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PART A
FINAL EXTERNAL WATER USE LICENCE COMPLIANCE AUDIT REPORT FOR ASSMANG MANGANESE (PTY) LTD - BLACK ROCK MINE OPERATIONS (BRMO), HOTAZEL, NORTHERN CAPE

LICENCE NO: 10/D41M/ABEGJ/3490
MC PROJECT CODE: 201910

Prepared for:

ASSMANG MANGANESE

BLACK ROCK MINE OPERATIONS

Northern Cape, South Africa

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APPROVAL FOR RELEASE

Name	Title	Signed
Ms. Mpho Manyabe	Manyabe Consultancy: Managing Director and Lead Auditor	

DECLARATION OF INDEPENDENCE

I, **Mpho Manyabe**, in my capacity as a Water Use Licence Compliance Auditor, hereby declare that –

- I act as an independent consultant in this Water Use Licence Compliance Audit (WULCA);
- I have performed the work relating to WULCA in an objective manner, even if this results in views and findings that are not favourable to Assmang Manganese (Pty) Ltd Black Rock Mine Operations (BRMO);
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have and will not have any vested interest in the activity;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the Act;
- I have expertise in conducting the WULCAs, including knowledge of the applicable Act, regulations and any guidelines that have relevance to the activity;
- I have complied with the Act, regulations and all other applicable legislation;
- I undertake to disclose to BRMO and the competent authority [Department of Water and Sanitation (DWS)] all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the report by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; and
- Based on information provided to me by BRMO, and in addition to information obtained during the course of this study, I have presented the results and conclusion within the associated document to the best of my professional ability.

Ms. Mpho Manyabe

Water Use Licence Compliance Auditor/ Environmental Assessment Practitioner

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LIST OF ABBREVIATIONS

Assmang (Pty) Ltd	Assmang
BBBEE	Based Black Economic Empowerment
BRMO	Assmang Manganese (Pty) Ltd Black Rock Mine Operations (BRMO)
CMA	Catchment Management Agency
CV	Curriculum Vitae
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EC	Electrical Conductivity
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EMS	Environmental Management System
EO	Environmental Officer
GDARD	Gauteng Department of Agriculture and Rural Development
GN	Government Notice
ha	Hectares
IWWMP	Integrated Water and Waste Management Plan
IWUL	Integrated Water Use Licence
MC	Manyabe Consultancy (Pty) Ltd
MEC	Member of the Executive Committee
mtpa	metric tonnes per annum
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NWA	National Water Act, 36 of 1998
N/A	Not applicable
PCD	Pollution Control Dam
RE	Remaining Extent
RFPs	Requests for Proposals
RSIP	Rehabilitation Strategy and Implementation Programme
SABS	South African Bureau of Standards
SANS	South African National Standard
SOT	Surface Ore Transport
STP	Sewage Treatment Plant
THP	Total Petroleum Hydrocarbon
TSF	Tailings/Slimes storage facilities
TUT	Tshwane University of Technology
UNISA	University of Southern Africa
WULA	Water Use Licence Application
WC&WDM	Water Conservation and Water Demand Management
WULCA	Water Use Licence Compliance Audit

DEFINITIONS

Alien species	Plants and animals which do not arrive naturally in an area - they are brought in by humans. Alien plants often force indigenous species out of the area.
Biodiversity	The rich variety of plants and animals that live in their own environment. Fynbos is a good example of rich biodiversity in the Cape.
Compliance	State of conformity with the law.
Compliance Audit	A planned and in-depth monitoring exercise in which all the conditions of authorisation are assessed for compliance, and where the water user is afforded an opportunity to indicate compliance with the conditions, and is requested to substantiate compliance with proof of evidence. Compliance Audits are normally conducted in accordance with a prepared systematic scheduled plan.
Conservation	Protecting, using and saving resources wisely, especially the biodiversity found in an area.
Contamination	Polluting or making something impure.

Contravention	Any act which violates the law.
Dam with a Safety Risk	Any dam i) which can contain or store more than 50 000 cubic metres of water, whether that water contains any substance or not, and which has a wall of a vertical height of more than five metres, measured as the vertical difference between the lowest downstream ground elevation on the outside of the dam wall and the non-overspill crest level or the general top level of the dam wall; ii) belonging to a category of dams declared under section 118(2) to be dams with a safety risk; or iii) declared under section 118(3)(a) to be a dam with a safety risk;
Environment	The surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Flora	All species of vegetation found in a particular region or environment
Impact	A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
Indigenous species	Plants and animals that are naturally found in an area.
Land use	Characterised by the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it. The definition of land use in this way establishes a direct link between the land cover and the actions of people in their environment.
Non-compliance	Where a water user or person does not adhere to the requirements of the Act or his/her entitlement. Failure to fulfil WUL requirement/ condition and/ or compliance obligation.
Pollution	Any change in the environment caused by substances and/or noise, malodours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, geotechnical and geological investigation and the provision of services, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or that will have such an effect in the future
Storm water management	Strategies implemented to control the surface flow of storm water such that erosion, sedimentation and pollution of surface and ground water resources in the immediate and surrounding environments are mitigated. This is specifically important during the construction and decommissioning (if applicable) phases of a project.

ABOUT THE ENVIRONMENTAL COMPLIANCE AUDITOR (S)

Manyabe Consultancy (Pty) Ltd (MC) is a 100% black female youth owned entity which offers sustainable development solutions to both public and private sectors, including parastatals (Mining, Waste, Energy and Industry). The company was founded in 2014 by Mpho Manyabe, who is the Managing Director.

MC seeks to maintain its strategic position in the Environmental Management Services by providing service of excellence to its clients. This is achieved by providing a professional and efficient service to our clients, providing the highest possible level of customer care, upholding the highest ethical and moral principles in our actions, words and thoughts and upholding of the highest possible level of integrity.

The objective of MC is to create an environment in which enthusiastic, highly skilled and motivated professionals seek professional opinions for contribution to the environmental, social and economic development in South Africa. MC is an emerging entity which currently has turnover of less than R10 million rand and is a level 1 contributor with 135% Broad Based Black Economic Empowerment (BBBEE) procurement.

Mpho Manyabe: Master of Science (MSc) in Environmental Science (Current), University of South Africa (UNISA), BSc Honours in Environmental Management, UNISA, 2016; National Diploma Environmental Sciences, Tshwane University of Technology (TUT), 2008

Mpho Manyabe currently holds a BSc Honours Degree in Environmental Management. She is completing her Master of Science Degree with the University of South Africa (UNISA) in Environmental Science. She has twelve (12) years of work experience in the field of Environmental Management from different consulting companies.

She was previously nominated to be in the Gauteng Department of Agriculture and Rural Development (GDARD) Environmental Impact Assessment (EIA) Environmental Assessment Practitioner (EAP) committee which was launched on 31 March 2015 comprising of EAPs and GDARD officials to provide quarterly reports to the Executive Authority (Member of the Executive Committee (MEC)) on issues identified as blockages to the improved efficiencies the department seeks to achieve.

She has been nominated to become a member of the Academic Advisory Committee for the Environmental Science programme in the Department of Environmental, Water and Earth Sciences in the Faculty of Science at the TUT, to serve for a period of three (3) years, where she will be assisting with preparation and provision of relevant, high quality teaching and learning content for students. She has been identified based on her expertise in the field of Environmental Sciences/Management in order to make a positive contribution to what TUT is offering students in terms of course content and on how to better run programs to the benefit of students.

Managing Director: Mpho Manyabe

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She is the Water Use Licence Compliance Auditor/ Environmental Assessment Practitioner on the project.

For the purposes of this WULCA, MC constitutes an independent competent person. MC further possess the required experience and subject matter knowledge to be able to perform an independent assessment of the IWUL as required by IWUL (**Licence No. 10/D41M/ABEGJ/3490**), condition 11 of Appendix I.

Please refer to Appendix 1 for the Auditor's Curriculum Vitae (CV).

EXECUTIVE SUMMARY

Manyabe Consultancy (Pty) Ltd (MC) was appointed to undertake a Water Use Licence Compliance Audit (WULCA) for the Black Rock Mine Operations (hereafter referred to as BRMO or the Mine).

The purpose of this report is to summarise the findings of an audit undertaken on 15 and 16 April 2019, to assess whether BRMO is compliant with conditions of the Water Use Licence (IWUL) (**Licence No. 10/D41M/ABEGJ/3490**), condition 11 of Appendix I i.e. *"The Licensee shall appoint an independent external auditor to conduct an annual audit on compliance with the conditions of this licence.*

The documentation which was audited included the following:

- The approved IWULs, dated October 2015 and April 2019 **(this WULCA did not assess the amended IWUL issued on 10 April 2019. The IWUL was reviewed to verify the activities which are currently being undertaken, which were not previously approved through the IWUL issued on 21 October 2015)**;
- Updated Environmental Management Programme (EMPr), dated 20 January 2017;
- External WULCA for Black Rock Mine Operation (BRMO), dated July 2018;
- Quarterly Water Quality Monitoring Reports, dated February 2014, January 2018, July 2018; October 2018 and January 2019;
- Bi-Annual Water Quality Reports, dated May 2018;
- Environmental Impact Assessment (EIA) and Management Programme Alignment Report, dated April 2009;
- Environmental Management Plan (EMP) Alignment Environmental Management Report, dated April 2009;
- Geophysical Investigation Report, dated November 2011;
- Mining Right, issued on 13 July 2011;
- Stormwater Management Plan, dated November 2014;
- BRMO Water Flow Diagrams;
- Correspondence to (14 March 2018) and from (08 September 2017) the DWS, on review of the Draft Integrated Water and Waste Management Plan (IWWMP) dated March 2012, and the response by Assmang thereof;
- Correspondence to (27 September 2018) the DWS for consolidation of licenses;
- Draft Integrated Water and Waste Management Plan (IWWMP) and IWUL Application Report, dated March 2012;
- Issued Environmental Authorisation (EA) for the decommissioning of a diesel storage facility;
- EMP Revision, dated October 2012;
- Draft EMPr Addendum, dated October 2011;
- Draft EIA Report, dated October 2011;
- Evaluation of the Hydrocensus data at Black Rock Mining Operations and its surroundings; dated December 2011;
- IWWMP; October 2012;
- Rehabilitation Plan for 2016/2017;
- External WULCA for BRMO, dated July 2018
- Groundwater supply feasibility study report, dated May 2017;
- Water Balance Spreadsheet, up to 01 March 2019;
- Request for proposals from service providers to undertake water balance and Water Conservation and Water Demand Management (WC&WDM); and Eradication of Alien Species.

For this WULCA, a total of 141 conditions out of the 170 conditions could be assessed in order to determine performance. The 3 conditions which were not assessed could not be determined due to the lack of information, and the absence of evidence during the physical inspection. The 26 conditions which were not assessed were not applicable (N/A), indicating that the condition is not currently applicable. Not applicable conditions were

removed from the total number of conditions from which the compliance score was calculated. From these 141 conditions, a total of 37 findings were found as being: “Partially in place”, 13 findings being: “Not in Place” and 91 findings as being: “In place” (refer to Figure 2 below).

For the previous WULCA, undertaken in 2018, a total of 143 conditions out of the 170 conditions could be assessed in order to determine performance. The 13 conditions which were not assessed could not be determined. The 14 conditions which were not assessed were not applicable (N/A), indicating that the condition is not currently applicable. Not applicable conditions were also removed from the total number of conditions from which the compliance score was calculated. From these 143 conditions, a total of 18 findings were found as being: “Partially in place”, 24 findings being: “Not in Place” and 101 findings as being: “In place” (refer to Figure 3 below).

It is to be noted, as evident from Table 6, that the assessment was characterised by a significant number of findings, which resulted in the high level of compliance achieved by BRMO. The high level of compliance attained as a result of the findings (based on information obtained during interviews and visual observations) made during the assessment, indicates that the holder of the IWUL, BRMO has been actively involved in the implementation of management measures as detailed in the IWUL; especially from a regulatory and compliance point of view.

The mining operations are managed by the BRMO, having made provision for the implementation of an Environmental Management System (EMS) at the operations. BRMO (as the holder of the IWUL) strive to ensure compliance to the IWUL. Environmental Officers (EOs) have been appointed to act on behalf of BRMO; and are providing for the required environmental monitoring for the duration of mining activities.

The audit findings are based on information relayed during interviews, as well as the observations made during physical site inspections, at a specific point in time. In some cases, where information was communicated, proof was also provided as support. Such audit findings were therefore seen as totally compliant.

Not all areas/ activities authorised by the IWUL could be visited/ inspected as a result of access restrictions and time constraints. Findings were therefore based on distant observations and assumptions.

The environmental compliance of BRMO to the requirements of the IWUL improved since the previous Annual External IWUL Audit, undertaken in 2018. The compliance percentage increased from **79.02%** to **81.45%.**

The assessment was furthermore facilitated for the period since the previous WULCA (2018) was undertaken. The level of compliance maintained with the management requirements provided for in the IWUL was thus assessed for a period of 1 year.

A number of findings were raised during the 2019 WULC audit. The findings raised relate to a wide variety of aspects. These include but are not limited to; additional approvals required by the DWS; exceeded water quality parameters, surface and groundwater monitoring, spill prevention and containment and documentation preparation and approval. All of the audit findings have been addressed in the body of this report along with recommendations for how non-compliances and deficiencies should be addressed. It is recommended that the Licence Holder reviews this report in detail and that required actions be taken in a timely manner in order to demonstrate a proactive approach in rectifying environmental non-compliance.

It has been noted in this report that BRMO have been granted the amended IWUL on 10 April 2019. The new WUL was not scoped on the current WULCA, hence it was not audited in detail. It is recommended that BRMO continues with the effective environmental management and monitoring as per the requirements of the IWUL.

SECTION 1: INTRODUCTION

This Water Use Licence Compliance Audit (WULCA) was performed in line with the requirements of the conditions of the Water Use Licence (IWUL) (**Licence No. 10/D41M/ABEGJ/3490**), condition 11 of Appendix I i.e. *"The Licensee shall appoint an independent external auditor to conduct an annual audit on compliance with the conditions of this licence.*

1-1 BACKGROUND INFORMATION

Assmang (Pty) Ltd (hereafter referred to as Assmang) mines manganese ore at the Black Rock area of the Kalahari, in the Northern Cape Province. The ore is mined from the Kalahari Manganese field. Black Rock Mine Operations (BRMO) are approximately 80 kilometres north-west of the town of Kuruman, in close proximity to the town of Hotazel.

In 1940, Assmang acquired a manganese ore outcrop on a small hillock known as Black Rock. Several large properties underlain by ore were subsequently found and acquired. Manganese ore mining operations were extended and today include 3 underground mining complexes namely:

- Gloria (commissioned in 1975) and producing medium grade carbonated ore; and
- Nchwaning II and Nchwaning III (commissioned in 1981 and 2004 respectively) and producing high grade oxide ore.

Mining has been undertaken since 1938, with the average grade of ore being approximately 42% manganese. The mine supplies high-grade manganese ore to both local and international markets. Only underground mining methods are presently utilised at the BRMO. Black Rock Mine previously had open cast and underground operations. The mining method for Gloria, as well as Nchwaning II and III, is via underground board and pillar methods, making use of trackless machines and underground conveyer systems. Ore is drilled, blasted, and crushed underground before being conveyed to the processing facilities on the surface. The mine has a projected maximum capacity of 6, 3 metric tonnes per annum (mtpa), and a life of 30 years or more.

1-2 LOCALITY

The BRMO mines are located on the Remaining Extent (RE) and Portion 1 of the farm Santoy, RE and Portion 1 of the farm Belgravia 264, RE and Portion 1, 2, and 3 of the farm Nchwaning 267 and Portion 1 of the farm Gloria 266 (refer to Figure 1).

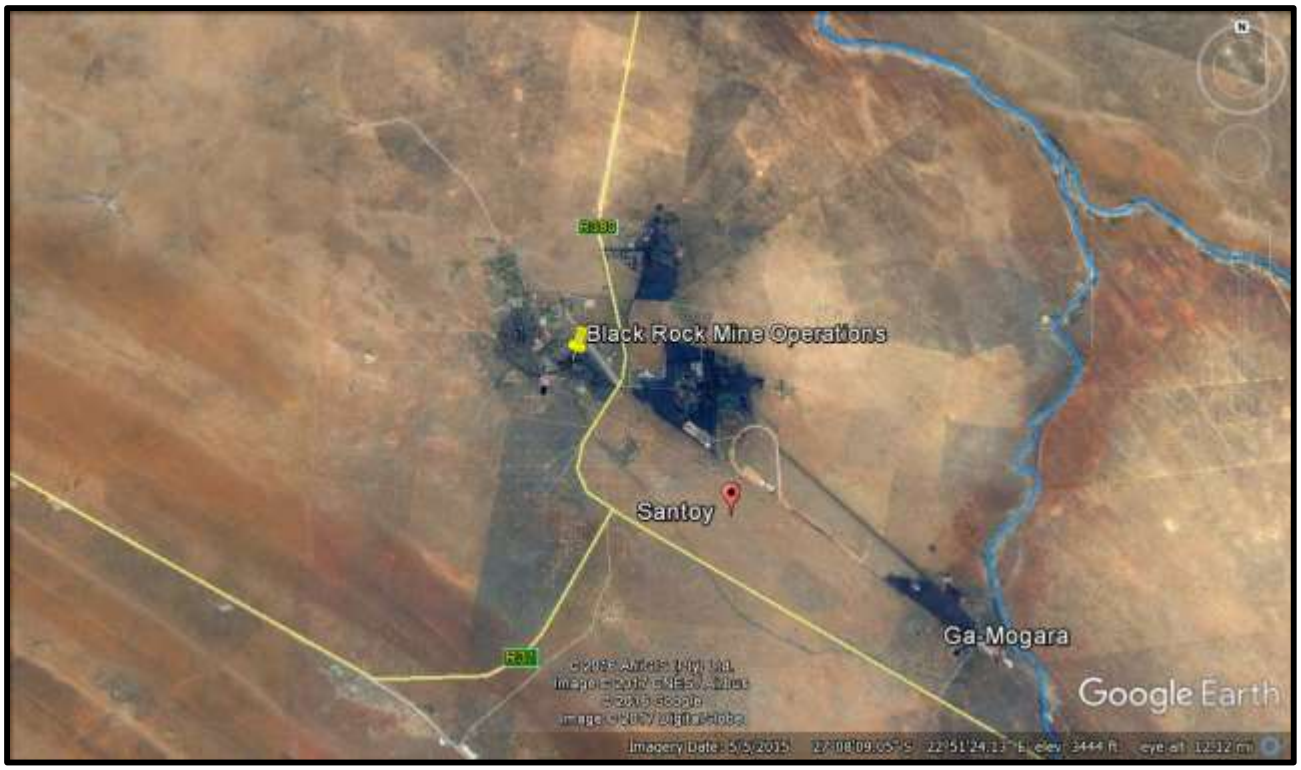

Figure 1: Overview of Black Rock Mine and Nchwaning III

SECTION 2: DESCRIPTION OF THE CURRENT SETTINGS

Ore extraction activities are all undertaken below surface. There is no extraction of ore via opencast operations, with the exception of authorised borrow pits for construction purposes as part of on-going upgrades. Recovery of fines and low-grade ore is also undertaken from surface stockpiles. The thickness of the mined seams in conjunction with underground crushing ensures that waste rock is not unnecessarily brought to surface. The ore is then further crushed and separated into various grades which are stockpiled in preparation for transport off the site. Transport is via rail and road.

Operations underground consist mainly of: drilling, blasting, crushing, handling and loading of ore.

Black Rock Manganese Mine (Black Rock Mining Operations) comprises of four mining operations i.e.

Black Rock: Black Rock Mine was operational for more than 60 years and ceased operations in 1992. The mine comprised of both opencast and underground operations. The opencast operations were concentrated around the Black Rock koppie with numerous open adits extending to the workings. The koppie itself has been extensively mined and is penetrated by many old adits.

Black Rock consists mainly of supporting and ancillary services for the active mining and ore processing facilities at the Gloria, Nchwaning II and Nchwaning III mines. The infrastructure associated with the BRMO operations, includes:

- Support/ Administration services offices,
- Clinic;
- Engineering workshops;
- Inactive - Ore laydown areas;
- Waste Management Facilities;
- Salvage Yard;
- A landing strip and hangars;

- Top soil stockpiles;
- Potable water and process water storage and management facilities;
- A back-up diesel power generation plant;
- Sub-stations and electrical works;
- Bulk fuel storage and refuelling station;
- Explosives Magazine;
- Unpaved and paved roads connecting the above and other BRMO operations;
- Sewage Treatment Plant; and
- Historic and active Tailings Storage Facilities.

BRMO also owns residential facilities, which are outside of the mining areas. Mining areas are fenced off. Therefore, these residential facilities are separately accessed from public roads and have no interconnecting access to mining areas. The Black Rock Village includes an old golf course, recreational facilities, and a commercial area, Santoy housing, Primary School and recreational club.

Facilities located within Black Rock's boundaries which are owned and operated by external parties include:

- Eskom's Klipkop substation; and
- Sedibeng Water's Potable water storage facilities connected to the Vaal Gamagara Water Scheme pipeline.

The historical mining works at the Koppie and related remnants are visible but fenced off.

Nchwaning III: Nchwaning III Mine is situated approximately 80km north-west of the town of Kuruman and 16km north-west of the village of Hotazel. The mine comprises two reserve blocks. The existing mine exploits the Block 2 reserve. The Nchwaning III Mine is accessed via a vertical personnel shaft to a depth of 350m located on the Black Rock property and a decline shaft that daylights adjacent to the Nchwaning plant. The decline shaft equipped with conveyors, which is the main hoisting shaft. Ore is crushed, washed and screened to various sizes and then is stacked according to size and grade. These stacks have nominal capacities of 280 to 320 tons each and are numbered and sampled.

Nchwaning III within Black Rock operation consists mainly of:

- A mine shaft;
- A vent shaft;
- Engineering workshops - underground; and
- Administrative and support facilities.

Gloria: The Gloria Mine is situated approximately 68km north-west of the town of Kuruman and 6km north-west of the village of Hotazel. The process and residue management infrastructure of the Gloria Mine will continue to be used for the remaining life of the mine. The Gloria mine exploits a portion of the strategically important Kalahari Manganese Field. The ore contained in this area represents a substantial portion of current world high-grade reserves. Mining occurs at a depth of 185m.

Gloria is along the R380 approximately ≈ 13km from Black Rock Main Offices. Gloria comprises of underground and surface /plant. Gloria has its Tailings/Slimes storage facilities (TSFs), Sewage Treatment Plant and Diesel Tanks within the mine premises. This mine produces lower grade ore.

Nchwaning II: The Nchwaning II Mine exploits a portion of the strategically important Kalahari Manganese Field. The ore contained in this area represents a substantial portion of

current world high grade reserves. Processing of ore is via the existing Nchwaning plant, which has been upgraded and now treats the ore from both Nchwaning II and III Mines. The mine has contributed significantly towards the infrastructure (rail, water, power and tarred roads) in the Northern Cape.

Nchwaning II is along the R380 approximately 1.69 km from Black Rock Main Offices. Nchwaning II comprises of underground and surface /plant. It produces higher grade ore. The mine comprises of the following sections that are within the mine

- Tailings/Slimes storage facilities;
- Surface Ore Transport area;
- Wash Bay;
- Sewage Treatment Plant;
- Potable water and process water storage and management facilities; and
- Bulk fuel storage and refuelling station.

SECTION 3: METHOD OF MINING

Assmang mines manganese ore, which is mined in the Black Rock area of the Kalahari, in the Northern Cape Province. The ore is mined from the Kalahari Manganese field. Two manganese seams are presently mined. The No. 1 seam is up to 6 metres in thickness and approximately 400 metres underground at Nchwaning II and 200 metres underground at Gloria. No 2 seam is situated above No 1 seam and is accessed via the Nchwaning II mining infrastructure.

Mining at Gloria and Nchwaning II takes place by drilling, blasting, and crushing of underground ore before being conveyed by a conveyor belt to the processing facilities on the surface.

As the manganese ore reaches the plant, it goes through the screener to be crushed into smaller particles. The particles are conveyed to a conveyor belt to be washed. Once the manganese ore is washed, it is then broken into different sizes. A dump truck and stacker would then transport the material to the stockpile area according to their grades.

SECTION 4: LEGAL REQUIREMENTS

4-1 THE CONSTITUTION OF SOUTH AFRICA, 1996 (ACT NO. 108 OF 1996)

Section 24 of the Constitution of South Africa, 1996 (Act No. 108 of 1996) states that *"…everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that (c) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."* This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development.

4-2 NATIONAL WATER ACT, 1996 (ACT NO.36 OF 1998)

The National Water Act, 1998 (Act 36 of 1998) (NWA), aims to manage national water resources in order to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected, and integrated management of water resources takes place. The NWA provides the legal basis upon which to develop tools and means to give effect to sustainable, equitable, water resource management in South Africa. One of these tools is the required authorisation of water uses, as defined in Chapter 4 of the NWA, prior to a Proponent's lawful commencement thereof. Section 21 of the NWA lists 11 water uses which can only be legitimately undertaken through a IWUL issued by the Department of Water and Sanitation (DWS).

In terms of the requirements of Section 21 of the NWA, a Water Use Licence Application (WULA) is required for the following water uses:

(a) taking water from a water resource;

(b) storing water;

(c) impeding or diverting the flow of water in a watercourse;

(d) engaging in a stream flow reduction activity contemplated in section 36;

(e) engaging in a controlled activity identified as such in section 37 (1) or declared under section 38 (1);

(f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;

(g) disposing of waste in a manner which may detrimentally impact on a water resource;

(h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;

(i) altering the bed, banks, course or characteristics of a watercourse;

(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and

(k) using water for recreational purposes.

BRMO has been issued with a IWUL, which was recently updated, for the following water uses:

- Section 21(a): Taking of water from a water resource, subject to the conditions set out in Appendices I and II.
- Section 21(b): Storing water, subject to conditions set out in Appendices I and III
- Section 21(e): Engaging in controlled activity, subject conditions set out in Appendices I and IV.
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource, subject to the conditions as set out in Appendices I and V.
- Section 21(j): Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people, subject to the conditions set out in Appendices I and VI.

4-2.1 Licence No. 10/D41M/ABEGJ/3490, condition 11 of Appendix I

This WULCA was performed in line with the requirements of the conditions of the IWUL (**Licence No. 10/D41M/ABEGJ/3490**), condition 11 of Appendix I i.e. *"The Licensee shall appoint an independent external auditor to conduct an annual audit on compliance with the conditions of this licence.*

BRMO was issued with an IWUL in October 2015 for BRMO (**Licence number: 10/D41M/ABEGJ/3490**), by the DWS which expires in October 2041 for the following water uses:

Table 1: Approved water uses

Section 21 Water Use	Description of Water Use
(a) taking water from a water resource	Taking of underground water (23 928 m^3/a) at Black Rock shaft 6 for manganese mining processes
	Taking of underground water (106 956 m^3/a) at Black Rock old shaft 7 for manganese mining processes
	Taking of underground water (25 800 m^3/a) at Black Rock old shaft 7 dewatering borehole for manganese mining processes
	Taking of underground water (23 928 m^3/a) at Black Rock old shaft 8 for manganese mining processes for manganese mining processes
	Taking of underground water (8 316 m^3/a) at Gloria Borehole for manganese mining processes
	Taking of underground water (86 424 m^3/a) at Gloria Shaft 2 (new) for manganese mining processes
	Taking of underground water (650 975 m^3/a) at Nchwaning II shaft for manganese mining processes
	Taking of underground water (176 232 m^3/a) at Nchwaning III shaft for manganese mining processes
(b) storing water	Gloria Fire Suppression tank 1 from Sedibeng Water Board (373 m^3)

	Gloria Fire Suppression tank 2from Sedibeng Water Board (373 m^3)
	Black Rock 5ML Potable reservoirs from Sedibeng Water Board (5 000 m^3)
	Potable reservoir 1 from VG (Vaal Gamagara) Line (Sedibeng water board (5 000 m^3)
	Potable reservoir 2 from VG Line (Sedibeng Water Board (5 000 m^3)
	Potable reservoirs from VG Line (Sedibeng Water Board (3 000 m^3)
	Black Rock 50 ML process reservoir (Sedibeng Water Board) (50 000 m^3)
	Nchwaning II 2.5ML process water reservoir at Nchwaning II Plant (Sedibeng Water Board) (2 500 m^3)
	Nchwaning II 500 KL process water reservoir at Nchwaning II Plant (Sedibeng Water Board) (500 m^3)
	Nchwaning III 5ML potable water reservoir (Sedibeng Water Board) (5000 m^3)
	Back Rock Fire Suppression tank (Sedibeng Water Board) (373 m^3)
	Back Rock Fire Suppression tank 2 (Sedibeng Water Board) (373 m^3)
(e) engaging in a controlled activity identified as such in section 37 (1) or declared under section 38 (1)	Irrigation of Golf course with water (376 442 m^3/a) from return water dam (treated effluent and underground dewatering).
	Irrigation of Black Rock village including Black rock school fields with water (61 600 m^3/a) from return water dam (treated effluent and underground dewatering).
(g) disposing of waste in a manner which may detrimentally impact on a water resource	Nchwaning II Pollution control dam (41 000 m^3) from underground workings.
	Nchwaning II Pollution control dam (4 100 m^3) from underground workings.
	Disposal of slimes from clarifier to water storage dam 1 at Black Rock Mine. Capacity: 50 000m^3; Volume: 2 500 m^3/a
	Disposal of slimes from clarifier to water storage dam 2 at Black Rock Mine. Capacity: 50 000m^3; Volume: 2 500 m^3/a
	Temporary storage of treated dewater underground water (water that is treated via the clarifier) - Clarifier Dam 1. Capacity: 50 000m^3; Volume: 1 044 000 m^3/a
	Disposal of "dirty" stormwater as part of Gloria mine expansion 1 (stormwater dam 1). Capacity: 50 000m^3; Volume: 29 762 m^3/a
	Disposal of "dirty" stormwater as part of Gloria mine expansion 2 (stormwater dam 2). Capacity: 50 000m^3; Volume: 29 762 m^3/a
	Disposal of "dirty" stormwater as part of Gloria mine expansion 3 (stormwater dam 3). Capacity: 50 000m^3; Volume: 29 762 m^3/a
	Process water dam (New process water dam 1 at Gloria Mine) for the storage of water from underground, decant water from TSF, Vaal Gamagara and stormwater dams. This water will be used for surface operations at Gloria new shaft and sinter plant complex.Capacity: 50 000m^3; Volume: 600 000 m^3/a
	Process water dam (New process water dam 2 at Gloria Mine) for the storage of water from underground, decant water from Tailings storage facility (TSF), Vaal Gamagara and stormwater dams. This water will be used for surface operations at Gloria new shaft and sinter plant complex. Capacity: 50 000m^3; Volume: 600 000 m^3/a
	Return water dam (20Ml dam) from Gloria slimes dam. Used to recover water from the active slimes dam and this water is re-used in the plant circuit. Capacity: 20 000m^3; Volume: 75 600 m^3/a
	Return water storage dam (Gloria 1Ml dam) used to store water from underground dewatering, reclaimed water from the return water dam, borehole at Gloria and from Vaal Gamagara (if needed). It will be used for mine Processing plant. Capacity :1 000m^3;Volume: 180 000 m^3/a
	New Plant water storage dam at Nchwaning II (wastewater dam at Nchwaning II) used to stored water from the Black Rock Water Treatment Plant which is then used as process water within the Nchwaning II plant. Capacity: 2 500m^3; Volume: 208 176 m^3/a
	Nchwaning II Plastic Dam used to recover water from the Nchwaning II slimes dam and stored treated effluent. Capacity: 3 000m^3; Volume: 180 000 m^3/a
	Disposing tailings into Nchwaning II Active Tailings Dam from Nchwaning mine. Volume: 45 080 m^3/a
	Disposing tailings in Nchwaning II Historical Tailings Dam from Nchwaning mine. Volume: 123 500 m^3/a
	Gloria Historical Tailings from Gloria mine. Volume: 100 000 m^3/a
	Gloria Active Tailings from Gloria mine. Volume: 22 560 m^3/a
	Dewatered water used for dust suppression of haul roads. Volume: 86 410 m^3/a
(j) altering the bed, banks, course or characteristics of a watercourse	Dewatering of underground water (Volume: 106 956 m^3/a) at Black Rock old shaft 7
	Dewatering of underground water (Volume: 25 800 m^3/a) at Black Rock old shaft 7 dewatering borehole
	Dewatering of underground water (Volume: 23 928 m^3/a) at Black Rock old shaft 8
	Dewatering of underground water (Volume: 8 316 m^3/a) at Gloria Borehole
	Dewatering of underground water (of Volume: 86 424 m^3/a) at Gloria Shaft 2 (new)
	Dewatering of underground water (of Volume: 650 975 m^3/a) at Nchwaning II shaft
	Dewatering of underground water (Volume: 176 232 m^3/a) at Nchwaning III shaft

The IWUL has been amended to include the water uses in Table 2 below. The previous IWUL issued on 21 October 2015 (**Licence number: 10/D41M/ABEGJ/3490**) has been superseded/ replaced by the Licence issued on 10 April 2019 (reference number has not changed).

The audited IWUL authorises BRMO to undertake the following water uses; **taking water from the underground workings**; **dispose tailings into the disposal facilities and associated waste management,** dewatering **of groundwater for safety of the employees, irrigating the Mine village** and storage **of water on the site**. The newly approved WUL authorises BRMO for exactly the same water uses, however there are additional localities/areas per water use.

Table 2: Amended water uses

Section 21 Water Use	Description of Water Use
(a) taking water from a water resource	Abstraction of Dewatered water of underground water (23 928 m^3/a) at Black Rock shaft 6 to be used for mine ore processing (added as an amendment)
(b) storing water	Storage of water from dewatering, water treatment, and process water circuit into Nchwaning II 2.5 ML Process Water Reservoir 1 at Nchwaning II Plant to be used for process water. Capacity: 2 500 m^3; Volume: 500 000m^3/a
	Storage of water from dewatering, water treatment, and process water circuit into Nchwaning II 2.5 ML Process Water Reservoir 2 at Nchwaning II Plant to be used for process water. Capacity: 2 500 m^3; Volume: 500 000m^3/a
	Storage of water from Black Rock potable water into Nchwaning II 500 KL Potable Water Reservoir at Nchwaning 11 Plant to be used for human consumption, ablutions, and emergency fire tanks. Capacity: 500 m^3 ; Volume: 300 000m^3/a
	Storage of water from Gloria vent shaft dewatering into Gloria Vent Shaft Reservoir to be used for Dust Suppression. Capacity: 250 m^3; Volume: 100 000m^3/a
	Storage of water from dewatering, water treatment, and process water circuit into Nchwaning II Clarifier Plant Reservoir to be used for process water and dust suppression. Capacity: 500 m^3; Volume: 600 000m^3/a
	Storage of water from dewatering, water treatment, and process water circuit into Black Rock Clarifier Plant Reservoir to be used for process water and dust suppression. Capacity: 500 m^3; Volume: 1000 000m^3/a
	Storage of water from Nchwaning II Potable Water circuit into Nchwaning I Fire Suppression Tank 1 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a
	Storage of water from Nchwaning II Potable Water circuit water into Nchwaning I Fire Suppression Tank 2 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a
	Storage of water from Nchwaning II Potable Water circuit water into Nchwaning II Fire Suppression Tank 1 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a
	Storage of water from Nchwaning II Potable Water circuit water into Nchwaning II Fire Suppression Tank 2 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a
	Storage of water from Potable Water circuit into Nchwaning II Load Out Fire Suppression Tank 1 to be used emergency suppression. Capacity: 373 m^3; Volume: 5 000m^3/a
	Storage of water from Potable Water circuit into Nchwaning II Load Out Fire Suppression Tank 2 to be used emergency suppression. Capacity: 373 m^3; Volume: 5 000m^3/a
	Storage of water from Vaal Gamagara Pipeline into Black Rock Potable water storage 1 -to be used for human consumption, ablutions, and emergency fire tanks. Capacity: 1 000m^3 ; Volume: 1 500 000 m^3/a
	Storage of water from Vaal Gamagara Pipeline into Black Rock Potable water storage 2 -to be used for human consumption, ablutions, and emergency fire tanks. Capacity: 1 000m^3 ; Volume: 1 500 000 m^3/a
	Storage of water from Black Rock potable water into Nchwaning II Potable water reservoir (roofed) to be used for human consumption, ablutions and emergency fire tanks. Capacity: 500m^3 ;Volume: 300 000 m^3/a
(g) disposing of waste in a manner which may detrimentally impact on a water resource	Dust suppression: Volume: 86 410 m^3/a
	Storage of water from Black Rock process water circuit into Black Rock Kopie Process water reservoir to be used as process water. Capacity: 500 m^3; Volume: 1 000 000 m^3/a
	Storage of water from Nchwaning II process water circuit into Rail Loop Process Water Reservoir 2 to be used for dust suppression and process water. Capacity: 1 500 m^3; Volume: 100 000 m^3/a
	Storage of water from Nchwaning II process water circuit into Rail Loop Process Water Reservoir 2 to be used for dust suppression and process water. Capacity: 1 500 m^3; Volume: 100 000 m^3/a
	Storage of water from Nchwaning 2 Tailings Facilities into Nchwaning 2 Existing TSF Return Water Dam to be used for process water and tailings disposal. Capacity: 3 000 m^3; Volume: 1000 000 m^3/a

	Storage of water from Nchwaning 2 Tailings Facilities into Nchwaning New TSF Return Water Dam to be used for process water and tailings disposal. Capacity: 650m^3; Volume: 1 000 000 m^3/a
	Storage of water from Nchwaning II process water circuit into Nchwaning II process water reservoir (TK01) to be used for processing. Capacity: 250m^3; Volume: 600 000 m^3/a
	Storage of water from Black Rock Clarifier into Belgravia Conservation Farm Pan 1 to be used for wildlife conservation. Capacity: 5 000m^3; Volume: 100 000 m^3/a
	Storage of water from Black Rock Clarifier into Belgravia Conservation Farm Pan 2 to be used for wildlife conservation. Capacity: 2 000m^3; Volume: 100 000 m^3/a
	Storage of water from Vaal Gamagara Supply into Gloria Potable Water Reservoir 1 to be used for human consumption, ablutions and emergency fire tanks. Capacity: 500m^3; Volume: 50 000 m^3/a
	Storage of water from Vaal Gamagara Supply into Gloria Potable Water Reservoir 2 to be used for human consumption, ablutions and emergency fire tanks. Capacity: 500m^3; Volume: 50 000 m^3/a
	Storage of water from process water circuit into Gloria Process Water Reservoir 1 to be used for processing and dust suppression. Capacity:1000m^3; Volume: 150 000 m^3/a
	Storage of water from process water circuit into Gloria Process Water Reservoir 2 to be used for processing and dust suppression. Capacity:1000m^3; Volume: 150 000 m^3/a
	Storage of stormwater from stockyard into Nchwaning II Pollution Control Dam to be used for processing and dust suppression. Capacity:3 500m^3; Volume: 10 000 m^3/a
	Storage of water from Gloria Tailings Facilities into Gloria Tailings Return water dam to be used for process water and tailings disposal. Capacity: 20 000m^3; Volume: 150 000 m^3/a
(j) altering the bed, banks, course or characteristics of a watercourse	Dewatering of underground water (Volume: 928 m3/a) at Black Rock shaft 6. Has changed to 23 928 m^3/a)
	Dewatering of underground water (Volume: 23 928 m^3/a) at Black Rock shaft 6

For the purposes of this WULCA, the amended water uses in Table 2 have not been assessed as part of this audit.

SECTION 5: METHODOLOGY/ SCOPE OF WORK

The scope of the audit was to determine the level of compliance which the BRMO maintains in terms of the IWUL conditions; at all of its licensed mining areas and associated infrastructure. This WULCA focuses on aspects relating to the operational phases. The report has intentionally excluded the construction phase as the mine is currently being operated.

The WULCA was essentially facilitated in order to determine the level of compliance with the conditions provided for in the IWUL issued on 21 October 2015 (**Licence number: 10/D41M/ABEGJ/3490**). In conducting the WULCA, the conditions made in the IWUL were used as basis for evaluation of BRMO compliance.

The scope of this audit further included:

- Distribution of notification/memo to all BRMO stakeholders prior to the commencement with the site inspections;
- Review of documentation and information provided during and after the site inspections;
- Undertaking of physical site inspections for the observation of the BRMO licensed mining areas and associated infrastructure from **Monday, 15 April 2019** to **Tuesday, 16 April 2019**;
- Interviews with key personnel conducted at the BRMO Head Office and at the mines; and
- Compilation of this technical WULCA Report.

SECTION 6: AUDIT OBJECTIVE

The objective of the audit was to verify and determine the level of compliance/ continued conformity that the BRMO maintains with the issued IWUL conditions. Part of the assessment was to identify and document any gaps with respect to management measures currently implemented and to provide recommendations on how to address these gaps.

SECTION 7: PERIOD OF THE ASSESSMENT

This WULCA report aims to fulfil the requirements of the issued IWUL for the time since the previous WULCA dated July 2018.

The mine's operations are legally obliged to conduct WULCA in terms of the conditions made in the relevant issued IWUL, condition 11 of Appendix I i.e. *"The Licensee shall appoint an independent external auditor to conduct an annual audit on compliance with the conditions of this licence'.*

The WULCA will therefore be undertaken every 1 year as stipulated in the IWUL, dated October 2015 (**Licence number: 10/D41M/ABEGJ/3490**) – amended on 10 April 2019.

SECTION 8: EVALUATION CRITERIA AND ASSESSMENT METHODOLOGY

The assessment was undertaken from **Monday, 15 April 2019** to **Tuesday, 16 April 2019**. Document reviews were conducted from **15 April 2019**, followed by the on-site inspection and interviews on **16 April 2019**. A two-day site visit was undertaken in order to have an understanding of the receiving environment and the current activities. The current activities and the existing surface infrastructure have been assessed.

A discussion pertaining to overall overview of the operations in all BRMO mines was convened.

The WULCA was conducted by means of the following:

8-1 DESKTOP STUDIES

Desktop study was undertaken by reviewing and verifying existing documents. BRMO personnel provided MC with the required background documentation. The documentation obtained and reviewed included but was not limited to:

- The approved IWULs, dated October 2015 and April 2019 **(this WULCA did not assess the amended IWUL issued on 10 April 2019. The IWUL was reviewed to verify the activities which are currently being undertaken, which were not previously approved through the IWUL issued on 21 October 2015)**;
- Updated Environmental Management Programme (EMPr), dated 20 January 2017;
- External WULCA for BRMO, dated July 2018;
- Quarterly Water Quality Monitoring Reports, dated February 2014, January 2018, July 2018; October 2018 and January 2019;
- Bi-Annual Water Quality Reports, dated May 2018;
- Environmental Impact Assessment (EIA) and Management Programme Alignment Report, dated April 2009;
- Environmental Management Plan (EMP) Alignment Environmental Management Report, dated April 2009;
- Geophysical Investigation Report, dated November 2011;
- Mining Right, issued on 13 July 2011;
- Stormwater Management Plan, dated November 2014;
- BRMO Water Flow Diagrams;
- Correspondence to (14 March 2018) and from (08 September 2017) the DWS;
- Correspondence to (27 September 2018) the DWS for consolidation of licenses;
- Draft Integrated Water and Waste Management Plan (IWWMP) and IWUL Application Report, dated March 2012;
- Issued Environmental Authorisation (EA) for the decommissioning of a diesel storage facility;

- EMP Revision, dated October 2012;
- Draft EMPr Addendum, dated October 2011;
- Draft EIA Report, dated October 2011;
- Evaluation of the Hydrocensus data at Black Rock Mining Operations and its surroundings; dated December 2011;
- IWWMP; October 2012;
- Rehabilitation Plan for 2016/2017;
- External WULCA for BRMO, dated July 2018
- Groundwater supply feasibility study report, dated May 2017;
- Water Balance Spreadsheet, up to 01 March 2019;
- Request for proposals from service providers to undertake water balance and Water Conservation and Water Demand Management (WC&WDM); and Eradication of Alien Species.
- Rainfall data from the mine;
- Waste characterisation/ classification report;
- Proof of submission of the internal audits to the DWS;
- Proof of submission of a detailed Stormwater Management Plan within three (3) months of issuance of the licence;
- Alien Invasive Eradication Plan; and
- Flow Meter Readings.

The above documentation was reviewed during the audit process. Special emphasis was placed on any non-compliances noted during the previous annual audits and these were highlighted for further inspection during this audit. An initial review of the approved IWUL was undertaken so as to establish the relevant environmental commitments and prepare detailed checklists. The checklists were used to evaluate compliance of the BRMO with the commitments of the IWUL.

The technical team from MC identified and gathered the information and data that would be required to undertake the WULCA.

8-2 CHECKLISTS

A checklist was formulated based on the operational conditions contained within the issued IWUL. The objective of using checklists is to define what to audit and how to document compliance.

8-3 INTERVIEWS

Interviews were conducted with key members of the BRMO, as well as with site managers/ foremen. The objective of interviewing personnel was to determine understanding of the IWUL conditions and to ensure that the information obtained during the “systems” audit and site inspection corresponds with information received from personnel during interviews.

Interviews were conducted with the following mines’ personnel:

Name and Surname	Designation	Mines Operations
Mr. Thami Mbonani	Environmental Officer	BRMO
Ms. Tshifhiwa Ravele	Environmental Specialist	BRMO
Mr. Mukesh Ramjee	Mine’s Foreman/ Supervisor	Gloria Mine
Mr. Bheki Ngwane	Total Depot Manager	Nchwaning III
Mr. Johan Fourie	Mechanical Foreman	Nchwaning II
Mr. Joepie	SOT - Fitter	Nchwaning II
Mr. Thabo Sephiri	Fraser Alexander Dam Operator/ Supervisor	Nchwaning II Slimes Dams
Mr. Itumeleng Jackals	Fraser Alexander Dam Operator	Nchwaning II Slimes Dams

Mr. Freddy Theroeng	Fraser Alexander Dam Operator	Nchwaning II Slimes Dams

Refer to Appendix 2 for the attendance registers during the project inception, site audits and close out meetings.

8-4 OBSERVATIONS

Observations were made during the site visits to BRMO mining areas and associated infrastructure. The objective of observations was for "ground truthing" purposes of what was learned during the documentation audit and interviews. A photo plate of pictures taken during the physical inspection is attached as Appendix 3 of this WULCA Report.

The table below shows the areas which were visited/ inspected.

Table 3: Mining Areas Visited/ Inspected

Gloria	Black Rock	Nchwaning II	Nchwaning III
Engineering services and facilities	Waste Management Facilities	Tailings Dams	Mine shaft
Ore Processing Plant	Sewage Treatment Plant	Tailings Storage Dams Extension	Bulk fuel storage and refuelling station
Slimes Dams (Dormant and Operational)	Clarifier Complex	Engineering services and facilities	
Decline Shaft (above ground visual inspections only)	Salvage Yard	Ore Processing Plants	
Sewage Treatment Plant	Old Black Rock mine works	Sewage treatment plant	
Waste Water Dam (1ML)	Potable water storage tank	Waste Water Activities	
Drove past the contractor Housing Facility and the Potable Water Reservoir	Bulk fuel storage and refuelling station	Surface Ore Transport	
Bulk Diesel Storage for Underground vehicles	Black Rock Village - Golf course, recreational facility and Rugby Field	Ore Stock Piles	
	Portable Water Storage Tanks		
	A back-up power generation plant		
	Upstream and Downstream Monitoring Boreholes		
	Offices, administration and support facilities		

SECTION 9: FINDINGS MADE DURING THE ASSESSMENT

This section contains a comprehensive breakdown on the status of compliance as determined for the period of the assessment. Table 6 below contains all the conditions from the IWUL. The WULCA was facilitated against these conditions.

9-1 CONDITION STATUS CODE DEFINITIONS

For the purpose of this WULCA, scores / status code definitions have been allocated to the conditions contained in the IWUL. The status codes have been divided into five different categories as outlined in Table 4 below.

The scores allocated to each condition are added and a compliance percentage is calculated, which can be seen as a representation of the level of compliance achieved by the BRMO. Note that the Status Code Definitions is not a weighted scoring system and as such will not indicate the severity of non-compliances.

Table 4: Condition Status Code Definitions

Category / Status	Score	Description	Colour code in Table
In place	**3**	When a condition is totally conformed to and the management measures which are in place are sufficient. No further actions necessary by BRMO management	
Partially in place	**1 or 2**	When a condition is not totally conformed to and the management measures which are in place are not sufficient.	
Not in place	**0**	Should a condition not be conformed to at all with no management measures in place	
Not applicable	**NA**	Where the condition as stipulated in not relevant or applicable to the operations at the BRMO. Not applicable conditions were removed from the total number of conditions from which the compliance score was calculated.	
Could not be determined at the time of the audit	**CND**	Where a condition could not be assessed for whatever reason	

Table 5: WULCA for the operational phase (NB: the mine has already been developed, and is operational)

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
Appendix I: General conditions					
1.	This licence is subject to all provisions of the National Water Act, 1998 (Act 36 of 1998).	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder.
2.	The responsibility for complying with the provisions of the licence is vested in the Licensee and not any other person or body.	√ In Place	√ In Place	Specialist Environmental	Noted. The Environmental Specialist (Ms. Tshifhiwa Ravele), as a representative of BRMO is responsible for ensuring compliance to the provisions of the license.
3.	The Licensee shall immediately inform the Provincial Head of any change of name, address, premises and/or legal status.	N/A	N/A	Licence Holder i.e. Assmang: BRMO	On the date of this audit, there was no change of name, address, premises or legal status of the License Holder. All of the licensee's details are the same and as per those included on the issued licence.
4.	If the properties mentioned in respect of which this licence is issued is subdivided or consolidated, the Licensee must provide full details of all changes in respect of the properties to the Provincial Head within sixty (60) days of the said change taking place.	N/A	N/A	Licence Holder i.e. Assmang: BRMO	As this is a once off condition it is considered not applicable for this audit. The properties as per the IWUL have not been subdivided nor consolidated.
5.	If a water user association is established in the area to manage the resources, membership of the Licensee to this association is compulsory.	√ In Place	N/A	Licence Holder i.e. Assmang: BRMO	It was reported that a water user association, was established however, has not been active. BRMO periodically checks with the relevant Catchment Management Agency (CMA) to ensure that, at such time as a water user association is established, BRMO will endeavour to obtain membership with the said association. BRMO are constantly liaising with the DWS, to inform BRMO, should there be such an association within the Kimberly area.
6.	The Licensee shall be responsible for any water use charges or levies imposed by a responsible authority.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder. The water use charges or levies have been imposed on the Licence Holder, and have been paid. Statements are available to support such. The first statement was received in 2018. The Engineering division within BRMO are responsible for payment of the invoices/ statements.
7.	While effect must be given to the Reserve as determined in terms of the Act, where a desktop determination of the Reserve has been used in issuance of a licence, when a comprehensive determination of the Reserve has finally been made; it shall be given effect to.	N/A	N/A	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder.
8.	The licence shall not be construed as exempting the Licensee from compliance with the provisions of any other applicable Act, Ordinance, Regulation or By-law.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder. The Licence Holder has implemented a legal register which includes and tracks compliance against all interlinked pieces of legislation and is updated on a regular basis.
9.	The licence and amendment of this licence are also subject to all the applicable procedural requirements and other applicable provisions of the Act, as amended from time to time.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	BRMO personnel confirmed that an IWUL amendment application was submitted to the DWS in October 2017, for the additional activities that were not included in the previous application. MC were informed that the IWUL had been issued. MC received the IWUL on 09 May 2019. The IWUL has been amended to include the highlighted water uses in Table 1 above. The previous IWUL issued on 21 October 2015 (**Licence number: 10/D41M/ABEGJ/3490)** has been superseded/ replaced by the Licence issued on 10 April 2019 (reference number has not changed).
10.	The Licensee shall conduct an annual internal audit on compliance with the conditions of licence. A report on the audit shall be submitted to the Provincial Head within one (1) month of the finalisation.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	An internal audit on compliance to the conditions of the licence was undertaken in December 2018. No proof of submission to the DWS within one (1) month of finalisation of the report was provided for. BRMO personnel confirmed that the internal reports are being submitted to the DWS on an annual basis. Proof of submission of the external audit reports compiled in February/ March 2016 was made available to MC.
11.	The Licensee shall appoint an independent external auditor to conduct an annual audit on compliance with the conditions of this licence. The first audit must be conducted within three (3) months of the date of issuance of this licence and a report on the audit shall be submitted to the Provincial Head within one (1) month of finalisation.	Partially in place	N/A	Licence Holder i.e. Assmang: BRMO	This condition is considered a once-off historical requirement and as such is not applicable to the current audit period.
12.	Flow metering, recording and integrating devices shall be maintained in a sound state of repair and calibrated by a competent person at intervals of not more than two (2) years. Calibration certificates shall be available for inspection by the Provincial Head or his/her representative upon request.	√ In Place	Partially in place	Licence Holder i.e. Assmang: BRMO	Not all, but some of the flow meters have been maintained in a sound state of repair and calibrated by a competent person. There currently have been some replacements of the old flow meters with electronic meters. Calibration certificates were confirmed by the BRMO personnel to have been submitted to the DWS. Proof of submission was not made available to MC. BRMO is currently undertaking a water/flow meter project, which entails the following: • The identification of all the areas (inlets, outlets and other areas within the processes) that require the installation of water/flow meters, as per existing WUL requirements. • Identifying the areas within the process; where water is used, reused, recycled and/or pumped into the existing TSF • Purchasing and installation of new flow meters, and fixing of the old defective meters; and • Calibration of the existing flow meters.
13.	Any incident that causes or may cause water pollution must be reported to the Provincial Head or his/her designated representative within twenty-four (24) hours.	√ In Place	Partially in place	Licence Holder i.e. Assmang: BRMO	BRMO personnel (Plant Foremen) alluded that there had been spillages at the Gloria Sewage Treatment Plant (STP), which occurred as a result of lack of potable water not being pumped into the system, which resulted into the plant's scrubber being blocked.

<table>
<tr><th>IWUL Condition #</th><th>Condition</th><th>2018 Compliance</th><th>2019 Compliance</th><th>Responsible Person</th><th>Findings/ Comments</th></tr>
<tr><td>14.</td><td>The Licensee shall use water efficiently to minimise total water intake, avoid usage of water where possible, implement good housekeeping and operating practices, and maximise the re-use /recycling of contaminated water.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Water use optimisation is being prioritised on e.g. The use of treated water for irrigation-controlled activities (at the Rugby field, situated at the Black Rock Village and the Black Rock Village as a whole). Water is being monitored. The current IWUL limits are being used as targets. The mine is in a process of developing the WC&WDM plan, and Requests for Proposals (RFPs) have been sent to the various service providers. BRMO is further in the process of conducting a water balance update project to further identify areas to use water more efficiently.</td></tr>
<tr><td>15.</td><td>Notices prohibiting unauthorised persons from entering the certain areas, as well as internationally acceptable signs indicating the risks involved in case of an unauthorised entry must be displayed along the boundary fence of these areas.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Notices prohibiting unauthorised persons from entering the certain areas, as well as internationally acceptable signs indicating the risks involved in case of an unauthorised entry were displayed along the boundary fence of all mines and its facilities. Safety signs were noted in place at various locations around the mine, including the TSFs and STPs.</td></tr>
<tr><td>16.</td><td>If the Licensee is not the end user/beneficiary of the water use related infrastructure and will not be responsible for long term maintenance and management of the infrastructure, the Licensee must provide a programme for hand over to the successor-in-title including a brief management/maintenance plan and the agreement for infrastructure along with allocation of responsibilities, within 6 month of this Licence issuance.</td><td>N/A</td><td>N/A</td><td>Licence Holder i.e. Assmang: BRMO</td><td>This condition is not applicable as BRMO is the end user/beneficiary of the water use related infrastructure and will be responsible for long term maintenance and management of the infrastructure.</td></tr>
<tr><td colspan="6">Appendix II: Section 21 (a) of the Act: Taking of water from a water resource</td></tr>
<tr><td>1.</td><td>This licence authorises the taking from underground as detailed in Table 1:
Table 1: Authorised water uses
<table>
<tr><th>Water uses</th><th>Purpose</th><th>Volume (m³/a)</th><th>Properties</th><th>Co-ordinates</th></tr>
<tr><td colspan="5">Section 21(a)</td></tr>
<tr><td>1</td><td>Taking of underground water at Black Rock shaft 6 for manganese mining processes</td><td>23 928 m³/a</td><td>Portion 1 of farm Santoy 230</td><td>S 27° 07' 21.5" E 22° 49' 44.4"</td></tr>
<tr><td>2</td><td>Taking of underground water at Black Rock old shaft 7 for manganese mining processes</td><td>106 956 m³/a</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 07' 47.6" E 22° 49' 48.1"</td></tr>
<tr><td>3</td><td>Taking of underground water at Black Rock old shaft 7 dewatering borehole for manganese mining processes</td><td>25 800 m³/a</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 07' 51.3" E 22° 49' 34.5"</td></tr>
<tr><td>4</td><td>Taking of underground water at Black Rock old shaft 8 for manganese mining processes for manganese mining processes</td><td>23 928 m³/a</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 07' 40.5" E 22° 49' 53.9"</td></tr>
<tr><td>5</td><td>Taking of underground water at Gloria Borehole for manganese mining processes</td><td>8 316 m³/a</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 10' 20.9" E 22° 53' 17.6"</td></tr>
<tr><td>6</td><td>Taking of underground water at Gloria Shaft 2 (new) for manganese mining processes</td><td>86 424 m³/a</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 10' 20.9" E 22° 53' 17.6"</td></tr>
<tr><td>7</td><td>Taking of underground water at Nchwaning II shaft for manganese mining processes</td><td>650 975m³/a</td><td>Portion 3 of farm Nchwaning 267</td><td>S 27° 8' 7.2" E 22°51'55.5"</td></tr>
<tr><td>8</td><td>Taking of underground water at Nchwaning III shaft for manganese mining processes</td><td>176 232m³/a</td><td>Portion 3 of farm Nchwaning 267</td><td>S 27° 08' 07.0" E 22° 51' 55.9"</td></tr>
</table></td><td>CND</td><td>CND</td><td>Licence Holder i.e. Assmang: BRMO</td><td>From the water balance excel spread sheet, calculated from July 2018 to April 2019, the following readings are provided for process water:
• At Gloria: 0m³
• Gloria 2: 0 m³
• Nchwaning II: 0 m³
• Nchwaning III: 94 m³

The following readings are provided for potable water:
• Gloria: 14195 m³
• Gloria 2: 0 m³
• Nchwaning II: 6454 m³
• Nchwaning III: 39009 m³

The water abstracted from the licenced sources has not been recorded and remains undetermined whether abstraction occurred from any other sources as included in Table 1.</td></tr>
<tr><td>2.</td><td>The quantity of water authorised to be taken in terms of this licence may not be exceeded without prior authorisation by the Department.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Noted by the Licence Holder.</td></tr>
<tr><td>3.</td><td>This licence does not imply any guarantee that the said quantities and qualities of water will be available at present or at any time in the future.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Noted by the Licence Holder.</td></tr>
<tr><td>4.</td><td>The Licensee shall continually investigate new and emerging technologies and put into practice water efficient devices or apply technique for the efficient use of water containing waste, in an endeavour to conserve water at all times.</td><td>√
In Place</td><td>√
In Place</td><td></td><td>Water use optimisation is being prioritised on e.g. The use of treated water for irrigation-controlled activities (at the Rugby field, situated at the Black Rock Village and the Black Rock Village as a whole). Water is being monitored. The current IWUL limits are being used as targets. The mine is in a process of developing the</td></tr>
</table>

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					WC&WDM plan, and RFPs have been sent to the various service providers. BRMO is further in the process of conducting a water balance update project to further identify areas to use water more efficiently. Not all, but some of the flow meters have been maintained in a sound state of repair and calibrated by a competent person. There currently have been some replacements of the old flow meters with electronic meters. Calibration certificates were confirmed by the BRMO personnel to have been submitted to the DWS. Proof of submission was not made available to MC. BRMO is currently undertaking a water/flow meter project, which entails the following: • The identification of all the areas (inlets, outlets and other areas within the processes) that require the installation of water/flow meters, as per existing WUL requirements. • Identifying the areas within the process; where water is used, reused, recycled and/or pumped into the existing TSF • Purchasing and installation of new flow meters, and fixing of the old defective meters; and • Calibration of the existing flow meters.
5. All water taken from the resource shall be measured as follows:					
5.1.	The daily quantity of water taken must be metered or gauged and the total recorded at the last day of each month; and	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	It was only confirmed through the mine personnel that all water pumped and abstracted is recorded on a daily basis.
5.2.	The Licensee shall keep record of all water taken and a copy of the records shall be forwarded to the Provincial Head each year with the annual water balance.	X Not in place	Partially in place	Licence Holder i.e. Assmang: BRMO	The mine is in a process of developing the WC&WDM plan, and RFPs have been sent to the various service providers. BRMO is further in the process of conducting a water balance update project to further identify areas to use water more efficiently. The water balance has not been updated for submission to the DWS for the years 2018 and 2019, and, therefore, no submission to the DWS has been undertaken. BRMO is, as described above, in the process of undertaking a full review of the water balance upgrade project. Once the project has been completed, the new updated water balance will be submitted to the DWS.
6.	No water taken may be pumped, stored, diverted, or alienated for purposes other than intended in this licence, without written approval by the Department.	X Not in place	√ In Place	Licence Holder i.e. Assmang: BRMO	BRMO used to operates water storage facilities that were not licenced and included: • Gloria Dust Suppression Dam (water from the new Gloria Vent Shaft) • Nchwaning I Fire Suppression Tank 1 • Nchwaning I Fire Suppression Tank 2 • Nchwaning II Fire Suppression Tank 1 • Nchwaning II Fire Suppression Tank 2 • Potable water storage 1 – Black Rock • Potable water storage 2 – Black Rock • Potable water dam (roofed) – Nchwaning II next to winder controls room. BRMO personnel confirmed that an IWUL amendment application was submitted to the DWS in October 2017, for the additional activities that were not included in the previous application. MC were informed that the IWUL had been issued. MC received the IWUL on 09 May 2019. The IWUL has been amended to include the highlighted water uses in Table 1 above. The previous IWUL issued on 21 October 2015 (Licence number: 10/D41M/ABEGJ/3490) has been superseded/ replaced by the Licence issued on 10 April 2019 (reference number has not changed). The following facilities were applied for through an amendment application, and have been approved. • Storage of water from dewatering, water treatment, and process water circuit into Nchwaning II 2.5 ML Process Water Reservoir 1 at Nchwaning II Plant to be used for process water. Capacity: 2 500 m^3; Volume: 500 000m^3/a • Storage of water from dewatering, water treatment, and process water circuit into Nchwaning II 2.5 ML Process Water Reservoir 2 at Nchwaning II Plant to be used for process water. Capacity: 2 500 m^3; Volume: 500 000m^3/a • Storage of water from Black Rock potable water into Nchwaning II 500 KL Potable Water Reservoir at Nchwaning 11 Plant to be used for human consumption, ablutions, and emergency fire tanks. Capacity: 500 m^3; Volume: 300 000m^3/a

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					• Storage of water from Gloria vent shaft dewatering into Gloria Vent Shaft Reservoir to be used for Dust Suppression. Capacity: 250 m^3; Volume: 100 000m^3/a • Storage of water from dewatering, water treatment, and process water circuit into Nchwaning II Clarifier Plant Reservoir to be used for process water and dust suppression. Capacity: 500 m^3; Volume: 600 000m^3/a • Storage of water from dewatering, water treatment, and process water circuit into Black Rock Clarifier Plant Reservoir to be used for process water and dust suppression. Capacity: 500 m^3; Volume: 1000 000m^3/a • Storage of water from Nchwaning II Potable Water circuit into Nchwaning I Fire Suppression Tank 1 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Nchwaning II Potable Water circuit water into Nchwaning I Fire Suppression Tank 2 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Nchwaning II Potable Water circuit water into Nchwaning II Fire Suppression Tank 1 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Nchwaning II Potable Water circuit water into Nchwaning II Fire Suppression Tank 2 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Potable Water circuit into Nchwaning II Load Out Fire Suppression Tank 1 to be used emergency suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Potable Water circuit into Nchwaning II Load Out Fire Suppression Tank 2 to be used emergency suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Vaal Gamagara Pipeline into Black Rock Potable water storage 1 -to be used for human consumption, ablutions, and emergency fire tanks. Capacity: 1 000m3; Volume: 1 500 000 m^3/a • Storage of water from Vaal Gamagara Pipeline into Black Rock Potable water storage 2 -to be used for human consumption, ablutions, and emergency fire tanks. Capacity: 1 000m^3; Volume: 1 500 000 m^3/a • Storage of water from Black Rock potable water into Nchwaning II Potable water reservoir (roofed) to be used for human consumption, ablutions and emergency fire tanks. Capacity: 500m^3; Volume: 300 000 m^3/a
7.	The Licensee shall install and monitor appropriate water measuring devices to measure the amount of water abstracted, received and/or consumed, as applicable to the infrastructure.	X Not in place	Partially in place	Licence Holder i.e. Assmang: BRMO	The mine is in a process of developing the WC&WDM plan, and RFPs have been sent to the various service providers. BRMO is further in the process of conducting a water balance update project to further identify areas to use water more efficiently. Not all, but some of the flow meters have been maintained in a sound state of repair and calibrated by a competent person. There currently have been some replacements of the old flow meters with electronic meters. Calibration certificates were confirmed by the BRMO personnel to have been submitted to the DWS. Proof of submission was not made available to MC. Flow meters are installed to measure the amount of water abstracted, received and/or consumed, discharged (irrigation). BRMO is currently undertaking a water/flow meter project, which entails the following: • The identification of all the areas (inlets, outlets and other areas within the processes) that require the installation of water/flow meters, as per existing WUL requirements. • Identifying the areas within the process; where water is used, reused, recycled and/or pumped into the existing TSF • Purchasing and installation of new flow meters, and fixing of the old defective meters; and • Calibration of the existing flow meters.
8.	The Licensee shall ensure that all measuring devices are properly maintained and in good working order and must be easily accessible. This shall include a programme of checking, calibration, and/ or renewal of measuring devices.	√ In Place	Partially in place	Licence Holder i.e. Assmang: BRMO	The mine is in a process of developing the WC&WDM plan, and RFPs have been sent to the various service providers. BRMO is further in the process of conducting a water balance update project to further identify areas to use water more efficiently. Not all, but some of the flow meters have been maintained in a sound state of repair and calibrated by a competent person. There currently have been some replacements of the old flow meters with electronic meters. Calibration certificates were confirmed by the BRMO personnel to have been submitted to the DWS. Proof of submission was not made available to MC. BRMO is currently undertaking a water/flow meter project, which entails the following:

<table>
<tr><th>IWUL Condition #</th><th>Condition</th><th>2018 Compliance</th><th>2019 Compliance</th><th>Responsible Person</th><th>Findings/ Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>• The identification of all the areas (inlets, outlets and other areas within the processes) that require the installation of water/flow meters, as per existing WUL requirements.
• Identifying the areas within the process; where water is used, reused, recycled and/or pumped into the existing TSF
• Purchasing and installation of new flow meters, and fixing of the old defective meters; and
• Calibration of the existing flow meters.</td></tr>
<tr><td>9.</td><td>The Licensee shall be responsible for any water use charges or levies, which may be imposed from time to time by the Department or responsible authority in terms of the Department's Raw Water Pricing Strategy.</td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Noted by the Licence Holder. The water use charges or levies have been imposed on the Licence Holder, and have been paid. Statements are available to support such. The first statement was received in 2018. The Engineering division within BRMO are responsible for payment of the invoices/ statements.</td></tr>
<tr><td>10.</td><td>The Licensee shall be responsible to address or compensate for any groundwater quality and quantity impacts that may arise due to the mining and associated activities.</td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Noted. No complaints have yet been received with regards to groundwater quality and quantity concerns.</td></tr>
<tr><td>11.</td><td>A groundwater monitoring (quality and quantity) report must be submitted to the Regional Head on a quarterly basis by the Licensee and the initial design of the monitoring network must be submitted within three (3) months of issuance of this licence to the Department.</td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Surface and groundwater monitoring is conducted on a quarterly and biannual basis. An IWWMP was submitted to authorities and included a groundwater monitoring plan as part of the licensing process. This groundwater monitoring plan was informed by a specialist geo-hydrological assessment. The monitoring network design was submitted prior to the issuing of the licence as part of the IWWMP. The site wide Geohydrological assessment undertaken in 2017 (GPT report: EEESB-16-1806) concludes that the current monitoring network is adequate. This report was recently (December 2017) submitted to the DWS along with an updated IWWMP.</td></tr>
<tr><td colspan="6">Appendix III: Section 21 (b) of the Act: Storing water</td></tr>
<tr><td>1.1</td><td>This licence authorises storing of water as indicated in Table 1.
<table>
<tr><th>Water uses</th><th>Purpose</th><th>Capacity/ Volume (m³, or m³/a)</th><th>Property Description</th><th>Co-ordinates</th></tr>
<tr><td colspan="5">Section 21(b)</td></tr>
<tr><td>1</td><td>Gloria Fire Suppression tank 1 from Sedibeng Water Board</td><td>Capacity: 373 m³</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 10' 17.5" E 22 ° 54' 49.4"</td></tr>
<tr><td>2</td><td>Gloria Fire Suppression tank 2from Sedibeng Water Board</td><td>Capacity: 373 m³</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 10' 17.5" E 22 ° 54' 49.4"</td></tr>
<tr><td>3</td><td>Black Rock 5ML Potable reservoirs from Sedibeng Water Board</td><td>Capacity: 5 000 m³</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 10' 16.9" E 22 ° 54' 25.4</td></tr>
<tr><td>4</td><td>Potable reservoir 1 from VG (Vaal Gamagara) Line (Sedibeng water board)</td><td>Capacity: 5 000 m³</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 10' 16.9" E 22 ° 54' 25.4</td></tr>
<tr><td>5</td><td>Potable reservoir 2 from VG Line (Sedibeng Water Board)</td><td>Capacity: 5 000 m³</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 10' 16.9" E 22 ° 54' 25.4</td></tr>
<tr><td>6</td><td>Potable reservoirs from VG Line (Sedibeng Water Board)</td><td>Capacity: 3 000 m³</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 10' 16.9" E 22 ° 54' 25.4</td></tr>
<tr><td>7</td><td>Black Rock 50ML Process reservoir (Sedibeng Water Board)</td><td>Capacity: 50 000 m³</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 10' 08.0" E 22 ° 54' 16.8</td></tr>
<tr><td>8</td><td>Nchwaning II 2.5ML Process Water Reservoir at Nchwaning II Plant (Sedibeng Water Board)</td><td>Capacity 2 500 m³</td><td>Portion 3 of farm Nchwaning 267</td><td>S 27° 10' 08.0" E 22 ° 51' 31.5"</td></tr>
<tr><td>9</td><td>Nchwaning II 500KL Process Water Reservoir at Nchwaning II Plant (Sedibeng Water Board)</td><td>Capacity 500 m³</td><td>Portion 3 of farm Nchwaning 267</td><td>S 27° 10' 08.1" E 22 ° 51' 31.0"</td></tr>
<tr><td>10</td><td>Nchwaning III 5ML Potable Water Reservoir (Sedibeng Water Board)</td><td>Capacity 5000 m³</td><td>Portion 3 of farm Nchwaning 267</td><td>S 27°07' 54.9" E 22 ° 50' 30.5"</td></tr>
<tr><td>11</td><td>Blackrock Fire Suppression tank 1 (Sedibeng Water Board)</td><td>Capacity: 373 m³</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 10' 17.5" E 22 ° 54' 49.4"</td></tr>
<tr><td>12</td><td>Blackrock Fire Suppression tank 2(Sedibeng Water Board)</td><td>Capacity: 373 m³</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 10' 17.5" E 22 ° 54' 49.4"</td></tr>
</table></td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>The condition is noted.</td></tr>
<tr><td>1.2</td><td>The Licensee is not indemnified from any detrimental effect that the reservoir may have on other properties and safety of the public. The Department does not accept any responsibility or liability for any damages or losses that may be suffered by any other party as a result of the construction and utilisation of the dam(s).</td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Noted by the Licence Holder.</td></tr>
<tr><td>1.3</td><td>The Licensee must follow acceptable construction, maintenance and operational practices to ensure the consistent, effective and safe performance of the storage of water in all storage facilities.</td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>No concerns were noted during the audit site inspection.</td></tr>
<tr><td>1.4</td><td>No additional water storage facilities can be constructed on the property without prior written consent of the Minister or responsible authority.</td><td>X Not in place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>BRMO personnel confirmed that an IWUL amendment application was submitted to the DWS in October 2017, for the additional activities that were not included in the previous application. MC were informed that the IWUL had been issued. MC received the IWUL on 09 May 2019. The IWUL has been amended to include the</td></tr>
</table>

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					highlighted water uses in Table 1 above. The previous IWUL issued on 21 October 2015 (Licence number: 10/D41M/ABEGJ/3490) has been superseded/ replaced by the Licence issued on 10 April 2019 (reference number has not changed). The following storage facilities were applied for through an amendment application, and have been approved. • Storage of water from dewatering, water treatment, and process water circuit into Nchwaning II 2.5 ML Process Water Reservoir 1 at Nchwaning II Plant to be used for process water. Capacity: 2 500 m^3; Volume: 500 000m^3/a. • Storage of water from dewatering, water treatment, and process water circuit into Nchwaning II 2.5 ML Process Water Reservoir 2 at Nchwaning II Plant to be used for process water. Capacity: 2 500 m^3; Volume: 500 000m^3/a • Storage of water from Black Rock potable water into Nchwaning II 500 KL Potable Water Reservoir at Nchwaning 11 Plant to be used for human consumption, ablutions, and emergency fire tanks. Capacity: 500 m^3; Volume: 300 000m^3/a • Storage of water from Gloria vent shaft dewatering into Gloria Vent Shaft Reservoir to be used for Dust Suppression. Capacity: 250 m^3; Volume: 100 000m^3/a • Storage of water from dewatering, water treatment, and process water circuit into Nchwaning II Clarifier Plant Reservoir to be used for process water and dust suppression. Capacity: 500 m^3; Volume: 600 000m^3/a • Storage of water from dewatering, water treatment, and process water circuit into Black Rock Clarifier Plant Reservoir to be used for process water and dust suppression. Capacity: 500 m^3; Volume: 1000 000m^3/a • Storage of water from Nchwaning II Potable Water circuit into Nchwaning I Fire Suppression Tank 1 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Nchwaning II Potable Water circuit water into Nchwaning I Fire Suppression Tank 2 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Nchwaning II Potable Water circuit water into Nchwaning II Fire Suppression Tank 1 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Nchwaning II Potable Water circuit water into Nchwaning II Fire Suppression Tank 2 to be used for emergency fire suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Potable Water circuit into Nchwaning II Load Out Fire Suppression Tank 1 to be used emergency suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Potable Water circuit into Nchwaning II Load Out Fire Suppression Tank 2 to be used emergency suppression. Capacity: 373 m^3; Volume: 5 000m^3/a • Storage of water from Vaal Gamagara Pipeline into Black Rock Potable water storage 1 -to be used for human consumption, ablutions, and emergency fire tanks. Capacity: 1 000m^3; Volume: 1 500 000 m^3/a • Storage of water from Vaal Gamagara Pipeline into Black Rock Potable water storage 2 -to be used for human consumption, ablutions, and emergency fire tanks. Capacity: 1 000m^3; Volume: 1 500 000 m^3/a • Storage of water from Black Rock potable water into Nchwaning II Potable water reservoir (roofed) to be used for human consumption, ablutions and emergency fire tanks. Capacity: 500m^3; Volume: 300 000 m^3/a. The amended IWUL, has been superseded/ replaced by the Licence issued on 10 April 2019.
2. Monitoring Requirements					
2.1.	Suitable measuring structures must be constructed to measure the flow entering and leaving the storage facilities and this information must be available on request.	**X Not in place**	**Partially in place**	Licence Holder i.e. Assmang: BRMO	Not all, but some of the flow meters have been maintained in a sound state of repair and calibrated by a competent person. There currently have been some replacements of the old flow meters with electronic meters. Calibration certificates were confirmed by the BRMO personnel to have been submitted to the DWS. Proof of submission was not made available to MC. Flow meters are installed to measure the flow entering and leaving the storage facilities. Based on the updated water flow diagram not all the storage structures have the required metering in place. Although the quantities of water abstracted are recorded, the quantities of water stored are not recorded on a monthly basis. BRMO is currently undertaking a water/flow meter project, which entails the following:

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					• The identification of all the areas (inlets, outlets and other areas within the processes) that require the installation of water/flow meters, as per existing WUL requirements. • Identifying the areas within the process; where water is used, reused, recycled and/or pumped into the existing TSF • Purchasing and installation of new flow meters, and fixing of the old defective meters; and • Calibration of the existing flow meters.
2.2	The quantity of water stored shall be recorded as at the last day of each month.	**CND**	**Partially in place**	Licence Holder i.e. Assmang: BRMO	As indicated in the internal audit plan provided for by BRMO (conducted in 2019), the quantities of water abstracted are recorded, and the quantities of water stored are not recorded on a monthly basis.
3. Dam Safety Requirements					
3.1.	The Licensee is not exempted from compliance with the provisions of the Regulations published under Government Notice R. 139 of 24 February 2012 read with Chapter 12 of the Act.	**N/A**	**N/A**	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder. It must be noted that BRMO do not operate any dams with safety risk. This condition is therefore not applicable to BRMO.
3.2.	The construction, enlargement, alteration or repair of a dam with a safety risk, must be carried out under a licence issued in terms of the above regulations.	**N/A**	**N/A**	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder. It must be noted that BRMO do not operate any dams with safety risk. This condition is therefore not applicable to BRMO.
3.3.	The Licensee shall supply any information, drawings, specifications, design assumptions, calculations, documents and test results when requested by the Regional Head.	**N/A**	**N/A**	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder. It must be noted that BRMO do not operate any dams with safety risk. This condition is therefore not applicable to BRMO.
3.4.	Dam safety evaluations must be performed in line with the requirements and intervals specified in the regulations.	**N/A**	**N/A**	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder. It must be noted that BRMO do not operate any dams with safety risk. This condition is therefore not applicable to BRMO.
4.Construction of Dam(s)					
4.1.	The as-built plans and specifications of the dam(s) must be submitted to the Provincial Head for his/her records.	**√ In Place**	**N/A**	Licence Holder i.e. Assmang: BRMO	This condition is considered a once-off historical requirement and as such is not applicable to the current audit period. It is however not known as to whether the Regional Head of the DWS was informed of the completion of the dams already constructed. As-built designs signed off by a registered engineer were not made available to MC.
4.2.	Construction of the dam(s) may not commence before authorisation in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) is issued.	**N/A**	**N/A**	Licence Holder i.e. Assmang: BRMO	This condition is not applicable as all facilities at BRMO were constructed prior to 2015. No additional infrastructure, requiring authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) have been constructed.
4.3.	The Government reserves the right to construct storage works at any time in any stream and to store all surplus water reaching the dam(s) and to control the allocation of such water.	**√ In Place**	**√ In Place**	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder.
4.4	Construction of the dam(s) may not commence unless the required authorisation to build has been issued by the Dam Safety Office of this Department.	**√ In Place**	**√ In Place**	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder.
Appendix III: Section 21 (e) of the Act: Engaging in a controlled activity					
1.Quantity of Wastewater for Irrigation					
1.1.	This licence authorises the irrigation of village parks, sports fields and Golf Course and with wastewater at detailed in in Table 1. **Table 1: Detailed of the controlled activities** **Water uses** / **Purposes** / **Volume (m^3/a)** / **Properties** / **Co-ordinates** Section 21(e) 1 — Irrigation of Golf course with water from return water dam (treated effluent and underground dewatering) — 376 442 m^3/a — Portion 1 of farm Santoy 230 — S 27° 07' 17.7" E 22° 49' 41.5" 2 — Irrigation of Black Rock village including Black rock school fields with water from return water dam (treated effluent and underground dewatering) — 61 600m^3/a — Portion 1 of farm Santoy 230 — S 27° 07' 17.7" E 22° 49' 41.5"	**X Not in place**	**√ In Place**	Licence Holder i.e. Assmang: BRMO	Potable water is being used to irrigate the golf course (only in areas where 750 trees have been planted). Irrigation of the golf course with waste water is therefore no longer happening, but rather only the irrigation of the villages parks and sports fields takes place. BRMO is only allowed to utilise 61 600 m^3/a. The Water Balance Excel Spreadsheet shows the following amounts as having been used for irrigation: **July 2018: 2 389 m^3/a.** **August 2018: 4 034 m^3/a.** **September 2018: 3 604 m^3/a.** **October 2018: 3 632 m^3/a.** The above amount indicate that BRMO have therefore not exceeded the limits.

<table>
<tr><th>IWUL Condition #</th><th>Condition</th><th>2018 Compliance</th><th>2019 Compliance</th><th>Responsible Person</th><th>Findings/ Comments</th></tr>
<tr><td>1.2.</td><td>The quantity of water containing waste authorised to be disposed on land through irrigation, in terms of this licence may not be exceeded.</td><td>X
Not in place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Potable water is being used to irrigate the golf course (only in areas where 750 trees have been planted). Irrigation of the golf course with waste water is therefore no longer happening, but rather only the irrigation of the villages parks and sports fields takes place.

BRMO is only allowed to utilise 61 600 m³/a. The Water Balance Excel Spreadsheet shows the following amounts as having been used for irrigation:

July 2018: 2 389 m³/a.
August 2018: 4 034 m³/a.
September 2018: 3 604 m³/a.
October 2018: 3 632 m³/a.

The above amount indicate that BRMO have therefore not exceeded the limits.</td></tr>
<tr><td>1.3.</td><td>The Licensee must prevent at all occurrence of invasive alien vegetation on all areas irrigated with water containing waste authorised under this licence.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Request for proposals from service providers to undertake Eradication of Alien Species have been distributed to the potential service provider in order to undertake the following:

• Compile and regularly update a programme for eradication of alien plants at all BRMO sites (i.e. Black Rock, including residential areas, Nchwaning 3, Nchwaning 2, and Gloria);
• Eradicate all the alien plants listed on Annexure 1 of this scope of work;
• All areas must be revisited to eradicate all the plants that germinated after eradication was done on that area;
• Eradicate alien invasive plants as per the Conservation of Agricultural Resources Act, 1983 (Act of 1983) and related regulations, and BRMO procedure for conservation of biodiversity;
• Eradication must be done using appropriate methods (e.g. cut stump treatment, frilling, spraying, stem injection, etc.). Where eradication must be done within a riparian environment, herbicide application must be done where it is absolutely necessary. The type of herbicide chosen in such instances must be less harmful to such environments and approved by the Environmental Specialist;
• Hand pulling/uprooting method may be applied where necessary (e.g. in the case of seedlings);
• Appropriate dyes must be applied to herbicide for ease of notification of treated stumps by field workers;
• All cut mesquite/prosopis trees must be left on site to decompose, the trees must be assembled in piles at reasonable distance from each other and not left scattered;
• Other eradicated invasive plants must be stored in refuse bags and transport to BRMO waste disposal site for disposal.

As detailed in the Scope of Work, BRMO has an Alien Vegetation Control Plan, which will be availed to the successful contractor to use as a guide in ensuring proper eradication and successful completion of the project. The entire project was expected to have commenced by/after 01 April 2019 and be completed before the 31 May 2019.</td></tr>
<tr><td colspan="6">2. Crop Type and Area Irrigated</td></tr>
<tr><td>2.1.</td><td>This licence authorises irrigation of a total surface area of 12.8 Hectares (ha) of open land (golf course, sports fields, village parks) on Portion 1 of farm Santoy 230 as detailed in Table 2.
Table 2: Type of crop and area to be irrigated
<table><tr><th>Land to be irrigated</th><th>Crop Type</th><th>Area (ha)</th></tr><tr><td>village parks and sports fields</td><td>Turf</td><td>1.8ha</td></tr><tr><td>Golf Course</td><td>Turf</td><td>11ha</td></tr></table></td><td>√
In Place</td><td>√
In Place</td><td></td><td>Potable water is being used to irrigate the golf course (only in areas where 750 trees have been planted). Irrigation of the golf course with waste water is therefore no longer happening, but rather only the irrigation of the villages parks and sports fields takes place.

BRMO is only allowed to utilise 61 600 m³/a. The Water Balance Excel Spreadsheet shows the following amounts as having been used for irrigation:

July 2018: 2 389 m³/a.
August 2018: 4 034 m³/a.
September 2018: 3 604 m³/a.
October 2018: 3 632 m³/a.

The above amount indicate that BRMO have therefore not exceeded the limits.</td></tr>
<tr><td colspan="6">3. Quality of Waste Water to Irrigate</td></tr>
</table>

<table>
<tr><th>IWUL Condition #</th><th>Condition</th><th>2018 Compliance</th><th>2019 Compliance</th><th>Responsible Person</th><th>Findings/ Comments</th></tr>
<tr><td>3.1.</td><td>The quality of the wastewater to irrigate shall not exceed the limits as set out in Table 3:
Table 3: Quality of waste water to irrigate
<table><tr><th>Parameters</th><th>Concentration</th></tr><tr><td>Colour, odour and taste</td><td>The waste water or effluent shall not contain any substance in a concentration capable of producing any colour, odour or taste</td></tr><tr><td>pH</td><td>5,5 and 9,5.</td></tr><tr><td>Dissolved Oxygen</td><td>Shall be at least 75 per cent saturation.</td></tr><tr><td>Conductivity</td><td>Not exceed 70 mS/m above intake to a maximum of 150 mS/m</td></tr><tr><td>Temperature</td><td>Maximum of 35°C</td></tr><tr><td>Oxygen Absorbed</td><td>The oxygen absorbed from acid N/80 potassium permanganate in 4 hours at 27°C shall not exceed 10 mg/l</td></tr><tr><td>Suspended solids</td><td>Not to exceed 25 mg/l.</td></tr><tr><td>Chloride as free Chlorine</td><td>0.25 mg/l</td></tr><tr><td>Sodium</td><td>Not to be increased by more than 90 mg/l above that of the intake water.</td></tr><tr><td>Fluoride (as F)</td><td>1.0 mg/l</td></tr><tr><td>Soap, oil and grease</td><td>2.5 mg/l</td></tr><tr><td>Chemical oxygen demand</td><td>75 mg/l</td></tr><tr><td>Typical (faecal) coli:</td><td>0 per 100 ml</td></tr><tr><td>Ammonia (ionised and un-ionised) as Nitrogen</td><td>3 mg/l</td></tr><tr><td>Nitrates (as N)</td><td>15 mg/l</td></tr><tr><td>Soluble ortho-phosphate (as P)</td><td>10 mg/l</td></tr></table></td><td>Partially in place</td><td>Partially in place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>According to the water quality monitoring reports, there are various exceedances of the stipulated limits.

As per BRMO Water Quality Monitoring Report, dated January 2019, compiled by Aquatico, 6 effluent water localities were sampled during January 2019. The results showed that a number of variables exceeded the applicable guidelines at the following localities:

pH: Final Effluent 5
EC: Final Effluent 2, Final Effluent 4, Final Effluent 5
NO3-N: Final Effluent 1, Final Effluent 2, Final Effluent 4, Final Effluent 5 and Final Effluent 6
NH4-N: Final Effluent 3
COD: Final Effluent 1, Final Effluent 2 and Final Effluent 4
TSS: Final Effluent 6
E. coli: Final Effluent 2, Final Effluent 4 and Final Effluent 6

Based on the WRC Quality of Domestic Water Supplies guideline, the water quality of all the monitored effluent water can be classified as Marginal (Final Effluent 3), Poor (Final Effluent 1) and Unacceptable (Final Effluent 2, 4, 5 and 6) quality based on exceeding variables. Overall the results indicated that the water quality of the majority of the effluent localities is deteriorating in terms of (NO3-N) compared to the previous sampling occasion.</td></tr>
<tr><td colspan="6">4. Monitoring</td></tr>
<tr><td colspan="6">4.1 Quantity</td></tr>
<tr><td>4.1.1.</td><td>The quantity of water containing waste irrigated must be metered and recorded daily.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Potable water is being used to irrigate the golf course (only in areas where 750 trees have been planted). Irrigation of the golf course with waste water is therefore no longer happening, but rather only the irrigation of the villages parks and sports fields takes place.

BRMO is only allowed to utilise 61 600 m³/a. The Water Balance Excel Spreadsheet shows the following amounts as having been used for irrigation:

July 2018: 2 389 m³/a.
August 2018: 4 034 m³/a.
September 2018: 3 604 m³/a.
October 2018: 3 632 m³/a.

The water pumped for irrigation is metered daily and checked at the end of the monthly.</td></tr>
<tr><td>4.1.2.</td><td>Monitoring for the quantity of the water containing waste for irrigation must be done at the point where the effluent is extracted from.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>The monitoring points are at the point of discharge (New Village Park Irrigation, School Sports Field Irrigation, Santoy and Sports Field Irrigation).</td></tr>
<tr><td colspan="6">4.2 Quality</td></tr>
<tr><td>4.2.1</td><td>Monitoring points for quality must be at the outlet of the water treatment plant.</td><td>X
Not in place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>The monitoring points are at the point of discharge (New Village Park Irrigation, School Sports Field Irrigation, Santoy and Sports Field Irrigation).</td></tr>
<tr><td>4.2.2</td><td>The date, time and monitoring point in respect of each sample taken must be recorded together with the results of the analysis.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>The provided Water Quality Monitoring Reports show that the date, time and monitoring point is recorded together with the results of the analysis.</td></tr>
<tr><td>4.2.3</td><td>Monitoring points must not be changed prior to notification and written approval by the Provincial Head.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>No monitoring points have been changed. Should there be such changes, the DWS will be notified of such.</td></tr>
<tr><td>4.2.4</td><td>The samples taken at outlet point of the waste water treatment plant shall be analysed for the variables at the frequencies detailed in Table 5:</td><td>Partially in place</td><td>Partially in place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Monitoring variables and frequency of samples are taken quarterly, and not monthly. Colour, odour and taste are currently not being analysed as per the reports provided.</td></tr>
</table>

<table>
<tr><th>IWUL Condition #</th><th>Condition</th><th>2018 Compliance</th><th>2019 Compliance</th><th>Responsible Person</th><th>Findings/ Comments</th></tr>
<tr><td></td><td>Table 5: Monitoring variables and frequency
<table><tr><th>Variable</th><th>Frequency</th></tr><tr><td>Colour, odour and taste</td><td>Monthly</td></tr><tr><td>pH</td><td>Monthly</td></tr><tr><td>Dissolved Oxygen</td><td>Monthly</td></tr><tr><td>Temperature</td><td>Monthly</td></tr><tr><td>Oxygen Absorbed</td><td>Monthly</td></tr><tr><td>Electrical Conductivity (EC)</td><td>Monthly</td></tr><tr><td>Chloride as Free Chlorine (Cl)</td><td>Monthly</td></tr><tr><td>Fluoride (F)</td><td>Monthly</td></tr><tr><td>Sodium</td><td>Monthly</td></tr><tr><td>Soap, oil and grease</td><td>Monthly</td></tr><tr><td>Chemical oxygen demand (COD)</td><td>Monthly</td></tr><tr><td>Faecal Coliforms</td><td>Monthly</td></tr><tr><td>Ammonia (as N)</td><td>Monthly</td></tr><tr><td>Nitrate (as N)</td><td>Monthly</td></tr><tr><td>Ortho-Phosphate (as P)</td><td>Monthly</td></tr><tr><td>Suspended solids</td><td>Monthly</td></tr></table></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6">4.3 Groundwater Monitoring</td></tr>
<tr><td>4.3.1</td><td>Ground water monitoring shall be undertaken as set out in condition 11 of Appendix II.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Groundwater Monitoring is being conducted at the following monitoring points, as set out in Condition 11 of Appendix II:

• Taking of underground water (23 928 m³/a) at Black Rock shaft 6 for manganese mining processes
• Taking of underground water (106 956 m³/a) at Black Rock old shaft 7 for manganese mining processes
• Taking of underground water (25 800 m³/a) at Black Rock old shaft 7 dewatering borehole for manganese mining processes
• Taking of underground water (23 928 m³/a) at Black Rock old shaft 8 for manganese mining processes for manganese mining processes
• Taking of underground water (8 316 m³/a) at Gloria Borehole for manganese mining processes
• Taking of underground water (86 424 m³/a) at Gloria Shaft 2 (new) for manganese mining processes
• Taking of underground water (650 975 m³/a) at Nchwaning II shaft for manganese mining processes
• Taking of underground water (176 232 m³/a) at Nchwaning III shaft for manganese mining processes

The following condition was included through the amended IWUL:

• Abstraction of Dewatered water of underground water (23 928 m³/a) at Black Rock shaft 6 to be used for mine ore processing (added as an amendment)

As per the Water Quality Monitoring Report compiled by Aquatico, in January 2019, groundwater monitoring was conducted at a total of nine monitoring boreholes located at three different mining operations (Black Rock Mine / Nchwaning complex / Gloria Mine). According to the report, GPT03 and GPT07 could not be sampled as Aquatico had no access because they were locked.

Groundwater sampling register is as follows:</td></tr>
</table>

<table>
<tr><th>IWUL Condition #</th><th>Condition</th><th>2018 Compliance</th><th>2019 Compliance</th><th>Responsible Person</th><th>Findings/ Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td colspan="9">SAMPLING REGISTER : MONTHLY</td></tr>
<tr><td colspan="2">PROJECT NAME:</td><td colspan="7">Assmang Manganese Black Rock</td></tr>
<tr><td colspan="2">MONTH:</td><td colspan="7">January 2019</td></tr>
<tr><td colspan="2">SAMPLER NAME:</td><td colspan="7">Reinhard van Heerden</td></tr>
<tr><td colspan="9">Assmang Manganese Black Rock</td></tr>
<tr><td rowspan="2">Locality</td><td rowspan="2">Description</td><td colspan="2">Coordinates</td><td rowspan="2">Sample Time</td><td rowspan="2">Status</td><td rowspan="2">Level</td><td rowspan="2">Remarks</td><td rowspan="2">Lab no</td></tr>
<tr><td>Latitude</td><td>Longitude</td></tr>
<tr><td colspan="9">Gloria Mine</td></tr>
<tr><td>GPT01</td><td>Impact monitoring Gloria Mine</td><td>S27.17362</td><td>E22.90012</td><td>2019-01-30 15:33</td><td>Yes</td><td>37.89 m</td><td>CLEAR</td><td>87885</td></tr>
<tr><td>GPT02</td><td>Impact monitoring Gloria Mine and its facilities</td><td>S27.16644</td><td>E22.91129</td><td>2019-01-30 11:00</td><td>Yes</td><td>70.88 m</td><td>TURBID</td><td>87886</td></tr>
<tr><td colspan="9">Nchwaning 2 Operations</td></tr>
<tr><td>GPT03</td><td>Impact monitoring Nchwaning 1 and 2 and its facilities</td><td>S27.14746</td><td>E22.86046</td><td>2019-01-30 12:22</td><td>Locked</td><td>-</td><td>LOCKED</td><td>-</td></tr>
<tr><td>GPT04</td><td>Impact monitoring Nchwaning 1 and 2 and its facilities</td><td>S27.13106</td><td>E22.87277</td><td>2019-01-30 09:21</td><td>Yes</td><td>45.11 m</td><td>CLEAR</td><td>87887</td></tr>
<tr><td>GPT07</td><td>Impact monitoring Sinter plant and Slimes dam complex</td><td>S27.15036</td><td>E22.89624</td><td>2019-01-30 11:21</td><td>Dry</td><td>-</td><td>DRY</td><td>-</td></tr>
<tr><td colspan="9">Black Rock Mine</td></tr>
<tr><td>GPT05</td><td>Impact monitoring Black Rock Mine and its facilities</td><td>S27.13453</td><td>E22.84526</td><td>2019-01-30 12:54</td><td>Yes</td><td>50.03 m</td><td>TURBID</td><td>87888</td></tr>
<tr><td>GPT06</td><td>Impact monitoring Black Rock Mine and its facilities</td><td>S27.12491</td><td>E22.84331</td><td>2019-01-30 16:41</td><td>Yes</td><td>42.69 m</td><td>TURBID</td><td>87889</td></tr>
<tr><td>GPT08</td><td>NW upstream impact monitoring borehole for Black Rock Mine and its facilities</td><td>S27.13080</td><td>E22.83626</td><td>2019-01-30 13:50</td><td>Yes</td><td>34.33 m</td><td>CLEAR</td><td>87890</td></tr>
<tr><td>GPT09</td><td>NW downstream impact monitoring borehole for Black Mine and its facilities</td><td>S27.12574</td><td>E22.83687</td><td>2019-01-30 17:21</td><td>Yes</td><td>57.1 m</td><td>CLEAR</td><td>87891</td></tr>
</table>
</td></tr>
<tr><td>4.3.2.</td><td>The Licensee shall monitor water quality and quantity on a monthly basis for a period of one (1) year after the licence has been issued.</td><td>√
In Place</td><td>N/A</td><td>Licence Holder i.e. Assmang: BRMO</td><td>This condition is considered a once-off historical requirement and as such is not applicable to the current audit period. However, MC could not determine as to whether the water quality and quantities were monitored on a daily basis for a period of 1 year subsequent to the issuance of the IWUL. The reports on water quality monitoring only show monitoring currently being undertaken on a biannual and quarterly basis.</td></tr>
<tr><td>4.3.3.</td><td>The Licensee shall ensure that groundwater monitoring points are located close to or at source of contamination to evaluate resultant impacts on the groundwater regime. Monitoring points should also be in place in migration paths of the primary groundwater plume to evaluate extent of pollution and migration rates. Additional boreholes need to be drilled and monitored as well. These monitoring boreholes should be located in such a way to maximise the likelihood of intercepting groundwater impacted by source materials/areas.</td><td>Partially in place</td><td>Partially in place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>No additional monitoring points have been established. An IWWMP was submitted to the authorities and included a groundwater monitoring plan as part of the licensing process. This groundwater monitoring plan was informed by a specialist geo-hydrological assessment. The monitoring network design was submitted prior to the issuing of the licence as part of the IWWMP. The site wide Geohydrological assessment undertaken in 2017 (GPT report: EEESB-16-1806) concludes that the current monitoring network is adequate. This report was recently (December 2017) submitted to the DWS along with an updated IWWMP.

Quarterly groundwater monitoring was conducted at a total of nine monitoring boreholes located at three different mining operations (Black Rock Mine / Nchwaning complex / Gloria Mine). The boreholes are located both up gradient and down gradient of the sites to determine any potential impacts that may occur as well as the development and movement of any pollution plume. The monitoring boreholes are therefore not located close to or at source of contamination to evaluate resultant impacts on the groundwater regime.</td></tr>
<tr><td>4.3.4.</td><td>The Licensee shall ensure that the possible impacts of contamination of water should also be assessed (impacts to sensitive ecosystems, other receptors etc.). The background water quality needs to be assessed as well to evaluate impacts of specific action/pollution sources on the groundwater regime.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>As per the Water Quality Monitoring Report compiled by Aquatico, in January 2019, groundwater monitoring was conducted at a total of nine monitoring boreholes located at three different mining operations (Black Rock Mine / Nchwaning complex / Gloria Mine). The results indicated that, at Black Rock Mine, all the boreholes exceeded the IWUL Groundwater resource quality (D41M) in terms of a number of variables, however these concentrations were mostly still within the SANS 241:2015 Drinking Water Limits. At Nchwaning II, although there were exceedances recorded at GPT04 in terms of EC, Mg, Na, Cl and SO4 based on the results presented and the variables analysed, the water quality profile of GPT04 is characteristic of the groundwater of the region. At the Gloria Mine, both the GPT01 and GTP02 exceeded the IWUL Groundwater resource quality (D41K) in terms of a number of variables, however most of these concentrations are still within the SANS 241:2015 Drinking Water Limits with the exception of Na, NO3- N, total Coliforms. It is advised that the water from the monitoring boreholes is not used as potable water if untreated. By virtue of the definition of contamination i.e. polluting or making something impure, MC concludes that the ground water has been slightly polluted.

Possible impacts of contamination of water have been assessed (impacts to sensitive ecosystems, other receptors etc.). The background water quality has also been assessed as well the evaluation of impacts of specific action/pollution sources on the groundwater regime.</td></tr>
<tr><td>4.3.5.</td><td>Consideration should be given to installing boreholes adjacent to Licensee area boundary, hydraulically down gradient from the activity to assist in resolving any possible off-site migration issues.</td><td>Partially in place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>No additional monitoring points have been established. An IWWMP was submitted to authorities and included a groundwater monitoring plan as part of the licensing process. This groundwater monitoring plan was informed by a specialist geo-hydrological assessment. The monitoring network design was submitted prior to the issuing of the licence as part of the IWWMP. The site wide Geohydrological assessment undertaken in 2017 (GPT</td></tr>
</table>

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					report: EEESB-16-1806) concludes that the current monitoring network is adequate. This report was recently (December 2017) submitted to the DWS along with an updated IWWMP. Quarterly groundwater monitoring was conducted at a total of nine monitoring boreholes located at three different mining operations (Black Rock Mine / Nchwaning complex / Gloria Mine). The boreholes are located both up gradient and down gradient of the sites to determine any potential impacts that may occur as well as the development and movement of any pollution plume.
4.3.6.	The Licensee shall ensure that monitoring boreholes are drilled and screened to a depth that will enable groundwater at the site to be effectively monitored and provide water quality results which are a true reflection of the prevailing conditions. This must take into consideration alignment of the screened portions of the casing with the appropriate water strikes or static water levels.	Partially in place	Partially in place	Licence Holder i.e. Assmang: BRMO	The DWS communicated to BRMO that additional monitoring is required (Letter reference 27/2/2/D1141/105/1, dated 08/09/2017). The letter states "There is a need for improvement of the groundwater monitoring network in order to effectively assess impacts associated with the mining activities in compliance to condition 4.14 of Appendix III". In a letter dated 14 March 2918, BRMO stated that they conducted a Geohydrological investigation in December 2011. In the report, it was recommended that BRMO expand the monitoring network by seven (7) extra boreholes since there were only 2 (two) monitoring boreholes at the time the investigation was carried out. Currently there is a total of 9 (nine) boreholes. It was stated in the letter submitted to the DWS in response to the queries raised, that, an updated Geohydrological investigation will be carried out within the new financial year F18/19 (July 2018- June 2019), which will entail the drilling of additional boreholes after the recommendations made by the Geohydrology-Specialist.
4.3.7.	The Licensee shall ensure that the casing of boreholes is adequately sealed near ground level and should have a secure cover over the top; and be constructed in such a way to prevent surface water ingress and unnecessary material, such as dirt and insects, entering the boreholes. The monitoring point should be properly secured to prevent unauthorised persons from gaining access and must be adequately labelled.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Monitoring boreholes are cased and have closable and lockable covers.
4.3.8.	The Licensee shall ensure that additional Geohydrological assessment needs to be conducted within one (1) of issuance of this licence which encompasses all of the information indicated above. The report must also contain an accurate assessment of source, pathways and receptors; and must provide the mitigation measures against pollution. It must include the monitoring network and its implementation plan.	√ In Place	N/A	Licence Holder i.e. Assmang: BRMO	This condition is considered a once-off historical requirement and as such is not applicable to the current audit period.
5. Methods of Analysis					
5.1.	Analyses shall be carried out in accordance with methods prescribed by and obtainable from the South African Bureau of Standards (SABS), in terms of the Standards Act 1982, (Act 30 of 1982).	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	As detailed in the Water Quality Monitoring Report of January 2019, various water samples are sampled on a quarterly basis at the Assmang BRMO. All fieldwork is conducted based on the protocols and specifications, and code of practice contained in the SABS ISO 5667:1-15. These international standards address all aspects from the programme design, sampling methods as well as sample preservation and many other aspects. Applicable standards include: • ISO 5667-1: 2006 Part 1: Guidance on the design of sampling programmes and sampling techniques • ISO 5667-3: 2003 Part 3: Guidance on preservation and handling of samples • ISO 5667-11: 1993 Part 11: Guidance on sampling of groundwater • DWAF Best Practice Guidelines Series G3: General Guidelines for Water Monitoring Systems.
5.2.	The samples shall be tested in an accredited laboratory.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	The analysis of water samples is undertaken by Aquatico which is a SANAS accredited testing laboratory (T0685).
5.3.	The methods of analysis must not be changed without prior notification to and written approval by the Provincial Head.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	There have not been any changes to the methods of analysis. Should this happen, the DWS will be notified prior to conducting such analyses.
6. General Irrigation Practices					
6.1	Irrigation with wastewater must be practised in accordance with the guidelines prescribed in the document titled "Guide: Permissible Utilisation and Disposal of Treated Sewage Effluent", issued by the former Department of Health under reference 11121513 and dated 30 May 1978, or in accordance with any relevant regulations promulgated under section 26 of the Act.	Partially in place	Partially in place	Licence Holder i.e. Assmang: BRMO	BRMO are in compliance with the guidelines prescribed in the document titled "Guide: Permissible Utilisation and Disposal of Treated Sewage Effluent", issued by the former Department of Health under reference 11121513 and dated 30 May 1978, or in accordance with any relevant regulations promulgated under section 26 of the Act. As per BRMO Water Quality Monitoring Report, dated January 2019, compiled by Aquatico, 6 effluent water localities were sampled during January 2019. The results showed that a number of variables exceeded the applicable guidelines at the following localities:

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					pH: Final Effluent 5 EC: Final Effluent 2, Final Effluent 4, Final Effluent 5 NO3-N: Final Effluent 1, Final Effluent 2, Final Effluent 4, Final Effluent 5 and Final Effluent 6 NH4-N: Final Effluent 3 COD: Final Effluent 1, Final Effluent 2 and Final Effluent 4 TSS: Final Effluent 6 E. coli: Final Effluent 2, Final Effluent 4 and Final Effluent 6 Based on the WRC Quality of Domestic Water Supplies guideline, the water quality of all the monitored effluent water can be classified as Marginal (Final Effluent 3), Poor (Final Effluent 1) and Unacceptable (Final Effluent 2, 4, 5 and 6) quality based on exceeding variables. Overall the results indicated that the water quality of the majority of the effluent localities is deteriorating in terms of (NO3-N) compared to the previous sampling occasion. Water quality monitoring indicates that various allowable pollutant concentrations are exceeded.
6.2. Irrigation with wastewater must be practiced in a systematic manner and precautions shall be taken so as to prevent:					
6.2.1.	*Water logging and pooling of waste in any location.*	√ In Place	Partially in place	Licence Holder i.e. Assmang: BRMO	No water logging or pooling of waste was noted at the sports fields and Golf Course. BRMO personnel confirmed that irrigation is only undertaken between 06h00 and 07h00 in the morning. It was however noted that water pooling and logging could have occurred at the BRMO village.
6.2.2.	*Pollution of underground water or surface water due to seepage or otherwise*	√ In Place	Partially in place	Licence Holder i.e. Assmang: BRMO	According to the water quality monitoring reports there are various exceedances of the stipulated limits. As per BRMO Water Quality Monitoring Report, dated January 2019, compiled by Aquatico, 6 effluent water localities were sampled during January 2019. The results showed that a number of variables exceeded the applicable guidelines at the following localities: pH: Final Effluent 5 EC: Final Effluent 2, Final Effluent 4, Final Effluent 5 NO3-N: Final Effluent 1, Final Effluent 2, Final Effluent 4, Final Effluent 5 and Final Effluent 6 NH4-N: Final Effluent 3 COD: Final Effluent 1, Final Effluent 2 and Final Effluent 4 TSS: Final Effluent 6 E. coli: Final Effluent 2, Final Effluent 4 and Final Effluent 6 Based on the WRC Quality of Domestic Water Supplies guideline, the water quality of all the monitored effluent water can be classified as Marginal (Final Effluent 3), Poor (Final Effluent 1) and Unacceptable (Final Effluent 2, 4, 5 and 6) quality based on exceeding variables. Overall the results indicated that the water quality of the majority of the effluent localities is deteriorating in terms of (NO3-N) compared to the previous sampling occasion. This is a concern with regards to potential pollution.
6.2.3.	*Fly breeding, public health hazard, odour or secondary pollution.*	Partially in place	√ In Place	Licence Holder i.e. Assmang: BRMO	According to the water quality monitoring reports there are various exceedances of the stipulated limits. As per BRMO Water Quality Monitoring Report, dated January 2019, compiled by Aquatico, 6 effluent water localities were sampled during January 2019. The results showed that a number of variables exceeded the applicable guidelines at the following localities: pH: Final Effluent 5 EC: Final Effluent 2, Final Effluent 4, Final Effluent 5 NO3-N: Final Effluent 1, Final Effluent 2, Final Effluent 4, Final Effluent 5 and Final Effluent 6 NH4-N: Final Effluent 3 COD: Final Effluent 1, Final Effluent 2 and Final Effluent 4 TSS: Final Effluent 6 E. coli: Final Effluent 2, Final Effluent 4 and Final Effluent 6

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					Based on the WRC Quality of Domestic Water Supplies guideline, the water quality of all the monitored effluent water can be classified as Marginal (Final Effluent 3), Poor (Final Effluent 1) and Unacceptable (Final Effluent 2, 4, 5 and 6) quality based on exceeding variables. Overall the results indicated that the water quality of the majority of the effluent localities is deteriorating in terms of (NO3-N) compared to the previous sampling occasion. This is a concern with regards to potential pollution. There is no fly breeding nor public health hazard posed by the waste water being used for irrigation.
6.2.4.	*Runoff from the irrigation area because of wet weather or any other conditions whatsoever and*	√ In Place	Partially in place	Licence Holder i.e. Assmang: BRMO	BRMO personnel confirmed that irrigation is only undertaken between 06h00 and 07h00 in the morning. It was however noted that water pooling and logging could have occurred at the BRMO village, resulting in runoff from the irrigation area.
6.2.5.	*The site of the irrigation area shall be adequately fenced to prevent the entry of animals and unauthorised persons.*	N/A	N/A	Licence Holder i.e. Assmang: BRMO	The irrigation area sites are not adequately fenced to prevent the entry of animals and unauthorised persons.as they are developed for public recreational uses.
7. Pipelines					
7.1.	The pipelines used for the conveyance of waste or waste water must be painted in a conspicuous colour or manufactured of a coloured material distinctly different from the colour of the pipelines in which drinking water is flowing to avoid the possibility of any cross-connections of the different pipelines.	Partially in place	Partially in place	Licence Holder i.e. Assmang: BRMO	The pipelines used for the conveyance of waste or waste water are not painted in a conspicuous colour or manufactured of a coloured material distinctly different from the colour of the pipelines in which drinking water is flowing to avoid the possibility of any cross-connections of the different pipelines. However, conspicuous signage is in place to distinctively show drinkable and not drinkable water.
7.2.	All stop-valves and taps on the pipelines conveying the waste or waste water shall be of a type that can be opened and closed by means of a loose wrench. This wrench shall be in the safekeeping of a responsible member of the staff to prevent unauthorised use thereof.	X Not in place	√ In Place	Licence Holder i.e. Assmang: BRMO	Stop-valves and taps on the pipelines conveying the waste or waste water are of a type that can be opened and closed by means of a loose wrench.
7.3.	Notices manufactured of a durable weather-proof material warning against the use of water containing waste for drinking and washing purposes must be displayed at prominent places where the waste is being reused and at all taps. Such notices shall be worded in the official languages applicable in the area.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Conspicuous signage is in place to distinctively show drinkable and not drinkable water. These notices are all written in English, Afrikaans and Setswana. 
8. Stormwater Management					
8.1	The Licensee is to submit a detailed stormwater management plan within three (3) months of issuance of this licence.	√ In Place	N/A	Licence Holder i.e. Assmang: BRMO	As this is a once off condition it is considered not applicable for this audit.
8.2.	The Licensee should ensure that all storm water run-off diverted from the site must be received and disposed of in a way that will not negatively impact the quality and total integrity of the receiving water resource.	CND	CND	Licence Holder i.e. Assmang: BRMO	Due to the low rainfall, high evaporation, flat topography and permeable sandy soils of the area, it is highly unlikely that clean water will flow into dirty areas. Storm water runoff is allowed along the natural topography and discharge to the receiving environment. BRMO indicated that exemption to regulation 6 of Government Notice Regulation (GNR.) 704 was requested, based on the low pollution potential associated with the manganese ore. The GN704 exemption application and the associated waste characterisation report were requested from BRMO, and have not been provided. MC was informed of the submission of the reports to the DWS. Additionally, at Nchwaning II, the original TSF constructed in 2018 is now being used as a storm water catchment dam.
8.3.	The Licensee must construct berms or furrows around the irrigation area are in order to prevent storm water ingress or water containing waste from entering any river, stream or wetland.	Partially in place	Partially in place	Licence Holder i.e. Assmang: BRMO	The irrigation areas sites are not constructed with berms or furrows around them in order to prevent storm water ingress or water containing waste from entering any river, stream or wetland. The village park (where

<table>
<tr><th>IWUL Condition #</th><th>Condition</th><th>2018 Compliance</th><th>2019 Compliance</th><th>Responsible Person</th><th>Findings/ Comments</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>irrigation is taking place) are bounded by roads which curbs diverting all surface water runoff to the sewer system.</td></tr>
<tr><td>8.4.</td><td>The Licensee must ensure that seepage and runoff from the area under irrigation does not flow beyond the boundaries of the irrigation area.</td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>No seepage and runoff from the areas under irrigation flowing beyond the boundaries of the irrigation areas were noted during the audits.</td></tr>
<tr><td colspan="6">APPENDIX IV: Section 21(g) of the Act: Disposing of waste in a manner which may detrimentally impact on a water resource</td></tr>
<tr><td colspan="6">1. Construction, Operation and Maintenance</td></tr>
<tr><td>1.1.</td><td>The Licensee shall carry out and complete all the activities, including the construction and operation of the facilities as indicated in Table 1, according to the Report and according to the final plans submitted with the Water Use Licence Application as approved by the Provincial Head.
Table 1: Details of Waste /Wastewater Management Facilities /
<table>
<tr><th>Water Uses</th><th>Activity Description</th><th>Capacity/ Volume (m^3, tonnes and/or m^3/a)</th><th>Property Description</th><th>Co-ordinates</th></tr>
<tr><td colspan="5">Section 21(g)</td></tr>
<tr><td>1</td><td>Nchwaning II Pollution control dam from underground workings</td><td>41 000 m^3</td><td>Portion 3 of farm Nchwaning 267</td><td>S 27° 08' 05.4" E 22 ° 51' 39.2"</td></tr>
<tr><td>2</td><td>Nchwaning II Pollution Control Dam from underground workings</td><td>4 100 m^3</td><td>Portion 3 of farm Nchwaning 267</td><td>S 27° 08' 21.3" E 22° 52' 3.5"</td></tr>
<tr><td>3</td><td>Disposal of slimes from clarifier to water storage dam 1 at Black Rock Mine</td><td>50 000m^3 2 500 m^3/a</td><td>Portion 1 of farm Nchwaning 267</td><td>S 27° 08' 16.2" E 22° 50' 06.2"</td></tr>
<tr><td>4</td><td>Disposal of slimes from clarifier to water storage dam 2 at Black Rock Mine</td><td>50 000m^3 2 500 m^3/a</td><td>Portion 3 of farm Nchwaning 267</td><td>S 27° 08' 16.7" E 22° 50' 12.8"</td></tr>
<tr><td>5</td><td>Temporary storage of "treated" dewater underground water(water that is treated via the clarifier) – Clarifier Dam 1</td><td>50 000m^3 1 044000 m^3/a)</td><td>Portion 1 of farm Nchwaning 267</td><td>S 27° 08' 08.9" E 22° 50' 14.6"</td></tr>
<tr><td>6</td><td>Disposal of "dirty" stormwater as part of Gloria mine expansion 1 (stormwater dam 1)</td><td>50 000m^3 29762m^3/a</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 09' 54.3" E 22° 53' 32.0"</td></tr>
<tr><td>7</td><td>Disposal of "dirty" stormwater as part of Gloria mine expansion 2(stormwater dam 2)</td><td>: 50 000m^3 29762m^3/a</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 10' 03.9" E 22° 53' 23.8"</td></tr>
<tr><td>8</td><td>Disposal of "dirty" stormwater as part of Gloria mine expansion 3(stormwater dam 3)</td><td>50 000m^3 29762m^3/a</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 10' 10.1" E 22° 53' 32.9"</td></tr>
<tr><td>9</td><td>Process water dam (New process water dam 1 at Gloria Mine)</td><td>50 000m^3 600 000m^3/a</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 09' 19.6" E 22° 53' 23.8"</td></tr>
</table>
</td><td>Partially in place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>BRMO personnel confirmed that all licenced activities are being undertaken as stipulated and approved in the IWUL.

BRMO personnel confirmed that an IWUL amendment application was submitted to the DWS in October 2017, for the additional activities that were not included in the previous application. MC were informed that the IWUL had been issued. MC received the IWUL on 09 May 2019. The IWUL has been amended to include the highlighted water uses in Table 1 above. The previous IWUL issued on 21 October 2015 (Licence number: 10/D41M/ABEGJ/3490) has been superseded/ replaced by the Licence issued on 10 April 2019 (reference number has not changed).

The following facilities were applied for through an amendment application, and have been approved.
• Storage of water from Black Rock process water circuit into Black Rock Kopie Process water reservoir to be used as process water. Capacity: 500 m^3; Volume: 1 000 000 m^3/a
• Storage of water from Nchwaning II process water circuit into Rail Loop Process Water Reservoir 2 to be used for dust suppression and process water. Capacity: 1 500 m^3; Volume: 100 000 m^3/a
• Storage of water from Nchwaning II process water circuit into Rail Loop Process Water Reservoir 2 to be used for dust suppression and process water. Capacity: 1 500 m^3; Volume: 100 000 m^3/a
• Storage of water from Nchwaning 2 Tailings Facilities into Nchwaning 2 Existing TSF Return Water Dam to be used for process water and tailings disposal. Capacity: 3 000 m^3; Volume: 1000 000 m^3/a
• Storage of water from Nchwaning 2 Tailings Facilities into Nchwaning New TSF Return Water Dam to be used for process water and tailings disposal. Capacity: 650m^3; Volume: 1 000 000 m^3/a
• Storage of water from Nchwaning II process water circuit into Nchwaning II process water reservoir (TK01) to be used for processing. Capacity: 250m^3; Volume: 600 000 m^3/a
• Storage of water from Black Rock Clarifier into Belgravia Conservation Farm Pan 1 to be used for wildlife conservation. Capacity: 5 000m^3; Volume: 100 000 m^3/a
• Storage of water from Black Rock Clarifier into Belgravia Conservation Farm Pan 2 to be used for wildlife conservation. Capacity: 2 000m^3; Volume: 100 000 m^3/a
• Storage of water from Vaal Gamagara Supply into Gloria Potable Water Reservoir 1 to be used for human consumption, ablutions and emergency fire tanks. Capacity: 500m^3; Volume: 50 000 m^3/a
• Storage of water from Vaal Gamagara Supply into Gloria Potable Water Reservoir 2 to be used for human consumption, ablutions and emergency fire tanks. Capacity: 500m^3; Volume: 50 000 m^3/a
• Storage of water from process water circuit into Gloria Process Water Reservoir 1 to be used for processing and dust suppression. Capacity:1000m^3; Volume: 150 000 m^3/a
• Storage of water from process water circuit into Gloria Process Water Reservoir 2 to be used for processing and dust suppression. Capacity:1000m^3; Volume: 150 000 m^3/a
• Storage of stormwater from stockyard into Nchwaning II Pollution Control Dam to be used for processing and dust suppression. Capacity:3 500m^3; Volume: 10 000 m^3/a
• Storage of water from Gloria Tailings Facilities into Gloria Tailings Return water dam to be used for process water and tailings disposal. Capacity: 20 000m^3; Volume: 150 000 m^3/a</td></tr>
</table>

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments

Water Uses	Activity Description	Capacity/ Volume (m^3, tonnes and/or m^3/a)	Property Description	Co-ordinates
Section 21(g)				
	for the storage of water from underground, decant water from Tailings storage facility (TSF), Vaal Gamagara and stormwater dams. This water will be used for surface operations at Gloria new shaft and sinter plant complex			
10	Process water dam (New process water dam 2 at Gloria Mine) for the storage of water from underground, decant water from Tailings storage facility (TSF), Vaal Gamagara and stormwater dams. This water will be used for surface operations at Gloria new shaft and sinter plant complex	50 000m^3 1.9ha 600 000m^3/a	Portion 1 of farm Gloria 266	S 27° 09' 21.9" E 22° 52' 33.7"
11	Return water dam (20Ml dam) from Gloria slimes dam. Used to recover water from the active slimes dam and this water is re-used in the plant circuit	20 000m^3 75 600 m^3/a	Portion 1 of farm Gloria 266	S 27° 10' 30.5" E 22° 54' 28.1"
12	Return water storage dam (Gloria 1Ml dam)used to store water from underground dewatering, reclaimed water from the return water dam, borehole at Gloria and from Vaal Gamagara (if needed). It will be used for mine processing plant	1 000m^3 Size: 0.1ha (1.2m X 28.5m X 30m) 180 000 m^3/a	Portion 1 of farm Gloria 266	S 27° 10' 24.0" E 22° 54' 34.3"
13	New Plant water storage dam at Nchwaning II (wastewater dam at Nchwaning II) used to stored water from the Black Rock Water Treatment Plant which	2 500 m^3 208 176 m^3/a	Remaining Extent of farm Nchwaning 267	S 27° 08' 12.2" E 22° 51' 51.6"

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	<table><tr><th>Water Uses</th><th>Activity Description</th><th>Capacity/ Volume (m^3, tonnes and/or m^3/a)</th><th>Property Description</th><th>Co-ordinates</th></tr><tr><td colspan="5">Section 21(g)</td></tr><tr><td></td><td>is then used as process water within the Nchwaning II plant</td><td></td><td></td><td></td></tr><tr><td>14</td><td>Nchwaning II Plastic Dam used to recover water from the Nchwaning II slimes dam and stored treated effluent</td><td>3 000 m^3 180 000 m^3/a</td><td>Remaining Extent of farm Nchwaning 267</td><td>S 27° 08' 16.9'' E 22° 52' 05.2''</td></tr><tr><td>15</td><td>Disposing tailings into Nchwaning II Active Tailings Dam from Nchwaning mine</td><td>45 080 m^3/a</td><td>Remaining Extent of farm Nchwaning 267</td><td>S 27° 8'20.75" E 22°52'11.40"</td></tr><tr><td>16</td><td>Disposing tailings in Nchwaning II Historical Tailings Dam from Nchwaning mine</td><td>123 500 m^3/a</td><td>Remaining Extent of farm Nchwaning 267</td><td>S 27° 8'15.65"" E 22°51'50.58"</td></tr><tr><td>17</td><td>Gloria Historical Tailings from Gloria mine</td><td>100 000 m^3/a</td><td>Portion 1 of farm Gloria 266</td><td>S 27°10'18.52" E 22°54' 43.54"</td></tr><tr><td>18</td><td>Gloria Active Tailings from Gloria mine</td><td>22 560 m^3/a</td><td>Portion 1 of farm Gloria 266</td><td>S 27°10' 32.84" E 22°54' 29.91"</td></tr><tr><td>20</td><td>Dewatered water used for dust suppression of haul roads</td><td>86 410 m^3/a</td><td>Portion 3 of Farm Nchwaning 267</td><td>S 27° 08' 16.7'' E 22° 50' 12.8''</td></tr></table>				
1.2.	The construction of the facilities listed in Table 6 must be carried out under the supervision of a professional Civil Engineer, registered under the Engineering Profession of South Africa Act, 1990 (Act 114 of 1990), as approved by the designer.	√ In Place	N/A	Licence Holder i.e. Assmang: BRMO	This condition is considered a once-off historical requirement and as such is not applicable to the current audit period. It is however noted that construction of all the facilities shown in Table 1 was carried out under supervision of professional Engineer. However, the facilities were constructed prior to the issuance of the licence. This condition has been amended to correctly reference Table 6 instead of Table 1, in the issued amended IWUL.
1.3.	The Licensee must within thirty (30) days after the completion of the activities referred in Table 6, shall in writing, under reference 27/2/2/D1141/105/1, inform the Regional Head thereof. This shall be accompanied by a signature of approval from the designer referred to above that the construction was done according to the design plans referred to in the Report.	N/A	N/A	Licence Holder i.e. Assmang: BRMO	This condition is considered a once-off historical requirement and as such is not applicable to the current audit period. The facilities were constructed prior to the issuance of the licence. This condition has been amended to correctly reference Table 6 instead of Table 1, in the issued amended IWUL.
1.4.	The Licensee shall submit a set of as-built drawings to the Regional Head after the completion of the waste facilities listed in Table 6.	√ In Place	N/A	Licence Holder i.e. Assmang: BRMO	This condition is considered a once-off historical requirement and as such is not applicable to the current audit period. It is however noted that the as-build drawing of the facilities was supplied to the DWS as indicated by the BRMO personnel. Proof of the submission is however not available. This condition has been amended to correctly reference Table 6 instead of Table 1, in the issued amended IWUL.
1.5.	The Licensee shall use acknowledged methods for sampling and the date, time and sampler must be indicated for each sample.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	The provided Water Quality Monitoring Reports show that the date, time and monitoring point is recorded together with the results of the analysis.
1.6.	The waste facilities listed in Table 6 shall be operated and maintained to have a freeboard of 0.8 metres above full supply level and all other water management systems related thereto shall be operated in such a manner that it is at all limes capable of handling the 1 :50-year flood event on top of its mean operating level.	X Not in place	X Not in place	Licence Holder i.e. Assmang: BRMO	A freeboard of 0.8 m was not apparent at certain sections along the top of the Nchwaning II slimes dams, Gloria Million Litre reservoir and return water dams. This increases the risk of spillage during a heavy rainfall event. It must be noted that the reservoir is less than 2 m high, and it is therefore not feasible to operate the reservoir with a 0.8 m freeboard This condition has been amended to correctly reference Table 6 instead of Table 1, in the issued amended IWUL.
1.7.	The tailings and pollution control dams must be designed in such a manner that any spillage can be contained and reclaimed at an early stage without any impact on the surrounding environment.	Partially in place	Partially in place	Licence Holder i.e. Assmang: BRMO	Gloria Surface Plant Pollution Control Dams (PCDs) do not have means for containment of spillage. However, it is reported that the dams' freeboard is maintained and that float switches are in place to pump water to alternative storage facilities if a dam reaches the minimum freeboard.

<table>
<tr><th>IWUL Condition #</th><th>Condition</th><th>2018 Compliance</th><th>2019 Compliance</th><th>Responsible Person</th><th>Findings/ Comments</th></tr>
<tr><td colspan="6">2. Disposal of waste and/ or waste water</td></tr>
<tr><td>2.1.</td><td>The Licensee is authorised to dispose the maximum quantity of waste or wastewater per annum into the waste management facilities / areas on properties as indicated in Table 6.</td><td>X
Not in place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>The maximum quantity of waste or wastewater disposed per annum into the waste management facilities / areas on properties as indicated in Table 1 is currently being recorded.

This condition has been amended to correctly reference Table 6 instead of Table 1, in the issued amended IWUL.</td></tr>
<tr><td colspan="6">3. Surface Water Monitoring</td></tr>
<tr><td>3.1.</td><td>The quantity of wastewater disposed of into pollution control dams shall be quantified and recorded daily.</td><td>X
Not in place</td><td>X
Not in place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>The maximum quantity of waste or wastewater disposed per annum into the waste management facilities / areas on properties as indicated in Table 1 is currently not being recorded.</td></tr>
<tr><td>3.2.</td><td>Monitoring for the quantity of water containing waste to be disposed into return water dams shall be done at the inlet(s) point(s} where the wastewater get disposed into pollution control dam (s).</td><td>X
Not in place</td><td>X
Not in place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>The maximum quantity of waste or wastewater disposed per annum into the waste management facilities / areas on properties as indicated in Table 1 is currently not being recorded.</td></tr>
<tr><td>3.3.</td><td>The licensee must establish (where applicable) the surface water quality monitoring points in consultation and approval by the Provincial Head within three months of the licence issuance date.</td><td>√
In Place</td><td>N/A</td><td>Licence Holder i.e. Assmang: BRMO</td><td>This condition is considered a once-off historical requirement and as such is not applicable to the current audit period.</td></tr>
<tr><td>3.4.</td><td>The Licensee shall monitor the quality of water containing waste on a monthly basis at monitoring points for variables or determinants including those listed in the Table 7.
Table 2: Water quality monitoring
<table><tr><th>Water Quality Variable/Determinants</th><th>Measuring Unit</th></tr><tr><td>pH</td><td>pH Units</td></tr><tr><td>Electrical Conductivity (EC)</td><td>mS/m</td></tr><tr><td>Total Dissolves Solids (TDS)</td><td>mg/l</td></tr><tr><td>Total Suspended Solids (TSS)</td><td>mg/l</td></tr><tr><td>Tota, Alkalinity</td><td>mg/l</td></tr><tr><td>Chloride (Cl)</td><td>mg/l</td></tr><tr><td>Sulphate (SO_4)</td><td>mg/l</td></tr><tr><td>Nitrate (NO_3)</td><td>mg/l</td></tr><tr><td>Ammonia/Ammonium (NH_3/NH_4)</td><td>mg/l</td></tr><tr><td>Chemical Oxygen Demand (COD)</td><td>mg/l</td></tr><tr><td>Ortho-Phosphate (PO_4)</td><td>mg/l</td></tr><tr><td>Fluoride (F)</td><td>mg/l</td></tr><tr><td>Total Hardness</td><td>mg/l</td></tr><tr><td>Calcium (Ca)</td><td>mg/l</td></tr><tr><td>Magnesium (Mg)</td><td>mg/l</td></tr><tr><td>Sodium (Na)</td><td>mg/l</td></tr><tr><td>Iron (Fe)</td><td>mg/l</td></tr><tr><td>Manganese (Mn)</td><td>mg/l</td></tr><tr><td>E.Coli</td><td>Cfu/100 ml</td></tr></table></td><td>X
Not in place</td><td>X
Not in place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Monitoring variables and frequency of samples are taken quarterly, and not monthly.</td></tr>
<tr><td>3.5.</td><td>Monitoring data from the monitoring programme shall be interpreted and measured against background water quality data, and the criteria determined to be provided to the Provincial Head.</td><td>CND</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Water Quality Monitoring Reports for various water samples are sampled on a quarterly and bi annual basis at the Assmang BRMO, at the specified ground water monitoring points as shown in Table 3, for submission to the DWS. Proof of submission of the external audit reports compiled in February/ March 2016 was made available to MC.</td></tr>
<tr><td>3.6.</td><td>The Licensee is to ensure that the monitoring done is in accordance to the DWS Best Practice Guideline: G3 - Water Monitoring Systems dated July 2009 and is done by a suitably qualified professional.</td><td>CND</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>As detailed in the Water Quality Monitoring Report of January 2019, various water samples are sampled on a quarterly basis at the Assmang BRMO. All fieldwork is conducted based on the protocols and specifications, and code of practice contained in the SABS ISO 5667:1-15. These international standards address all aspects from the programme design, sampling methods as well as sample preservation and many other aspects. Applicable standards include:

• ISO 5667-1: 2006 Part 1: Guidance on the design of sampling programmes and sampling techniques
• ISO 5667-3: 2003 Part 3: Guidance on preservation and handling of samples
• ISO 5667-11: 1993 Part 11: Guidance on sampling of groundwater
• DWAF Best Practice Guidelines Series G3: General Guidelines for Water Monitoring Systems.

The analysis of water samples is undertaken by Aquatico which is a SANAS accredited testing laboratory (T0685).</td></tr>
</table>

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<tr><td></td><td></td><td></td><td></td><td></td><td>A review of the water quality reports as submitted to the DWS, in comparison to the DWS Best Practice Guideline: G3 — Water Monitoring Systems, confirmed that the water monitoring programme is implemented in compliance to the best practice guideline.</td></tr>
<tr><td colspan="6">4. Groundwater Monitoring</td></tr>
<tr><td>4.1.</td><td>The Licensee shall record the date, time and monitoring point in respect of each sample taken, together with the results of the analysis.</td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>The provided Water Quality Monitoring Reports show that the date, time and monitoring point is recorded together with the results of the analysis.</td></tr>
<tr><td>4.2.</td><td>The Licensee shall monitor on quarterly basis the groundwater resources at the groundwater monitoring points as listed in Table 3, to determine the impact of the facilities and other activities on the quality by taking samples and monitoring groundwater level changes at the monitoring points and submit quarterly monitoring results on a bi-annual basis to the Department.
Table 3: Groundwater monitoring points
<table>
<tr><th>Locality</th><th>Description</th><th>South Co-ordinates</th><th>East Co-ordinates</th></tr>
<tr><td>Gloria 266</td><td>Impact monitoring at Gloria Mine</td><td>-27.1756</td><td>22.9021</td></tr>
<tr><td>Gloria 266</td><td>Impact monitoring Gloria Mine and its facilities</td><td>-27.1679</td><td>22.9104</td></tr>
<tr><td>Nchwaning 267</td><td>Impact monitoring at Nchwaning 1 and its facilities</td><td>-27.1243</td><td>22.8638</td></tr>
<tr><td>Nchwaning 267</td><td>Impact monitoring at Nchwaning 2 and its facilities</td><td>-27.1243</td><td>22.8638</td></tr>
<tr><td>Belgravia 264</td><td>Impact monitoring at Black rock mine and its facilities</td><td>-27.1354</td><td>22.8443</td></tr>
<tr><td>Belgravia 264</td><td>Impact monitoring at Black rock mine and its facilities</td><td>-27.125</td><td>22.8433</td></tr>
<tr><td>Belgravia 264</td><td>Impact monitoring at Black rock mine and its facilities</td><td>-27.130790</td><td>22.8361</td></tr>
<tr><td>Belgravia 264</td><td>Impact monitoring at Black rock mine and its facilities</td><td>-27.125760</td><td>22.83691</td></tr>
</table></td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Water Quality Monitoring Reports for various water samples are sampled on a quarterly and bi annual basis at the Assmang BRMO, at the specified ground water monitoring points as shown in Table 3, for submission to the DWS. Proof of submission of the external audit reports compiled in February/ March 2016 was made available to MC.</td></tr>
<tr><td>4.3.</td><td>The methods of analysis shall not be changed without prior notification to and written approval by the Minister.</td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>There have not been any changes to the methods of analysis. Should this happen, the DWS will be notified prior to conducting such analyses.</td></tr>
<tr><td>4.4.</td><td>Monitoring points shall not be changed prior to notification to and written approval by the Responsible Authority.</td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>There have not been any changes to monitoring points. Should this happen, the DWS will be notified prior to changing the monitoring points.</td></tr>
<tr><td>4.5.</td><td>Analysis shall be carried out in accordance with methods prescribed by and obtainable from the SABS, in terms of the Standards Act (Act 30 of 1982).</td><td>√ In Place</td><td>√ In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>As detailed in the Water Quality Monitoring Report of January 2019, various water samples are sampled on a quarterly basis at the Assmang BRMO. All fieldwork is conducted based on the protocols and specifications, and code of practice contained in the SABS ISO 5667:1-15. These international standards address all aspects from the programme design, sampling methods as well as sample preservation and many other aspects. Applicable standards include:

• ISO 5667-1: 2006 Part 1: Guidance on the design of sampling programmes and sampling techniques
• ISO 5667-3: 2003 Part 3: Guidance on preservation and handling of samples
• ISO 5667-11: 1993 Part 11: Guidance on sampling of groundwater
• DWAF Best Practice Guidelines Series G3: General Guidelines for Water Monitoring Systems.</td></tr>
<tr><td>4.6.</td><td>Groundwater monitoring points to be established must be identified in consultation and approved by the Provincial Head.</td><td>√ In Place</td><td>Partially in place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>DWS recommended that a study be conducted to evaluate a need for additional monitoring boreholes. BRMO adhered to their recommendation by conducting the geo-physical survey, and the study suggested that a borehole must be established to ensure that adequate monitoring is undertaken, considering the expansion of the mine.

BRMO has acknowledge the recommendations, considers expanding its ground water monitoring network (as per geophysical survey report).</td></tr>
</table>

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					BRMO personnel confirmed that an IWUL amendment application was submitted to the DWS in October 2017, for the additional activities that were not included in the previous application. MC were informed that the IWUL had been issued. MC received the IWUL on 09 May 2019. The IWUL has been amended to include the highlighted water uses in Table 1 above. The previous IWUL issued on 21 October 2015 (Licence number: 10/D41M/ABEGJ/3490) has been superseded/ replaced by the Licence issued on 10 April 2019 (reference number has not changed). The following facilities were applied for through an amendment application, and have been approved. • Storage of water from Black Rock process water circuit into Black Rock Kopie Process water reservoir to be used as process water. Capacity: 500 m^3; Volume: 1 000 000 m^3/a • Storage of water from Nchwaning II process water circuit into Rail Loop Process Water Reservoir 2 to be used for dust suppression and process water. Capacity: 1 500 m^3; Volume: 100 000 m^3/a • Storage of water from Nchwaning II process water circuit into Rail Loop Process Water Reservoir 2 to be used for dust suppression and process water. Capacity: 1 500 m^3; Volume: 100 000 m^3/a • Storage of water from Nchwaning 2 Tailings Facilities into Nchwaning 2 Existing TSF Return Water Dam to be used for process water and tailings disposal. Capacity: 3 000 m^3; Volume: 1000 000 m^3/a • Storage of water from Nchwaning 2 Tailings Facilities into Nchwaning New TSF Return Water Dam to be used for process water and tailings disposal. Capacity: 650m^3; Volume: 1 000 000 m^3/a • Storage of water from Nchwaning II process water circuit into Nchwaning II process water reservoir (TK01) to be used for processing. Capacity: 250m^3; Volume: 600 000 m^3/a • Storage of water from Black Rock Clarifier into Belgravia Conservation farm Pan 1 to be used for wildlife conservation. Capacity: 5 000m^3; Volume: 100 000 m^3/a • Storage of water from Black Rock Clarifier into Belgravia Conservation farm Pan 2 to be used for wildlife conservation. Capacity: 2 000m^3; Volume: 100 000 m^3/a • Storage of water from Vaal Gamagara Supply into Gloria Potable Water Reservoir 1 to be used for human consumption, ablutions and emergency fire tanks. Capacity: 500m^3; Volume: 50 000 m^3/a • Storage of water from Vaal Gamagara Supply into Gloria Potable Water Reservoir 2 to be used for human consumption, ablutions and emergency fire tanks. Capacity: 500m^3; Volume: 50 000 m^3/a • Storage of water from process water circuit into Gloria Process Water Reservoir 1 to be used for processing and dust suppression. Capacity:1000m^3; Volume: 150 000 m^3/a • Storage of water from process water circuit into Gloria Process Water Reservoir 2 to be used for processing and dust suppression. Capacity:1000m^3; Volume: 150 000 m^3/a • Storage of stormwater from stockyard into Nchwaning II Pollution Control Dam to be used for processing and dust suppression. Capacity:3 500m^3; Volume: 10 000 m^3/a • Storage of water from Gloria Tailings Facilities into Gloria Tailings Return water dam to be used for process water and tailings disposal. Capacity: 20 000m^3; Volume: 150 000 m^3/a
4.7.	Additional geophysical investigation need to be conducted by the Licensee, especially close to potential contaminant sources in order to ascertain preferential flow paths and to assist in the establishment of an effective groundwater monitoring network which needs to be submitted to the responsible authority within one (1) of issuance of this licence.	**X Not in place**	**√ In Place**	Licence Holder i.e. Assmang: BRMO	A Geohydrological survey was conducted and the report was submitted to the DWS.
4.8.	Monitoring boreholes for aqueous phase substances should be purged before a water sample is collected by the Licensee.	**√ In Place**	**√ In Place**	Licence Holder i.e. Assmang: BRMO	The water quality monitoring reports indicate that water is purged prior to sampling by either removing three volumes of water or pumping the borehole until the in-situ measured EC stabilises. The report does not state that some boreholes have not been purged. However, the borehole inspection report indicates that some boreholes cannot be purged due to depth or physical restrictions.
4.9.	The Licensee is to establish groundwater monitoring points as close to or at source of contamination to evaluate their impacts on the groundwater regime. Monitoring points should also be placed in migration paths of the primary groundwater plume to evaluate extent of pollution and migration rates. Additional boreholes need to be drilled as well and they should be located in such a way to maximise the likelihood of intercepting groundwater impacted by source materials/areas.	**√ In Place**	**Partially in place**	Licence Holder i.e. Assmang: BRMO	No additional monitoring points have been established. An IWWMP was submitted to authorities and included a groundwater monitoring plan as part of the licensing process. This groundwater monitoring plan was informed by a specialist geo-hydrological assessment. The monitoring network design was submitted prior to the issuing of the licence as part of the IWWMP. The site wide Geohydrological assessment undertaken in 2017 (GPT report: EEESB-16-1806) concludes that the current monitoring network is adequate. This report was recently (December 2017) submitted to the DWS along with an updated IWWMP. Quarterly groundwater monitoring was conducted at a total of nine monitoring boreholes located at three different mining operations (Black Rock Mine / Nchwaning complex / Gloria Mine). The boreholes are located both up gradient and down gradient of the sites to determine any potential impacts that may occur as well as

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					the development and movement of any pollution plume. The monitoring boreholes are therefore not located close to or at source of contamination to evaluate resultant impacts on the groundwater regime.
4.10.	The Licensee shall establish monitoring points adjacent to the mine boundary, hydraulically down gradient from the mining activity to assist in resolving any possible off-site migration issues.	√ In Place	Partially in place	Licence Holder i.e. Assmang: BRMO	No additional monitoring points have been established. An IWWMP was submitted to authorities and included a groundwater monitoring plan as part of the licensing process. This groundwater monitoring plan was informed by a specialist geo-hydrological assessment. The monitoring network design was submitted prior to the issuing of the licence as part of the IWWMP. The site wide Geohydrological assessment undertaken in 2017 (GPT report: EEESB-16-1806) concludes that the current monitoring network is adequate. This report was recently (December 2017) submitted to the DWS along with an updated IWWMP. Quarterly groundwater monitoring was conducted at a total of nine monitoring boreholes located at three different mining operations (Black Rock Mine / Nchwaning complex / Gloria Mine). The boreholes are located both up gradient and down gradient of the sites to determine any potential impacts that may occur as well as the development and movement of any pollution plume.
4.11.	The Licensee is to ensure that monitoring boreholes are drilled and screened to a depth that will enable groundwater at the site to be effectively monitored and provide water quality results which are a true reflection of the prevailing conditions. This must take into consideration alignment of the screened portions of the casing with the appropriate water strikes or static water levels.	Partially in place	Partially in place	Licence Holder i.e. Assmang: BRMO	The DWS communicated to BRMO that additional monitoring is required (Letter reference 27/2/2/D1141/105/1, dated 08/09/2017). The letter states "There is a need for improvement of the groundwater monitoring network in order to effectively assess impacts associated with the mining activities in compliance to condition 4.14 of Appendix III". In a letter dated 14 March 2918, BRMO stated that they conducted a Geohydrological investigation in December 2011. In the report, it was recommended that BRMO expand the monitoring network by 7 extra boreholes since there were only 2 (two) monitoring boreholes at the time the investigation was carried out. Currently there is a total of 9 (nine) boreholes. It was stated in the letter submitted to the DWS in response to the queries raised, that, an updated Geohydrological investigation will be carried out within the new financial year F18/19 (July 2018- June 2019), which will entail the drilling of additional boreholes after the recommendations made by the Geohydrology-Specialist.
4.12.	The Licensee is to ensure that the casing is adequately sealed near ground level and should have a secure cover over the top; and be constructed in such a way to prevent surface water ingress and unnecessary material, such as dirt and insects, entering the boreholes. The monitoring point should be properly secured to prevent unauthorised persons from gaining access and must be adequately labelled.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Monitoring boreholes are cased and have closable and lockable covers.
4.13.	The Licensee is to ensure that aquifer tests and interpretations are done to assess aquifer characteristics.	CND	CND	Licence Holder i.e. Assmang: BRMO	Such was conducted as part of the consolidated Geohydrological assessment. However, such could not be determined as the consolidated Geohydrological assessment has not been provided to MC.
4.14.	The Licensee is to ensure that an additional Geohydrological assessment is conducted within 1 year of issuance of this licence which encompasses all of the information indicated above. The report must also contain an accurate assessment of source, pathways and receptors; and must provide the mitigation measures against pollution. It must include the monitoring network and its implementation plan.	CND	N/A	Licence Holder i.e. Assmang: BRMO	This condition is considered a once-off historical requirement and as such is not applicable to the current audit period.
4.15.	The responsibility rests with the Licensee to identify any sources of pollutions from their undertaking and to take appropriate measures to prevent or minimise the pollution of the environment.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder.
4.16.	The Licensee is to ensure that the monitoring done is in accordance to the DWS Best Practice Guideline: G3 -Water Monitoring Systems dated July 2009 and is done by a suitably qualified professional.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	As detailed in the Water Quality Monitoring Report of January 2019, various water samples are sampled on a quarterly basis at the Assmang BRMO. All fieldwork is conducted based on the protocols and specifications, and code of practice contained in the SABS ISO 5667:1-15. These international standards address all aspects from the programme design, sampling methods as well as sample preservation and many other aspects. Applicable standards include: • ISO 5667-1: 2006 Part 1: Guidance on the design of sampling programmes and sampling techniques • ISO 5667-3: 2003 Part 3: Guidance on preservation and handling of samples • ISO 5667-11: 1993 Part 11: Guidance on sampling of groundwater • DWAF Best Practice Guidelines Series G3: General Guidelines for Water Monitoring Systems. The analysis of water samples is undertaken by Aquatico which is a SANAS accredited testing laboratory (T0685).

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<tr><td colspan="6">5.Water Resource Protection</td></tr>
<tr><td>5.1.</td><td>The impact of mine activities on groundwater resource shall not exceed the quality as indicated in Table 8:
Table 8: Groundwater Resource Quality
<table>
<tr><th>Parameter</th><th colspan="2">Groundwater Quality Reserve 1.1.1</th></tr>
<tr><th></th><th>D41K</th><th>D41M</th></tr>
<tr><td>Sodium (mg/l)</td><td>27.01</td><td>66.00</td></tr>
<tr><td>Magnesium (mg/l)</td><td>66.44</td><td>35.86</td></tr>
<tr><td>Calcium (mg/l)</td><td>90.48</td><td>51.26</td></tr>
<tr><td>Chloride(mg/l)</td><td>118.80</td><td>70.29</td></tr>
<tr><td>Sulphate (mg/l)</td><td>36.17</td><td>38.50</td></tr>
<tr><td>Nitrate (mg/l)</td><td>10.00</td><td>8.45</td></tr>
<tr><td>Fluoride (mg/l)</td><td>0.39</td><td>0.50</td></tr>
<tr><td>Ph</td><td>8.69</td><td>6 – 9.5</td></tr>
<tr><td>Electrical conductivity (mS/m)</td><td>106.65</td><td>97.02</td></tr>
</table></td><td>Partially in place</td><td>Partially in place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Groundwater monitoring was conducted at a total of nine monitoring boreholes located at three different mining operations (Black Rock Mine / Nchwaning complex / Gloria Mine) during in January 2019.

At Black Rock Mine, Both the GPT05 and GTP06 exceeded the IWUL Groundwater resource quality (D41M) in terms of a number of variables, however these concentrations are still within the SANS 241:2015 Drinking Water Limits except the Nitrate concentrations and total coliforms at GPT06. The Ca, Mg and Na (not at GPT06) also exceeded the IWUL Groundwater resource quality (D41M) limits consequently resulting in the total hardness of both these boreholes to be very high. The hardness concentration at Black Rock mine is not unlike most other boreholes in the area, resulting from the calcareous/dolomitic underlying geology characteristic of many parts of the Northern Cape Province. The exceedance of particular concern is the nitrate concentrations of both boreholes. GPT05 (53.7 mg/l) and GPT06 (60.5 mg/l) exceeded both the IWUL Groundwater resource quality (D41M) limit and the SANS 241:2015 limit. Heavy metal concentrations at both GPT05 and GPT06 were either low to below the detection limits. Based on the results, low bacteriological content was present in GPT05, but elevated total Coliforms were present at GPT06.

Both the up-gradient (GPT08) and down-gradient (GTP09) monitoring boreholes exceeded the IWUL Groundwater resource quality (D41M), however they were both still within the SANS 241:2015 Drinking Water Limits with the exception of EC / TDS at GPT09 and nitrate at both localities. The Ca, Mg and Na also exceeded the IWUL Groundwater resource quality (D41M) limits consequently resulting in the total hardness of both these boreholes to be very high. The hardness concentration at Black Rock mine is not unlike most other boreholes in the area, resulting from the calcareous/dolomitic underlying geology characteristic of many parts of the Northern Cape Province. Elevated nitrate concentrations remain a concern as both GPT08 (74.8 mg/l) and GPT09 (47.1 mg/l) also exceeded both the IWUL Groundwater resource quality (D41M) limit and the SANS 241:2015 limit. Based on the position of these boreholes relative to the mining area the nitrate concentration can most likely be attributed to the mining operations (nitrate based explosives used for blasting). This is only speculative at this stage and requires more investigation. Heavy metal concentrations at both GPT08 and GPT09 were either low to below the detection limits. Based on the results, low bacteriological content was present in GPT09, but elevated total Coliforms were present at GPT08. It should however be noted that the COD concentrations of both GPT08 and GPT09 were relatively high which indicates the presence of organic matter.

At Nchwaning complex, the only borehole that was sampled during the January 2019 sampling was GPT04 as GPT03 and GPT07 were not sampled during January 2019 due to the caps that were locked. Although there were exceedances recorded at GPT04 in terms of EC, Mg, Na, Cl and SO4, based on the results presented and the variables analysed, the water quality profile of GPT04 is characteristic of the groundwater of the region.

At Gloria Mine, both the GPT01 and GTP02 exceeded the IWUL Groundwater resource quality (D41K) in terms of a number of variables, however most of these concentrations are still within the SANS 241:2015 Drinking Water Limits with the exception of Na, NO3- N, total Coliforms. The exceeding variable of particular concern is the nitrate concentration of GPT01.Note that this is the up-gradient borehole and the high nitrate concentration was higher than the concentration of the down-gradient borehole. It is therefore assumed that the impact is further to the south-west. This is however speculative at this stage and requires more investigation and updated groundwater models. Apart from an increase in salinity (Na) and F from the up-gradient (GPT01) to the down-gradient borehole there seem to be no significant impact on the groundwater at Gloria mine based on the analysed variables.</td></tr>
<tr><td colspan="6">6. Stormwater Management</td></tr>
</table>

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
6.1.	Stormwater leaving the Licensee's premises shall in no way be contaminated by any substance, whether such substance is a solid, liquid, vapour or gas or a combination thereof which is produced, used, stored, dumped or spilled on the premises.	CND	Partially in place	Licence Holder i.e. Assmang: BRMO	Due to the low rainfall, high evaporation, flat topography and permeable sandy soils of the area, it is highly unlikely that clean water will flow into dirty areas. Storm water runoff is allowed along the natural topography and discharge to the receiving environment. BRMO indicated that exemption to regulation 6 of GN704 was requested, based on the low pollution potential associated with the manganese ore. The GN704 exemption application and the associated waste characterisation report were requested from BRMO, and have not been provided. MC was informed of the submission of the reports to the DWS. Additionally, at Nchwaning II, the original TSF constructed in 2018 is now being used as a storm water catchment dam. The storm water catchment dam will allow for the contaminated storm water to be intercepted by canals and diverted to the newly installed storm water catchment dam for re-use during dust suppression.
6.2.	Increase runoff due to vegetation clearance and/or soil compaction must be managed, and steps must be taken to ensure that stormwater does not lead to bank instability and excessive levels of silt entering the stream.	Partially in place	Partially in place	Licence Holder i.e. Assmang: BRMO	Erosion was noted on the western side walls of the Nchwaning II slimes dam. Overall, there was no increased runoff due to vegetation clearance and/or soil compaction noticed during the site audit.
6.3.	Stormwater shall be diverted from the mine complex site and roads, and shall be managed in such a manner as to disperse runoff and concentrating the stormwater flow.	Partially in place	Partially in place	Licence Holder i.e. Assmang: BRMO	Due to the low rainfall, high evaporation, flat topography and permeable sandy soils of the area, it is highly unlikely that clean water will flow into dirty areas. Storm water runoff is allowed along the natural topography and discharge to the receiving environment. BRMO indicated that exemption to regulation 6 of GN704 was requested, based on the low pollution potential associated with the manganese ore. The GN704 exemption application and the associated waste characterisation report were requested from BRMO, and have not been provided. MC was informed of the submission of the reports to the DWS. Additionally, at Nchwaning II, the original TSF constructed in 2018 is now being used as a storm water catchment dam. The storm water catchment dam will allow for the contaminated storm water to be intercepted by canals and diverted to the newly installed storm water catchment dam for re-use during dust suppression.
6.4.	Where necessary control works must be constructed to attenuate the velocity of any stormwater discharge and to protect the banks of the affected watercourses.	CND	Partially in place	Licence Holder i.e. Assmang: BRMO	No storm water management measures (clean or affected water) are implemented at BRMO. Clean storm water runoff and rainfall are not diverted away from the operation or contained once within the operational area. Storm water runoff is allowed flow along the natural topography and discharge to the receiving environment, except at Nchwaning II, the original TSF constructed in 2018 is now being used as a storm water catchment dam. The storm water catchment dam will allow for the contaminated storm water to be intercepted by canals and diverted to the newly installed storm water catchment dam for re-use during dust suppression. BRMO indicated that exemption to regulation 6 of GN704 was requested, based on the low pollution potential associated with the manganese ore. The GN704 exemption application and the associated waste characterisation report were requested from BRMO, and have not been provided. MC was informed of the submission of the reports to the DWS.
6..5.	Stormwater control works must be constructed, operated and maintained in a sustainable manner throughout the impacted area.	CND	Partially in place	Licence Holder i.e. Assmang: BRMO	
6.6.	All stormwater that would naturally run across the pollution areas shall be diverted via channels and trapezoidal drains designed to contain the 1 :50-year flood.	CND	Partially in place	Licence Holder i.e. Assmang: BRMO	
6.7.	Polluted stormwater system shall be designed and implemented to provide suitable routing and pumping capacity for contaminated stormwater from the individual facilities to the respective stormwater dams in accordance with the design specifications as contained in the Report.	CND	Partially in place	Licence Holder i.e. Assmang: BRMO	
7. Plant Areas and Conveyances					
7.1.	Pollution caused by spills from the conveyances must be prevented through proper maintenance and effective protective measures.	√ In Place	X Not in place	Licence Holder i.e. Assmang: BRMO	Evidence of overflow, or spillage, from STP was observed at the Nchwaning 2, Gloria and Black Rock WTWWs.
7.2.	All reagent storage tanks and reaction units must be supplied with a bunded area built to the capacity of the facility and provided with sumps and pumps to return the spilled material back into the system. The system shall be maintained in a state of good repair and standby pumps must be provided.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	No concerns regarding the reagent storage tanks and reaction units were noted during the audit site inspection.
7.3.	Any hazardous substances must be handled according to the relevant legislation relating to the transport, storage and use of the substance.	√ In Place	Partially in place	Licence Holder i.e. Assmang: BRMO	All of the hazardous substances are handled according to the relevant legislation. The bunded areas under the diesel storage tanks do not allow seepage through the bund walls. All the bunded areas under the diesel pumps are in good condition, except that a fuel spillage outside of the concrete lined filling station at Nchwaning II was noted, which had not been cleaned up. It is understood that the filling station is in the process of being decommissioned and relocated. Spill management kits are being kept and maintained on site wherever liquid hazardous materials are stored, and where refuelling and /or servicing of plant, vehicles and machinery takes place.

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					The salvage yard floor is not concreted where potentially contaminated bulky material/items are stored outside of water tight steel skips/containers, and appropriately integrated with the remainder of the site's 'dirty' storm water management system. The dripping oils from the old vehicles was noted. There were no drip trays underneath to prevent the hazardous substances from contaminating the soil beneath them.
7.4. Any access roads or temporary crossings must be:					
7.4.1.	non-erosive, structurally stable and shall not induce any flooding or safety hazard and	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Not all, but some access roads have been compacted and are covered with low grade Manganese ore, in order to prevent dust from being generated in all mines. On the other hand, some roads are tarred.
7.4.2.	repaired immediately to prevent further damage	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	No concerns were noted on the access road at the time of the audit site inspection.
8. Access Control					
8.1.	Strict access procedures must be followed in order to gain access to the properties.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Access is controlled and restricted to the required areas.
8.2.	Access to the pollution control dam and slimes dam must be limited to authorised employees of the Licensee and their contractors only.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	All pollution control dams and slimes dams are fenced off.
8.3.	Notices prohibiting unauthorised persons from entering the controlled access areas as well as internationally acceptable signs indicating the risks involved in case of an unauthorised entry must be displayed along the boundary fence of these areas.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Notices prohibiting unauthorised persons from entering the certain areas, as well as internationally acceptable signs indicating the risks involved in case of an unauthorised entry were displayed along the boundary fence of all mines and its facilities. Safety signs were noted in place at various locations around the mine, including the TSFs and STPs.
9. Contingencies					
9.1. Accurate and up-to-date records shall be kept of all system malfunctions resulting in non-compliance with the requirements of this licence. The records shall be available for inspection by the Regional Head upon request. Such malfunctions shall be tabulated under the following headings with a full explanation of all the contributory circumstances:					
9.1.1.	operating errors;	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Accurate and update-to-date records of system malfunctions are maintained by BRMO and include for the requirements as per this condition.
9.1.2.	mechanical failures (including design, installation or maintenance);	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	
9.1.3.	environmental factors (e.g. flood);	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	
9.1.4	loss of supply services (e.g. power failure); and	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	
9.1.5	other causes.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	
9.2.	The Licensee must, within twenty-four (24) hours, notify the Provincial Head of the occurrence or potential occurrence of any incident which has the potential to cause, or has caused water pollution, pollution of the environment, health risks or which is a contravention of the licence conditions.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	It was reported that the STPS at Black Rock Mine overflowed in recent years, and the incident was never reported to the Regional Head of the Department. As reported, the overflow did not warrant reporting to the DWS. BRMO personnel also confirmed that there had been spillages at the Gloria STPs, which occurred as a result of lack of potable water not being pumped into the system, which resulted into the plant's scrubber being blocked. A fuel spillage outside of the concrete lined fuel station at Nchwaning II was noted, and the trenches that surround the Surface Ore Transport (SOT) workshop were noted to be silted. There had been one incident whereby hydrocarbon contaminated soil was relocated and stored at the Waste Management Facilities at the Hazardous Waste Transfer Facility.
9.3. The Licensee must, within fourteen (14) days, or a shorter period of lime, as specified by the Regional Head, from the occurrence or detection of any incident referred above submit an action plan, which must include a detailed lime schedule, to the satisfaction of the Regional Head with measures taken to:					
9.3.1.	*correct the impacts resulting from the incident;*	√ In Place	X Not in place	Licence Holder i.e. Assmang: BRMO	It was reported that the STPS at Black Rock Mine overflowed in recent years, and the incident was never reported to the Regional Head of the Department. As reported, the overflow did not warrant reporting to the DWS. BRMO personnel also confirmed that there had been spillages at the Gloria STPs, which occurred as a result of lack of potable water not being pumped into the system, which resulted into the plant's scrubber being blocked.
9.3.2.	*prevent the incident from causing any further impacts; and*	√ In Place	X Not in place	Licence Holder i.e. Assmang: BRMO	
9.3.3.	*prevent a recurrence of a similar incident.*	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					A fuel spillage outside of the concrete lined fuel station at Nchwaning II was noted, and the trenches that surround the Surface Ore Transport (SOT) workshop were noted to be silted. There had been one incident whereby hydrocarbon contaminated soil was relocated and stored at the Waste Management Facilities at the Hazardous Waste Transfer Facility.
10. Integrated Water and Waste Management					
10.1.	The Licensee must update an IWWMP, which must, together with the updated Rehabilitation Strategy and Implementation Programme (RSIP), be submitted to the Provincial Head for approval within 1 year from the date of issuance of this licence.	**Partially in place**	**N/Ae**	Licence Holder i.e. Assmang: BRMO	An updated RSIP is being submitted on annual basis to DWS. This condition is however considered a once-off historical requirement and as such is not applicable to the current audit period.
10.2.	The IWWMP and RSIP shall thereafter be updated and submitted to the Regional Head for approval, annually.	**Partially in place**	**Partially in place**	Licence Holder i.e. Assmang: BRMO	RSIP has not yet been developed. The IWWMP is not being submitted to the DWS on an annual basis.
10.3.	The Licensee must, at least one hundred and eighty (180) days prior to the intended closure of any facility, or any portion thereof, notify the Regional Head of such intention and submit any final amendments to the IWWMP and RSIP as well as a final Closure Plan for approval.'	**√ In Place**	**N/A**	Licence Holder i.e. Assmang: BRMO	All mines are still being operated with no anticipation of closure in the near future. BRMO will ensure that they, at least one hundred and eighty (180) days prior to closure of any facility, or any portion thereof, notify the Regional Head of such intention and submit final amendments to the IWWMP and RSIP as well as a final Closure Plan for approval.
10.4.	The Licensee shall make full financial provision for all investigations, designs, construction, operation and maintenance for a mine plant facility should it become a requirement as a long-term water management strategy.	**N/A**	**N/A**	Licence Holder i.e. Assmang: BRMO	Noted by the Licence Holder.
11. Operational Conditions					
11.1. Water samples must be taken from all the monitoring boreholes by using approved sampling techniques and adhering to recognised sampling procedures. Samples should be analysed for both organic as well as inorganic pollutants, as mining activity often lead to hydrocarbon spills in the form of diesel and oil. At least the following water quality parameters should be analysed for:					

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
11.1.1.	*Major ions (Ca, K, Mg, Na, SO4, NO3, Cl, F)*	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	As outlined in the report compiled by Aquatico, the following methodology is applied during sampling: **a. Water Quality Sampling:** As detailed in the Water Quality Monitoring Report of January 2019, various water samples are sampled on a quarterly basis at the Assmang BRMO. All fieldwork is conducted based on the protocols and specifications, and code of practice contained in the SABS ISO 5667:1-15. These international standards address all aspects from the programme design, sampling methods as well as sample preservation and many other aspects. Applicable standards include: • ISO 5667-1: 2006 Part 1: Guidance on the design of sampling programmes and sampling techniques • ISO 5667-3: 2003 Part 3: Guidance on preservation and handling of samples • ISO 5667-11: 1993 Part 11: Guidance on sampling of groundwater • DWAF Best Practice Guidelines Series G3: General Guidelines for Water Monitoring Systems. The analysis of water samples is undertaken by Aquatico which is a SANAS accredited testing laboratory (T0685). Observations during sampling are of critical importance during the evaluation of the water quality results. Aquatico therefore employs highly qualified personnel to conduct the fieldwork as well as the evaluation component of the programme. Aquatico developed a custom-made data sheet in accordance with SABS ISO guidelines 5667-1 to 5667-3, to assist the field scientist in recording the physical and environmental information of the sampling locality. This information is needed to interpret water quality especially if the water quality results obtained by the laboratory indicate sudden changes at a specific locality. These sheets typically include the following information: • Location, name and details of the sample site • Method of collection • Name of collector • Nature of pre-treatment, if any • Preservative or stabilizer added, if any • Flow status or dam level • Water level of boreholes • Other data gathered at this point Boreholes at BRMO are purged before sampling. Purging is done for the purpose to obtain a representative sample from the groundwater aquifer by displacing the stagnant water. Purging of boreholes before sampling

<table>
<tr><th>IWUL Condition #</th><th>Condition</th><th>2018 Compliance</th><th>2019 Compliance</th><th>Responsible Person</th><th>Findings/ Comments</th></tr>
<tr><td>11.1.2.</td><td>pH</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td rowspan="4">involves the removal of sufficient water until the general quality is stable. This is done by either removing three volumes of water or pumping the borehole until the in-situ measured EC stabilizes.

Difficulties regarding purging during monitoring:
• Access problems may include boreholes that cannot be purged due to the fact that the monitoring locality is obstructed or the pathway to the location is restricted.
• Static water level depth may restrict purging
✓ Dry conditions
✓ Low water levels
✓ Equipment – extremely deep boreholes with low static water levels are not purged

Specific water quality analysis is required on all the sampled localities, as indicated in the Table below.
<table><tr><th colspan="5">Water Quality Analysis</th></tr><tr><th>Constituent</th><th>Groundwater (9)</th><th>Final Effluent (6)</th><th>Wastewater to irrigate (4)</th><th>Oil Separator (7)</th></tr><tr><td colspan="5">Physical Parameters</td></tr><tr><td>pH</td><td>√</td><td>√</td><td>√</td><td></td></tr><tr><td>Electrical Conductivity (EC)</td><td>√</td><td>√</td><td>√</td><td></td></tr><tr><td>Total dissolved salts (TDS)</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Total Suspended Solids (TSS)</td><td></td><td>√</td><td>√</td><td></td></tr><tr><td>Total Hardness (TH)</td><td></td><td>√</td><td></td><td></td></tr><tr><td>Sodium Adsorption Ratio (SAR)</td><td></td><td>√</td><td></td><td></td></tr><tr><td>Colour, Odour, Taste</td><td></td><td></td><td>√</td><td></td></tr><tr><td>Dissolved Oxygen (DO)</td><td></td><td></td><td>√</td><td></td></tr><tr><td>Temperature</td><td></td><td></td><td>√</td><td></td></tr><tr><td colspan="5">Chemical Parameters</td></tr><tr><td>Total Alkalinity</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Chloride as Cl</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Sulphate as SO_4</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Nitrate as NO_3_N</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Ammonium as NH4_N</td><td></td><td>√</td><td>√</td><td></td></tr><tr><td>Ammonia/Ammonium</td><td></td><td>√</td><td>√</td><td></td></tr><tr><td>Ortho-Phosphate asPO_4</td><td></td><td>√</td><td>√</td><td></td></tr><tr><td>Fluoride as F</td><td>√</td><td>√</td><td>√</td><td></td></tr><tr><td>Calcium as Ca</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Magnesium as Mg</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Sodium as Na</td><td>√</td><td>√</td><td>√</td><td></td></tr><tr><td>Potassium as K</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Aluminium as Al</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Iron as Fe</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Manganese as Mn</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Zinc as Zn</td><td>√</td><td></td><td></td><td></td></tr><tr><td>Boron as B</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Copper as Cu</td><td>√</td><td></td><td></td><td></td></tr><tr><td>Lead as Pb</td><td>√</td><td></td><td></td><td></td></tr><tr><td>Silicon as Si</td><td>√</td><td>√</td><td></td><td></td></tr><tr><td>Chemical Oxygen Demand (COD)</td><td>√</td><td>√</td><td>√</td><td></td></tr><tr><td>Total Soap, Oils, and Grease (SOG)</td><td></td><td></td><td>√</td><td>√</td></tr><tr><td>Total Petroleum Hydrocarbons (TPH)</td><td>√</td><td></td><td></td><td>√</td></tr><tr><td>Oxygen Absorbed</td><td></td><td></td><td>√</td><td></td></tr><tr><td>Free chlorine</td><td></td><td></td><td>√</td><td></td></tr><tr><td colspan="5">Bacteriological Parameters</td></tr><tr><td>E coli + Total Coliforms</td><td>√</td><td>√</td><td>√</td><td></td></tr></table></td></tr>
<tr><td>11.1.3.</td><td>Electrical Conductivity (EC)</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td></tr>
<tr><td>11.1. 4.</td><td>Total Petroleum Hydrocarbon (THP)</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td></tr>
<tr><td>11.1.5.</td><td>Total Alkalinity</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td></tr>
<tr><td>12.2.</td><td>The sample results for the above water quality parameters should be recorded on a data sheet. It is proposed that the data should be entered into an appropriate computer database and reported to the Provincial Head.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>As soon as water quality data is received from the laboratory, it is verified and entered into the Aquatico water quality management programme. This software has an MS Excel platform and can therefore interact with any other database system. Verification is seen as a critical step since it allows to re-analyse laboratory results that may seem questionable.</td></tr>
</table>

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
12.3.	The Licensee must ensure in advance that alternative water supply for external water users is provided to the users should groundwater resources be impacted.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	In cases were water supply for external users becomes a problem due to the ground water resources being impacted, potable water stores from the mine will be used. These will be supplied to water users using bowsers. However, there is no formal documented plan for such. There currently have not been any complaints from the external users.
12.4.	The Pollution Control dam must be designed in such a manner that any spillage can be contained and reclaimed without any impact on the surrounding environment, a plan must be in place to stop overflowing in the dam in case of rainy seasons.	CND	Partially in place	Licence Holder i.e. Assmang: BRMO	Gloria Surface Plant PCDs do not have means for containment of spillage. However, it is reported that the dams' freeboard is maintained and that float switches are in place to pump water to alternative storage facilities if a dam reaches the minimum freeboard.
12.5.	All future expansion works must be lined in accordance with a Class C barrier system from Reg 636 or equivalent as a concrete structure above ground compliant with BS 8007 for retaining structures.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	The TSF liner designs for the new dams were submitted to the Department of Mineral Resources (DMR) for consideration and approval prior to commencing with construction activities. The old TSFs were not lined as they were constructed prior to the promulgation of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA), GNR. 636: National Norms and Standards for disposal of waste to landfill.
12.6.	The Licensee shall reuse the mineral rich tailings within a limited period (5 years) or provide a closure cap design as required by MR2 of 1998, clause 8.4.7 for complete implementation by the same date.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	BRMO is currently investigating several strategies for the re-use of tailing material, including the pelleting of tailings material for sale as product.
12.7.	The Licensee shall, at all times, together with the conditions of this licence adhere to the Regulations on use of water for mining and related activity aimed at the protection of water resources (GN 704, 4 June 1999).	X Not in place	Partially in place		A GN 704 audit is being undertaken in concurrently with this WULCA. From the GN 704 Report (Part B of this report), BRMO has a number of positives as well as compliances with GN704 Regulations, that are briefly summarised below: BRMO are conducting GN704 audits on a regular basis, indicating their commitment to continual improvement; • A number of GN704 exemptions have been approved by the DWS as part of the Mines recently amended IWUL; • The Mine is operated as a closed system, meaning that dirty water generated is recycled and reused; • Dirty water systems were generally noted to be in good working order; and • Dams were noted to be fenced with appropriate warning signs erected. The following were non-compliances noted at BRMO where improvement needs to be made: • Regulation 6: Capacity requirements of clean and dirty water systems: ✓ The STPs at Nchwaning II and Gloria were noted to be spilling onto bare ground. It is recommended that the Mine's project to expand the STPs treatment capacities is implemented as soon as possible, as STP spills were noted on the previous audit; ✓ A fuel spillage outside of the concrete lined filling station at Nchwaning II was noted, which had not been attended to. It is understood that the filling station is in the process of being decommissioned and relocated. It is recommended that the spill is cleaned up as soon as possible and rehabilitation commence once the relocation process is complete; ✓ The cut-off trenches that surround the SOT workshops were filled with silt. It is recommended that a walkthrough of the trenches is conducted, and that all sediment is removed. It is further recommended that the trenches are inspected on a more regular basis; and ✓ Freeboard of 0.8 m was not apparent at certain sections along the top of the Nchwaning II slimes dam, Gloria Million Litre reservoir and return water dams. It is recommended that freeboard is ensured at the Nchwaning II slimes dam. Exemption from GN704 should be applied for, for the Million Litre reservoir, as the reservoir is less than 2 m high, and it is therefore not feasible to operate the reservoir with a 0.8 m freeboard. • Regulation 7: Protection of water resources: ✓ As mentioned under Regulation 6, the STPs at Nchwaning II and Gloria were noted to be actively spilling, a fuel spillage outside of the concrete lined filling station at Nchwaning II was noted, trenches that surround the SOT workshop were silted, and freeboard of 0.8 m was not apparent at the Nchwaning II slimes dam, Gloria Million Litre reservoir and return water dams. The recommendations provided should be implemented; and ✓ Erosion was noted on the western side wall of the Nchwaning II slimes dam. It is recommended that a walkthrough of all slimes dams is undertaken, to identify areas where notable erosion is taking place, and that these areas are repaired.
12. Water Conservation and Water Demand					
12.1.	Licensee shall develop and submit a WC&WDM plan to the Provincial Head, which:	X Not in place	X Not in place		

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
12.2.	contains the mine water management and water loss strategies and programmes;	X Not in place	X Not in place		Request for proposals from service providers to develop WC&WDM Plan for submission to the DWS, as part of the water balance upgrade project, have been distributed to the potential service provider in order to undertake the following: • Site visit / physical inspection to understand the operational water requirements and/ or consumption. • Data Analysis and Documentation to enable "Basis of Model Design" and the document will be developed. • Develop a conceptual water balance for the current system in an effective, reliable and reputable format; • Code the mode. The model must be able to simulate the dynamics of the interactions between water storages, the plant, the mine area, clean and dirty catchment runoff and the waste facilities; • Collect and populate model with current/ future pumping capacities, process flows, production and areas; and • Develop and update the stochastic rainfall to allow different sequences of daily rainfall to be generated within the model, to determine the probability of spill and failure of supply for a particular water management strategy. The parameters of the stochastic model are to be determined by fitting the model to a measured daily rainfall record considered to be representative of the area. • Develop the export functionality to export the average overall balance/ arranged data into an MS Excel spreadsheet • Verify the overall detailed water balance and a detailed balance check around each key component of the mine, including the water balance schematics for reporting and forecasting purposes. • Calibrate the model based on available data. It must be noted that the quality of the calibration is limited by the amount and quality of the records and will therefore also depend on the existing water monitoring network. • Design and Avail a simplified interactive user interface to allow for use of the model by BRMO staff. • Compile and produce a comprehensive report reflecting the assumptions, Mathematical models used to calculate different processes, first-degree order constants assumed in the model; and Results from verification and validation simulation. *The report should not be limited to the aforementioned elements.* • Conduct the water management review and establish the baseline risk assessment; • Determine water saving initiatives that can be implemented for BRMO • Develop a Water Conservation and Demand plan/ Strategy for BRMO.
12.3.	sets annual targets for improved water use efficiency for the mining activity, beneficiation and waste disposal practices and stipulates which measures will be implemented to achieve the targets on the mine;	X Not in place	X Not in place		
12.2.	Licensee shall update the WC&WDM plan on an annually basis and submit to the Provincial Head for approval.	X Not in place	X Not in place		
12.3.	Licensee shall report on annually basis the implementation of water conservation and water demand management measures including retrofitting with water efficient technologies and devices, reduction of total water demand, improvement in water use efficiency benchmarks and targets.	X Not in place	X Not in place		
13. Reporting					
13.1.	The Licensee shall update the water balance annually and calculate the loads of waste emanating from the activities. The Licensee shall determine the contribution of their activities to the mass balance for the water resource and must furthermore co-operate with other water users in the catchment to determine the mass balance for the water resource reserve compliance point.	X Not in place	X Not in place	Licence Holder i.e. Assmang: BRMO	A water balance for the current year has not been completed, and has therefore not been submitted to the DWS. As discussed in the above finding, a water balance upgrade project is currently underway. Once complete, such will be submitted to the DWS.
13.2.	The Licensee shall submit the results of analysis for the monitoring requirements to the Provincial Head on a quarterly basis under reference number: 27/2/2/D1141/105/1.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Water Quality Monitoring Reports for various water samples are sampled on a quarterly and bi annual basis at the Assmang BRMO, at the specified ground water monitoring points as shown in Table 3, for submission to the DWS. Proof of submission of the external audit reports compiled in February/ March 2016 was made available to MC.

<table>
<tr><th>IWUL Condition #</th><th>Condition</th><th>2018 Compliance</th><th>2019 Compliance</th><th>Responsible Person</th><th>Findings/ Comments</th></tr>
<tr><td>13.3.</td><td>The Licensee is to assess the possible impacts of contamination of water (impacts to sensitive ecosystems, other receptors etc.). The background water resource quality needs to be assessed as well to evaluate impacts of specific actions/pollution sources on the groundwater regime.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>As per the Water Quality Monitoring Report compiled by Aquatico, in January 2019, groundwater monitoring was conducted at a total of nine monitoring boreholes located at three different mining operations (Black Rock Mine / Nchwaning complex / Gloria Mine). The results indicated that, at Black Rock Mine, all the boreholes exceeded the IWUL Groundwater resource quality (D41M) in terms of a number of variables, however these concentrations were mostly still within the SANS 241:2015 Drinking Water Limits. At Nchwaning II, although there were exceedances recorded at GPT04 in terms of EC, Mg, Na, Cl and SO4 based on the results presented and the variables analysed, the water quality profile of GPT04 is characteristic of the groundwater of the region. At the Gloria Mine, both the GPT01 and GTP02 exceeded the IWUL Groundwater resource quality (D41K) in terms of a number of variables, however most of these concentrations are still within the SANS 241:2015 Drinking Water Limits with the exception of Na, NO3- N, total Coliforms. It is advised that the water from the monitoring boreholes is not used as potable water if untreated. By virtue of the definition of contamination i.e. polluting or making something impure, MC concludes that the ground water has been slightly polluted.

Possible impacts of contamination of water have been assessed (impacts to sensitive ecosystems, other receptors etc.). The background water quality has also been assessed as well the evaluation of impacts of specific action/pollution sources on the groundwater regime.</td></tr>
<tr><td colspan="6">APPENDIX V – SECTION 21 (J) OF THE ACT: REMOVING, DISCHARGING OR DISPOSING OF WATER FOUND UNDERGROUND IF IT IS NECESSARY FOR THE EFFICIENT CONTINUATION OF AN ACTIVITY OR FOR THE SAFETY OF PEOPLE</td></tr>
<tr><td>1.</td><td>The Licensee is authorised to remove a maximum quantity of 1 188 559 m³/a from the open cast pit as described in Table 9.

Table 9: Section 21 (j) water use activities
<table>
<tr><th>Water uses</th><th>Purpose</th><th>Volume (m³/a)</th><th>Property Description</th><th>Co-ordinates</th></tr>
<tr><td colspan="5">Section21(j)</td></tr>
<tr><td>1</td><td>Dewatering of underground water at Black Rock shaft 6</td><td>928 m³/a</td><td>Portion 1 of farm Santoy 230</td><td>S 27° 07' 21.5" E 22° 49' 44.4"</td></tr>
<tr><td>2</td><td>Dewatering of underground water at Black Rock old shaft 7</td><td>Volume: 106 956 m³/a</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 07' 47.6" E 22° 49' 48.1"</td></tr>
<tr><td>3</td><td>Dewatering of underground water at Black Rock old shaft 7 dewatering borehole</td><td>25 800 m³/a</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 07' 51.3" E 22° 49' 34.5"</td></tr>
<tr><td>4</td><td>Dewatering of underground water at Black Rock old shaft 8</td><td>23 928 m³/a</td><td>Portion 1 of farm Belgravia 264</td><td>S 27° 07' 40.5" E 22° 49' 53.9"</td></tr>
<tr><td>5</td><td>Dewatering of underground water at Gloria Borehole</td><td>8 316 m³/a</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 10' 20.9" E 22° 53' 17.6"</td></tr>
<tr><td>6</td><td>Dewatering of underground water at Gloria Shaft 2 (new)</td><td>86 424 m³/a</td><td>Portion 1 of farm Gloria 266</td><td>S 27° 10' 20.9" E 22° 53' 17.6"</td></tr>
<tr><td>7</td><td>Dewatering of underground water at Nchwaning II shaft</td><td>650 975 m³/a</td><td>Portion 3 of farm Nchwaning 267</td><td>S 27° 8' 7.2" E 22° 51' 55.5"</td></tr>
<tr><td>8</td><td>Dewatering of underground water at Nchwaning III shaft</td><td>176 232 m³/a</td><td>Portion 3 of farm Nchwaning 267</td><td>S 27° 08' 07.0" E 22° 51' 55.9"</td></tr>
</table></td><td>N/A</td><td>N/A</td><td>Licence Holder i.e. Assmang: BRMO</td><td>Only underground mining methods are presently utilised at the BRMO. Black Rock Mine previously had open cast and underground operations. The mining method for Gloria, as well as Nchwaning II and III, is via underground bord and pillar methods, making use of trackless machines and underground conveyer systems. Ore is drilled, blasted, and crushed underground before being conveyed to the processing facilities on the surface.

From the water balance excel spread sheet, calculated from July 2018 to April 2019, the following readings are provided for process water:
• At Gloria: 0m³
• Gloria 2: 0 m³
• Nchwaning II: 0 m³
• Nchwaning III: 94 m³

The following readings are provided for potable water:
• Gloria: 14195 m³
• Gloria 2: 0 m³
• Nchwaning II: 6454 m³
• Nchwaning III: 39009 m³

This condition is not applicable and needs to be amended as there is currently no open cast pit at BRMO.

The following quantities for the removal of underground water from the open cast pit as described in Table 9. were applied for through an amendment application, and have been approved.

• Dewatering of underground water (Volume: 928 m³/a) at Black Rock shaft 6. This condition has changed to 23 928 m³/a).
• Dewatering of underground water (Volume: 23 928 m³/a) at Black Rock shaft 6.</td></tr>
<tr><td>2.</td><td>The quantity of the water authorised to be removed and disposed of into the pollution control dam in terms of this license may not be exceeded without prior authorisation by the Department.</td><td>N/A</td><td>N/A</td><td>Licence Holder i.e. Assmang: BRMO</td></tr>
<tr><td>3.</td><td>The Licensee shall provide any water user whose water supply is impacted by the water use with potable water.</td><td>√
In Place</td><td>√
In Place</td><td>Licence Holder i.e. Assmang: BRMO</td><td>In cases were water supply for external users becomes a problem, potable water stores from the mine will be used. These will be supplied to water users using bowsers. However, there is no formal documented plan for</td></tr>
</table>

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					such. There currently have not been any complaints from the external users. BRMO currently provides potable water to the mine village.
4.	The quantity of water removed from underground must be metered and recorded on a daily basis.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Only underground mining methods are presently utilised at the BRMO. Black Rock Mine previously had open cast and underground operations. The mining method for Gloria, as well as Nchwaning II and III, is via underground bord and pillar methods, making use of trackless machines and underground conveyer systems. Ore is drilled, blasted, and crushed underground before being conveyed to the processing facilities on the surface. From the water balance excel spread sheet, calculated from July 2018 to April 2019, the following readings are provided for process water: • At Gloria: 0m^3 • Gloria 2: 0 m^3 • Nchwaning II: 0 m^3 • Nchwaning III: 94 m^3 The following readings are provided for potable water: • Gloria: 14195 m^3 • Gloria 2: 0 m^3 • Nchwaning II: 6454 m^3 • Nchwaning III: 39009 m^3 This condition is not applicable and needs to be amended as there is currently no open cast pit at BRMO. The following quantities for the removal of underground water from the open cast pit as described in Table 9. were applied for through an amendment application, and have been approved. • Dewatering of underground water (Volume: 928 m^3/a) at Black Rock shaft 6. This condition has changed to 23 928 m^3/a). • Dewatering of underground water (Volume: 23 928 m^3/a) at Black Rock shaft 6. Though the readings for the groundwater levels were not provided, it was only confirmed through the mine personnel that all water pumped and abstracted is recorded on a daily basis.
5.	Groundwater levels shall be monitored every six months (once in the beginning of the dry season and once in the beginning of the wet season), level measurements shall be reported in tabular and graphical formats indicating trends.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	The water quality monitoring reports are being compiled quarterly and biannually and therefore, groundwater levelling monitoring is conducted quarterly and biannually, with the results tabulated and graphed within the water quality monitoring reports.
6.	Self-registering flow meters must be installed in the delivery lines at easily accessible positions near the dewatering points.	X Not in place	Partially in place	Licence Holder i.e. Assmang: BRMO	BRMO is currently undertaking a water/flow meter project, which entails the following: • The identification of all the areas (inlets, outlets and other areas within the processes) that require the installation of water/flow meters, as per existing WUL requirements. • Identifying the areas within the process; where water is used, reused, recycled and/or pumped into the existing TSF • Purchasing and installation of new flow meters, and fixing of the old defective meters; and • Calibration of the existing flow meters. Not all lines at BRMO have been fitted with flow meters.
7.	The flow metering devices shall be maintained in a sound state of repair and calibrated by a competent person at intervals of not more than once in two (2) years. Calibration certificates shall be available for inspection by the Provincial Head or his/her representative upon request.	√ In Place	Partially in place	Licence Holder i.e. Assmang: BRMO	Not all, but some of the flow meters have been maintained in a sound state of repair and calibrated by a competent person. There currently have been some replacements of the old flow meters with electronic meters. Calibration certificates were confirmed by the BRMO personnel to have been submitted to the DWS. Proof of submission was not made available to MC.
8.	Calibration certificates in respect of the pumps must be submitted to the Provincial Head after installation thereof and thereafter at intervals of two years.	X Not in place	Partially in place	Licence Holder i.e. Assmang: BRMO	BRMO is currently undertaking a water/flow meter project, which entails the following: • The identification of all the areas (inlets, outlets and other areas within the processes) that require the installation of water/flow meters, as per existing WUL requirements.

IWUL Condition #	Condition	2018 Compliance	2019 Compliance	Responsible Person	Findings/ Comments
					• Identifying the areas within the process; where water is used, reused, recycled and/or pumped into the existing TSF • Purchasing and installation of new flow meters, and fixing of the old defective meters; and • Calibration of the existing flow meters.
9.	The date and time of monitoring in respect of each sample taken shall be recorded together with the results of the analysis.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	The provided Water Quality Monitoring Reports show that the date, time and monitoring point is recorded together with the results of the analysis.
10.	Analysis shall be carried out in accordance with methods prescribed in condition 6 of appendix III.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	An error in reference to Condition 6 of Appendix of Appendix III was made in this condition, as Condition 6 of Appendix III referred to irrigation. This has however been amended through the amended IWUL issued on 10 April 2019. As detailed in the Water Quality Monitoring Report of January 2019, various water samples are sampled on a quarterly basis at the Assmang BRMO. All fieldwork is conducted based on the protocols and specifications, and code of practice contained in the SABS ISO 5667:1-15. These international standards address all aspects from the programme design, sampling methods as well as sample preservation and many other aspects. Applicable standards include: • ISO 5667-1: 2006 Part 1: Guidance on the design of sampling programmes and sampling techniques • ISO 5667-3: 2003 Part 3: Guidance on preservation and handling of samples • ISO 5667-11: 1993 Part 11: Guidance on sampling of groundwater • DWAF Best Practice Guidelines Series G3: General Guidelines for Water Monitoring Systems.
11. The Provincial Head must be informed of any incident that may lead to groundwater being disposed of contrary to the provisions of this license, by submitting a report containing the following information:					
11.1.	Nature of the incident (e.g. operating malfunctions, mechanical failures, environmental factors, loss of supply services, etc.)	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	It was reported that no incident occurred that may lead to under-groundwater being disposed of contrary to the provisions of the licence.
11.2.	Actions taken to rectify the situation and to prevent pollution or any other damage to the environment; and	√ In Place	√ In Place		
11.3.	Measures to be taken to prevent re-occurrence of any similar incident.	√ In Place	√ In Place		
12.	The Licensee shall follow acceptable construction, maintenance and operational practices to ensure the consistent, effective and safe performance of the groundwater removal system.	√ In Place	√ In Place	Licence Holder i.e. Assmang: BRMO	Acceptable construction, maintenance and operational practices were noted on site.
13.	Reasonable measures must be taken to provide for mechanical, electrical or operational failures and malfunctions of the underground water removal system.	√ In Place	√ In Place		BRMO has back-up generator sets in place to ensure the safe continuation of mining and dewatering activities. Back-up pumps are also available to ensure dewatering in the event of pump failure.

SECTION 10: FINDINGS AND RECOMMENDATIONS

10-1 SUMMARY OF FINDINGS

The findings for the BRMO, according to the operational conditions of the IWUL, summary and breakdown of compliance is reflected in Table 6 below:

Table 6: Summary of BRMO in terms of the Operational Conditions in the IWUL

Out of a total possible score of			**426**
BRMO scored during the time of this WULCA			**347**
OVERALL COMPLIANCE PERCENTAGE			
The performance percentage obtained by BRMO for this WULCA Report is:			**81.45%**
COMPLIANCE FINDING SUMMARY			
SUMMARY DESCRIPTION			**NUMBER**
Total number of condition			**170**
Assessable conditions			**141**
Un-assessable conditions			**29**
Conditions: Not in place			**13**
Conditions: Partially in place			**37**
Conditions: In place			**91**
COMPLIANCE BREAKDOWN SUMMARY			
PHASE	**POSSIBLE SCORE**	**ACTUAL SCORE**	**PERCENTAGE**
OPERATIONAL PHASE	**426**	**347**	**81.45 %**

10-2 SUMMARY OF RECOMMENDATIONS

IWUL Condition	Recommendations
Appendix I: General conditions	
12.	All flow meters must be maintained in a sound state of repair and calibrated by a competent person, at intervals of not more than 2 years. Replacements of the old flow meters with electronic meters must be undertaken. Calibration certificates must be made available which were confirmed by BRMO to have been submitted to the DWS, and proof of submission to the DWS must be made available.
13.	BRMO must report all incidents as required and implement effective solutions or management measures to prevent recurrence or effectively contain the spillages. All incidents must be reported to the DWS, and documented. Proof of reporting of such incidents to the DWS must be readily available. At Nchwaning II, the rehabilitation report for the rehabilitation activities which was undertaken ex situ must be made available. The fuel spillage outside of the concrete lined filling station at Nchwaning II must be cleaned up. BRMO must ensure that the hazardous waste generated from the clean-up is safely taken to the waste management facilities for proper management.
5. All water taken from the resource shall be measured as follows:	
5.2.	The WC&WDM plan must be submitted to the DWS on an annual basis.
7.	Additional flow meters must be installed and monitored/ maintained in a sound state of repair in order to measure the amount of water abstracted, received and/or consumed and this information must be available on request.
8.	Additional flow meters must be installed and monitored/ maintained in a sound state of repair and must be easily accessible. The flow metres must be calibrated by a competent person, at intervals of not more than 2 years. A programme of checking, calibration, and/ or renewal of measuring devices will be developed and updated as and when required. Replacements of the old flow meters with electronic meters must be undertaken. Calibration certificates must be made available.
Appendix III: Section 21 (b) of the Act: Storing water	

2.1.	Additional flow meters must be installed and monitored/ maintained in a sound state of repair in order to measure the flow entering and leaving the storage facilities and this information must be available on request.
2.2	The quantities of water stored must be recorded on a monthly basis. Proof of such records must be made available.
Appendix III: Section 21 (e) of the Act: Engaging in a controlled activity	
3. Quality of Waste Water to Irrigate	
3.1.	It is recommended that the water quality of the waste water to irrigate must be managed to below the limits as per the IWUL. An investigation must be carried out in order to determine the cause of exceedances. BRMO must engage with the DWS regarding the amendment of the limits as specified in Table 3.
4. Monitoring	
4.2 Quality	
4.2.4	Monitoring variables and frequency of samples must be taken monthly. Colour, odour and taste must also be analysed, however, BRMO have engaged with the DWS regarding the amendment of the variable as specified in Table 5, to exclude colour, odour and taste.
4.3 Groundwater Monitoring	
4.3.3.	BRMO to expand its ground water monitoring network (as per geophysical survey report).
4.3.6.	BRMO to expand its ground water monitoring network (as per geophysical survey report).
6. General Irrigation Practices	
6.1	The water quality of the waste water to irrigate must be managed to below the limits as per the IWUL. An investigation must be carried out in order to determine the cause of exceedances. BRMO must engage with the DWS regarding the amendment of the limits as specified in Table 3.
6.2. Irrigation with wastewater must be practiced in a systematic manner and precautions shall be taken so as to prevent:	
6.2.1.	Water pooling and logging must be investigated at the BRMO village.
6.2.2.	An investigation must be carried out in order to determine the deterioration at the effluent localities in terms of (NO3-N), in order to prevent further degradation to the environment .
6.2.4.	Water pooling and logging must be investigated at the BRMO village.
7. Pipelines	
7.1.	The pipelines used for the conveyance of waste or waste water must be painted in a conspicuous colour or manufactured of a coloured material distinctly different from the colour of the pipelines in which drinking water is flowing to avoid the possibility of any cross-connections of the different pipelines. Given that the pipelines have already been installed, BRMO must engage with the DWS and notify them of the strategies that are being implemented in order to avoid the possibility of any cross-connections of the different pipelines.
8. Stormwater Management	
8.3.	BRMO must engage with the DWS should this condition not be implementable.
APPENDIX IV: Section 21(g) of the Act: Disposing of waste in a manner which may detrimentally impact on a water resource	
1. Construction, Operation and Maintenance	
1.6.	A freeboard must be ensured at the Nchwaning II slimes dam. Exemption from GN704 should be applied for, for the Million Litre reservoir, as the reservoir is less than 2 m high, and it is therefore not feasible to operate the reservoir with a 0.8 m freeboard.
1.7.	Gloria Surface Plant PCDs must have means for containment of spillage.
3. Surface Water Monitoring	
3.1.	The maximum quantity of waste or wastewater disposed per annum into the waste management facilities / areas on properties as indicated in Table 1 must be recorded daily.
3.2.	The maximum quantity of waste or wastewater disposed per annum into the waste management facilities / areas on properties as indicated in Table 1 must be recorded.
3.4.	Monitoring variables and frequency of samples must be taken monthly.
4. Groundwater Monitoring	
4.6.	DWS recommended that a study be conducted to evaluate a need for additional monitoring boreholes. BRMO adhered to their recommendation by conducting the geo-physical survey, and the study suggested that borehole be established to ensure that adequate monitoring is undertaken, considering the expansion of the mine. BRMO, has acknowledge the recommendations, considers expanding its ground water

	monitoring network (as per geophysical survey report). BRMO to expand its ground water monitoring network (as per geophysical survey report).
4.9.	DWS recommended that a study be conducted to evaluate a need for additional monitoring boreholes. BRMO adhered to their recommendation by conducting the geo-physical survey, and the study suggested that borehole be established to ensure that adequate monitoring is undertaken, considering the expansion of the mine. BRMO, has acknowledge the recommendations, considers expanding its ground water monitoring network (as per geophysical survey report). BRMO to expand its ground water monitoring network (as per geophysical survey report).
4.10.	DWS recommended that a study be conducted to evaluate a need for additional monitoring boreholes. BRMO adhered to their recommendation by conducting the geo-physical survey, and the study suggested that borehole be established to ensure that adequate monitoring is undertaken, considering the expansion of the mine. BRMO, has acknowledge the recommendations, considers expanding its ground water monitoring network (as per geophysical survey report). BRMO to expand its ground water monitoring network (as per geophysical survey report).
4.11.	DWS recommended that a study be conducted to evaluate a need for additional monitoring boreholes. BRMO adhered to their recommendation by conducting the geo-physical survey, and the study suggested that borehole be established to ensure that adequate monitoring is undertaken, considering the expansion of the mine. BRMO, has acknowledge the recommendations, considers expanding its ground water monitoring network (as per geophysical survey report). BRMO to expand its ground water monitoring network (as per geophysical survey report).
5.Water Resource Protection	
5.1.	An investigation must be carried out in order to determine the cause of exceedances.
6. Stormwater Management	
6.1.	BRMO to make available GN704 exemption application and the associated waste characterisation report, including the proof of submission to the DWS, in order for MC to confirm the compliance to this condition.
6.2.	A walkthrough of all slimes dams must be undertaken in order to identify areas where notable erosion is taking place, and that these areas are repaired.
6.3.	BRMO to make available GN704 exemption application and the associated waste characterisation report, including the proof of submission to the DWS, in order for MC to confirm the compliance to this condition.
6.4.	BRMO to make available GN704 exemption application and the associated waste characterisation report, including the proof of submission to the DWS, in order for MC to confirm the compliance to this condition.
6.5.	BRMO to make available GN704 exemption application and the associated waste characterisation report, including the proof of submission to the DWS, in order for MC to confirm the compliance to this condition.
6.6.	BRMO to make available GN704 exemption application and the associated waste characterisation report, including the proof of submission to the DWS, in order for MC to confirm the compliance to this condition.
6.7.	BRMO to make available GN704 exemption application and the associated waste characterisation report, including the proof of submission to the DWS, in order for MC to confirm the compliance to this condition.
7. Plant Areas and Conveyances	
7.1.	BRMO must investigate and implement effective solutions to the prevent recurrence.
7.3.	The salvage yard floor must be concreted where potentially contaminated bulky material/items are stored outside of water tight steel skips/containers, and appropriately integrated with the remainder of the site's 'dirty' storm water management system.
9. Contingencies	
9.3.1.	BRMO must report all incidents as required and implement effective solutions or management measures to prevent recurrence or effectively contain the spillages. All incidents must be reported to the DWS, and documented. Proof of reporting of such incidents to the DWS must be readily available. At Nchwaning II, the rehabilitation report for the rehabilitation activities which was undertaken ex situ must be made available. The fuel spillage outside of the concrete lined filling station at Nchwaning II must be cleaned up. BRMO must ensure that the hazardous waste generated from the clean-up is safely taken to the waste management facilities for proper management. It was reported that the STP at Black Rock Mine overflowed in recent years, and the incident was never reported to the Regional Head of the Department. As reported, the overflow did not warrant reporting to the DWS.
9.3.2.	

	BRMO personnel also confirmed that there had been spillages at the Gloria STPs, which occurred as a result of lack of potable water not being pumped into the system, which resulted into the plant's scrubber being blocked. A fuel spillage outside of the concrete lined filling station at Nchwaning II was noted, and the trenches that surround the SOT workshop were noted to be silted. Although unlikely, the potential exists for water resources to be contaminated. There had been one incident whereby contaminated soil was removed and stored on the ground, which led to contamination of the soil. Rehabilitation was undertaken ex situ. The latter two incidents were not reported to the DWS.
10. Integrated Water and Waste Management	
10.2.	RSIP must be developed. The IWWMP must be submitted to the DWS on an annual basis.
11. Operational Conditions	
12.4.	Gloria Surface Plant PCDs must have means for containment of spillage.
12.7.	At the STPs at Nchwaning II and Gloria, the Mines project to expand the STPs treatment capacities must be implemented as soon as possible. At the fuel spillage outside of the concrete lined filling station at Nchwaning II, the spill must be cleaned up as soon as possible. For erosion control, a walkthrough of the trenches must be conducted, and that all sediment must be removed. Trenches must be inspected on a regular basis. A freeboard must be ensured at the Nchwaning II slimes dam. Exemption from GN704 should be applied for, for the Million Litre reservoir, as the reservoir is less than 2 m high, and it is therefore not feasible to operate the reservoir with a 0.8 m freeboard.
12. Water Conservation and Water Demand	
12.1.	Once the WC&WDM Plan has been developed, it should be submitted to the DWS, as soon as possible, and on annual basis thereafter. Proof of submission to the DWS must be made available.
12.2.	
12.3.	
12.2.	
12.3.	
13. Reporting	
13.1.	The WC&WDM plan with the water balance reports, once compiled, must be submitted to the DWS on an annual basis. The updated water balance must be submitted to the DWS for the year 2019.
APPENDIX V – SECTION 21 (J) OF THE ACT: REMOVING, DISCHARGING OR DISPOSING OF WATER FOUND UNDERGROUND IF IT IS NECESSARY FOR THE EFFICIENT CONTINUATION OF AN ACTIVITY OR FOR THE SAFETY OF PEOPLE	
6.	Additional flow meters must be installed and monitored/ maintained in a sound state of repair. All flow meters must be maintained in a sound state of repair and calibrated by a competent person, at intervals of not more than 2 years. Replacements of the old flow meters with electronic meters must be undertaken. Calibration certificates must be made available which were confirmed by BRMO to have been submitted to the DWS, and proof of submission to the DWS must be made available.
7.	
8.	

SECTION 11: CONCLUSION

For this WULCA, a total of 141 conditions out of the 170 conditions could be assessed in order to determine performance. The 3 conditions which were not assessed could not be determined due to the lack of information, and the absence of evidence during the physical inspection. The 26 conditions which were not assessed were not applicable (N/A), indicating that the condition is not currently applicable. Not applicable conditions were removed from the total number of conditions from which the compliance score was calculated. From these 141 conditions, a total of 37 findings were found as being: "Partially in place", 13 findings being: "Not in Place" and 91 findings as being: "In place" (refer to Figure 2 below).

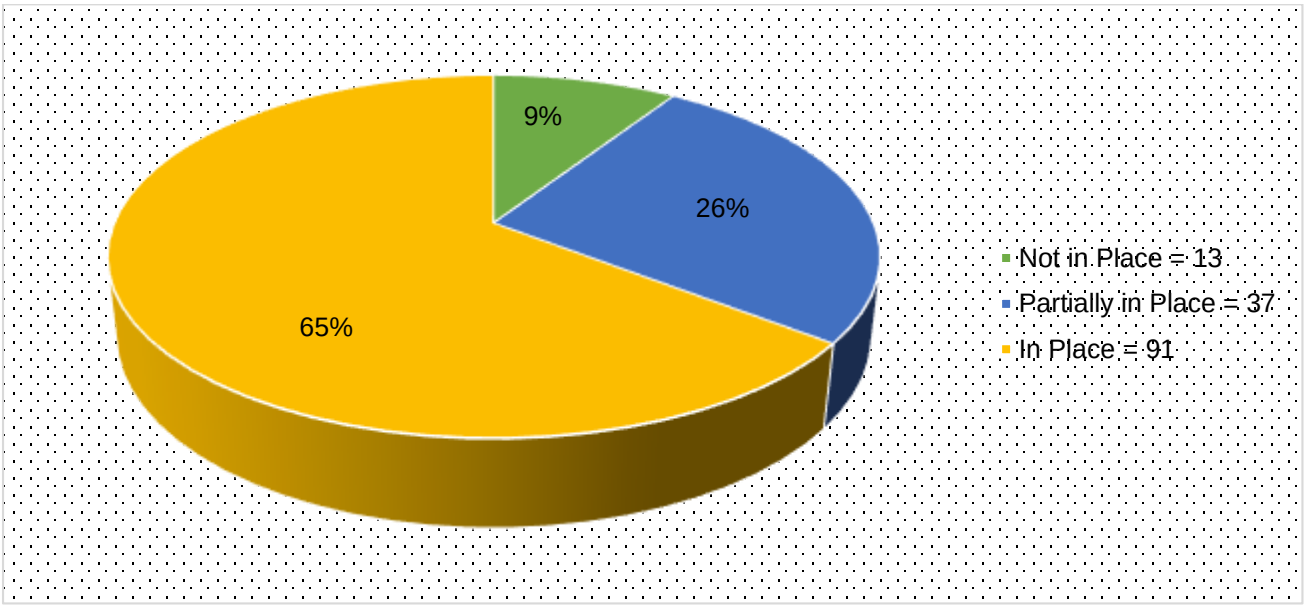

Figure 2:Summary of compliance with the IWUL conditions for the WULCA conducted in 2019.

For the previous WULCA, undertaken in 2018, a total of 143 conditions out of the 170 conditions could be assessed in order to determine performance. The 13 conditions which were not assessed could not be determined. The 14 conditions which were not assessed were not applicable (N/A), indicating that the condition is not currently applicable. Not applicable conditions were also removed from the total number of conditions from which the compliance score was calculated. From these 143 conditions, a total of 18 findings were found as being: “Partially in place”, 24 findings being: “Not in Place” and 101 findings as being: “In place” (refer to Figure 3 below).

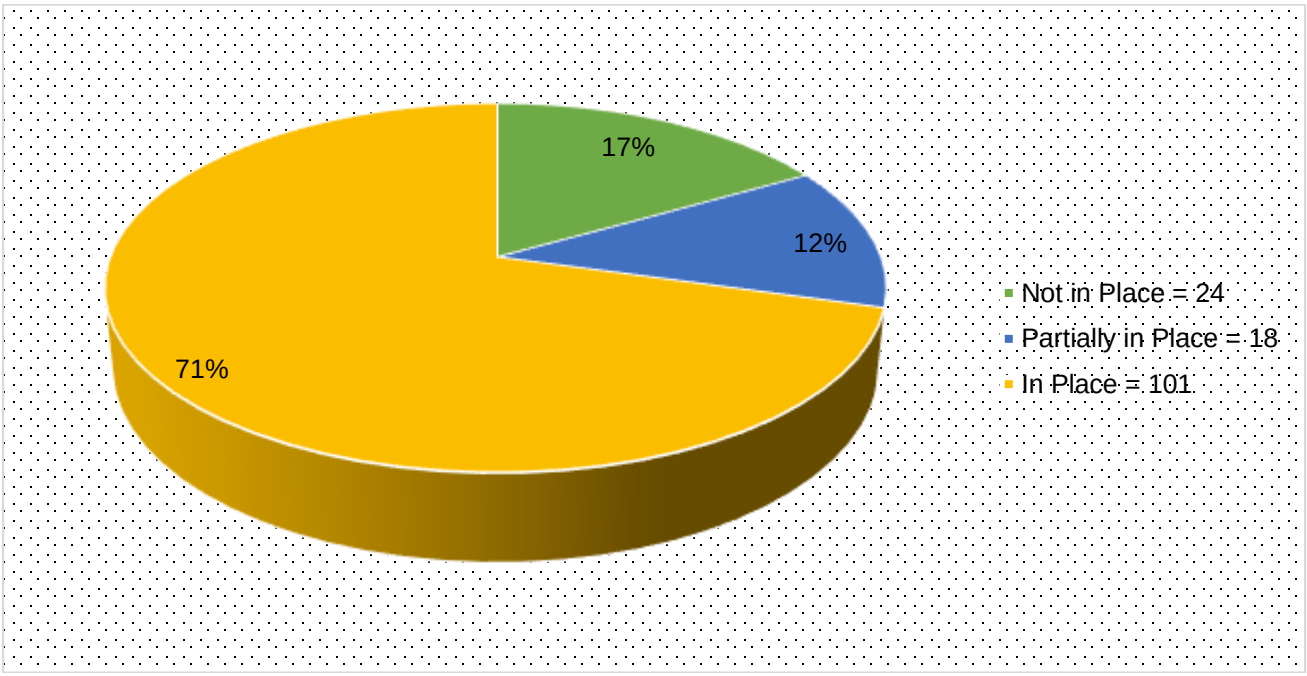

Figure 3:Summary of compliance with the IWUL conditions for the WULCA conducted in 2018.

It is to be noted, as evident from Table 6, that the assessment was characterised by a significant number of findings, which resulted in the high level of compliance achieved by BRMO. The high level of compliance attained as a result of the findings (based on information obtained during interviews and visual observations) made during the assessment, indicates that the holder of the IWUL, BRMO has been actively involved in the implementation of management measures as detailed in the IWUL; especially from a regulatory and compliance point of view.

The mining operations are managed by the BRMO, having made provision for the implementation of an Environmental Management System (EMS) at the operations. BRMO (as the holder of the IWUL) strive to ensure compliance to the IWUL. Environmental Officers (EOs) have been appointed to act on behalf of BRMO; and are providing for the required environmental monitoring for the duration of mining activities.

The audit findings are based on information relayed during interviews, as well as the observations made during physical site inspections, at a specific point in time. In some cases, where information was communicated, proof was also provided as support. Such audit findings were therefore seen as totally compliant.

Not all areas/ activities authorised by the IWUL could be visited/ inspected as a result of access restrictions and time constraints. Findings were therefore based on distant observations and assumptions.

The environmental compliance of BRMO to the requirements of the IWUL improved since the previous Annual External IWUL Audit, undertaken in 2018. The compliance percentage increased from **79.02%** to **81.45%.**

A number of findings were raised during the 2019 WULC audit. The findings raised relate to a wide variety of aspects. These include but are not limited to; additional approvals required by the DWS; exceeded water use and water quality parameters, surface and groundwater monitoring, spill prevention and containment and documentation preparation and approval. All of the audit findings have been addressed in the body of this report along with recommendations for how non-compliances and deficiencies should be addressed. It is recommended that the Licence Holder review this report in detail and that required actions be taken in a timely manner in order to demonstrate a proactive approach in rectifying environmental non-compliance.

It has been noted in this report that BRMO have been granted the amended IWUL on 10 April 2019. The new WUL was not scoped on the current WULCA, hence it was not audited in detail. It is recommended that BRMO continues with the effective environmental management and monitoring as per the requirements of the IWULs.

Appendix 1: Environmental Compliance Auditors' Curriculum Vitae

Mpho Manyabe CURRICULUM VITAE

MPHO MANYABE

Name of Firm:	Manyabe Consultancy (Pty) Ltd
Profession:	Environmental Management and Compliance
Date of Birth:	05 May 1983
Position:	Managing Director
Years of Experience:	12 years
Nationality:	South African
Languages:	Tshivenda (Home Language), English, Isi Zulu, IsiXhosa, Southern Sotho

EDUCATIONAL QUALIFICATIONS:

- **MSc in Environmental Science**, University of South Africa (UNISA) (current)
- **BSc Honours in Environmental Management**, University of South Africa (UNISA), 2016
- **National Diploma Environmental Sciences**, Tshwane University of Technology, 2008

BIOGRAPHY:

Mpho Manyabe has twelve (12) years of work experience in the field of Environmental Management from various consulting companies.

She was previously nominated to be in the Gauteng Department of Agriculture and Rural Development (GDARD) Environmental Impact Assessment (EIA) Environmental Assessment Practitioner (EAP) committee representing the Forum which was launched on 31 March 2015 comprising of three (3) EAPs and two (2) GDARD officials to provide quarterly reports to the Executive Authority (Member of the Executive Committee (MEC)) on issues identified as blockages to the improved efficiencies the department seeks to achieve.

She has also been nominated to become a member of the Academic Advisory Committee for the Environmental Science programme in the Department of Environmental, Water and Earth Sciences in the Faculty of Science at the Tshwane University of Technology (TUT), to serve for a period of three (3) years, where she will be assisting with preparation and provision of relevant, high quality teaching and learning content for students. She has been identified based on her expertise in the field of Environmental Sciences/Management.

She has good understanding of environmental legislation. She has excellent knowledge of Integrated Environmental Management (IEM) tools, including EIAs, Strategic Environmental Assessments (SEAs), Social Impact Assessments (SIAs), Environmental Management Frameworks (EMFs), Safety, Health and Environmental Management, waste management and environmental law in general.

COURSE PRESENTATIONS

- Introduction to Integrated Waste Management for Environmental Managers presented by the Centre of Environmental Managers (CEM).
- Project Management (PM 24) presented by Golder and Associates.
- Environmental Law for Environmental Managers presented by the Centre of Environmental Managers (CEM)
- Overview of the National Environmental Management: Waste Act 59 of 2008 ("NEMWA") in view of its commencement on 1 July 2009 presented by Cameron Cross.
- National Environmental Management Act, 107 of 1998: commencement of EIA regulations 2010 and Listing Notices- presented by Cameron Cross, 17 September 2010.
- IAIAsa 2010 National Conference, CSIR CONVENTION CENTRE, PRETORIA, GAUTENG- 23 – 25 August 2010
- Applying Safety, Health and Environmental (SHE) principles and Procedures, NOSA 2011.

PROFESSIONAL DETAILS

CURRENT POSITION(S)
Firm: Manyabe Consultancy
Position: Managing Director
Period: May 2016 - present

Tasks Include:

- Pre- Feasibility Exercises
- Screening exercises
- Scoping and Environmental Impact Reporting (S&EIRs)
- Basic Assessments (BAs)
- Environmental Management Programmes (EMPrs)
- Section 24 G Rectification Applications
- Public Participation Processes (PPPs)
- Environmental Control Officer (ECO)
- Environmental Auditing
- Surface and Ground Water Monitoring
- Air Quality Monitoring
- Greening Projects
- Water Use License Applications (WULAs) for all industries
- Waste Management License Applications (for existing and new sites)
- Contaminated Sites Assessments
- Integrated Water and Waste Management Plans (IWWMPs) & Rehabilitation
- Strategy and Implementation Programmes (RSIPs)

- EIAs related to Prospecting, Mining Rights and Permits Applications
- Mining Closure Applications (Closure Plans, Performance Assessments and Risk Assessments)
- EMPR Performance Assessments
- Old Order Mining Rights EMPr amendments as per the MPRDA
- Section 11 Applications as per the MPRDA
- Section 102 Applications as per the MPRDA
- MPRDA Financial Provisions

OTHER PREVIOUS POSITION(S)

Firm: GIBB Engineering & Science
Position: Senior Environmental Scientist
Period: May 2015 - November 2015

Firm: Strategic Environmental Focus
Position: Project Manager
Period: November 2012 - April 2015

Firm: Zitholele Consulting
Position: Environmental Scientist
Period: November 2012 - April 2015

Firm: Digby Wells & Associates
Position: Environmental Scientist
Period: 2007 - 2008

PROFESSIONAL AFFILIATIONS

- Member of International Association of Impact Assessors (IAIA)

RELEVANT EXPERIENCE AND PROJECTS INVOLVEMENT

Extensive experience in the compilation, co-ordination and management of numerous Environmental Impact Assessments (EIAs) Reports, including inter alia, Environmental Impact Assessment Reports (EIARs), Basic Assessments (BAs) and Scoping Reports (SRs), Environmental Management Programmes Reports, as required by the Environment Conservation Act, 1989 (Act 73 of 1989) (ECA), the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the Development Facilitation Act, 1995 (Act 67 of 1995) (DFA). Projects experience includes EIAs for the upgrade of the Underground Storage Tanks (USTs), development of green fields mining areas, development of Filling Stations, mausoleums, development, extension, closure of Waste Disposal Facilities, auditing, upgrade of storm water systems, establishment of substations and overhead power lines, construction of railway lines and bridges, construction of a bird hide and a hiking trail, and township developments.

Following are some of the relevant projects she has been involved in:

- Environmental Scientist for the development of a mausoleum in Rietfontein and Zuurfontein Basic Assessments for Basfour 3512 (Pty) Ltd Vanderbijlpark, South Africa
- Environmental Scientist for an EIA for the extension of the Boitshepi Landfill Site and auditing of the site for Emfuleni Local Municipality, Vanderbijlpark, South Africa
- Project Manager and Environmental Consultant for the closure and Development of a new waste disposal facility of the Devon Waste Site for the Lesedi Local Municipality.
- Environmental Scientist for an EIA for upgrade of the storm water system in Protea Glen Extensions 1-4 for Johannesburg Roads Agency (Pty) Ltd.
- Assisting in the compilation of reports for the establishment of the Kappa sub-station within the Western Cape Province, EIA and EMP for Eskom.
- Assisting in the compilation of reports for the integration of the Bravo (Kusile) power station into the Eskom grid in which 5 EIAs for the proposed construction of overhead power lines and associated infrastructure were compiled for Eskom.
- Assisting in the compilation of reports for the Basic Assessment and Water Use License for the construction of Ingula Bridge, Harrismith for Eskom.
- Assisting in the compilation of reports for the EIA for a railway and associated infrastructure to transport sorbent to the Kusile Power Station for Eskom.
- Project Manager and Environmental Assessment Practitioner for the construction of the hiking trail and bird hide for the Cradle of Humankind World Heritage Site Gauteng Department of Agriculture and Rural Development (GDARD).
- Project Manager and Environmental Assessment Practitioner for the construction of Cyferpan Township Development for SCIP Engineering Group (Pty) Ltd, on behalf of the Gauteng Department of Local Government and Housing (GDoLG& H) Gauteng.
- Environmental Manager for the BA and Water Use License Application (WULA) for the Ingonyama Road Link Extension for the Johannesburg Development Agency (JDA).
- Environmental Manager for the Scoping and Environmental Impact Reporting (S&EIR) for the Skywalk Project at the God's Window for the Mpumalanga Tourism and Parks Agency,
- Environmental Manager for the BA and Heritage Impact Assessment (BA) for Stats SA.
- Environmental Manager for the BA and Heritage Impact Assessment (BA) for Stats SA.
- Environmental Manager for Malelane Shopping Centre for the Amendment Application for Misty Sea Trading.
- Environmental Manager for closure of the Vlakfontein Clay Quarry for Ceramics Industries Limited (CIL)

- Environmental Manager for Environmental Management Programme for the Cyferfontein Clay Quarry for Ceramics Industries Limited (CIL)
- Environmental Manager for the Social and Labour Plan (SLP) amendment, Section 11 Applications and update of the Financial Provisions as per the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) for Ceramics Industries Limited Clay Quarries.
- Environmental Manager for S&EIR for the proposed Mareetsane Batho-Batho Solar PV facility for Kgatelopele Private Equity and Venture Capital (Pty) Ltd.
- Environmental Manager for an Environmental Legal Opinion for Mogale City Local Municipality and Absa.
- Environmental Manager for an Environmental Legal Opinion for the Capricorn Prospecting Right Application for Truckmec (Pty) Ltd (Tuckmec).
- Environmental Manager for the S&EIR for the proposed Steel Manufacturing Plant in Nigel.
- Environmental Manager for the S&EIR and Air Emissions License (AEL) for the proposed Springfield Health Care Risk Waste Treatment Facility for Pikitup.
- Environmental Manager for the BA Process for the proposed Delmore Park Extension 7 Residential Development, Ekurhuleni Metropolitan Municipality (EMM), Gauteng for Reiger Park Development Company (Pty)
- Environmental Manager for the Section 24G for Afrox MIG plant in North West.
- Environmental Manager for the Closure Plan for DRD Gold, Germiston Mine.
- Environmental Manager for BAs, S&EIRs and WULAs for Abland's commercial, residential developments
- Environmental Manager for Passenger Rail Agency of South Africa (PRASA) S&EIR and WULA for the proposed Nigel Manufacturing Plant in Nigel.

Public Participation Processes

- In-depth knowledge and experience in project management of Public Participation Processes (PPPs) related projects involving EIAs, deproclamation of nature reserves, etc.

- Project Manager and Public Participation Practitioner for undertaking a Public Participation Process (PPP) for the Deproclamation of a portion of the Onderstepoort Nature Reserve for Brian Falconer Property Group.

Search and Rescues

- Environmental Scientist for the Bravo Search and Rescue near Witbank for Eskom.

Greening Construction Projects

- Overall project management of the R10 000 000.00 GP Greening of Mamelodi Schools Project

- Project Manager and Implementer for the Gauteng Province: Greening of Mamelodi Schools Project involving the establishment/ construction of a park for the Department of Environmental Affairs (DEA).

Specialist Review

- Specialist review of all specialist reports for projects for integration into the final environmental reports.

Safety, Health and Environmental (SHE) Training:

- Safety, Health and Environmental (SHE) awareness training in a waste management company including the review of policies for proper implementation.
- Project Manager and Training Facilitator for provision of Safety, Health and Environmental (SHE) services for Pikitup Johannesburg (Pty) Ltd.

CONTACTABLE REFERENCES

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Appendix 2: Signed Attendance Registers (Inception Meeting, Site Audit and Close Out Meeting)

ATTENDANCE REGISTER – INCEPTION MEETING
201910 WATER USE LICENSE AND GN 704 AUDIT ASSMANG MANGANESE
15 APRIL 2019

MAMYABE CONSULTANCY

TITLE/ NAME/ SURNAME	ORGANISATION / INTEREST	CONTACT DETAILS		SIGNATURE
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		Cell 0781686109.		
		E-mail thamim@brmo.co.za.		
Richard Maseli	BRMO	Tel	Postal Address	
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		E-mail Ishifhiwar@brmo.co.za		

NCHWANING II – slimes dams operators

ATTENDANCE REGISTER – SITE AUDITS
201910 WATER USE LICENSE AND GN 704 AUDIT ASSMANG MANGANESE
15 – 17 APRIL 2019

MANYABE CONSULTANCY

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		E-mail			
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		E-mail			
		Tel		Postal Address	
		Fax			
		Cell			
		E-mail			
		Tel		Postal Address	
		Fax			
		Cell			
		E-mail			
		Tel		Postal Address	
		Fax			
		Cell			
		E-mail			

ATTENDANCE REGISTER – SITE AUDITS
201910 WATER USE LICENSE AND GN 704 AUDIT ASSMANG MANGANESE
15 – 17 APRIL 2019

MANYABE CONSULTANCY

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		Cell			
		E-mail			
		Tel		Postal Address	
		Fax			
		Cell			
		E-mail			
		Tel		Postal Address	
		Fax			
		Cell			
		E-mail			
		Tel		Postal Address	
		Fax			
		Cell			
		E-mail			

NKHWANING II

ATTENDANCE REGISTER – SITE AUDITS
201910 WATER USE LICENSE AND GN 704 AUDIT ASSMANG MANGANESE
15 – 17 APRIL 2019

MANYABE CONSULTANCY

TITLE/ NAME/ SURNAME	ORGANISATION / INTEREST	CONTACT DETAILS			SIGNATURE
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		Cell			
		E-mail			
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		E-mail			
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		Cell			
		E-mail			

ATTENDANCE REGISTER – SITE AUDITS
201910 WATER USE LICENSE AND GN 704 AUDIT ASSMANG MANGANESE
15 – 17 APRIL 2019

MANYABE CONSULTANCY

TITLE/ NAME/ SURNAME	ORGANISATION / INTEREST	CONTACT DETAILS			SIGNATURE
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		E-mail			
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		Cell			
		E-mail			
		Tel		Postal Address	
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		Cell			
		E-mail			
		Tel		Postal Address	
		Fax			
		Cell			
		E-mail			

ATTENDANCE REGISTER – CLOSE OUT MEETING
201910 WATER USE LICENSE AND GN 704 AUDIT ASSMANG MANGANESE
17 APRIL 2019

MANYABE CONSULTANCY

TITLE/ NAME/ SURNAME	ORGANISATION / INTEREST	CONTACT DETAILS		SIGNATURE
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		E-mail pieter@brmo.co.za.		
MR BHEKI MAGONGO	BRMO	Tel 053 751 5248	Postal Address	
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		E-mail bhekim@brmo.co.za		

ATTENDANCE REGISTER – CLOSE OUT MEETING
201910 WATER USE LICENSE AND GN 704 AUDIT ASSMANG MANGANESE
17 APRIL 2019

MANYABE CONSULTANCY

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Appendix 3: Photo plate

WATER USE LICENSE AUDIT ASSMANG MANGANESE PHOTO PLATE

MONITORING BOREHOLES

Monitoring boreholes located at three different mining operations (Black Rock Mine / Nchwaning complex / Gloria Mine)

BULK FUEL STORAGE AND REFUELLING STATIONS

All of the hazardous substances are handled according to the relevant legislation. The bunded areas under the diesel storage tanks do not allow seepage through the bund walls. All the bunded areas under the diesel pumps are in good condition, except that a fuel spillage outside of the concrete lined filling station at Nchwaning II was noted, which had not been cleaned up. It is understood that the filling station is in the process of being decommissioned and relocated.

RETURN WATER DAMS

Water containing waste being disposed into return water dams

SAFETY/ WARNING/ INFORMATIVE SIGNAGE

Notices manufactured of a durable weather-proof material warning against the use of water containing waste for drinking and washing purposes being displayed at prominent places where the waste is being reused and at all taps worded in the official languages applicable in the area.

Appropriate warning signs erected all around the mine.

Notices prohibiting unauthorised persons from entering the certain areas, as well as internationally acceptable signs indicating the risks involved in case of an unauthorised entry were displayed along the boundary fence of all mines and its facilities. Safety signs were noted in place at various locations around the mine, including the Tailings Storage Facilities (TSFs) and Sewage Treatment Plants (STPs).

RESERVOIRS

Potable water reservoir (roofed) being used for human consumption, ablutions and emergency fire tanks.

WASTE MANAGEMENT

Waste bins and skips strategically placed in all working areas

WASTE WATER TREATMENT

The STPs at Black Rock, Nchwaning II and Gloria. The STPs at Nchwaning II and Gloria were noted to be actively spilling onto bare ground during the audit.

PUMP STATIONS

HAZARDOUS SUBSTANCES STORAGE

All reagent storage tanks and reaction units have been supplied with a bunded area built to the capacity of the facility and provided with sumps. .

SPILL KITS

Spill management kits are being kept and maintained on site wherever liquid hazardous materials are stored, and where refuelling and /or servicing of plant, vehicles and machinery takes place.

WATER CONSERVATION
OIL AND WATER SEPERATORS

Storm water infrastructure is in place. Contaminated water from process works at all mining areas is being collected into the process water circuit. The water is transported from the processing works, to settling plants for further processing, and is directed back to the mines for re-use. In cases were water is mixed with oils/ hazardous substances, the water is decanted into the oil/water separator. The separated is temporarily stored in JoJo tanks for re-use.

STORMWATER COLLECTION DAMS

No storm water management measures (clean or affected water) are implemented at BRMO. Clean storm water runoff and rainfall are not diverted away from the operation or contained once within the operational area. Storm water runoff is allowed flow along the natural topography and discharge to the receiving environment, except at Nchwaning II, the original TSF constructed in 2018 is now being used as a storm water catchment dam. The storm water catchment dam will allow for the contaminated storm water to be intercepted by canals and diverted to the newly installed storm water catchment dam for re-use during dust suppression.

POLLUTION CONTROL AND SLIMES DAMS

All pollution control dams and slimes dams are fenced off. A freeboard of 0.8 m was not apparent at certain sections along the top of the Nchwaning II slimes dams.







SITE DOCUMENTATION

Averyone entering the dams areas are being made to sign the register.

TOTAL FILLING STATION

The total Filling Station at Nchwaning III complied with all the relevant legislation.







SITES BEING IRRIGATED
Potable water is being used to irrigate the golf course (only in areas where 750 trees have been planted). Irrigation of the golf course with waste water is therefore no longer happening, but rather only the irrigation of the villages parks and sports fields takes place.