



water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

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LICENCE IN TERMS OF CHAPTER 40 OF THE NATIONAL WATER ACT, 1998 (ACT NO 36 OF 1998) (THE ACT)

I, **Trevor Balzer**, in my capacity as Acting Director-General in the Department of Water Affairs and acting under authority of the powers delegated to me by the Minister of Water and Environmental Affairs, hereby authorise the following water uses in respect of this licence.

SIGNED: _____

DATE: _____

LICENCE NO: 03/C22J/ACFGIJ/1369

FILE NO: 16/2/7/C222/C45

1.	Water User:	Goldfields SA – South Deep Mine
	Postal Address of applicant:	P.O. Box 57
		WESTONARIA
		1780

2. Water uses

- | | | |
|------|---------------------------|---|
| 2.1. | Section 21(a) of the Act: | Taking of water from a water resource, subject to the conditions set out in Appendices I, II and VII. |
| 2.2. | Section 21(c) of the Act: | Impeding or diverting the flow of water in a watercourse, subject to the conditions set out in Appendices I, III and VII. |
| 2.3. | Section 21(f) of the Act: | Discharging waste or water containing waste into a water resource, subject to the conditions set out in Appendices I, IV and VII. |
| 2.4. | Section 21(g) of the Act: | Disposing of waste in a manner which may detrimentally impact on a water resource, subject to the conditions as set out in Appendices I, V and VII. |
| 2.5. | Section 21(i) of the Act: | Altering the bed, banks course or characteristics of a watercourse, subject to the conditions set out in Appendices I, III and VII. |
| 2.6. | Section 21(j) of the Act: | Removing, discharging or disposing of water found underground, subject to the conditions set out in Appendices I, VI and VII |

B 03950

3. Property on which the use will be exercised

Table1: Properties

Water use	Activity Description	Property Description	Property Owner	Title Deed Number
Ss 21 (a)	Abstraction of water from South shaft	Modderfontein 345IQ, portions 65 and 30	South Deep Gold Mine	56765/1999
Ss 21 (a)	Abstraction of water from Leeuspruit	Modderfontein 345IQ, portions 65 and 30	South Deep Gold Mine	56765/1999 56766/1999
Ss 21(c & i)	Haul road crossing across the Kariegaspruit	Modderfontein 345IQ, portion 3,41 and 61	South Deep Gold Mine	56766/1999
Ss 21(c & i)	Existing river diversion of Leeuspruit and flow metre installation in the diversion	Portion 51, Doornpoort 347 IQ	South Deep Gold Mine	56766/1999
Ss 21 (f)	Discharging water into the Leeuspruit	Modderfontein345IQ, portion 44	South Deep Gold Mine	56766/1999
Ss 21 (g)	Disposing 1200 000 tonnes of gold slurry per annum	Portion 3; 20; 21; 40 and 41 of farm modderfontein 345IQ	South Deep Gold Mine	56766/1999
Ss 21 (g)	Disposing 360 000 of gold plant slurry as backfill into the mined out workings underground	Portion 3; 20; 21; 40 and 41 of farm modderfontein 345IQ	South Deep Gold mine	56766/1999
Ss 21 (g)	Disposing 20 400 sewage sludge into the drying beds	Portion 44 modderfontein 345IQ	South Deep gold mine	56766/1999
Ss 21(g)	Disposing a maximum quantity of 584 000 tonnes of waste rock	Portion 7 of the farm Doornpoort 347 IQ	South Deep Gold Mine	56766/1999

Ss 21(g)	Disposing quantity of 1000 000 into the return water dam	Portion 20, 50, 51 Doornpoort 345IQ	South Deep Gold Mine	56766/1999
Ss 21 (j)	Removing fissure for use in the process	Modderfontein 345IQ, portions 30	South Deep Gold mine	56766/1999

4. Registered owner of the Property

Goldfields SA: South Deep Mine

5. Licence and Review Period

This licence is valid for a period of twenty nine (29) years from the date of issuance and the first review may be done within one (1) year after the issuance of this licence followed up by five (5) years review interval.

6. Definitions

"Any terms, words and expressions as defined in the National Water Act, 1998 (Act 36 of 1998) shall bear the same meaning when used in this licence."

"The Regional Head" means the Regional Chief Director: Gauteng, Department of Water Affairs, Private Bag X995, Pretoria,

"Report" means all documentation submitted by in support of the water use licence application, including the water use licence application forms and all communication between the Licensee and the Department

7. Brief description of the application

The water use involves the taking of water from the South Shaft boreholes located on the farm Modderfontein, existing haul road and flow metre, river diversion and pipeline crossing; discharging treated sewage effluent into the Leeuspruit; disposal of waste water into the waste water containment facilities and the removal of water from underground for the continuity of an activity or safety of the people.



APPENDIX I
CONDITIONS FOR ALL WATER USES

1. This licence is subject to all applicable provisions of the National Water Act, 1998 (Act 36 of 1998).
2. The responsibility for complying with the provisions of the licence is vested in the Licensee and not any other person or body.
3. The Licensee must immediately inform the Regional Head of any change of name, address, premises and/or legal status.
4. If the property 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 Regional Head of the Department within 60 days of the said change taking place.
5. If a water user association is established in the area to manage the resource, membership of the Licensee to this association is compulsory.
6. The Licensee shall be responsible for any water use charges or levies imposed by a responsible authority.
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.
8. When compulsory licensing is implemented for the water resource in respect of which this licence was issued, the water use authorized in this licence could be subject to appropriate reduction.
9. The licence shall not be construed as exempting the Licensee from compliance with the provisions any other applicable Act, Ordinance, Regulation or By-law.
10. 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.
11. 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 years. Calibration certificates shall be available for inspection by the Regional Head or his representative upon request.
12. Any incident that causes or may cause water pollution shall be reported to the Regional Head or his/her designated representative within 24 hours.



APPENDIX II

Section 21 (a) of the Act: Taking water from a water resource

1. ABSTRACTION

- 1.1. This licence authorises the taking of a maximum quantity of Two hundred and seventy three thousand seven hundred and fifty six cubic metres per annum (273 756 m³/a) of extraneous groundwater from South Shaft boreholes for mining purpose at the following coordinates, X coordinate 26°24'14.10" S and Y coordinate 27°41' 7 .40" E
- 1.2. This licence authorises the taking of a maximum quantity of Seven hundred and twenty nine thousand nine hundred and ninety six cubic metres per annum (729 996 m³/a) as fissure water for mining purposes at the following coordinates, X coordinate 26°24'36.00" S and Y coordinate 27°41' 22 .95" E
- 1.3. The quantity of water authorised to be taken in terms of this licence may not be exceeded without prior authorisation by the Minister.
- 1.4. 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.
- 1.5. The above mentioned volume may be reduced when the licence is reviewed.
- 1.6. 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.
- 1.7. 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.
- 1.8. The Department accepts no liability for any damage, loss or inconvenience, of whatever nature, suffered as a result of:
 - 1.8.1. shortage of water
 - 1.8.2. inundations or flood
 - 1.8.3. siltation of the resource; and
 - 1.8.4. required reserve releases.
- 1.9. The Licensee shall establish and implement a continual process of raising awareness amongst itself, its workers and stakeholders with respect to Water Conservation/Water Demand Management initiatives.
- 1.10. 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.



- 1.11. Notices prohibiting unauthorised persons from entering certain areas, as well as signs indicating the risks involved in case of an unauthorised entry must be displayed along the boundary fence of these areas.
- 1.12. The Licensee shall establish a programme of formal Information Management System, which maintains a database on water supply, distribution and delivery infrastructure.
- 1.13. The Licensee shall update and submit the water balance annually and calculate the loads of waste emanating from the activities.

2. MONITORING REQUIREMENTS

2.1. All water taken from the resource shall be measured as follows:

- 2.1.1. the daily quantity of water taken must be metered or gauged and the total recorded at the last day of each month; and
 - 2.1.2. the Licensee shall keep record of all water taken and a copy of the records shall be forwarded to the Regional Head on or before 25 January and 25 July of each year.
- 2.2. The Licensee is not exempted from compliance with the provisions of the Regulations published under Government Notice R1560 of 25 July 1986, as amended from time to time.



APPENDIX III

Section 21 (c) of the Act: Impeding or diverting the flow of water in a watercourse

Section 21 (i) of the Act: Altering the bed, banks, course or characteristic of a watercourse

1. CONSTRUCTION, OPERATION AND MAINTENANCE

1.1 The licence authorises the following section 21 (c) and (i) water use activities in the Westonaria and Vanderbijlpark magisterial district, located within the Rietspruit water management area as set out in table 2 below and in the water use application reports submitted to the Department.

1.1.1 The impeding, diverting and altering the flow/ bed of the Kariegaspruit for the installation of flow meter at the following location as set out in table 2.

Table 2: Haul road and flow meter location

Water Use	Property	X-coordinate	Y-coordinate
Haul road and flow meter installation	Portion 3, 41 and 61 Modderfontein 345 IQ	S26°25'37.88"	E29°23'93.6"

1.1.2 The impeding, diverting and altering the flow/ bed of the Leeuspruit River and the installation of flow meter at the following location as set out in table 3.

Table 3: Diversion of Leeuspruit River and flow meter location

Water Use	Property	X-coordinate	Y coordinate
River Diversion and flow meter installation	Portion 41 and 61, Modderfontein 345 IQ	Start of diversion S26°25'9.37"	Start of diversion E27°40'58.94"
		End of diversion S26°25'16.90"	End of diversion E27°40'56.31"

1.1.3 The impeding, diverting and altering the flow/ bed of the tributary of the Leeuspruit River by the pipeline crossing at the following location as set out in table 4 to the Doornpoort tailings facility.

Table 4: Pipeline location

Water Use	Property	X – coordinate	Y – coordinate
Pipeline Crossing	Portion 51, Doornpoort 347 IQ	S26°25'35.06	E27°40'16.37"

1.2 The Licensee shall carry out and complete all activities listed under condition 1.1 of this appendix according to all the reports submitted to the Department.

- 1.3 The Licensee must submit a set of as-built drawings (not schematic layouts) to the Regional Head of all river diversions, road crossings and weirs.
- 1.4 The conditions of the authorisation shall be brought to the attention of all persons (employees, sub-consultants, contractors etc.) associated with the undertaking of this activity and the Licensee shall take such measures that are necessary to bind such persons to the conditions of this licence.
- 1.5 Construction activities must not take place within the 1:100 year flood-line or within a horizontal distance of 100 meters from any watercourse, estuary, borehole or well, whichever is the greatest, unless authorised by this licence as part of the activities described in the reports submitted to the Department.
- 1.6 Compensation measures for damage to and or mitigation measures must be recommended if avoidance or minimisation of the impacts of the proposed development is not possible or if mitigation measures fail to adequately protect the in-stream and riparian habitat.
- 1.7 No material with pollution generating potential will be used in any construction activities.
- 1.8 The necessary erosion prevention mechanisms shall be employed to ensure the sustainability of all structures.
- 1.9 The Licensee must ensure that structures such as the river diversions, river road crossings, weirs and the culverts shall not be damaged excessively by floods exceeding the magnitude of floods occurring on average once in every 100 years.
- 1.10 The structure of temporary crossings must be non-erosive, structurally stable and must not induce any flooding or safety hazard. Temporary crossings must be inspected regularly for accumulation of debris, blockage, erosion of abutments and overflow areas. Debris must be removed and damages must be repaired and reinforced immediately.
- 1.11 The natural migration of aquatic biota and upstream movement of fish must not be disturbed.
- 1.12 The development may not impede natural drainage lines.
- 1.13 Pollutions caused by spills from the conveyances must be prevented through proper maintenance and effective protective measures especially near all stream crossings.
- 1.14 Any access roads or temporary crossings should be:
 - 1.14.1 non-erosive, structurally stable and should not induce any flooding or safety hazard
 - 1.14.2 any damage be repaired immediately to prevent further damage



2 STORMWATER MANAGEMENT

- 2.1 Where necessary works must be constructed to attenuate the velocity of the stormwater discharge and to protect the banks of the watercourse.
- 2.2 Stormwater control works must be constructed, operated and maintained in a sustainable manner throughout the project.
- 2.3 Increased 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 watercourse.
- 2.4 Stormwater leaving the Licensee's premises must 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.

3 WATER QUALITY

- 3.1 The Licensee shall ensure that the quantity of the water to downstream water users does not decrease because of the existence of the river diversions, river crossings, culverts and associated maintenance of road crossings.
- 3.2 The pipeline should incorporate turn over to minimise spillage during operation. Should larger spillage occur due to malfunction of the pipe or for any other reason, clean up of the spillage should be undertaken as soon as possible following the event. In this regard regular inspection must be undertaken.

4 GENERAL SPECIFICATIONS

- 4.1 A suitably qualified person appointed by the Licensee and approved in writing by the Regional Head, must be responsible for ensuring that the structures are maintained in line with the design specifications.
- 4.2 The Licensee must ensure that river diversion, river crossings, and weirs shall not be damaged excessively by floods exceeding the magnitude of floods occurring on average once in every 100 years.
- 4.3 The necessary erosion prevention mechanisms shall be employed to ensure the sustainability of all the structures.
- 4.4 Where temporary crossings are included their structure must be non-erosive, structurally stable and may not induce any flooding or safety hazard. Temporary crossings must be inspected regularly for accumulation of debris, blockage, erosion of abutments and overflow areas. Damaged areas shall be repaired and reinforced immediately.
- 4.5 The Licensee must submit a set of as-built detailed drawings (not schematic layouts) to the Regional Head of all river diversions, road crossings, and weirs, within one (1) year from the date of issuance of this licence.



- 4.6 The Licensee shall deliver proof to the Regional Head of compliance to the licence, when required.

5 PROTECTIVE MEASURES

- 5.1 The diversion structures may not restrict river flows by reducing the overall river width or obstructing river flow.
- 5.2 Alien vegetation must not be allowed to further colonize the area, and all new alien vegetation recruitment must be eradicated or controlled, using standard methods approved by the Department.

6 REHABILITATION AND MANAGEMENT

- 6.1 The vegetation of the surrounding catchment should also be managed to prevent erosion and siltation of the water course.
- 6.2 The Licensee shall take steps necessary to allow movement of aquatic species, including migratory species during the rehabilitation programme.
- 6.3 The Licensee shall embark on a systematic long-term rehabilitation programme to restore natural watercourses to environmentally acceptable and sustainable conditions, which shall include, but not be limited to:
- 6.3.1 The rehabilitation of disturbed and degraded riparian areas to restore and upgrade the riparian habitat integrity to sustain a bio-diverse riparian ecosystem; and
 - 6.3.2 Annually assess the habitat to monitor the sustainability of the diversions and compliance with these conditions. Action must be taken to rectify any negative impacts.

7 BUDGETARY PROVISION

- 7.1 The Licensee shall make budgetary provision for investigations, designs, construction, operation, maintenance and closure for the mine.
- 7.2 The Licensee shall submit the first budgetary provision thirty six months after the issuance of this licence, for approval by the Regional Head.
- 7.3 The budgetary provision shall be updated thereafter submitted by **1 November** of each year for approval by the Regional Head.



APPENDIX IV

Section 21 (f) of the Act: Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, or other conduit

1. QUANTITY OF WATER CONTAINING WASTE

1.1. The Licensee is authorized to discharge a maximum quantity of Seven hundred and thirty thousand cubic metres per annum (730 000 m³/a) of purified sewage effluent based on a maximum quantity of two thousand five hundred cubic metres per day (2 500 m³/d) into the Leeuspruit on portion 44 of the farm Modderfontein 345 IQ at the following coordinates, X-coordinate S 26° 25' 7.25" and Y-coordinate E 27°41'13.31"

2. QUALITY OF WATER CONTAINING WASTE

2.1. The quality of the treated water containing waste discharged into the: Leeuspruit may not exceed the following non-exceedance values or range in table 5:

Table 5: Discharge Standards

VARIABLE	UNIT	LIMIT
pH		6.5 – 9.5
Electrical Conductivity (EC)	mS/m above intake to a maximum of 150	70
Total dissolved solids (DS)	mg/l	11
Suspended solids (SS)	mg/l	25
Ammonia (NH ₄ as N)	mg/l	6
Nitrate (NO ₂ /NO ₃ as N)	mg/l	15
Phosphate (PO ₄ as P)	mg/l	10
Chemical Oxygen Demand (COD)	mg/l	75 after removal of algae
Chloride (as Cl)	mg/l	70
Feecal coliform	CFU/ 100 ml	500

3. MONITORING

3.1. Quantity

3.1.1. The quantity of waste discharged into the Leeuspruit shall be metered and recorded daily.

3.1.2. Monitoring for the quantity of waste shall be done at the point where the waste is discharged into the Leeuspruit.

3.1.3. The installation of the water meters must comply with the specifications of the manufacturer with regard to distance from obstructions in the pipelines upstream and downstream of the meters. The meters must be approved by the Department before installation and it must reach 999 999 m³ before resetting to 0 m³

3.1.4. 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 years. Calibration certificates shall be available for inspection by the Regional Head or his representative upon request.

3.2. Quality of waste

3.2.1. The quality of the waste shall be monitored by taking grab samples every week at the monitoring points described in condition 4.2 of this appendix. Each sample shall be analysed according to condition 5 of this appendix for the following variables: and/or any other variable as may be required from time to time by the Regional Head.

Table 6: Water Quality variables and frequencies

pH		Daily
EC	in mS/m	Monthly
Chemical oxygen demand	in mg/l	Monthly
Ammonia (as N)	in mg/l	Monthly
Orthophosphate (as P)	in mg/l	Monthly
Nitrate (as N)	in mg/l	Monthly
Chloride (as Cl)	in mg/l	Daily
Suspended solids	in mg/l	Daily
TDS in mg/l		Monthly
Faecal coliforms per 100ml	in counts	Monthly

3.3. The date, time and monitoring point in respect of each sample taken shall be recorded together with the results of the analysis.

4. MONITORING POINTS

4.1. Monitoring for quality and flow shall only be carried out at the monitoring points listed below:

4.1.1. Monitoring points for the flow:

4.1.1.1 at the inlet point of the plant

4.1.1.2 at the outlet point of the plant

4.1.2 Monitoring points for quality:

4.1.2.1 at the inlet where waste water enters the plant



4.1.2.2 at the outlet point of the plant

4.2. The monitoring points shall not be changed without prior notification to and written approval by the Regional Head.

4.3. The monitoring programme (including sampling network and sampling techniques) must be in accordance with all applicable procedures obtainable from the South African Bureau of Standards (SABS).

5. METHODS OF ANALYSIS

5.1. Analyses shall be carried out in accordance with methods prescribed by and obtainable from the South African Bureau Standards, in terms of the Standards Act, Act 30 of 1982.

5.2. The methods of analysis shall not be changed without prior notification to and written approval by the Minister or delegated nominee.

6. STORMWATER MANAGEMENT

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.

7. OPERATION OF THE WASTE WATER TREATMENT WORKS

7.1. The waste water treatment works shall be supervised and controlled by a suitably qualified and experienced employee of the Licensee who shall have under his control an adequate number of operators who have been classified in terms of regulation 2834 dated 27 December 1985 (or any update thereto) and in terms of Section 26 of the Act, to ensure proper functioning of the works and processes at all times.

7.2. Suitably qualified and experienced mechanical and electrical artisans shall be available to be called in for inspection and maintenance of the works.

7.3. No any other waste, which may deleteriously affect the efficient functioning of the works or final water containing waste, shall be received in the Sewage Purification Works.

8. AUDITING AND REPORTING

8.1. The Licensee shall conduct an annual internal audit on compliance with the conditions of this licence. A report on the audit shall be submitted to the Regional Head within one month of finalization of the report, and shall be made available to an external auditor should the need arise.

8.2. The Licensee shall appoint an independent external auditor to conduct an audit on compliance with the conditions of this licence two (2) years after the issuance of this licence. The first audit must be conducted within six (6) months from the date of issuance of this licence and a report on the audit shall be submitted to the Regional Head within one month of finalization of the report.

9. GENERAL

9.1 No intractable or toxic waste shall be allowed to find its way into the waste water treatment works and /or be discharged with the final waste. The Licensee shall take all steps possible to prevent discharge of any substance into the sewers, which could have a deleterious effect on the operation of works and/or final waste.



APPENDIX V

Section 21 (g) of the Act: Disposing of waste in a manner which may detrimentally impact on a water resource

1 STORAGE OF WATER CONTAINING WASTE

1.1 The licensee is authorised to dispose of a maximum quantity in cubic metres (m³) of water containing waste per year and dispose the mine residue deposits in tonnes per year into the waste storage facilities as described in table 7 below.

Table 7: Waste storage facilities for the disposal of water containing waste in terms of cubic metres

Facility	Volume in cubic metres per annum (m ³ /a)	Waste description
Thickeners	5 x 3 500	Thickeners at old gold plant area
Refrigeration dams	5 x 2 700	The dams for chilled water at the Refrigeration plant
Settling dams	2 x 3 000	Dams for settling water at the Gold plant
Settlers A and B	2 x 650	For settling water at the gold plant
Retention pond	62 400	Retention pond at twin shaft
Old Return Water Dam	15 000	Containing waste from the old tailings facility
Cascades ponds	3 000	Runoff water from the tailings facility
New return water dam,	52 487	Waste from the new tailings facility
Condenser dam	200	Dams at the refrigeration plant for condensing
Mine water dams	2 x 2 200	Containing water used
Doornpoort return water dam	1 000 000	Waste from the Doornpoort tailings facility
Sludge	20 400	Sludge from the wastewater treatment plant onto the drying beds

Table 8: Waste storage facilities for the disposal of waste in terms of tonnes

Facility	Tonnes per annum	Description
Gold slurry	1 200 000	Disposing gold slurry into tailings facility
Gold slurry	1 560 000	Disposing gold slurry as backfill into the mined out workings underground
Waste rock	584 000	Waste rock onto the rock dump

1.2 Sludge from drying beds must be quantified, analysed, classified and managed strictly according to the Guidelines for Utilisation and Disposal of Wastewater Sludge by the



Department of Water Affairs published by the Water Research Commission as report no TT261/06 dated March 2006

2 CONSTRUCTION AND OPERATION

2.1 The Licensee shall carry out and complete all the activities, including the construction and operation of the facilities listed below in Table 9, according to the Report and according to the final plans submitted with the Integrated Water Use Licence Application as approved by the Regional Head.

Table 9: Geographical positions of all the waste water management facilities

Activities	Storage facility	Properties	Total water (m3/a)	Capacity	Area of facility	Coordinates
S 21(g)	Disposing of gold slurry per annum	Portion 3, 20, 21, 40, and 41 of farm Modderfont ein 345 IQ	1 200 000	1 200 000	South shaft	26° 25' 0.02"S 27° 40' 12.16"E
S 21 (g)	Disposing waste water from the Doornpoort tailings facility into the return water dam	Portion 20, 50, 51 Doornpoort 345IQ	1 000 000	1 000 000	Doornpoort	26° 28' 0.05"S 27° 39' 14.18"E
S 21 (g)	Disposing gold plant slurry as backfill into the mined out workings underground	Portion 3, 20, 21, 40, and 41 of farm Modderfont ein 345 IQ	360 000	360 000	South shaft	26° 24' 14.94"S 27° 41' 8.26"E
S 21 (g)	Disposing sewage sludge from South Shaft WWTW into the drying beds	Portion 44 Modderfont ein 345 IQ	20 400	20 400	South shaft	26° 25' 8.18"S 27° 41' 13.44"E
S 21(g)	Disposing of waste rock into waste rock dump	Portion 7 of the farm Doornpoort 347 IQ	584 000	584 000	Twin shaft	26° 25' 16.38"S 27° 39' 14.02"E
S21 (g)	Twin shaft retention pond	Portion 3; 20; 21; 40 and 41 of farm	62 400	62 400	Twin shaft	26° 25' 22.62"S 27° 39' 56.92"E

Activities	Storage facility	Properties	Total water (m3/a)	Capacity	Area of facility	Coordinates
		modderfont ein 345IQ				
S 21(g)	Old return water dam	Portion 3; 20; 21; 40 and 41 of farm modderfont ein 345IQ	15 000	15 000	South shaft	26° 25' 30.83"S 27° 40' 17.65"E
S 21 (g)	Cascade ponds	Portion 3; 20; 21; 40 and 41 of farm modderfont ein 345IQ	3 000	16 X 3 000 (12 unlined and 4 PVC lined)	South shaft	26° 25' 10.27 "S 27° 40' 33.85"E
S 21 (g)	New return water dam	Portion 3; 20; 21; 40 and 41 of farm modderfont ein 345IQ	52 487	52 487	South shaft	26° 25' 12.50"S 27° 40' 49.12"E
S 21 (g)	Gold plant settling dams (2)	Portion 3; 20; 21; 40 and 41 of farm modderfont ein 345IQ	2 X 3 500	2 X 3 500	Twin shaft	26° 25' 11.52"S 27° 40' 34.81"E
S 21 (g)	Settlers A & B	Portion 3; 20; 21; 40 and 41 of farm modderfont ein 345IQ	2 X 650	2 X 650	South shaft	26° 25' 10.41"S 27° 39' 31. 57"E
S 21(g)	Mine water dam	Portion 3; 20; 21; 40 and 41 of farm modderfont ein 345IQ	2 X 2 200	2 X 2 200	South shaft	26° 24' 20.74"S 27° 41' 15.72"E
S 21 (g)	Refrigeration dams	Portion 3; 20; 21; 40 and 41 of	5 X 2 700	5 X 2 700	South shaft	26° 24' 22.17"S

Activities	Storage facility	Properties	Total water (m3/a)	Capacity	Area of facility	Coordinates
		farm modderfont ein 345IQ				27° 41' 15.72"E

2.2 The Licensee must ensure that the disposal of the waste water and the operation and maintenance of the system are done according to the provisions in the Report.

2.3 The waste facilities listed in Table 9 shall be operated and maintained to have a minimum freeboard of 0.8 metres above full supply level and all other water systems related thereto shall be operated in such a manner that it is at all times capable of handling the 1:50 year flood-event on top of its mean operating level.

2.4 The Licensee shall use acknowledged methods for sampling and the date, time and sampler must be indicated for each sample.

3 MONITORING

3.2 The Licensee shall monitor on monthly basis the water resources at surface water monitoring point and Ground water monitoring point to determine the impact of the facility and other activities on the water quality by taking samples at the monitoring points described in Table 10, 11 and 12 below:

Table 10: Surface Water monitoring points for South Deep Mine

Locality	Description/purpose	Coordinates	
		S	E
S11B	Upstream of mine in Leeuspruit at Vereeniging Road (R28)	26°23'45"S	27°42'1"E
S11A	Upstream of mine in Leeuspruit in access road to mine	26°24'17"S	27°41'42"E
S13	Tributary as Delta	26°24'54"S	27°41'6"E
S6	Downstream of mine at Leeuspruit	26°25'18"S	27°40'54"E
S10	Downstream of mine in Kariegaspruit	26°25'36"S	27°40'24"E



Table 11: Ground Water Monitoring points for South Deep Mine

Borehole locality	Purpose	Coordinates	
		S	°E
SD1	Up-gradient of old tailings dams	26°24'28"S	27°40'40"E
SD2	Monitor industrial waste site	26°24'11"S	27°40'41"E
SD3	Up-gradient of waste industrial site	26°24'2"S	27°40'50"E
SD4	Up-gradient of South Shaft waste rock dump	26°24'11"S	27°41'26"E
SD5	Up-gradient of cascade ponds	26°24'54"S	27°40'28"E
SD6	Up-gradient of new tailings dam	26°24'32"S	27°39'59"E
SD7	Determine extend impacts from the new tailings dam	26°24'56"S	27°39'56"E
SD9	Monitor impact from the evaporation and cascade dam	26°25'18"S	27°40'46"E
SD10	Down-gradient from the new tailings dam	26°25'25"S	27°40'40"E
SD 12	Down-gradients from the old gold plant, close to the wetland	26°24'50"S	27°41'5"E
SD 13	Down-gradient from South Shaft waste rock dump	26°24'2"S	27°41'21"E
SD 14	Potential impacts at South Deep waste	26°25'20"S	27°39'25"E

Table 12: Bio-monitoring points for South Deep Mine

Borehole locality	Purpose	Coordinates	
		°S	°E
Leeu 1	Monitor continuous discharge from mining operation	26°24'54"S	27°41'6"E
Leeu 2	Sampling point in stream diversion (Leeuwspruit)	26°25'14"S	27°40'54"E
Leeu 3	Sampling point after Leeuwspruit leaves the mine's premises 24af4e71	26°25'50"S	27°41'5"E
Leeu 4	Sampling point after confluence of Leeuwspruit and Kariegaspruit	26°26'18"S	27°41'7"E



Leeu 5	Next to gravel road at Kalbasfontein 365 IQ	26°28'26"S	27°41'34"E
Kariega 1	Upstream historical discharge from Twin Shaft underground	26°25'31"S	27°40'17"E
Kariega 2	Downstream from Kariega 1	26°25'44"S	27°40'32"E
Loop 1	Upstream from mine in "Loopspruit"	26°23'47"S	27°38'45"E
Loop 2	West of South Deep Shaft waste rock dump in "Loopspruit"	26°25'22"S	27°38'24"E
Loop 3	Downstream from mine in "Loopspruit", at Fochville Road	26°27'16"S	27°38'16"E

- 3.3 Flow metering devices shall be maintained in a sound state of repair and calibrated by a competent person annually or as specified by manufacturer. Calibration certificates shall be available for inspection by the Regional Head or his representative upon request.
- 3.4 The date, time and monitoring point in respect of each sample taken shall be recorded together with the results of the analysis.
- 3.5 Monitoring points shall not be changed prior to notification to and written approval by the Regional Head.
- 3.6 An Aquatic Scientist approved by the Regional Head must establish a monitoring programme for the following indices: Invertebrate Habitat Assessment System (IHAS) and the latest SASS (South African Scoring System). Sampling must be done once during the summer season and once during the winter season, annually, to reflect the status of the river upstream and downstream of the mining activities.
- 3.7 Water quality testing to be performed on all pollution control dams on a quarterly basis in order to determine the risks to the receiving environment. The data gathered in the investigation must be reported annually to the Regional Head. If any concentrations levels as specified above are exceeded, the Licensee must institute an investigation to determine the cause of poor water quality. Furthermore, the Licensee must undertake geochemical assessment on discard dumps.
- 3.8 The Licensee shall participate in any initiative such as Direct Estimation of Ecological Effect Potential (DEEEP) to determine the toxicity of complex tailings waste discharges. Both acute and chronic toxicity must be addressed and at least three taxonomic groups must be present when toxicity tests are performed.



3.9 Analysis 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).

3.10 The methods of analysis shall not be changed without prior notification to and written approval by the Minister.

4 STORM WATER MANAGEMENT

4.2 Storm water 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.

4.3 Increase runoff due to vegetation clearance and/or soil compaction must be managed, and steps must be taken to ensure that storm water does not lead to bank instability and excessive levels of silt entering the stream.

4.4 Storm water 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 storm water flow.

4.5 Where necessary works must be constructed to attenuate the velocity of any storm-water discharge and to protect the banks of the affected watercourses.

4.6 Storm water control works must be constructed, operated and maintained in a sustainable manner throughout the impacted area.

4.7 All storm water that would naturally run across the pollution areas shall be diverted via channels and trapezoidal drains designed to contain the 1:50 year flood.

4.8 The polluted storm water system shall be designed and implemented to provide suitable routing and pumping capacity for contaminated storm water from the individual facilities to the respective storm water dams in accordance with the design specifications as contained in the Integrated Water Use licence Application report.

5 PLANT AREAS AND CONVEYANCES

5.2 Pollution caused by spills from the conveyances must be prevented through proper maintenance and effective protective measures especially near all stream crossings.

5.3 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.

5.4 Any hazardous substances must be handled according to the relevant legislation relating to the transport, storage and use of the substance.



5.5 Any access roads or temporary crossings must be:

- 5.5.1 non-erosive, structurally stable and shall not induce any flooding or safety hazard and
- 5.5.2 be repaired immediately to prevent further damage.

6 ACCESS CONTROL

6.2 Strict access procedures must be followed in order to gain access to the property. Access to the pollution control dams, discard dumps, storm water dam and Return water dam must be limited to authorised employees of the Licensee and their Contractors only.

6.3 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.

7 CONTINGENCIES

7.2 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:

- 7.2.1 operating errors
- 7.2.2 mechanical failures (including design, installation or maintenance)
- 7.2.3 environmental factors (e.g. flood)
- 7.2.4 loss of supply services (e.g. power failure) and
- 7.2.5 Other causes.

7.3 The Licensee must, within 24 hours, notify the Regional 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.

7.4 The Licensee must, within 14 days, or a shorter period of time, 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 time schedule, to the satisfaction of the Regional Head of measures taken to:

- 7.4.1 correct the impacts resulting from the incident
- 7.4.2 prevent the incident from causing any further impacts and
- 7.4.3 prevent a recurrence of a similar incident.

8 INTEGRATED WATER AND WASTE MANAGEMENT

8.1 The Licensee must update an *Integrated Water and Waste Management Plan (IWWMP)*, which must together with the updated *Rehabilitation Strategy and Implementation Programme (RSIP)*, be submitted to the Regional Head for approval within one (1) year from the date of issuance of this licence.



- 8.2 The IWWMP and RSIP shall thereafter be updated and submitted to the Regional Head for approval, annually.
- 8.3 The Licensee must, at least 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.
- 8.4 The Licensee shall make full financial provision for all investigations, designs, construction, operation and maintenance for a water treatment plant should it become a requirement as a long-term water management strategy.
- 8.5 The Licensee shall implement a plan for the lining of all the unlined dams and submit that plan to the Regional Head for approval within 12 months after the issuance of this licence and the lining shall start the end of December 2014.
- 8.6 The designs for the lining as per condition 10.5 above shall be submitted to the Regional Head for approval 6 months before the lining commences.
- 8.7 The Licensee shall submit a post closure management plan for the groundwater quality and quantity to the Department for approval 6 months after the issuance of this licence
- 8.8 The Licensee shall identify the pollution plume and have remediation measures in place and submit those measures to the department for approval 6 months after the issuance of this licence
- 8.9 The Licensee shall implement a plan to minimize the discharge of seepage and any overflows from return water, or pollution control dams to the Leeuspruit, Kariegaspruit and intake of water from Rand Water, 5 (five) years after issuance of this licence.
- 8.10 The Licensee shall submit a Scoping Report to the Regional Head outlining time frames, actions and investigations to be done by the mine to implement the plans as required in conditions 10.5, 10.7 and 10.8 mentioned above, by November 2012.
- 8.11 The Licensee shall submit a licence application/s for the measures that will be implemented as well as the completed investigation as outlined by the Scoping Document as per the Environmental Impact Assessment, by the end of December 2016.
- 8.12 All pollution control dams shall be operated and maintained in accordance with Regulations GN704, promulgated in terms of the National Water Act, 36 of 1998, to prevent seepage or spillage to the environment.
- 8.13 The Licensee shall submit a storm water management plan within 30 days after the issuance of this licence.
- 8.14 The Licensee shall during backfill use the material that does not have the potential to leach heavy metals.
- 8.15 The Licensee shall undertake a geochemical assessment on the unlined existing tailings facilities to determine leaching of heavy metals and intercept any plume towards groundwater



within one (1) year after the issuance of this licence and submit the report to the Regional Head within 30 days after the completion of the assessment.

8.16 The Licensee shall update the water balance and submit it to the Regional Head annually

A handwritten signature in black ink, consisting of a stylized 'P' followed by a '3'.

APPENDIX VI

Section 21 (j) of the Act: Removing of water found underground

1. The Licensee is authorised to remove a volume not exceeding seven hundred and twenty nine thousand nine hundred and ninety six cubic metres per annum (729 996 m³/a) of groundwater from Portion 3, 20, 21, 40 and 41 of the farm Modderfontein 345 QI for the efficient continuation of mine or for the safety of the people at the following coordinates, X coordinate 26°24'14.10" S and Y coordinate 27°41' 7 .40" E
2. The quantity of the water authorised to be removed and disposed of into the pollution control dam in terms of this Licence may not be exceeded without prior authorisation by the Minister.
3. The Licensee shall provide affected water user whose water supply is impacted by the water use with potable water.
4. The quantity of water removed from underground must be metered and recorded on a daily basis.
5. The 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).
6. Self registering flow meters must be installed in the delivery lines at easily accessible positions near the dewatering points.
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 years. Calibration certificates shall be available for inspection by the Regional Head or his/her representative upon request.
8. Calibration certificates in respect of the pumps must be submitted to the Regional Head after installation thereof and thereafter at intervals of two years.
9. The date and time of monitoring in respect of each sample taken shall be recorded together with the results of the analysis.
10. Analysis shall be carried out in accordance with methods prescribed by and obtainable from the South African Bureau of Standards, in terms of the Standards Act, 1982 (Act 30 of 1982).
11. The methods of analysis shall not be changed without prior notification to the Licensee and written approval by the Minister or his/her delegated nominee.
12. The Licensee shall follow acceptable construction, maintenance and operational practices to ensure the consistent, efficient and safe performance of the groundwater removal system.
13. Reasonable measures must be taken to provide for mechanical, electrical or operational failures and malfunctions of the underground water removal system.



APPENDIX VII

GENERAL CONDITIONS

1 WATER BALANCE

- 1.1 The Licensee shall maintain a negative water balance and update it on a 6 (six) monthly basis and submit it to the Regional Head.
- 1.2 The Licensee shall investigate and implement measures that will conserve and use water efficiently so as to replace the use of the water from South Shaft boreholes and the water from Rand Water for the mine processes within 3 (three) years after the issuance of this licence.

2 INFORMATION MANAGEMENT

- 2.1 The monitoring programme must be compatible with the Department's Water Management System and / or Microsoft Excel.
- 2.2 The Licensee shall store and manage collected data in such a manner to ensure the correctness of the data and prevent the corruption of this data for a period of five (5) years. Data must be stored in processed format.
- 2.3 The Licensee shall develop and update the monitoring programme to ensure that the monitoring programme identifies and quantifies all water use and water containing waste disposal and discharge as well as impacts or potential impacts on the Water Resource, ground and surface water, such as:
 - 2.3.1 Potential impacts on the water quality;
 - 2.3.2 Potential impacts on water quantity;
 - 2.3.3 Potential impacts on the Resource Quality Objectives;
 - 2.3.4 To comply with the conditions of this licence.
- 2.4 A quality control programme must be implemented to ensure that the monitoring programme facilitates the correct procedures for data collection, analysis, and reporting.
- 2.5 The Licensee shall define the following for each point:
 - 2.5.1 Reason for selecting each point;
 - 2.5.2 Variables to be monitored and methods for analyses;
 - 2.5.3 Performance and compliance criteria for each point;
 - 2.5.4 Area description, including other factors that may influence the data;
- 2.6 Each point shall be registered with a digital photograph and GPS co-ordinate in the monitoring programme.
- 2.7 The Licensee shall register the monitoring programme with the Department.



- 2.7 The Licensee shall register the monitoring programme with the Department.
- 2.8 All data required in terms of this licence shall be submitted electronically to the Department's Water Management System (WMS) database as well as in hard copy at the end of each month.
- 2.9 All reports shall be submitted in duplicate.

3 INSTITUTIONAL ARRANGEMENTS WITHIN THE CATCHMENT

- 3.1 The Licensee shall send a representative to the Forums at which they will be required from time to time to give input and report on compliance to the licence and progress in investigations.
- 3.2 The Licensee shall support all activities within the Forums in support of the establishment of a Catchment Management Agency and the development of a Catchment Management Strategy.
- 3.3 The Licensee shall through the Rietspruit Forum or any other suitable body which all the dischargers in the catchment can participate and contribute to any studies or actions required by the Licensee by actively contributing financially, provide the relevant expertise, and/or relevant information/data in any investigation as required by the Department that addresses integrated catchment issues.

END OF LICENCE



TRANSMISSION VERIFICATION REPORT

TIME : 02/12/2011 15:28
NAME : JRANAKE
FAX : 0123921359
TEL : 0123921307
SER.# : E7J447975

DATE, TIME	02/12 15:18
FAX NO./NAME	00865201900
DURATION	00:10:25
PAGE(S)	20
RESULT	OK
MODE	STANDARD



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Private Bag X313, Pretoria, 0001, Sedibeng Building, 185 Francis Baard Street, Pretoria.,
Tel: (012) 336 7500 Fax (012) 323-4472 / (012) 326 - 2715. www.dws.gov.za

LICENCE IN TERMS OF CHAPTER 4 OF THE NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998) (THE ACT)

I, **Trevor Balzer**, in my capacity as Deputy Director-General: Special Projects in the Department of Water and Sanitation: and acting under authority of the powers sub- delegated to me by the Acting Director- General of Water and Sanitation, hereby authorizes the following water uses in respect of this licence.

SIGNED:

DATE:

19/11/2008

LICENCE NO: 08/C22J/GCEFIJA/8705
FILE NO: 27/2/2 /C822/30/1

1. Licensee:
Postal Address:

South Deep Gold Mine
P.O Box 57
WESTONARIA
1780

2. Water Uses

- 2.1 Section 21(a) of the Act: Taking of water from a water resource, subject to the conditions set out in appendices I and II
- 2.2 Section 21(c) of the Act: Impeding or diverting the flow of water in a watercourse, subject to the conditions set out in Appendices I and III
- 2.3 Section 21(e) of the Act: Engaging in a controlled activity, subject to the conditions set out in Appendices I and IV
- 2.4 Section 21 (f) of the Act Discharging waste or water containing waste into a water resource through a pipe, canal, canal, sewer or other conduit subject to the conditions set out in Appendices I and V
- 2.6 Section 21(g) of the Act: Discharging waste or water containing waste into a water resource, subject to the conditions set out in Appendices I and VI
- 2.7 Section 21(i) of the Act: Altering the bed, banks course or characteristics of a watercourse, subject to the conditions set out in Appendices I and III

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- 2.8 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, subject to the conditions set out in Appendices I and VII.

3. Properties and ownership on which the use will be exercised

Table 1: Properties where water uses will be exercised

Properties	Water uses	Owner
Portion 3,20,21,30,41,44,39 and 65 of farm Modderfontein 345 IQ	Section 21(a)	South Deep Gold Mine
Portion 3 and 52 of the farm Modderfontein 345 IQ, Portion 3,12,20,41,44 and 61 of the farm Modderfontein 345 IQ	Section 21(c) and (i)	South Deep Gold Mine
Portion 12, 20,21 of farm Modderfontein 345 IQ	Section 21(e)	South Deep Gold Mine
Portion 44 of the farm Modderfontein 345 IQ	Section 21(f)	South Deep Gold Mine
Portion 1,7,20,43,45,46,50,51,52,53 of the farm Doornpoort 347 IQ. Portion 44 of the farm Modderfontein 345 IQ	Section 21(g)	South Deep Gold Mine
Portion 30 of the farmmodderfontein 345IQ	Section 21(j)	South Deep Gold Mine

4. Licence and Review Period

- 4.1 This licence is valid for a period of twenty two (22) years from the date of issuance, and it may be reviewed at intervals of not more than five (5) years.

5. Definitions

"Any terms, words and expressions as defined in the National Water Act, 1998 (Act 36 of 1998)(NWA) shall bear the same meaning when used in this licence."

"The Provincial Head" means the Head of Provincial Operations: Gauteng, Department of Water and Sanitation, Private Bag X995, Pretoria, 0001.

"Report" refers to the reports entitled;

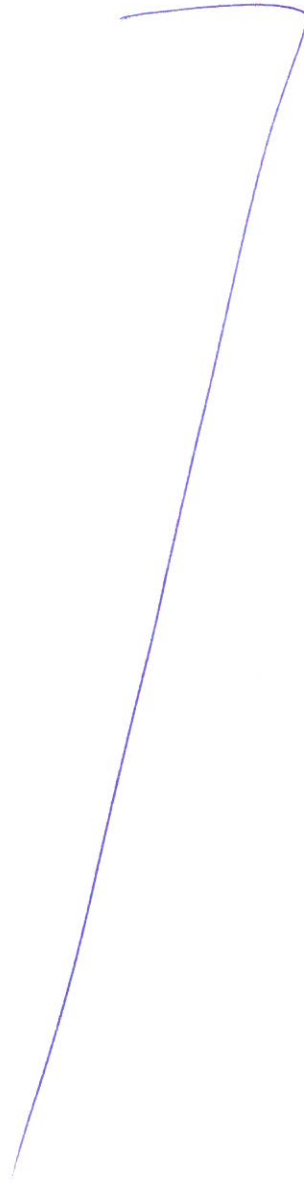
- Integrated Water and Waste Management Plan (IWWMP) for South Deep Gold Mine in support of a water use licence amendment application, Prepared by Golders Associates, September May 2015.
- Rectifications sought to correct errors and amendments required in respect of IWUL number 03/C22J/ACFGIJ/1369, dated May 2015.
- Integrated Water and Waste Management Plan (IWWMP) as the technical supporting document.
- Groundwater reserve determination study in the Upper Vaal Water Management area: Intermediate Level. Prepared by Chief Directorate: Chief Directorate-Water Ecosystem
- Hydrogeological Investigation and impact assessment proposed tailing storage facility No.5-South Deep Mine. Prepared by Golders Associates, dated August 2007.

- South Deep Gold Mine Environmental Management Programme (EMP) prepared EcoPartners dated October 2011

as well as all other related documentations and communication (emails, letters, verbal, presentations, etc) related thereto.

6. Description of the activity

This license authorises South Deep mine for the following water uses in terms of section 40 for section 21(a),(c),(e),(f),(g),(i) and (j) of the National Water Act, 1998 (Act 36 of 1998) for taking water from the South Shaft boreholes and Leeuspruit river, installation of flow meter at the river, river diversion, pipeline crossing the stream, discharging of waste water into the river, irrigation of TSF with treated effluent, disposing of waste water into containment facilities and removing of water found underground for continuation of mining and safety of the people. The mine falls within the Vaal River Water Management Area, quaternary catchments C22J,



APPENDIX I

General conditions for the licence

1. This licence is subject to all applicable provisions of the National Water Act, 1998 (Act 36 of 1998).
2. The responsibility for complying with the provisions of the licence is vested in the Licensee and not any other person or body.
3. The Licensee must immediately inform the Provincial Head of any change of name, address, premises and/or legal status.
4. If the properties in respect of which this licence is issued are subdivided or consolidated, the Licensee must provide full details of all changes in respect of the properties to the Provincial Head of the Department within sixty (60) days of the said change taking place.
5. If a water user association is established in the area to manage the resource, membership of the Licensee to this association is compulsory.
6. The Licensee will be responsible for any water use charges or levies imposed from time to time by a Responsible Authority or Department.
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.
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.
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.
10. The Licensee must conduct an annual internal audit on compliance with the conditions of the licence. A report on the audit must be submitted to the Provincial Head within one (1) month of finalisation.
11. The Licensee must appoint an independent external auditor to conduct an audit once every two years on compliance with the conditions of this licence. The first audit must be conducted within three (3) months of the date of licence issuance and a report on the audit must be submitted to the Provincial Head within one (1) month of finalisation of the report.
12. Any incident that causes or may cause water pollution must be reported to the Provincial Head or his/her designated representative within 24 hours.
13. If the water use described in this licence is not exercised within three (3) years of the date of the licence, the authorization will be withdrawn. Upon commencement of the water use, the Licensee must inform the Regional Head in writing.



14. Notices prohibiting unauthorized persons from entering water use premises must be displayed.
15. The Department accepts no liability for any damage, loss or inconvenience, of whatever nature, suffered as a result of amongst other things:
 - 15.1 Inundation of flood;
 - 15.2 Any force majeure event; and
 - 15.3 Siltation of the river or dam basin.
- 16 This licence supersede licence number **03/C22J/ACFGIJ/1369** dated **21/11/2011**

APPENDIX II**Section 21(a): Taking water from a water resource**

1. This licence authorises the abstraction of a maximum quantity of water as indicated in Table 2:

Table 2: Water use activities for Section 21(a)

Purpose/ Description	Property	Volume	Co-ordinates
Water is abstracted from Salvage BH (A1) to reduce the pollution plume and is disposed to twin shaft PCD.	Portion 39, of farm Modderfontein 345 IQ	154 030 m ³ /a	26°25'3.06"S 27°39'50.48"E
Old RWD seepage interception BH (A4) to reduce the pollution plume. The water is disposed (recycled back) to the RWD.	Portion 44, of farm Modderfontein 345 IQ	154 030 m ³ /a	26°25'18.03"S 27°40'55.73"E
Abstraction of water from Scavenger BH (A5-1) to reduce the pollution plume and disposal in Doornpoort RWD.	Portion 41, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°24'45.12"S 27°40'45.85"E
Abstraction of water from Scavenger BH (A5-2) borehole to reduce the pollution plume and disposal in RWD.	Portion 20, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°25'0.49"S 27°40'51.32"E
Abstraction of water from Scavenger BH(A5-3) to reduce the pollution plume and disposal in RWD	Portion 3, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°25'12.66"S 27°40'38.06"E
Abstraction of water from Scavenger BH(A5-4) to reduce the pollution plume and disposal in RWD	Portion 3, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°25'21.87"S 27°40'25.25"E
Abstraction of water from Scavenger BH(A5-5) to reduce the pollution plume and disposal in RWD	Portion 21, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°25'7.25"S 27°40'6.35"E
Abstraction of water from Scavenger BH(A5-6) to reduce the pollution plume and disposal in RWD	Portion 21, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°25'7.25"S 27°40'0.35"E
Abstraction of water from scavenger BH (A6-1) below the Doornpoort TSF to reduce the pollution plume and disposal in RWD.	Portion 20, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°27'49.99"S 27°38'18.73"E
Abstraction of water from Scavenger BH (A6-2) below the old TSF to reduce the pollution plume and disposal in RWD.	Portion 20, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°27'42.49"S 27°38'18.08"E
Abstraction of water from South Shaft borehole for mining purpose	Portion 30 and 65 of the farm Modderfontein 345 IQ	273 756 m ³ /a	26°24'14.10"S 27°41'7.40"E
Abstraction of water from Leeuspruit for mining purpose	Portion 30 and 65 of the farm Modderfontein 345 IQ	729 996 m ³ /a	26°24'36.00"S 27°41'22.95"E
BH1	Farm Doornpoort 347 IQ	94 900 (2.0L/s)	-26.467033°; 27.636497°
SD31	Farm Doornpoort 347 IQ	94 900 (0.25L/s)	-26.471389°; 27.649738°

SD32	Farm Doornpoort 347 IQ	94 900 (0.6L/s)	-26.471790°; 27.654380°
SD38	Farm Doornpoort 347 IQ	94 900 (1L/s)	-26.468937°; 27.645781°
SD40	Farm Doornpoort 347 IQ	94 900 (1.2L/s)	-26.469808°; 27.639373°
SD43	Farm Doornpoort 347 IQ	94 900 (1.55L/s)	-26.465064°; 27.640661°

2. The quantity of water authorised to be taken in terms of this licence may not be exceeded without prior authorisation by the Minister.
3. 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.
4. The above mentioned volumes may be reduced when the licence is reviewed.
5. The Licensee must continually investigate new and emerging technologies and put into practice water use efficient devices or in an endeavour to conserve water at all times.
6. The Licensee must install appropriate water measuring devices to measure the volume of water abstracted. The Licensee must ensure that all measuring devices are properly maintained and in good working order and must be easily accessible. This must include a programme of checking, calibration, and/ or renewal of measuring devices. All water taken from the resource must be measured, recorded and reported as follows:
 - 6.1 The daily quantity of water taken must be metered or gauged and the total recorded at the last day of each month; and
 - 6.2 The Licensee must keep record of all water measurement taken and a copy of the records must be forwarded to the Provincial Head on or before 25 January and 25 July of each year.
7. No water taken may be used for purposes other than intended in this licence, without written approval by the Provincial Head or his/her delegated nominee.
8. Notices prohibiting unauthorised persons from entering 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.
9. The Department accepts no liability for any damage, loss or inconvenience, of whatever nature, suffered as a result of:
 - 9.1 shortage of water;
 - 9.2 inundations or flood;
 - 9.3 siltation of the resource; and
 - 9.4 required reserve releases.
10. The Licensee must establish a programme of formal Information Management System, which maintains a database on water supply, distribution and delivery infrastructure.

11. The Licensee must establish and implement a continual process of raising awareness amongst itself, its workers and stakeholders with respect to Water Conservation and Water Demand Management initiatives.
12. The Licensee must use all water on the mine efficiently and must:
 - 12.1 Minimise the total water intake;
 - 12.2 Avoid the use of water where possible;
 - 12.3 Implement "good" housekeeping and operating practices; and
 - 12.4 Maximise the re-use of contaminated water.
13. A person who owns and operate a mine must develop a water conservation and water demand management plan, which –
 - 13.1 Quantifies the water use efficiency of the activity;
 - 13.2 Contains the mine water management and water loss strategies and programmes;
 - 13.3 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;
 - 13.4 Reports on the implementation of more efficient processes, equipment designs, and other on-site measures to enable the mine to avoid and reduce water consumption; and
 - 13.5 Report on the implementation and reduction of total water demand including water use efficiency benchmarks and targets where these have been set by the Department.
14. The holder of a mining right or production right must:
 - 14.1 Update the water conservation and water demand management plan annually;
 - 14.2 Execute the water conservation and water demand management plan; and
 - 14.3 Submit the water conservation and water demand management plan to the Department as part of the IWWMP, unless directed otherwise by the Department.

APPENDIX III

Section 21(c) of the Act: Impeding or diverting the flow of water in a watercourse;
And
Section 21(i) of the Act: Altering the bed, banks, course or characteristics of a watercourse

1. General

1.1 This licence authorises the Licensee for Section 21 (c) and (i) water use activities as indicated in Table 3.

Table 3: Details of water uses

Description/Purpose	Property	Dimensions	Co-ordinates
Haul Road crossing Leeuspruit River and flow meter –entrance to South Shaft. The road is an existing road with a new meter installation.	Portion 44, of farm Modderfontein 345 IQ	L=55m H=1.0 m W=57 m	26 °24'37.3"S 27 °41'64.1"E
Road crossing Leeuspruit River subsidiary (road and pipelines) at Doornpoort site-existing road.	Portion 12, of farm Modderfontein 345 IQ	L=12m H=2.0m W=100m	26 °27'49.27"S 27 °38'4.21"E
Road crossing Leeuspruit River diversion-existing road passing over the river diversion.	Portion 20, of farm Modderfontein 345 IQ	L=15 H=2.0 W=35	26 °25'14.17"S 27 °41'0.53"E
South shaft storm water separation system which run through a wetland.	Portion 20, of farm Modderfontein 345 IQ		Start 26 °24'30.83"S 27 °41'7.53"E End 26 °25'0.26"S 27 °40'53.30"E

1.2 The Licensee must carry out and complete all the activities listed under condition 1.1 according to the following.

1.2.1 Reports submitted to the Department or the Responsible Authority, specifically:

1.2.1.1 Dirty storm water from the Western WRD will be collected by a perimeter drainage ditch, draining to one of 3 containment ponds(RWDs), from which water will be over pumped for re-use within the Twin Shafts Gold Plant unless water quality testing indicates it is suitable for discharge to the environment.

1.2.1.2 Dirty storm water from the Twin Shafts Gold Plant will be collected by a series of drainage ditches and conveyed into Twin Shafts Catchment Dams for re-use within the Twin Shafts Gold Plant.

1.2.1.3 Dirty storm water from the eastern side slopes, to drains and paddocks of the New TSF will be conveyed to the New RWD;

- 1.2.1.4 Dirty storm water from the remainder of the New TSF (western and southern side slopes, for drains and paddocks) will be conveyed into the Cascade Dam (old RWD), which will be over pumped into the New RWD as required;
- 1.2.1.5 Dirty water the New RWD will be re-used at the Full Plant Tailings (FPT) Backfill Plant.
- 1.2.1.6 The existing decant structures in the Old TSF and New TSF will be retained and will be used to drain storm water from the surface of the TSFs into the New RWD.
- 1.2.1.7 The volume of the New RWD will be increased by de-silting and extending and it will be lined to prevent infiltration.
- 1.2.1.8 The volume of the Old RWD will be increased slightly by de-silting and it will be lined to prevent infiltration.
- 1.2.2 Conditions of this licence; and
- 1.2.3 Any other written direction issued by the Responsible Authority in relation to this licence.
- 1.3 No activity must take place within the 1:100 year flood line or the delineated riparian habitat, whichever is the greatest, or within 500 m radius from the boundary of any wetland unless authorised by this licence.
- 1.4 The conditions of the authorisation must be brought to the attention of all persons (employees, sub-consultants, contractors etc.) associated with the undertaking of these activities and the Licensee must take such measures that are necessary to bind such persons to the conditions of this licence.
- 1.5 A copy of the water use licence and reports set out under condition 1.2 must be on site at all times.
- 1.6 A suitably qualified person(s), appointed by the Licensee, and approved in writing by the Provincial Head must be responsible for ensuring that activities are undertaken in compliance with the specifications as set out in Reports submitted to the Department and the conditions of this licence.

2. FURTHER STUDIES AND INFORMATION REQUIREMENTS

- 2.1 The Licensee must develop Landscape Maintenance Plan and submit to the Department for approval within three months of issuance.
- 2.2 The storm water canal must be design as natural as possible with rock, topsoil and vegetation.

3. PROTECTIVE MEASURES

3.1 Stormwater Management

- 3.1.1. Stormwater management practices must be constructed, operated and maintained in a sustainable manner throughout the project and for the water use activities set out in condition 1.1 and must include but are not limited to the following:



- 3.1.1.1. Increased 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 watercourse(s);
 - 3.1.1.2. Where the stormwater enters the river systems, sediment and debris trapping, as well as energy dissipation control structures must be put in place.
 - 3.1.1.3. Stormwater must be diverted from activities such as construction works, mining areas and roads must be managed in such a manner as to disperse runoff and to prevent the concentration of stormwater flow;
 - 3.1.1.4. The velocity of stormwater discharges must be attenuated and the banks of the watercourses protected;
 - 3.1.1.5. Stormwater leaving the Licensee's premises must 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;
 - 3.1.1.6. Drainage next to the construction works and mining area must be diverted away from the water course(s) to ensure that any contaminated runoff does not flow directly into the watercourse(s) as a stormwater discharge and
 - 3.1.1.7. Infiltration down the verges of the roads rather than surface runoff must be encouraged.
- 3.1.2. The Licensee must ensure that clean storm water is discharged into bio retention ponds outside of the riparian area.

3.2 Structures, Construction Plant and Materials

- 3.2.1. The Necessary erosion prevention measures must be employed to ensure the sustainability of all structures.
- 3.2.2. The height, width and length of structures must be limited to the minimum dimension necessary to accomplish the intended function.
- 3.2.3. Structures must not be damaged by floods exceeding the magnitude of floods occurring on average once in every 50 years.
- 3.2.4. Structures must be non-erosive, structurally stable and must not induce any flooding or safety hazard.
- 3.2.5. Structures must be inspected regularly for accumulation of debris, blockage, erosion of abutments and overflow areas - debris must be removed and damages must be repaired and reinforced immediately.
- 3.2.6. The construction camp, plant and material stockpiles must be located outside the extent of the watercourse(s) and must be recovered and removed one (1) month after construction has been completed.
- 3.2.7. During construction erosion berms should be installed to prevent gully formation, according to the slope.
- 3.2.8. All areas affected by construction should be rehabilitated upon completion of the construction phase of the development. Areas should be reseeded with indigenous

vegetation species as required, and the use of seednets is recommended to prevent erosion.

3.2.9. During the construction phase no vehicles shall be allowed to indiscriminately drive through any wetland areas.

3.2.10. The Licensee must ensure that culverts are spaced over width of the watercourse.

3.2.11. Construction of culverts must cater for animal movement and ecological connectivity

3.2.12. No construction is allowed within the 1:100 year floodline and/or delineated riparian habitat, whichever is the greatest, or within 500 m radius from the boundary of any wetland unless authorised in this license.

3.2.13. Any access roads or crossings should be:

3.2.13.1. Non-erosive, structurally stable and should not induce any flooding or safety hazard;

3.2.13.2. Any damage is repaired immediately to prevent further damage; and

3.2.13.3. Non-polluting with respect to silt and litter that can be deposited into a watercourse.

3.3. Water Quality

3.3.1 The in-stream water quality must be analysed for the variables indicated in Table 4 on a monthly basis at the monitoring points, both upstream and downstream of the river diversion and river crossing and reported according to condition 5.2.

Table 4: Variables to be monitored

Variable
Temperature (°C)
pH
Electrical conductivity (EC) (mS/m)
Suspended solids (SS) (mg/l)
Dissolved oxygen (mg/l)
Turbidity (NTU)
Alkalinity (mg CaCO ₃ /l)

3.3.2 Monitoring must continue for three (3) years after the cessation of the activities listed in condition 1.1.

3.3.3 Monitoring must be undertaken as set out in condition 5 of Appendix III.

3.3.4 Activities (such as maintenance) that lead to elevated levels of turbidity of any watercourse must be minimised

3.3.5 The Licensee must ensure that the quality and quantity of the water to downstream water users does not decrease because of the water use activities listed under condition 1.1 of Appendix III

3.3.6 Pollution of and disposal/spillage of any material into the watercourse must be prevented, reduced, or otherwise remediate through proper operation, maintenance and effective protective measures.

- 3.3.7 Vehicles and other machinery must be serviced well above the 1:100 year flood-line or outer edge of the riparian habitat whichever is the greatest. Oils and other potential pollutants must be disposed off at an appropriate licensed site, with the necessary agreement from the owner of such a site.
- 3.3.8 Any hazardous substances must be handled according to the relevant legislation relating to transport, storage and use of the substance.
- 3.3.9 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 must be maintained in a state of good repair.
- 3.3.10 Activities (such as maintenance) must be scheduled to take place during dry seasons when flows are lowest where reasonably possible. If this is not possible and if management measures have not been provided for in the reports submitted to the Provincial Head, the Licensee must submit such to the Provincial Head for a written approval before these activities commence. Natural in stream hydrology is to be used to determine which months constitute the low flow months.
- 3.4 Flow**
- 3.4.1 The activities must be conducted in a manner that does not negatively affect catchment yield, hydrology and hydraulics. The Licensee must ensure that the overall magnitude and frequency of flow in the watercourse(s) does not decrease, other than for natural evaporative losses and authorised attenuation volumes.
- 3.4.2 Appropriate design and mitigation measures must be developed to minimise impacts on the natural flow regime of the watercourse i.e. through placement of structures/supports and to minimise turbulent flow in the watercourse.
- 3.4.3 Structures must be designed in a way to prevent the damming of stream/river water and not impact on the flow of the water, during the construction and operational phases of all developments.
- 3.4.4 The development may not impede natural drainage lines.
- 3.4.5 The diversion structures may not restrict river flows by reducing the overall river width or obstructing river flow.
- 3.4.6 Place infrastructure below calculated bank full flow scour depths and allow a safety margin.
- 3.4.7 Bank filling must restore the channel shape and bed level to pre-construction condition.
- 3.4.8 Where flow in watercourse is permanent, the trench must be staged across part of the channel to maintain flows. Flows must not be stopped.

3.5 Riparian and In-stream Habitat (Vegetation and Morphology)

- 3.5.1 Activities (including spill clean-up) must start up-stream and proceed into a down-stream direction, so that the recovery processes can start immediately, without further disturbance from upstream works.
- 3.5.2 Operation and storage of equipment must not take place within the 1:100 year flood line or delineated riparian habitat, whichever is the greatest unless authorised in this licence.
- 3.5.3 Activities must not occur in sensitive riffle habitats.
- 3.5.4 Indigenous riparian vegetation, including dead trees, outside the limits of disturbance indicated in the site plans must not be removed from the area.
- 3.5.5 Alien and invader vegetation must not be allowed to further colonise the area, and all new alien vegetation recruitment must be sustainably eradicated or controlled.
- 3.5.6 Existing vegetation composition must be maintained or improved by maintaining the natural variability in flow fluctuations. Rehabilitated areas shall have vegetation basal cover of at least 15% at all times.
- 3.5.7 Recruitment and maintaining of a range of size classes of dominant riparian species in perennial channels must be stimulated.
- 3.5.8 Encroachment of additional exotic species and terrestrial species in riparian zones must be discouraged.
- 3.5.9 Accumulation of woody debris on terraces by periodic flooding must be discouraged.
- 3.5.10 Existing flood terraces and deposition of sediments on these terraces to ensure optimum growth, spread and recruitment of these species must be maintained.
- 3.5.11 All reasonable steps must be taken to minimise noise and mechanical vibrations -in the vicinity of the watercourses.
- 3.5.12 The necessary erosion prevention mechanisms must be employed to ensure the sustainability of all structures and activities and to prevent in-stream sedimentation.
- 3.5.13 Soils that have become compacted through the water use activities must be loosened to an appropriate depth to allow seed germination.
- 3.5.14 Slope/bank stabilisation measures must be implemented with a 1:3 ratio or flatter and vegetated with indigenous vegetation immediately after the shaping.
- 3.5.15 Stockpiling of removed soil and sand must be stored outside of the 1:100 flood line or delineated riparian habitat, whichever is greater, to prevent being washed into the river and must be covered to prevent wind and rain erosion.
- 3.5.16 The indiscriminate use of machinery within the in-stream and riparian habitat will lead to compaction of soils and vegetation and must therefore be strictly controlled.
- 3.5.17 The overall macro-channel structures and mosaic of cobbles and gravels must be maintained by ensuring a balance (equilibrium) between sediment deposition and

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sediment conveyance maintained. A natural flooding and sedimentation regime must thus be ensured as far as reasonably possible.

3.5.18 As much indigenous vegetation growth as possible shall be promoted within the proposed development area in order to protect soil and to reduce the percentage of the surface area which is paved.

3.5.19 Run-off from paved surfaces should be slowed down by the strategic placement of berms.

3.6 Biota

3.6.1 The Licensee must take all reasonable steps to allow movement of aquatic species, including migratory species.

3.6.2 All reasonable steps must be taken not to disturb the breeding, nesting and/or feeding habitats and natural movement patterns of aquatic biota.

3.6.3 The current level of diversity of biotopes and communities of animals, plants and micro-organisms must be maintained.

4. REHABILITATION AND MANAGEMENT

4.1 The Licensee must embark on a systematic long-term rehabilitation programme to restore the watercourse(s) to environmentally acceptable and sustainable conditions after completion of the activities, which must include, but not be limited to the rehabilitation of disturbed and degraded riparian areas to restore and upgrade the riparian habitat integrity to sustain a bio-diverse riparian ecosystem.

4.2 All disturbed areas must be re-vegetated with an indigenous seed mix in consultation with an indigenous plant expert, ensuring that during rehabilitation only indigenous shrubs, trees and grasses are used in restoring the biodiversity.

4.3 An active campaign for controlling invasive species must be implemented within disturbed zones to ensure that it does not become a conduit for the propagation and spread of invasive exotic plants.

4.4 Rehabilitation must be concurrent with construction.

4.5 Topsoil must be stripped and redistributed.

4.6 Compacted and disturbed areas must be shaped to natural forms and to follow the original contour. In general cut and fill slopes and other disturbed areas must not exceed 1:3 (v:h) ratio, it must be protected, vegetated, ripped and scarified parallel with the contour.

4.7 The Provincial Head must sign a release form indicating that rehabilitation was done satisfactory according to specifications as per this licence.

4.8 A photographic record must be kept as follows and submitted with reports as set out in section 5:

4.8.1 Dated photographs of all the sites to be impacted before construction commences;

- 4.8.2 Dated photographs of all the sites during construction on a monthly basis; and
- 4.8.3 Dated photographs of all the sites after completion of construction, seasonally.
- 4.9 Rehabilitation structures must be inspected regularly for the accumulation of debris, blockages instabilities and erosion with concomitant remedial and maintenance actions.

5. MONITORING AND REPORTING

- 5.1 A comprehensive and appropriate environmental assessment and monitoring programme (including bio-monitoring) to determine the impact, change, deterioration and improvement of the aquatic system associated with the activities listed under condition 1.1 as well as compliance to these water use licence conditions must be developed and submitted to the Provincial Head for a written approval and must subsequently be implemented as directed.
- 5.2 Quarterly monitoring reports must be submitted to the Responsible Authority until otherwise agreed in writing with the Provincial Head.
- 5.3 A qualified person must be retained by the Licensee who must give effect to various licence conditions and to ensure compliance thereof pertaining to all activities of impeding and/or diverting flow of watercourses as well as alterations to watercourses on the properties as set out in condition 1.1.
- 5.4 The Licensee must conduct an annual internal audit on compliance with the conditions of this licence. A report on the audit must be submitted to the Provincial Head within one month of finalisation of the audit. A qualified auditor must undertake this audit.
- 5.5 The audit reports must include but are not limited to:
 - 5.5.1 Reporting in respect of the monitoring programme referred to in condition 5.2;
 - 5.5.2 A record of implementation of all mitigation measures including a record of corrective actions; and
 - 5.5.3 Compensation measures for damage where mitigation measures have failed to adequately protect the in-stream and riparian habitat or any other characteristic of the watercourses.
- 5.6 The Licensee must apply in writing to the Provincial Head for alternative reporting arrangements for which written approval must be provided.
- 5.7 A wetland specialist must be appointed to monitor the compliance to the wetland management and rehabilitation plan and conditions in this license pertaining to impacts on wetlands and provide specialist advice for corrective actions and compile audit reports which must be submitted to the Responsible Authority.

6. OTHER WATER USERS

- 6.1 The Licensee must attempt to prevent adverse affect on other water users. All complaints must be investigated by a suitable qualified person and if investigations prove that the Licensee has impaired the rights of other water users, the Licensee must initiate suitable compensative measures.



7. POLLUTION PREVENTION, INCIDENTS AND MALFUNCTIONS

- 7.1 Pollution incidents must be dealt with in accordance with the Act.
- 7.2 Any incident that may cause pollution of any water resource shall immediately be reported to the Responsible Authority.
- 7.3 If surface and/or groundwater pollution has occurred or may possibly occur, the Licensee must conduct, and/or appoint specialists to conduct the necessary investigations and implement additional monitoring, pollution prevention and remediation measures to the satisfaction of the Provincial Head.
- 7.4 The Licensee must keep all records relating to the compliance or non-compliance with the conditions of this licence in good order. Such records shall be made available to the Provincial Head within fourteen (14) days of receipt of a written request by the Department for such records.
- 7.5 The Licensee must keep an incident report and complaints register, which must be made available to any external auditors and the Department.

8. BUDGETARY PROVISIONS

- 8.1 The Licensee must ensure that there is a budget sufficient to complete and maintain the water use and for successful implementation of the rehabilitation programme as set out in this licence.
- 8.2 The Provincial Head may at any stage of the process request proof of budgetary provisions for rehabilitation and closure of project.

APPENDIX IV

Section 21 (e) of the Act: Engaging in a controlled activity

1. This licence authorises the Licensee for Section 21 (e) water use activities as indicated in Table 5.

Table 5: Water use activity for Section 21(e)

Description of the activity	Volume	Property	Area (ha)	Co-ordinates
Irrigation of old TSF with water from RWD 1 and 2 for maintenance of grassed areas	730 000 m ³ /a	Farm Modderfontein Portions 3, 20, 21, 40 and 41 of farm Modderfontein	240	26°24'52.80"S 27°40'36.14"E
Irrigation of new TSF with water from RWD 3 and 4 for maintenance of grassed areas.	730 000 m ³ /a	Farm Modderfontein	240	26°25'5.08"S 27°40'13.09"E
Irrigation of Doornpoort TSF with water from RWDs for maintenance of grassed areas	730 000 m ³ /a	Portion 1,44,45,51,52 and 53 of the farm Doornpoort 347 IQ.	240	26°27'53.34"S 27°38'48.78"E
Irrigation of shaft areas with water from Twin shaft PCD.	365 000 m ³ /a	Farm Modderfontein	240	26°24,235'S 27°41,186'E
Irrigation of all TSF with final effluent from WWTW	912 500 m ³ /a	Farm Modderfontein and farm Doornpoort 347 IQ.	960	26° 24.235"S; 27° 41.186"E 26°24'52.80"S 27°40'36.14"E 26°25'5.08"S; 27°40'13.09"E 26°27'53.34"S 27°38'48.78"E

- 1.2. The quantity of wastewater authorised to be irrigated in terms of this licence may not be exceeded without prior authorisation by the Minister.

2. CROP TYPE AND AREA IRRIGATED

- 2.1 This licence authorises to irrigate a total surface area of nine hundred and sixty hectares (960 ha) of grass on the properties according to agreement.

3. Quality of Water Containing Waste

- 3.1. The quality of water containing waste to be irrigated with must not exceed the limits as per table 6.

Table 6: Water quality parameters relevant for sampling

Variables	Limits
pH	6-9
Electrical Conductivity (mS/m)	150
Sodium Absorption ratio (SAR)	5
Chemical oxygen demand (COD) (mg/l)	75

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Faecal Coliforms per 100ml	500
e-coli per 100ml	0
Suspended Solids (mg/l)	25
PO4 (mg/l)	10
NO3/NO2 (as N) (mg/l)	5

4. Monitoring

- 4.1. The quantity of water containing waste irrigated shall be metered and recorded daily.
- 4.2. Monitoring for the quantity of the water containing waste for irrigation shall be done at the point where the effluent is piped into the irrigation dam.
- 4.3. 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 years. Calibration certificates shall be available for inspection by the provincial Head or his representative upon request.
- 4.4. The monitoring point/s shall not be changed without prior notification to and written approval by the Provincial Head.

5. REPORTING

- 5.1. 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.
- 5.2. The licensee shall submit the results of analysis for the monitoring requirements to the Provincial Head on a quarterly basis.

6. METHODS OF ANALYSIS

- 6.1. Analyses shall be carried out in accordance with methods prescribed by and obtainable from the South African National Standards (SANS), in terms of the Standards Act, Act 30 of 1982.
- 6.2. The methods of analysis shall not be changed without prior notification to and written approval by the Provincial Head.

7. GENERAL IRRIGATION PRACTICES

- 7.1 Irrigation shall 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 11/2/5/3 and dated 30 May 1978, or in accordance with any relevant regulations promulgated under section 26 of the Act.
- 7.2 Irrigation with waste shall be practiced in a systematic manner and precautions shall be taken so as to prevent –

- 7.2.1. water logging and pooling of waste in any location
 - 7.2.2. pollution of underground water or surface water due to seepage or otherwise
 - 7.2.3. fly breeding, public health hazard, odour or secondary pollution
 - 7.2.4. runoff from the irrigation area because of wet weather or any other conditions whatsoever
 - 7.2.5. the site of the irrigation area shall be adequately fenced to prevent the entry of animals and unauthorised persons.
 - 7.2.6. the unreasonable chemical or physical deterioration of, or any other damage to, the soil of the irrigation site; the unauthorized use of the wastewater by members of the public; and
 - 7.2.7. Preventing of people being exposed to the mist originating from the industrial waste.
- 7.3 Notices manufactured of durable weather-proof material prohibiting unauthorised entry and warning against the use of water containing waste for drinking and washing purposes shall be displayed at prominent places along the fence and at entrance gates. Such notices shall be worded in the official languages applicable in the area.

8. PIPELINES

- 8.1. The pipelines used for the conveyance of waste shall 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.
- 8.2. All stop-valves and taps on the pipelines conveying the effluent 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.
- 8.3. Notices manufactured of a durable weather-proof material warning against the use of water containing waste for drinking and washing purposes shall 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.

APPENDIX V

Section 21 (f) of the Act: Discharging waste or water containing waste into a water resource through a canal, sewer, or other conduit.

1. QUANTITY OF WATER CONTAINING WASTE

- 1.1 The Licensee is authorised to discharge a maximum quantity of one million and ninety five thousands cubic metres per annum (1 095 000 m³/a) of excess underground water into the Leeuspruit on portion 44 of the farm Modderfontein 345 IQ as indicated in Table 7.

Table 7: Water use activity

Description of the activity	Volume (m ³ /a)	Property	Co-ordinates
Discharge of excess underground water.	1 095 000	Portion 44, of farm Modderfontein 345 IQ	26°25'35.6"S 27°41'.21.81"E

- 1.2. The Licensee must ensure that the discharge of the wastewater and the operation and maintenance of the system are done according to the provisions in the Report.
- 1.3. The Licensee must use acknowledged methods for sampling and the date, time and sampler must be indicated for each sample.
- 1.4. Manufacturer's calibration certificates to be maintained and flow meter register kept.

2. QUALITY OF WASTE WATER TO BE DISCHARGED

- 2.1. The quality of waste water discharged into the Leeuspruit must not exceed the limits as indicated in Table 8:

Table 8: Quality of waste water to be discharged

Variable	Unit	Limit
pH		5-9.7
Electrical Conductivity (EC)	mS/m	170
Chemical Oxygen Demand (COD)	mg/l	75
Nitrate/Nitrite as Nitrogen (NO ₃ /NO ₂ as N)	mg/l	1
Ortho-Phosphate as Phosphorous (PO ₄ as P)	mg/l	1
Total Dissolved Solids (TDS)	mg/l	1200
Sulphate (as SO ₄)	mg/l	500
Total Cyanide (as CN)	µg/l	200
Magnesium (as Mg)	mg/l	70
Sodium (as Na)	mg/l	200
Aluminium (Al)	µg/l	300
Cadmium (Cd)	µg/l	3
Copper (as Cu)	µg/l	2000
Iron (as Fe)	µg/l	2000
Manganese	µg/l	400
Uranium (U)	µg/l	30
Zinc (Zn)	mg/l	5
Calcium (as Ca)	mg/l	100

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Arsenic (As)	µg/l	10
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3. MONITORING

3.1. Quantity

- 3.1.1. The Quantity of waste discharged into Leeuspruit must be metered and recorded daily.
- 3.1.2. Monitoring for the quantity of waste must be done at the point where the waste is discharged into Leeuspruit.
- 3.1.3. The installation of water meters must comply with the specifications of the manufacturer with regard to distance from obstructions in the pipelines upstream and downstream of the meters.
- 3.1.4 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 years. Calibration certificates must be available for inspection by the Provincial Head or his representative upon request.

3.2. Quality of waste

- 3.2.1. The quality of the waste must be monitored by taking grab samples every week at monitoring points described in condition 5.2 of this appendix. Each sample must be analysed according to condition 6 of this appendix for variables indicated in Table 9; and/or any other variable as may be required from time to time by the Provincial head.

Table 9: water quality Variables and frequencies

Variable	Unit	Frequency
pH		Daily
Electrical Conductivity (EC)	mS/m	Monthly
Chemical Oxygen Demand (COD)	mg/l	Monthly
Nitrate/Nitrite as Nitrogen (NO ₃ /NO ₂ as N)	mg/l	Monthly
Ortho-Phosphate as Phosphorous (PO ₄ as P)	mg/l	Monthly
Total Dissolved Solids (TDS)	mg/l	Monthly
Suspended Solids	mg/l	Daily
Ammonia (as N)	µg/l	Monthly
Chloride (as Cl)	mg/l	Daily
Faecal coliforms	CFU/100ml	Monthly

- 3.2.1 The date, time and monitoring point in respect of each sample taken must be recorded together with the results of the analysis.

4. MONITORING POINTS

- 4.1 Monitoring for Quality and flow shall only be carried out at the monitoring points listed below:
- 4.1.1 at the discharge point where the water containing waste is discharged into the Leeuspruit

4.1.2 the upstream and downstream of the discharge point

- 4.2. Monitoring points must not be changed prior to notification to and written approval by the Provincial Head.

5. METHOD OF ANALYSIS

- 5.1. Analyses shall be carried out in accordance with methods prescribed by and obtainable from the South African Bureau of Standards, in terms of the standards Act, Act 30 of 1982.
- 5.2. The methods of analysis shall not be changed without prior notification to and written approval by the Minister or delegated nominee.

6. STORMWATER MANAGEMENT

- 6.1. Storm water leaving the Licensee's premises must 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.

7. OPERATION OF THE WASTE WATER TREATMENT WORKS

- 7.1. The waste water treatment works shall be supervised and controlled by a suitably qualified and experienced employee of the Licensee who shall have under his control an adequate number of operators who have been classified in terms of regulation 2834 dated 27 December 1985 (or any update thereto) and in terms of section 26 of the Act, to ensure proper functioning of the works and processes at all times.
- 7.2. Suitably qualified and experienced mechanical and electrical artisans shall be available to be called in for inspection and maintenance of the works.
- 7.3. No any other waste, which may deleteriously affect the efficient functioning of the works or final water containing waste, shall be received in the Sewage Purification Works.

APPENDIX VI

Section 21(g) of the Act: Disposing of waste in a manner which may detrimentally impact on a water resource

1. DISPOSAL OF WATER CONTAINING WASTE

Table 10: Water use activity

Facilities	Description	volume	Capacity (m³)/Dimensions(m)/Area (ha)
Dust suppression with waste water from Old Return water dam on all haul roads.	Road dust seppression	365 000 m³/a	3566 ha
Thickeners	Thickeners at old gold plant area		5 x 3 500 m³
Refrigeration dams	Dams for chilled water at the refrigeration plant		5 2 800 m³
Rock dump	Disposal of rock	584 000 tons/a	
Condenser dam	Dams at the refrigeration plant for condensation		200 m³
Underground workings	Disposing gold plant slurry as backfill into mined out workings underground	360 000 m³/a	360 000 m³

- 1.1. The Licensee must ensure that the disposal of the waste or water containing waste and the operation and maintenance of the system are done according to the provisions in the Report.
- 1.2. The waste facilities in table 11 must be operated and maintained to have a minimum freeboard of 0.8 metres above full supply level and all other water systems related thereto shall be operated in such a manner that it is at all times capable of handling the 1:50 year flood-event on top of its mean operating level.
- 1.3. The Licensee must use acknowledged methods for sampling and the date, time and sampler must be indicated for each sample.

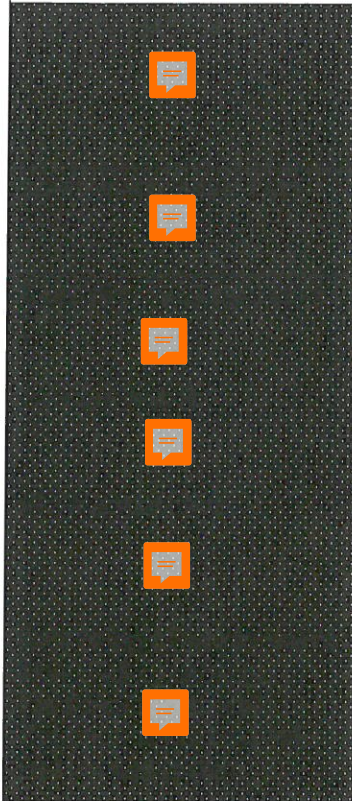
2. CONSTRUCTION AND OPERATION

- 2.1. The Licensee shall carry out and complete all activities, including the construction and operation of the facilities listed in Table 11 According to the report and according to the final plans submitted with the integrated Water Use Licence Application as approved by the Department.

Table 11: Volumes of waste to be disposed at the waste disposal facilities

Storage Facility	Volume (m³/annum)	Property	Capacity	Co-ordinates
Disposing of gold slurry at south shaft.	1 200 000	Portion 3,20,21,40 and 41 of farm Modderfontein 345 IQ	1 200 000	26°25'0.02"S 27°40'12.16"E
Disposing waste water from the Doornpoort		Portion 20, 50, 51 Doornpoort 345 IQ	1 000 000	26°28'0.05"S 27°39'14.18"E

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tailings facility into the return water dam	1 000 000			
Twin shaft retention pond	62 000	Portion 3,20,21,40 and 41 of farm Modderfontein 345 IQ	62 000	26°25'22.62" S 27°39'56.92" E
	3 000	Portion 3,20,21,40 and 41 of farm Modderfontein 345 IQ	16X3 000 (12 unlined and 4 PVC lined)	26°25'10.27" S 27°40'33.85" E
	52 487	Portion 3,20,21,40 and 41 of farm Modderfontein 345 IQ	52 487	26°25'12.50"S 27°40'49.12"E
	2 X 3 500	Portion 3,20,21,40 and 41 of farm Modderfontein 345 IQ	2 X 3 500	26°25'11.52"S 27°40'31.51"E
	2 X 650	Portion 3,20,21,40 and 41 of farm Modderfontein 345 IQ	2 X 650	26°25'10.41"S 27°39'57"E
	2 X 2 200	Portion 3,20,21,40 and 41 of farm Modderfontein 345 IQ	2 X 2 200	26°24'20.74"S 27°41'15.72"E 26°25'10.27"S 27°40'33.85"E
	150 000	Portion 3, 20, 21, 40 and 41 of the farm Modderfontein 345IQ,	150 000	26°25'10.27"S 27°40'33.85"E

3. MONITORING

- 3.1. The Licensee must monitor on a monthly basis the water resources at surface water monitoring points and groundwater monitoring points to determine the impact of the facilities and other activities on the water quality by taking samples at the monitoring points as indicated in Tables 12 and 13.

3.2. Table 12: Surface water monitoring points for South Deep mine

ID No.	Description	Coordinates
S11B	Upstream of mine in Leeuspruit at Veeriniging Road (R28)	26°23'45"S 27°42'1"E
S11A	Upstream of mine in Leeuspruit in access road to mine	26°24'17"S 27°41'42"E
S13	Tributary as Delta	26°24'54"S 27°41'6"E
S6	Downstream of mine in Leeuspruit	26°25'18"S 27°40'54"E
S10	Downstream of mine in Kariegaspruit	26°25'36"S 27°40'24"E

Table 13: Groundwater monitoring points for South Deep Mine

ID No	Purpose	Co-ordinates
SD1	Up-gradient of old tailing dams	26°24'28"S 27°40'40"E
SD2	Monitor industrial waste site	26°24'11"S 27°40'41"E
SD3	Up-gradient of waste industrial site	26°24'2"S 27°40'50"E
SD4	Up-gradient of South Shaft waste rock dump	26°24'11"S 27°41'26"E
SD5	Up-gradient of cascade ponds	26°24'54"S 27°40'28"E
SD6	Up-gradient of new tailings dam	26°24'32"S 27°39'59"E
SD7	Determine extend impacts from the new tailings dam	26°24'56"S 27°39'56"E
SD9	Monitor impact from the evaporation and cascade dam	26°25'18"S 27°40'46"E
SD10	Down-gradient from the new tailings dam	26°25'25"S 27°40'40"E
SD12	Down-gradient from the old gold plant, close to the wetland	26°24'50"S 27°41'5"E
SD13	Down-gradient from south shaft waste rock dump	26°24'2"S 27°41'21"E
SD14	Potential impacts at South deep waste	26°25'20"S 27°39'25"E

- 3.2. The date, time and monitoring point in respect of each sample taken must be recorded together with the results of the analysis.
- 3.3. Monitoring points must not be changed prior to notification to and written approval by the Provincial Head.
- 3.4. For boreholes already impacted upon, the Licensee must inform the water users of the danger of using that water and supply water of acceptable quality to their intended use.
- 3.5. Analysis must be carried out in accordance with methods prescribed by and obtainable from the South African National of Standards (SANS), in terms of the Standards Act, 1982 (Act 30 of 1982).
- 3.6. The methods of analysis must not be changed without prior notification to and written approval by the Minister or the Responsible Authority.
- 3.7. An Aquatic Scientist approved by the Provincial Head must establish a monitoring programme for the following indices: Invertebrate Habitat Assessment System (IHAS) and the latest SASS (South African Scoring System). Sampling must be done once during the summer season and once during winter season, annually, to reflect the status of the river upstream and downstream of the mining activities.

- 3.8 Toxicity testing to be performed on the tailings disposal complex monitoring boreholes on a semester basis in order to determine the risks to the receiving environment. The data gathered in the investigation must be reported annually during March of each year to the Provincial Head. If any toxicity levels as specified is exceeded, the Licensee must institute an investigation to determine the cause of toxicity.
- 3.9 Toxicity testing must be conducted quarterly on the wastewater stream from the tailing disposal compartments when returned back to the mine for use as process water.
- 3.10 The Licensee must participate in any initiative such as Direct Estimation of Ecological Effect Potential (DEEEP) to determine the toxicity of complex tailings waste discharges. Both acute and chronic toxicity must be addressed and at least three taxonomic groups must be present when toxicity tests are performed.
- 3.11 The applicant must conduct updated groundwater drawdown simulations for pumping from boreholes SD17 and SD18, in conjunction with boreholes SDS4, SDS6, SDS7 and SDS8. The updated drawdown simulations for drawdown after pumping for 20, 40, 60, 80 and 100 years must be provided to the Department for review prior to the commencement of pumping for remediation.
- 3.12 Additional boreholes must not be included into the groundwater remediation plan without conducting updated numerical groundwater modelling for the additional boreholes.
- 3.13 The Licensee must investigate the viability of removing the pollution source by re-mining the TSF material at Doornpoort. If viable, this project should be prioritised and any new tailings generated should only be deposited onto a sufficiently designed and lined TSF.
- 3.14 All new boreholes should be properly sited, according to the results of the geophysical survey.
- 3.15 Destroyed boreholes must be re-drilled namely SD1, SD3 and SD5 and included into the monitoring programme.
- 3.16 The monitoring programme must be updated submitted to the Department within 6 months of licence issuance.
- 3.17 The following boreholes must be included into the monitoring programme
- SD24S (existing)
 - SD24D (existing)
 - FERRIERA (existing)
 - NMBH1 (new)
 - NMBH2 (new)
 - NMBH3 (new)
 - NMBH4 (new)
 - NMBH5 (new)
 - NMBH6 (new)
 - NMBH7 (new)



4. STORMWATER MANAGEMENT

- 4.1. Stormwater leaving the Licensee's premises must 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.
- 4.2. 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.
- 4.3. Stormwater must be diverted from the mine complex site and roads and must be managed in such a manner as to disperse runoff and concentrating the stormwater flow.
- 4.4. Where necessary works must be constructed to attenuate the velocity of any stormwater discharge and to protect the banks of the affected watercourses.
- 4.5. Stormwater control works must be constructed, operated and maintained in a sustainable manner throughout the impacted area.
- 4.6. All stormwater that would naturally run across the pollution areas must be diverted via channels and trapezoidal drains designed to contain the 1:50 year flood.

5. PLANT AREAS AND CONVEYANCE

- 5.1. Pollution caused by spills from the pipelines must be prevented through proper maintenance and effective protective measures especially near all stream crossings.
- 5.2. 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 must be maintained in a state of good repair and standby pumps must be provided.
- 5.3. Any hazardous substances must be handled according to the relevant legislation relating to the transport, storage and use of the substance.
- 5.4. Any access roads or temporary crossings must be:
 - 5.4.1. non-erosive, structurally stable and must not induce any flooding or safety hazard and
 - 5.4.2. be repaired immediately to prevent further damage.

6. ACCESS CONTROL

- 6.1. Strict access procedures must be followed in order to gain access to the properties. Access to waste or water containing waste facilities must be limited to authorised employees of the Licensee and their Contractors only.
- 6.2. 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.

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7. CONTINGENCIES

- 7.1. Accurate and up-to-date records must be kept of all system malfunctions resulting in non-compliance with the requirements of this licence. The records must be available for inspection by the Provincial Head upon request. Such malfunctions must be tabulated under the following headings with a full explanation of all the contributory circumstances:
- 7.1.1. operating errors;
 - 7.1.2. mechanical failures; (including design, installation or maintenance)
 - 7.1.3. environmental factors; (e.g. flood)
 - 7.1.4. loss of supply services; (e.g. power failure) and
 - 7.1.5. other causes.
- 7.2. The Licensee must, within 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.
- 7.3. The Licensee must, within 14 days, or a shorter period of time, as specified by the Provincial Head, from the occurrence or detection of any incident referred above, submit an action plan, which must include a detailed time schedule, to the satisfaction of the Provincial Head of measures taken to:
- 7.3.1. correct the impacts resulting from the incident;
 - 7.3.2. prevent the incident from causing any further impacts; and
 - 7.3.3. prevent a recurrence of a similar incident.

8. INTEGRATED WATER AND WASTE MANAGEMENT

- 8.1. The Licensee must update an *Integrated Water and Waste Management Plan (IWWMP)*, which must together with the updated *Rehabilitation Strategy and Implementation Programme (RSIP)*, be submitted to the Provincial Head for approval within one (1) year from the date of issuance of this licence.
- 8.2. The IWWMP and RSIP shall thereafter be updated and submitted to the Provincial Head for approval, annually.
- 8.3. The Licensee must, at least 180 days prior to the intended closure of any mining related activities, or any portion thereof, notify the Provincial Head of such intention and submit any final amendments to the IWWMP and RSIP as well as a final *Closure Plan*, for approval.
- 8.4. The Licensee must make full financial provision for all investigations, designs, construction, operation and maintenance for a water treatment plant should it become a requirement as a long-term water management strategy.

APPENDIX VII

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

1. The Licensee is authorised to remove a maximum volume not exceeding seven hundred and twenty nine thousand nine hundred and ninety six cubic metres per annum (729 996 m³/a) of water found underground from Portion 3, 20, 21,40 and 41 of the farm Modderfontein 345 IQ for the efficient continuation of mine or safety of the people.
2. The quantity of the water authorised to be removed in terms of this licence may not be exceeded without prior authorisation by the minister.
3. The licensee shall provide affected water user whose water supply is impacted by the water use with water that is fit for use.
4. The quantity of water removed from underground must be metered and recorded on a daily basis.
5. The groundwater levels must be monitored every six (6) months (once in the beginning of the dry season and once in the beginning of the wet season).
6. Self-registering flow metres must be installed in the delivery lines at easily accessible positions near the dewatering points.
7. The flow metering devices must 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 must be available for inspection by the Provincial Head or his/her representative upon request.
8. Calibration certificates in respect of the pumps must be submitted to the Provincial Head after installation thereof and thereafter at intervals of two (2) years.
9. The date and time of monitoring in respect of each sample taken must be recorded together with the results of the analysis.
10. Analysis must be carried out in accordance with methods prescribed by and obtainable from the South African National of Standards, in terms of the Standards Act, 1982 (Act 30 of 1982).
11. The methods of analysis must not be changed without prior notification to the Licensee and written approval by the Minister or his/her delegated nominee.
12. The Provincial Head must be informed of any incident that may lead to groundwater being disposed of contrary to the provisions of this licence, by submitting a report containing the following information:
 - 12.1 nature of the incident (e.g. operating malfunctions, mechanical failures, environmental factors, loss of supply services, etc)
 - 12.2 actions taken to rectify the situation and to prevent pollution or any other damage to the environment and
 - 12.3 measures to be taken to prevent re-occurrence of any similar incident.
13. The Licensee must follow acceptable construction, maintenance and operational practices to ensure the consistent, effective and safe performance of the groundwater removal system.



14. Reasonable measures must be taken to provide for mechanical, electrical or operational failures and malfunctions of the underground water removal system.

[END OF LICENCE]

ps

ps



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

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AMENDMENT LICENCE IN TERMS OF SECTION 50 AND 158 OF THE NATIONAL WATER ACT, 1998 (ACT NO 36 OF 1998)

I, **Simon Maphangula**, in my capacity as Provincial Head: Gauteng Provincial Operations (Acting); acting under authority of the powers delegated to me by the Acting Director General of the Department of Water and Sanitation, hereby authorise the amendment of licence: **South Deep Gold Mine**, dated 03 May 2019, licence no: **08/C22J/GCEFIJA/8705**

SIGNED: _____

DATE: _____

The above mentioned licence is amended as follows:

Amendment of the Licensee

1. The Licensee is hereby amended-

a by substitution of condition 1 of the following:

“South Deep **[Gold Mine]** Joint Venture: South Deep Gold Mine”

Amendment of properties and ownership on which the water use will be exercised

2. Properties and ownership on which the water use will be exercised is hereby amended-

a. by the substitution in properties for Table 1 of the following Table:

Table 1: Properties where water uses will be exercised

Properties	Water uses	Owner
Portion 3,20,21,30,41,44,39 and 65 of farm Modderfontein 345 IQ	Section 21(a)	South Deep Gold Mine
Portion 3 and 52 of the farm Modderfontein 345 IQ, Portion 3,12,20,41,44 and 61 of the farm Modderfontein 345 IQ	Section 21(c) and (i)	South Deep Gold Mine
Portion 12, 20,21 of farm Modderfontein 345 IQ	Section 21(e)	South Deep Gold Mine

Properties	Water uses	Owner
Portion 44 of the farm Modderfontein 345 IQ	Section 21(f)	South Deep Gold Mine
Portion 1,7,20,43,45,46,50,51,52,53 of the farm Doornpoort 347 IQ. Portion 44 of the farm Modderfontein 345 IQ	Section 21(g)	South Deep Gold Mine
Portion 30 of the <u>farm modderfontein</u> 345IQ	Section 21(j)	South Deep Gold Mine

Amendment of the description of the activities

3. Description of the activities is hereby amended-

- a by substitution for the description of the activities of the following description of the activities:

"This license authorises South Deep Gold mine for the following water uses in terms of section 40 for section 21(a),(c),(e),(f),(g),(i) and (j) of the National Water Act, 1998 (Act 36 of 1998) for taking water from the South Shaft boreholes and Leeuspruit river, installation of flow meter at the river, river diversion, pipeline crossing the stream, discharging of waste water into the river, irrigation of TSF with treated effluent, disposing of waste water into containment facilities and removing of water found underground for continuation of mining and safety of the people. The mine falls within the Vaal River Water Management Area, quaternary catchments C22J",

Amendment of condition I of Appendix II

4. Condition 1 of the licence is hereby amended

- a. by the substitution in condition 1 for Table 2 of the following Table:

Table 2: Water use activities for Section 21(a)

Purpose/ Description	Property	Volume	Co-ordinates
1.Water is abstracted from Salvage BH [A] (A3) to reduce the pollution plume and is disposed to twin shaft PCD.	Portion 39, of farm Modderfontein 345 IQ	154 030 m ³ /a	26°25'3.06"S 27°39'50.48"E
Old RWD seepage interception BH (A4) to reduce the pollution plume. The water is disposed (recycled back) to the RWD.	Portion 44, of farm Modderfontein 345 IQ	154 030 m ³ /a	26°25'18.03"S 27°40'55.73"E
2.Abstraction of water from Scavenger BH (A5-1) [to reduce the pollution plume and disposal in Doornpoort RWD] below old TSF to reduce the	Portion 41, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°24'45.12"S 27°40'45.85"E

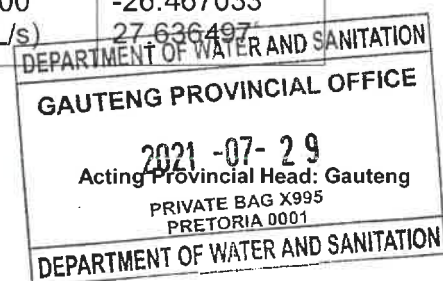
DEPARTMENT OF WATER AND SANITATION
GAUTENG PROVINCIAL OFFICE

2021 -07- 29

Acting Provincial Engineer
PRETORIA 0001

DEPARTMENT OF WATER AND SANITATION

Purpose/ Description	Property	Volume	Co-ordinates
<u>pollution plume and disposal in old RWD.</u>			
3. Abstraction of water from Scavenger BH (A5-2) [borehole to reduce the pollution plume and disposal in RWD] below old TSF to reduce the <u>pollution plume and disposal in RWD.</u>	Portion 20, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°25'0.49"S 27°40'51.32"E
4. Abstraction of water from Scavenger BH (A5-3) [to reduce the pollution plume and disposal in RWD] below old TSF to reduce the <u>pollution plume and disposal in RWD.</u>	Portion 3, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°25'12.66"S 27°40'38.06"E
5. Abstraction of water from Scavenger BH(A5-4) [to reduce the pollution plume and disposal in RWD] below old TSF to reduce the <u>pollution plume and disposal in RWD.</u>	Portion 3, of farm Modderfontein 345 IQ	94 900 m ³ /a	[26°25'7.25"S] <u>26°25'30.70"S</u> 27°40'25.25"E
Abstraction of water from Scavenger BH(A5-5) to reduce the pollution plume and disposal in RWD	Portion 21, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°25'7.25"S 27°40'6.35"E
Abstraction of water from Scavenger BH(A5-6) to reduce the pollution plume and disposal in RWD	Portion 21, of farm Modderfontein 345 IQ	94 900 m ³ /a	26°25'7.25"S 27°40'0.35"E
6. Abstraction of water from scavenger BH (A6-1) below the Doornpoort TSF to reduce the pollution plume and disposal in RWD.	[Portion 20, of farm Modderfontein 345] <u>Doornpoort 347 IQ</u>	94 900 m ³ /a	26°27'49.99"S 27°38'18.73"E
7. Abstraction of water from Scavenger BH (A6-2) below the old TSF to reduce the pollution plume and disposal in RWD.	[Portion 20, of farm Modderfontein 345] <u>Doornpoort 347 IQ</u>	94 900 m ³ /a	26°27'42.49"S 27°38'18.08"E
Abstraction of water from South Shaft borehole for mining purpose	Portion 30 and 65 of the farm Modderfontein 345 IQ	273 756 m ³ /a	26°24'14.10"S 27°41'7.40"E
Abstraction of water from Leeuspruit for mining purpose	Portion 30 and 65 of the farm Modderfontein 345 IQ	729 996 m ³ /a	26°24'36.00"S 27°41'22.95"E
BH1	Farm Doornpoort 347 IQ	94 900 (2.0L/s)	-26.467033° 27°41'22.95"E



Purpose/ Description	Property	Volume	Co-ordinates
SD31	Farm Doornpoort 347 IQ	94 900 (0.25L/s)	-26.471389°; 27.649738°
SD32	Farm Doornpoort 347 IQ	94 900 (0.6L/s)	-26.471790° 27.654380°
SD38	Farm Doornpoort 347 IQ	94 900 (1L/s)	-26.468937° 27.645781°
SD40	Farm Doornpoort 347 IQ	94 900 (1.2L/s)	-26.469808° 27.639373°
SD43	Farm Doornpoort 347 IQ	94 900 (1.55L/s)	-26.465064° 27.640661°

Amendment of condition 3 of Appendix III

5. Condition 3.1.2 of the licence is hereby amended

by substitution of condition 3.1.2 for the following condition:

“3.1.2 The Licensee must ensure that clean storm water is discharged **[into bio retention ponds]** outside of the riparian area”.

Amendment of condition 1 of Appendix V

Condition 1.1 of the licence is hereby amended

a. by the substitution in condition 1.1 for Table 7 of the following Table:

Table 7: Water use activity

Description of the activity	Volume (m³/a)	Property	Co-ordinates
Discharge of excess underground water.	1 095 000	Portion 44, of farm Modderfontein 345 IQ	[26°25'35.6"S] 26°24'35.59"S 27°41'.21.81"E

Amendment of condition 3 of Appendix VI

6. Condition 3.1 of the licence is hereby amended

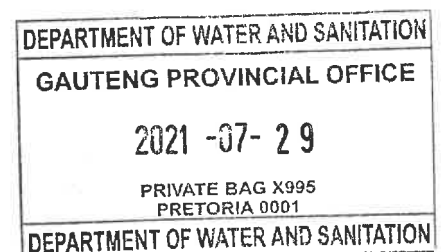
a by substitution of condition 3.1 of the following condition:

“3.1 The Licensee must monitor on a **[monthly]** quarterly basis the water resources at surface water monitoring points and groundwater monitoring points to determine the impact of the facilities and other activities on the water quality by taking samples at the monitoring points as indicated in Tables 10 and 11”.

Amendment of condition 1 of Appendix VII

7. Condition 1 of the licence is hereby amended

a by substitution of condition 1 of the following condition:



- "1 The Licensee is authorised to remove a maximum volume not exceeding **[seven hundred and twenty-nine thousand nine hundred and ninety-six cubic metres per annum (729 993m³/a)]** one million eight hundred and twenty-four thousand nine hundred and ninety-six cubic meters per annum (1 824 996 m³/a) of water found underground from Portion 3, 20, 21, 40 and 451 of the farm Modderfontein 345IQ for the efficient continuation of mine or safety of the people".

[END OF LICENCE]

