Applicant: Anglo American Platinum_Mogalakwena Mine
Project: Proposed Explosives Depot Expansion
Tel No: 015 418 2129
Fax No: (015) 417 0036
Postal Address: Private Bag X2463, Mokopane, 0600
Physical Address: N11 Groblers Bridge Road, Steilloop Road, Mokopane, 0600

DMR REF. NO. : LP 30/5/1/3/2/1 (50) EM

SHANGONI
Management Services (Pty) Ltd

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT: ANGLO AMERICAN PLATINUM_MOGALAKWENA MINE

TEL NO: (015) 418 2129
FAX NO: (015) 417 0036
POSTAL ADDRESS: PRIVATE BAG X2463, MOKOPANE, 0600
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AngloAmerican

IMPORTANT NOTICE

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

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment. In terms of section 16(3) (b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

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

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

OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

The objective of the basic assessment process is to, through a consultative process-

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
(b) identify the alternatives considered, including the activity, location, and technology alternatives;
(c) describe the need and desirability of the proposed alternatives,
(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
    (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and

(ii) the degree to which these impacts—

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be managed, avoided or mitigated;

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

(i) identify and motivate a preferred site, activity and technology alternative;

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

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

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ABBREVIATIONS

Acronyms	Definitions
ANPP	Ammonium Nitrate Porous Prills
BA	Basic Assessment
CBA	Critical Biodiversity Areas
DMR	Department of Mineral Resources
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme report
EPWP	Extended Public Works Programme
GDP	Gross Domestic Product
GIS	Geographic Information System
GN	Government Notice
I&AP	Interested and Affected Parties
IRP	Identified Resource Protection
IWUL	Integrated Water Use License
MLM	Mogalakwena Local Municipality
MPM	Mogalakwena Platinum Mine
NEMA	National Environmental Management Act
NEMAQA	National Environmental Management Air Quality Act
NEMWA	National Environmental Waste Management Act
NWA	National Water Act
OEL	Occupational Exposure Limit
OHS Act	Occupational Health and Safety Act
R.	Regulation
SANS	South African National Standard
WDM	Waterberg District Municipality

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PART A

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1. Contact Person and correspondence address

1.1 Details of the EAP

Name of The Practitioner: Shangoni Management Services: Wilda Meyer and Mpho Masango

Tel No.: (012) 807 7036

Fax No. : (012) 807 1014

e-mail address: wilda@shangoni.co.za and mpho@shangoni.co.za

1.2 Expertise of the EAP.

The qualifications of the EAP

NAME	QUALIFICATIONS
Wilda Meyer	B.Sc. Hons degree in Geography and Environmental Management
Mpho Masango	National Diploma: Environmental Sciences
Brian Hayes (Technical reviewer)	BEng (Chemical Engineer), MSc (Environmental Engineering), Pr.Eng.

Summary of the EAP's past experience.

NAME	SUMMARY OF EXPERIENCE
Wilda Meyer	Wilda has experience in conducting Environmental Management Programmes (EMPs), Basic Assessment Reports, Scoping Reports, Environmental Impact Assessments (EIAs), Waste Licence Applications, Integrated Water and Waste Management Plans (IWWMPs) and Integrated Water Use License Applications (IWULAs). Wilda also focusses on conducting environmental audits, such as EMP Performance Assessments and ISO14001 Internal Audits. She also has valuable experience in ISO14001 Environmental Management System (EMS) Implementation and has successfully implemented and obtained ISO14001 certification at various gold- and diamond mine sites.
Mpho Masango	Mpho studied at the Tshwane University of Technology where she obtained her National Diploma (NDip) in Environmental Sciences, majoring in Environmental Management and Environmental

NAME	SUMMARY OF EXPERIENCE
	Resources. She is currently part of the Mining: EIA and EMP Department, and is involved with processes related to the Scoping Reports, Environmental Impact Assessments, Environmental Management Programmes, and Public Participation. Mpho also assists with Air Quality Impact Assessments.
Brian Hayes	Brian is a registered professional engineer (Chemical) with a master degree in Environmental Engineering from the University of Nottingham. Brian has 22 years' experience in environmental management and environmental engineering.

2. Location of the overall Activity.

Farm Name:	Overysel 815 LR
Application area (Ha)	2.18 ha
Magisterial district:	Waterberg District Municipality
Distance and direction from nearest town	30 km North-west of Mokopane
21 digit Surveyor General Code for each farm portion	T0LR00000000081500000

3. Locality map

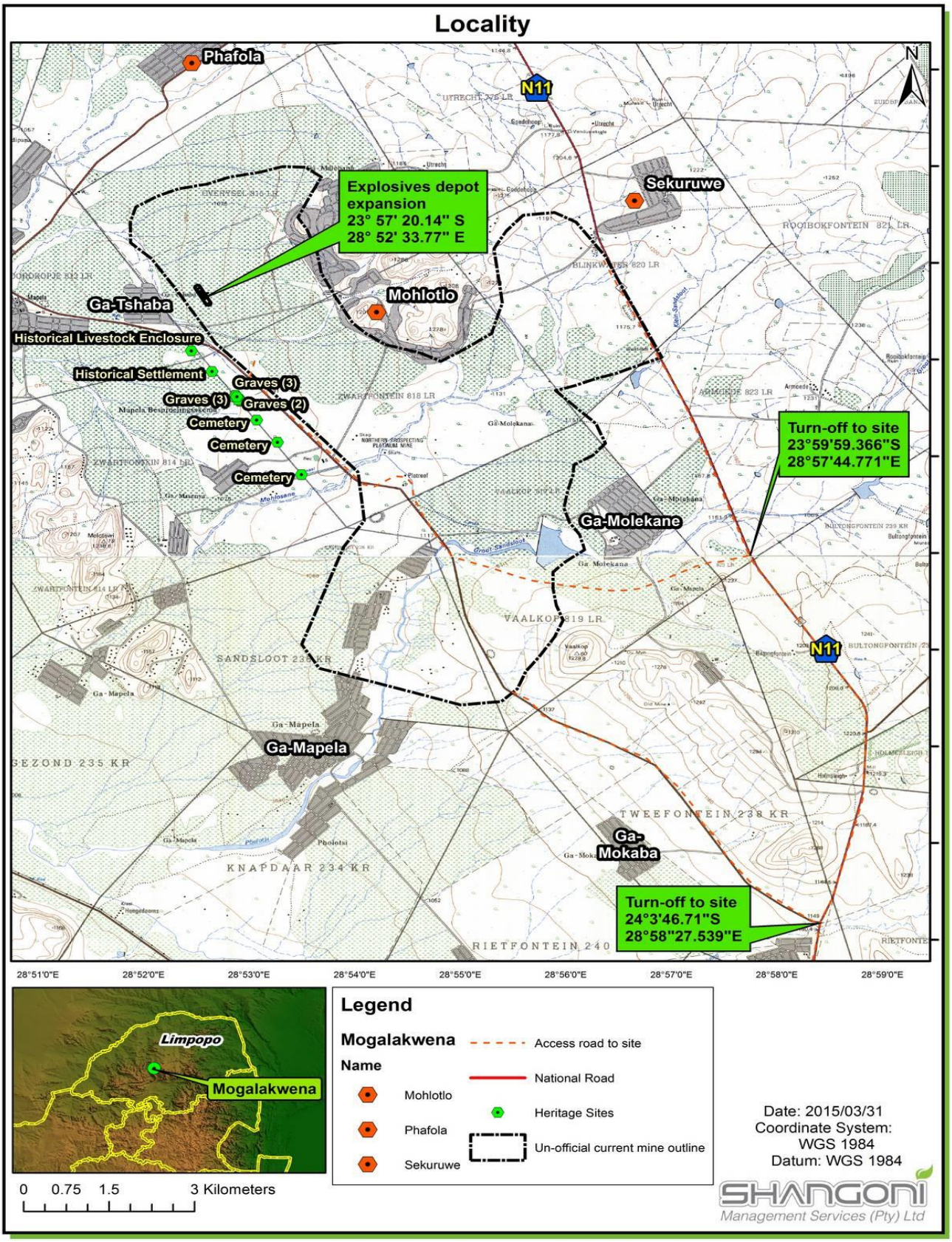

Figure 1: Locality map

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

Refer to Figure 2 below for a plan showing the proposed activity. The detailed infrastructure layout is also presented in the design drawings attached in Annexure E6.

4.1 Listed and specified activities

Table 1: Listed and specified activities

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY Ha or m²	LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)
Grading and sloping of area during construction (expansion). Note: On top of Waste Rock Dump No. 2	±1.45 ha for expansion area ± 2.18 ha for total Explosives Depot area	N/A	N/A
Off-loading and levelling of gravel / material / bricks / cement for surfacing and construction (expansion). Note: On top of Waste Rock Dump No. 2		N/A	N/A
General construction-related activities during expansion (e.g. use of machinery and vehicles, erection of silo structures, building of containment areas (bunded areas) etc.) Note: On top of Waste Rock Dump No. 2		N/A	N/A
Storage and handling of more than 80 m^3 of explosives and accessories (e.g. detonators, etc.) (Section of Depot: Explosives Magazine)	Storage area 494.09 m^2 Total area: 7 122.5m^2	X	GNR 983 of 2014 Activity 51 (Note: Application is made for the expansion)
Storage and handling of emulsion (BME and AEL Emulsion Storage and Handling areas) and ANPP.	1277.35 m^2 Total area: 14 684.45m^2	X	GNR 983 of 2014 Activity 51 (Note: Application is made for the expansion)

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY Ha or m²	LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)
Storage of equipment, accessories etc. in 2x stores	72.8 m^2	N/A	N/A
Water management (establishment and use of water management facilities) in and around the site (pipelines, water tanks and pump base, pit for collection of water from containment areas)	For the depot area 2.18 ha	N/A	N/A
Construction and erection of security measures such as fences, guard house and lighting	Less than 25 m^2	N/A	N/A
Offloading and refilling of explosives, ANPP and Emulsion	N/A	X	GNR 983 of 2014 Activity 51
Utilisation of the Explosives Depot	2.18 ha	X	GNR 983 of 2014 Activity 51
Transportation of explosives, ANPP and Emulsion to the Explosives Depot	N/A	X	X
Decommissioning through demolition of concrete structures and removal of salvageable equipment (posts, pumps, water tanks, gates, silos and concrete rubble).	2.18 ha	X	X
Reshaping of slopes on the waste rock dump top surface	2.18 ha	X	X
Replacement and levelling of topsoil (growth medium) on top of waste rock dump	2.18 ha	X	X
Re-vegetation of the site	2.18 ha	X	X

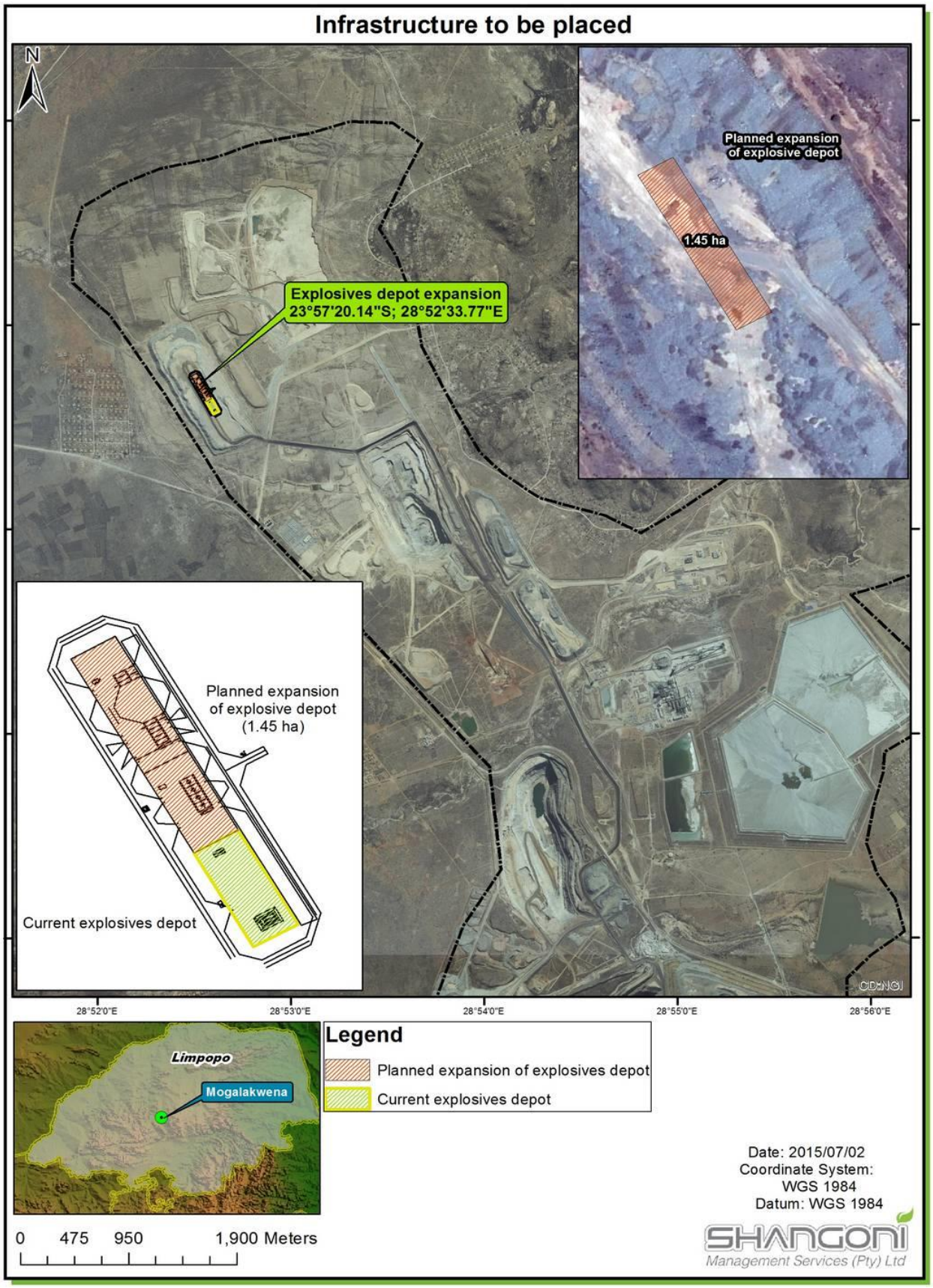

Figure 2: Site plan (Refer also to the design drawings in Annexure E6)

4.2 Description of the activities to be undertaken

Background

Anglo American Platinum Limited - Mogalakwena Mine is an existing platinum mine that has been operational since 1992 and the expected life of the mine is in excess of 30 years. The mine utilises an open pit mining method to extract platinum group metals and base metals (copper, nickel, and cobalt) from the ground. Platinum group metals are extracted from the ore in the form of a concentrate at either the South (Sandsloot and Zwartfontein ore) or North (PPRust north ore) concentrators. Ore is transported by haul roads to the gyratory crusher and by conveyors to the mineral processing plant.

The proposed activity applied for is the expansion of the current Explosives Magazine, situated on top of the existing Waste Rock Dump No. 2, located within Mogalakwena Mine's existing mining rights area. The expansion activity will consist of the storage of more than 80m^3 of explosives in the Explosives Magazine Section as well as the construction (relocation), storage and handling of an ANPP and Emulsion Storage and Handling Section. The two mentioned sections will combined form the new "Explosives Depot".

The original emulsion silos (AEL Depot) and Explosives Magazine were located in the central and southern section of the mining rights area of Mogalakwena Mine, while most work is now concentrating in the northern section. Refer to Figure 3 for the location of the old explosive depot areas versus the proposed location of the new explosives depot (where the expansion is proposed to take place).

Figure 3: Location of old versus new Explosives Magazine and Emulsion areas

A previous application for Environmental Authorisation (under the 2010 EIA Regulations) was undertaken by I.W. Terblanche & Associates Environmental Consultants, in the form of a Basic Assessment Report and Environmental Management Programme, specifically for the movement of the Explosives Magazine and Emulsion Sections to a central point on the mine. The following was applied for:

- Relocation of six (6) emulsion silos and gassing room from the farm Sandsloot 236 KR;
- Decommissioning of two (2) magazines and four (4) silos and the conversion of the area to a training centre without demolishing the existing silo and magazine structures;
- The erection of six (6) emulsion silos and gassing room on the farm Zwartfontein 818 LR as relocated from the farm Sandlsoot 236 KR; and
- The construction of two (2) new emulsion silos on the farm Zwartfontein 818 LR.

An Environmental Authorisation for the above-mentioned was issued by the Limpopo Department of Economic Development, Environment and Tourism (LEDET) on 22 April 2014 (refer to Annexure B). However, the locations as authorised can no longer be used as the latest mine planning of Mogalakwena Mine has since indicated that the area identified and applied for the placement of the above-mentioned infrastructure, is earmarked for future mining. Furthermore, as cut 8 joins the North- and Central pits, the workers will fall within the dangerous blast radius of the repositioned Explosives Depot (as authorised and mentioned above).

Subsequently, Mogalakwena Mine applied (via Shangoni Management Services – the EAP) for an amendment to the afore-mentioned Environmental Authorisation to LEDET to relocate the site(s) from the farms Sandsloot 236 KR and Zwartfontein 818 LR to the farm Overysel 815 LR. The amendment application was submitted in September 2014. LEDET responded in a letter dated 10 October 2014 stating that the Basic Assessment that was undertaken in respect of the Environmental Athorisation that was issued for the proposed location of the emulsion silos, excluded the farm Overysel 815 LR. LEDET added that the proposed relocation of the silos cannot be addressed through an amendment process as it involves a property that did not form part of the initial Basic Assessment as approved. Mogalakwena Mine was thus requested to submit a new application for Environmental Authorisation for the relocation of the silos (refer Annexure B).

Since the promulgation of the Environmental Impact Assessment (EIA) Regulations in December 2014, the application and evaluation process of Environmental Authorisations for mining sites now fall within the jurisdiction of the Department of Mineral Resources (DMR). Therefore, this Basic Assessment Report (BAR) for the expansion of the Explosives Depot will be submitted to the DMR. The application form for environmental authorisation was submitted to the DMR on 11 September 2015. A Reference number has not yet been received, however, due to timeframes provided in the EIA Regulations, 2015, the DMR telephonically agreed that the EAP may commence with Public Participation in order to meet the required timeframes.

Details of the proposed activity

Mogalakwena Platinum Mine (MPM) has relocated its existing Explosives Magazine. The new facility, which will consist of the Explosives Magazine Section and the ANPP and Emulsion Storage and Handling Section, is referred to collectively as the “Explosives Depot”.

The first phase which has been constructed (relocated) consists of the Explosives Magazine area with two containers located inside the bunker area and two containers on the outside (the latter located approximately 75 metres away from the mentioned bunker). Each of the four containers has a capacity of 67.70 m^3. However, as per the Explosives Regulation GN R1604 of 1972 under the Explosives Act (Act No. 26 of 1956), which refers to a stacking height limit of 1900 mm, as well as requiring that the stacks be so arranged that the code markings on every case or carton can be readily seen (therefore the requirement for a walk-way in-between stacked cases), the applicant is only allowed to store 300 cases per Explosives Magazine container.

The volume of each case was worked out to be 46cm x 34.5cm x 12cm = 190.44 cubic centimetres = 0.19 cubic metres (m^3) per case (box). Therefore, the 0.19 m^3 x 300 cases = 57 m^3 per magazine container. The applicant is thus allowed to only store a maximum of 57 m^3 per magazine container (thus a total of 228m^3 in four (4) magazine containers), based on the equation and the requirements as set out in the Explosives Regulations above. Although the explosives cases (boxes) have empty spaces / cavities in between (since the explosives to be stored and handled at the Magazine section are solid explosives and parts, and not liquid), the volume (capacity) of the cases and containers was calculated (as per above) based on a worst case approach, totalling to 228m^3 in total for the Explosives Magazine Section.

The 228m^3 capacity at the Magazine Section thus exceeds the threshold of the 80m^3 as contained in the 2014 EIA Regulations, Listing Notice 1. As per information provided to the EAP, the applicant has indicated that only a maximum of 80m^3 is currently being stored in total within the four (4) magazine containers), and that this will remain as such until an Environmental Authorisation is issued for the expansion of the Magazine facility by more than 80m^3 (as per Listing Notice 1: Activity 51 – as applied for in this Basic Assessment Report). The applicant wishes to use the containers to their maximum capacity, and this application is thus made to the Department of Mineral Resources (DMR) for the expansion of the Explosives Magazine Section (i.e. to store more than 80m^3 of explosives and associated equipment in the four magazine containers).

Furthermore, the second phase will (apart from applying for an expansion of the Magazine facility (as mentioned above)), also entail the construction and use of the new ANPP and Emulsion (BME and AEL) Storage and Handling Section, which will be located next to the mentioned Magazine area (also on top of Waste Rock Dump No. 2), and will form part of the overall combined “Explosives Depot”.

The newly constructed Explosives Depot will be located on the existing Mogalakwena Mine Waste Rock Dump (WRD) No.2, which is situated within the existing mine boundary area for which Mogalakwena Mine has a Mining Right (LP 50 MR).

<u>Storage capacity</u>

The Expansion of the Explosives Depot will thus include the following:

- 4x 200 tons (in total 332.43m^3) of BME emulsion silos;

- BME bunded areas around BME silos. Bunded area capacity of 137.86m^3 each (551.44m^3 in total for four BME bunded areas);
- 6x 40 tons (in total 99.73m^3) of AEL emulsion silos;
- AEL bunded areas around AEL silos. Bunded area capacity of 44.51m3 each (267.06m^3 in total for six AEL bunded areas);
- 2x 50 tons (in total 41.55m^3) of Ammonium Nitrate Porous Prills (ANPP) silos;
- ANPP bunded areas around ANPP silos. Bunded area capacity of 55.86m^3 each (total 111.72m^3 in total for two ANPP bunded areas); and
- Storage of explosives and accessories of more than 80m^3 in the existing four Explosives Magazine containers (228m^3).

The total capacity for the storage of explosives and emulsion is 1403.93m^3 for the Emulsion Storage and Handling Section, and 228m^3 for the Magazine Section. Therefore, the total combined capacity of the Explosives Depot storage areas will be 1 631.93m^3.

Design

Detailed design drawings were compiled for the proposed Explosives Depot Expansion project. Copies of the mentioned design drawings are attached in Annexure E6.

Infrastructure and components stored

The following infrastructure will be constructed and erected as part of the Explosives Depot Expansion:

- 4x 200 tons (in total 332.43m^3) of BME emulsion silos;
- BME bunded areas around BME silos. Bunded area capacity of 137.86m^3 each (551.44m^3 in total for four BME bunded areas);
- 6x 40 tons (in total 99.73m^3) of AEL emulsion silos;
- AEL bunded areas around AEL silos. Bunded area capacity of 44.51m3 each (267.06m^3 in total for six AEL bunded areas);
- 2x 50 tons (in total 41.55m^3) of Ammonium Nitrate Porous Prills (ANPP) silos;
- ANPP bunded areas around ANPP silos. Bunded area capacity of 55.86m^3 each (total 111.72m^3 in total for two ANPP bunded areas); and
- Storage of explosives and accessories of more than 80m^3 in the existing four Explosives Magazine containers.
- Accessory and equipment stores;
- Guard (security) houses and accompanying stores; and
- Water management measures, including pipelines, a 15 000L water tank for spills and cleaning purposes, a pump base and a pit collection sump (refer to description below).

Refer to Annexure E8 for a list and photographs of the components that will be stored and handled at the Explosives Depot.

Storm water management

Waste Rock Dump No. 2 is currently draining onto paddocks to the west, before it runs to the Mohlosane River. To the east of the WRD, water drains into a sump in the open pit from where it goes to Dam 1160 for re-use in the process.

The water management on the Explosives Depot site will be managed in terms of dirty water management areas and waste rock runoff areas. The dirty water management areas can be defined as the storage facilities (i.e. emulsion- and ANPP silos) (and bunded areas surrounding such facilities). The remainder of the site is regarded as a waste rock runoff area.

Rain water falling on the Explosives Depot dirty water management areas will be drained out of the bunded areas and will be gravity fed to a sump in the North pit, via a drainage pipe that runs from the bunded areas to a collection pit, and then from there to a sump in the North pit). From the open pit sump the water will be pumped to Dam 1160.

Water falling on the waste rock runoff areas at the Explosives Depot will be regarded as storm water draining from the Waste Rock Dump, as was the case prior to the development of the Explosives Depot on Waste Rock Dump No. 2, and will continue to drain from the waste rock dump, as mentioned above.

It should be noted that the mine has an extensive surface and groundwater monitoring programme in place. Although, it is not anticipated that significant impacts will be caused by the addition of the Explosives Depot to the waste rock dump site, the mentioned monitoring programme will continue to be implemented for the future water management of Waste Rock Dump No. 2. The mine also proposes to drill an additional borehole close to Waste Rock Dump No. 2 in order to monitor for potential additional impacts resulting from the Explosives Depot.

The Basic Assessment Report and its accompanying Environmental Management Programme Report (EMPr) provides background information on surface water and groundwater qualities on the mine, as well as potential impacts and management and mitigation measures.

Drinking water and water for cleaning purposes:

A15 000L water tank will be placed on-site for spills and cleaning purposes. Bottled water for drinking purposes will be provided to the site.

Waste management:

General (domestic) waste is anticipated to be generated on the Explosives Depot site from the guard (security) houses and other employees working on the site. General waste will be placed in suitably marked containers on the site and recycled (where possible) or removed by a suitably qualified contractor to a licenced waste disposal facility.

The mine has a waste management procedure in place as part of its ISO14001 Environmental Management System that will continue to be implemented at the proposed Explosives Depot.

Although emulsion is considered a hazardous substance due to its oil content, any spillages of emulsion is currently (and will continue to be) contained in the bunded areas and will be collected in buckets and used in or deposited next to the blast holes at the open pit. Emulsion spillages are therefore not disposed of as hazardous waste but are destroyed during open pit blasting.

Hazardous waste that may be generated at the Explosives Depot includes the following:

- Chemical containers or packaging from cleaning agents, that will be placed in suitably marked containers on the site and removed by a suitably qualified contractor to a licenced waste disposal facility.
- Explosives packaging from the Explosives Magazine area will either be taken to the open pit operations to be destroyed in the blast or to Waste Rock Dump No. 1 where it is incinerated. See Table 2 below for photographs of the explosives destruction bay.

Table 2: Photographs of explosives destruction bay

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Spill handling

As mentioned above, any spillages of emulsion will be contained in the bunded areas and collected in buckets and used in or deposited next to the blast holes at the open pit. The mine's current incident reporting procedure, that forms part of its ISO14001 Environmental Management System will continue to be used in order to communicate the occurrence and volume of spillages.

Electricity supply

An 80m long, 11KV power line will be erected for electricity supply to the Explosives Depot. This does however not trigger a listed activity in terms of the EIA Regulations, dated 2014.

Emergency preparedness and response

Dry powder fire extinguishers will be placed on-site. In case of an emergency (e.g. a fire) the main emergency response plan will be to evacuate the site as soon as possible to a 400m minimum evacuation distance. The mine has an Emergency Preparedness and Response Code of Practice (COP) in place (reference number: MS-SHE-HLH-COP-0005). Appendices R and S to the mentioned COP relates to the Explosion and Fire Emergency plans / checklists which lists the steps to be taken in case of a fire or explosion occurring. See Figures 4 and 5 below for the extracts from the mentioned COP appendices. The mentioned action plans / checklists will be followed at the Explosives Depot in case of such an emergency.

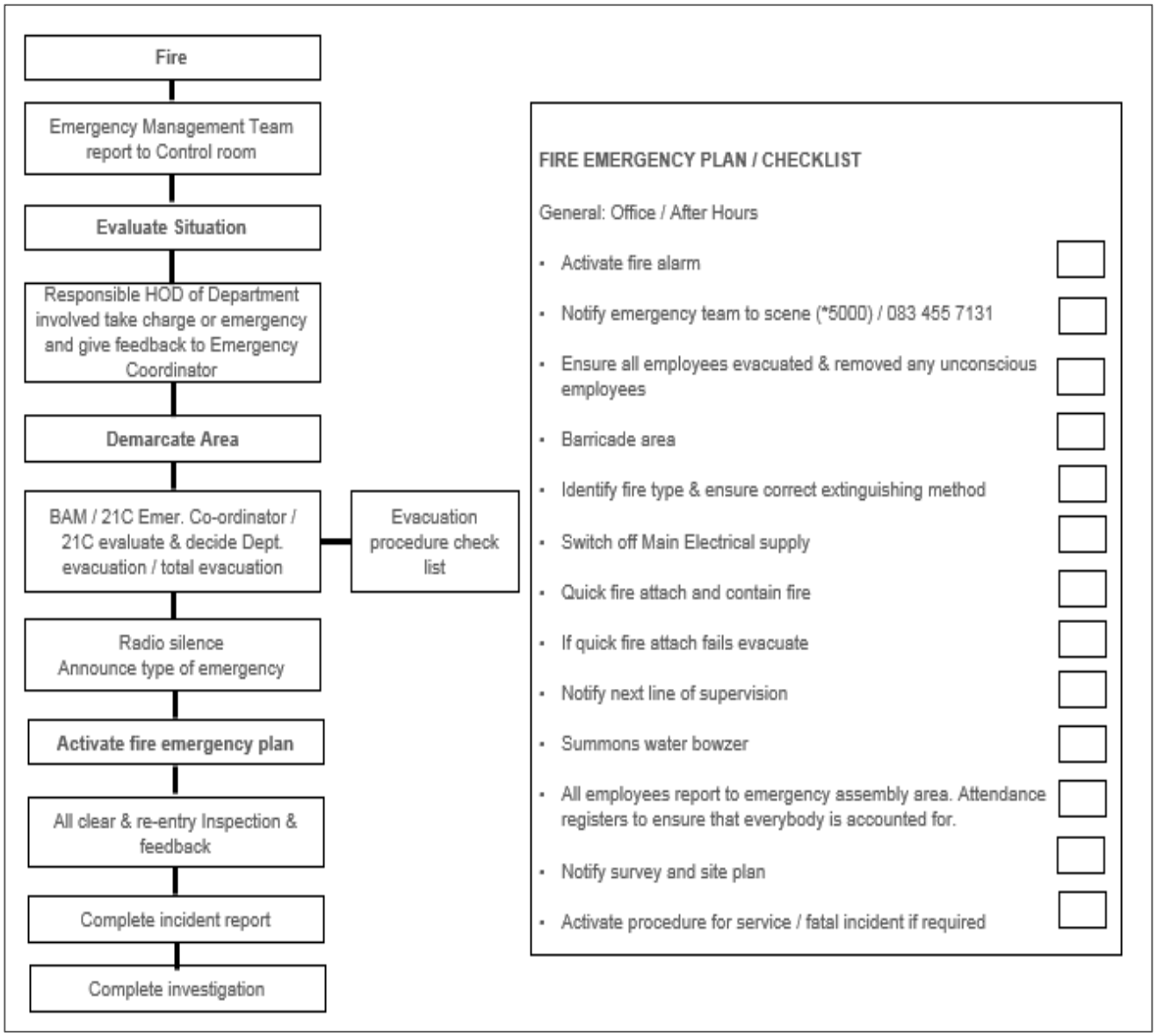

Figure 4: Fire Emergency Plan / Checklist (source: Anglo Platinum Emergency Action Plan and COP)

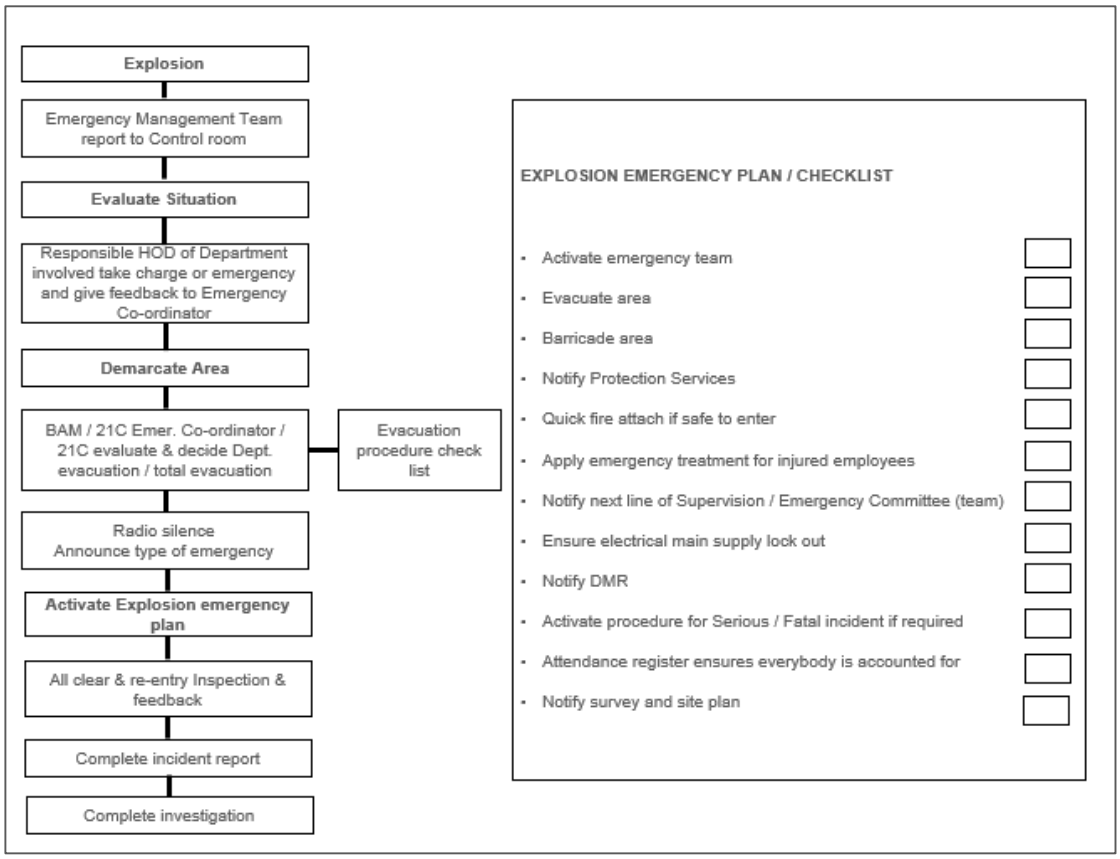

Figure 5: Explosion Emergency Plan / Checklist (source: Anglo Platinum Emergency Action Plan and COP)

The emergency coordinator will be responsible for the initiation of evacuation and emergency drills on the site. Such drills will be conducted on a bi-annual basis. Furthermore, the emergency coordinator will do routine inspections on-site for possible fire or explosion risks.

Furthermore, the following preventive measures, as set out in the Explosives Regulations, GN.R1604, dated 08 September 1972, will be adhered to in terms of emergency preparedness and response:

- The mine will ensure that the lightning protection system is thoroughly examined and tested at least once a year, not later than 30 September, by a competent person. The result of the examination and test to be entered into the book referred to in Regulation 8.4 in addition to being reported forthwith to the Chief Inspector of Explosives.
- No person shall smoke or make or have a fire or naked light within the fence surrounding a magazine nor shall any person take into this area, any pipe, tobacco, cigarette or matches or any means of making a naked light.
- No person entering a magazine shall wear boots or shoes containing any exposed metal.
- The Depot will be effectively protected from veldt fires, and, to this end, grass within the fence surrounding the Depot shall be kept as short as practicable and this area shall be kept free of combustible material such as timber, bush, dry grass, newspapers, boxes, cartons etc.

5. Policy and Legislative Context

Table 3: Policy and legislative context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	**REFERENCE WHERE APPLIED** (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.** (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
Explosives Act (Act No. 26 of 1956) Explosives Regulation GN R1604 of 1972	Section 4.2 (Part A); Section 1.5 (Part B of Basic Assessment Report (BAR))	See Section 4.2 (Part A) above and Section 1.5 (Part B of BAR).
Limpopo Conservation Plan (v2) Technical Report (EDET/2216/2012), dated September 2013	Section 7.4.1 (Part A of BAR): Chapter M	See Section 7.4.1 (Part A of BAR): Chapter M
Mineral and Petroleum Resources Development Act (Act 28 of 2002)	Taken into consideration during the Basic Assessment process.	
Mogalakwena Local Municipality 2014-15 Integrated Development Plan.	Section 7.4.1	N/A
National Water Act (Act No. 36 of 1998) Government Notice (GN) No. 399 of 26 March 2004	The GN No. 399 of 26 March 2004 has been applied in Part B (1.4.3) of the BAR and Environmental Management Programme Report (EMPr).	In terms of the GN No. 399 of 26 March 2004 (General Authorisations), MPM does not require a Water Use License (WUL) for storage of water on-site in the 15 000L tank and also do not need to register the water use.
National Water Act (Act No. 36 of 1998) Regulations on use of water for mining and related activities GNR 704 of 1999	Section 1.5 (Part B of BAR)	See Section 1.5 (Part B of BAR).

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	**REFERENCE WHERE APPLIED** (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.** (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
National Environmental Management Biodiversity Act (Act No. 10 of 2004) Alien Invasive Species Regulation GN R598 of 2004	Section 1.5 (Part B of BAR)	See Section 1.5 (Part B of BAR).
National Environmental Management Act (Act 107 of 1998)	Whole document	The legislation gives guide on how the basic assessment process should be carried out.
National Environmental Management Act (Act No. 107 of 1998) Environmental impact Assessment Regulations, 2014 _ R982	Whole document	GN R. 982 gives guide on the contents of the BAR and EMPr. This document was prepared to meet the requirements of GN R. 982.
National Environmental Management Act (Act No. 107 of 1998) Environmental impact Assessment Regulations, 2014 _ R983	N/A	BAR is conducted due to the listed activity as per the Environmental Impact Assessment Regulations, 2014 _Listing Notice 1: GN R983, being triggered.
National Environmental Management Air Quality Act (Act No. 39 of 2004) Dust control regulations GN R829 of 2013	Section 1.5 (Part B of BAR)	See Section 1.5 (Part B of BAR)
SABS Code of Practice 10103: 2008 - The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	Section 1.5 (Part B of BAR)	See Section 1.5 (Part B of BAR)

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	**REFERENCE WHERE APPLIED** (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.** (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
Waterberg District Municipality 2014-2015 Integrated Development Plan	Section 7.4.1 (Part A) of BAR.	See Section 7.4.1 (Part A) of BAR.
Waterberg District Municipality Environmental Management Framework – Final Report (date unknown).	Section 7.4.1 (Part A) of BAR.	
Waterberg District Municipality Environmental Management Framework – Status Quo Report	Section 7.4.1 (Part A) of BAR.	
Mogalakwena Local Municipality 2014-2015 Integrated Development Plan	Section 7.4.1 (Part A) of BAR.	

6. Need and desirability of the proposed activities.

Mogalakwena Mine uses an open cast method to mine platinum. Explosives are an integral part of the effective extraction of minerals for Mogalakwena Mine's operations as they are used to blast large rocks in order to reach the minerals below. ANPP, emulsion (stored in silos) and detonators, and explosives (stored in magazines) are some of the ingredients used for blasting. MPM will use explosives throughout the operational phase of the mine. Platinum is valuable and significantly contributes to the Gross Domestic Product (GDP) of the province and the country. Expansion of the Explosives Depot is desirable to ensure continuation of mining activities at Mogalakwena Mine. In addition, the proposed expansion site is located on top of a waste rock dump (Waste Rock Dump No. 2). The site was selected based on its proximity to the current main mining activities on an already developed and available waste rock dump (disturbed area).

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

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

Table 4: Need and Desirability of the Proposed Project

Requirement		Part where requirement is addressed/response
1.	**How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?[1]**	The study site is located within the Savanna Biome of South Africa. The Savanna Biome is further divided into smaller units known as vegetation types. The vegetation type present at the study site is the Makhado Sweet Bushveld (Mucina & Rutherford, 2006) as shown in Figure 7 below. Natural Makhado Sweet Bushveld comprise of short and shrubby bushveld with a poorly developed grass layer on slightly too moderately undulating plains. Makhado Sweet Bushvelds are poorly conserved and about 27% have been transformed by cultivation and, to a smaller extent, urban and built-up areas. The Makhado Sweet Bushveld vegetation type is listed as vulnerable and has a conservation target of 19%. About 1% is statutorily conserved, mainly in the Bellevue Nature Reserve (Mucina & Rutherford, 2006). The Explosives Depot Expansion will take place on Mogalakwena Mine's Waste Rock Dump No. 2,
1.1	How were the following ecological integrity considerations taken into account?	
1.1.1	*Threatened Ecosystems.[2]*	
1.1.2	*Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.[3]*	

[1] Section 24 of the Constitution and section 2(4)(a)(vi) of NEMA refer.
[2] Must consider the latest information including the notice published on 9 December 2011 (Government Notice No. 1002 in Government Gazette No. 34809 of 9 December 2011 refers) listing threatened ecosystems in terms of Section 52 of National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
[3] Section 2(4)(r) of NEMA refers.

Requirement	Part where requirement is addressed/response
	which falls within the mine's existing disturbed mining rights area. There is no natural vegetation currently on the mentioned Waste Rock Dump. Two wetlands were identified on the mine however; these wetlands are not located near the location of the proposed activities.
1.1.3 Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs").	Refer to Chapter M of Part 7.4.1.
1.1.4 Conservation targets.	
1.1.5 Ecological drivers of the ecosystem.	
1.1.6 Environmental Management Framework.	According to Waterberg District Municipality's Environmental Management Framework, Mogalakwena Mine is situated in Environmental Management Zone 6: Restricted mining focus area in aesthetic and/or ecological resource areas. Zone 6 represents areas where significant mineral resources, especially the platinum group metals, occur in areas with a generally high aesthetic and/or ecological value. A preferred activity within this zone is the mining of minerals, which is conducted in a well-planned manner and which will ensure that widespread and unacceptable damage to the aesthetic and/or ecological values of the area will not occur (Waterberg District Municipality, EMF, date unknown). No finalised Spatial Development Framework for the Waterberg District Municipality is yet available. However, according to Draft Waterberg District Municipality's Spatial Development Framework, dated 2009, Mogalakwena Platinum Mine is situated in an area earmarked as platinum potential area. In addition to that, the area is also marked as active mines area. Furthermore, the Mogalakwena Housing and Spatial Development Framework, Final Draft, 2005, recognises the Mogalakwena mine and states that the mine is the largest mining operation in the Mogalakwena local municipality. Refer also to Chapter M in Section 7.4.1 (Part A of this BAR).
1.1.7 Spatial Development Framework.	
1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).[4]	According to the Mogalakwena Local Municipality Final 2014-15 Integrated Development Plan, Mogalakwena Mine is one of the air quality hotspots within Waterberg. According to the South African Air

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

Requirement		Part where requirement is addressed/response
		Quality Information System (www.saaqis.org.za), Mogalakwena Mine is situated in an air quality priority area (see Chapter J in Section 7.4.1 (Part A of BAR)).
1.2	How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[5]	The potential impacts that have been identified and may occur as a result of the proposed activity has been discussed in Part A, Sections 7.5 and 9 of this document. Mogalakwena Mine aimed at constructing the Explosives Magazine area on top of a Waste Rock Dump (disturbed area) in order to minimise any impact on natural vegetation (other areas). The expansion of the Depot will also take place on Waste Rock Dump No. 2, thereby preventing impacts on natural vegetation. Measures for implementation, where certain impacts (such as the establishment of alien invasive vegetation on the Waste Rock Dump) have been proposed in Part B (EMPr) Sections 1.4.4, 1.5 and 1.6.
1.3	How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[6]	
1.4	What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?[7]	General (domestic) waste is anticipated to be generated on the Explosives Depot site from the guard (security) houses and other employees working on the site. General waste will be placed in suitably marked containers on the site and recycled (where possible) or removed by a suitably qualified contractor to a licenced waste disposal facility. The mine has a waste management procedure in place as part of its ISO14001 Environmental Management System that will continue to be implemented at the proposed Explosives Depot. Although emulsion is considered a hazardous substance, due to its oil content, any spillages of emulsion is currently (and will continue to be) contained in the bunded areas and will be collected in buckets and used in or deposited next to the blast holes at the open pit. Emulsion spillages are therefore not disposed of as hazardous waste but will be destroyed during the blasting process. Hazardous waste that may be generated at the Explosives Depot includes the following: • Explosives packaging from the Explosives Magazine area will either be taken to the open pit operations to be destroyed in the blast or to the

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

Requirement		Part where requirement is addressed/response
		back of rehabilitated Waste Rock Dump No. 1 where it is incinerated. • Chemical containers or packaging from cleaning agents, that will be placed in suitably marked containers on the site and removed by a suitably qualified contractor to a licenced waste disposal facility.
1.5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[8]	Since the proposed Explosives Expansion will take place on an already disturbed area (a Waste Rock Dump), no sites of cultural heritage will be disturbed. Refer also to Chapter N and Figure 17 below.
1.6	How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?[9]	The mining and removal of ore (non-renewable resources) at Mogalakwena Mine will result in the destruction of the geological strata, which is a consequence of mining. In order to continue mining, blasting and the use of explosives will be necessary. Although the proposed Expansion of the Explosives Depot will fulfil the purpose of storing and handling of explosives, it does not directly relate to the blasting activity. It does however contribute indirectly to the overall mining and related activities undertaken at Mogalakwena Mine, that impact on non-renewable resources
1.7	How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?[10]	General purpose raw water will be pit water pumped to and from the North Gooseneck. This is where most dust suppression trucks fill up on the mine. The raw water from the pit will be used primarily for cleaning, dust suppression. A 15 000L tank will be placed on the proposed expansion site for the purpose of spills and cleaning. The water will be delivered by tanker from the North Gooseneck. Bottled drinking water will be provided to the site. The potential impacts that may be occur as a result of the proposed activity have been identified and discussed in Part A, Sections 7.5 and 9 of this document.
1.7.1	*Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their*	The storage, handling and use of explosives in blasting activities are necessary for the successful mining activities at Mogalakwena Mine. Therefore, the proposed activity is dependent on the mining of

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

Requirement		Part where requirement is addressed/response
	ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)	resources, as the storage of explosives is a related activity to mining. Should the waste rock as contained on Waste Rock Dump No. 2 be identified for re-mining in the future, such resources will not be available, unless Mogalakwena Mine applies for the necessary authorisations for relocating the Explosives Depot.
1.7.2	*Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)*	
1.7.3	*Do the proposed location, type and scale of development promote a reduced dependency on resources?*	
1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts?[11]	The proposed site for development and expansion was chosen on the principles that it is located on an already disturbed area (i.e. on top of Waste Rock Dump No. 2).
1.8.1	*What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?*	It is believed that no knowledge gaps exist in terms of the proposed project, the current state of the environment at the proposed site as well as the potential impacts associated with the proposed project. Also, no uncertainties have been identified. The following assumptions are made: • That all information provided by the applicant regarding the proposed project is correct. • That the mitigation measures proposed in this report and the EMPr are implemented correctly and are effective. • All research/reference sources are accurate. • That there will be no significant changes to the proposed project that could affect the findings and recommendations of this report and the EMPr.
1.8.2	*What is the level of risk associated with the limits of current knowledge?*	Based on the above descriptions, it is our opinion that the level of risk associated with the limits of current knowledge is low.
1.8.3	*Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?*	
How will the ecological impacts resulting from this development impact on people's environmental right in terms of the following:[12]		
1.8.4	*Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken*	All potential negative and positive impacts associated with the proposed activity have been identified and discussed in Part A, Sections 7.5 and 9 of this document.

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

Requirement		Part where requirement is addressed/response
	to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	
1.8.5	*Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?*	The proposed site for development and expansion was chosen on the principles that it is located on an already disturbed area (i.e. on top of Waste Rock Dump No. 2), thereby minimising the impacts on the bio-physical environment.
1.9	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	All potential negative and positive impacts associated with the proposed activity have been identified and discussed in Part A, Sections 7.5 and 9 of this document.
1.10	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	
1.11	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?[13]	Refer to Annexure E1 for the Alternatives Assessment Report.
1.12	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?[14]	A determination of the potential impacts associated with the proposed activity has been included in Part A, Sections 7.5 and 9 of this document.
What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?		
2.1.1	*The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,*	According to the Mogalakwena Local Municipality's 2014-15 IDP, Key Performance Area Number 5 for the municipality is "*Social and Local Economic Development*" and the Strategic objective is "*to create inclusive and well-coordinated investment opportunities for the growth of the economy*." Furthermore, the IDP sets out the following priority areas: • Sustainable infrastructure development and maintenance; • Building and retention of institutional capacity, • Revenue enhancement, • Stimulating economic development, • Consistent and regular monitoring, reporting and evaluation, • Effective and clear communication, • Integrated land use planning and management, • Environmental sustainability, and
2.1.2	*Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),*	
2.1.3	*Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and*	
2.1.4	*Municipal Economic Development Strategy ("LED Strategy").*	

[13] Section 2(4)(b) of NEMA refer.
[14] Regulations 22(2)(i)(i), 28(1)(g) and 31(2)(1) in Government Notice No. R. 543 refer.

Requirement	Part where requirement is addressed/response
	• Social / community development. In terms of Operational objectives: short, medium and long term strategies, as contained in the mentioned IDP, one of the LED strategies for job creation is mineral beneficiation. With regards to spatial opportunities the IDP states that although the mining sector in the municipality is limited around Mogalakwena, this may change in the future with possible extensions of the Mogalakwena Platinum Mine. No finalised Spatial Development Framework for the Waterberg District Municipality is yet available. However, as mentioned earlier, according to Draft Waterberg District Municipality's Spatial Development Framework, dated 2009, Mogalakwena Platinum Mine is situated in an area earmarked as platinum potential area. In addition to that, the area is also marked as active mines area. Furthermore, the Mogalakwena Housing and Spatial Development Framework, Final Draft, 2005, recognises the Mogalakwena mine and states that the mine is the largest mining operation in the Mogalakwena local municipality.
2.2 Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	A determination of the potential impacts associated with the proposed activity has been included in Part A, Sections 7.5 and 9 of this document.
2.2.1 Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	As the proposed activity is the expansion of the existing Explosives Magazine for an existing mining area, no additional income will be generated from the proposed expansion activity (directly), however, the storage and handling of explosives contributes indirectly to the success of the mining operations and its production. The mine will continue to provide work for employees and contractors during the Operational Phase of the proposed expansion activity. As per Mogalakwena Social and Labour Plan (SLP), the focus areas for its Local Economic Development (LED) programmes include: • Job creation and poverty alleviation; • Community infrastructure, • Education, training and skills development, and • Community, safety, health and welfare.

Requirement	Part where requirement is addressed/response
	The SLP also sets out the LED budget summary for each focus area.
2.3 How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?[15]	The closest community which is Ga-Tshaba Village is probably at present already desensitised to the existing mining areas and the WRD, and the additional expansion project will not add to any additional impacts in terms of the social character of the area. It is not anticipated that the proposed activity will have an impact upon the physical, psychological, developmental, cultural or social needs and interests of the community
2.4 Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term?[16] Will the impact be socially and economically sustainable in the short- and long-term?	The proposed activity will have a relative equitable impact distribution over the short (construction phase) and long-term (operational phase). The impacts, as shown in Part A, Section 7.5 and 9 of this report, are mostly low taking mitigatory measures into account, for both the construction and operational phases. The development will be economically sustainable over the short and long-term as the mining operation is expected to continue for at least the next 30 years.
2.5 In terms of location, describe how the placement of the proposed development will:[17]	
2.5.1 result in the creation of residential and employment opportunities in close proximity to or integrated with each other,	As the proposed activity is the expansion of the existing Explosives Magazine for an existing mining area, residential opportunities will not be created. The mine will continue to provide work for employees during the operational phase.
2.5.2 reduce the need for transport of people and goods,	The need for the transportation of explosives to the site will not be reduced as it would be necessary for trucks to offload explosives to the mine for the purpose of blasting in the open pits. The proposed activity will not impact on the transportation of people.
2.5.3 result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	
2.5.4 compliment other uses in the area,	The current land use at Mogalakwena Mine is that of 'mining'. The use, storage and handling of explosives forms and integral part of mining activities.
2.5.5 be in line with the planning for the area,	According to Waterberg District Municipality's Spatial Development Framework, Mogalakwena Platinum Mine is situated in an area earmarked as platinum potential area. In addition to that, the area is also marked as active mines area. According to Waterberg District Municipality's Environmental Management Framework,

[15] Section 2(2) of NEMA refers.
[16] Sections 2(2) and 2(4)(c) of NEMA refers.
[17] Section 3 of the Development Facilitation Act, 1995 (Act No. 67 of 1995) ("DFA") and the National Development Plan refer.

Requirement	Part where requirement is addressed/response
	Mogalakwena Platinum Mine is situated in an area which is said to be Zone 6: Restricted mining focus area in aesthetic and/or ecological resource areas. The zone (Zone 6) represents areas where significant mineral resources, especially the platinum group metals, occur in areas with a generally high aesthetic and/or ecological value
2.5.6 for urban related development, make use of underutilised land available with the urban edge,	Not applicable as the development is not an urban related development and will take place outside urban edges
2.5.7 optimise the use of existing resources and infrastructure,	The expansion site for the proposed activity is situated within the existing mining area, which has existing access roads to Waste Rock Dump No. 2. The existing access roads will therefore be utilised to gain access to the proposed expansion site.
2.5.8 opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	
2.5.9 discourage "urban sprawl" and contribute to compaction/densification,	It is not anticipated that the project will contribute towards “urban sprawl” as the proposed activity is not associated with any housing or residential areas. The use and operation of the Explosives Depot will continue with the expansion thereof. Current employees will thus be used for the operation of the depot, and the continuation of the Social and Labour Plan implementation will be relevant.
2.5.10 contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	
2.5.11 encourage environmentally sustainable land development practices and processes,	Effective waste and water management and control and mitigation of environmental impacts. Refer to Part A, Sections 7.5, 9 and Part B, Sections 1.4.4, 1.5 and 1.6 of this report for all impacts and mitigation measures associated with this project.
2.5.12 take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	The site was planned (i.e. to be placed on a Waste Rock Dump) in order to avoid significant environmental impacts.
2.5.13 the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	The current mining operation results in high socio-economic returns. The Explosives Depot is an activity related to mining and is necessary for the continuation of mining.
2.5.14 impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	It is not anticipated that the proposed activity will impact on any socio-cultural or heritages resources. The “sense of place” of the area has also already been impacted on as a result of current mining activities conducted on the property in question. Therefore, regular passers-by of the area as well as local residents within the area are likely to be desensitised to the mining activities.
2.5.15 in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	It is not foreseen that the proposed activity will act as a catalyst to create a more integrated settlement.

Requirement	Part where requirement is addressed/response
2.6 How were a risk-averse and cautious approach applied in terms of socio-economic impacts?[18]	The proposed site for development and expansion was chosen on the principles that it is located on an already disturbed area (i.e. on top of Waste Rock Dump No. 2), thereby aiming to minimise impacts on surrounding communities.
2.6.1 What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?19	It is believed that no knowledge gaps exist in terms of the proposed project, the current state of the environment at the proposed site as well as the potential impacts associated with the proposed project. Also, no uncertainties have been identified. The following assumptions are made: • That all information provided by the applicant regarding the proposed project is correct. • That the mitigation measures proposed in this report and the EMPr are implemented correctly and are effective. • All research/reference sources are accurate.• That there will be no significant changes to the proposed project that could affect the findings and recommendations of this report and the EMPr. Based on the above descriptions, it is our opinion that the level of risk associated with the limits of current knowledge is low.
2.6.2 What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	
2.6.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	
2.7 How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1 Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	It is not anticipated that the proposed project will impact significantly on people's health, safety and social ills. All potential negative and positive impacts associated with the proposed activity have been identified and discussed in Part A, Sections 7.5 and 9 of this document.
2.7.2 Positive impacts. What measures were taken to enhance positive impacts?	The proposed site for development and expansion was chosen on the principles that it is located on an already disturbed area (i.e. on top of Waste Rock Dump No. 2), thereby minimising the impacts on the bio-physical environment and the surrounding communities.
2.8 Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	It is not anticipated that the activity's socio-economic impacts will result in new, direct ecological impacts. The proposed site's location is on top of an already disturbed area (i.e. existing Waste Rock Dump). No additional negative socio-economic impacts are

[18] Section 2(4)(a)(vii) of NEMA refers.
[19] Section 24(4) of NEMA refers.

Requirement	Part where requirement is addressed/response
	anticipated to be associated with the proposed activity.
2.9 What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?[20]	The proposed site for expansion was chosen on the principles that it is located on an already disturbed area (i.e. on top of Waste Rock Dump No. 2), thereby minimising the impacts on the bio-physical environment and the surrounding communities. Refer to Annexure E1 for the Alternatives Assessment Report. The alternatives identified allow for the “best practicable environmental option” to be selected.
2.10 What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?[21] Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	
2.11 What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?22	Employees and contractors up to a certain skills level will be involved during the Construction- and Operational phase of the Explosives Depot Expansion.
2.12 What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?[23]	Mitigation measures were recommended to ensure that the environmental consequences of the proposed development were addressed. Refer to Part A, Sections 7.5 and 9, and Part B, Sections 1.4.4, 1.5 and 1.6 for all environmental impacts identified and mitigation measures proposed for the development.
2.13 What measures were taken to:	
2.13.1 ensure the participation of all interested and affected parties,	Refer to the Public Participation report attached hereto as Annexure D1.
2.13.2 provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,[24]	The public participation process is open to all parties. Public notices and a newspaper advertisement were distributed to encourage participation.
2.13.3 ensure participation by vulnerable and disadvantaged persons,[25]	The public participation process is open to all parties, including vulnerable and disadvantaged persons.
2.13.4 promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,[26]	All employees at Mogalakwena Mine undergo environmental awareness/training. This will continue for employees and contractors working at the Explosives Depot Expansion section.

[20] Section 2(4)(b) of NEMA refers.
[21] Section 2(4)(c) of NEMA refers.
[22] Section 2(4)(d) of NEMA refers.
[23] Section 2(4)(e) of NEMA refers.
[24] Section 2(4)(f) of NEMA refers.
[25] Section 2(4)(f) of NEMA refers.
[26] Section 2(4)(h) of NEMA refers.

Requirement	Part where requirement is addressed/response
2.13.5 ensure openness and transparency, and access to information in terms of the process,[27]	The public participation process for this project was conducted by Shangoni Management Services in terms of: • The procedures and provisions in terms of the NEMA (as amended), 2008; • Chapter 6 of the EIA Regulations of 2014; • Other relevant legislation such as the Promotion of Access to Information Act (PAIA), 2000. Therefore, the process was open and transparent and the public had access to all documents. All public participation information has been included in Annexure D1.
2.13.6 ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge[28]*, and*	
2.13.7 ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?[29]	
2.14 Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?[30]	As mentioned previously, the proposed Explosives Depot Expansion is a continuation of an existing activity that forms part of the mining and related activities of the existing Mogalakwena Mine. It is not anticipated that additional opportunities will occur as a result of the expansion of the existing facility. However, as the Explosives Depot is a necessary and integral part of the mining activities at Mogalakwena Mine, it indirectly contributes to the continued success of the mining activity and continued job security and socio-economic well-being of the area.
2.15 What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?[31]	All contractors, sub-contractors and workers will attend compulsory environmental awareness training and inductions. This training will highlight the dangers associated with the workplace. Procedures relating to environmental risks will also be put in place and will be regularly updated.
2.16 Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1 the number of temporary versus permanent jobs that will be created,	The labour complement of 2537 employees inclusive of 879 contractors (October 2009 baseline) at the mine s sourced from some 21 local municipalities across the provinces of Limpopo and Mpumalanga. As the proposed activity is the expansion of the existing Explosives Magazine for an existing mining area, no additional income will be generated from the proposed expansion activity (directly), however, the
2.16.2 whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),	
2.16.3 the distance from where labourers will have to travel,	
2.16.4 the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and	

[27] Section 2(4)(k) of NEMA refers.
[28] Section 2(4)(g) of NEMA refers.
[29] Section 2(4)(q) of NEMA refers.
[30] Section 2(4)(g) of NEMA refers.
[31] Section 2(4)(j) of NEMA refers.

Requirement	Part where requirement is addressed/response
2.16.5 the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	storage and handling of explosives contributes indirectly to the success of the mining operations and its production. The mine will continue to provide work for employees and contractors during the Operational Phase of the proposed expansion activity. The activity will continue to contribute to continued job security without impacting on employment opportunities in other sectors.
2.17 What measures were taken to ensure:	
2.17.1 that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and	Refer to the Public Participation report attached hereto as Annexure D1. Other government departments are included on the list of I&APs and stakeholders and received the notifications of the proposed activity as well as notifications on the availability of the BAR and EMPr for review. All applicable environmental legislation was considered and adhered to during the Basic Assessment process.
2.17.1 that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	
2.18 What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?[32]	The proposed site for development and expansion was chosen on the principles that it is located on an already disturbed area (i.e. on top of Waste Rock Dump No. 2), thereby minimising the impacts on the bio-physical environment and the surrounding communities. During the Public Participation Process, all issue and concerns raised by the I&APs, stakeholders and the Organs of State are taken into account and responses are provided.
2.19 Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?[33]	Mitigation measures proposed are realistic. Refer to Part B, Sections 1.4.4, 1.5 and 1.6.
2.20 What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?[34]	The applicant will be responsible for the costs of any remediation of pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects. Refer also to Part A, Section 18 of this report.
2.21 Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the	The alternatives for the proposed project are described in Part A, Section 7 as well as in Annexure

[32] Section 2(4)(o) of NEMA refers.
[33] Section 240(1)(b)(iii) of NEMA and the National Development Plan refer.
[34] Section 2(4)(p) of NEMA refers.

	Requirement	Part where requirement is addressed/response
	alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?[35]	E1. The alternatives were assessed in terms of the following four categories: 1. Environmental. 2. Technical/Engineering. 3. Economical. 4. Social. Refer to Annexure E1 for a detailed description of the method utilised in assessing the alternatives for the proposed project.
2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?[36]	The identified impacts have been presented in Parts 7.5 and 9.

7. Motivation for the overall preferred site, activities and technology alternative including a full description of the process followed to reach the proposed preferred alternatives within the site.

Preferred site:

The current Explosives Magazine is located on-top of an existing Waste Rock Dump (Waste Rock Dump No. 2) of the operational Mogalakwena Mine. Mogalakwena Mine proposes to expand the mentioned Explosives Magazine to contain more than 80m^3 of explosives as well as to add ANPP, and AEL and BME emulsion storage and handling areas including its associated infrastructure. Mogalakwena Mine proposes to locate the expansion section next to the existing Explosives Magazine site, in order to have one Explosives Depot on-top of Waste Rock Dump No.2.

The existing and proposed Explosives Depot sections were (and is proposed to be) placed on-top of Waste Rock Dump No. 2 based on the principle that it is an already disturbed site, located within the mine's existing mining boundary area, thereby minimising the environmental impacts associated with the development.

7.1 Details of the development footprint alternatives considered

Location alternatives

The proposed activity is the expansion of an already existing Explosive Magazine which is already situated on top of Waste Rock Dump No. 2. Therefore, alternatives in terms of location could not be considered due to the nature of the project (i.e. it being an expansion project).

Other alternatives were identified and evaluated for the proposed project. These alternatives are as follows:

[35] Section 2(4)(b) of NEMA refers.
[36] Regulations 22(2)(i)(i), 28(1)(g) and 31(2)(1) in Government Notice No. R. 543 refer.

- Expansion of the site versus No-project Option;
- Activity Alternatives; and
- Design Alternatives.

Expansion of the site versus No-project Option:

By not implementing the Expansion option (preferred option), the No-project option becomes the alternative option. The No-project option does not only imply that the expansion of the current site (i.e. Explosives Magazine where explosives storage is currently kept to 80m^3 in total) will not be implemented, but also means that the current ANPP and emulsion silos, located to the south of the mining area will need to continue to serve the purpose of the ANPP and Emulsion storage and handling areas, should the No-project option be implemented.

For this section there were two alternatives identified, namely the Expansion option and the No-project option. These options were quantitatively assessed by using the methods provided above. The Alternative Assessment Sheets indicating the scores are attached along with this Alternatives Assessment Report in Annexure E1 to this Basic Assessment Report. Options reviewed with an explanation on each as well comments with respect to their advantages and disadvantages are also provided in Annexure E1 (Alternatives Assessment Report). The Expansion option has received the highest comparative score and is thereby indicated as the most suitable option, as reflected in Table 5 below.

Table 5: Comparative review – Expansion option versus No-Project Option

	Expansion Option (preferred option)	No-Project Option
Environmental	59.09%	60.61%
Social	66.67%	66.67%
Technical	58.82%	47.06%
Economic	45.82%	33.33%
FINAL SCORE	**57.60%**	**51.92%**

The storage and use of explosives form an integral part of the effective extraction of minerals from Mogalakwena Mine's opencast mining operations, specifically for blasting purposes. It indirectly contributes to the success of the mining and related activities and the socio-economic benefit derived from such.

Since the old ANPP and Emulsion storage and handling yards are located in an area earmarked for future mining, not expanding the new Explosives Depot (in the new location, i.e. Waste Rock Dump No. 2) will influence the future mineral reserve planning and in turn may have a negative impact on the socio-economic aspects associated with the mining activities.

Activity alternatives:

The following activity alternatives were assessed:

- The implementation of the combined Explosives Depot (i.e. strategic reserve) (preferred option);
- Daily delivery from the supplier(s); and
- Shared infrastructure with sister mining companies (located more than 300km from the mine).

The combined Explosives Depot (strategic reserve) has received the highest comparative score and is thereby indicated as the most suitable option, as reflected in Table 6 below. Refer to Annexure E1 for comments made in this regard.

Table 6: Comparative review – Activity Alternatives

	Combined Explosives Depot (preferred option)	Daily delivery from supplier(s)[37]	Shared Infrastructure and travel from sister mining companies (>300km distance) (weekly)
Environmental	100.00%	60.61%	78.79%
Social	86.67%	86.67%	86.67%
Technical	68.63%	60.78%	72.55%
Economic	58.33%	54.17%	66.67%
FINAL SCORE	**78.41%**	**65.56%**	**76.17%**

Design alternatives:

The following design alternatives were assessed:

- Construction and storage in more silos, with smaller capacities: 2x 50 tons ANPP Silos; 6x 40 ton AEL Silos and 4x 200 tons BME Silos (preferred option); and
- Construction and storage in less amount of silos, with increased capacities: 1x 100 ton ANPP Silo, 3 x 80 ton AEL Silos, 2x 400 ton BME Silos).

The construction and storage in a larger number of silos, with smaller capacities has received the highest comparative score and is thereby indicated as the most suitable option, as reflected in Table 7 below. Refer to Annexure E1 for comments made in this regard.

[37] Suppliers located in Potchefstroom, Delmas, Rustenburg, Modderfontein, Sasolburg and Ekandustria

Table 7: Comparative review – Design Alternatives

	2x50 ton ANPP Silos, 6x40 ton AEL Silos, 4X200 tons BME Silos (preferred option)	Increased silo capacity with less number of silo's (1x 100 ton ANPP Silo, 3 x 80 ton AEL Silo's, 2x 400 ton BME Silo's)
Environmental	100.00%	95.45%
Social	100.00%	100.00%
Technical	94.12%	94.12%
Economic	100.00%	81.25%
FINAL SCORE	**88.53%**	**84.58%**

Land use alternatives:

Land use alternatives are not applicable to this Environmental Authorisation application as the current land use on the proposed site is mining. Whether any of the alternatives mentioned above are implemented, even the No-Project option, the land use will remain that of mining, as Mogalakwena Mine is an existing mine with a Life of Mine in excess of 30 years.

7.2 Details of the Public Participation Process Followed

A detailed public participation process was undertaken, as contained in Annexure D1. The Public Participation Process as followed include:

- Stakeholder identification;
- Registration of Interested and Affected Parties (I&AP's) and key stakeholders;
- Methods of notification, e.g. advertisement, site notices, Background Information Document (BID), electronic notifications and notifications via letter,
- Access and opportunity to review the BAR and EMPr by IAP's, stakeholders and relevant authorities; and
- Public participation meetings.

7.3 Summary of issues raised by I&APs

Table 8 below provides a summary of the comments and issues raised and reaction to those responses.

Table 8: Comments and Responses[38]

Interested and Affected Parties		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
AFFECTED PARTIES					
Samuel Mashishi	Council of Induna Chaba and Mapela Traditional Authority	19 January 2016 (Consultation with the council of Induna Chaba and Mapela Traditional Authority)	What will happen if the silos overflow of if there is a spillage	A bund wall will be built around the silos to contain any spillage that might occur.	Refer to Section 4.2 of Part A of this Basic Assessment Report (BAR). Refer to Table 39 in Section 1.4.1. of Part B of this BAR.
			What will happen if the sedimentation and soil erosion affects the community	The project location is on top of a waste rock dump. There would be minimal impacts in terms of sedimentation and soil erosion as a result of the explosive depot expansion project.	Refer to Table 34 in Section 12 of Part A of this BAR.
			What will happen if the impacts affect the community	Subsequent to identifying potential impacts, management measures are proposed for the mine to	Part A, Section 12, Table 34 of the Basic Assessment Report.

[38] Please note that comments were not received during the public review period. Comments/concerns included in the table were raised during public participation meetings that were held with the Council of Induna Chaba and Mapela Tribal Authority and also with the community of Ga-Tshaba Village. Most of the concerns/comments were responded during the meeting. However, additional responses deemed necessary are also included.

Please take note that the attendance register of the community meeting held at Ga-Chaba Village was taken by the villagers during the meeting. They stated that they will hold on to the attendance register until they meet with the mine's management. As a result, details of the attendees of the community meeting are not known. Therefore, they will be referred to as 'attendee'

Interested and Affected Parties AFFECTED PARTIES		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
				implement in order to mitigate or minimize impacts.	
			The community do not get a chance to review the report as it is placed far from the community	The report was taken to the council Induna Chaba and Mapela Traditional Authority (T/A).	Not Applicable
			How will the community benefit from the project in terms of employment.	The project is a relocation of facilities that are existing and there are already two companies handling the explosives. The project is necessary for the mine to continue running, and thus, all the members of the community working at the mine will benefit in terms of keeping their jobs.	Part A, Section 12, Table 34 of the Basic Assessment Report. Paragraph 2 under Section 1.8 of the Public Participation Report (PP) (attached as Appendix D1)
			Clarity on the following statement. “No significant impacts were identified during the environmental impact assessment process. Medium	significant impacts are impacts which are rated ‘high’. In this case, there are no impacts that are rated high.	Not applicable

Interested and Affected Parties AFFECTED PARTIES		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			rated environmental impacts were identified however relate to the following; “	Only the medium and low rated impacts.	
Francina Matlala	Council of Induna Chaba and Mapela Traditional Authority	19 January 2016 (Consultation with the council of Induna Chaba and Mapela Traditional Authority)	It should not be said that there will be no impact on the community because the community experience impacts from the mine everyday	Impacts were identified in this report and the EAP is not saying there will be no impact on the environment.	Refer to the following for the Environmental Impact Assessment: Section 7.5, Table 26 Section 9, table 32 Section 11.3, Table 33 Refer to Risk Assessment Report attached as Annexure E2
Attendee 1	Community member/Villager	27 January 2016 (Community meeting at Ga-Chaba Village)	Reason why Public Participation (PP) is carried out during the expansion phase and not prior to construction of the explosive magazine.	PP is carried out when an application for an Environmental Authorisation (EA) is lodged with the relevant department.	Not applicable.
			Where was BME and AEL storing explosives.	There is an existing explosives depot in the mining right boundary of Mogalakwena Platinum Mine (MPM). The explosives depot	Refer to Section 4.2 (third paragraph) of Part A of this Basic Assessment Report (BAR).

Interested and Affected Parties		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
AFFECTED PARTIES					
				is far from the north mining activities. The mine proposes to relocate and expand the explosives depot	
Attendee 2	Community member/Villager	27 January 2016 (Community meeting at Ga-Chaba Village)	What will happen if the explosives depot explodes	There are strict policies regarding safety at the explosives depot. Police and Fire brigades are also consulted in relocations of the explosive depot. The risk of an explosion is however very low because the explosives needs a detonator to explode, something that is not kept on site. The handlers of the explosives are very knowledgeable and thoroughly trained. One of them was a commissioner of the police.	Refer to Risk Assessment Report attached as Annexure E2 Refer to Table 26 in Section 7.5 of Part A of BAR Refer to Table 32 in Section 9 of Part A of BAR Refer to Table 41 in Section 1.6 of Part B of this BAR

Interested and Affected Parties		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
AFFECTED PARTIES					
Samuel Mashishi	Council of Induna Chaba and Mapela Traditional Authority	27 January 2016 (Community meeting at Ga-Chaba Village	When a spillage occurs, it does not matter what barricade you've built, the explosives can penetrate and flow to the community because of the slope. There will be hazards and the people of the community will lose their lives.	The explosives containers/silos will be built with bund wall to prevent any spills from reporting to the environment. The bund area will be designed to have more capacity than the silos to prevent overflow.	Refer to Section 4.2 of Part A of this Basic Assessment Report (BAR). Refer to Table 39 in Section 1.4.1. of Part B of this BAR.
			It is written in the report that dust control measures will be implemented but dust is always seen from the mine.	<u>Response during the meeting</u> Mitigation measures proposed to mitigate dust must be implemented by the mine. The mine commits to implementing the measures and if the department approves the report, then MPM will be committed to implement the measures. Villagers can fill in the complaints register to notify the mine of concerns	Part A, Section 12, Table 34 of the Basic Assessment Report

Interested and Affected Parties AFFECTED PARTIES		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
				regarding dust and other issues. Additional response MPM is planning on having 5 dust buckets erected and monitored in communal areas to the west of the mine.	
			What Shangoni Management Services (SMS) has done in terms of helping MPM with the report writing is understandable but the villagers wish they could be involved in writing the report	The villagers cannot be physically involved in writing the report. However, comments from the villagers are included in the report.	Paragraph 2 under Section 1.8 of the Public Participation Report (PP) (attached as Appendix D1)
			People from Ga-Tshaba village should work during the construction phase of the explosives depot	Shangoni cannot influence employment but will note the concern in the reports that will be submitted to the Department of Mineral Resources (DMR)	Paragraph 2 under Section 1.8 of the Public PP report (attached as Appendix D1)

Interested and Affected Parties AFFECTED PARTIES		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
				Personnel from the mine who were at the meeting noted the comment and will communicate the concern to the mine's management.	
Attendee 1	Community members/Villagers	27 January 2016 (Community meeting at Ga-Chaba Village)	When does MPM want to expand the explosives depot	The Basic Assessment Report (BAR) will be submitted on the 5th of February 2016 and that the BAR needs to be approved by DMR. As soon as an EA is obtained, MPM will look to start with the expansion. Furthermore, when the EA is given, if given, it is circulated for everyone to comment on for a month and thus construction of the explosives depot cannot be carried out directly after the EA has been issued.	Not Applicable.

Interested and Affected Parties AFFECTED PARTIES		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
Attendee 1	Community members/Villagers	27 January 2016 (Community meeting at Ga-Chaba Village)	Shangoni is paid by MPM. The villagers need an independent view; they need to consult with experts before approving/disapproving the project.	Shangoni is paid by the applicant but it is required by legislation to be independent and objective. SMS is independent and that the report SMS compiled for the project looked at the environmental risks of the project. Inputs from different environmental specialists were used to determine the potential environmental risks.	Refer to Table 26 in Section 7.5 of Part A of BAR
Attendee 2		27 January 2016 (Community meeting at Ga-Chaba Village)	How will the project benefit the community	The project is necessary for the mine to continue running, and thus, all the members of the community working at the mine will benefit in terms of keeping their jobs.	Part A, Section 12, Table 34 of the Basic Assessment Report. Paragraph 2 under Section 1.8 of the PP report (attached as Appendix D1)
Attendee 3		27 January 2016	Attendance register will be used to show that the	The attendance register is used as proof that a meeting	Not applicable

Interested and Affected Parties AFFECTED PARTIES		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
		(Community meeting at Ga-Chaba Village)	community approves the project.	was held. It is attached as an annexure to the report that will be submitted to DMR.	
Samuel Mashishi and Attendee 1		27 January 2016 (Community meeting at Ga-Chaba Village)	The villagers of Ga-Chaba wants to meet with the mine's management before approving/disapproving the project.	<u>Response during the meeting</u> Personnel from the mine who were at the meeting will inform the mine's management the issues the villagers have. They endeavour to organise a meeting with between MPM and the Villagers. <u>Additional response</u> MPM's Senior Management have been in consultation with communities around the mine. A community engagement agreement is currently being drafted	Not applicable

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

7.4.1 Type of environment affected by the proposed activity[39]

A baseline description or "*status quo"* of the of the present environmental situation is provided in this part of the document. The following attributes / aspects have been described in detail, in the following respective chapters:

- Chapter A: Geology.
- Chapter B: Climate.
- Chapter C: Topography.
- Chapter D: Soil.
- Chapter E: Vegetation.
- Chapter F: Fauna.
- Chapter G: Surface water.
- Chapter H: Wetlands and other surface water features.
- Chapter I: Groundwater.
- Chapter J: Air Quality.
- Chapter K: Noise.
- Chapter L: Visual.
- Chapter M: Portected areas and conservation planning.
- Chapter O: Cultural Heritage.
- Chapter P: Regional socio-economic structures.

Chapter A: Geology

The following information was sourced from the reports titled**, "***Mogalakwena Local Municipality (MLM) 2014-15 Integrated Development Plan (IDP)",* "*Waterberg District Municipality (WDM) 2014-15 Integrated Development Plan*" and "*Environmental Management Program*, compiled by SRK, dated 1996.

The greater Waterberg District area is unique due to its geological formations (predominantly sandstone). The Waterberg district has a fairly complex geology with a relative high degree of minerals. The simplified geology of the Waterberg District can be classified into five distinct geology types, namely the Transvaal Super Group, Karoo Super Group, Waterberg Group, Bushveld Igneous Complex, and the Achaean Granite/Gneiss and Swazian Complex.

[39] Information included in this section of this report has been sourced from previous studies and documentation generated for Mogalakwena Mine. Some of the studies conducted were not specifically conducted for the explosive depot expansion project, but were identified to be applicable in certain aspects to the project. Background information from such studies were thus used for the purpose of this section of the report, but are not attached as 'specialist studies', since these were not conducted specifically for the project. Such study reports will be available upon request.

The most important intrusive rock formation is the Bushveld Ingenious Complex that holds large reserves of platinum. The Bushveld Igneous Complex harbours important sources of platinum and chromium. The Karoo Super Group contains coal deposits while the Waterberg Group contains no minerals of economic value. The Transvaal Super Group has iron ore deposits. The lithology of the area shows that there are 26 dominant rock types occurring in the Waterberg District.

The area consists of structures of the Bushveld complex of which the Platreef, or local equivalent of the Merensky Reef, forms the floor of the Complex. This basal contact has an overlapping or transgressive relationship with the underlying sedimentary units of the Transvaal Supergroup.

The Platreef strikes, or trends, generally to the north-west and dips, or is inclined, to the south-west at an average of 40 degrees. There are a number of north-east trending dykes cutting through the Platreef horizon, typically of the Pilanesberg Age. Several major east-west striking faults interrupt the strike of the Platreef and minor strike faults have been identified.

Over the northern part of the deposit, from approximately the southern end of the Zwartfontein North Section, there is a wedge of Transvaal Supergroup rocks occurring between the Bushveld Complex and the granite. The lowest member of the Transvaal rocks is the Malmani Subgroup, which, in this area, consists of dolomite, meta-dolomite and calc-silicate.

The hanging wall of the reef consists of norites and these are reported to be unmineralised. In the footwall dolomite there is a 100-200m thick zone that contains scattered mineralisation that may be mined in future. Mineralisation within the oxidised zone that could give rise to problems of acid mine drainage are pyrrhotite, pyrite, chalcopyrite and pentlandite (SRK, 1996).

Figure 6 and 7 below shows the geology at the site.

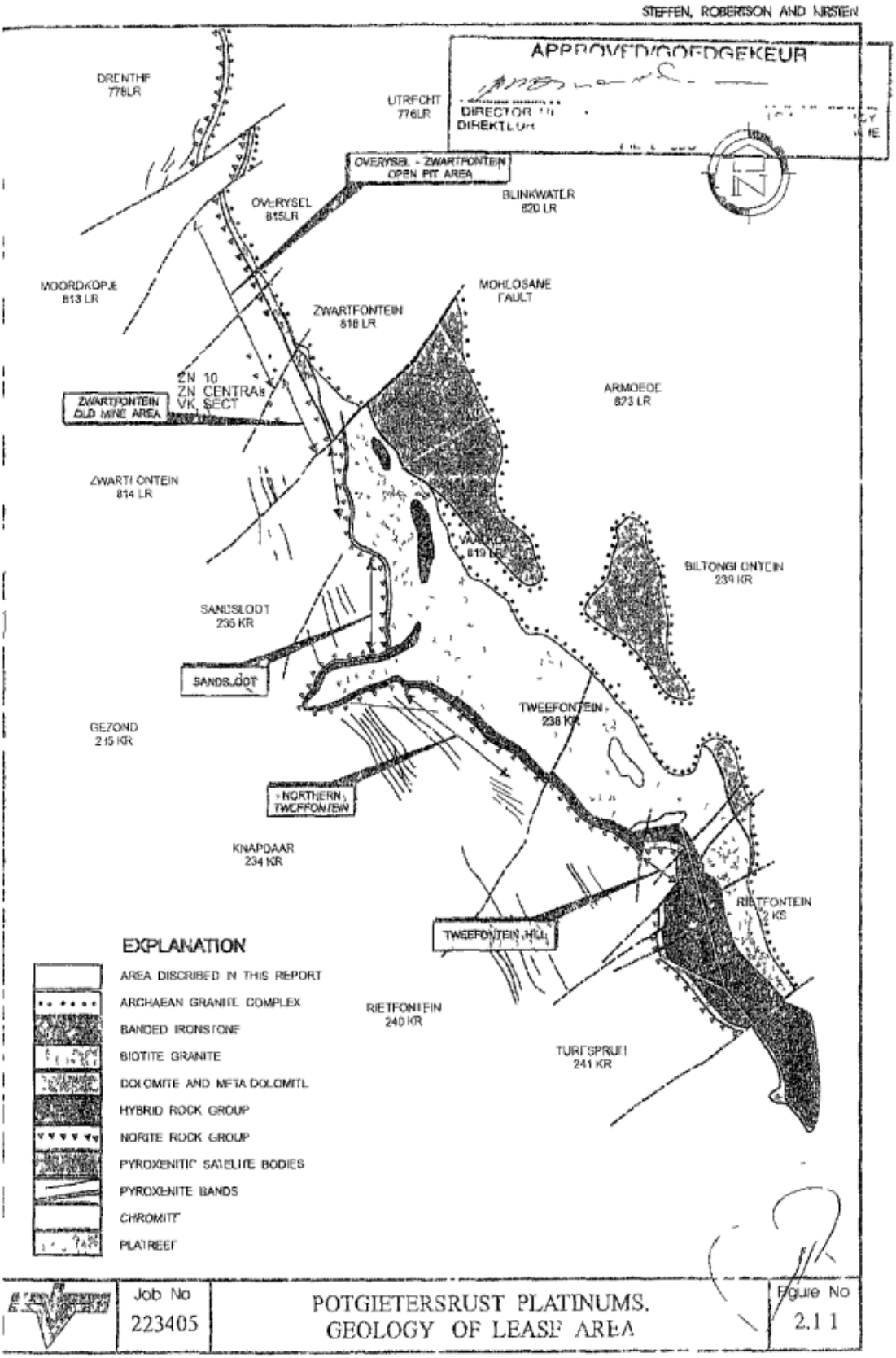

Figure 6: Map showing geology of the mining area.

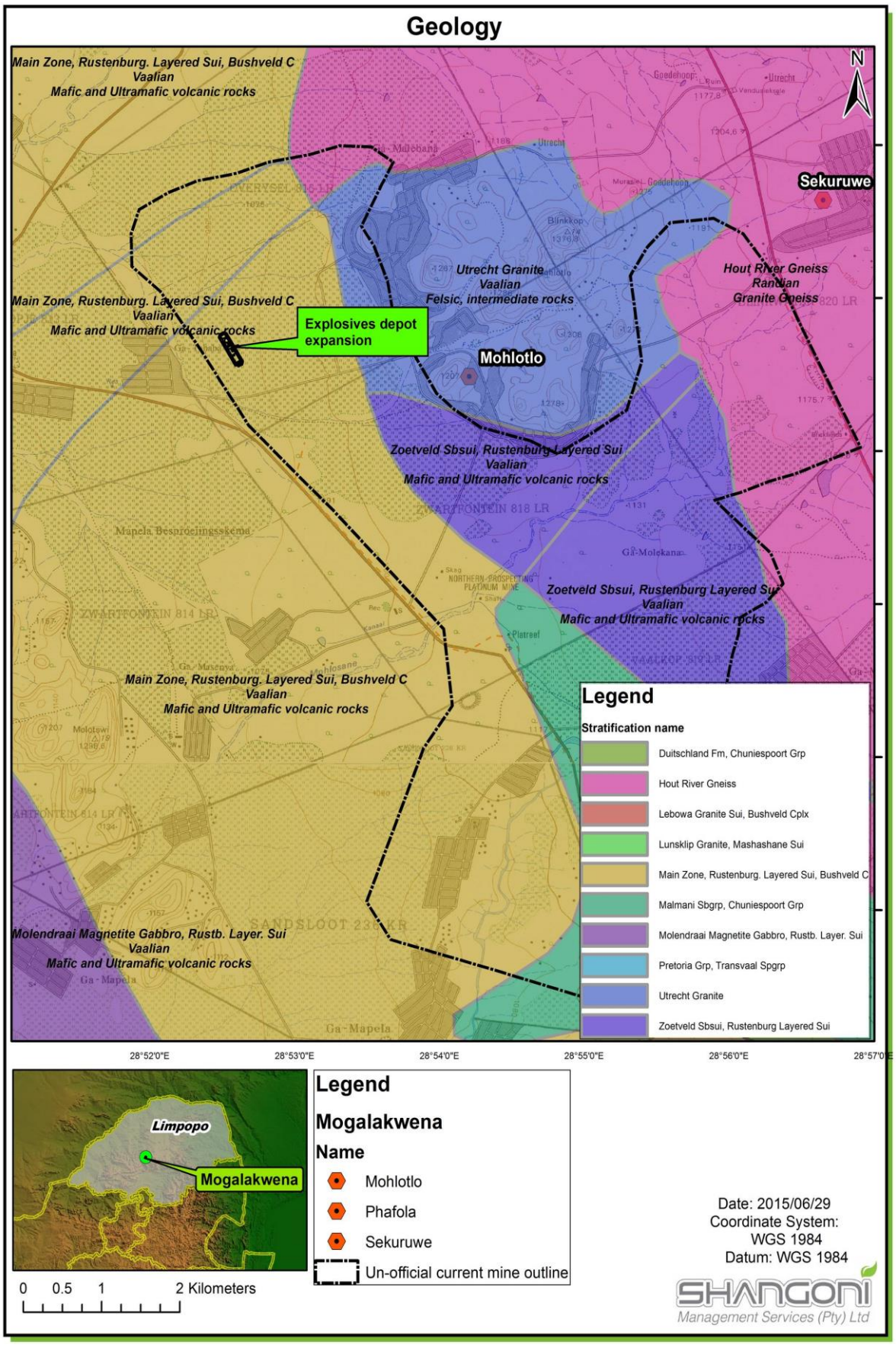

Figure 7: Map showing geology at the site

Chapter B: Climate

Temperature

The maximum mean annual temperature for the mine is between 27.1°C and 31°C and the minimum mean annual temperature for the site area is between 4.1°C and 6°C (AGIS, 2007). The figure below shows the annual monthly average temperature at the site.

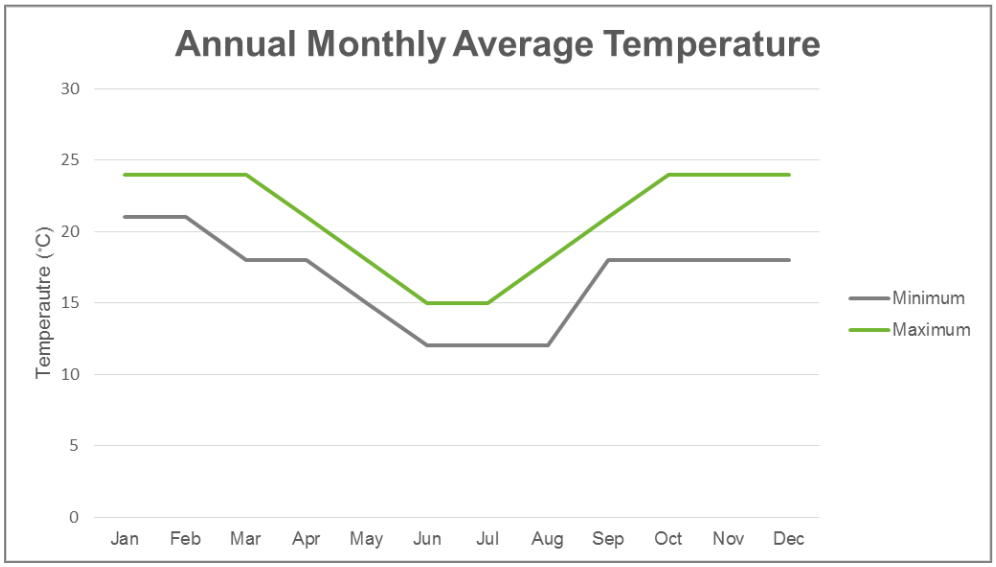

Figure 8: Long-term Mean Annual Temperatures at the study site

Rainfall

According to the AGIS Comprehensive Atlas (2007), the mean annual rainfall at the mine is 401-600mm per annum. According to Weather Station W0633482 located 15 south-west of the mine, the mean annual rainfall in the area is 660mm per annum (SRK Consulting, 2013). The figure below shows the annual monthly rainfall at the site for 2013 (AGIS, 2007).

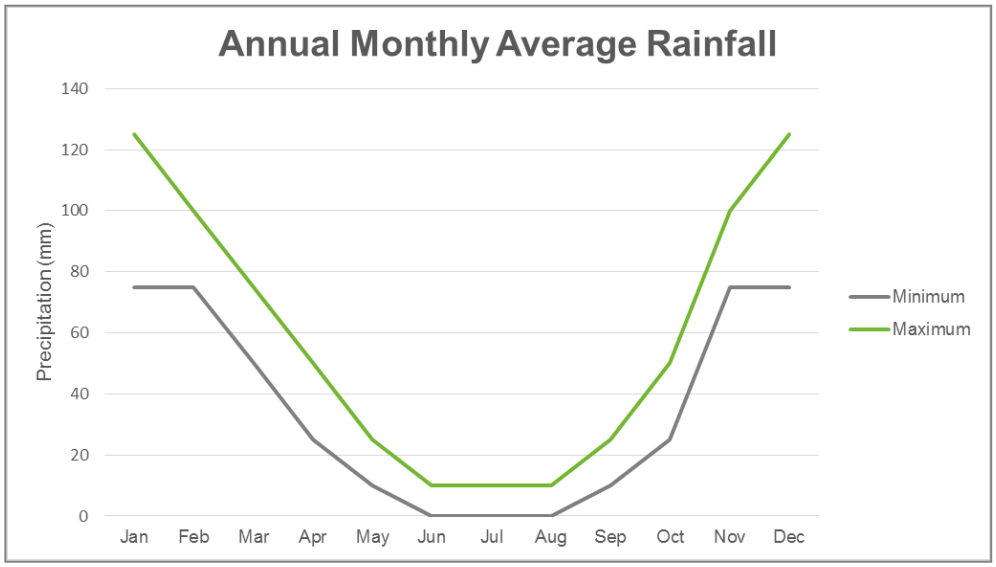

Figure 9: Long-term Mean Annual Rainfall at the Study Site

Evaporation

The Mean Annual Evaporation of the area is 2 001 – 2 200mm per annum (DWAF, 2010).

According to data from Weather Station W0633482 located 15km south-west of the mine, the average annual evaporation ranges between 1 755 and 2 210mm per annum. This exceeds the annual precipitation of 660mm per annum at the site (SRK Consulting, 2013).

Table 9: Rainfall and evaporation data for the MPM region

Month	Rainfall (mm) WB 633482 (1903 to 2000)			Evaporation WB A6E001	
	Average	Maximum	Minimum	A-pan	S-pan
September	12.7	82.9	0.0	200.4	161.3
October	46.3	194.2	1.0	233.4	192.3
November	92.0	251.2	0.0	225.4	184.5
December	116.1	259.7	6.0	235.1	193.5
January	141.7	444.6	0.0	233.3	191.8
February	95.8	351.4	0.0	202.1	163.0
March	84.5	211.3	19.2	193.8	155.3
April	31.8	188.7	0.0	157.3	121.4
May	21.4	174.5	0.0	135.6	101.3
June	3.8	71.7	0.0	113.5	80.7
July	6.7	69.2	0.0	121.4	88.1
August	7.3	56.7	0.0	158.4	122.4
Total	**660**			**2210.1**	**1755.7**

Wind

The following information was obtained from www.windfinder.com (refer to Table 10 and Figure 10 below).

Table 10: Statistics based on observations taken between 12/2011 - 05/2015 daily from 7am to 7pm local time

Month of the year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Year
Dominant wind direction													
Wind probability >= 4 Beaufort (%)	0	2	0	0	0	1	2	3	1	0	0	0	**1**

Month of the year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Year
Average wind speed (kts)	4	4	4	4	4	4	4	5	5	5	5	4	**4**
Average air temperature (°C)	26	26	25	22	22	18	18	20	24	24	25	25	**22**

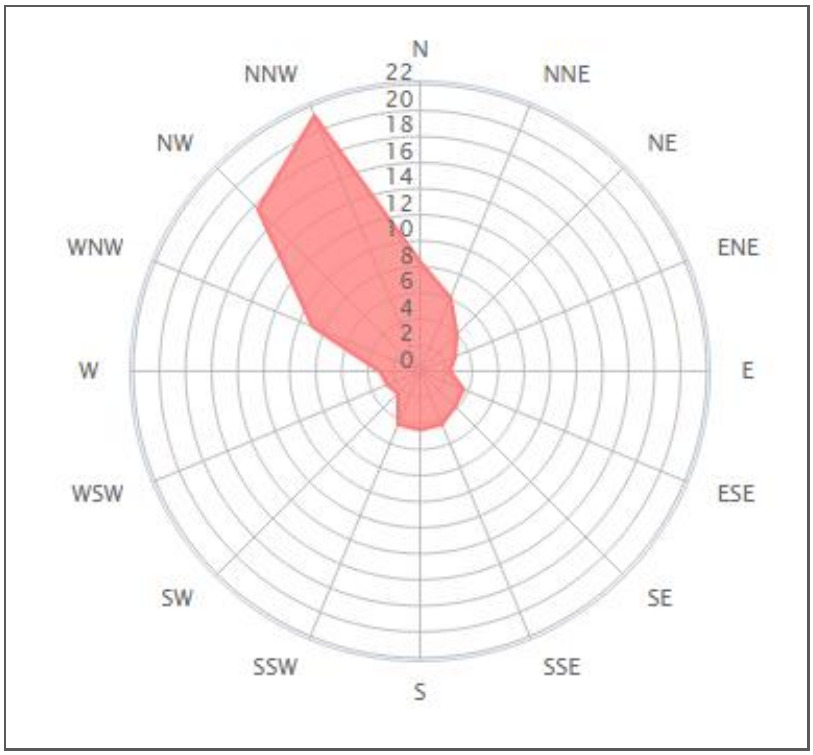

Figure 10: Year wind direction distribution (in %)

Chapter C: Topography

The topography of the area associated with Mogalakwena Mine and in relation to the proposed expansion site is given in the figure below.

Topography varies across the existing mining area, between areas occupied by the open pits and sections associated with stockpiles and waste rock dumps. The mining operations are in flat areas varying between 1060 m and 1160m above sea level. Regionally these flat areas are separated by higher koppies and ridges. The northern part of the mine site (Central Overysel and Northern Zwartfontein) has a gentle slope to the west (SRK, 1996). The proposed expansion site (Waste Rock Dump No. 2) is located at elevations of between 1 074m and 1 134m above sea level.

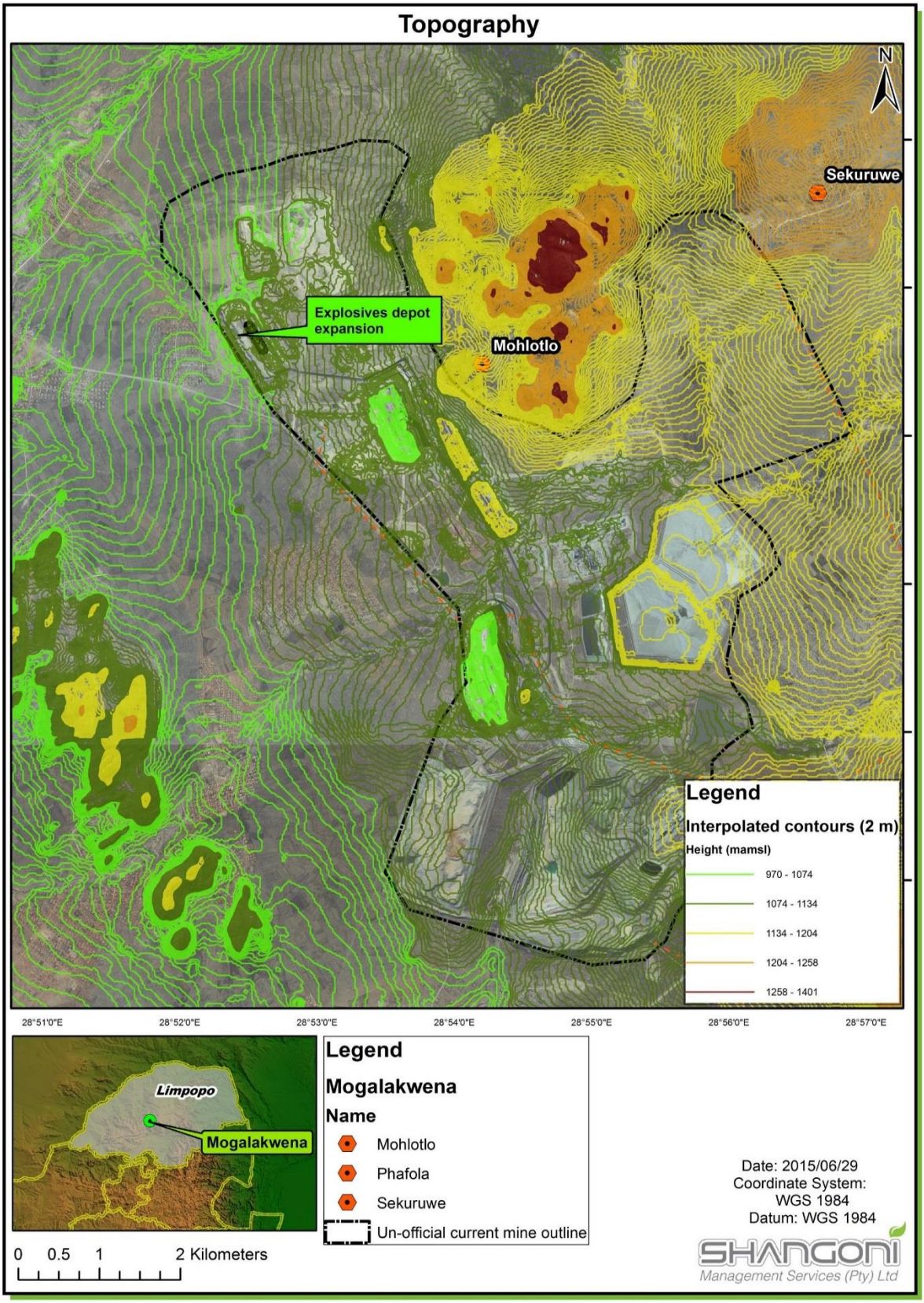

Figure 11: Map showing topography of the site

Chapter D: Soil

Soils found within the mining area can be divided into three groups, namely:

- Sandy, loamy soils found on the flatter areas (Hutton and Shortland Forms);
- Shallower rocky soils associated with slopes (Mispha Forms); and
- Clay soils associated with depressions (Arcadia Form).

The soils of this area are of moderate to poor quality for agricultural use, due to their moderate neutral fertility, weak to moderate structure, soil chemical properties, restricted depth, marginal and often erratic rainfall and rockiness in places (SRK, 2012).

The soils have not been classified geotechnically in terms of their properties to provide adequate cover material, either as low permeability cover or as a growth medium. Of importance is the dispersive nature of the soils and their ability to withstand erosion forces on slopes. Previous experience with Arcadia forms indicates that these soils may be dispersive to some extent and are less suitable than the Hutton and Shortland forms as cover material. The stony nature of the Mispah soils generally renders these soils as unsuitable of cover material (SRK, 2012).

The proposed Explosives Depot expansion activity's location is on top of Waste Rock Dump No. 2. According to Figure 12 below, the waste rock dump is located on the soil which is classified as Lithosoils (S13). S13 soils are characterised as shallow soils on hard or weathering rock. S13 soils restricted soil depth and are associated with rockiness. These soils may, however, receive water runoff from associated rock.

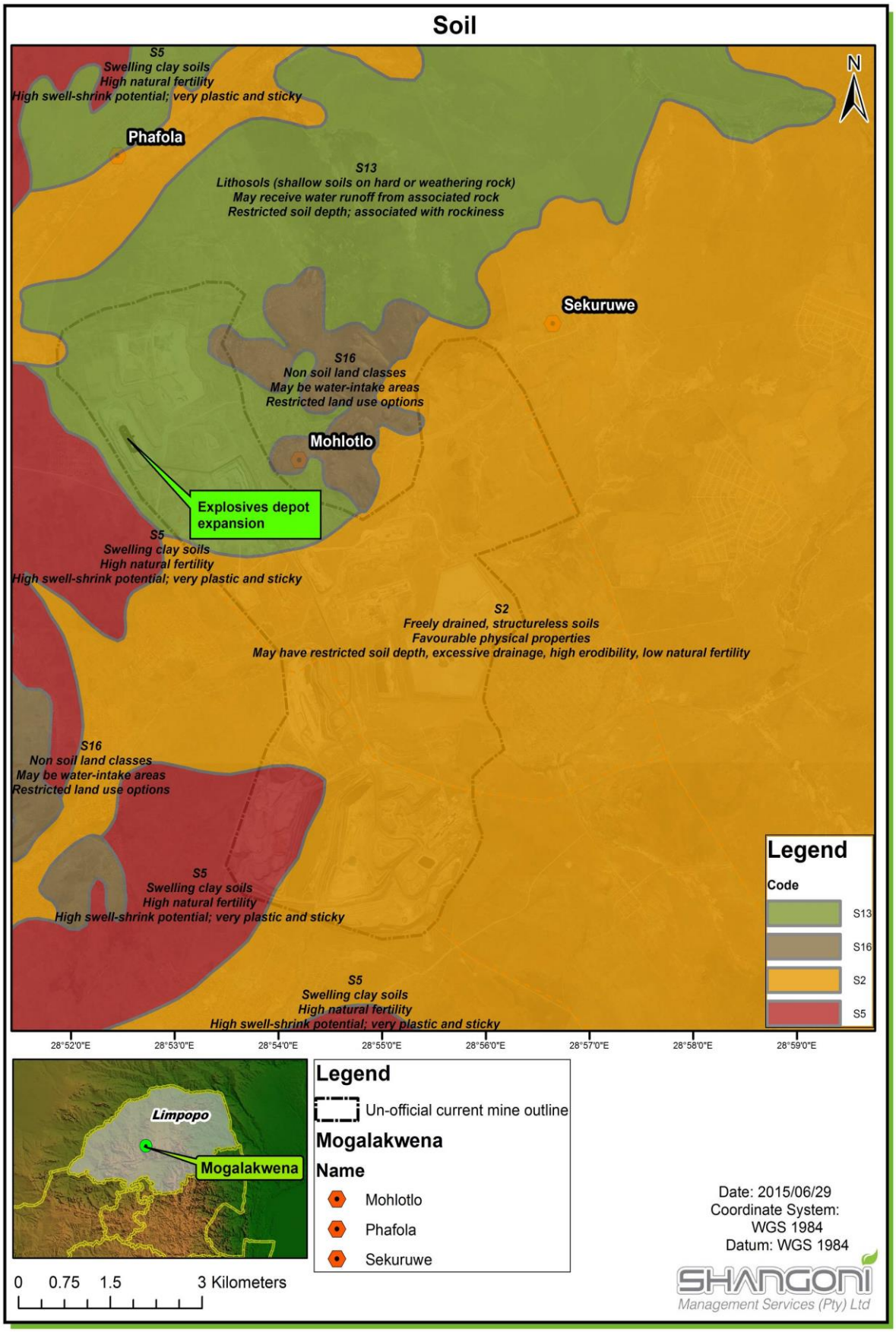

Figure 12: Map showing the soil of the site.

Chapter E: Vegetation

Vegetation type (s)

The proposed location for the Explosives Depot expansion has been entirely disturbed by mining activities and as such, no remaining vegetation is present at the proposed site. A desktop assessment of the vegetation of the general area is given below.

According to the municipal biodiversity summary on SANBI, Biodiversity GIS website, Mogalakwena Local Municipality consists of two biomes (namely the grass and the savanna biome), 12 vegetation types, 1 vulnerable ecosystem and no endangered or critically endangered ecosystem.

The study site is located within the Savanna Biome of South Africa. The Savanna biome has an herbaceous layer that is usually dominated by grass species and a discontinuous to very open tree layer. The term bushveld is often used for many Savanna areas in South Africa. It is appropriate since the woody component of the biome often doesn't form a distinct layer, but presents an irregular series of interlocking, often low canopies with openings and little distinction between tall shrubs and small trees (Mucina & Rutherford, 2006).

The Savanna Biome is further divided into smaller units known as vegetation types. The vegetation type present at the study site is the Makhado Sweet Bushveld (Mucina & Rutherford, 2006) as shown in Figure 13 below. Natural Makhado Sweet Bushveld comprise of short and shrubby bushveld with a poorly developed grass layer on slightly too moderately undulating plains. Makhado Sweet Bushvelds are poorly conserved and about 27% have been transformed by cultivation and, to a smaller extent, urban and built-up areas. The Makhado Sweet Bushveld vegetation type is listed as vulnerable and has a conservation target of 19%. About 1% is statutorily conserved, mainly in the Bellevue Nature Reserve (Mucina & Rutherford, 2006).

Dominant species

Important taxa for the Makhado Sweet Bushveld vegetation type include the following species (Mucina & Rutherford, 2006):

Small Trees: *Acacia erubescens, A. gerrardii, A. mellifera* subsp*. detinens, A. rehmanniana, Boscia albitrunca, Combretum apiculatum, Acacia tortilis* subsp*. heteracantha* and *Terminalia sericea.*

Tall Scrubs: *Commiphora pyracanthoides, Dichrostachys cinerea, Grewia flava, Hibiscus calyphyllus, Lycium shawii* and *Rhigozum obovatum.*

Low Scrubs: *Barleria lancifolia, Hirpicium bechuanense, Indigofera poliotes, Melhania rehmannii* and *Pechuel-Loeschea leubnitziae.*

Graminoids: *Anthephora pubescence, Arisitida stipitata* subsp*. graciliflora, Cenchrus ciliaris, Enneapogon scoparius, Brachiaria nigropedata, Eragrostis trichophora, Panicum coloratum, P. maximum, Schmidtia pappophoroides* and *Urochloa mosambicensis.*

Herbs: *Chamaecrista absus, Corbichonia decumbens, Geigeria acaulis, Harpagophytum procumbens* subsp. *transvaalense, Heliotropium steudneri, Hemizygia elliottii, Hermbstaedtia odorata, Leucas sexdentata, Osteospermum muricatum* and *Tephrosia purpurea* subsp*. leptostachya.*

Endemic Taxon: Herb: *Dicliptera minor* subsp*. pratis-manna.*

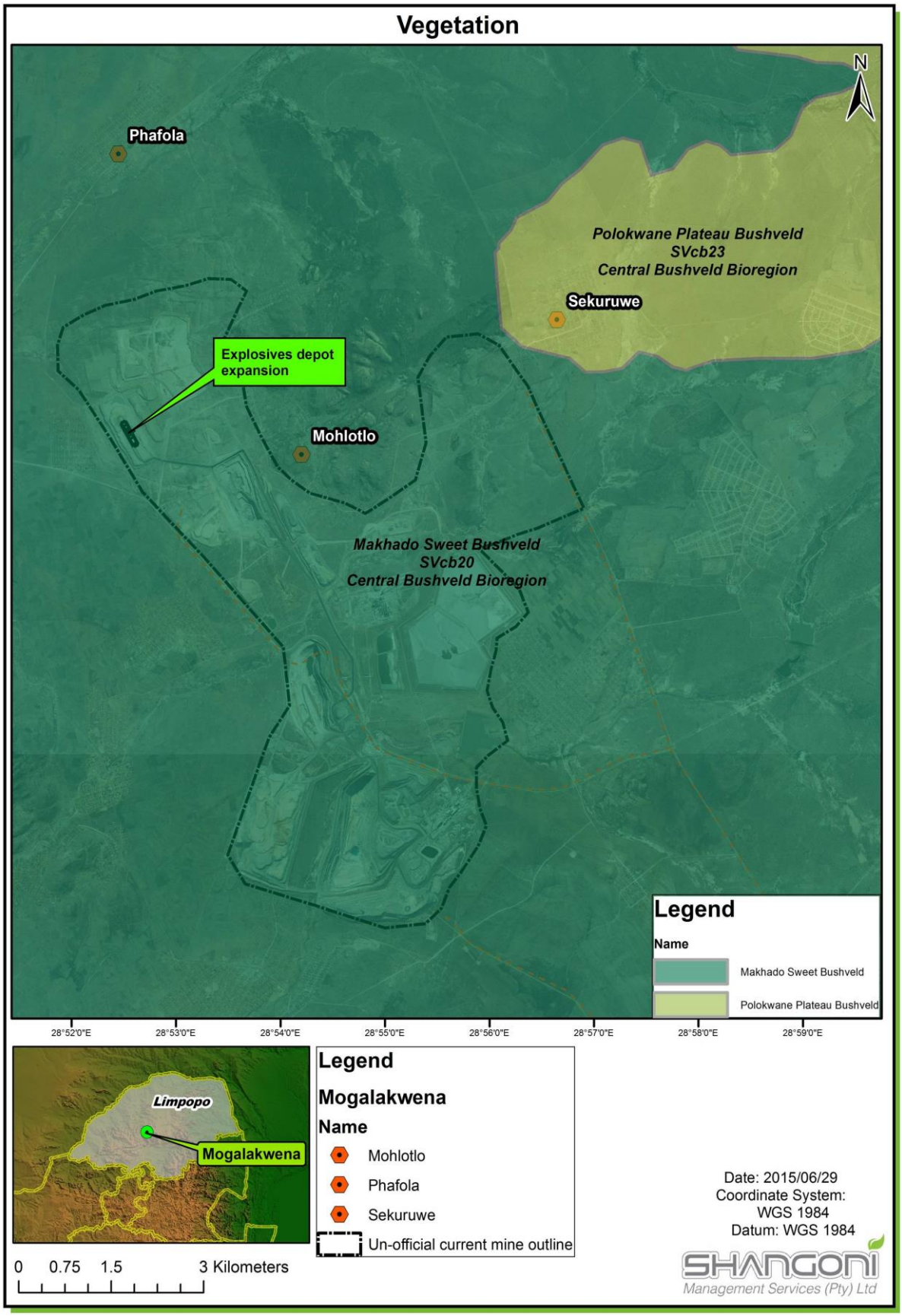

Figure 13: Vegetation Map

Chapter F: Fauna

Species that commonly occur in the mining area will be limited to small mammals, birds and reptiles (including snakes) due to the disturbed nature of the mining area.

Mammals: Approximately nine mammal species can be found in the area. All nine species have wide distribution ranges and are not restricted in terms of their ability to move or migrate.

Birds: Approximately 216 bird species were recorded in the quarter degree square where the mine is situated. Three of these species are classified as endangered in the Red Data List. All of the species are large migrating species and it is unlikely that breeding sites will be present at the mine.

Reptiles and amphibians: No red data species have been recorded in the quarter degree square where the mine is situated (SRK, 1996).

Chapter G: Surface Water

Catchment

The site lies within the Limpopo Water Management Area. The proposed expansion site falls within the A61G quaternary catchment. Refer to Figure 14 below.

Mean annual runoff (MAR)

The total Mean Annual Runoff for the Limpopo Water Management Area is 986 million m^3/annum and the Ecological Reserve is 156 million m^3/annum (DWAF, 2004).

Surface water quantity and use

SRK Consulting surveyed the surface water use of the mine during the compilation of the Integrated Water and Waste Management Plan Update and Water Use Licence Amendment for the Mogalakwena Mine in December 2013.

Domestic use

Mogalakwena Mine abstracts water from three well fields within the mine lease and surrounding areas. Communities surrounding the mine also rely on groundwater for potable and domestic use (SRK Consulting, 2013).

Industrial use

Industrial water use in the immediate area is limited to mining operations. Process water is made up of sewage effluent from the Mokopane and Polokwane sewage works, open cast pit water and process water dam water. Wellfield water supplements the process water. The dirty water is contained within the mine's dirty water circuit (SRK Consulting, 2013).

Livestock and irrigation

Surface water is used for farming and livestock watering, although this is severely limited by the intermittent nature of flow in the rivers. The communities surrounding the mine also make use of the Vaalkop Dam water (SRK Consulting, 2013).

Water authority

The Department of Water Affairs (Limpopo regional office) is the responsible water authority for the area.

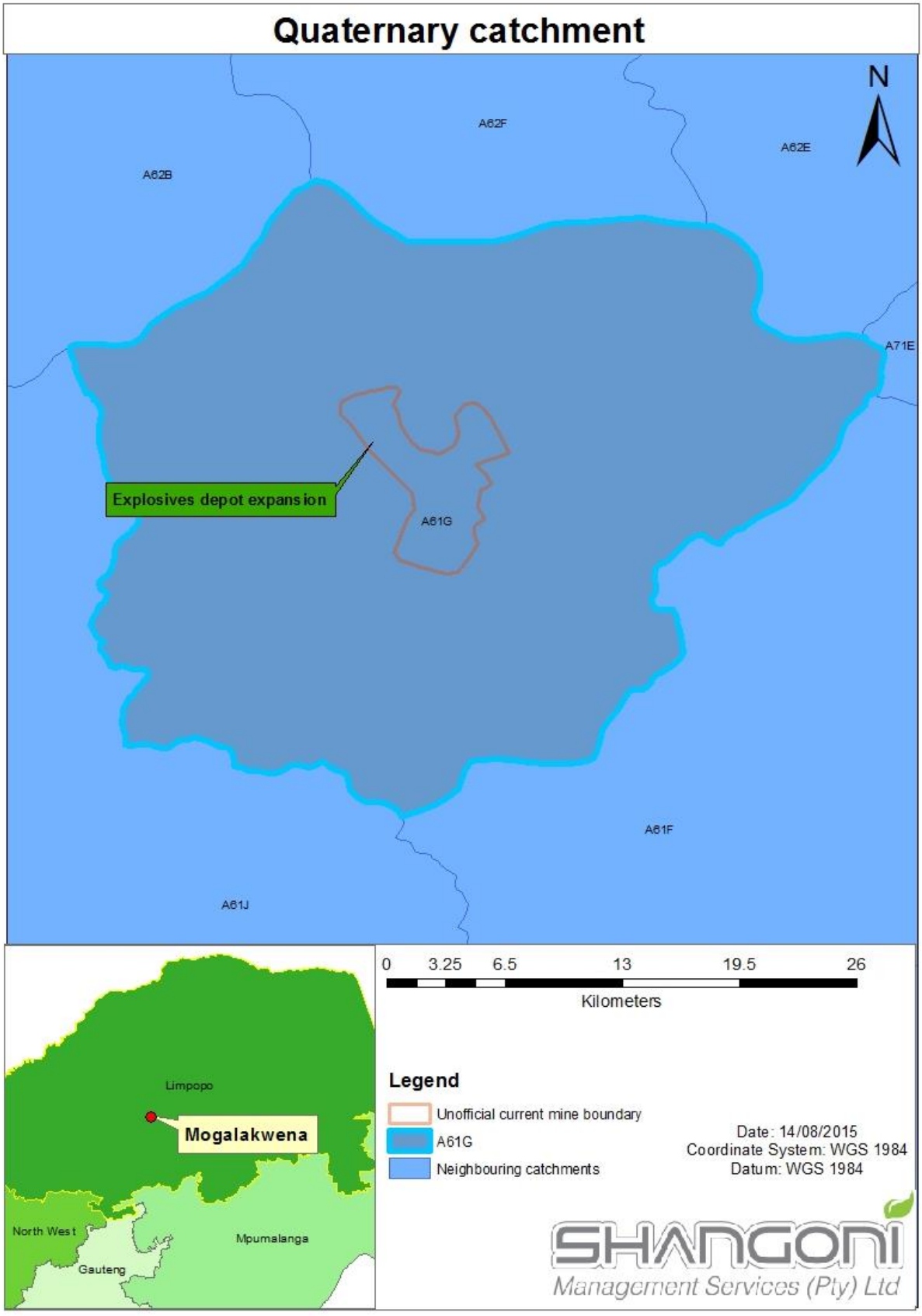

Figure 14: Catchment Map

Surface water quality

Aqua Earth compiled a quarterly monitoring report to assess the performance of Mogalakwena Mine against the conditions set out in the Integrated Water Use License issued by the Department of Water Affairs in May 2007. The surface water quality was assessed and the results are included in this report. In order to assess the quality of the surface water on the Mogalakwena Mine, a total of 20 surface water samples were taken from different sampling locations (listed in the table below and shown in the figure thereafter) and analysed by an independent laboratory. The samples were compared to water quality standards set out by the Department of Water Affairs in the Integrated Water Use License (IWUL), IRP (Identified Resource Protection Standards) and the South African National Standards (SANS) of the mine. These standards for surface water are shown in Table 11 below.

Table 11: Surface Water Sampling Locations

Sample location	Site abbreviation	Site name
River water samples	**MRD**	Mohlosane River Downstream
	MRDD	Mohlosane River Downstream Discharge
	MRU	Mohlesane River Upstream
	GMB	Ga-Molekane Stream Bridge
	SGB	Sandsloot Bridge
	SS	Sandsloot River south of pit
	RCU	River above Commandodrift
	RCD	River below Commandodrift
	B-Wet	Blinkwater Wetland
	VDW	Vaalkop Dam Wall
	VDS	Vaalkop Dam Source
Pit water samples	**PW-ZFT**	Zwartfontein pit water
	PW-N	North pit – pit water
	PW-S	South pit – pit water
	PW-SS	Sandsloot pit water
	PW-C	Central pit – pit water
Storm water samples	**RWD**	Return Water Dam
	OS1	POCS oil sump
	OS2	POCS oil sump run-off
	SWS	Storm water sump
	SP	Settling pond
	PCD-NC	Mogalakwena north concentrator storm water dam
	PCD-NN	Storm water dam referred to as *Nitrate Dam*
Waste water samples	**Mok-effluent**	Mokopane effluent sample
	Pol-effluent	Polokwane effluent sample

Figure 15: Surface water sampling points (source: Aqua Earth, 2015)

Table 12: water quality guidelines and Identified Resource Protection

Variables	***IWUL***		***Identified Resource Protection (IRP)***	***SANS 241: 2011***
	Open pit water quality concentrations	***Sewage effluent concentrations***		
pH	*5.5-9.5*	*5.5-9.5*	*6.5 – 9.0*	*≥5 to ≤ 9.7*
Electrical Conductivity (mS/m)	*175.00*	*175.00*	*310*	*≤ 170*
Total Dissolved Solids (mg/l)	*1160*	*780*	*2000*	*≤ 1200*
Sodium as Na (mg/l)	*100.00*	*120.00*	*70*	*≤ 200*
Magnesium as Mg (mg/l)			*70*	
Calcium as Ca (mg/l)			*80*	
Chloride as Cl (mg/l)	*110.00*	*110.00*	*100*	*≤ 300*
Sulphate as SO4 (mg/l)	*220.00*	*135.00*	*500*	*≤ 250*
Nitrate as NO3 (mg/l)	*100.00*	*15.00*	*20*	*≤ 11*
Potassium as K (mg/l)			*500*	
Flouride as F (mg/l)	*0.20*	*0.20*	*1.5*	*≤ 1.5*
Iron as Fe (mg/l)			*0.2*	*≤ 0.3*
Manganese as Mn (mg/l)			*0.02*	*≤ 0.1*
Chromium as Cr (mg/l)			*0.1*	
Suspended Solids (mg/l)		*25.00*	*50*	
Orthophosphate as P (mg/l)		*1.00*		
Chemical Oxygen Demand as COD (mg/l)		*75*		

The results of the surface water chemistry of the different samples was classified according to their source, origin and representation.

River samples

The results for the samples collected from rivers located in the vicinity of the mine were compared against the Department of Water Affairs (DWA) standards set out as a guideline for the water resource protection in mining industry (identified resource protection standards - IRP). Where the parameters concentration exceeds IRP limits, the values are highlighted (Table 13).

Table 13: River water chemistry as compared with IRP (February 2015

Sampling point	pH	Electrical Conductivity (mS/m)	Sodium as Na (mg/l)	Magnesium as Mg (mg/l)	Calcium as Ca (mg/l)	Chloride as Cl (mg/l)	Sulphate as SO4 (mg/l)	Nitrate as NO3 (mg/l)	Potassium as K (mg/l)	Fluoride as F (mg/l)	Iron as Fe (mg/l)	Manganese as Mn (mg/l)	Chromium as Cr (mg/l)
BWET	7.14	38.77	67.61	9.30	5.48	36.43	19.25	0.15	0.62	0.16	2.88	<0.01	<0.01
RCU	8.60	106.10	119.00	52.98	30.98	133.46	51.46	5.82	7.44	0.37	<0.01	<0.01	<0.01
RCD	9.59	52.97	62.83	19.10	22.42	86.26	12.27	0.07	3.08	0.68	0.03	0.01	<0.01
MRU	8.68	231.20	230.48	130.28	101.84	308.72	545.70	0.20	5.32	0.32	0.01	0.02	<0.01
Identified Resource Protection (IRP)													
IRP Max Limits	6.5 – 9.0	310	70	70	80	100	500	20	500	1.5	0.2	0.02	0.1

Pit water samples

The water samples results collected from pits are compared against the Department of Water Affairs (DWA) standards set out as a guideline for the water resource protection in mining industry (identified resource protection standards – IRP) and the standards set out in the WUL. Where the parameter concentration exceeds the IRP limits, the values are highlighted IRP (refer to Table 14 and Table 15).

Table 14: Pit water chemistry as compared to the IRP standards (February 2015)

Sampling point	pH	Electrical Conductivity (mS/m)	Sodium as Na (mg/l)	Magnesium as Mg (mg/l)	Calcium as Ca (mg/l)	Chloride as Cl (mg/l)	Sulphate as SO4 (mg/l)	Nitrate as NO3 (mg/l)	Potassium as K (mg/l)	Flouride as F (mg/l)	Iron as Fe (mg/l)	Manganese as Mn (mg/l)	Chromium as Cr (mg/l)
PW-N	8.14	138.60	231.40	5.20	54.92	242.86	160.98	11.06	3.08	2.60	0.01	0.04	<0.01
PW-C	8.58	164.20	216.78	31.02	85.53	163.70	246.10	65.40	6.87	0.85	0.02	<0.01	<0.01
PW-S	8.02	194.70	146.40	110.01	115.11	148.26	352.80	76.30	6.48	0.35	<0.01	0.07	<0.01
PW-ZFT	8.81	111.30	96.38	65.20	54.32	103.86	215.84	12.40	6.56	0.15	<0.01	<0.01	<0.01
PW-SS	8.91	170.30	120.57	81.33	139.41	26.57	502.92	40.26	6.75	117.42	0.01	<0.01	<0.01
Identified Resource Protection (IRP)													
IRP Max Limits	6.5 – 9.0	310	70	70	80	100	500	20	500	1.5	0.2	0.02	0.1

Table 15: Pit water chemistry as compared to the limits set in WUL (February 2015)

Site Name	Sampling Points	pH	EC mS/m	Ca mg/l	Mg mg/l	Na mg/l	Cl mg/l	SO4 mg/l	NO3-N mg/l
Pit Water	PW-N	8.14	138.60	54.92	5.20	231.40	242.86	160.98	11.06
	PW-C	8.58	164.20	85.53	31.02	216.78	163.70	246.10	65.40
	PW-S	8.02	194.70	115.11	110.01	146.40	148.26	352.80	76.30
	PW-ZFT	8.81	111.30	54.32	65.20	96.38	103.86	215.84	12.40
	PW-SS	8.91	170.30	139.41	81.33	120.57	26.57	502.92	40.26

Storm Water Dam and Return Water Dam samples

A comparison of the results returned for storm and return water dams were compared against the Department of Water Affairs (DWA) standards set out as a guideline for the water resource protection in mining industry (identified resource protection standards - IRP).

Table 16: Storm water and Return water dam chemistry (February 2015)

Sampling point	pH	Electrical Conductivity (mS/m)	Sodium as Na (mg/l)	Magnesium as Mg (mg/l)	Calcium as Ca (mg/l)	Chloride as Cl (mg/l)	Sulphate as SO4 (mg/l)	Nitrate as NO3 (mg/l)	Potassium as K (mg/l)	Fluoride as F (mg/l)	Iron as Fe (mg/l)	Manganese as Mn (mg/l)	Chromium as Cr (mg/l)
SWS	7.70	210.20	314.64	37.84	68.72	241.52	574.20	0.12	37.52	0.15	0.02	0.02	<0.01
SP	7.73	220.80	295.92	55.08	94.04	242.68	657.70	0.12	31.80	0.18	0.02	0.07	<0.01
OS1	6.90	254.20	491.52	38.24	34.60	126.45	274.06	<1.4	6.04	0.40	1.41	1.07	0.02
OS2	9.53	168.20	210.33	89.37	27.00	187.59	93.75	0.09	11.55	0.50	0.01	<0.01	<0.01
RWD	9.65	212.10	268.72	63.00	108.16	213.76	690.70	1.60	25.76	0.15	<0.01	<0.01	<0.01
PCD-NC	7.80	297.80	390.45	88.25	166.65	298.90	961.30	0.25	46.70	0.20	0.02	0.05	<0.01
PCD-NN	8.71	180.80	144.00	100.29	101.43	148.40	338.30	57.85	7.65	0.29	<0.01	<0.01	<0.01
Identified Resource Protection (IRP)													
IRP Max Limits	6.5 – 9.0	310	70	70	80	100	500	20	500	1.5	0.2	0.02	0.1

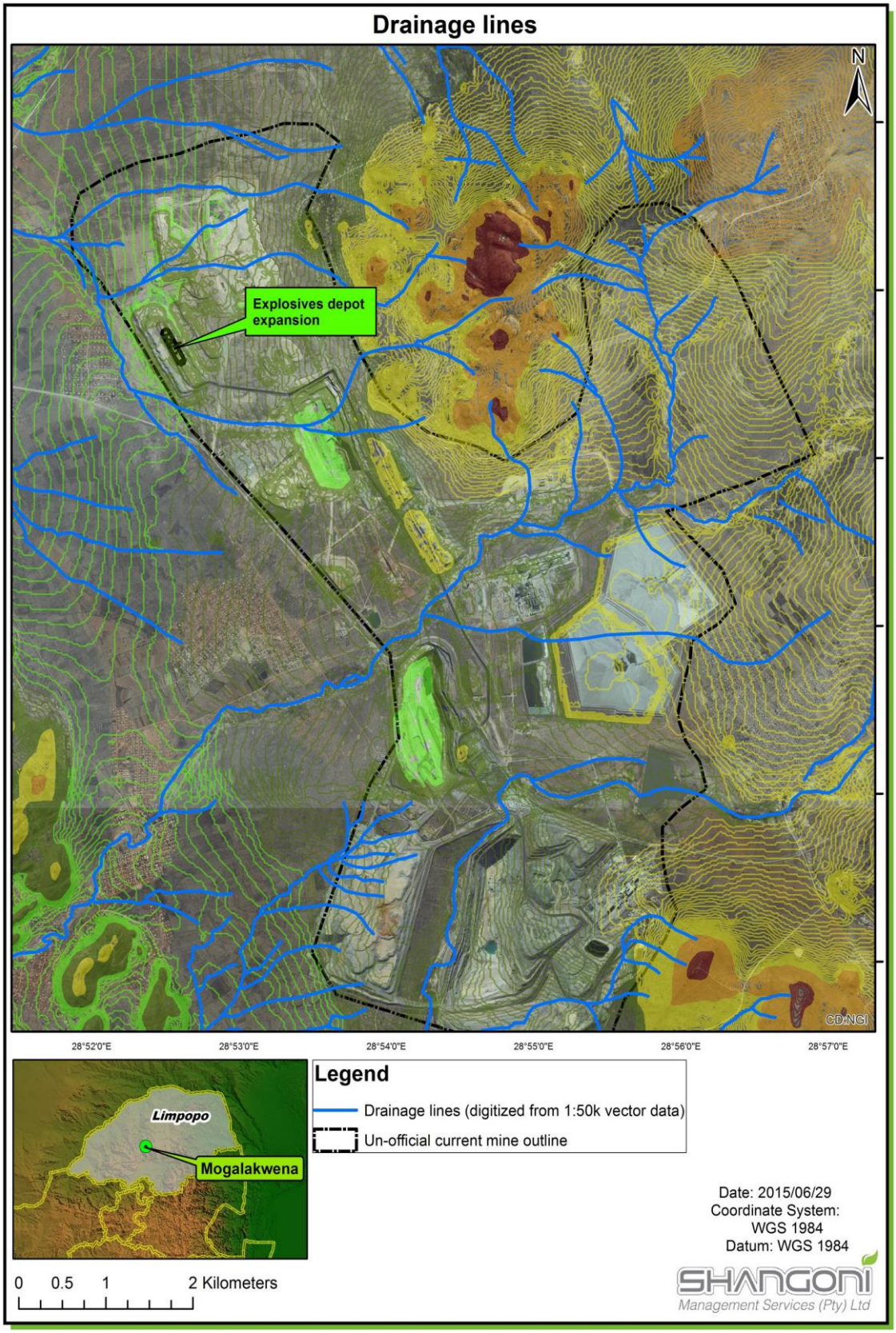

Figure 16: Map showing surface water features of the site

Chapter H: Wetlands and other surface water features

The NFEPA wetlands located within and around the Mogalakwena mining area in relation to the proposed location of the Explosives Depot site, are shown in Figure 17 below.

According to the Integrated Water and Waste Management Plan compiled by SRK Consulting (2013), the riparian zones along drainage lines can also be classified as wetlands. However, due to the ephemeral nature of the watercourses in the mine lease area, these riparian wetlands are not considered significant.

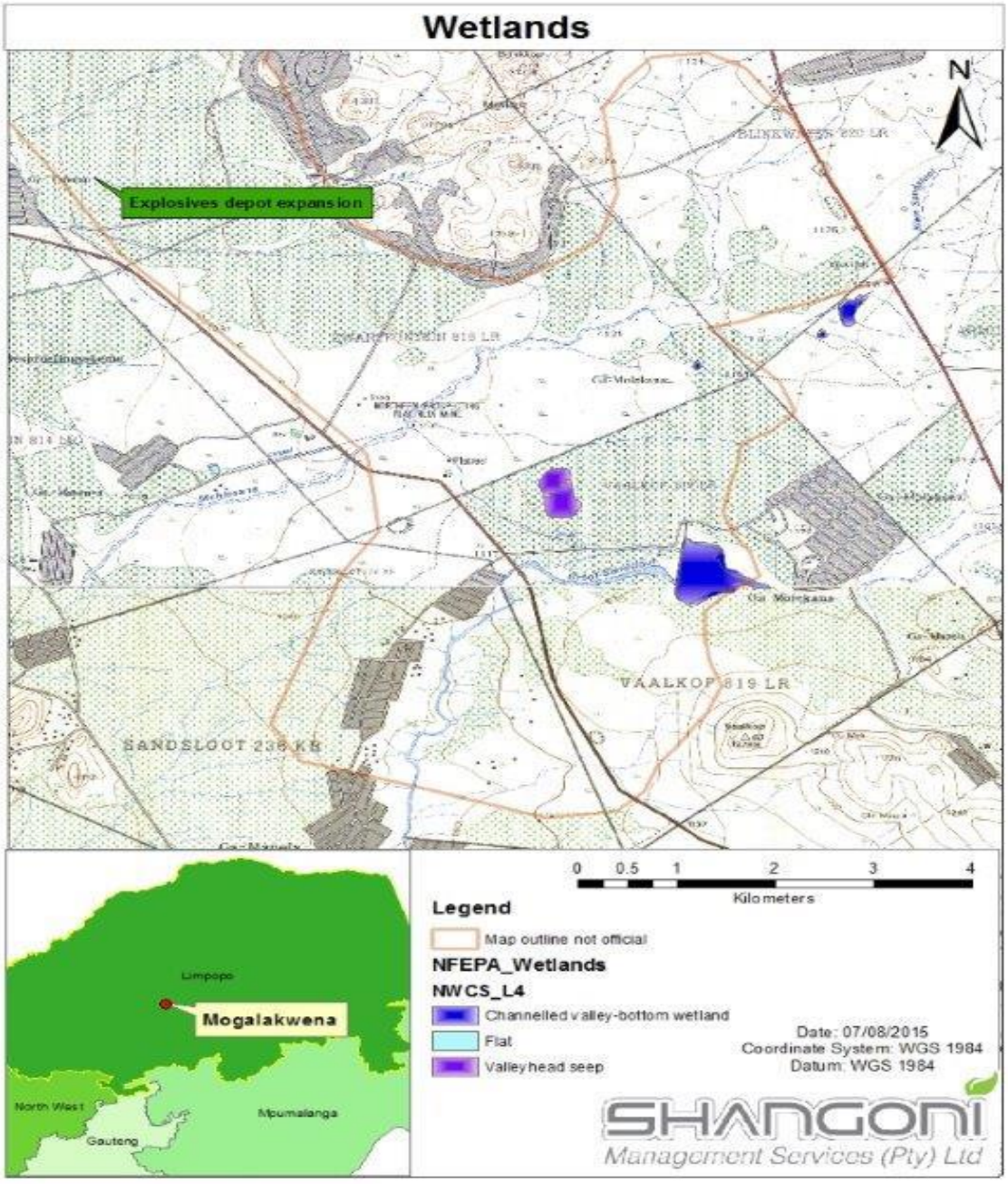

Figure 17: Wetlands present on the mining site

Chapter I: Groundwater

Aquifer type

In terms of the Parsons Aquifer Classification System, the aquifers in the area of the Mogalakwena Mine are “sole source aquifers” as they supply 50% or more of the domestic water in the area. The Aquifer Vulnerability Classification is therefore high (SRK Consulting, 2013).

There are two aquifer systems in the PPRust North and Zwartfontein South areas, namely:

- Weathered Zone, Semi-confined Aquifer; and
- Unweathered, Fractured Rocks, Semi-confined Aquifer.

The groundwater recharge is approximately 4mm per annum and the baseflow is approximately 9mm per annum in the area of the mine (DWAF, 2010).

Depth of water tables

The depth to the water level is approximately 14.3mbgl (metres below ground level) in the area of the mine (DWAF, 2010).

Boreholes and springs

Water used on the mine is abstracted form three wellfields, namely:

- PPL;
- Blinkwater; and
- Commandodrift

Treated potable water is stored in two tanks/reservoirs from where it is pumped, via a reticulation system, to the operations. Potable water is mainly for domestic use, but some potable water is also used in the concentrator process at the South Concentrator (SRK Consulting, 2013).

Groundwater quality

As part of the conditions set out in the IWUL, Mogalakwena Mine is required to collect groundwater samples and submit the samples to an independent accredited laboratory for chemical analysis.

Aqua Earth compiled Mogalakwena Mine’s first quarter monitoring report for the year, dated 2015. A total of 55 boreholes were sampled and results analysed (see Figure 18 for the location of groundwater sampling points).

The closest groundwater monitoring point to the proposed Explosives Depot Expansion site is Borehole P126. Refer to Figure 18 below.

The results reported indicate marginal to good water quality for mine boreholes when compared to the SAN241:2011. However, the SANS241:2011 does not provide limits for some of the parameters analysed (see Table 17).

The results were also compared against the DWA standards set out in the IWUL in Table 18 below. When compared to the limits set in WUL the results indicate elevated EC, Mg, Na, Cl and SO_4 concentrations for most of the mine boreholes (Aqua Earth, 2015).

Figure 18: Groundwater sampling points (Aqua Earth, 2015)

Table 17: Groundwater quality of boreholes around the mine (February 2015)

	Determinant	pH	EC	TDS	Ca	Mg	Na	K	Cl	SO4	NO3- N	F	Fe	Mn	NO2	Cu
	Risk	Operational	Aesthetic	Aesthetic	NS	NS	Aesthetic	NS	Aesthetic	Aesthetic	Acute health	Chronic health	Aesthetic	Aesthetic	NS	Chronic Health
	Unit		mS/m	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Mine Boreholes	P111	7.69	400.8	2605	48.9	498	50.5	5.9	325.15	1468.65	<0.06	0.19	0.045	<0.01	<0.01	<0.01
	P112	7.01	258	1677	104.04	188.36	149.08	7	210.24	731.3	1.2	0.2	0.007	0.057	0.028	0.02
	P114S	6.39	151.2	983	91.32	101.64	80.73	4.08	223.71	224.04	0.15	<0.10	<0.01	0.027	<0.01	0.008
	P115	7.41	138.8	902	86.32	96.82	70.32	1.8	130.05	128.08	8.1	0.57	<0.01	<0.01	<0.01	<0.01
	P115S	7.41	150.5	978	89.31	92.46	99.51	1.59	157.77	125.52	6.21	0.64	<0.01	<0.01	<0.01	0.01
	P116S	7.99	111	722	49.15	75.15	76.65	2.1	118.45	97.75	1.3	0.77	0.006	<0.01	<0.01	<0.01
	P117	7.31	187	1216	88.17	146.91	101.58	2.67	233.94	317.55	10.2	0.35	0.006	<0.01	<0.01	0.005
	P118	7.74	162.4	1056	38.67	93.15	157.17	7.38	168.54	347.12	0.15	0.24	0.015	0.218	<0.01	0.0068
	P120	7.57	64.91	422	21.02	35.64	73.73	1.735	46.59	31.858	1.06	0.19	0.009	<0.01	<0.01	0.014
	P120S	7.24	115.3	749	48.5	79	93.06	2.76	86.22	13.12	2.96	0.14	<0.01	<0.01	<0.01	
	P121	7.59	142.8	928	45.91	97.62	115.4	3.66	72.67	46.217	2.75	0.68	0.005	<0.01	<0.01	0.027
	P121S	6.46	14.29	93	5.612	5.96	13.5	1.65	5.22	18.54	0.43	<0.10	0.019	<0.01	0.02	
	P122	7.3	114.8	746	42.2	77.86	96.32	5.08	95.8	23.18	5.28	0.12	0.007	<0.01	<0.01	
	P122S	6.88	64.65	421	20.6	18.92	98.49	4.01	21.28	21.98	0.06	0.11	0.03	0.235	<0.01	
	P123	6.97	275.3	1789	96.2	55.7	388.25	35.35	580.9	48.2	0.2	0.61	0.24	2.005	0.024	<0.01
	P124	7.38	112.9	734	97.06	76.54	39.46	8.2	79.34	89.2	6.34	0.28	0.006	<0.01	<0.01	<0.01
	P125	7.37	176.2	1145	109.53	87.27	147	11.82	208.71	185.34	30.3	0.39	0.01	<0.01	<0.01	<0.01
	P126	6.95	514	3341	417.6	206.95	287.5	10.9	162.6	1278.9	136.2	1	0.007	<0.01	0.035	<0.01
	P127	7.35	183.4	1192	52.08	176.19	21.18	6.84	162	354.12	7.5	0.19	0.006	<0.01	0.01	<0.01
	P128	7.37	198	1287	96.96	155.73	99	1.62	35.52	268.41	40.53	0.46	0.008	<0.01	<0.01	<0.01
	P138	7.08	250.5	1628	172.1	95.55	208.8	14.45	465.3	153.75	7.75	0.38	0.008	<0.01	0.025	<0.01
	P139	6.65	26.92	175	15.79	6.5	29.3	2.6	13.82	36.49	0.118	2	0.04	0.006	<0.01	<0.01
	P140	7.19	274.3	1783	89.6	69.5	386.1	3.9	561.05	107.7	8	1.4	0.007	<0.01	<0.01	<0.01
	P141	7.26	150.1	976	92.31	47.22	184.53	2.52	198.21	51.63	9.27	1	0.008	<0.01	<0.01	0.008
	P44	7.33	157.2	1024	106.41	98.01	97.32	3.9	191.55	227.25	0.12	0.14	0.005	0.172	<0.01	0.005
	SRK5S	6.53	33.94	220	5.23	3.75	68.58	0.25	35.25	5.607	0.2	<0.10	0.256	<0.01	<0.01	0.014

Standard Limit (SANS 241:2011)	≥5 to ≤ 9.7	≤ 170	≤ 1200	NS	NS	≤ 200	NS	≤ 300	≤ 250	≤ 11	≤ 1.5	≤ 0.3	≤ 0.1	NS	≤ 2
NS	Not Specified			mg/l	milligrams per litre						Above SANS 241: 2011 Limits				

Table 18: Groundwater quality results as compared to the DWA standards as set in IWUL (February 2015)

Site Name	BH Number	pH	EC mS/m	Ca mg/l	Mg mg/l	Na mg/l	Cl mg/l	SO4 mg/l	NO3-N mg/l
Mine Boreholes	P111	7.69	400.8	48.9	498	50.5	325.15	1468.65	<0.06
	P112	7.01	258	104.04	188.36	149.08	210.24	731.3	1.2
	P114S	6.39	151.2	91.32	101.64	80.73	223.71	224.04	0.15
	P115	7.41	138.8	86.32	96.82	70.32	130.05	128.08	8.1
	P115S	7.41	150.5	89.31	92.46	99.51	157.77	125.52	6.21
	P116S	7.99	111	49.15	75.15	76.65	118.45	97.75	1.3
	P117	7.31	187	88.17	146.91	101.58	233.94	317.55	10.2
	P118	7.74	162.4	38.67	93.15	157.17	168.54	347.12	0.15
	P120	7.57	64.91	21.02	35.64	73.73	46.59	31.858	1.06
	P120S	7.24	115.3	48.5	79	93.06	86.22	13.12	2.96
	P121	7.59	142.8	45.91	97.62	115.4	72.67	46.217	2.75
	P121S	6.46	14.29	5.612	5.96	13.5	5.22	18.54	0.43
	P122	7.3	114.8	42.2	77.86	96.32	95.8	23.18	5.28
	P122S	6.88	64.65	20.6	18.92	98.49	21.28	21.98	0.06
	P123	6.97	275.3	96.2	55.7	388.25	580.9	48.2	0.2
	P124	7.38	112.9	97.06	76.54	39.46	79.34	89.2	6.34
	P125	7.37	176.2	109.53	87.27	147	208.71	185.34	30.3
	P126	6.95	514	417.6	206.95	287.5	162.6	1278.9	136.2
	P127	7.35	183.4	52.08	176.19	21.18	162	354.12	7.5
	P128	7.37	198	96.96	155.73	99	35.52	268.41	40.53
	P138	7.08	250.5	172.1	95.55	208.8	465.3	153.75	7.75
	P139	6.65	26.92	15.79	6.5	29.3	13.82	36.49	0.118

Site Name	BH Number	pH	EC mS/m	Ca mg/l	Mg mg/l	Na mg/l	Cl mg/l	SO4 mg/l	NO3-N mg/l
	P140	7.19	274.3	89.6	69.5	386.1	561.05	107.7	8
	P141	7.26	150.1	92.31	47.22	184.53	198.21	51.63	9.27
	P44	7.33	157.2	106.41	98.01	97.32	191.55	227.25	0.12
	SRK5S	6.53	33.94	5.23	3.75	68.58	35.25	5.607	0.2

Chapter J: Air Quality

According to Mogalakwena Local Municipality Final 2014-15 Integrated Development Plan, Mogalakwena Mine is one of the air quality hotspot within the Waterberg. Mogalakwena Mine is the largest contributor to domestic fuel burning emissions in the District, contributing to approximately 52% of emissions. Also, according to the South African Air Quality Information System (www.saaqis.org.za), Mogalakwena Mine is situated in an air quality priority area (refer to Figure 19 below)

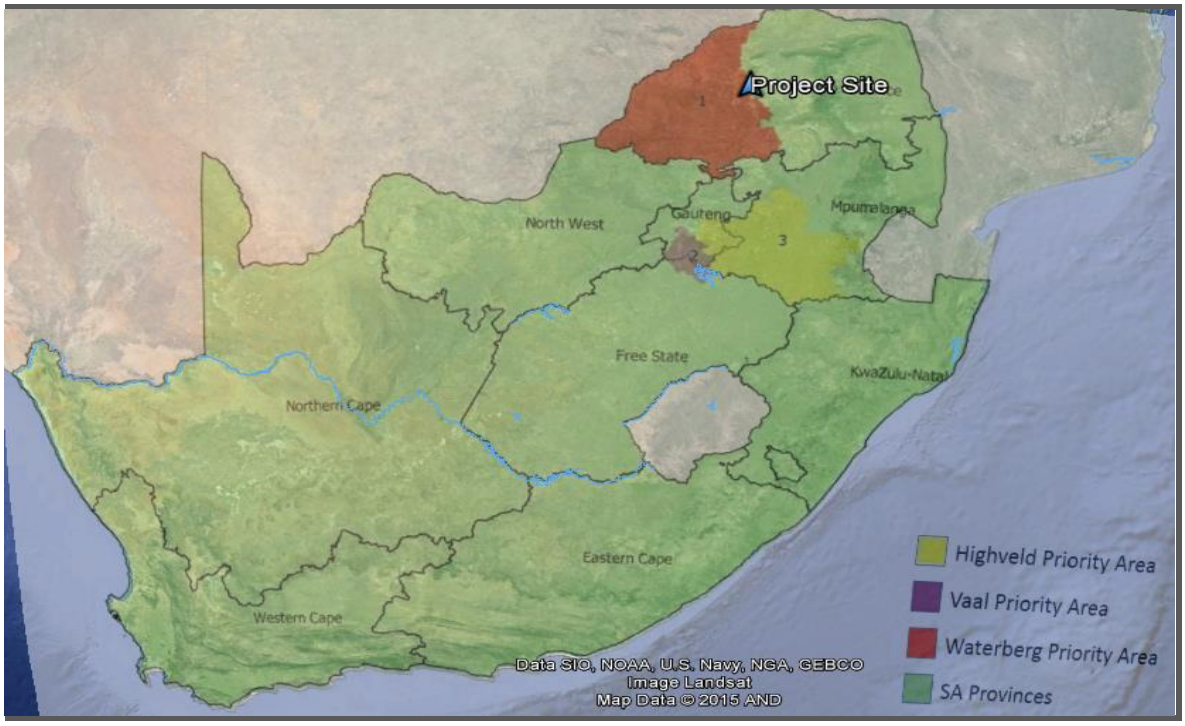

Figure 19: Air quality priority areas (www.saagis.org.za)

An Air Quality Management Plan was compiled for Mogalakwena Mine by SGS South Africa (Pty) Ltd in August 2011. Pollutants identified at Mogalakwena Mine include dust fallout and particulate matter (PM_{10}) pollutants.

Table 19: Sites/tasks assessed in the Emission Inventory

Activity	Possible Pollutants
Material Transfer	Dust Fallout and PM_{10}
Excavations	Dust Fallout and PM_{10}
Paved Roads and Surfaces	Dust Fallout and PM_{10}
Unpaved Surfaces	Dust Fallout and PM_{10}
Industrial Wind Erosion	Dust Fallout and PM_{10}

Table 20: Description of the Potential Pollutants at the Mogalakwena Mine

Pollutant	Description
Dust fallout	Dust fall-out can be defined as dust particles with an aerodynamic diameter greater than 10 micrometres, that have been entrained into the air by a physical process such as wind, the movement of vehicles, stack emissions and from fugitive dust. These particles are generally too heavy to remain in suspension in the air for any period of time and drop back to the ground over a relatively short distance of approximately 4km depending on a combination of various factors such as particle size, density, temperature (of the air and the particle), emission velocity or method, ambient wind speed and humidity.
PM_{10}	This describes particle matter (dust) with sizes smaller than 10 micrometres in diameter. It is respirable and does not settle easily. It can travel up to hundreds of kilometres at a time.

Dust Fallout

Mogalakwena Mine has a dust monitoring programme in place. Monthly dust deposition monitoring is conducted by SGS the results are compared to the National Dust Control Regulations, dated November 2013 and a resultant monthly report is generated for the mine. Table 21 below provides the limits for residential and non-residential areas as per the mentioned Regulations. Figures 20 and 21 provide the locations of the dust buckets at the mine. Dust monitoring point GTRDS and GTRMD (multidirectional) is located next to Waste Rock Dump No. 2 (i.e. the proposed Explosives Depot Expansion site).

Table 21: Dust fall limits and permitted frequency of exceeded dust fall rate

Restriction Areas	Dust fall rate (D) ($mg/m^2/day$, 30 day average)	Permitted frequency of exceeding dust fall rate
Residential	D < 600	Two within a year, not sequential months
Non-residential	600 < D > 1 200	Two within a year, not sequential months

Figure 20: Google earth image of location of dust buckets in relation to the proposed expansion site (projects site)

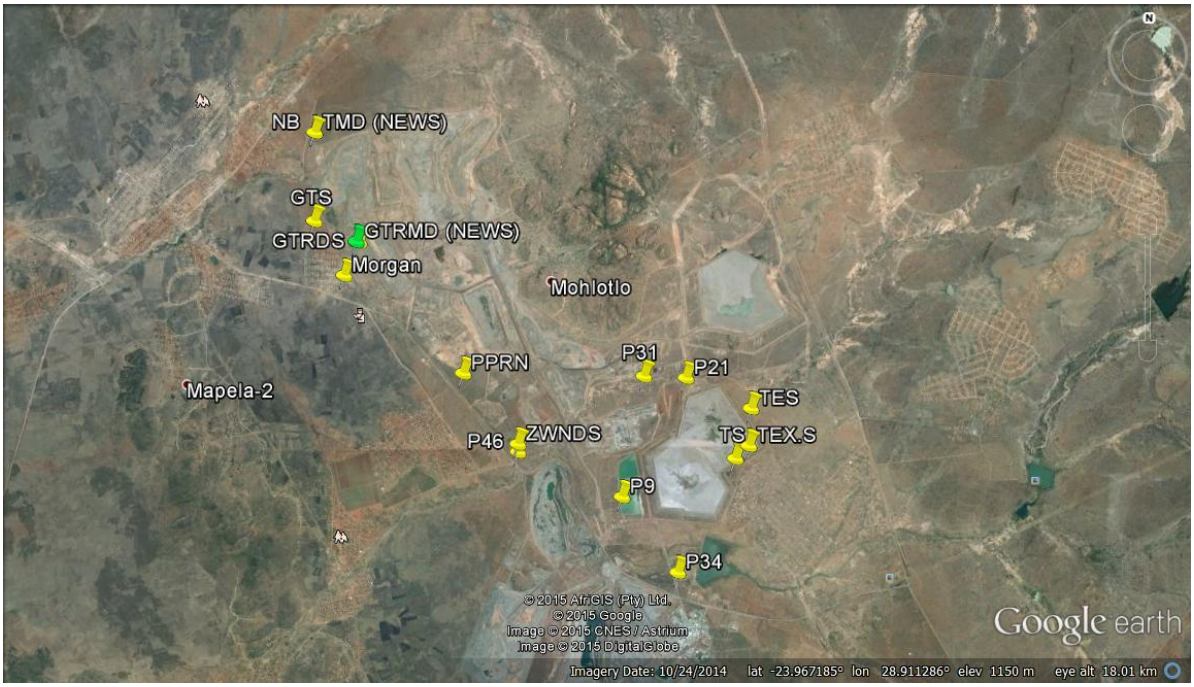

Figure 21: Google earth image showing dust bucket location names

The results of the latest dust monitoring reports (January to June 2015) is shown in Figure 22 below.

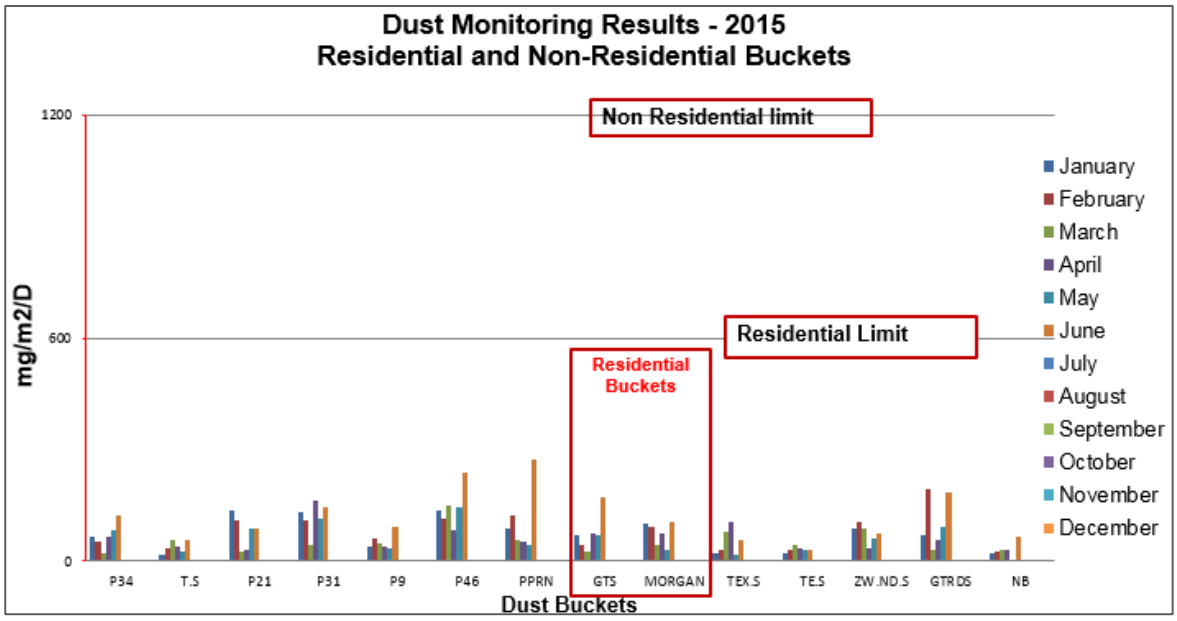

Figure 22: Google earth image showing dust bucket location names

PM_{10}

PM_{10} levels were measured (as part of the air quality management plan, compiled by SGS in August 2011) at four different sites on the mine, namely the contractor's camp, the water works site, the helipad and the office. Results showed that the PM_{10} levels at the contractors' camp were well below the National Ambient Air Quality Standards for PM_{10}. This showed that the camp is not influenced by an excess of PM_{10} dust.

Results for PM_{10} levels at the water works site showed nine exceedances of the National Ambient Air Quality Standards. The site was mainly characterised by fallout results that were outside the current and future SANS guidelines. This indicated that this area may be of concern in the future.

PM_{10} levels at the Mogalakwena Mine's Helipad showed three exceedances of the National Ambient Air Quality Standards. This site was mainly characterised by fallout results that were outside the current and future SANS guidelines. This indicated that this area is an immediate priority as it impacts both ambient air as well as the mine personnel working in this area.

PM_{10} levels at the office showed that the National Ambient Air Quality Standards were exceeded on three occasions. It is, however, believed that the two higher values of exceedance occurred due to contamination as the other results were extremely low.

Chapter K: Noise

Mogalakwena Mine conducted a noise survey in 2010 whereby noise measurements were taken at the communities/villages located close to the mine. One of the measuring points were at Ga-Tshaba village which is the village closest to the proposed Explosives Depot Expansion site (Waste Rock Dump No.2).

According to SANS 10103: 2008, the statutory exposure limit is 50 dBA during the day and 40 dBA during the night. According to the survey report, measurements were taken during the day (06:00–22:00) and night (22:00–06:00), in accordance with the procedure provided in SANS 10103: 2008. Results from the survey are included in the table below.

Table 22: Results of Noise measurements at Ga-Tshaba Village

Area name	Time		Reading (dBA)	Standard SANS: 10103	Comments
	start	Stop		dBA	
Measured ambient noise levels (day time).					
Ga-Tshaba village	12:00	12:10	41.9	50	Mine activities clearly. Animals People talking Children talking
Measured ambient noise levels (night time).					
Ga-Tshaba village	02:07	02:17	**42.2**	40	Mining activities Animals Traffic

The ambient noise level at Ga-Tshaba village was 41.9 dBA during day time and 42.2 dBA at night. During day time the main source of noise was children talking and shouting, a man and woman shouting at each other, dogs barking, chicken crowing and a lady singing. Mining activities could be heard, mainly trucks dumping, reverse alarms and a track dozer.

At night time mining could be heard especially when the trucks were dumping as well as the reverse alarms and a track dozer. Other noise sources include crickets, dogs barking and a taxi passing by on the gravel road.

It was concluded that although mining activities could be heard vaguely in the background most of the time, the village's day to day activities also contribute to the noise levels measured

Chapter L: Visual

The mix of land uses in the area, including open pit mining, subsistence agriculture, rural villages and fallow land all add to the visual character of the region. The existing mine and its associated activities (such as Tailings dams, Waste Rock Dumps and infrastructure) have a visual impact upon receptors surrounding the mine. Existing indirect impacts from a visual and 'sense of place' perspective include the generation of dust, the visibility of waste rock dumps, infrastructure as well as light pollution from the mining operations.

Chapter M: Protected areas and conservation planning

According to Waterberg District Municipality's Environmental Management Framework, Mogalakwena Platinum Mine is situated in an area which is marked as Zone 6: Restricted mining focus area in aesthetic and/or ecological resource areas. Zone 6 represents areas where significant mineral resources, especially platinum group metals, occur in areas with a generally high aesthetic and/or ecological value (refer to Figure 23). Furthermore, the proposed activity (forming part of Mogalakwena Mine's operations) is situated in an area which is marked as an area with active mines, which is said to have potential platinum (refer to Figure 24) (Waterberg District Municipality Final Draft SDF, 2009).[40]

Figure 25 below shows the protected areas and conservation planning areas in relation to the proposed site (forming part of Mogalakwena Mine's operations).

Figure 26 indicates the Critical Biodiversity Areas in relation to the location of the proposed expansion site. There are no Critical Biodiversity Areas or Protected Areas present at the mine (see Figure 20). The proposed site is located in an area classified as 'no natural habitat remaining.

[40] No Finalised SDF for Waterberg District Municipality available yet.

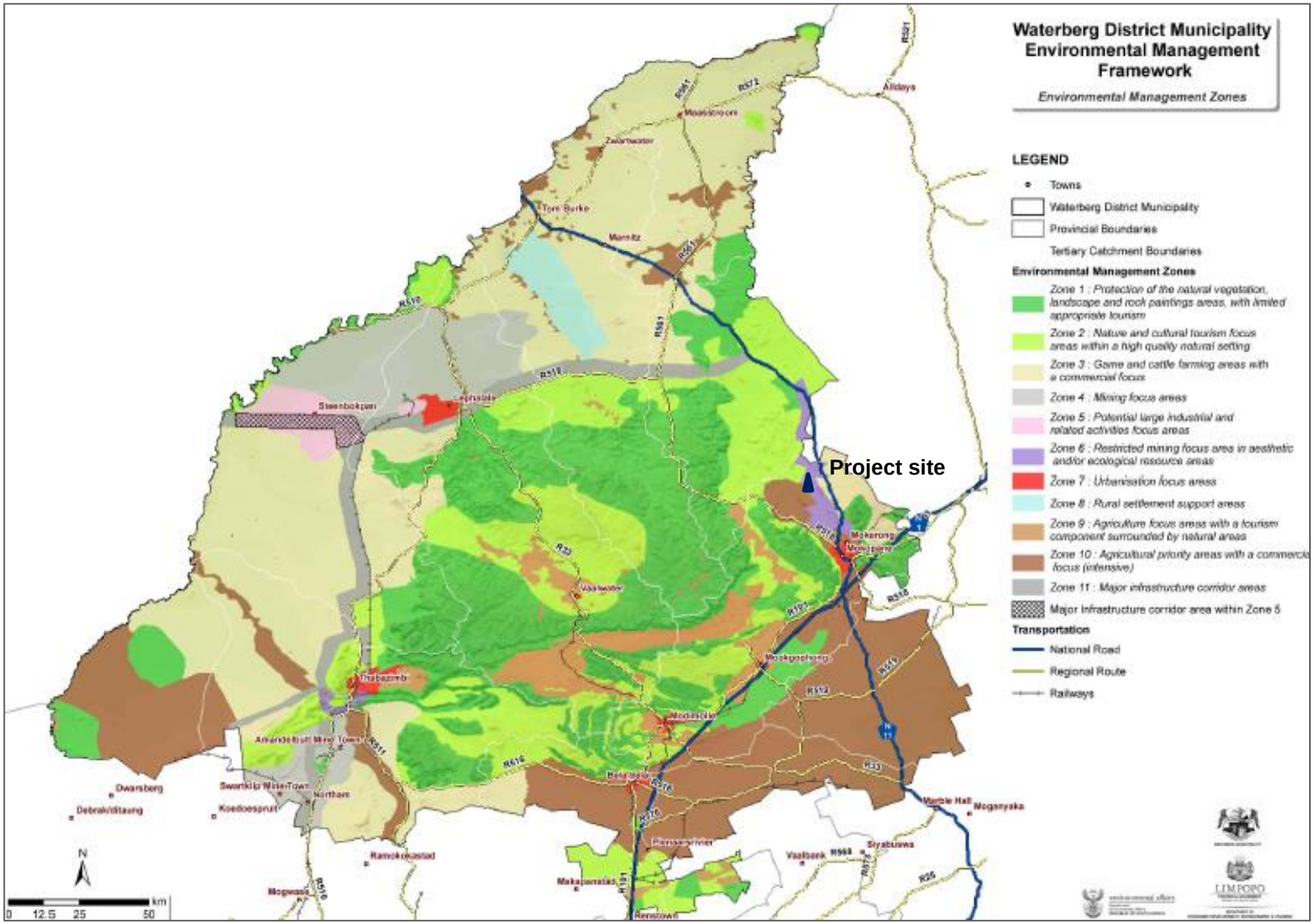

Figure 23: Environmental management zones (adapted from Waterberg District Municipality EMF, date unknown)

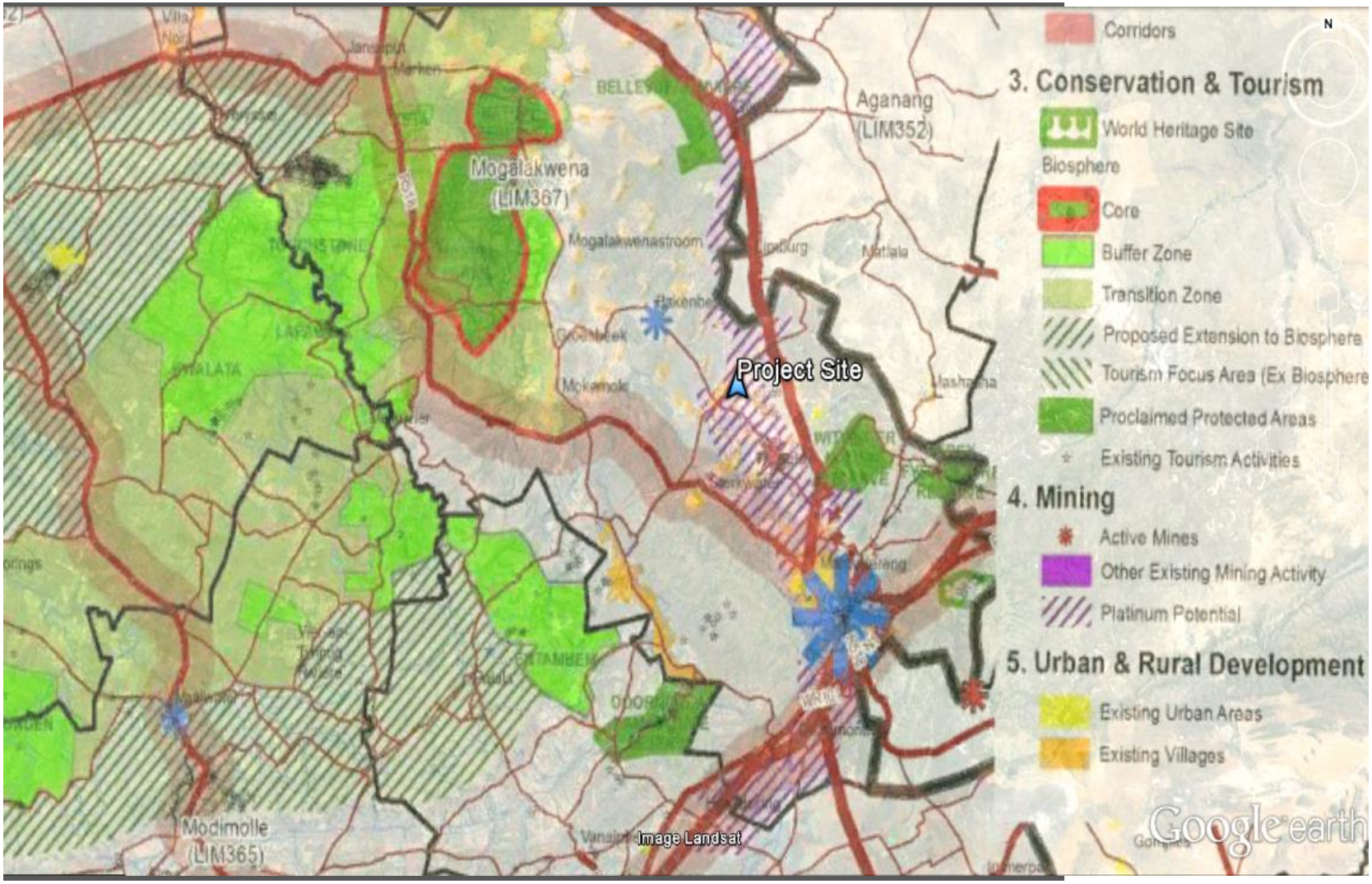

Figure 24: Map showing the locality of the proposed activity in relation to SDF areas (adapted from the Waterberg District Municipality Final Draft SDF, 2009)

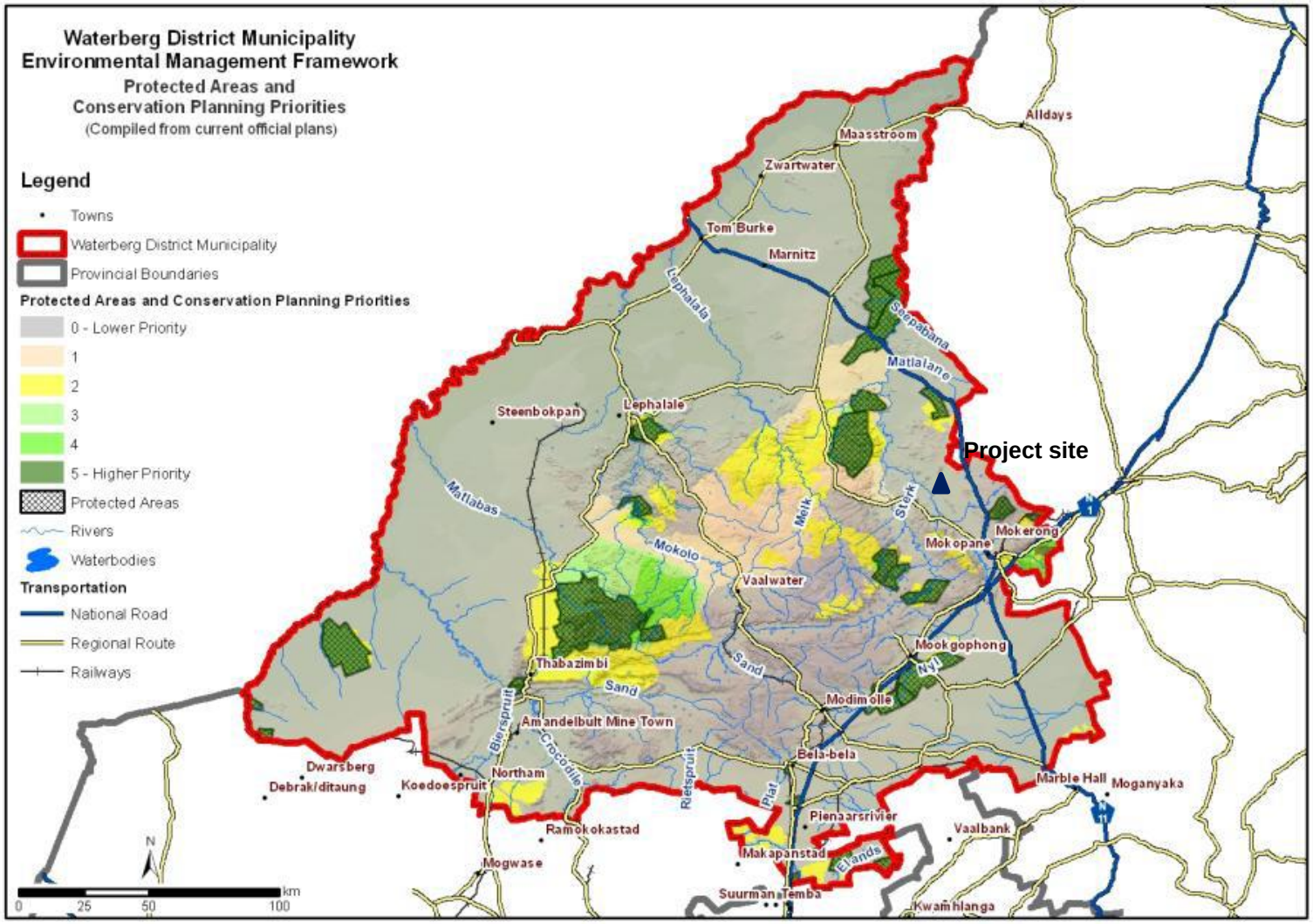

Figure 25: Protected areas and conservation planning priorities (adapted from Waterberg District Municipality EMF, date unknown)

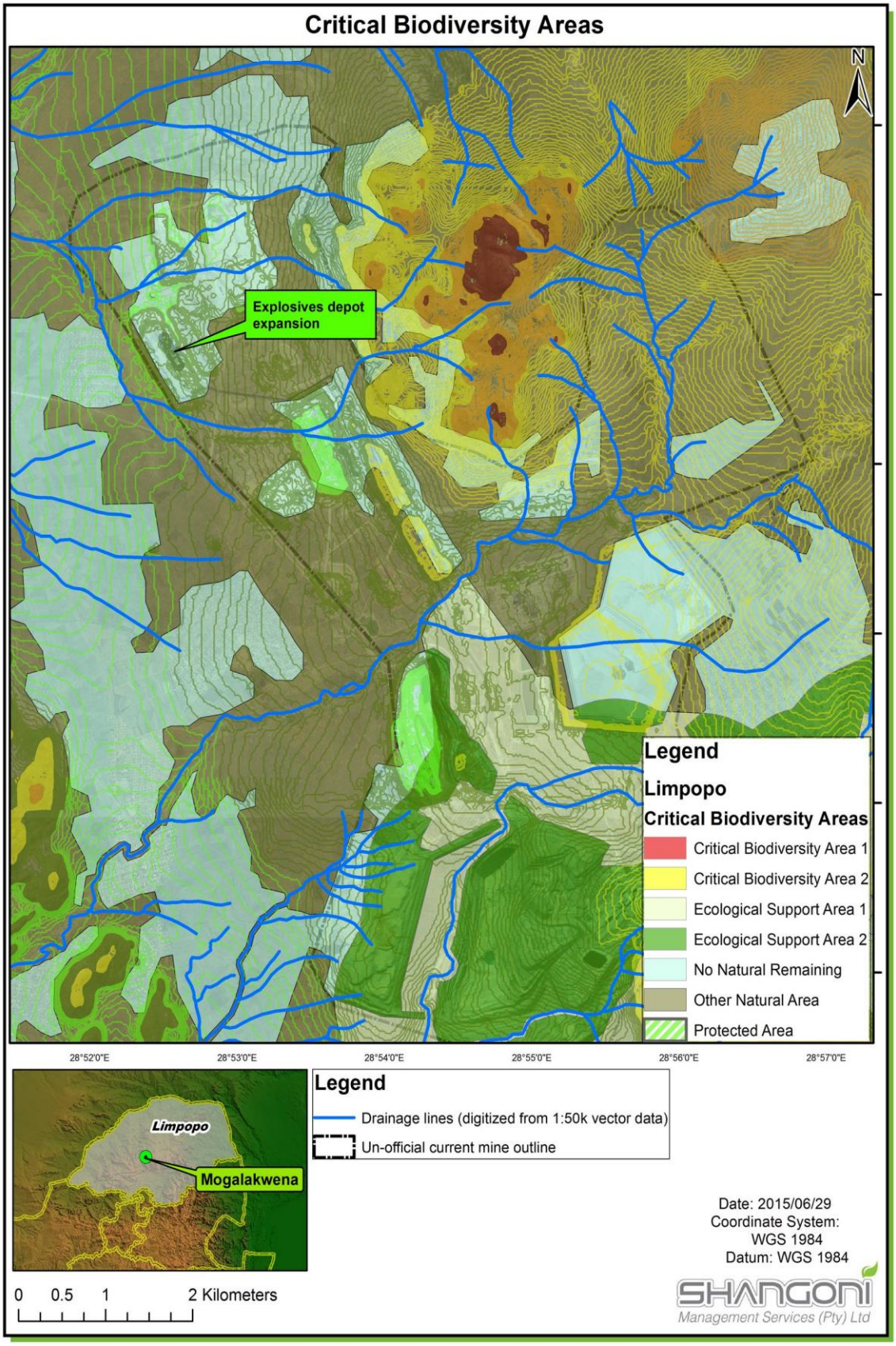

Figure 26: Critical Biodiversity Areas Map

Chapter N: Cultural Heritage

A Cultural Heritage Survey was conducted for Mogalakwena Mine by Francois P. Coetzee from the Department of Anthropology and Archaeology from the University of South Africa in December 2011. During the survey, no artefacts from the Stone or Iron Ages were found on the farms Overysel 815 LR or Zwartfontein 818 LR. However, a total of eight grave sites and cemeteries were recorded adjacent to the mine boundary.

As most of the graves do not have inscriptions, these graves are regarded as older than 60 years, in terms of Section 36(3) of the National Heritage Resources Act (Act No. 25 of 1999), and should therefore be protected. A high significance rating is awarded to all the grave site and cemeteries (on a local level). A total of four historical settlements (structures and house foundations) were recorded adjacent to the border of the mine. These settlements are probably older than 60 years and are therefore protected by the National Heritage Resources Act (Act No. 25 of 1999). All the structures at the sites have, however, completely collapsed and no substantial deposits with cultural material were recorded. A low significance rating was awarded to the settlements. All of the identified sites are located outside the border of the mine and therefore outside the perimeters of the proposed explosives depot expansion site. Please refer to Figure 25 below for the location of graves and cemeteries.

Chapter O: Regional socio-economic structures

Demography

According to Mogalakwena Local Municipality's (MLM) Integrated Development Plan (IDP) dated 2014-2015, census 2011 showed that Mogalakwena Municipality contains over 45% of the Waterberg district's population with a total population of 307 682 and 79 396 households. The Africans are in majority (295 796) and constitute approximately 96% of the total Mogalakwena municipality population. The white population is 9 274, coloured population 403 and the Indian/Asian population 1 646. Just over 53% of the population is females. The population growth rate is estimated at 0.31% in 2011.

Mogalakwena Municipality contains over 45% of the Waterberg district's population with a total population of 307 682 and 79 396 households**.**

Employment

One of the key social problems facing the Mogalakwena Municipality is poverty. The unemployment estimates in the Municipality vary between 45% and 70% of the economically active population (people between the ages of 15 and 64 years). Women, and especially rural women, form the greatest number affected by the lack of job opportunities as well as other social problems.

Of the 78 647 economically active (employed or unemployed but looking for work) people in the district, 40.2% are unemployed. The unemployment rate of the Mogalakwena Local Municipality is almost double that of the other municipalities in the district. This could be attributed to a reduction in mining activities in recent years.

Table 23: Employment status, 2001 versus 2011

Gender	Employed		Unemployed		Not economically active	
	2001	2011	2001	2011	2001	2011
Female	16 345	21 358	19 172	17 833	56 353	59 600
Male	20 744	25 679	14 526	13 777	37 919	51 396

Key economic sectors

Key sectors contributing towards the economy of Mogalakwena Local Municipality are:

- Mining;
- Agriculture; and
- Tourism.

Mining

The mining industry in the municipal area contributes to the economic development of the District, Province, and Nationally. The Mogalakwena area is the largest production area of platinum in the Province. Mogalakwena Platinum Mine has proven reserves of 280 million tons and its current extraction rate is 57 million tons per year.

Agriculture

According to mentioned IDP, Mogalakwena Municipality is an area which mainly consists of rural land, agricultural land and some land dominated by urban and mining/industrial activities. Agricultural land within the municipal boundaries is categorised by the following farming activities: game; crops; livestock; poultry and horticulture. Products such as maize, game, cattle, vegetables, tobacco and citrus products are farmed. Although the bulk of production come from privately owned commercial farms, a large portion of land has been claimed and resituated to local communities where emerging and small-scale black farmers are producing.

Tourism

According to the IDP, the area of Mogalakwena is blessed with rich history and cultural heritage resources that have potential for tourism. The Mogalakwena tourism sites include the following, amongst other:

- Waterberg Biosphere Reserve-;
- The Makapan Valley World Heritage Site; and
- Etrich Game Farm; and

Access to basic services

Free basic municipal services are services provided at no charge by the Government to poor households. The services currently include water and electricity. These services are provided by municipalities and include a minimum amount of electricity, water and sanitation that is sufficient to cater for the basic needs of a poor household.

Table 24: Number of consumer units (households) receiving free basic services (2012/13)

Municipality	Water	Sanitation	Electricity
Mogalakwena	4 541	4 541	4 541

7.4.2 Description of the current land uses.

Land use and development at the site

The site on which the Explosives Depot Expansion is proposed is located within the Mogalakwena Mine boundary, on an existing Waste Rock Dump No. 2 (in an area with a current land use of mining). Currently, there is an Explosives Magazine consisting of four containers on the site, two of which are located in a bunker.

Agricultural capability

Areas surrounding the existing mine are mainly used for commercial grazing and agricultural purposes. There are also a few rural settlements adjacent to the mine where most of the mine workers reside. The following broad land capability classes in Table 25 have been identified in the approved EMP for the mine.

Table 25: Land capability classes on the mine

Site	Area disturbed	Land capability
Sandsloot and adjacent infrastructure	755ha	Predominately grazing
Overysel	495ha	Grazing with very limited agriculture
Zwartfontein North	300ha	Arable
Zwartfontein South	90ha	Mixed arable and grazing
Tweefontein North	250ha	Grazing
Tweefontein South	35ha	Grazing

7.4.3 Description of specific environmental features and infrastructure on the site.

The Explosives Depot expansion activities are to be carried out on top of Mogalakwena Mine's Waste Rock Dump No. 2. The existing Explosives Magazine section of the Depot is currently located on the mentioned waste rock dump. The infrastructure associated with the existing Explosives Magazine section include four containers (two located inside a bunker area, and two located outside the bunker, approximately 75 m away from the bunker), fencing, signage, and a guard house. Annexure E7

provides photographs of the old Explosives Magazine and emulsion storage and handling areas, as well as the existing Explosives Magazine located on Waste Rock Dump No. 2.

There are currently no environmental features on top of Waste Rock Dump No. 2. Environmental features located within and surrounding the existing mining area include drainage lines (as per Chapter G above and Figure 27 below) and heritage sites. The latter being located outside the mining right boundary of Mogalakwena Mine.

7.4.4 Environmental and current land use map.

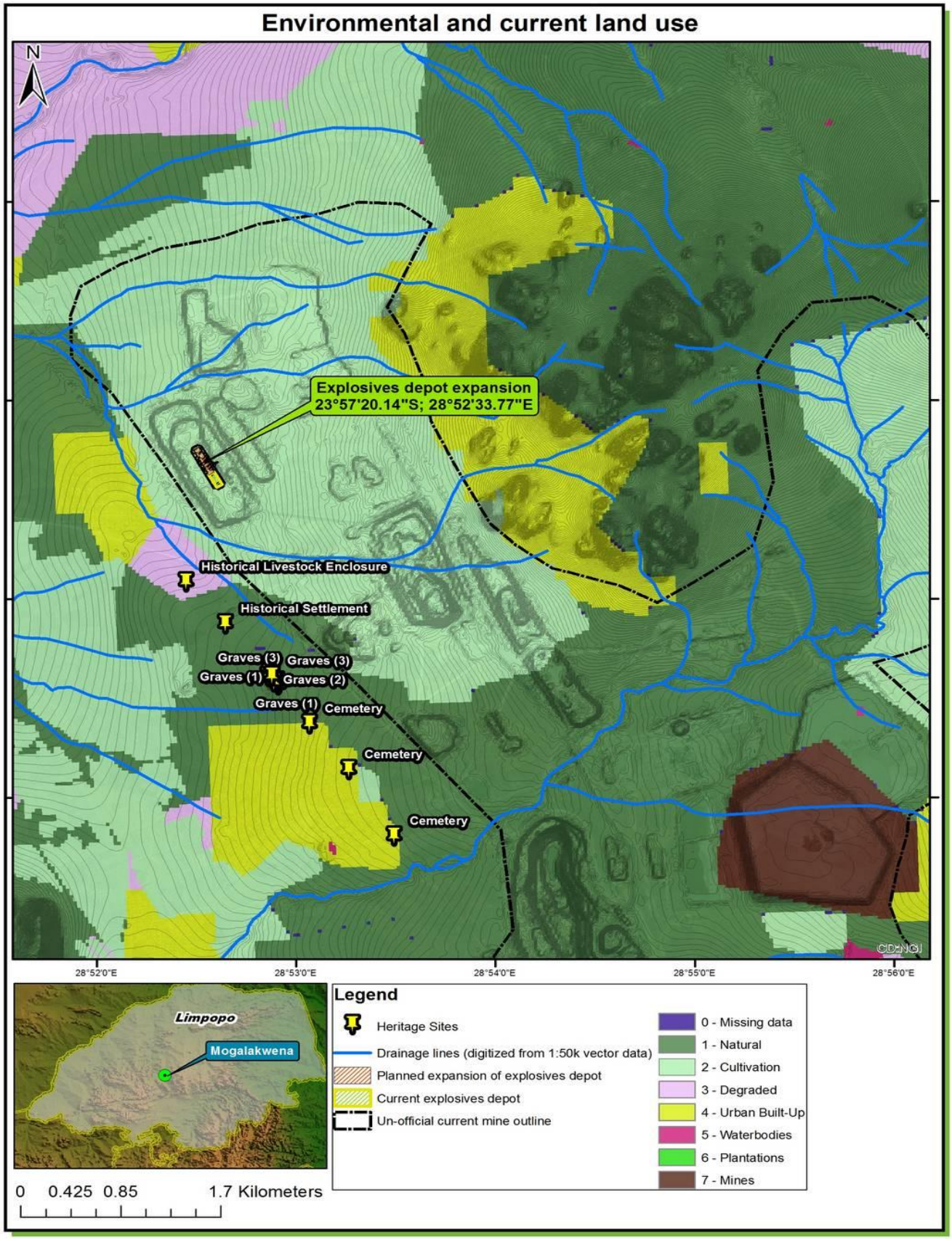

Figure 27: Environmental and current land use map

7.5 Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts

Table 26: potential impacts identified for the activities described in the initial site layout.

Environmental component	Activity	Impact description	Duration	Pre-mitigation[41]			Reversible (Yes/No)	Irreplaceable loss (Yes/No)	Avoided/ Managed/ Mitigated
				Probability	Magnitude	Significance			
Air Quality	Grading and sloping of area during construction (Expansion).	Impact on ambient air quality due to dust generated when grading and sloping the proposed project site. Cumulative impact during construction, along with existing mining and related activities.	Lasting one month to a year	4	1	Low	Yes	No	Mitigated
	Offloading and levelling of gravel/material/ bricks/cement for surfacing and construction (expansion).	Impact on ambient air quality due to dust generated during offloading and levelling of grave. Furthermore, atmospheric emissions from heavy vehicles during construction activities. Cumulative impact during construction, along with existing mining and related activities.	Lasting one month to a year	4	1	Low	Yes	No	Mitigated
	Construction and erection of security measures such as fences, guard houses and lighting.	Impact on ambient air quality due to dust generated during excavations for posts, fences etc. Cumulative impact during construction, along with existing mining and related activities.	Lasting one month to a year	3	1	Low	Yes	No	Mitigated
	General construction-related activities during expansion (e.g. use of machinery and vehicles, building of containment areas (bunded areas) etc.) (Overall rating).	Impact on ambient air quality due to air emission and dust generated when undertaking general construction activities such as movement of heavy vehicles, excavation for posts etc. Cumulative impact during construction, along with existing mining and related activities.	Lasting one month to a year	4	1	Low	Yes	No	Mitigated
	Preferred Alternative: Construction and storage in more silos, with smaller capacities.			4	1	Low			
	Second Alternative: Construction and storage in less amount of silos, with increased capacities.			4	1	Low			
	Offloading and refilling of the explosives.	Potential for fire and/or explosion to occur due to explosives material and substances being exposed to sparks or open flames.	Lasting days to a month	3	3	Medium	Yes	No	Avoided and managed
	Storage of emulsion (ANPP, EP200) (overall rating)	Potential for fire and/or explosion to occur due to explosive material and substances being exposed to sparks or open flames.	Lasting days to a month	3	3	Medium	Yes	No	Avoided and managed
	Preferred Alternative: Construction and storage in more silos, with smaller capacities.			2	2	Low			
	Second Alternative: Construction and storage in less amount of silos, with increased capacities			3	3	Medium			
	Storage of more than 80m^3 of explosives and accessories (e.g. detonators, etc.) (Explosives magazine)	Potential for fire and/or explosion due to explosive material and accessories being exposed to sparks or open flames.	Lasting days to a month	3	3	Medium	Yes	No	Avoided and Managed
	Utilisation of Explosives Depot	Potential for fire and/or explosion due to explosives material and substances being exposed to sparks or open flames.	Lasting days to a month	3	3	Medium	Yes	No	Avoided and managed

[41] Probability, magnitude and significance is based on Shangoni Management Services risk assessment criteria used as provided in Section 7.6 below.

	Transportation of explosives to the Explosives Depot (overall rating)	Potential for fire/explosion due to explosives material and substances being exposed to sparks or open flames.	Lasting days to a month	3	3	Medium	Yes	No	Avoided and managed
	Preferred Alternative: Construction and use of storage reserve (Explosives Depot)	Fire/explosion due to explosives material and substances being exposed to sparks or open flames.	Lasting days to a month	3	3	Medium	Yes	No	Avoided and managed
		Impact on ambient air quality due to dust generated by vehicle movement to and on the site.	Lasting days to a month	4	1	Low	Yes	No	Mitigated
	Other Alternatives: Daily deliveries from supplier(s) or shared infrastructure with sister mining companies.	Potential for fire/explosion due to explosives material and substances being exposed to sparks or open flames.	Lasting days to a month	3	2	Medium	Yes	No	Avoided and managed
	Water management (establishment and use of such facilities) in and around the site (pipelines, water tank, pump base and pit for collection of storm water).	Impact on ambient air quality due to dust generated when excavating trenches for pipelines, storm water collection pits etc. Cumulative impact during construction, along with existing mining and related activities	Lasting days to a month	3	1	Low	Yes	No	Mitigated
	Decommissioning through demolition of concrete structures and removal of salvageable equipment (posts, pumps, water tanks, gates, silos and concrete rubble).	Reduced visibility due to dust fallout. Cumulative impact during decommissioning, along with other mining and related and / or decommissioning activities.	Lasting 1 month to 1 year	3	1	Low	Yes	No	Mitigated
	Reshaping of the waste rock dump top surface during decommissioning	Impact on air quality (reduced visibility) due to dust fallout and emission from vehicles. Cumulative impact during decommissioning, along with other mining and related and / or decommissioning activities.	Lasting 1 month to 1 year	4	1	Low	Yes	No	Mitigated
	Replacement and levelling of topsoil (growth medium) during rehabilitation	Reduced visibility due to dust fallout. Cumulative impact during decommissioning, along with other mining and related and / or decommissioning activities.	Lasting 1 month to 1 year	4	1	Low	Yes	No	Mitigated
Groundwater	Construction of Explosives Depot	It is not anticipated that the construction (expansion related) activities will have a direct impact on groundwater. The proposed expansion project will be located on top of a waste rock dump.	Not applicable			No direct impact anticipated	Not applicable		
	Storage and handling of explosives at the Explosives Depot during the Operational Phase or removal of explosives from the site during the Decommissioning Phase.	Borehole P126 is the closest borehole in relation to the location of Waste Rock Dump No. 2. According to the groundwater quality results (as per Section 7.4), this groundwater monitoring point has exceedances in terms of EC, TDS, Na, SO_4, and NO_3 (Nitrate). It is not anticipated that the operation of the Explosives Depot will result in an additional significant impact on groundwater in terms of Nitrates from a storage perspective. However, should a fire or explosion occur, or explosive material or substances be left to infiltrate the waste rock dump surface, a cumulative impact in terms of Nitrate concentration may occur.	Lasting 5 years to Life of project	3	2	Medium	Yes	No	Avoided and Managed
Heritage	Construction and utilisation of Explosives Depot	It is not anticipated that the proposed activity will result in impacts on heritage as no heritage resources are located on top of Waste Rock Dump No. 2	Not applicable			No impact anticipated	Not applicable		

		Identified heritage resources are located outside the boundary of the MPM mining right.							
Noise	Grading and sloping of area during construction (expansion)	Noise generated by vehicles/ machinery used for grading and sloping of the site. Cumulative impact during construction, along with existing mining and related activities	Lasting days to a month	3	1	Low	Yes	No	Managed
	Offloading and levelling of gravel, material, bricks and cement for surfacing and construction	Noise generated by vehicles and also machinery/vehicle used for levelling activities. Cumulative impact during construction, along with existing mining and related activities	Lasting days to a month	3	1	Low	Yes	No	Managed
	General construction-related activities during expansion (e.g. establishment of construction camp, use of machinery and vehicles, building of containment areas (bunded areas) etc.)	Noise generated by construction vehicles/ machinery. Cumulative impact during construction, along with existing mining and related activities	Lasting days to a month	2	1	Low	Yes	No	Managed
	Construction and erection of security measures such as fences, guard houses, lighting.	Noise generated by vehicles/ machinery during construction. Cumulative impact during construction, along with existing mining and related activities	Lasting days to a month	1	1	Low	Yes	No	Managed
	Transportation of explosives to the explosives depot Preferred Alternative: Use of storage reserve (Explosives Depot) (i.e. less frequent travelling on roads)	Noise generated by trucks travelling to and from the explosives depot. Cumulative impact during operation, along with existing mining and related activities. However, the impact significance will be lower than with more frequent trips to the mine, should a strategic storage reserve not be implemented (see below).	Lasting five years to life of explosive depot	2	1	Low	Yes	No	Managed
	Alternatives: Daily deliveries from supplier(s) or shared infrastructure with sister mining companies.	Noise generated by trucks travelling on a frequent basis, to and from the explosives depot. Cumulative impact during operation, along with existing mining and related activities.	Lasting five years to life of explosive depot	3	2	Medium	Yes	No	Managed
	Decommissioning through demolition of concrete structures and removal of salvageable equipment (posts, pumps, water tanks, gates, silos and concrete rubble.	Noise generated by decommissioning activities. Cumulative impact during decommissioning, along with existing mining and related / decommissioning activities.	Lasting 1 month to a year.	2	1	Low	Yes	No	Managed
Protected areas and conservation	Construction and utilisation of explosive depot	It is not anticipated that the proposed activity will have any impact on protected areas and conservation in the larger due to the location of protected and conservation areas in relation to the location of proposed activities. The proposed expansion site is located on an existing mining area.	Not applicable			No impact anticipated	Not applicable		
Soil, land use and land capability	Replacement and levelling of topsoil (growth medium) during rehabilitation.	Water or wind erosion of topsoil.	Lasting 1 month to 1 year	4	2	Medium	Yes	No	Mitigated
		Compaction of topsoil, affecting growth of vegetation during and after rehabilitation. This could impact on the overall rehabilitation and end land use objectives for the area, if not appropriately implemented.	Lasting 5 years to life of	4	2	Medium	Yes	No	Avoided or mitigated

		Potential cumulative impact, if other rehabilitation activities surrounding the site are not undertaken appropriately.	rehabilitation programme						
Socio-economic	Preferred Alternative: Utilisation of explosives depot as a strategic storage reserve	It is not anticipated that the proposed activity will impact on any socio-economic aspects of the surrounding area, as the mine is already an operational activity, and Waste Rock Dump No. 2 is an existing structure. The "sense of place" of the area has also already been impacted on as a result of current mining activities conducted on the property in question. Therefore, regular passers-by of the area as well as local residents within the area are likely to be desensitised to the mining activities.	Not applicable			No impact anticipated	Not applicable		
	Transportation of explosives to the explosives depot Other Alternatives: Daily deliveries from supplier(s) or shared infrastructure form sister mining companies.	Daily or frequent deliveries to the mine will put communities at risk as potential accidents or spillages (contaminating water resources) may occur and fire risks which may threaten the lives of community members. Livestock of communities may also be at risk of being hit by delivery trucks / tankers.	Lasting 5 years to life of explosive depot	3	3	Medium	Yes	No	Avoided
Surface Water	Grading and sloping of area during construction	Ponding due to uneven surfaces resulting from construction activities.	Lasting one month to one year	2	2	Low	Yes	No	Avoided
	Offloading and levelling of gravel, material, bricks and cement for surfacing and construction	Potential for contamination of surface water due to spillages of cement.	Lasting one month to one year	1	1	Low	Yes	No	Avoided and mitigated
		Ponding due to incorrect levelling of the gravel.	Lasting one month to one year	2	2	Low	Yes	No	Avoided and mitigated
	Offloading and refilling of the explosives	Spillages may occur during offloading and/or refilling of explosives. Storm water may be contaminated upon coming into contact with the spillage.	Lasting 5 years to life of explosive depot	2	2	Low	Yes	No	Avoided or managed
	Utilisation of explosives depot	Spillages on the ground may occur as a result of mishandle or leakage. Storm water may be contaminated upon coming into contact with the spillage.	Lasting 5 years to life of explosive depot	2	2	Low	Yes	No	Avoided and managed
		Contamination of surface water due to inappropriate management of storm water Potential cumulative impact along with other mining and related activities.	Lasting 5 years to life of explosive depot	2	2	Low	Yes	No	Avoided and managed
	Preferred Activity Alternative: Storage of emulsion (ANPP, EP200)	Spillages on the ground may occur as a result of mishandle or leakage. Storm water may be contaminated upon coming into contact with the spillage. A smaller risk may be associated with design alternative 1 than for design alternative 2 (i.e. smaller tanks, and if only one tanks leaks or spills, the volume spilled will be less).	Lasting days to a month	2	1	Low	Yes	No	Avoided and Managed
	Design Alternative 1: Construction and storage in more silos, with smaller capacities								
	Design Alternative 2: Construction and storage in less amount of silos, with increased capacities		Lasting days to a month	2	2	Low	Yes	No	Avoided and Managed

	Transportation of explosives to the explosives depot Other Activity Alternatives: Daily deliveries from supplier(s) or shared infrastructure with sister mining companies.	Potential accidents resulting in spillages of explosives into water resources.	Lasting days to a month	3	2	Low	Yes	No	Managed or mitigated
	Water management (establishment and use of such facilities) in and around the site (pipelines, water tanks, pump base, pit for collection of storm water)	Leakages from pipelines collecting dirty water from the bunker area to the collection/drainage pit may contaminate clean storm water runoff if not appropriately managed.	Lasting 5 years to life of explosive depot	2	2	Low	Yes	No	Avoided and managed
	Replacement and levelling of topsoil (growth medium) during rehabilitation	Wash down of sediments resulting in sedimentation or siltation of water resources, if not appropriately managed.	Lasting 5 years to full cover of vegetation	2	3	Medium	Yes	No	Avoided
Traffic	Preferred Activity Alternative: Transportation of explosives to the explosives depot (less frequently) to the strategic storage reserve (Explosives Depot)	An increase in traffic is not anticipated as explosives are currently being transported to Mogalakwena Mine, and therefore no additional negative impact is anticipated. As a strategic storage reserve is proposed, less frequent trips are anticipated to be made to the mine.	Not applicable			Impact is not anticipated	Not applicable		
	Other Activity Alternatives: Daily / more frequent deliveries from supplier(s) or shared infrastructure with sister mining companies	Increase in traffic due to daily / more frequent deliveries of explosives in comparison to the preferred activity alternative above. Cumulative impact on traffic should daily or more frequent trips be made to the mine.	Lasting five years to life of explosive depot	2	2	Low	Yes	No	Avoided or mitigated
Vegetation	Re-vegetation of the waste rock dump surface during rehabilitation.	Unsuccessful re-vegetation due to shortage of nutrients, compaction and / or slope failure.	Lasting 5 years to life of rehabilitation programme	3	2	Medium	Yes	No	Avoided and managed
		Establishment of alien invasive plants.	Beyond closure phase	4	2	Medium	Yes	No	Avoided and mitigated
Visual	Construction, erection and utilisation of security measures such as fences, guard houses, lighting.	Visual impact due to lighting during the night. Cumulative impact along with existing mining and related activities, if not appropriately managed.	Lasting 1 month to 1 year	3	2	Medium			
	Utilisation of explosives depot	Light pollution and nuisance due to lighting at the explosive depot. Cumulative impact along with existing mining and related activities, if not appropriately managed.	Lasting 5 years to life of explosives depot	4	2	Medium	Yes	No	Managed

7.6 Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.

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

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

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

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

The risk assessment methodology is based on defining and understanding the three basic components of the risk, i.e. the source of the risk, the pathway and the target that experiences the risk (receptor). Refer to Figure 28 below for a model representing the above principle (as contained in the DWA's Best Practice Guideline: G4 – *Impact Prediction*).

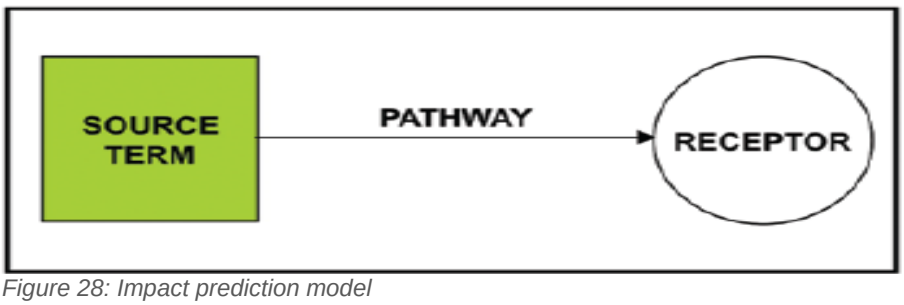

Figure 28: Impact prediction model

Table 27 and Table 28 below indicate the methodology to be used in order to assess the Probability and Magnitude of the impact, respectively, and Table 29 provides the Risk Matrix that will be used to plot the Probability against the Magnitude in order to determine the Severity of the impact.

Table 27: Determination of Probability of impact

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

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

Table 28:Determination of Magnitude of impact

SOURCE								RECEPTOR			
Duration of impact	**Score**	**Extent**	**Score**	**Volume / Quantity / Intensity**	**Score**	**Toxicity / Destruction Effect**	**Score**	**Reversibility**	**Score**	**Sensitivity of environmental component**	**Score**
Lasting days to a month	1	Effect limited to the site. (metres);	1	Very small quantities / volumes / intensity (e.g. < 50L or < 1Ha)	1	Non-toxic (e.g. water) / Very low potential to create damage or destruction to the environment	1	Bio-physical and/or social functions and/or processes will remain unaltered.	1	Current environmental component(s) are largely disturbed from the natural state. Receptor of low significance / sensitivity	1
Lasting 1 month to 1 year	2	Effect limited to the activity and its immediate surroundings. (tens of metres)	2	Small quantities / volumes / intensity (e.g. 50L to 210L or 1Ha to 5Ha)	2	Slightly toxic / Harmful (e.g. diluted brine) / Low potential to create damage or destruction to the environment	2	Bio-physical and/or social functions and/or processes might be negligibly altered or enhanced / Still reversible	2	Current environmental component(s) are moderately disturbed from the natural state. No environmentally sensitive components.	2
Lasting 1 – 5 years	3	Impacts on extended area beyond site boundary (hundreds of metres)	3	Moderate quantities / volumes / intensity (e.g. > 210 L < 5000L or 5 – 8Ha)	3	Moderately toxic (e.g. slimes) Potential to create damage or destruction to the environment	3	Bio-physical and/or social functions and/or processes might be notably altered or enhanced / Partially reversible	3	Current environmental component(s) are a mix of disturbed and undisturbed areas. Area with some environmental sensitivity (scarce / valuable environment etc.).	3
Lasting 5 years to Life of Organisation	4	Impact on local scale / adjacent sites (km's)	4	Very large quantities / volumes / intensity (e.g. 5000 L – 10 000L or 8Ha– 12Ha)	4	Toxic (e.g. diesel & Sodium Hydroxide)	4	Bio-physical and/or social functions and/or processes might be considerably altered or enhanced / potentially irreversible	4	Current environmental component(s) are in a natural state. Environmentally sensitive environment / receptor (endangered species / habitats etc.).	4
Beyond life of Organisation / Permanent impacts	5	Extends widely (nationally or globally)	5	Very large quantities / volumes / intensity (e.g. > 10 000 L or > 12Ha)	5	Highly toxic (e.g. arsenic or TCE)	5	Bio-physical and/or social functions and/or processes might be severely/substantially altered or enhanced / Irreversible	5	Current environmental component(s) are in a pristine natural state. Highly Sensitive area (endangered species, protected habitats etc.)	5

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

Table 29: Determination of Severity of impact

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

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

7.7 The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.

Table 30: Advantage and disadvantages of the proposed activity and alternatives[42]

Alternative		Advantages	Disadvantages
Expansion versus No-Project Option	Expansion Option on Waste Rock Dump No. 2	• Strategic storage reserve, resulting in faster tanker turn-around times, and in turn resulting positively on mining operation. • Minimum environmental impacts as already disturbed area. • As Mogalakwena Mine is an existing mining operation, the surrounding communities will have become desensitised on the mining and related activities, includng the existence of Waste Rock Dump No. 2. Therefore, no additional negative socio-economic, visual and sense of place related impacts are anticipated to occur as a result of the expansion activities on top of Waste Rock Dump No. 2. • Proximity of site to the main mining activities on an already developed and	• Some short term environmental impacts may occur during the Construction Phase, such as dust and noise generating activities, however, the Construction Phase is anticipated to have a duration of a year or less, where after the mentioned impacts will be minimal. • Site establishment and construction costs. • Constraints on site layout as per Explosives Inspector requirements.

[42] Refer also to Annexure E1 (Alternatives Assessment Report)

Alternative		Advantages	Disadvantages
		available waste rock dump.	
Expansion versus No-Project Option	No Project Option	• Minimal additional environmental impacts as ANPP and Emulsion areas will remain in current location. • No site establishment and associated cost.	• Influence on mining operation and in turn, will result in a significant negative economic impact, if the minerals cannot be mined in the earmarked open pit areas as a result of the ANPP and Emulsion silos not being relocated. • By not expanding the current Explosives Magazine area (located on top of Waste Rock Dump No. 2) to be able to store more than 80m^3 of explosives, logistically and from an operational point of view, the storage and handling of explosives will become a complicated exercise as another off-site location will need to be idetified for the storage of the additional excess explosives (if not allowed to be stored at the combined Explosives Depot site).
Activity alternatives	Combined Explosives Depot	• Strategic storage reserve, resulting in faster tanker turn-around times, and in turn resulting positively on mining operation. • Less-regular delivery trips to the mine (due to strategic storae reserve). • Lower operational costs for implementing a	• Site establishment and construction costs. • Some short term environmental impacts may occur during the Construction Phase, such as dust and noise generating activities, however, the Construction Phase is anticipated to have a duration of a year or less, where after the mentioned impacts will be minimal.

Alternative		Advantages	Disadvantages
		strategic reserve and to have explosives, ANPP and Emulsion delivered less often to the mine (compared to the other two alternatives below). • Best practical environmental option, as with less frequent deliveries (i.e. strategic reserve and less delivery trips) less environmental impacts are expected (such as dust generation, risks to communities and fauna, traffic, sense of place and noise generation). • Avoidance of transportation strike risks impacting on production.	• Constraints on site layout as per Explosives Inspector requirements.
	Daily deliveries from supplier(s)	• No site establishment and associated cost. • Daily trips may generate more job opportunities.	• Considered non-practical from a technical and operational perspective, as a number of risks are associated with having to be dependent on daily deliveries of explosives, ANPP and Emulsion, such as possible non-deliveries impacting on the availability of the explosives, ANPP and Emulsion for mining operations, and in turn impacting on production. • Costs for daily trips to the mine will be higher

Alternative		Advantages	Disadvantages
			than if less frequent deliveries are made. • Environmentally, risks associated with daily deliveries to the mine include dust- and noise generation on a daily basis, risks to communities, fauna and surface water sources (i.e. potential for accidents on roads which could result in spillage), higher traffic volumes on roads, and impacts on sense of place as more frequent truck trips). • Risks in terms of transportation strikes that may result in a few days' loss of production.

Alternative		Advantages	Disadvantages
	Shared infrastructure with sister mining companies	• No site establishment and associated cost. • More frequent trips may generate more job opportunities.	• Feasibility is questionable as most of the sister mining companies are located more than 300km from Mogalakwena Mine. This option would thus also require more frequent trips to the mine for deliveries to take place, and would still be more disadvantageous as to implement the option of constructing and operating a combined Explosives Depot serving as a strategic storage reserve on the mine. • Environmentally, risks associated with deliveries to the mine include dust- and noise generation on a frequent basis, risks to communities, fauna and surface water sources (i.e. potential for accidents on roads which could result in spillage), higher traffic volumes on roads, and impacts on sense of place as more frequent truck trips). • Risks in terms of transportation strikes that may result in a few days' loss of production.
Design alternatives	Construction and storage in more silos, with smaller capacities	• The impact significance associated with smaller silos is lower since the capacity is less. Operationally, having another silo, would not hamper the continuation of refilling	• The construction duration will be slightly longer than with the other alternative (below).

Alternative		Advantages	Disadvantages
		of tankers from the site, should a spillage have occurred and one of the tanks are out of operation.	
	Construction and storage in less amount of silos, with increased capacities	• The construction duration will be slightly shorter than with the other alternative (above).	• The impact significance associated with larger silos is higher since the capacity is more. Operationally, not having another silo, would hamper the continuation of refilling of tankers from the site, should a spillage have occurred and the tank is out of operation (emulsion is not available for refilling).

7.8 The possible mitigation measures that could be applied and the level of risk.

The table below provides a summary of the issues and concerns as raised by affected parties and an assessment of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered.

Table 311: Concerns raised by I&APs and assessment of mitigation measures.[43]

Concerns as raised by affected parties	Mitigation measures or site alternative	Impact Post Mitigation		
		Probability	Magnitude	Severity
What will happen if the silos overflow of if there is a spillage	• Spillages must be prevented and if spillages occur, they must be cleaned. • Spillage cleaning equipment must be provided. • Spilled emulsion must be disposed of in a designated colour coded bin/or kept on spill tray until being disposed of. • Silos / tanks must be regularly inspected for leaks	2	2	Low
What will happen if the sedimentation and soil erosion affects the community	• Windbreak structures to reduce wind erosion. • Toe seepage quantity monitoring • Toe paddocks to contain sediment that may wash from slopes • Divert storm water to reduce water erosion	2	1	Low
What will happen if the explosives depot explodes	• Firefighting equipment must be regularly inspected and filled after use. • Fire-fighting equipment must be serviced as stipulated in SANS 1475-1. • Compliance to Explosives Act and Regulations. • Fire prevention and response plan should be developed for the area, and implemented. • All contractors, sub-contractors and workers will attend compulsory environmental awareness training and inductions. This training will	2	2	Low

[43] Refer to Risk Assessment Report that is attached to this BAR as Annexure E2 for more mitigation measures and level of risk

	highlight the dangers associated with the workplace. Procedures relating to environmental risks will also be put in place and will be regularly updated. • Silos must be regularly inspected for leaks. • Mine-wide emergency response procedure/plan already in place should be implemented and complied with at the explosive depot. • Spillages must be prevented and if spillages occur, they must be cleaned. • Spillage cleaning equipment must be provided.			
It is written in the report that dust control measures will be implemented but dust is always seen from the mine	• Dust suppressants must be applied to the ground to minimise dust generation. • Alternatively, water can be sprayed on the ground to minimise dust generated. • The Air quality monitoring programme will be continued with	2	1	Low

7.9 Motivation where no alternative sites were considered.

No site alternatives were considered due to the nature of the proposed project site. The project relates to the expansion of an already existing explosives storage and handling facility, and therefore the consideration of site location alternatives was not possible.

The existing Explosives Magazine facility that is located on Waste Rock Dump No. 2 (to be expanded) was placed on the mentioned waste rock dump based on the principle that the dump is a previously disturbed area located within the mine's existing mining rights boundary, thereby minimising the impacts on the environment. The initial placement of the existing facility therefore took into account the best practical environmental option.

7.10 Statement motivating the alternative development location within the overall site.

Not applicable. See section 7.9 above.

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

The following process was undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

- A site visit was undertaken to determine the current status quo of the area associated with the explosives depot expansion and possible environmental impacts and risks.
- A review of available information was done.
- The EAP made use of spatial tools (such as GIS) to determine the status quo of the site in relation to the surrounding environment and to identify possible environmental impacts and risks.
- Consultation was done with the applicant representatives for technical input and designs.
- All impacts and risks as identified are contained within Section 7.5 of this report. Further provided is an assessment of the significance of each issue and risk and an indication of the extent to which the impact could be avoided or addressed by the adoption of mitigation measures.

The methodology applied in assessing and ranking the impacts and risks is described in Section 7.6 above.

9. Assessment of each identified potentially significant impact and risk

No significant (high rated) impacts were identified during the Basic Assessment process. The table below provides all low and medium rated impacts identified.

Table 32: Assessment of each identified potential impact

Environmental component (Aspects affected)	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
Air Quality	Grading and sloping of area during construction (Expansion).	Impact on ambient air quality due to dust generated when grading and sloping the proposed project site. Cumulative impact during construction, along with existing mining and related activities.	Construction	Low	Dust control measures will be implemented.	Low
	Offloading and levelling of gravel, material, bricks and cement for surfacing and construction	Impact on ambient air quality due to dust generated during offloading and levelling of grave. Furthermore, atmospheric emissions from heavy vehicles during construction activities. Cumulative impact during construction, along with existing mining and related activities.	Construction	Low	Dust control measures will be implemented.	Low
	Construction and erection of security measures such as fences, guard houses, lighting.	Impact on ambient air quality due to dust generated during excavations for posts, fences etc. Cumulative impact during construction, along with existing mining and related activities.	Construction	Low	Dust control measures will be implemented	Low
	General construction-related activities during expansion (e.g. use of machinery and vehicles, building of containment areas (bunded areas) etc.) (overall rating).	Impact on ambient air quality due to air emission and dust generated when undertaking general construction activities such as movement of heavy vehicles, excavation for posts etc. Cumulative impact during construction, along with existing mining and related activities. .	Construction	Low	Dust control measures will be implemented.	Low
	Preferred Alternative: Construction and storage in more silos, with smaller capacities.			Low		Low
	Second Alternative: Construction and storage in less amount of silos, with increased capacities.			Low		Low
	Offloading and refilling of the explosives	Potential for fire and/or explosion to occur due to explosives material and substances being exposed to sparks or open flames.	Operational	Medium	Fire prevention measures, fire control measures and spillage control measures will be implemented.	Low
	Storage of emulsion (ANPP, EP200)	Potential for fire and/or explosion to occur due to explosive material and substances being exposed to sparks or open flames.	Operational	Medium	Fire prevention measures and fire control measures will be implemented.	Low
	Preferred Alternative: Construction and storage in more silos, with smaller capacities.			Low		
	Second Alternative: Construction and storage in less amount of silos, with increased capacities			Medium		

Environmental component (Aspects affected)	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
	Storage of more than 80 m3 of explosives and accessory (e.g. detonators, etc.) (Explosive magazine)	Potential for fire and/or explosion due to explosive material and accessories being exposed to sparks or open flames.	Operational	Medium	Fire prevention measures and fire control measures will be implemented.	Low
	Utilisation of explosives depot	Potential for fire and/or explosion due to explosives material and substances being exposed to sparks or open flames.	Operational	Medium	Fire prevention measures, fire control measures and spillage control measures will be implemented.	Low
	Transportation of explosives to the Explosives Depot (overall rating)	Potential for fire/explosion due to explosives material and substances being exposed to sparks or open flames.	Operational	Medium	Fire prevention measures, fire control measures and spillage control measures will be implemented.	Low
	Preferred Alternative: Construction and use of storage reserve (Explosives Depot)	Fire/explosion due to explosives material and substances being exposed to sparks or open flames.	Operational	Medium	Fire prevention measures, fire control measures and spillage control measures will be implemented.	Low
		Impact on ambient air quality due to dust generated by vehicle movement to and on the site.		Low	Dust control measures will be implemented.	Low
	Other Alternatives: Daily deliveries from supplier(s) or shared infrastructure with sister mining companies.	Potential for fire/explosion due to explosives material and substances being exposed to sparks or open flames.	Operational	Medium	Fire prevention measures, fire control measures and spillage control measures will be implemented.	Low
	Water management (establishment and use of such facilities) in and around the site (pipelines, water tanks, pump base, pit for collection of storm water)	Impact on ambient air quality due to dust generated when excavating trenches for pipelines, storm water collection pits etc. Cumulative impact during construction, along with existing mining and related activities.	Construction and Operational	Low	Dust control measures will be implemented.	Low
	Decommissioning through demolition of concrete structures and removal of salvageable equipment (posts, pumps, water tanks, gates, silos and concrete rubble.	Reduced visibility due to dust fallout. Cumulative impact during decommissioning, along with other mining and related and / or decommissioning activities.	Decommissioning	Low	Dust control measures will be implemented	Low
	Reshaping of the waste rock dump top surface during decommissioning	Impact on air quality (reduced visibility) due to dust fallout and emission from vehicles. Cumulative impact during decommissioning, along with other mining and related and / or decommissioning activities.	Closure	Low	Dust control measures will be implemented	Low
	Replacement and levelling of topsoil (growth medium) during rehabilitation	Reduced visibility due to dust fallout.		Low	Dust control measures will be implemented	Low

Environmental component (Aspects affected)	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
		Cumulative impact during decommissioning, along with other mining and related and / or decommissioning activities.				
Groundwater	Construction of Explosives Depot	It is not anticipated that the construction (expansion related) activities will have a direct impact on groundwater. The proposed expansion project will be located on top of a waste rock dump.	Not applicable	No additional impact from explosive depot	Not applicable	No additional impact from explosive depot
	Storage and handling of explosives at the Explosives Depot during the Operational Phase or removal of explosives from the site during the Decommissioning Phase.	Borehole P126 is the closest borehole in relation to the location of Waste Rock Dump No. 2. According to the groundwater quality results (as per Section 7.4), this groundwater monitoring point has exceedances in terms of EC, TDS, Na, SO_4, and NO_3 (Nitrate). It is not anticipated that the operation of the Explosives Depot will result in an additional significant impact on groundwater in terms of Nitrates from a storage perspective. However, should a fire or explosion occur, or explosive material or substances be left to infiltrate the waste rock dump surface, a cumulative impact in terms of Nitrate concentration may occur.	Operational and Closure	Medium	Groundwater monitoring, prevention of spillages and fire / explosion.	Low
Heritage	Construction and utilisation of Explosives Depot	It is not anticipated that the proposed activity will result in impacts on heritage as no heritage resources are located on top of Waste Rock Dump No. 2. Identified heritage resources are located outside the boundary of the MPM mining right.	Not applicable.	No anticipated impact	Not applicable	No anticipated impact
Noise	Grading and sloping of area during construction (expansion)	Noise generated by vehicles/ machinery used for grading and sloping of the site. Cumulative impact during construction, along with existing mining and related activities	Construction	Low	Noise control measures will be implemented.	Low
	Offloading and levelling of gravel, material, bricks and cement for surfacing and construction	Noise generated by vehicles and also machinery/vehicle used for levelling activities. Cumulative impact during construction, along with existing mining and related activities	Construction	Low		Low

Environmental component (Aspects affected)	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
	General construction-related activities during expansion (e.g. establishment of construction camp, use of machinery and vehicles, building of containment areas (bunded areas) etc.)	Noise generated by vehicles/ machinery during construction. Cumulative impact during construction, along with existing mining and related activities	Construction and Operational	Low		Low
	Construction and erection of security measures such as fences, guard houses, lighting.	Noise generated by vehicles/ machinery during construction. Cumulative impact during construction, along with existing mining and related activities	Construction	Low		Low
	Transportation of explosives to the explosives depot Preferred Alternative: Use of storage reserve (Explosives Depot) (i.e. less frequent travelling on roads)	Noise generated by trucks travelling to and from the explosives depot. Cumulative impact during operation, along with existing mining and related activities. However, the impact significance will be lower than with more frequent trips to the mine, should a strategic storage reserve not be implemented (see below).	Operation	Medium		Medium
	Alternatives: Daily deliveries from supplier(s) or shared infrastructure with sister mining companies.	Noise generated by trucks travelling on a frequent basis, to and from the explosives depot. Cumulative impact during operation, along with existing mining and related activities.	Operation	Low		Low
	Decommissioning through demolition of concrete structures and removal of salvageable equipment (posts, pumps, water tanks, gates, silos and concrete rubble).	Noise generated by decommissioning activities. Cumulative impact during decommissioning, along with existing mining and related / decommissioning activities.	Decommissioning	Low		Low
Protected areas and conservation	Construction and utilisation of explosive depot	It is not anticipated that the proposed activity will have any impact on protected areas and conservation in the larger due to the location of protected and conservation areas in relation to the location of proposed activities. The proposed expansion site is located on an existing mining area	Not applicable	No impact is anticipated	Not applicable	No impact is anticipated
Soil, land use and land capability	Replacement and levelling of topsoil (growth medium) during rehabilitation.	Water or wind erosion of topsoil.		Medium	Topsoil control measures will be implemented	Low
		Compaction of topsoil, affecting growth of vegetation during and after rehabilitation. This could impact on the overall rehabilitation		Medium	Correct levelling measures will be implemented	Low

Environmental component (Aspects affected)	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
		and end land use objectives for the area, if not appropriately implemented. Potential cumulative impact, if other rehabilitation activities surrounding the site are not undertaken appropriately.				
Socio-economic	Preferred Alternative: Utilisation of explosives depot as a strategic storage reserve	It is not anticipated that the proposed activity will impact on any socio-economic aspects of the surrounding area, as the mine is already an operational activity, and Waste Rock Dump No. 2 is an existing structure. The "sense of place" of the area has also already been impacted on as a result of current mining activities conducted on the property in question. Therefore, regular passers-by of the area as well as local residents within the area are likely to be desensitised to the mining activities.	Not applicable	No impact is anticipated	Not applicable	No impact is anticipated
	Transportation of explosives to the explosives depot Other Alternatives: Daily deliveries from supplier(s) or shared infrastructure form sister mining companies.	Daily or frequent deliveries to the mine will put communities at risk as potential accidents or spillages (contaminating water resources) may occur and fire risks which may threaten the lives of community members. Livestock of communities may also be at risk of being hit by delivery trucks / tankers.	Operational	Medium	Socio-economic (SLP) measures, spill measures and health and safety system implementation.	Low
Surface water	Grading and sloping of area during construction	Ponding due to uneven surface resulting from construction activities	Construction	Low	Storm water management measures will be implemented	Low
	Offloading and levelling of gravel, material, bricks and cement for surfacing and construction	Contamination of surface water due to spillages of cement	Construction	Low	Storm water management measures will be implemented	Low
		Ponding due to incorrect levelling of the gravel.	Construction	Low	Storm water management measures will be implemented	Low
	Offloading and refilling of the explosives	Spillages may occur during offloading and/or refilling of explosives. Stormwater may be contaminated upon coming into contact with the spillage.	Construction	Low	Storm water management measures will be implemented	Low

Environmental component (Aspects affected)	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
	Utilisation of explosives depot	During utilisation of the explosive depot, spillages on the ground may occur as a result of mishandle or leakage. Stormwater may be contaminated upon coming into contact with the spillage.	Operation	Low	Storm water management measures will be implemented	Low
		Contamination of surface water due to inappropriate management of waste. Potential cumulative impact along with other mining and related activities.	Operation	Low	Storm water management measures will be implemented	Low
	Preferred Activity Alternative: Storage of emulsion (ANPP, EP200) Design Alternative 1: Construction and storage in more silos, with smaller capacities Design Alternative 2: Construction and storage in less amount of silos, with increased capacities	Spillages on the ground may occur as a result of mishandle or leakage. Storm water may be contaminated upon coming into contact with the spillage. A smaller risk may be associated with design alternative 1 than for design alternative 2 (i.e. smaller tanks, and if only one tanks leaks or spills, the volume spilled will be less).	Operation	Low	Storm water management measures will be implemented	Low
	Transportation of explosives to the explosives depot Other Activity Alternatives: Daily deliveries from supplier(s) or shared infrastructure with sister mining companies.	Potential accidents resulting in spillages of explosives into water resources	Operation	Low	Speed control measures and spillage management measures will be implemented	Low
	Water management (establishment and use of such facilities) in and around the site (pipelines, water tanks, pump base, pit for collection of storm water)	Leakages from pipelines collecting dirty water from the bunker area to the collection/drainage pit may contaminate clean storm water runoff if not appropriately managed.	Construction and operation	Low	Storm water management measures will be implemented	Low
	Replacement and levelling of topsoil (growth medium) during rehabilitation	Wash down of sediments resulting in sedimentation or siltation of water resources, if not appropriately managed.	Decommissioning	Medium	Erosion control measures will be implemented.	Low
Traffic	Preferred Activity Alternative: Transportation of explosives to the explosives depot (less frequently) to the strategic storage reserve (Explosives Depot)	An increase in traffic is not anticipated as explosives are currently being transported to Mogalakwena Mine, and therefore no additional negative impact is anticipated. As a strategic	Operation	No impact is anticipated	Not applicable	No impact is anticipated

Environmental component (Aspects affected)	Activity	Impact description	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Pre-mitigation Significance	Mitigation type Modify/Remedy/Control/Stop	Post-mitigation Significance
		storage reserve is proposed, less frequent trips are anticipated to be made to the mine.				
	Other Activity Alternatives: Daily / more frequent deliveries from supplier(s) or shared infrastructure with sister mining companies	Increase in traffic due to daily / more frequent deliveries of explosives in comparison to the preferred activity alternative above. Cumulative impact on traffic should daily or more frequent trips be made to the mine.	Operation	Low	Access gate near contractor's camp to be used to minimise travelling on mine roads and mixing with other mine trucks.	Low
Vegetation	Re-vegetation of the waste rock dump	Unsuccessful re-vegetation due to shortage of nutrients, compaction and / or slope failure.	Closure	Medium	Measures to prevent compaction, shortage of nutrients and slope failure will be implemented	Low
		Establishment of alien invasive plants.		Medium	Measures to control alien invasive plants will be implemented.	Low
Visual	Construction, erection and utilisation of security measures such as fences, guard houses, lighting.	Visual impact due to lighting during the night. Cumulative impact along with existing mining and related activities, if not appropriately managed.	Construction	Medium	Lighting control measures will be implemented. i.e., the lights must be directed inward towards the explosives depot.	Low
	Utilisation of explosives depot	Light pollution and nuisance due to lighting at the explosive depot. Cumulative impact along with existing mining and related activities, if not appropriately managed.	Construction and Operational	Medium	Lighting control measures will be implemented. i.e., the lights must be directed inward towards the explosives depot.	Low

10. Summary of specialist reports

The proposed activity is an expansion of an Explosives Depot within Mogalakwena Mine's existing mining right boundary, on an already disturbed site. The proposed expansion activities are to be undertaken on top of Waste Rock Dump No.2. The project site does not have any natural features on its top surface. Existing information (previous studies conducted and documents compiled as obtained from the mine) have therefore been used as background information in this BAR, and were deemed sufficient for the purpose of this BAR.

11. Environmental impact statement

11.1 Summary of the key findings of the environmental impact assessment

Key environmental risks identified by the EAP

No significant impacts were identified during the environmental impact assessment process. Medium rated environmental impacts identified however relate to the following:

- Fire and/or explosion occurring due to explosive material and substances being exposed to sparks or open flames.
- Water or wind erosion of topsoil during and after rehabilitation.
- Compaction of topsoil, affecting growth of vegetation during rehabilitation.
- Unsuccessful re-vegetation during rehabilitation due to shortage of nutrients, compaction and slope failure.
- Establishment of alien invasive plants.
- Light pollution and nuisance due to lighting at the Explosive Depot
- Wash down of sediments resulting in sedimentation or siltation of water resources.

Key environmental Concerns raised by I&APs

- Overflowing of explosives during a spillage.
- Explosion of the explosive depot.
- Effectiveness of implementation of the dust control measures.

11.2 Final Site Map

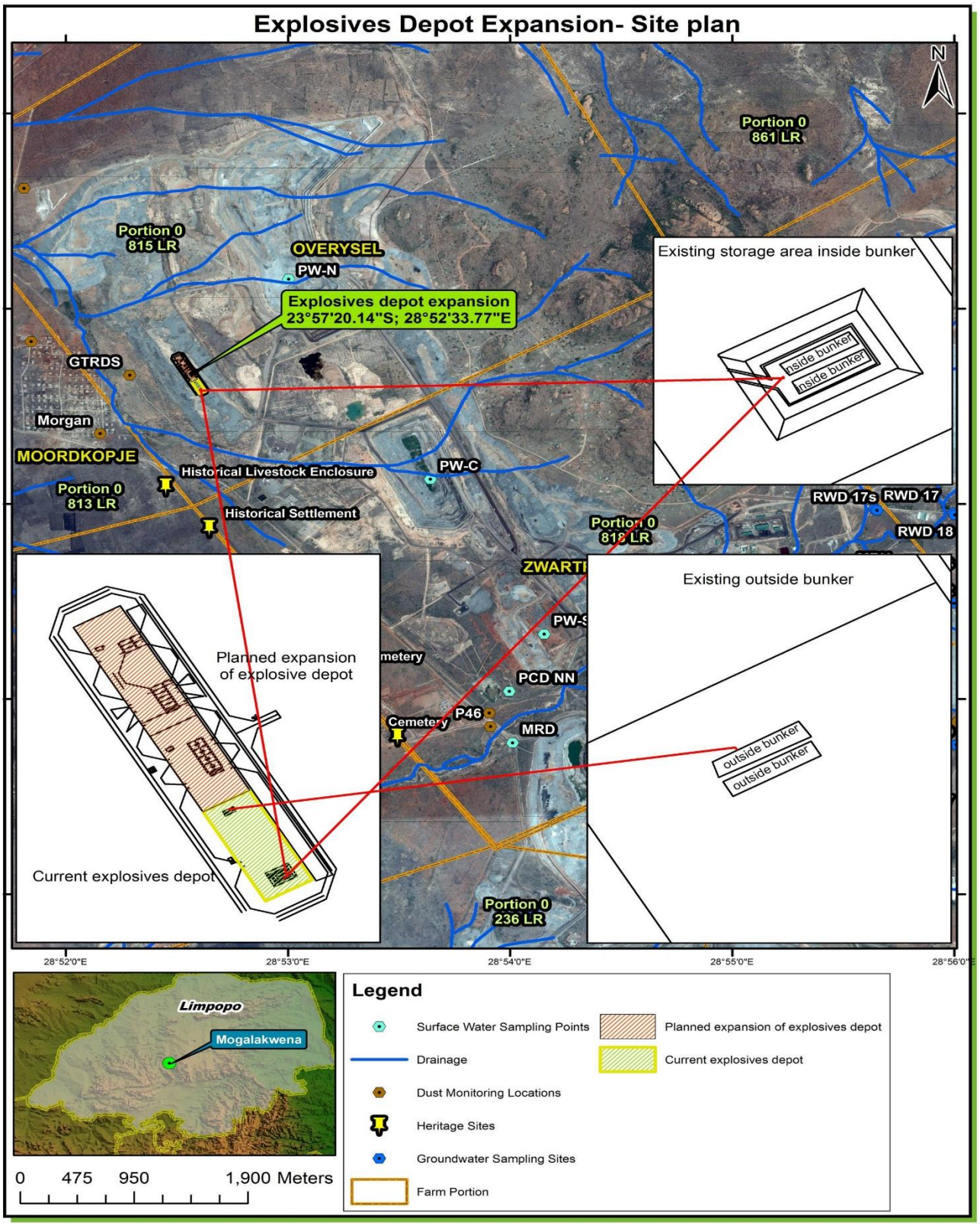

Figure 29: Final site map

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

Table 33: Summary of most significant (medium) negative environmental impacts without mitigation measures implemented

Air quality	
Potential for fire and/or explosion to occur due to explosives material and substances being exposed to sparks or open flames.	
Groundwater	
Borehole P126 is the closest borehole in relation to the location of Waste Rock Dump No. 2. According to the groundwater quality results (as per Section 7.4), this groundwater monitoring point has exceedances in terms of EC, TDS, Na, SO_4, and NO_3 (Nitrate). It is not anticipated that the operation of the Explosives Depot will result in an additional significant impact on groundwater in terms of Nitrates from a storage perspective. However, should a fire or explosion occur, or explosive material or substances be left to infiltrate the waste rock dump surface, a cumulative impact in terms of Nitrate concentration may occur.	
Noise	
Noise generated by trucks travelling on a frequent basis, to and from the explosives depot. Cumulative impact during operation, along with existing mining and related activities.	
Soil, land use and land capability	
Water or wind erosion of topsoil during and after rehabilitation.	
Compaction of topsoil, affecting growth of vegetation during and after rehabilitation. This could impact on the overall rehabilitation and end land use objectives for the area, if not appropriately implemented. Potential cumulative impact, if other rehabilitation activities surrounding the site are not undertaken appropriately	
Surface water	
Wash down of sediments resulting in sedimentation or siltation of water resources, if not appropriately managed.	
Socio-economic	
Daily or more frequent deliveries (other alternatives) to the mine will put communities at risk as potential accidents or spillages (contaminating water resources) may occur and fire risks which may threaten the lives of community members. Livestock of communities may also be at risk of being hit by delivery trucks / tankers.	
Vegetation	
Unsuccessful re-vegetation during rehabilitation due to shortage of nutrients, compaction and/ or slope failure	
Establishment of alien invasive plants.	
Visual	
Light pollution and nuisance due to lighting at the Explosives Depot Cumulative impact along with existing mining and related activities, if not appropriately managed.	

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

Table 34: Impact management objectives and the impact management outcomes

Environmental aspect	Objective	Summary of impact management outcome
Air	Minimise impact on ambient air quality caused by air emissions and dust generating activities (vehicles and fires/explosions).	• Dust suppression at and surrounding the site must be undertaken when carrying out dust generating activities • Vehicles must be regularly serviced and speed control signs must be put in place. • Open fires on-site must not be permitted. • Firefighting equipment must be available on site, regularly inspected and refilled after use. • A site specific fire prevention and management plan must be developed indicating all equipment needed on-site and steps to follow to prevent a fire and in the event of a fire (in consultation with the local fire department). • Requirements as per the Explosives Act and associated Regulations should be adhered to. • The above-mentioned plan must be implemented. • Spillages must be cleaned as soon as possible to avoid unintentional/accidental exposure to open flames. • Smoking must not be permitted on site.

Environmental aspect	Objective	Summary of impact management outcome
		• Keep the site damp to reduce wind-blowing of seeds and soil. • The mine's air quality monitoring and management plan will be continued with during the Life of the operation. Specific attention will be given to dust generation from the proposed site during the Construction Phase.
Ground water	To ensure that no additional impacts occur.	• Continue with groundwater monitoring programme.
Heritage	To ensure the proposed project does not have an impact on the heritage	• The proposed activities are not anticipated to have an impact on the heritage resources and thus there are no impact management outcomes.
Noise	To minimize noise generation and nuisance during construction, operational phase and decommissioning phase.	• Sound amplification equipment's such as sirens are not to be used on-site unless during an emergency. • Vehicles must not be idled or revved. • Vehicles will be equipped with silencers and noise reducing equipment, where possible.
Protected Areas and conservation	To ensure that no impact occurs	• According to figure 24, the proposed activity is to be located on an area which has low priority while according to figure 23, the proposed activity is to be located on an area which is classified as no natural habitat remaining. • It is not anticipated that the proposed activity will have an impact on the protected areas and thus there are no impact management outcomes
Socio-Economic	To ensure that no impact occurs	• As the proposed activity is the expansion of the existing Explosives Magazine for an existing mining area, residential opportunities will not be created. The mine will continue to

Environmental aspect	Objective	Summary of impact management outcome
		provide work for employees during the operational phase.
Soil	Minimise soil erosion and prevent slope failure	• Windbreakers must be put in place during rehabilitation to prevent or reduce wind erosion. • Reshaping of the waste rock dump surface during rehabilitation to stable slopes. • Monitoring of displacement for slope failure. • Appropriate management of storm water runoff to avoid erosion. • Minimise the compaction of the soil as far as possible • Put up jesh mesh to control erosion during rehabilitation. • Monitor the physical stability of the waste rock dump.
Surface water	Prevent or minimize the impact on surface water quality due to surface water contaminating activities.	• Storm water management measures must be put in place on site to capture contaminated water on-site and divert clean water from dirty/contaminated water. • The collection pit must be constructed in such a manner that it can contain more than the expected volume to counter for heavy storms. • Cement must not be mixed on bare ground. • Ready mix concrete trucks may not be permitted to wash the containers on-site.

Environmental aspect	Objective	Summary of impact management outcome
		• Spillage must be cleaned as soon as possible to prevent contamination of storm water runoff when it rains. • Sediment control structures must be put in place to prevent or reduce sedimentation. • Storm water runoff must be diverted to prevent or reduce wash off of ameliorants into water bodies.
Traffic	To ensure no additional impact occurs	• An increase in traffic is not anticipated as explosives are currently transported Mogalakwena Mine. However, the following can be carried out to ensure no additional impact occurs: • Lessen vehicles during rush hours. • Avoid unnecessary trips. • Undertake bulk transportation to minimize the number of trips taken.
Vegetation	To successfully re-vegetate the site	• Careful selection of seed (vegetation must be compatible with the growth medium) for rehabilitation of the site. • Put up jesh mesh to control erosion during rehabilitation • Application of mulch to suppress weeds during rehabilitation • Monitor alien invasive plants throughout the life of the operation • Monitor vegetation cover and stability throughout the life of the operation

Environmental aspect	Objective	Summary of impact management outcome
Visual	To minimise light pollution during construction and operational phase	• Lighting on site must be directed inward (on site) and not to the outside from the explosives depot. • Dust suppressing agents and / or water must be sprayed on the bare ground to reduce the dust that will be generated.

13. Aspects for inclusion as conditions of Authorisation.

The following are the aspects for inclusion as conditions of authorisation, as identified by the EAP.

- Weatherproof, durable and legible notices in at least three languages applicable in the area, shall be displayed at each entrance to the site. Theses notices must prohibit unauthorised entry and state the hours of operation, the name, address and telephone number of the licence holder and the person responsible for the operation of the site.
- The explosives depot must be managed and operated by sufficient people who are competent in respect of the responsibilities to be undertaken in connection to the operation of the activities.
- The management and operation of the explosive depot must be in accordance with the relevant legislation.
- The project should remain in full compliance with the requirements of the EMPr and with all regulatory requirements.
- The EMPr should be implemented by qualified environmental personnel who have the competence and credibility to interpret the requirements of the EMPr. Such persons must be issued with a written mandate by Mogalakwena Mine's management to provide guidance and instructions to employees and contractors.
- Stakeholder engagement must be maintained during the construction, operational phases of the project, with the emphasis on the continuing provision of information.
- Contents of the EMPr must be made known to all the contractors, subcontractors and employees working at the explosives depot.
- The environmental authorisation must be accessible to everyone who is affected by matters in the authorisation.
- Construction must be carried out under inspection of a registered professional engineer and according to the approved site plan.
- An Environmental Control Officer (ECO) will be appointed by Mogalakwena Mine in order to monitor compliance with the conditions of the environmental authorisation during all the life phases of the project. The ECO will conduct bi-annual audits on the compliance status of the project until such time as the DMR deems such audits not to be necessary any longer. The resultant audit reports will be submitted to the DMR.

- An annual external audit will be conducted by an independent auditor in order to verify compliance with the conditions of the Environmental Authorisation. The resultant audit reports will be compiled and submitted as per the 2014 EIA Regulations requirements.

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

In terms of Appendix 1(3) (o) of the 2014 EIA Regulations GN R.982, the Environmental Impact Assessment Practitioner (EAP) must provide a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.

It is believed that no knowledge gaps exist in terms of the proposed project, the current state of the environment at the proposed site as well as the potential impacts associated with the proposed project. Also, no uncertainties have been identified.

The following assumptions are made:

- That all information provided by the applicant regarding the proposed project is correct.
- That the mitigation measures proposed in this report and the EMPr are implemented correctly and are effective.
- All research/reference sources are accurate.
- That there will be no significant changes to the proposed project that could affect the findings and recommendations of this report and the EMPr.

Based on the above descriptions, it is the EAP's opinion that the level of risk associated with the limits of current knowledge is low.

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

15.1 Reasons why the activity should be authorized or not.

In accordance with Appendix 1(3) (p) of the 2014 EIA Regulations GN R.982, the Environmental Impact Assessment Practitioner (EAP) must provide an opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation must be stated.

The proposed expansion of the Explosives Depot is not an income-generating activity, however, the explosives are used in the day to day operation of the mine.

No significant negative environmental impacts that are irreversible were identified during the Basic Assessment process. Furthermore, the Explosives Depot expansion will be undertaken on an existing previously disturbed site (i.e. a waste rock dump), thereby minimising the potential for a number of and / or the significance of environmental impacts.

Due to the above-mentioned, the EAP is of the opinion that the activity should be authorised.

15.2 Conditions that must be included in the authorisation

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

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

- Weatherproof, durable and legible notices in at least three languages applicable in the area, shall be displayed at each entrance to the site. Theses notices must prohibit unauthorised entry and state the hours of operation, the name, address and telephone number of the licence holder and the person responsible for the operation of the site.
- The explosives depot must be managed and operated by sufficient people who are competent in respect of the responsibilities to be undertaken in connection to the operation of the activities.
- The management and operation of the explosive depot must be in accordance with the relevant legislation.
- The project should remain in full compliance with the requirements of the EMPr and with all regulatory requirements;
- The EMPr should be implemented by qualified environmental personnel who have the competence and credibility to interpret the requirements of the EMPr. Such persons must be issued with a written mandate by Mogalakwena Mine's management to provide guidance and instructions to employees and contractors; and
- Stakeholder engagement must be maintained during the construction, operational phases of the project, with the emphasis on the continuing provision of information.
- Contents of the EMPr must be made known to all the contractors, subcontractors and employees working at the explosives depot.
- The environmental authorisation must be accessible to everyone who is affected by matters in the authorisation.
- Construction must be carried out under inspection of a registered professional engineer and according to the approved site plan.
- An Environmental Control Officer (ECO) will be appointed by Mogalakwena Mine in order to monitor compliance with the conditions of the environmental authorisation during all the life phases of the project. The ECO will conduct bi-annual audits on the compliance status of the project until such time as the DMR deems such audits not to be necessary any longer. The resultant audit reports will be submitted to the DMR.
- An annual external audit will be conducted by an independent auditor in order to verify compliance with the conditions of the Environmental Authorisation. The resultant audit reports will be compiled and submitted as per the 2014 EIA Regulations requirements.

15.2.2 Rehabilitation requirements

Information included in this section of this Basic Assessment has been sourced from a report titled: "Mogalakwena Platinum Mine-*Preliminary Closure Plan, dated October 2012, compiled by SRK Consulting".*

The rehabilitation requirements of the Explosives Depot are as follows:

- Demolition and disposal (in accordance to the waste disposal procedure) of the physical structures on site such as the bunker areas, security house etc.)
- Removal of physical structures for re-use or recycling, such as containers, silos, fences, gates, water tanks etc.
- Re-shaping and re-sloping of Waste Rock Dump No. 2 so as to make it sustainable over the long term.
- Re-vegetation to limit the potential of erosion on the waste rock dump.
- Water management to limit the release of sediment until vegetation is fully established to limit potential of erosion on the dump.
- There is no potential to generate acidity or leach significant metals from the waste rock dump. The lack of acid generating or metal leaching potential on the dumps implies that low permeability-infiltration reducing covers are not required on the dump.
- Site observations indicate that there is limited opportunistic vegetation colonisation on the waste rock dump, where the waste rock has not been covered with growth medium. This indicates that some form of cover material is required to establish vegetation. Stockpiled soil is limited, therefore there is likely to be a significant growth medium deficit at closure of the mine. Mogalakwena Mine assumes that with appropriate field trials, it will be possible to identify a blend of topsoil and saprolite from the upper pit areas that will be suitable to sustain plant growth. Mogalakwena Mine further assumes that deficits in topsoil can be addressed through the establishment of appropriately engineered borrow pits.
- Prior to closure, the leachate and runoff from the surface of the waste rock dump will be monitored to determine if the quality will meet the requirements of the Water Use Licence or requires management on site.
- Mogalakwena Mine assumes that as the rainfall is relatively limited in the region, engineered dump runoff control structures are not required in the Closure design criteria.

16. Period for which the Environmental Authorisation is required.

The total period for which authorisation is required, is for the remaining life of mine, with a breakdown as provided in the table below.

Please take note that the exact period for operation was not provided due to the fact that the Explosives Depot will be operational throughout the entire life of mine, taking into consideration that Mogalakwena Mine may expand their mining activities in future.

The Closure phase of the Explosives Depot will take place after cessation of mining activities and will thus be conducted in accordance with the mine-wide Closure Plan.

Table 35: stages of operation and their timeframes

Stages of operation	Timeframe (Years)
Planning	0.5 years
Construction	1 year
Commissioning	0.5 years
Operation	Remaining life of mine (+30 years)
Closure	Upon cessation of the mining activities.
TOTAL Period	+30 years

17. Undertaking

It is hereby confirmed that the undertaking required to meet the requirement of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment Report and EMPr.

18. Financial Provision

The required amount for rehabilitation of the proposed Explosives Magazines amounts to R1 089 908.00 which includes Contingency of 10%, P&G of 6% and VAT of 14%. The calculation has been included in the table below. The methodology in how the quantum was derived has been included in Section 18.1 below.

Table 366: Calculation of the required rehabilitation amount

No	Description	Unit	Quantity	Master rate	Multiplication factor	Weighting factor 1	Amount
2(A)	Demolition of steel buildings and structures	m2	1239.43	R180.33	1	1.1	R245 859.42
2(B)	Demolition of reinforced concrete buildings and structures	m2	1417.493	R265.75	1	1.1	R414 370.77
5	Demolition of housing and/or administration facilities	m2	111	R360.68	1	1.1	R44 038.46
12	Fencing	m	643.98	R113.88	1	1.1	R80 673.59
							R784 942.24
	Weighting factor 2				Sub Total 1	1.05	**R824 189.35**
	Preliminary and General		6% of Subtotal 1				R49 451.36
	Contingency		10.0% of Subtotal 1				R82 418.93
	Grand total						**R956 059.65**

						vat 14%	R133 848.35
							R1 089 908.00

18.1 Explain how the aforesaid amount was derived.

A calculation was done using the supplied plan reference number PO192-EXP-CIV-LAY-001-Rev 0.2 listing all the proposed infrastructure requirements. Some assumptions were made as part of the calculation.

Assumptions

- The rehabilitation of the site subsequent to demolition and removal of the infrastructure forms part of the existing rehabilitation strategy and financial provision calculation for the rehabilitation of the waste rock dump.
- The rehabilitation of the existing facility has been included in the current financial provision calculation.
- All structures will be demolished and removed and material disposed of at licensed facilities.
- Money derived from recycling of components have not been calculated.
- Mineral Mined – Table B13: Platinum
- Primary Risk class - Table B13 – Class C mine
- Environmental Sensitivity – Table B4 – Low sensitivity
- Specialist studies required – Table B9 – Screening level risk assessment
- Preliminary and General – 6% as total is below R100 000 000-00
- Contingency 10%
- Weighting factor 1 Table B7 – Nature of terrain – Undulating 1.10
- Weighting factor 2 Table B8 – Proximity to urban area – Remote 1.05

The structure dimensions were used to determine the volumes and different sizes requiring demolition. This was included in the DMR calculations spreadsheet (See Annexure E4). The rates used in the spreadsheet have been escalated since 2005 with an average of 6% per annum based on the CPI of the year.

Table 37: Dimensions of the proposed expansion structures

Description	Construction material	Dimensions			Number	Unit	Total
		Length	Width	Height			
Fence	Wire	266.99	55		1	Meters	643.98
ANPP Storage Yard							
Smaller silo ANPP 2x50T	Steel silos			31	2	Cubic Meters	62
AEL Storage yard							
Emulsion AEL Silos 6x40T	Steel silos			24.8	6	Cubic Meters	148.8

Description	Construction material	Dimensions			Number	Unit	Total
		Length	Width	Height			
Bund wall 1	Reinforced concrete	60.6	0.19	1	1	Cubic Meters	11.514
Bund wall 2	Reinforced concrete	89.42	0.19	1	1	Cubic Meters	16.9898
Concrete slab 1	Reinforced concrete	15.2	15.16		1	Square Meters	230.432
Concrete slab 2	Reinforced concrete	31.11	13.6		1	Square Meters	423.096
Guard House 1	Brick (assumption)	5	5		1	Square Meters	25
Guard house 2	Brick (assumption)	5	5		1	Square Meters	25
Water tank and pump base	Zozo (no cost included)						
Store	Brick (assumption)	6	3		1	Square Meters	18
Drainage pipe 110mm HDPE	HDPE (no cost – part of slab removal)	84.6					84.6
Collection pit	Reinforced concrete	15	3			Square Meters	45
BME Storage yard							
Larger silo BME 200T	Steel silos			124	4	Cubic meters	496
Bund wall 3	Reinforced concrete	113.9	0.19	1		Cubic meters	21.641
Concrete slab 3	Reinforced concrete	42.15	14.8		1	Square Meters	623.82
Guard house 3	Brick (assumption)	5	5		1	Square Meters	25
Store	Brick (assumption)	6	3		1	Square Meters	18
Collection pit	Reinforced concrete	15	3			Square Meters	45

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

The proposed activity is an expansion of the current Explosives Depot. The explosives are used for blasting activities within Mogalakwena Mine's operational area. The premature financial provision calculation has been

made to identify an estimated quantum required once the structures have been completed and the site is in full operation. It is envisaged that the Explosives Depot will remain on site until end of life of mine. No operational cost will be required to rehabilitate the site until the mine has gone into a Closure phase. The operational cost incurred on site would relate to meeting the commitments stipulated in the EMPr (Part B). This will include operational and maintenance related activities.

19. Specific Information required by the competent Authority

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

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

The activity is to be carried out on an already disturbed area (waste rock dump) and the activity is not cost-generating and thus will not have any additional impacts on the socio-economic conditions of the area. Refer also to Section 7.5 for the impact table.

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

The expansion of the Explosives Depot activities is to be carried out on top of a waste rock dump. The site is already disturbed by Mogalakwena Mine's operations. No heritage, cultural or national estate is located on or in close proximity to the proposed expansion site and therefore it is not anticipated that the proposed activity will impact on heritage resources.

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

Table 38: Proof of investigation as required by section 24(4)(a) and (b)

24 (4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment-	
(a) must ensure, with respect to every application for an environmental authorisation-	
i. Coordination and cooperation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state;	Department of Mineral Resources is the only applicable authority for the proposed project and thus the only organ of state. However, Mogalakwena Local Municipality and Waterberg District Municipality, as well as the Department of Water and Sanitation have been registered as stakeholders and copies of the documentation will be made available to these organs of state upon request, for review.

ii. That the findings and recommendations flowing from an investigation, the general objectives of integrated environmental management laid down in this Act and the principles of environmental management set out in section 2 are taken into account in any decision made by an organ of state in relation to any proposed policy, programme, process, plan or project;	All the findings from investigations (including public participation) have been included in this Basic Assessment report.
iii. That a description of the environment likely to be significantly affected by the proposed activity is contained in such application;	The proposed expansion of the explosive depot is to be carried out on a site that is already disturbed by Mogalakwena Mine's operations. The proposed project is to be carried out on top of a waste rock dump with no natural features. However, environmental baseline information has been included in this BAR.
iv. Investigation of the potential consequences for or impacts on the environment of the activity and assessment of the significance of those potential consequences or impacts; and	Investigation of impact on the environment and assessment of the significance of the potential impacts have been done. See Sections 7.5 and 9.
v. Public information and participation procedures which provide all interested and affected parties, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures; and	• Background information document (BID) and notification letters have been sent to interested and affected parties (I&APs), organs of states and stakeholders. • Notice boards have been placed in relevant places (onsite and in public places). • A newspaper advertisement has been placed in the local newspaper. • This Basic Assessment report is made available to IAPs and stakeholders for review for a period of 30 days.
(b) must include, with respect to every application for an environmental authorisation and where applicable-	
i. Investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity;	Investigation of impact on the environment and assessment of the significance of the potential impacts including the option of not implementing the proposed expansion of the explosive depot have been done. See sections 7.5 and 9.
ii. Investigation of mitigation measures to keep adverse consequences or impacts to a minimum;	Mitigation measures are outlined in section 9 of this Basic Assessment Report. Refer also to Part B (EMPr).
iii. Investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), excluding the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act;	The expansion of the explosive depot activities is to be carried out on top of a waste rock dump. The site is already disturbed by Mogalakwena Mine's operations. No heritage, cultural or national estate is located on the proposed expansion site and therefore it is not anticipated that the proposed activity will impact on heritage resources.

iv.	Reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;	Refer to Section 14 above.
v.	Investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implementation;	Mogalakwena Mine has monitoring programmes for surface water, ground water and air quality. Some of the monitoring points are located near the project site and therefore ongoing monitoring of those environmental components should be carried out. Vegetation cover and physical stability of the site should be monitored during the rehabilitation site until a Closure certificate is obtained.
vi.	Consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3); and	Please take note that the expansion project location is proposed to be on top of a waste rock dump which has no natural features. Surrounding environmental attributes identified were however taken into consideration during the process.
vii.	Provision for the adherence to requirements that are prescribed in a specific environmental management Act relevant to the listed or specified activity in question.	The listed activity (Activity 51 of Listing Notice 1 of the 2014 EIA Regulations (GN.R983)) has been applied for as part of the Basic Assessment process. The principles and requirements as contained in NEMA, 1998 as well as the EIA Regulations, dated 2014, there under were taken into consideration and complied with as part of this BAR and its EMPr.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. Draft environmental management programme.

1.1 Details of the EAP

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

1.2 Description of the Aspects of the Activity

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

1.3 Composite Map

Refer to Annexure A4 for a map that superimposes the proposed activity, its associated structures and infrastructures on the environmental sensitivities of the preferred site and its surroundings.

1.4 Description of Impact management objectives including management statements

1.4.1 Determination of Closure objectives.

The following Closure objectives were obtained from the preliminary Closure plan compiled by SRK in October 2012.

The Closure objectives which will drive the Closure criteria and which have been developed to support the Closure vision are:

- Adhere to all statutory and other legal requirements;
- Ensure safety and health of all stakeholders during Closure and post closure and that communities using the site after Closure are not exposed to unacceptable risks.
- Ensure that Closure supports productive uses considering pre mining conditions and are in agreement with commitments to stakeholders.
- Physically and chemically stabilise remaining structures to minimise residual risks.
- Promote bio-diversity and biological sustainability to the maximum extent practicable.

- Utilise Closure strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance.

As stated previously the infrastructure of the Explosives Depot expansion section will be constructed on top of an existing waste rock dump. Therefore, the rehabilitation of the site (once all infrastructure has been demolished and removed) will form part of the waste rock dump rehabilitation.

The following assumptions have been made with regards to the waste rock dump rehabilitation (SRK, October 2012):

- Demolition and disposal (in accordance to the waste disposal procedure) of the physical structures on site such as the bunker areas, security house etc.)
- Removal of physical structures for re-use or recycling, such as containers, silos, fences, gates, water tanks etc.
- Re-shaping and re-sloping of Waste Rock Dump No. 2 so as to make it sustainable over the long term.
- Re-vegetation to limit the potential of erosion on the waste rock dump.
- Water management to limit the release of sediment until vegetation is fully established to limit potential of erosion on the dump.
- There is no potential to generate acidity or leach significant metals from the waste rock dump. The lack of acid generating or metal leaching potential on the dumps implies that low permeability-infiltration reducing covers are not required on the dump.
- Site observations indicate that there is limited opportunistic vegetation colonisation on the waste rock dump, where the waste rock has not been covered with growth medium. This indicates that some form of cover material is required to establish vegetation. Stockpiled soil is limited, therefore there is likely to be a significant growth medium deficit at closure of the mine. Mogalakwena Mine assumes that with appropriate field trials, it will be possible to identify a blend of topsoil and saprolite from the upper pit areas that will be suitable to sustain plant growth. Mogalakwena Mine further assumes that deficits in topsoil can be addressed through the establishment of appropriately engineered borrow pits.
- Prior to closure, the leachate and runoff from the surface of the waste rock dump will be monitored to determine if the quality will meet the requirements of the Water Use Licence or requires management on site.
- Mogalakwena Mine assumes that as the rainfall is relatively limited in the region, engineered dump runoff control structures are not required in the Closure design criteria.

The following waste rock dump design criteria was stated in the preliminary Closure plan compiled in 2012 by SRK:

- Slopes will be reshaped to be no steeper than 3H: 1V.
- Land capability on the waste dumps will not be restored, irrespective of where in the landscape the dumps are located. A blend of topsoil and saprolite will be utilised to form growth media on which

vegetation can be established to minimise erosion and improve the visual aesthetics, with the minimum thickness of growth media being 300mm.

The following Closure actions were obtained from the preliminary Closure plan compiled in 2012 by SRK:
The strategy will be to undertake Closure activities that will result in a stable landform, capable of supporting a vegetation community analogous with surrounding grasslands, where the generation of contact water and sediment laden runoff is limited by the incorporation of appropriate covers in the closure design. Aesthetics associated with the dumps will be improved as a consequence of the establishment of vegetation on these facilities.

Historical information indicates that opportunistic vegetation is limited, implying that a form of growth media is required. During operations, trials will be conducted to determine whether there is a blend of saprolite and topsoil that can be formed to sustain vegetation, without the blend being dispersive and subject to slumping and erosional influences. The cover placement strategy will be:

- Growth media will be placed on the lower slopes of all facilities. This is required to limit sediment washout from higher up the slopes, migrating to the toe of the facilities. It is also required to limit sediment generation from the lower slopes.
- Islands of growth media will be placed on the higher slopes to form nodes from which plants may be distributed to other portions of the slopes. The size and spacing of these nodes will be determined from field trials established during the operational period.
- The top surfaces of all facilities will require cover with growth medium and vegetation establishment to limit dust generation. Trials will be conducted to determine whether saprolite with appropriate ameliorants will support a vegetation population on these surfaces.
- Access ramps to the top of the dumps will remain while the top is being reclaimed. Once complete, ramps will be reshaped to a profile similar to the rest of the dump. Dumps constructed with a toe to crest slope greater than 20o-24o will be reshaped to an overall slope of no greater than 20o-24o using the cut and fill method, pushing down slope. This can only be undertaken on slopes where there are not space constraints at the toe. Dumps that are space constrained, will not be reshaped, however, the following actions will be implemented:
- The entire dump face, irrespective of where the face is in the profile, will be covered with a non-dispersive growth medium of 500mm thick and vegetation established;
- Toe paddocks will be established at the base of the lowest slope to contain sediment that may wash from slopes.
- Visual screens using naturally occurring tree species will be established at strategic positions along the toe to visually screen the facilities from adjacent receptors. This strategy will be implemented for all facilities where there is limited potential that the contained waste would ever be utilised as aggregate in construction activities. Where the potential exists as determined by the physical and geochemical characteristics of the waste rock, the waste rock facilities will remain open for processing by 3rd parties.

Primary Objective

- Physical and chemical stabilisation;
- Minimise stakeholder exposure to residual risks; and
- Promote biological sustainability.

Post closure land use

- Aggregate for construction; and
- Indigenous grasslands.

Closure data gaps

- Undertake the necessary investigations to close the following data gaps;
- Requirements for aggregate post closure;
- Location of aggregate dump;
- Geochemistry of potential leachate;
- Closure water balance;
- Slope water management requirements;
- Stability and seepage analyses;
- Closure material characterisation; and
- Vegetation trials on blended growth media.

Closure methodologies

- Reshape outer slopes to 20˚, where not space constrained;
- Reshape haul roads to meet final profile requirements;
- Place 300mm of growth media on lower slopes;
- Place islands of growth media on slopes higher in the profile;
- Place growth media on the top surface; and
- Establish vegetation as per Vegetation Management Programme.

Closure criteria

- Water quality requirements;
- Physical and chemical stability requirements;
- Vegetation requirements; and
- Post mining land use criteria.

Monitoring requirements

- Groundwater quality;
- Toe seepage quality and quantity;
- Displacement to indicate physical instability;

- Vegetation cover and diversity; and
- Erosional losses.

1.4.2 Volumes and rate of water use required for the operation.

A raw water tank with a volume of 15000 Litres (15 m^3) will be placed on site for spills and cleaning purposes. Water for this purpose will be sourced from the North Gooseneck.

1.4.3 Has a water use licence been applied for?

Mogalakwena Mine falls within catchment A61G. The mine proposes to store 15 000 litres (15m^3) of water in a water tank on the proposed expansion site. According to Government Notice No. 399 of 26 March 2004, Section 1.7 and Table 1.3 (b) (General Authorisations), Mogalakwena Mine does not require a water use license for the storage of water as it complies with the specific conditions in the general authorisation. Also, according to Government Notice No. 399 of 26 March 2004, Section 1.8, Mogalakwena Mine does not have to register the water use as the volume that will be stored on-site will be less than 10 000 m^3 of water.

1.4.4 Impacts to be mitigated in their respective phases

Table 39: Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURBANCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Grading and sloping of area during construction	Construction	1.45 ha	• Dust suppressants must be applied to the ground to reduce the dust that will be generated when grading and sloping. • Alternatively, water can be sprayed on the ground to reduce dust generated and to also reduce the noise generated by contact of the grader with the ground. • Correct grading and sloping should be done to avoid uneven surface resulting in ponding. • Vehicles should be regularly serviced to minimise atmospheric emissions. • Noise monitoring will be conducted during the Construction Phase in order to ensure compliance with the relevant standard. • The Air quality monitoring programme will be continued with.	Dust suppressants will be applied to reduce dust so as to not exceed the acceptable rate as identified National Environmental Management Air Quality Act (Act No. 39 0f 2004) (NEMAQA, 2004) – Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2005 Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008 and SANS 10103: 2008.	During Construction
Offloading and levelling of gravel, material, bricks and cement for surfacing and construction	Construction		• Cement may only be mixed on an impermeable surface (not on bare ground). • Gravel should be sprayed with water to reduce dust. • Ready mix trucks are not permitted to clean chutes on site. • Both used and unused cement bags are to be stored in weatherproof containers/stores to avoid contact with rain or runoff. • A dedicated temporary cleaning area is to be identified to facilitate washing of all cement equipment. The cleaning area could be a plastic lined cleaning pit or dedicated plastic or metal drums, located as close as possible to a water point • The gravel should be correctly levelled to avoid uneven surface resulting in ponding. • Storm water should be diverted around the construction site to allow maximum runoff. • Vehicles should be regularly serviced to minimise atmospheric emissions. • Noise monitoring will be conducted during the Construction Phase in order to ensure compliance with the relevant standard.	Prevention of surface water or storm water will be carried out to comply with the National Water Act (Act No. 36 of 1998) (NWA, 1998) and regulations on use of water for mining and related activities aimed at the protection of water resources GNR 704, 1999. Dust suppressants will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2005 Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008 and SANS 10103:2008	During construction

ACTIVITIES	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURBANCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
General construction-related activities during expansion (e.g. use of machinery and vehicles, building of containment areas (bunded areas) etc.)	Construction		• Building rubble must be kept separate from other construction waste and disposed at a designated landfill site. • Construction waste must be disposed at a designated landfill site. • Compliance to traffic signs • Maximum speed on site must be determined. • Unnecessary noise such as revving or hooting must be restricted. • Regular maintenance of vehicles and equipment is required. Repair and attend to lose or rattling covers, worn bearings and broken equipment. • Noise generating activities should be carried out during the day for least disturbance. • Generators must be switched off when not used. • Construction vehicles should be regularly serviced to minimise atmospheric emissions. • All contractors, sub-contractors and workers will attend compulsory environmental awareness training and inductions. This training will highlight the dangers associated with the workplace. Procedures relating to environmental risks will also be put in place and will be regularly updated	Construction waste will be disposed of in a manner as to comply with the National Environmental Management Waste Act (Act No. 59 of 2008), (NEMWA, 2008) Dust suppressants will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2005 Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008 and SANS 10103:2008	During construction
Construction, erection and utilisation of security measures such as fences, guard houses and lighting	Construction and operational	N/A	• Lights should, as far as possible, be angled inwards to the explosive depot and not to the exterior of the site. • Construction waste must be disposed of at a designated landfill. • General waste must be disposed of in the correct colour coded waste bin/skip. • Dust suppressants must be applied to reduce/avoid dust. • Fence must be high enough. • Access control measures such as a register must be practiced. • Construction vehicles should be regularly serviced to minimise atmospheric emissions.	Disposal of waste will be in a manner as to comply with the NEMWA, 2008. Dust suppressants and associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2005 The fencing, guarding and access controlling of the explosive depot will be carried out in compliance with OHS Act, 1993 – Explosive Regulation GNR 109 of 2003 and Explosive Act (Act No. 26 of 1956 – Explosive regulations GNR 1604 of 1972.	During operational

ACTIVITIES	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURBANCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Offloading and refilling of the explosives	Operational	2.18 ha	• Firefighting equipment must be available at the site. • Firefighting equipment must be regularly inspected and filled after use. • Fire-fighting equipment must be serviced as stipulated in SANS 1475-1. • Fire prevention plan to be put in place in consultation with the local fire services for the site and fire prevention measures will comply with the Explosives Act and Regulations thereunder. • Spillages must be prevented and if spillages occur, spillage cleaning equipment must be provided. • Spilled emulsion must be disposed of in a designated colour coded bin/or kept on spill tray until being disposed of. • Open flames are restricted at or near the explosives depot. • Bund wall must be impermeable to contain spillages during offloading and refilling.	Firefighting equipment will be provided, placed where it is visible and accessible to everyone. An emergency control plan will be implemented to comply with the Occupational Health and Safety (Act 85 of 1993) (OHS Act, 1993) – Explosive Regulation GNR 109 of 2003. Prevention of spillages and cleaning of the spillage will be undertaken to comply with OHS Act, 1993 – Explosive Regulation GNR 109 of 2003 and Explosives Act (Act No. 26 of 1956) – Explosives Regulation GN R1604 of 1972.	During operational phase
Transportation of explosives to the explosive depot <u>Alternative:</u> Daily deliveries from supplier(s) or shared infrastructure with sister mining companies.	operational	N/A	• Compliance to traffic signs • Maximum speed on site must be determined. • Unnecessary noise such as revving or hooting must be restricted. • Emergency response plan contents must be made known to the transporters. • Spillage must be prevented and if it occurs, it must be cleaned. • The tanks must be regularly inspected for leakages. • Vehicles should be regularly serviced to minimise atmospheric emissions.	Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008 and SANS 10103:2008 Prevention of spillages and cleaning of the spillage will be undertaken to comply with OHS Act, 1993 – Explosive Regulation GNR 109 of 2003 and Explosives Act (Act No 26 of 1956) – Explosives Regulations GN R 1604 of 1972. Dust suppressants associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2005.	During operational phase
Storage of equipment accessory etc. in 2x stores	Operational	72.8 m^2	• Storage of waste in stores must not be permitted. • Waste generated from accessories stored in the stored must be disposed of in the correct labelled skip/bin.	Waste management will be carried out in compliance to the NEMWA, 2008 as well as the Waste Management Regulations.	Operational
Storage of emulsion (ANPP, EP200)	Operational	Storage area: 1277.35 m^2	• Silos / tanks must be regularly inspected for leaks. • Protective clothing must be provided to employees.	Firefighting equipment will be provided, placed where it is visible and accessible to everyone. An emergency	During operational

ACTIVITIES	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURBANCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Alternatives: • Construction and storage in more silos, with smaller capacities • Construction and storage in less amount of silos, with increased capacities		Total area: 14 684.45m^2	• Firefighting equipment must be available at the site and kept where they are visible and accessible for use when required. • Firefighting equipment must be regularly inspected and filled after use. • Fire-fighting equipment must be serviced as stipulated in SANS 1475-1. • Mine-wide emergency response procedure/plan already in place should be implemented and complied with at the explosive depot.	control plan will be implemented to comply with the OHS Act, 1993 – Explosive Regulation GNR 109 of 2003 and Explosive Act (Act No. 26 of 1956 – Explosive regulations GNR 1604 of 1972.	
Storage of more than 80 m3 of explosives and accessory (e.g. detonators, etc.) (Explosive magazine)	Operational	Storage area 494.09 m^2 Total area: 7 122.5m^2	• Fire-fighting equipment must be serviced as stipulated in SANS 1475-1. • Mine-wide emergency response procedure/plan already in place should be implemented and complied with at the explosive depot. • Firefighting equipment must be available at the site and kept where they are visible and accessible for use when required. • Firefighting equipment must be regularly inspected and filled after use.		
Utilisation of explosives depot	Operational	2.18 ha	• Refuse skips can be used, but must consist of closing lids to ensure the containment of waste. • Emulsion waste must be placed in a separate container and disposed of accordingly. • All waste (hazardous and general) must be disposed of at a landfill site. • Burning of waste onsite must not be permitted. • Waste drums, with closing lids, must be provided at the explosive depot. The drums must be colour coded of clearly labelled for the different waste types. • Dust suppressants must be applied on the ground at the site to avoid/reduce dust generation • Firefighting equipment must be available at the site. • Firefighting equipment must be regularly inspected and filled after use. • Fire-fighting equipment must be serviced as stipulated in SANS 1475-1. • All containers (bins, skips or bulk containers) shall be kept in a clean and hygienic manner.	Firefighting equipment will be provided, placed where it is visible and accessible to everyone. An emergency control plan will be implemented to comply with the OHS Act, 1993) – Explosive Regulation GNR 109 of 2003 and Explosive Act (Act No. 26 of 1956 – Explosive regulations GNR 1604 of 1972. Waste management will be carried out in compliance to the NEMWA, 2008. The fencing, guarding and access controlling of the explosive depot will be carried out in compliance with OHS Act,1993 – Explosive Regulation GNR 109 of 2003 and Explosive Act (Act No. 26 of 1956 – Explosive regulations GNR 1604 of 1972. Dust suppressants and associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA,	During operational phase

ACTIVITIES	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURBANCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• Containers of explosives must not be reused and should be disposed of at a designated landfill. • All contractors, sub-contractors and workers will attend compulsory environmental awareness training and inductions. This training will highlight the dangers associated with the workplace. Procedures relating to environmental risks will also be put in place and will be regularly updated • Employees must be trained on waste management, emergency response, spillage control and dangerous good handling. Training records must be kept • Silos must be regularly inspected for leaks. • Protective clothing must be provided to the employees. • Mine-wide emergency response procedure/plan already in place should be implemented and complied with at the explosive depot. • Complaints lodged must be recorded. • Lights should, as far as possible, be angled inwards to the explosive depot and not to the exterior of the site. • Spillage must be prevented and if it occurs, it must be cleaned. • Access control must be carried out. • Generation of unnecessary noise must be avoided.	2004 - Dust Control Regulation GNR 827 of 2013 and the SANS 1929: 2005 Noise control measures will be applied so as to not exceed the maximum noise specified in the SANS 10103: 2008 and code 0328 of 2008. Prevention of spillages and cleaning of the spillage will be undertaken to comply with OHS Act, 1993 – Explosive Regulation GNR 109 of 2003 and Explosive Act (Act No. 26 of 1956 – Explosive regulations GNR 1604 of 1972. Storm water management and prevention of contamination of surface water will be carried out in compliance with NWA, 1998 and regulations on use of water for mining and related activities aimed at the protection of water resources GN R704 of 1999.	
Water management (establishment and use of such facilities) in and around the site (pipelines, water tanks, pump base, pit for collection of storm water)	Construction and operational		• Water tank must always have sufficient water for firefighting in case of an emergency. • Clean storm water must be prevented from mixing with dirty storm water through diversions. • Pipelines should be regularly inspected for leaks	Strom water management and prevention of contamination of surface water will be carried out in compliance with NWA, 1998 and regulations on use of water for mining and related activities aimed at the protection of water resources GN R704 of 1999.	During construction and operational phase.
Decommissioning through demolition of concrete structures and removal of salvageable equipment (posts, pumps, water tanks, gates, silos and concrete rubble.	Decommissioning phase	2.18 ha	• Dust suppressants must be applied to reduce dust. • Water spraying of the surface to reduce duct generated during decommissioning. • Holes due to removal of post, pumps etc must be filled with soil. • Decommissioning must be done during the day to prevent noise at night. • Unnecessary noise must not be generated (hooting, revving etc.).	Dust suppressants and associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and the SANS 1929: 2005	During decommissioning phase

ACTIVITIES	PHASE Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE OF DISTURBANCE (volumes, tonnages and hectares or m²)	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• Decommissioning waste (concrete rubble and scrap metals) must be disposed of in appropriate landfills, if not sold to scrap dealers • Storm water runoff must be diverted away from temporary storage of decommissioning waste.	Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008 and SANS 10103: 2008. Waste management will be carried out in compliance to the NEMWA, 2008.	
Reshaping of slopes	Closure phase	2.18 ha	• Reshape to a stable slope as determined by a professional engineer. • Monitoring of displacement to indicate slope stability • Waste spraying must be carried out to reduce the generation of dust.	Dust suppressants and associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and the SANS 1929: 2005.	During closure phase
Replacement and levelling of topsoil (growth medium)	Closure phase	2.18 ha	• Equipment not resulting in compaction of the soil should be used to replace and level the topsoil. • Replacement of dump topsoil to prevent/reduce dust generation. • Windbreak structures to reduce wind erosion. • Toe seepage quantity monitoring • Toe paddocks to contain sediment that may wash from slopes • Divert storm water to reduce water erosion	Dust suppressants and associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and the SANS 1929: 2005	During closure phase
Revegetation of the site	Closure phase	2.18 ha	• Application of mulch to suppress weeds. • Put up jesh mesh or any other equivalent material to control erosion. • Alien invasive plants monitoring. • Removal of alien vegetation. • Careful selection of seeds (compatibility of vegetation with growth medium) • Vegetation cover and stability monitoring • Toe seepage quantity monitoring • Toe paddocks to contain sediment that may wash from slopes • Distribute seeds with a hydroseeder to avoid wind erosion. • Divert storm water runoff to prevent or reduce seeds being washed off by storm water runoff. • Ensure infiltration of rain water to avoid water clogging or ponding	N/A	During closure phase

1.5 Impact Management Outcomes

Table 40:Impact management outcomes, identifying the stand of impact management required for the identified aspects

Environmental component (Aspects affected)	Activity	Potential impact	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Mitigation type Modify/Remedy/Control/Stop	Standard to be achieved
Air Quality	Grading and sloping of area during construction (Expansion).	Impact on ambient air quality due to dust generated when grading and sloping the proposed project site. Cumulative impact during construction, along with existing mining and related activities.	Construction	Dust control measures will be implemented.	According to SANS 1929: 2005 and NEMAQA, 2004 - National Dust Control Regulations GN R827 of 2013, Dustfall rate (D) (mg/m2/day, 30-days average) are as follows. Residential area D < 600 Industrial area 600 < D < 1200 According to OHS Act, 1993 - Explosives Regulation GN R109 of 2003 and Explosives Act (Act No 26 of 1956) Explosives Regulation GN R 1604 of 1972, the following must be carried out: • All firefighting appliances and emergency equipment provided throughout the danger area shall be so placed and kept that they are readily visible and accessible for use when required. • No person shall smoke or make or have a fire or naked light within the fence surrounding a magazine nor shall any person take into this area, any pipe, tobacco, cigarette or matches or any means of making a naked light. • enter danger area with radio transmitters, matches, cigarette lighters or other devices capable of generating heat or spark sources; Therefore, MPM must implement the above.
	Offloading and levelling of gravel, material, bricks and cement for surfacing and construction	Impact on ambient air quality due to dust generated during offloading and levelling of grave. Furthermore, atmospheric emissions from heavy vehicles during construction activities. Cumulative impact during construction, along with existing mining and related activities.	Construction	Dust control measures will be implemented.	
	Construction and erection of security measures such as fences, guard houses, lighting.	Impact on ambient air quality due to dust generated during excavations for posts, fences etc. Cumulative impact during construction, along with existing mining and related activities.	Construction	Dust control measures will be implemented	
	Storage of emulsion (ANPP, EP200 Storage of emulsion (ANPP, EP200) (overall rating) Preferred Alternative: Construction and storage in more silos, with smaller capacities.	Potential for fire and/or explosion to occur due to explosive material and substances being exposed to sparks or open flames.	Construction	Fire prevention measures and fire control measures will be implemented.	
	Storage of more than 80 m3 of explosives and accessory (e.g. detonators, etc.) (Explosive magazine)	Potential for fire and/or explosion due to explosive material and accessories being exposed to sparks or open flames.	Operation	Fire prevention measures and fire control measures will be implemented.	
	General construction-related activities during expansion (e.g. establishment of construction camp, use of machinery and vehicles, building of containment areas (bunded areas) etc.)	Impact on ambient air quality due to air emission and dust generated when undertaking general construction activities such as movement of heavy vehicles, excavation for posts etc. Cumulative impact during construction, along with existing mining and related activities.	Construction	Dust control measures will be implemented.	
	Water management (establishment and use of such facilities) in and around the site (pipelines, water tanks, pump base, pit for collection of storm water)	Impact on ambient air quality due to dust generated when excavating trenches for pipelines, storm water collection pits etc. Cumulative impact during construction, along with existing mining and related activities	Construction and Operation	Dust control measures will be implemented.	
	Utilisation of explosives depot	Potential for fire and/or explosion due to explosives material and substances being exposed to sparks or open flames.	Operation	Fire prevention measures, fire control measures and spillage control measures will be implemented.	
	Transportation of explosives to the Explosives Depot (overall rating)	Potential for fire/explosion due to explosives material and substances being exposed to sparks or open flames.	Operation	Fire prevention measures, fire control measures and spillage control measures will be implemented.	

Environmental component (Aspects affected)	Activity	Potential impact	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Mitigation type Modify/Remedy/Control/Stop	Standard to be achieved
	Preferred Alternative: Construction and use of storage reserve (Explosives Depot)	Fire/explosion due to explosives material and substances being exposed to sparks or open flames.	Operation	Fire prevention measures, fire control measures and spillage control measures will be implemented.	
		Impact on ambient air quality due to dust generated by vehicle movement to and on the site.		Dust control measures will be implemented.	
	Offloading and refilling of the explosives	Potential for fire and/or explosion to occur due to explosives material and substances being exposed to sparks or open flames.	Operation	Fire prevention measures, fire control measures and spillage control measures will be implemented.	
	Decommissioning through demolition of concrete structures and removal of salvageable equipment (posts, pumps, water tanks, gates, silos and concrete rubble.	Reduced visibility due to dust fallout. Cumulative impact during decommissioning, along with other mining and related and / or decommissioning activities.	Decommissioning	Dust control measures will be implemented	
	Reshaping of slopes of the waste rock dump	Impact on air quality (reduced visibility) due to dust fallout and emission from vehicles. Cumulative impact during decommissioning, along with other mining and related and / or decommissioning activities.	Closure	Dust control measures will be implemented	
	Replacement and levelling of topsoil (growth medium)	Reduced visibility due to dust fallout. Cumulative impact during decommissioning, along with other mining and related and / or decommissioning activities.		Dust control measures will be implemented	
Groundwater	Construction of Explosives Depot	It is not anticipated that the construction (expansion related) activities will have a direct impact on groundwater. The proposed expansion project will be located on top of a waste rock dump.	Not applicable	Not applicable	Not applicable
	Storage and handling of explosives at the Explosives Depot during the Operational Phase or removal of explosives from the site during the Decommissioning Phase.	Borehole P126 is the closest borehole in relation to the location of Waste Rock Dump No. 2. According to the groundwater quality results (as per Section 7.4), this groundwater monitoring point has exceedances in terms of EC, TDS, Na, SO_4, and NO_3 (Nitrate). It is not anticipated that the operation of the Explosives Depot will result in an additional significant impact on groundwater in terms of Nitrates from a storage perspective. However, should a fire or explosion occur, or explosive material or substances be left to infiltrate the waste rock dump surface, a cumulative impact in terms of Nitrate concentration may occur.	Operation and Decommissioning	Groundwater monitoring will be continued in close proximity to Waste Rock Dump No. 2.	Groundwater quality will be compared with the IWUL qualities prescribed as well as the DWS's limits and SANS standards.
Heritage	Construction and utilisation of Explosives Depot	It is not anticipated that the proposed activity will result in impacts on heritage as no heritage resources are located on top of Waste Rock Dump No. 2 Identified heritage resources are located outside the boundary of the MPM mining right.	Not applicable.	Not applicable	Not applicable

Environmental component (Aspects affected)	Activity	Potential impact	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Mitigation type Modify/Remedy/Control/Stop	Standard to be achieved
Noise	Grading and sloping of area during construction	Noise generated by vehicles/ machinery used for grading and sloping of the site. Cumulative impact during construction, along with existing mining and related activities	Construction	Noise control measures will be implemented.	According to SANS Standards 10103: 2004, urban district maximum ambient noise levels are 50 dBA for day time and 40 dBA for night time.
	General construction-related activities during expansion (e.g. establishment of construction camp, use of machinery and vehicles, building of containment areas (bunded areas) etc.)	Noise generated by construction vehicles/ machinery. Cumulative impact during construction, along with existing mining and related activities	Construction and Operational		
	Construction and erection of security measures such as fences, guard houses, lighting.	Noise generated by vehicles/ machinery during construction. Cumulative impact during construction, along with existing mining and related activities	Construction		
	Transportation of explosives to the explosives depot Preferred Alternative: Use of storage reserve (Explosives Depot) (i.e. less frequent travelling on roads)	Noise generated by trucks travelling to and from the explosives depot. Cumulative impact during operation, along with existing mining and related activities. However, the impact significance will be lower than with more frequent trips to the mine, should a strategic storage reserve not be implemented (see below).	Operation		
	Alternatives: Daily deliveries from supplier(s) or shared infrastructure with sister mining companies.	Noise generated by trucks travelling on a frequent basis, to and from the explosives depot. Cumulative impact during operation, along with existing mining and related activities.			
	Decommissioning through demolition of concrete structures and removal of salvageable equipment (posts, pumps, water tanks, gates, silos and concrete rubble.	Noise generated by decommissioning activities. Cumulative impact during decommissioning, along with existing mining and related / decommissioning activities.	Decommissioning		
Protected areas and conservation	Construction and utilisation of explosive depot	It is not anticipated that the proposed activity will have any impact on protected areas and conservation in the larger due to the location of protected and conservation areas in relation to the location of proposed activities. The proposed expansion site is located on an existing mining area	Not applicable	Not applicable	Not applicable
Soil, land use and land capability	Replacement and levelling of topsoil (growth medium) during rehabilitation.	Water or wind erosion of topsoil.	Closure	Topsoil control measures will be implemented	No standard. MPM have to implement practicable measures to prevent or minimise loss of soil.
		Compaction of topsoil, affecting growth of vegetation during and after rehabilitation. This could impact on the overall rehabilitation and end land use objectives for the area, if not appropriately implemented.		Correct levelling measures will be implemented	

Environmental component (Aspects affected)	Activity	Potential impact	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Mitigation type Modify/Remedy/Control/Stop	Standard to be achieved
		Potential cumulative impact, if other rehabilitation activities surrounding the site are not undertaken appropriately.			
Socio-economic	Preferred Alternative: Utilisation of explosives depot as a strategic storage reserve	It is not anticipated that the proposed activity will impact on any socio-economic aspects of the surrounding area, as the mine is already an operational activity, and Waste Rock Dump No. 2 is an existing structure. The "sense of place" of the area has also already been impacted on as a result of current mining activities conducted on the property in question. Therefore, regular passers-by of the area as well as local residents within the area are likely to be desensitised to the mining activities.	Not applicable	Not applicable	Not applicable
	Transportation of explosives to the explosives depot Other Alternatives: Daily deliveries from supplier(s) or shared infrastructure form sister mining companies.	Daily or frequent deliveries to the mine will put communities at risk as potential accidents or spillages (contaminating water resources) may occur and fire risks which may threaten the lives of community members. Livestock of communities may also be at risk of being hit by delivery trucks / tankers.	Operation	Stop: Not going through this specific activity	Not applicable
Surface water	Grading and sloping of area during construction	Ponding due to uneven surface resulting from construction activities	Construction	Storm water management measures will be implemented. Inspection measures will be implemented. Training of contractors to ensure construction activities are carried out correctly.	According to NWA, 1998, Regulations on use of water for mining and related activities aimed at the protection of water resources GN R704 of 1999, every person in control of a mine must: • design, construct, maintain and operate any dirty water system at the mine or activity so that it is not likely to spill into any clean water system more than once in 50 years • prevent water containing waste or any substance which causes or is likely to cause pollution of a water resource from entering any water resource, either by natural flow or by seepage, and must retain or collect such substance or water containing waste for use, re-use,
	Offloading and levelling of gravel, material, bricks and cement for surfacing and construction	Contamination of surface water due to spillages of cement	Construction	Storm water management measures will be implemented. Inspection measures will be implemented. Spillage prevention and control measures will be implemented.	
		Ponding due to incorrect levelling of the gravel.		Storm water management measures will be implemented. Inspection measures will be implemented. Training of contractors to ensure construction activities are carried out correctly.	

Environmental component (Aspects affected)	Activity	Potential impact	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Mitigation type Modify/Remedy/Control/Stop	Standard to be achieved
	Offloading and refilling of the explosives	Spillages may occur during offloading and/or refilling of explosives. Stormwater may be contaminated upon coming into contact with the spillage.	Operation	Spillage prevention and control measures will be implemented. Inspection measures will be implemented. Storm water management measures will be implemented	evaporation or, for purification and disposal in terms of the Act • prevent the erosion or leaching of materials from any residue deposit or stockpile from any area and contain material or substances so eroded or leached in such area by providing suitable barrier dams, evaporation dams or any other effective measures to prevent this material or substance from entering and polluting any water resources; Therefore, MPM must take measures to prevent topsoil being washed into water resource due to water erosion and wind erosion. MPM must take measures to prevent disposal of general waste (construction waste, decommissioning, domestic waste etc.) from being disposed into water resources. MPM must ensure dirty water collected in collection pit does not overflow and contaminate clean water. According to Explosives Act (Act No 26 of 1956) Explosives Regulation GN R 1604 of 1972, the following must be carried out:
	Utilisation of explosives depot	During utilisation of the explosive depot, spillages on the ground may occur as a result of mishandle or leakage. Stormwater may be contaminated upon coming into contact with the spillage.	Operation	Spillage prevention and control measures will be implemented. Inspection measures will be implemented. Storm water management measures will be implemented	
		Contamination of surface water due to inappropriate management of waste. Potential cumulative impact along with other mining and related activities		Storm water management measures will be implemented. Inspection measures will be implemented.	
	Preferred Activity Alternative: Storage of emulsion (ANPP, EP200) Design Alternative 1: Construction and storage in more silos, with smaller capacities Design Alternative 2: Construction and storage in less amount of silos, with increased capacities	Spillages on the ground may occur as a result of mishandle or leakage. Storm water may be contaminated upon coming into contact with the spillage. A smaller risk may be associated with design alternative 1 than for design alternative 2 (i.e. smaller tanks, and if only one tanks leaks or spills, the volume spilled will be less).	Operation	Spillage prevention and control measures will be implemented. Inspection measures will be implemented. Storm water management measures will be implemented	
	Water management (establishment and use of such facilities) in and around the site (pipelines, water tanks, pump base, pit for collection of storm water)	Leakages from pipelines collecting dirty water from the bunker area to the collection/drainage pit may contaminate clean storm water runoff if not appropriately managed.	Construction and operation	Storm water management measures will be implemented. Inspection measures will be implemented.	
	Replacement and levelling of topsoil (growth medium) during rehabilitation	Wash down of sediments resulting in sedimentation or siltation of water resources, if not appropriately managed.	Closure	Storm water and erosion control measures will be implemented.	

Environmental component (Aspects affected)	Activity	Potential impact	Phase (Construction/ Commissioning/ Operational/ Decommissioning/ Closure/Post-Closure)	Mitigation type Modify/Remedy/Control/Stop	Standard to be achieved
					• All reasonable measures shall be taken to prevent spillages of explosives • Explosive waste such as boxes, plastics etc. which have been in contact with explosives shall be disposed in an authorised manner. • Efficient provision for draining the area where explosives are stored (explosive depot/magazine). Therefore, MPM must take measures to prevent spillages, dispose waste in a correct manner and put up storm water control measures.
Traffic	Preferred Activity Alternative: Transportation of explosives to the explosives depot (less frequently) to the strategic storage reserve (Explosives Depot)	An increase in traffic is not anticipated as explosives are currently being transported to Mogalakwena Mine, and therefore no additional negative impact is anticipated. As a strategic storage reserve is proposed, less frequent trips are anticipated to be made to the mine.	Operation	Not applicable	No standard to achieve
	Other Activity Alternatives: Daily / more frequent deliveries from supplier(s) or shared infrastructure with sister mining companies	Increase in traffic due to daily / more frequent deliveries of explosives in comparison to the preferred activity alternative above. Cumulative impact on traffic should daily or more frequent trips be made to the mine.	Operation	Traffic management measures	No standard to achieve
Vegetation	Re-vegetation of the waste rock dump	Unsuccessful re-vegetation due to shortage of nutrients, compaction and / or slope failure.	Closure	Measures to prevent compaction, shortage of nutrients and slope failure will be implemented	According to National Environmental Biodiversity Act (No. 10 of 2004), Alien and invasive species regulation GN R598 of 2004, Spreading or allowing the spread of any specimen of a listed invasive species is a restricted activity. MPM must, where possible, prevent the establishment and spreading of listed invasive species
		Establishment of alien invasive plants.		Measures to control alien invasive plants will be implemented.	
Visual	Construction, erection and utilisation of security measures such as fences, guard houses, lighting.	Visual impact due to lighting during the night. Cumulative impact along with existing mining and related activities, if not appropriately managed.	Construction	Lighting control measures will be implemented. i.e., the lights must be directed inward towards the explosives depot.	
	Utilisation of explosives depot	Light pollution and nuisance due to lighting at the explosive depot. Cumulative impact along with existing mining and related activities, if not appropriately managed.	Construction and Operation	Lighting control measures will be implemented. i.e., the lights must be directed inward towards the explosives depot.	

1.6 Impact Management Actions

Table 41: Impact management actions, identifying the manner in which the impact management objectives and outcomes will be achieved.

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Grading and sloping of area during construction	Cumulative impact on ambient air quality due to dust generated when grading and sloping the proposed project site.	Dust control measures will be implemented.	During Construction Phase	Dust suppressants will be applied to reduce dust so as to not exceed the acceptable dust rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2008 Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008 and SANS 10103:2008
	Cumulative noise generated by vehicles/ machinery used for grading and sloping of the site	Noise control measures to be implemented.		
	Ponding due to uneven surface resulting from construction activities	Storm water management measures will be implemented. Training of contractors to ensure construction activities are carried out correctly.		
Offloading and levelling of gravel, material, bricks and cement for surfacing and construction	Cumulative impact on ambient air quality due to dust generated during offloading and levelling of grave. Furthermore, atmospheric emissions from heavy vehicles during construction activities.	Dust control measures will be implemented.	During Construction and Construction Phase	Prevention of contamination of surface water or storm water will be carried out to comply with the NWA, 1998 - Regulations on use of water for mining and related activities aimed at the protection of water resources GNR 704, 1999. Dust suppressants will be applied to reduce dust so as to not exceed the acceptable dust rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2008 Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008 and SANS 10103: 2008
	Contamination of surface water due to spillages of cement	Storm water management measures will be implemented. Spillage prevention and control measures will be implemented		
	Ponding due to incorrect levelling of the grave.	Storm water management measures will be implemented. Training of contractors to ensure construction activities are carried out correctly.		
Construction and erection of security measures such as fences, guard houses, lighting.	Cumulative impact on ambient air quality due to dust generated during excavations for posts, fences etc.	Dust control measures will be implemented	During Construction Phase	Disposal of waste will be in a manner as to comply with the NEMWA, 2008. Dust suppressants will be applied to reduce dust so as to not exceed the acceptable dust rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2008
	Cumulative noise pollution generated by vehicles/ machinery during construction.	Noise control measures will be implemented		
	Visual impact due to lighting during the night.	Lighting control measures will be implemented. e.g., the lights must be directed inward into the explosive depot		

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
General construction-related activities during expansion (e.g. use of machinery and vehicles, building of containment areas (bunded areas) etc.)	Cumulative impact on ambient air quality due to air emission and dust generated when undertaking general construction activities such as movement of heavy vehicles, excavation for posts etc. Cumulative noise generated by construction vehicles/ machinery.		During Construction Phase	Construction waste will be disposed of in a manner as to comply with the National Environmental Management Waste Act (NEMWA), 2008. Dust suppressants will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2008 Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008 and SANS 10103:2008 Prevention of surface water or storm water will be carried out to comply with the NWA, 1998 - Regulations on use of water for mining and related activities aimed at the protection of water resources GNR 704, 1999.
Storage of emulsion (ANPP, EP200)	Fire and/or explosion occurring due to explosive material and substances being exposed to sparks or open flames.	Documented fire prevention measures and fire control equipment	During Operation Phase	Firefighting equipment will be provided, placed where it is visible and accessible to everyone. An emergency control plan will be implemented to comply with the OHS Act, 1993 – Explosive Regulation GNR 109 of 2003 and Explosives Act (Act No. 26 of 1956) – Explosives regulations GN R1604 of 1972. Strom water management and prevention of contamination of surface water will be carried out in compliance with NWA, 1998 - Regulations on use of water for mining and related activities aimed at the protection of water resources GNR 704, 1999.
<u>Design alternative</u>: Construction and storage in more silos, with smaller capacities	Spillages on the ground may occur as a result of mishandle or leakage. Stormwater may be contaminated upon coming into contact with the spillage.	Spillage prevention and control measures will be implemented. Storm water management measures will be implemented.		
<u>Design alternative:</u> Construction and storage in less amount of silos, with increased capacities				
Storage of more than 80 m3 of explosives and accessory (e.g. detonators, etc.) (Explosive magazine)	Fire and/or explosion occurring due to explosive material and substances being exposed to sparks or open flames.	Documented fire prevention measures and fire control equipment	During Construction phase	Firefighting equipment will be provided, placed where it is visible and accessible to everyone. An emergency control plan will be implemented to comply with the OHS Act, 1993 – Explosive

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
				Regulation GNR 109 of 2003 and Explosives Act (Act No. 26 of 1956) – Explosives regulations GN R1604 of 1972.
Water management (establishment and use of such facilities) in and around the site (pipelines, water tanks, pump base, pit for collection of storm water)	Cumulative impact on ambient air quality due to dust generated when excavating trenches for pipelines, storm water collection pits etc.	Dust control measures will be implemented.	During construction and Operational Phase.	Strom water management and prevention of contamination of surface water will be carried out in compliance with NWA, 1998 - Regulations on use of water for mining and related activities aimed at the protection of water resources GNR 704, 1999.
	Leakages from pipelines collecting dirty water from the bunker area to the collection/drainage pit may contaminate clean storm water.	Storm water management measures will be implemented		
Utilisation of explosives depot	Fire and/or explosion occurring due to explosives material and substances being exposed to sparks or open flames	Documented fire prevention measures and spillage control measures will be implemented. Firefighting equipment will be provided	During Operational Phase	Firefighting equipment will be provided, placed where it is visible and accessible to everyone. An emergency control plan will be implemented to comply with the OHS Act, 1993 – Explosive Regulation GNR 109 of 2003 and Explosives Act (Act No. 26 of 1956) – Explosives regulations GN R1604 of 1972. Waste management will be carried out in compliance to the NEMWA, 2008. The fencing, guarding and access controlling of the explosive depot will be carried out in compliance with OHS Act, 1993– Explosive Regulation GNR 109 of 2003 and Explosives Act (Act No. 26 of 1956) – Explosives regulations GN R1604 of 1972. Dust suppressants and associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2008 Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008 and SANS 10103: 2008.
	During utilisation of the explosive depot, spillages on the ground may occur as a result of mishandle or leakage. Stormwater may be contaminated upon coming into contact with the spillage.	Spillage prevention and control measures will be implemented. Storm water management measures will be implemented		
	Contamination of surface water due to inappropriate management of waste	Storm water management measures will be implemented		
	Light pollution and nuisance due to lighting at the explosive depot	Lighting control measures will be implemented. e.g., the lights must be directed inward into the explosive depot		

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
				Prevention of spillages and cleaning of the spillage will be undertaken to comply with OHS Act, 1993) – Explosive Regulation GNR 109 of 2003 and Explosives Act (Act No. 26 of 1956) – Explosives regulations GN R1604 of 1972. Strom water management and prevention of contamination of surface water will be carried out in compliance with NWA, 1998 and Regulations on use of water for mining and related activities aimed at the protection of water resources GNR 704.
Transportation of explosives to the explosive depot <u>Alternatives:</u> Daily deliveries from supplier(s) or shared infrastructure with sister mining companies.	Fire/explosion due to explosives material and substances being exposed to sparks or open flames.	Documented fire prevention measures, fire control equipment and spillage control measures will be implemented.	During Operational Phase	Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008. and SANS 10103: 2008 Prevention of spillages and cleaning of the spillage will be undertaken to comply with OHS Act, 1993 – Explosive Regulation GN R 109 of 2003 and Explosive Act (Act 26 of 1956) – Explosives Regulation GN R1604 of 1972. Dust suppressants associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and SANS 1929: 2008.
	Impact on ambient air quality due to dust generated by vehicle movement to and on the site.	Dust control measures will be implemented.		
	Alternatives may also result in increase in traffic due to frequent trips	Traffic control measures		
Offloading and refilling of the explosives	Fire and/or explosion occurring due to explosives material and substances being exposed to sparks or open flames	Documented fire prevention measures, fire control equipment and spillage control measures will be implemented.	During Operational Phase	Firefighting equipment will be provided, placed where it is visible and accessible to everyone. An emergency control plan will be implemented to comply with the OHS, 1993 – Explosive Regulation GNR 109 of 2003 and Explosive Act (Act 26 of 1956) – Explosives Regulation GN R1604 of 1972. Prevention of spillages and cleaning of the spillage will be undertaken to comply with OHS

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	Contamination of surface water due to spillages of cement	Spillage prevention and control measures will be implemented.		Act 85 of 1993 – explosive regulation GNR 109 of 2003 and Explosive Act (Act 26 of 1956) – Explosives Regulation GN R1604 of 1972. Collection pit will be constructed to drain contaminated water in order to comply with the OHS Act, 1993 – explosive regulation GNR 109 of 2003 and Explosive Act (Act 26 of 1956) – Explosives Regulation GN R1604 of 1972.) and NWA, 1998 and NWA, 2008 – GNR 704
Decommissioning through demolition of concrete structures and removal of salvageable equipment (posts, pumps, water tanks, gates, silos and concrete rubble.	Reduced visibility due to dust fallout.	Dust control measures will be implemented.	During Decommissioning Phase	Dust suppressants and associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in NEMAQA, 2004 - Dust Control Regulation GNR 827 of 2013 and the SANS 1929: 2005 Noise control measures will be applied so as to not exceed the maximum noise specified in the code SABS 0328 of 2008. Waste management will be carried out in compliance to the NEMWA, 2008
	Noise generated by decommissioning activities.	Noise control measures will be implemented.		
Reshaping of slopes of the waste rock dump	Impact on air quality (reduced visibility) due to dust fallout and emission from vehicles.	Dust control measures will be implemented.	During Closure Phase	Dust suppressants and associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in the Dust Control Regulation GNR 827 of 2013 and the SANS 1929: 2005
Replacement and levelling of topsoil (growth medium)	Reduced visibility due to dust fallout.	Dust control measures will be implemented.	During Closure Phase	Dust suppressants and associated dust control measures will be applied to reduce dust so as to not exceed the acceptable rate as identified in the Dust Control Regulation GNR 827 of 2013 and the SANS 1929: 2005
	Wash down of sediments resulting in sedimentation or siltation of water resources.	Topsoil control measures will be implemented.		
	Water or wind erosion of topsoil.	Erosion control measures will be implemented.		

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	Compaction of topsoil, affecting growth of vegetation.	Correct levelling methods will be implemented.		
Revegetation of the site	Unsuccessful re-vegetation due to shortage of nutrients, compaction and slope failure.	Compatibility of vegetation type with the growth medium.	During Closure Phase	
	Establishment of alien invasive plants.	Invasive plants control measures		

1.7 Financial Provision

1.7.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

The proposed expansion activity is to be carried on an already disturbed site (a waste rock dump). The site thus does not have any natural features. The Closure objectives for the proposed activity do however relate to the rehabilitation and associated activities of waste rock dumps on the mine (which is considered the baseline environment for the proposed Explosives Depot expansion site).

Please see Section 1.4.1 for Closure objectives.

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

It is hereby confirmed that the environmental objectives in relation to Closure (as contained in this BAR) have been provided to the landowner and registered Interested and Affected Parties. A landowner consent form has also been signed by the landowner. Refer to Annexure D1 for the Public Participation Report and Annexure D2 for the landowner consent form.

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

The proposed activity is an expansion of an Explosive Depot on a site that has previously been disturbed by Mogalakwena Mine's activities. The rehabilitation of the site will be included in the mine-wide rehabilitation plan that will be developed and submitted to the department prior to decommissioning.

Mogalakwena Mine has however compiled a preliminary Closure plan dated 2012 which contains action plans for the Closure of the whole mine. The action plans of the waste rock dump are also included in the mentioned preliminary Closure plan.

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

Table 42 below includes a comparison of the action plan of the waste rock dump and the Closure objectives of the site.

Table 42: Compatibility of action plans with the closure objectives

WRD action plans	Closure objectives
Physical and chemical stabilisation.	Incorporation of appropriate covers in the closure design to create a stable landform, capable of supporting a vegetation

	community analogous with surrounding grasslands, where the generation of contact water and sediment laden runoff is limited
Minimise stakeholder exposure to residual risks	Groundwater quality and displacement to indicate physical instability amongst other monitoring programmes will be carried out.
Promote biological sustainability.	Slopes will be reshaped to be no steeper than 3H:1V.A blend of topsoil and saprolite will be utilised to form growth media on which vegetation can be established to minimise erosion and improve the visual aesthetics, with the minimum thickness of growth media being 300mm.
To adhere to the relevant standards and legal requirements.	Dumps constructed with a toe to crest slope greater than 20°-24° will be reshaped to an overall slope of no greater than 20°-24° using the cut and fill method, pushing down slope.
Ensure the closure of the site in such a manner for it to be aligned with the overall mine wide closure objectives.	<u>Site Closure objectives:</u> • To comply with relevant standards and legal requirements. • Minimise stakeholder exposure to residual risks • Ensure the closure of the site in such a manner for it to be aligned with the overall mine wide closure objectives. • Physically and chemically stabilise the site • Promote biological sustainability <u>Mine-wide closure objectives:</u> • Adhere to all statutory and other legal requirements; • Ensure safety & health of all stakeholders during closure and post closure and that communities using the site after closure are not exposed to unacceptable risks. • Ensure that closure supports productive uses considering pre mining conditions and are in agreement with commitments to stakeholders. • Physically and chemically stabilise remaining structures to minimise residual risks. • Promote bio-diversity and biological sustainability to the maximum extent practicable. • Utilize closure strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance.

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

Refer to Part A (EIA) Section 18 for the financial provision required to manage and rehabilitate the environment.

Refer to Annexure E4 for a detailed calculation of the financial provision in accordance with the applicable guideline.

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

Refer to Part A (EIA): Section 18 of this report. It is hereby confirmed by the applicant that the requirements for financial provision will be met, as part of the overall mine-wide financial provision and closure cost assessments.

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

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

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

Table 43: Mechanism for monitoring compliance with EMPR and environmental authorisation

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Construction of the expansion section of the Explosives Depot	Impacts related to all environmental aspects	Auditing of this EMPr and the environmental authorisation.	Internal: Mogalakwena Mine auditor External: Environmental Control Officer (ECO).	Internal: One audit and an internal audit report to be compiled during the Construction Phase. External: Should the construction activity last for a year, Bi-annual audits to be conducted for that year and audit reports to be submitted to DMR.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Construction of the expansion section of the Explosives Depot	Noise generation	Environmental noise monitoring	Internal: Mogalakwena Mine Environmental Department's responsibility to initiate.	Once off Environmental noise monitoring to be conducted during the Construction Phase, during the start of this phase.
Operation of Explosives Depot	Impacts related to all environmental aspects	Auditing of this EMPr and the environmental authorisation.	Internal: Mogalakwena Mine auditor External: Independent environmental auditor or Environmental Control Officer (ECO).	Internal: Monthly inspections (including environmental aspects) and bi-annual internal audit reports during the Operational Phase. External independent auditor / ECO: Bi-annual audits to be conducted and audit reports to be submitted to DMR, during the Operational Phase.
	Noise generation	Environmental noise monitoring	Internal: Mogalakwena Mine Environmental Department's responsibility to initiate.	Annual Environmental noise monitoring to be conducted during the first three years of the Operational Phase, with correspondence with DMR thereafter in terms of the need to continue with such monitoring at the specific site.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Decommissioning and rehabilitation of the Explosives Depot	Impacts related to all environmental aspects	Auditing of this EMPr and the environmental authorisation.	Internal: Mogalakwena Mine auditor External: Independent environmental auditor or Environmental Control Officer (ECO).	Internal: Monthly inspections (including environmental aspects) and bi-annual internal audit reports during the Decommissioning Phase. External independent auditor / ECO: Bi-annual audits to be conducted and audit reports to be submitted to DMR, during the Decommissioning Phase.
Decommissioning and rehabilitation of the Explosives Depot	Noise generation	Environmental noise monitoring	Internal: Mogalakwena Mine Environmental Department's responsibility to initiate.	Once off Environmental noise monitoring to be conducted during the onset of the Dismantling Phase of the site, with correspondence with DMR thereafter in terms of the need to continue with such monitoring at the specific site during the remainder of the Decommissioning Phase of the waste rock dump.
Groundwater-, surface water and air quality monitoring for the mining site will continue throughout the Life of Mine, as per current frequencies as contained in the monitoring programmes. Results of monitoring (as provided above) are to be analysed in the environmental audit reports compiled by the internal and external auditors.				

1.9 Indicate the frequency of the submission of the performance assessment/ environmental audit report.

Refer to Table 43 above.

1.10 Environmental Awareness Plan

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

Mogalakwena Platinum Mine will inform employees and contractors of any environmental risks through

- Environmental awareness training;
- Blasting and explosive guidelines and procedures; and
- Inductions.

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

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

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

- Air Quality
  - Activities that may result or mitigate impact on air quality; speeding on roads, the requirements for dust suppression.
  - Negative impacts on the receiving environment if mitigation measures are not implemented.

- Surface water
  - How incidents should be reported, and emergency requirements.
  - The importance of storm water control and maintenance of storm water infrastructure.
  - The importance to re-use water and to prevent spillages and leakages.

- Waste management
  - The correct separation of general- and hazardous waste.
  - The correct disposal of waste and consequences of incorrect disposal of waste.
  - Minimisation of waste generation.
  - Mine-wide waste procedures in place.

- Traffic
  - Abide by traffic rules, no speeding allowed.
  - To minimise unnecessary trips.
  - Minimum operation during rush hours.

- Emergency Preparedness and Response
  - Smoking and non-smoking areas.
  - How to report any emergency or incident.
  - How to respond when emergency alarm goes off.

- Noise
  - The generation of unnecessary noise such as revving the car.

- Health and Safety
  - Protective clothing (hard hat, shoes, vest, masks etc.) as a non-negotiable requirement.
  - Specific requirements (i.e. no exposed metal parts on shoes) at Explosives Depot.
  - Site plan, evacuation routes and assembly points.
  - Handling of hazardous and non-hazardous material.

1.11 Specific information required by the Competent Authority

The following information may be required by the competent authority.

Table 44: Specific information required by the competent authority

Information	Frequency of submission
Quantum of Financial Provision (mine wide)	Annually
Performance Assessment Report (Environmental audit)	Refer to Table 43 above
Environmental Noise Monitoring Reports	Refer to Table 43 above
Ground water Monitoring Reports	As per current frequencies for monitoring (DWS) Results will be analysed in the audit reports that will be submitted to the DMR. Refer to Table 43 above
Surface water monitoring Reports	
Air quality monitoring Reports	

2. UNDERTAKING

The EAP herewith confirms

(a) the correctness of the information provided in the reports ☐

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

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

(d) the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein. ☐

Signature of the environmental assessment practitioner:

Name of company:

Date:

-END-