scale agricultural developments could take place (i.e. crop and livestock farming).

4 BASELINE ENVIRONMENTAL DESCRIPTION

4.1 Geology

4.1.1 Regional Geology

Phase 1 of the SOFS Mining Operation, the DBM Project, is part of the southern Free State goldfields which is situated in the Free State Province of central South Africa. Centred on the town of Virginia, it is approximately 280 km by national road from Johannesburg. It stretches east-west across the axis of a large north-easterly plunging synform representing the southern closure of the Central Rand Group of the Witwatersrand Supergroup. Structural deformation is dominated by numerous approximately north-south trending normal faults which predominantly are downthrown to the west .

4.1.2 Local Geology

The rocks of the Karoo Sequence extend over the entire DBM Project area at surface as indicated in Figure 4.1. These strata vary in thickness from 350 – 960 m as was established by means of exploration boreholes drilled.

During late Jurassic times the Karoo strata were intruded by dolerite. These intrusions (highlighted in purple on Figure 4.1) mainly occur in the south eastern and north eastern sections of the study area. This intrusion into Karoo strata caused the weakening of those lithologies at the contact zone, which resulted in preferential flow paths for groundwater.

Below the Karoo Sequence the stratigraphy of the Ventersdorp Supergroup shows considerable lateral variability across the DBM Project study area.

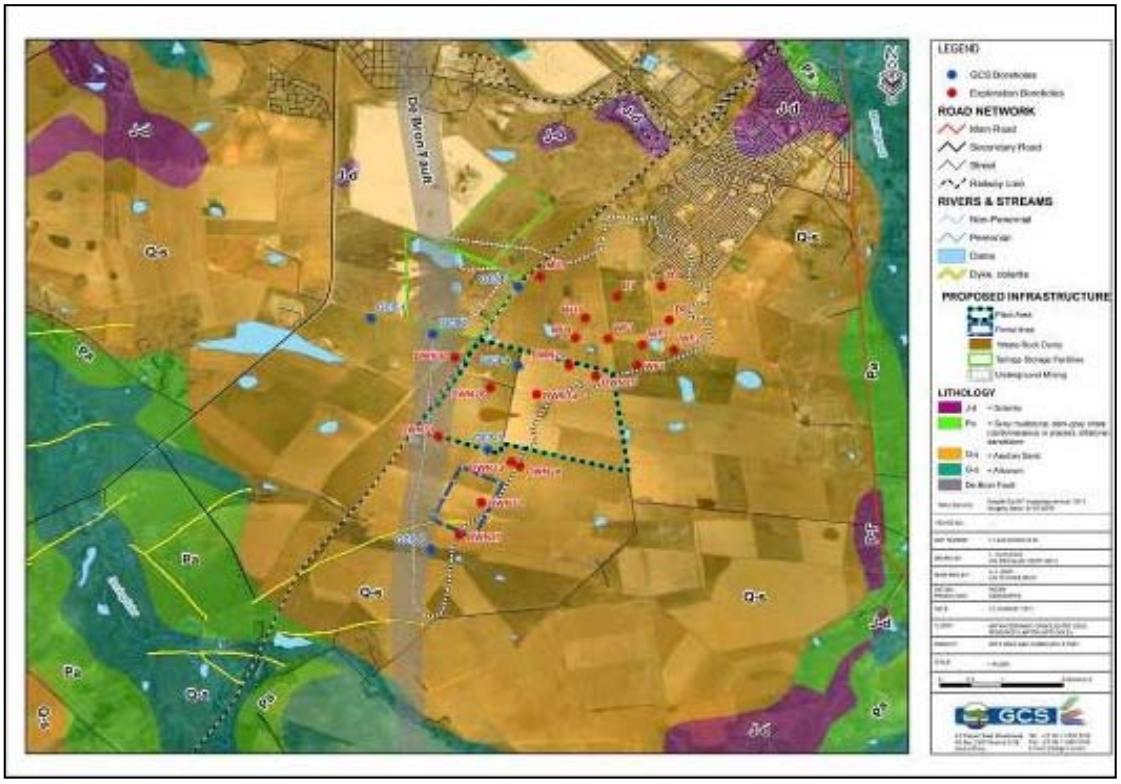
Within the western section of the project area this sequence is comprised of thick coarse clastic sediments of the Platberg Formation.

The Ventersdorp strata are underlain by the economically important Central Rand Group of the Witwatersrand Supergroup, which comprises the Johannesburg and Turfontein Subgroups. In the Johannesburg Subgroup, five unconformity bounded sequences (UBS's) have been recognised, with the Virginia Formation at the base, passing upwards into the St Helena, Welkom and Dagbreek Formations.

Gold and uranium bearing conglomerates are developed on the basal unconformities of each of these subdivisions, including the Leader Reef (Dagbreek Formation), the B Reef

(Spes Bona Formation), the Kalkoenkrans Reef (Aandenk Formation) and the Beatrix/VS5 Reef (Eldorado Formation).

A three-dimensional reconstruction of the Central Rand Group stratigraphy in the southern Free State Goldfield indicates a progressive southerly thinning of the sequence into the DBM Project area. This attenuation of the Central Rand Group is related to uplift during the latter phase of deposition in the Basin, causing erosion by superimposed, onlapping unconformities. These erosional relationships and the resulting sub-cropping of strata are the primary control on the distribution of the four gold bearing reefs within the DBM Project area.



(Figure not to scale – please refer to Appendix A for the A3 figure)

Figure 4.1: DBM Project Regional Geology Map

4.2 Topography

The topography of the region is described as 'Plains and Pans', situated approximately 1,400 meters above mean sea level (mamsl). No declared conservation area or centre of endemism is present within the immediate vicinity of the study area. The Willem Pretorius Nature Reserve is situated approximately 25 km to the southeast.

4.3 Climate

The DBM Project area falls within the dry Highveld grassland and summer rainfall region of South Africa.

The climate is typical of a continental plateau with a wide diurnal temperature range. Winters are cold to mild with occasional severe frost, with temperatures ranging from 0 - 21 degrees centigrade (°C). Summers are hot with temperatures varying from 11 - 30 °C.

Thunderstorms are frequent in the southern Free State with infrequent hail storms. Snowfalls have been recorded only once in the last 40 years. The climate conditions in South Africa enable exploration and mining operations to be conducted throughout the year.

The proposed Wits Gold mining area is situated at approximately 1360 – 1380 mamsl. It is characterized by warm wet summers and cool dry winters.

The proposed mining area falls within the C4C rain zone and the contact of two quaternary catchments namely C42K and C42J.

4.4 Soils, Land use and Land Capability

Refer to Appendix D-1 for the Soil, Land Capability and Land Use Scoping Report.

4.4.1 Land type data

Two different land types were identified on the proposed Phase 1 DBM Project site. These land types are Bd20 and Dc8. Land type Bd20 is found in landscapes where the slope everywhere is between 0 - 2% while the slope length differs for the different positions. For Position 1 (Figure 4.2), slope length is between 1,000 – 3,000 m and 500 – 2,000 m for Position 3. Landscape Positions 4 and 5 has slope length between 50 - 300 m. The soil forms in this land type mainly have sandy clay-loam texture with clay percentages between 6 -

30%. The geology underlying this land type is shale, mudstone and sandstone of the Ecca and Beaufort Groups.

Land type Dc8 is found in four different landscape positions i.e. 5, 5(1), 5(2) and 5(3). Positions 5 have slopes of between 0 - 3% and slope lengths of 200 – 1,500m. Positions 5(1), 5(2) and 5(3) all have slopes between 0 - 2% but shorter slope lengths between 50 – 1,000 m, depending on the position. The soil forms in this land type have a variety of texture classes ranging from clay to sandy clay-loam. The geology underlying this land type is mainly Ecca sandstone, shale and grit. Dolerite sills occur in places.

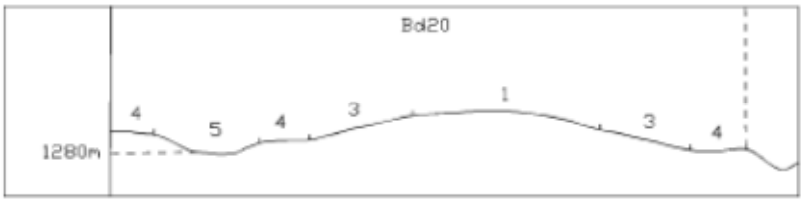


Figure 4.2: Terrain form sketch for Land Type Bd20

4.4.2 Physical soil properties

Six different soil forms are present in the study area. The soil forms identified are Clovelly (Cv), Avalon (Av), Oakleaf (Oa), Valsrivier (Va), Mispah (Ms) and Katspruit (Ka) soils. All these soils have yellow-brown soil colours (apart from the G horizon of the Katspruit form) and different levels of clay accumulation in the B-horizon. The Avalon soil form is underlain by a soft plinthic B1-horizon (also called water table soils) that act as a sponge to store water and which is an excellent soil form for crop production in drier years. The Katspruit soil forms showed definite mottling within the top 50 cm of the profile and must therefore be classified as a hydromorphic soil with wetland functionality. The Oakleaf and Valsrivier soil forms have cutanic B1-horizons of varying structure strength. The Clovelly soil profiles on site are deep and very suitable for crop production purposes.

4.4.3 Chemical soil properties

The pH (KCl) of the analyzed soil samples range between 4.5 - 5.4. The soils found on the sites can be described as very strongly acid to strongly acid. The low pH may result in nutrient deficiencies of certain elements in crops as well as be conducive to certain element toxicities such as aluminium. The low pH of the soils can be improved by the addition of agricultural lime. The low pH will also have implications for soil rehabilitation purposes should the proposed project go ahead. The stockpiles should first be ameliorated with lime to increase the pH before natural vegetation can be established.

The cation chemistry (Ca, Mg, K, Na) is typical that of the soil forms in the area of the proposed project. Very high levels of calcium (271 - 817 mg/kg), magnesium (73 - 416 mg/kg) suppress relatively high levels of potassium (72 – 297 mg/kg) during nutrient uptake by plants. The high Ca and Mg levels may be the result of the crop cultivation practices such as the addition of chemical fertilizers and lime containing these elements.

The soil identified on site falls in three different texture classes – loamy sand, sandy loam, and sandy clay loam. All these samples have low to medium-low clay content (<34%) and are dominated by the sand fraction. This results in the soil forms on site being susceptible to erosion, especially wind and water erosion.

4.4.4 Land capability

The soil and land types identified in the Phase 1 infrastructure area could be classified into three land capability classes i.e. land with arable land capability (905 ha), grazing land capability (122 ha) as well as land with wetland land capability (23 ha). The deep yellow-brown Clovelly and Avalon soil profiles together with the slightly structured soil profiles of the Oakleaf soil form are the soil forms with arable land capability. The Valsrivier and Mispah soil forms can be classified as land with grazing land capability for the strongly structured B1-horizon of the Valsrivier form as well as the rocky limitations to soil depth of the Mispah form make these soil forms less suitable for crop production.

The Katspruit soil form has hydromorphic properties and is therefore classified as soil with wetland land capability. The areas with wetland land capability should be conserved because of the water purification and water storage capacity of wetland soils.

4.5 Biodiversity

Refer to Appendix D-2 for the Biodiversity Scoping Report.

4.5.1 Flora

The largest extent of the study area is located in the Vaal-Vet Sandy Grassland (Endangered Status), with the eastern portion situated in the Highveld Alluvial Vegetation (Least Threatened Status). The South African National Biodiversity Index (SANBI) database indicates the known presence of only seven plant species within this particular ¼-degree grid (2826BB). This low diversity is the result of the poor floristic knowledge (under sampling) of the area and is not regarded a true reflection of floristic diversity. No floristic species of conservation importance is indicated to occur in this region, according to

the Plants of Southern Africa (POSA) database, which is similarly a reflection of the poor floristic knowledge of the area.

The site investigation revealed the presence of 102 plant species in the study area. The diversity is regarded as relative diverse, reflecting not only on the species richness of the regional vegetation types, but also the effect of transformation and the influx of weeds and alien invasive species. Grasses and forbs dominate the species diversity while a low percentage of the species composition comprises woody individuals. The floristic diversity of the site is represented by 41 plant families, dominated by Asteraceae and Poaceae.

No Threatened plant species were observed during the site investigation. Taking the habitat variability and status into consideration, a medium-low probability for the presence of Red Data species is estimated for the study area. The following species are included in the Declining category:

- *Boophone disticha* (Bushman Poison Bulb, Tumblehead).

The following species are included in the Free State Nature Conservation Act, 2007 (Provincially Protected Species, Article 30):

- *Boophone disticha* (Bushman Poison Bulb, Tumblehead);
- *Harpagophytum* species (Grapple plant, Wood spider);
- *Asclepias stellifera*; and
- All *Helichrysum* species (H*. aureonitens, H. caespititium, H. rugulosum*).

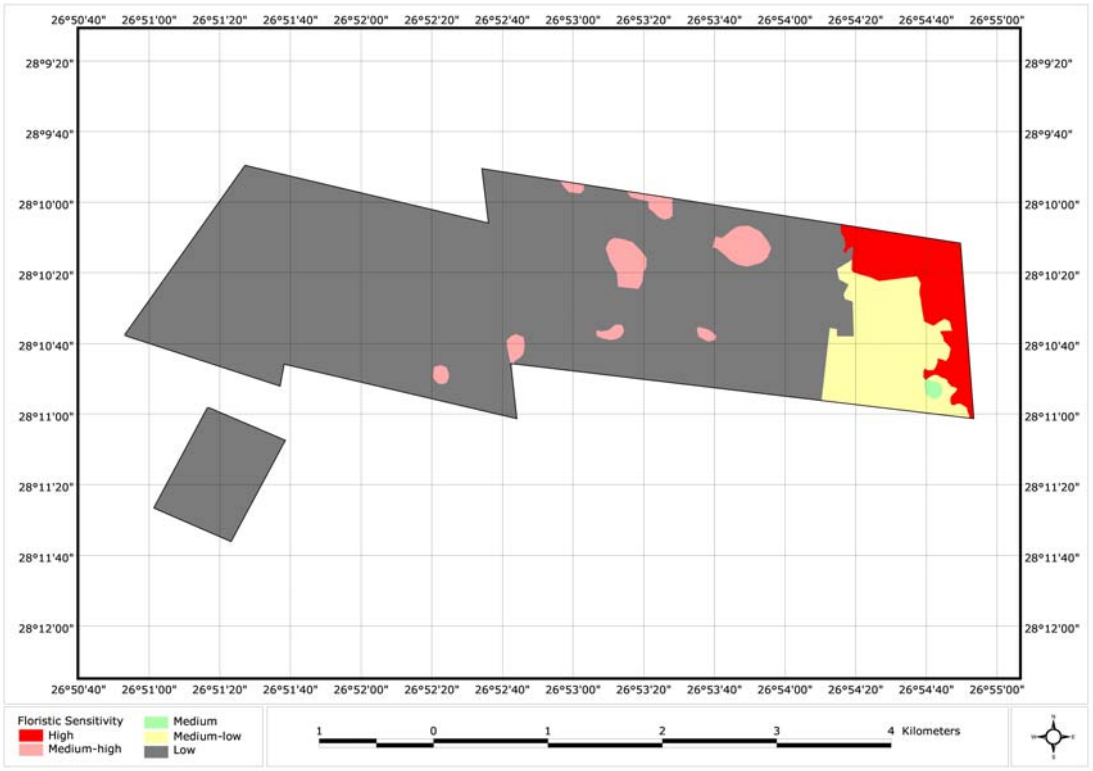
- Results of the photo analysis and site investigations revealed the presence of the following habitat types within the Phase 1 project area:
- Agricultural Fields (±878.3ha, 80.6%, Low Floristic Sensitivity);
- Dams/ Impoundments (±1.8ha, 0.2%, Medium Floristic Sensitivity);
- Degraded Grassland (±89.8ha, 8.2%, Medium-low Floristic Sensitivity);
- Endorheic Pans (±32.7ha, 3.0%, Medium-high Floristic Sensitivity);
- Exotic Trees (±4.4ha, 0.4%, Low Floristic Sensitivity);
- Homesteads & Infrastructure (±22.5ha, 2.1%, Low Floristic Sensitivity); and
- Natural Grassland (±59.6ha, 5.5%, High Floristic Sensitivity).

The study area is characterised by severe habitat transformation resulting from agricultural activities as well as surrounding mining related activities, also reflecting regional transformation levels, resulting in extremely limited remaining natural grassland habitat on a local and regional scale. These areas are generally unsuitable for agriculture, either to

the ephemeral wetland status of endorheic pans, or shallow and poor soils, as in the case of the remaining grassland areas.

Agricultural fields comprise the largest extent of the study area; no natural vegetation (Vaal-Vet Sandy Grassland) remains in these parts and consequently a low sensitivity is ascribed. Endorheic pans are however situated within the agricultural fields and, although not exhibiting pristine or important floristic attributes, are likely to perform vital ecological roles on a local and regional scale. The importance of these areas cannot be underestimated and hence a medium-high sensitivity is ascribed to these areas. It is strongly recommended that these areas be excluded from the proposed development and available alternate sites be investigated.

Terrestrial grassland habitat is restricted to the eastern part of the study area, comprising the Highveld Alluvial Vegetation Type. A large portion has been subjected to in sowing and surface disturbances and, together with a high grazing pressure, consequently exhibit a relative poor status. In contrast, the remaining portion of natural grassland is regarded species rich and relative pristine. A number of provincially protected plants are present within this part of the study area and hence a high sensitivity is ascribed to this portion (Figure 4.3). It is strongly recommended that this part of the study area be excluded from the proposed development.



(Figure not to scale – please refer to Appendix A for the A3 figure)

Figure 4.3: Flora Habitat Sensitivities Map

4.5.2 Fauna

The presence of 60 animal species was confirmed during the site investigation, additionally 15 invertebrate families were also observed during the survey period. The animals (species and families) observed in the study area are, for the most part, typical grassland species and representative of grassland animal communities that are widespread in the regional areas of the Vaal-Vet Sandy Grassland and in the larger extent of the Dry Highveld Grassland Bioregion (and associated pans).

It is estimated that 49 of the 66 Red Data animals listed for the Free State Province have a low probability of occurring in the study area, 10 have a moderate-low probability, and nine a moderate probability of occurring in the study area. The presence of two Red Data species was confirmed during the survey period, namely the Lesser Kestrel and Lanner Falcon. Additionally, the Aardvark (*Orycteropus afer*) is listed as a provincially protected species (Free State Nature Conservation Act 2008, Schedule 1).

The following faunal sensitivities were ascribed to available habitat types:

- Agricultural Fields (Low Faunal Sensitivity);
- Dams/ Impoundments (Medium-high Faunal Sensitivity);

- Degraded Grassland (Medium Faunal Sensitivity);
- Endorheic Pans (Medium-high Faunal Sensitivity);
- Exotic Trees (Low Faunal Sensitivity);
- Homesteads & Infrastructure (Low Faunal Sensitivity); and
- Natural Grassland (High Faunal Sensitivity).

Most of the study area has been transformed by agriculture and associated infrastructure, while remaining natural faunal habitat found in the study area is represented by isolated fragments of natural and degraded grassland and two endorheic pans. This significant loss of faunal habitat and fragmentation of the remaining patches of untransformed habitat have undoubtedly led to a loss of species richness and faunal diversity within the area investigated. Furthermore, prosecution of animals; directly by carnivores or indirectly (species such as Cape Vulture) and the historic use of agrochemicals and pesticides resulted in a loss of species locally (study area) and regionally.

Animals observed in the study area mainly include generalists, but grassland and wetland specialists also are present. Faunal communities of the study area attest to the ecological functionality of both the grasslands and wetlands found in the study area. The presence of two Red Data grassland birds and a provincially protected mammal confirms the sensitivity of the natural grasslands of the study area despite the isolated nature of the grassland fragments remaining.

During the field investigation, none of the endorheic pans had significant surface water; it is reasonable to assume that the species richness of these areas will increase significantly when the presence of surface water attracts a variety of water birds and invertebrates.

4.6 Hydrology

Refer to Appendix D-3 for the Hydrological Scoping Report.

Work that is likely to be required for future detailed planning, water use licence applications and compliance to regulations in respect of environmental protection and conservation will include:

- Planned separation of clean and dirty water systems;
- Conceptual design of a Storm-Water Management System, including drains and pollution control infrastructure;
- Development of a Storm-Water Management Plan;
- Development of a formal Water Quality Monitoring System and Plan;

- Design of pollution control dams, return water dams and other related infrastructure;
- Development of a Water Balance (to support the IWULA); and
- Further specific hydrological investigations that may be required by the mine.

This work is currently being undertaken and detailed results will be provided in the EIA/EMP report which is on track to be submitted within the legislated 180 day period (i.e. by 7 August 2012).

4.7 Geohydrology

Refer to Appendix D-4 for the Geohydrological Scoping Report.

4.7.1 Baseline Groundwater Levels

Based on existing groundwater level data, a strong relationship exists (90% correlation factor) between the groundwater table and surface topography. Groundwater levels within the project area varies between 1365 – 1390 mamsl. The groundwater flow direction therefore mimics the topography.

4.7.2 Baseline Groundwater Chemistry

Existing groundwater chemistry data that were obtained from different sources including most recent field work indicates elevated nitrate and arsenic concentrations, which might be mining related. However, this is in contradiction to the fact that the study area is situated on a water divide and upstream of historic mining activities. The possible pollution sources can therefore not be confirmed.

4.7.3 Baseline Aquifer Conditions

The drilling of 6 monitoring boreholes within the proposed project area were, to a large extent, limited to the upper weathered sections of the Karoo aquifer which in some instances were weathered up to a depth of forty meters. Preliminary indications were that:

- Blow yields for this section varied between 0.1 l/s (seepage) to 1.1 l/s; and
- Transmissivity values for pumping tests that were performed varied between 0.4 to 1.7 m2/d.

It can therefore be concluded that aquifer potential is low, but of high importance to its users.

4.8 Wetlands

Refer to Appendix D-5 for the Wetland and Aquatic Ecosystems Scoping Report.

Several wetlands have been identified within the proposed Phase 1 infrastructure footprint area. The different types of wetlands that are expected to occur on site, or within 500 m of the site boundaries, include:

- Pans;
- Hillslope seepage wetlands;
- Dams; and
- Unchannelled valley bottom wetlands.

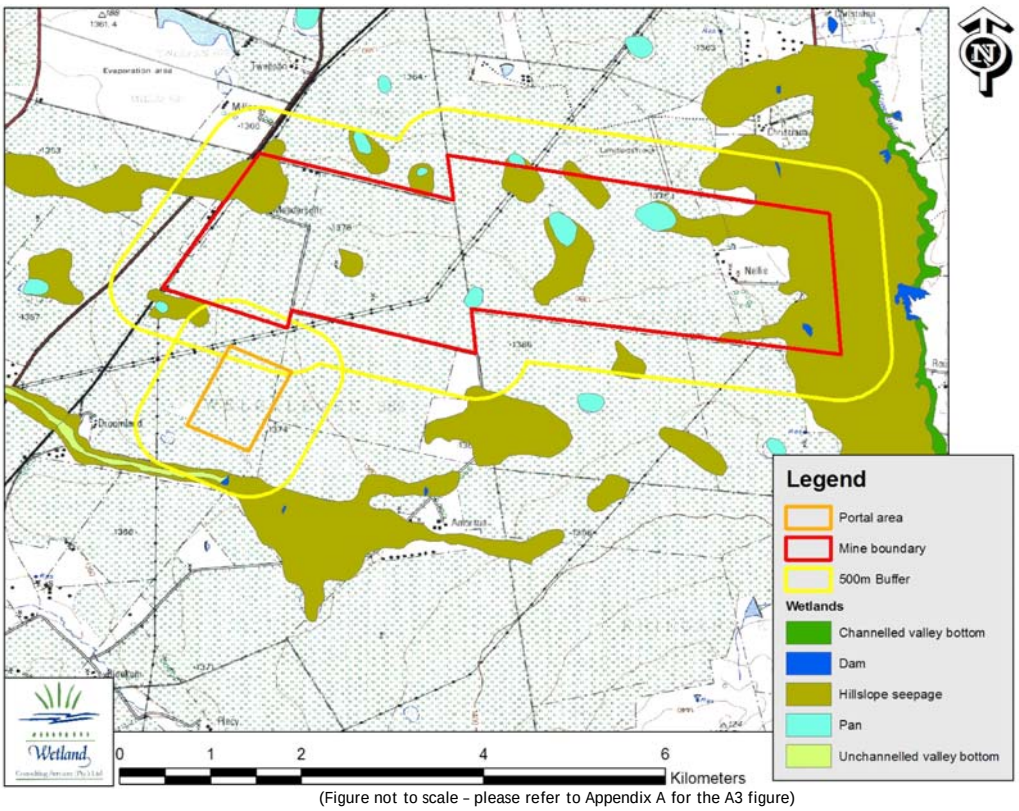
The identified wetlands, based on a desktop delineation of wetness and greenness signatures visible on Google Earth imagery, are illustrated in Figure 2. All of the areas identified as possibly being wetlands will be further investigated in the field and the presence of wetlands and the wetland boundaries will be verified.

Based on the desktop mapping, approximately 19.6 % (just over 192 ha) of the proposed infrastructure area is suspected to be covered by wetlands, consisting mostly of hillslope seepage wetlands (173 ha). A total of 4 pans are expected to occur on site. However, given the extensive transformation of the site through cultivation (more than 84 % of the site is indicated as having been cultivated in the 1:50 000 topographical maps), the desktop delineation of the wetlands on site should only be viewed as a relatively low confidence delineation as cultivated fields can often obscure wetness signatures and the actual wetland boundaries, especially in the case of the hillslope seepage wetlands, might differ significantly following detailed ground-truthing.

The proposed infrastructure areas are situated along a watershed between catchments C42K (west), C42H (east) and C42J (north), though catchment C42J is only marginally affected. In terms of receiving water resources that might be impacted by activities on site, the Doring River to the west of the site and the Merriespruit to the east of the site would thus need to be considered. Both are tributaries of the Sand River. Although no data could be obtained for these rivers specifically, some data is available for the Sand River. According to the National Freshwater Ecosystem Priority Areas data set (Nel et al., 2011), the Sand River immediately above and below Virginia is in a largely modified condition

(Present Ecological Status (PES) D), but its upper reaches and tributaries are generally in a better condition, with some considered PES categories A/B (pristine/largely natural condition). The Department of Water Affairs (DWA) Status Quo Report classifying significant water resources of the Vaal River (DWA, 2011) further supports these general findings.

In addition, a number of seasonal pans occur on site. These could be of some importance in terms of biodiversity, potentially supporting pan-adapted aquatic invertebrates and associated vertebrates higher up in the food chain (frogs, water birds).



(Figure not to scale – please refer to Appendix A for the A3 figure)

Figure 4.4: Map showing wetland areas as identified during the desktop delineation.

4.9 Traffic

Refer to Appendix D-6 for the Traffic Scoping Report.

The following roads, might be affected by the proposed mining activities:

- R30, a Provincial road situated to the west of the proposed development;
- The access road to the development, from the R30. This road becomes Jan Hofmeyer Street, further north, in the Bronville area; and
- The R73 which runs in the north-south direction (to the east of the development). This road links Jan Hofmeyer Street to the N1 which runs in the north-south direction.

The road link capacity (a measure of roadway performance to determine congestion levels) will be assessed as part of the investigation.

In addition, the following intersections will be assessed:

- Intersection 1: Theunissen Street / Virginia Highway;
- Intersection 2: Theunissen Street / gravel road (access to the mine); and
- Intersection 3: Jan Hofmeyer Street / S1279.

On a regional scale, access to the development can be gained from the R30, the R73 and the N1.

In terms of local access, the proposed operation will gain access from Intersection 2, which is also an access to the Thabo Trust farm. Currently, this access can be considered as an informal access and might require a formal approval. The adequacy of this access needs to be investigated further as currently the access is an uncontrolled railway crossing.

4.10 Air quality

Refer to Appendix D-7 for the Air Quality Scoping Report.

Winds for this site have a strong north to north easterly signature, with frequent strong winds occurring particularly in the summer months. Dust dispersion will be overwhelmingly to the south of the site, while dust levels will simultaneously be elevated due to the existing large tailings dumps to the north.

The proposed operation is situated in a high altitude region characterized by regular summer rains but where the winters are cool and dry. Hot, windy summers will result in conditions ideal for the desiccation of the environment and the wind entrainment of any loose material. Areas most affected by dust from the mine will generally lie to the south of the site.

4.10.1 Areas of concern

Emissions to air during the development and operation of a mine of this nature are generally limited to dust, smoke emissions from heavy machinery and vehicles, and a wide range of trace gases given off during the drying of solvents and similar processes resulting from activities associated with routine construction and maintenance. Of these, dust is by

far the greatest potential polluter. The degree to which dust becomes a polluter is in direct relation to four factors:

- The nature of the area to be exposed by surface clearing (including total area, shape relative to prevailing winds and height of dumps etc);
- The moisture content of the soil and by association, the average rainfall for the area;
- The silt content and grading of the material exposed to the surface; and
- Activities taking place on that surface (transport, loading, blasting and entrainment by the passage of vehicles).

Dust is expected to be generated by almost all activities on the site but special attention needs to be placed on the design and location of the tailings dams to limit wind entrainment of loose material. Of additional concern is the possibility of radioactive material being present in the entrained dust. While the radiation related study falls outside of this study, the dispersion modelling generated here will be used to inform that specialist study.

4.10.2 Dust Monitoring

A dust monitoring network was put into place by GCS in November of 2011. Early initial results for December 2011 indicate slight to moderate dust fall in the area, most likely as a result of farming activities and wind born material from the existing tailings to the north.

This monitoring is set to continue for at least a year, to provide a baseline against which future dust levels can be assessed.

4.10.3 Recommendations

The following is recommended:

- An air quality specialist study be undertaken to assess likely dust dispersion fields from the activities planned for the site;
- Dust monitoring to continue; and
- The methods used to store hydrocarbons on site be assessed and optimised in terms of best practice as pertains to fugitive emissions.

4.11 Radiation

Refer to Appendix D-8 for the Radiation Scoping Report.

Gold mining and processing operations are known to be responsible for various environmental disturbances. The gold bearing reefs generally mined in South Africa, in addition to gold, often contain naturally occurring radionuclides such as uranium, thorium and radium. All ore and mining wastes generated as part of a gold mining operation, as well as the residues from mineral processing (tailings) disposed of at the site, are expected to contain these naturally occurring radionuclides, and are generally referred to as Naturally Occurring Radioactive Material (NORM).

The presence of NORM has been confirmed in the reefs of the Free State gold fields that are to be mined and processed as part of the SOFS Mining Operation. It is thus expected that humans involved in the mining and mineral processing operations will be exposed to radioactivity from the NORM present in the ore. Members of the public may also be exposed to NORM through products, by-products, residues and wastes generated by the mining and mineral processing activities.

The protection of human health and the environment from the adverse effects of radiation exposure to NORM is regulated by national legislation. The national legislation is enforced by the National Nuclear Regulator (NNR), a statutory body responsible not only for regulating the nuclear industry, but also NORM associated with the mining and mineral processing sector. Operations that produce, handle, store or distribute NORM have to register with the NNR and are issued with a Certificate of Registration (CoR) in terms of which the radiological impacts from the operation on workers, members of the public and the environment has to be monitored and assessed on a regular basis and the findings submitted to the NNR for review.

To obtain a CoR for the proposed operation, the following must be submitted to the NNR for approval before the commencement of any activities at the proposed site:

- A baseline study report on background radioactivity levels at the site;
- An assessment report for workers involved in actions where there is a likelihood of radiation exposure;
- A radiological safety assessment report for the public and the environment; and
- A radiation management plan including, among other,:
    - Safety and Security of Naturally Occurring Radiation Sources (Physical Security);
    - Transport Procedure;
    - Emergency Preparedness arrangements;

- Occupational Radiation Protection Plan;
- Waste Management Programme;
- Quality Management Programme;
- Public Exposure Monitoring and Control Programme; and
- Medical Surveillance and Control Programme.

The baseline survey of the site selected for the proposed operation has been initiated and includes the following:

- A gamma survey of the potentially affected area;
- An environmental radon survey using passive radon gas monitors;
- Sampling of environmental media for full spectrum radiological analysis including soil, surface water, groundwater, stream sediment and plant material (crops); and
- Full spectrum radiological analysis of ore and mineral processing residue.

The results obtained through the baseline assessment provides the opportunity to compare results of subsequent radiological monitoring, performed after commencement of mining and mineral processing activities at the proposed SOFS Mining Operation, with environmental conditions prevailing at the site before operations began.

4.12 Sites of historical and cultural importance

Refer to Appendix D-9 for the Heritage Impact Assessment Scoping Report.

Two sites of cultural heritage significance were located in and very near to the footprint area of Phase 1 of the SOFS Mining Operation.

Site 1

This is a graveyard consisting of approximately 40 graves. There probably are more as the dense grass cover made it very difficult to do an accurate count. Two types of grave dressing were identified being stone packet or cement borders. Some graves are marked with metal markers. The graves that do have headstones have cement or stone headstones

The development will have a direct impact on the site. The exact nature thereof is however not known and should be confirmed by the applicant. Due to the sensitivity of this issue, graves are always regarded as having a high cultural significance. The areas may be fenced off and preserved. Pictures to be taken of current status.

Site 2

This is the remains of an old station. It consists of at least three buildings, most likely dating to the 1930's/ 40's and the ruins of more buildings.

The site falls to the west and just outside of the footprint area of the proposed mining development. Therefore there will not be a direct impact on the site, but there will be a secondary one. The buildings are regarded as having a medium cultural significance. It still is in a good condition, but is not very unique. Pictures will be taken of current status for records.

4.13 Socio conditions

Refer to Appendix D-10 for the Draft Social Impact Assessment (SIA).

The following social change processes are expected to take place as a result of this project:

Demographic processes	Economic processes	Geographic processes
• In-migration; • Presence of temporary workers; • Resettlement; and • Displacement / dispossession - with compensation	• Waged labour; and • Conversion and diversification of economy. • Rejuvenation of industry - mine supply/equipment service providers	• Conversion and diversification of land use; • Enhanced transport and rural accessibility; and • Physical splintering.
Institutional and legal processes	**Emancipatory and empowerment processes**	**Socio-cultural processes**
• No impacts are expected.	• Capacity building.	• Deviant social behaviour.

5 PUBLIC PARTICIPATION PROCESS

This section of the report documents the process, which was followed with respect to consultation of interested and affected parties (I&APs / Stakeholders) and the Government Authorities.

5.1 Purpose of Public Participation

Public Participation Process (PPP) is a requirement of the EIA/EMP process and ensures that all relevant I&AP's are consulted and involved. The process ensures that all stakeholders have an opportunity to raise their comments as part of an open and transparent process, which in turn ensures for a complete comprehensive environmental study.
The purpose of PPP and the engagement process is to:

- Introduce the proposed project;
- Explain the EIA/EMP and PPP processes to be undertaken;
- Determine and record public issues and concerns;
- Provide opportunities for public input and gathering of local knowledge;
- Inform a broad range of stakeholders about the project and the environmental process to be followed;
- Establish lines of communication between stakeholders and the project team;
- Identify all the significant issues in the project; and
- Identify possible mitigation measures or environmental management plans to minimise and/or prevent environmental impacts, associated with the project.
- Once the concerns of I&AP's have been established, the EIA/EMP study will aim to address these concerns.

The public participation undertaken will be available in the final Environmental Scoping Report.

5.1.1 Introductory authorities meeting

An introductory authority meeting was held with the DWA on Monday 15 October 2012.

5.1.2 List of authorities consulted

A comprehensive list of authorities was compiled during the early stages of the project. The authorities as listed in Appendix C have been invited to become involved in the process by inviting them to the introductory authorities meeting.

5.1.3 Identification of I&APs

All I&APs Wits Gold database will be contacted at the start of the project in terms of regulation 55 of National Environmental Management Act (Act No. 107 of 1998) (NEMA) as interested and affected parties in relation to the application. During the consultation with I&APs, additional parties will be identified and will be included within the existing database to provide an updated database. Numerous I&APs were notified by word of mouth. Parties who responded to the advertisements and notifications placed were included within the database.

GCS has developed and will maintain an electronic database for the duration of the project where stakeholder details are captured and automatically updated as and when information is received from I&APs.

Refer to Appendix C for the the I&AP database.

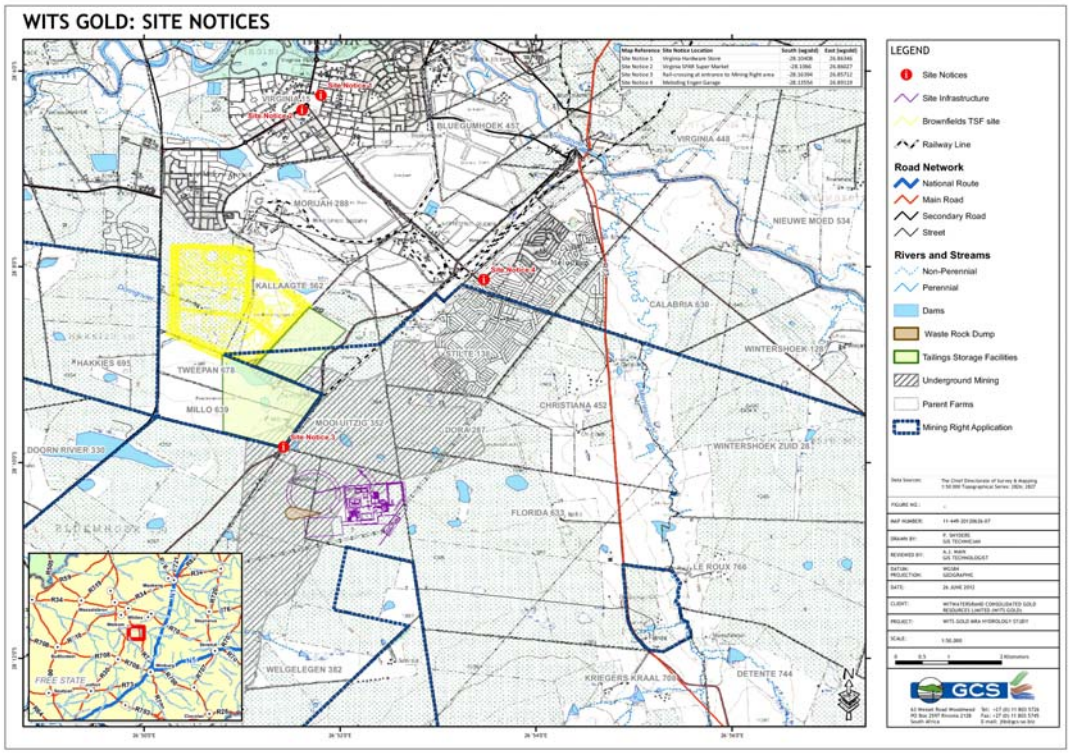
5.1.4 Notification of stakeholders

5.1.4.1 Site Notices

A2 laminated site notices according to Regulation 54 of the NEMA have been placed on and around the project area at the following co-ordinates (Table 5.1) and Figure 5.1.

Table 5.1: Site Notice placements

Site	Coordinates	
	South	East
Virginia Hardware Store	-28.10408	026.86346
Virginia SPAR Super Market	-28.10660	026.86027
Rail-crossing at entrance to Mining Right area	-28.16394	026.85712
Meloding Engen Garage	-28.13554	026.89119



(Figure not to scale – please refer to Appendix A for the A3 figure)

Figure 5.1: Site Notice Locations.

5.1.4.2 Media advertisements

Advertisements, according to Regulation 54 of NEMA, regarding the project background and the assessment process being followed was placed in the following newspaper:

- Volksblad Vista, 4 October 2012.

5.1.5 Public Meeting

The registered I&AP's were notified and invited to attend the NEMA scoping meeting on 23 October 2012 at 16:00 at the Virginia NG Kerk via email and bulk sms. The registered I&AP's were also notified of the scoping meeting via the site notices and advertisements.

5.1.6 Issues Trail

Through ongoing consultation, issues will be raised during the process. This is an ongoing process and will therefore be updated as comments and responses from the authorities and public are made regarding specific issues about the project. All issues and comments will be formally addressed in the EIA/EMP.

5.1.7 Document Review

The Draft Environmental Scoping Report (ESR) was made available for review by I&APs on the 5 October 2012 until 4 November 2012 and all registered I&APs were informed of the report's availability, if I&APs required a copy on CD that was provided. The document was also available on the GCS website at www.gcs-sa.biz.

Issues and responses will be documented and incorporated in the EIA/EMP reports.

Preliminary timeframes for the process to be followed and time for review are given below:

- Submission of Draft Scoping Report (Public and Authorities) 5 October 2012
- Public Meeting 23 October 2012
- Public review end 4 November 2012
- Submission of Final Scoping Report (Public and Authorities) 12 November 2012

Detailed timeframes will be communicated to the I&APs as the project progresses.

6 PLAN OF STUDY FOR THE EIA AND DRAFT EMP

Based on the outcome of the Scoping Phase, an EIA and an EMP Report will be submitted to the relevant DEA officer for consideration and approval. This section details the proposed way forward for the EIA/EMP.

6.1 Specialist Studies

A number of specialist investigations have been commissioned for the project to ensure that all issues relating to the SOFS EIA/EMP are addressed with the appropriate level of detail. The specialist investigations will be conducted by a team of professionals, each with specific expertise.

Each specialist study addressed the standard requirements for an investigation of this nature. In addition, the issues raised during the consultation process will be addressed / taken into account by the specialists. An outline of the approach and the aspects addressed under each study are provided below.

It was anticipated that the following specialist investigations be required due to the nature and size of the proposed development and the associated listed activities according to NEMA, NEM:AQA, NEM:WA and NWA:

- Soil, Land Use and Land Capability Assessment;
- Ecology (Fauna & Flora) Impact Assessment;
- Hydrological Impact Assessment;
- Geohydrological Impact Assessment;
- Wetland and Aquatics Impact Assessment;
- Archaeological Assessment;
- Radiation Impact Assessment;
- Social Impact Assessment Impact Assessment;
- Air Quality Assessment;
- Traffic Assessment Impact Assessment;
- Blast and Vibrations Impact Assessment;
- Visual Impact Assessment;
- Noise Impact Assessment;and
- Sustainable Development Investigation

6.1.1 Soils, Land Use and Land Capability Assessment

The objectives of this survey were:

- To describe the soils (distribution, types, depth, surface features, wetness hazard and cultivation factors per horizon, suitability for agriculture and topsoil, physical and chemical characteristics, fertility, erodability, dry land production potential and irrigation potential);
- To determine the pre-development land capability;
- To determine the present land use;
- To conduct an Impact Assessment for the soils and land capability which will feed into the overall EIA; and
- To propose mitigation measures for the impacts to form part of the EMP.

6.1.2 Ecological Assessments

It could reasonably be expected, and was confirmed in the impact assessment, that surface impacts on the natural environment constitute the most significant impact on biodiversity attributes of the study area. The decimation of remaining areas of natural habitat during the construction phase will not only completely destroy the existing habitat within areas of high ecological sensitivity, but will also destroy the potential of other area to be inhabited by a relatively diverse and natural composition of plants and animals. Most of the area comprises agricultural fields where extremely little natural attributes occur and consequently moderate and low ecological sensitivities were ascribed. The loss of these areas is unlikely to affect the local or regional biodiversity attributes to a significant level or the conservation status of animals that are likely to inhabit these parts.

Small portions of the study area are considered ecologically important on a local scale; attributes that contribute to this sensitivity include the presence of conservation important animals and plants, a high diversity of species noted and a relative pristine status. Impacts within these areas are expected to be significant and severe. The endorheic pans, whilst not currently in a prime condition due to the absence of water, are likely to be inhabited by a diverse composition of animals when inundated for a prolonged period. It is also likely that conservation important species will utilise these features during specific periods (for example the Marsh Sylph during flowering periods of the grass *Leersia hexandra*).

Similarly, the remaining portion of natural grassland in the eastern part of the study area is regarded sensitive in terms of biodiversity attributes. Not only was a diverse composition of plants and animals noted within this area, the presence of plants and animals of

conservation importance were noted, reflecting the relative pristine nature of this portion of grassland, in spite of relative high grazing pressure.

The only manner in which these portions of habitat can be conserved is by excluding them from the proposed development, the natural grassland in particular. In contrast, it is only reasonable to expect that it is impossible to conserve all the endorheic pans, as it will affect the proposed development significantly. However, every effort will? be made to conserve as much of this habitat type as possible. The exclusion of these areas from the proposed development is likely to reduce the probability of impacts to an acceptable level. Included in this statement is the understanding that all site specific and generic mitigation measures are implemented in order to prevent impacts from spilling into adjacent sensitive areas.

6.1.3 Surface Water

Work that is likely to be required for future detailed planning, water use licence applications and compliance to regulations in respect of environmental protection and conservation will include:

- Planned separation of clean and dirty water systems;
- Conceptual design of a Storm-water Management System, including drains and pollution control infrastructure;
- Development of a Storm-water Management Plan;
- Development of a formal Water Quality Monitoring System and Plan;
- Design of pollution control dams, return water dams and other related infrastructure;
- Development of a Water Balance (to support IWULA); and
- Further specific hydrological investigations that may be required by the mine.

6.1.4 Groundwater

6.1.4.1 Baseline Groundwater Levels

It is suggested the newly drilled monitoring boreholes get monitored on a quarterly basis to establish baseline groundwater level trends.

6.1.4.2 Baseline Groundwater Chemistry

It is suggested the newly drilled monitoring boreholes, especially BH1_TFS – BH3_TFS get sampled on a quarterly basis to establish baseline groundwater chemistry trends.

6.1.5 Wetland Investigation

Following on from the desktop assessment, a site visit will be undertaken in the summer of 2012 to ground truth all potential wetland areas within the affected area and verify the existence and extent of all wetland areas. Wetland boundaries will be delineated using both soil wetness indicators (mottling and gleying) and vegetation indicators according to the method prescribed in the document "A practical field procedure for identification and delineation of wetland and riparian areas" (DWAF, 2005). During the site visit, information regarding impacts on, and condition of, the wetlands will be collected enabling an evaluation of both the ecological health (PES) and the Ecological Importance and Sensitivity (EIS) of the wetlands.

To assess the health of aquatic ecosystems a number of tools will be utilised, including the SASS5 methodology, analysis of diatoms, physico-chemical water quality assessments, and habitat integrity assessments.

Based on the information collected in the field and experience from working on other EIA and EMP processes, potential impacts will be identified and appropriate mitigation measures recommended where the impact on the wetlands and aquatic ecosystems is unavoidable. Where applicable, suitable management measures will also be recommended, and a biomonitoring plan compiled.

The findings of the study will be collated and a wetland and aquatic ecosystem assessment report will be compiled, which will also include appropriate sections for inclusion in the EMP.

6.1.6 Archaeological Investigation

The objectives of the archaeological study will be to:

- Address the cultural and archaeological aspects of the site;
- Survey the site where the infrastructure will be located;
- Locate, identify, interpret and document all possible sites, features and objects of cultural importance in the area;
- Assess the impact on these sites, features and objects; and
- Suggest possible mitigation measures to reduce the impact on sites, features and objects of cultural importance.

The archaeological investigation undertaken will include the following activities:

- Surveying on foot the site and focusing on areas more likely to contain evidence of human activity (erosion trenches, clumps of trees, bushes, streams and riverbeds);
- Interpreting the 1: 50 000 topographic map of the area;
- Documenting the location of potential sites using a GPS;
- Providing a description and preliminary interpretation of any findings;
- Assessing the sites, features and objects located in terms of their cultural importance, research and scientific value, tourism and educational potential and the potential impact of development on the preservation of important sites; and
- Identifying suitable mitigation measures, if required.

6.1.7 Radiation

Based on the results of the baseline studies, worker and public assessments, the documents collectively referred to as the Radiation Management Plan will be completed and submitted to the NNR on 14 September 2012 for approval. The radiological impact and safety assessment prepared by ARCONSA makes provision not only for the authorisation sought from the NNR, but also includes an assessment of the radiological impacts associated with the proposed activity in terms of the EIA process. Significance of the impacts identified through the worker and public safety assessments will be determined using the standard impact assessment approach outlined by GCS.

6.1.8 Social Assessment

The detailed assessment will be undertaken to determine the potential impacts, as well as cumulative impacts within the area in which the SOFS mining operation is situated in terms of the social and economic components.

The purpose of the social assessments will be to:

- Provide a systematic analysis in advance of the likely impacts that a development event (or project) will have on the day-to-day life of persons and communities;
- Help individuals, communities, as well as organisations to understand and anticipate the possible social consequences on individuals and communities of proposed projects, developments or policy changes; and
- To serve to identify potential social impacts and variables that could influence the eventual project process.

6.1.9 Air Quality Assessment

The following is recommended:

- An air quality specialist study be undertaken to assess likely dust dispersion fields from the activities planned for the site;
- Dust monitoring to continue; and
- The methods used to store hydrocarbons on site be assessed and optimised in terms of best practice as pertains to fugitive emissions.

6.1.10 Traffic Assessment

The following will be investigated as part of this Traffic Impact Assessment:

- Traffic demand at the intersections under investigation during the AM and PM peak hours;
- Expected trips generated by gold mining and related activities;
- Expected performance of the intersections and road links under consideration (in terms of congestion levels);
- Public transport provision;
- Safety of the local communities (in terms of pedestrian movement);
- Road Safety at the access to the proposed development: sight distance, intersection spacing, conflict with other modes of transport, such as rail; and

- Existing condition of the access roads to the mine.

The extent of the traffic related impact will be included in the final assessment report.

Insert info on blast and vibration, visual, noise and SDI here too.

6.2 Compilation of the EIA/EMP

The following sections provide the reader with a view on how the potential impacts will be rated in terms of their significant and what the contents of the EIA/EMP will entail.

6.2.1 Environmental Impact Significance Rating Methodology

To ensure uniformity, the assessment of potential impacts will be addressed in a standard manner so that a wide range of impacts is comparable. For this reason a clearly defined rating scale will be provided to the specialist to assess the impacts associated with their investigation.

Each impact identified will be assessed in terms of probability (likelihood of occurring), scale (spatial scale), magnitude (severity) and duration (temporal scale). To enable a scientific approach to the determination of the environmental significance (importance), a numerical value will be linked to each rating scale.

The following criteria will be applied to the impact assessment for the EIA/EMP:

Occurrence

- Probability of occurrence (how likely is it that the impact may occur?); and
- Duration of occurrence (how long may impact last?).

Severity

- Magnitude (severity) of impact (will the impact be of high, moderate or low severity?); and
- Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site?).

Status of Impact

- +: Positive impact

- -: Negative impact
- N: Neutral (no impact)

In order to assess each of these factors for each impact, the following ranking scales were used:

Probability:=P	*Duration:=D*
5 – Definite/don't know	5 – Permanent
4 – Highly probable	4 - Long-term (ceases with the operational life)
3 – Medium probability	3 - Medium-term (5-15 years)
2 – Low probability	2 - Short-term (0-5 years)
1 – Improbable	1 – Immediate
0 – None	
Scale:=S	*Magnitude:=M*
5 – International	10 - Very high/don't know
4 – National	8 – High
3 – Regional	6 – Moderate
2 – Local	4 – Low
1 – Site only	2 – Minor
0 – None	
Status of Impact	
+: Positive	
-: Negative	
N: Neutral	

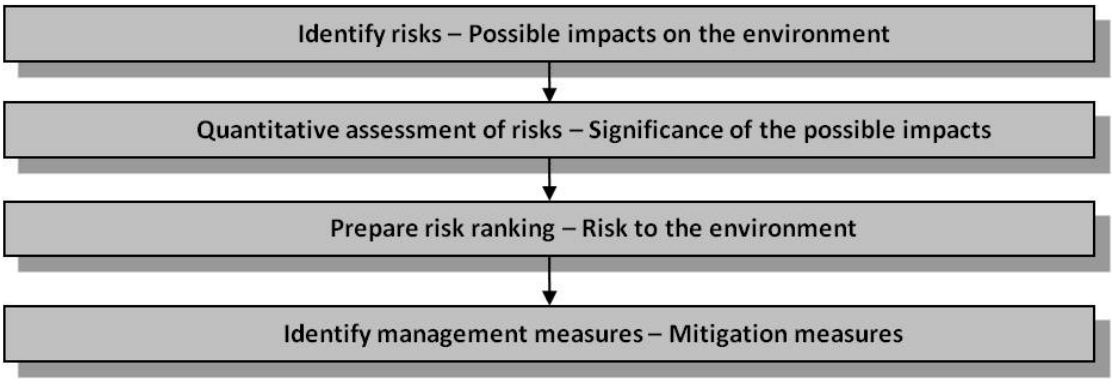
Once the above factors have been ranked for each impact, the environmental significance of each was assessed using the following formula:

SP = (magnitude + duration + scale) x probability

The maximum value that can be achieved is 100 Significance Points (SP). Environmental effects were rated as follows:

Significance	*Environmental Significance Points*	*Colour Code*
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	<-60	H

The following process will be followed:



6.2.2 Reporting

Based on the outcome of the environmental scoping phase, an EIA and an EMP Report will be submitted to the DMR for consideration and approval.

6.3 Environmental Impact Assessment Report (EIA Report in terms of the NEMA)

An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision contemplated in regulation 36, and must include –

(a) details of –

(i) the EAP who compiled the report;

(ii) the expertise of the EAP to carry out an environmental impact assessment

(b) a detailed description of the proposed activity;

(c) a description of the property on which the activity is to be undertaken

and the location of the activity on the property, or if it is -

(i) a linear activity, a description of the route of the activity; or

(ii) an ocean-based activity, the coordinates where the activity is to be undertaken;

(d) a description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;

(e) details of the public participation process conducted in terms of

subregulation (I) , including -

(i) steps undertaken in accordance with the plan of study

(ii) a list of persons, organisations and organs of state that were registered as interested and affected patties;

(iii) a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and

(iv) copies of any representations, objections and comments received from registered interested and affected parties;

(f) a description of the need and desirability of the proposed activity and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that mav be affected by the activity;

(g) an indication of the methodology used in determining the significance of potential environmental impacts;

(h) a description and comparative assessment of all alternatives identified during the environmental impact assessment process;

(i) a summary of the findings and recommendations of any specialist report or report on a specialised process;

(j) a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;

(k) an assessment of each identified potentially significant impact,

including -

(i) cumulative impacts;

(ii) the nature of the impact;

(iii) the extent and duration of the impact;

(iv) the probability of the impact occurring;

(v) the degree to which the impact can be reversed;

(vi) the degree to which the impact may cause irreplaceable loss of resources; and

(vii) the degree to which the impact can be mitigated.

(l) a description of any assumptions, uncertainties and gaps in knowledge;

(m) 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;

(n) an environmental impact statement which contains -

(i) a summary of the key findings of the environmental impact assessment; and

(ii) a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;

(o) a draft environmental management plan that complies with regulation 34;

(p) copies of any specialist reports and reports on specialised processes complying with regulation 33; and
(q) any specific information that may be required by the competent authority.

6.4 Environmental Management Programme Report (EMP in terms of the NEMA)

Each specialist will be required to identify means of avoiding, mitigating and/or managing the negative impacts in his/her particular aspect of the investigation. The recommended management strategies will be synthesised by GCS to formulate the Environmental Management Programme (EMP) for the proposed mining operation.

Wherever possible, management strategies will be incorporated into the mine systems to avoid, or appropriately manage impacts from the outset.

A draft environmental management plan must include -

(a) details of -

(i) the person who prepared the environmental management plan; and
(ii) the expertise of that person to prepare an environmental

(b) information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of -

(i) planning and design;
(ii) pre-construction and construction activities;
(iii) operation or undertaking of the activity;
(iv) rehabilitation of the environment; and
(v) closure, where relevant.

(c) a detailed description of the aspects of the activity that are covered by the draft environmental management plan;

(d) an identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b);

(e) where appropriate, time periods within which the measures contemplated in the draft environmental management plan must be implemented; and

(f) proposed mechanisms for monitoring compliance with the environmental management plan and reporting thereon.

6.5 EIA/EMP Feedback and Review

A feedback meeting will be held with the stakeholders and authorities in order to give them an opportunity to comment on the document as well as ask relevant questions about aspects associated with the project. Once completed, the comments will be incorporated into the EMP and the DMR will be asked to make a final decision on the EIA/EMP.

6.6 Preliminary Timeframes

Preliminary timeframes for the process to be followed and time for review are given below:

- Submission of the Draft Scoping Report (Public and Authorities) 5 October 2012
- Public Meeting 23 October 2012
- Public review end 4 November 2012
- Submission of the Final Scoping Report (Public and Authorities) 12 November 2012

Detailed timeframes will be communicated to the I&APs as the project progress.

6.7 Other Environmental Applications

In addition to the NEMA process, it will be necessary to undertake environmental applications in terms of the NWA and an EIA/EMP according to the NEM:AQA and NEM:WA. These applications are running concurrent with the NEMA process. The MPRDA process has been concluded pending the outcomes and findings of the NEMA, NEM:AQA, NEM:WA and NWA processes.

6.7.1 MPRDA Process

The MPRDA make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources; and to provide for matters connected therewith by:

- Recognizing that minerals and petroleum are non-renewable natural resources;
- Acknowledging that South Africa's mineral and petroleum resources belong to the nation and that the State is the custodian thereof;
- Affirming the State's obligation to protect the environment for the benefit of present and future generations, to ensure ecologically sustainable development of mineral and petroleum resources and to promote economic and social development;

- Recognizing the need to promote local and rural development and the social upliftment of communities affected by mining;
- Reaffirming the State's commitment to reform to bring about equitable access to South Africa's mineral and petroleum resources;
- Being committed to eradicating all forms of discriminatory practices in the mineral and petroleum industries;
- Considering the State's obligation under the Constitution to take legislative and other measures to redress the results of past racial discrimination;
- Reaffirming the State's commitment to guaranteeing security of tenure in respect of prospecting and mining operations; and
- Emphasizing the need to create an internationally competitive and efficient administrative and regulatory regime.

The ESR and EIA/EMP in respect of the MPRDA process have been submitted to the Department of Mineral Resources (DMR) in Welkom on 14 March 2012 and 7 August 2012 respectively.

6.7.2 NEM:AQA Process

Table 6.1: Listed Activities according to NEM:AQA

Number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice) :	Listed activity:	Mining Activity
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)			
GN No. 248 GG No. 33064 of 21/03/2010	12 Cat 3 (1) Subcat 3.1	Combustion installations not used primarily for steam raising or electricity generation.	The eluted carbon is reactivated in a reactivation kiln at a temperature of 750 °C to drive off any organics which have adsorbed on to the carbon. The reactivated carbon is then acid washed with diluted hydrochloric acid to remove adsorbed lime. The acid washed carbon is then returned to the CIL tanks.
GN No. 248 GG No. 33064 of 21/03/2010	13 Cat 4 (17) Subcat 4.17	The precious and base metal production and refining.	Precious Metal Production: Gold. Precious Metal Refining: All core gold produced in the plant will be sold to Rand Refinery in South Africa for refining.

6.7.3 NEM:WA Process

A person who wishes to commence, undertake or conduct an activity listed under Category B, must conduct an environmental impact assessment process, as stipulated in the environmental impact assessment regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as part of a waste management license application. The following environmental authorisation process will be undertaken for the development of the proposed Water treatment Plant and Brine Ponds.

Table 6.2: Listed Activities according to NEM:WA

Number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice) :	Listed activity:	Mining Activity
National Environmental Management: Waste Act, 2008 (Act 59 of 2008)			
GN No. 718 GG No. 32368	Schedule 19(1)Cat B 4(1)	The storage including the temporary storage of hazardous waste in lagoons.	Clarity required whether the TSF constitutes being a lagoon. However, the TSF facility already exists and falls under a mine rehabilitation liability, the relevant portion of which will be taken over by Wits Gold The act says a lagoon 'means the containment of waste in excavations and includes evaporation dams, earth cells sewage treatment facilities and sludge farms"
GN No. 718 GG No. 32368	Schedule 19(1)Cat B 4 (7)	The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic metres or more.	Sewage treatment plant and excess mine water treatment.
GN No. 718 GG No. 32368	Schedule 19(1)Cat B 4 (9)	The disposal of any quantity of hazardous waste to land,	Tailings Storage Facility (TSF)
GN No. 718 GG No. 32368	Schedule 19(1)Cat B 4 (11)	The construction of facilities for activities listed in Category B of this Schedule (not in isolation to associated activity),	

6.7.4 NWA Process

According to NWA, water may not be used without prior authorisation from the leading authority, in this case the Department of Water Affairs (DWA). Due to the requirements of the NWA, an Integrated Water Use License Application needs to be compiled and handed in at the DWA to ensure the legality of the SOFS Mining Operation's water uses. GCS will be undertaking the development of the required Water Use Licenses as per the NWA.

The following water uses in terms of Section 21 of the NWA will be applied for at the Free State Regional Office of the DWA:

- (a): Taking water from a water resource;
- (b): Storing water;
- (c): Impeding or diverting the flow of water in a watercourse;
- (f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit
- (g): Disposing of waste in a manner which may detrimentally impact on a water resource;
- (i) Altering the bed, banks, course or characteristics of a watercourse; and
- (j): Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

A pre-consultation meeting with the DWA was held on Monday 15 October 2012. During this meeting the relevant Section 21 water uses were confirmed.

7 GAP ANALYSIS

The following specialist studies were identified as gaps in the MPRDA EIA/EMP and will be addressed in the final NEMA EIA/EMP:

- Blast and Vibrations Impact Assessment;
- Visual Impact Assessment;
- Noise Impact Assessment; and
- Sustainable Development investigation.

8 CONCLUSION

Witwatersrand Consolidated Gold Resources (herein after referred to as "Wits Gold", "the Applicant" or "the Company") is a dual listed company with listings on the Toronto Stock Exchange and the Johannesburg Stock Exchange Limited. The Department of Mineral Resources (DMR) has granted New Order Prospecting Rights to Wits Gold, covering a total of 119,586 hectares (ha) in three goldfields, namely the Southern Free State (SOFS), Potchefstroom and Klerksdorp goldfields. This application pertains to Phase 1 of the SOFS Mining Operation, namely the DBM Project, which covers an area of 4,024 ha over two of the New Order Prospecting Rights.

The proposed project is located within the following District and Local Municipalities:

- Lejweleputswa District Municipalities;
- Matjhabeng Local Municipality; and
- Masilonyana Local Municipality.

Phase 1 of the SOFS Mining Operation, namely the DBM Project, is situated in the Free State Province of central South Africa and is south of the town of Virginia (28°70"S, 26°54"E); whilst the closest major towns to Virginia are Welkom (24 km North-West) and Bloemfontein (136 km South-West), Virginia is approximately 270 km by national road from Johannesburg. It is important to note that the DBM Project extends over numerous farms and/or Prospecting Rights and a portion of the area used to form part of the Harmony Merriespruit Mine lease area that was unmined. This area will be included in the Mining Right Application area once transfer the properties to Wits Gold is notarially executed. Application for ministerial consent in terms of Section 102 of the MPRDA has been granted and the regional office of the DMR is processing the necessary documentation in order to give effect to the transfer of the rights to Wits Gold. Underground mining methods will be implemented at depths starting from 480 metres below surface. Mining is currently planned to be undertaken using narrow reef breast mining approach common to the gold mines of South Africa. Support for the mining will be from a trackless footwall infrastructure below

the Leader Reef (bottom reef horizon). This is less common but not unique in underground South African gold mines.

The primary access route to the DBM Project is the N1 national road or freeway; with tarred, main roads (R73, R70 and R34) branching off this freeway. The Wits Gold properties are intersected approximately 86 km from the N1/R34 turnoff (or 21 km via a direct gravel road from the same junction).

The project zone of influence will extend to the township of Meloding, which is approximately 1.8 km from the proposed shaft area. The TSF location is proposed to be situated on an existing Brownfield Tailings Storage Facility (TSF) in the area. The final option will depend on agreements between all affected parties and relevant government approvals. This aspect will be assessed and discussed in more detail during the EIA phase of the project. Access to the mine will probably be via a portal decline and vertical shaft combination, or a twin vertical shaft system. The Engineering Scoping Study envisaged that the decline would be used to transport all rock to surface while men and materials would be transported via the vertical shaft. This mine design was refined and modified in the pre-feasibility study, where a twin vertical shaft system is proposed.

Proposed infrastructure that will form part of Phase 1 of the SOFS Mining Operation, namely the DBM Project will include:

WATER	**BULK POWER SUPPLIES**
Bulk water supplies;	Bulk power supplies;
Surface supply reticulation;	Main Eskom yard;
Underground supply reticulation;	Surface reticulation;
Dirty water pumping and settling; and	Underground reticulation; and
Sewage treatment.	Emergency generators.
SURFACE INFRASTRUCTURE	**UNDERGROUND INFRASTRUCTURE**
Buildings and offices;	Workshops;
Workshops;	First aid facility;
Clinic;	Fire detection;
Stores and marshalling yard;	Rescue chambers;
Core yard;	Stores; and
Sewage treatment and waste disposal;	Pump chambers.
Roads and storm water handling;	
Tailing storage facilities & waste rock dump;	
Rock handling & conveyors;	
Change house;	
Main fans;	
Shaft headgears;	
Winders;	
Ice plant & cooling towers; and	
Metallurgical plant.	

The Public Participation Process (PPP) has been initiated as part of the requirements of the NEMA, NEM:AQA, NEM:WA and NWA.

The public participation that will be undertaken will be included in the final Environmental Scoping Report.

The following specialist investigations have been undertaken in the MPRDA phase and will be included in the NEMA EIA/EMP for the proposed development and the associated listed activities according to NEMA, NEM:AQA, NEM:WA and NWA:

- Soil, Land Use and Land Capability Assessment;
- Ecology (Fauna & Flora) Impact Assessment;
- Hydrological Impact Assessment;
- Geohydrological Impact Assessment;
- Wetland and Aquatics Impact Assessment;
- Archaeological Assessment;
- Radiation Impact Assessment;
- Social Impact Assessment Impact Assessment;
- Air Quality Assessment; and
- Traffic Assessment Impact Assessment;

The following specialist studies were identified as gaps in the MPRDA EIA/EMP and are currently being undertaken for inclusion in the final NEMA/NEM:AQA/NEM:WA EIA/EMP:

- Blast and Vibrations Impact Assessment;
- Visual Impact Assessment;
- Noise Impact Assessment; and
- Sustainable Development Investigation.

9 REFERENCES

Air Quality Assessment:
Simon Gear, 2012, AIR QUALITY Virginia – Wits Gold DBM Project Air Quality scoping report. Kijani Green Energy (Pty) Ltd

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Riaan A. J. Robbeson, 2012. Terrestrial Biodiversity Impact Assessment for the proposed Virginia Wits Gold DBM Project, Free State Province

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De Bron- Merriespruit South Groundwater Study Scoping Report, GCS (Pty) Ltd, 2012.

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Wits-Gold DBM Project Hydrology Scoping Report, GCS (Pty Ltd), 2012.

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Draft Social Impact Assessment Report, GCS (Pty) Ltd, 2012.

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BASELINE SOIL, LAND CAPABILITY AND LAND USE STUDY FOR THE PROPOSED WITS GOLD DBM PROJECT, Terra Africa Consult, 2012.

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Baseline Traffic Impact Assessment: Scoping Report, ITS (Pty) Ltd, 2012.

Wetland Assessment

Scoping Paragraph: Desktop Wetland and Aquatic Ecosystems Assessment for the Wits Gold DBM Project near Virginia, Free State Province, Wetland Consulting Services (Pty) Ltd, 2012.

Appendix A: A3 Figures

Appendix B: Public Participation Process to date

Appendix C: Database

Appendix D: Specialist Studies

Appendix E: Site Selection Report

Appendix F: Harmony Letter

Appendix G: GCS Company Profile