water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Private Bag X 54304, Durban, 4000, Southern Life Building, 88 Joe Slovo Street, Durban, 4000
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LICENCE IN TERMS OF CHAPTER 4 OF THE NATIONAL WATER ACT, 1998 (ACT NO 36 OF 1998) (THE ACT)

I, **Ashley Starkey,** in my capacity as Provincial Head: KwaZulu-Natal Provincial Operations, acting under authority of the powers delegated to me by the Acting Director General of the Department of Water and Sanitation, hereby authorise the following water uses in respect of this licence.

SIGNED: A. Starkey

DATE: 28 April 2021.

LICENCE NO: 11/V12B/ABGAFIJC/10497
FILE NO: 27/2/1/V112/4/5/2

THIS LICENCE SUPERSEDES ALL LICENCES, AUTHORISATIONS, PERMITS, EXEMPTIONS GRANTED TO THE ESKOM INGULA PUMPED STORAGE SCHEME.

1.	**Licensee:**	**ESKOM HOLDINGS SOC LIMITED (Ingula Pumped Storage Scheme)**
	Postal Address:	Private Bag X10046 **Lady Smith** 3370

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(b) of the Act:	Storing water, subject to the conditions set out in Appendices I and III.
2.3	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 IV.

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2.4	Section 21(f) of the Act:	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit, subject to the conditions set out in Appendices I and V
2.5	Section 21(g) of the Act:	Disposing of waste in a manner which may detrimentally impact on a water resource, subject to the conditions set out in Appendices I and VI
2.6	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 IV.
2.7	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 on which the uses will be exercised

3.1 Portion 3 of Farm Braamhoek 1220

3.2 Portion 6 of Farm Bedford No. 2 1845

3.3 Portion 1 of remainder Farm Braamhoek 1220

3.4 Farm Bedford No 2. 1845

3.5 Remainder Portion Farm Chatsworth 388

3.6 Remainder portion and portion 2 of Farm Zaaifontein 1074

3.7 Remainder portion of Farm Braambosch 14997

3.8 Portion 5 of Farm Paarde Kraal 1979

3.9 Portion 0 Farm Strathmorn 9878

3.10 Portion 1 Farm Welkom 1310

3.11 Portion 1 Farm Trekboer 1002

4. Registered owner of Properties

4.1 Eskom Holdings Ltd, Title deed – T13665/2004

5. Licence and Review Period

5.1 This licence is valid for a period of forty (40) years from the date of issuance and it may be reviewed every five (5) years

6. Definitions

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

"The Act" means the National Water Act, 1998 (Act 36 of 1998)

"The Provincial Head" means the Head of Provincial Operations: Kwazulu-Natal, Department of Water and Sanitation Private Bag X 54304, Durban 4000.

"Extent of the watercourse" means the outer edge of the 1:100 year floodline or the delineated riparian habitat, whichever is the greatest.

"Regulated area of a wetland" is the use of water for section 21 (c) and (i) water uses within 500m radius from the boundary of any wetland.

A "wetland" means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with mustow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

The "characteristics of a watercourse/s" mean the flow regime, water quality, habitat (including the physical structure of the watercourse/s and associated vegetation) and biota found within the extent of the watercourse/s. The Resource Quality characteristics as defined in the National Water Act, 1998 (Act 36 of 1998).

7. Brief Description of Activities

This licence authorizes water use activities for taking of water, storing of water, impeding or diverting stream flow, discharging and disposing wastewater for Eskom Ingula Pumped Storage Scheme on farm Zaaifontein, Braamhoek and Bedford. The farm lies on the Drakensberg escarpment. The upper reservoir is on the headwater tributary of the Wilge River (which flows west into the Vaal River System) and the lower reservoir in the headwaters of Klip River. The scheme consists of the two reservoirs which are connected by the enclosed tunnel systems and pump turbine units with a potential generation capacity of approximately 1 332 MW.

APPENDIX I

General conditions for the license

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 license 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 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 Provincial 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 license, 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 license 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 of 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. The Licensee shall conduct an annual internal audit on compliance with the conditions of licence. A report on the audit shall be submitted to the Provincial Head within one month of the finalization of the audit.

12. The Licensee shall appoint an independent external auditor to conduct an annual audit on compliance with the conditions of this licence. The first audit must be conducted within 3 (three) months of the date this license and a report on the audit shall be submitted to the Provincial Head within one month of finalization of the report.

13. 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

14. Any incident that cause or may cause water pollution shall be reported to the Provincial Head or his/her designated representative within 24 hours.

15. If the Licensee is not the end user/beneficiary of the water use related infrastructure and will not be responsible for long term maintenance and management of the infrastructure, the Licensee must provide a programme for hand over to the successor-in-title including a brief management/maintenance plan and the agreement for infrastructure along with allocation of responsibilities, within (3) months of the date of issuing of this licence.

16. Notices prohibiting unauthorized persons from entering the certain areas, as well as internationally acceptable signs indicating the risks involved in case of an unauthorized entry must be displayed along the boundary fence of these areas.

17. The Department accepts no liability for any damage, loss or inconvenience, of whatever nature, suffered as a result of:

17.1 shortage of water;
17.2 inundations of flood;
17.3 siltation of the resource; and
17.4 required reserve releases

18. The Licensee shall establish a programme of formal information Management System, which maintains a database on water supply distribution and delivery infrastructure.

19. The Licensee shall 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.

20. This licence hereby supersedes:

20.1 The licence granted to Eskom Holding Limited dated 15 May 2007, with the licence number: 27/2/2/V112/1/1;
20.2 The licence granted to Eskom-Ingula Pump Storage Scheme dated 17 May 2011, with the license number; 27/2/2/V112/1/1;
20.3 The licence granted to Eskom-Ingula Pump Storage Scheme dated 30 July 2014, with the license number; 07/V12A/ABCEFGIJ/2439 and;
20.4 All other Authorizations, Permits, Exemptions granted to the Eskom-Ingula Pumped Storage Scheme.

APPENDIX II

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

1. This licence authorizes the taking of a maximum quantity of one hundred and ninety eight thousand seven hundred and forty eight cubic metres per annum (198 748 m^3/a) of groundwater as detailed in Table 1.

Table 1: Authorised Water use activities

Description of the Borehole	Purpose	Properties	Total Water (m3/a)	Coordinates
Area 2 (Lower Main Works) Borehole E1A	Construction and Domestic	Remainder of Farm Zaaifontein 1074	35040	S 28º 16' 43.8" E 29º 34' 49.08"
Area 2 (Lower Main Works) Borehole 2A (CMI) KZN100240	Construction and Domestic	Remainder of Farm Zaaifontein 1074	66 107	S 28 16'48.5" E 29 35' 30.2"
Area 2 (Lower Main Works) Borehole 2B (CMI) KZN 100241	Construction and Domestic	Remainder of Farm Zaaifontein 1074	23 327	29° 35' 18.7" E 28° 16' 24.8" S
Area 2 (Lower Main Works) Borehole 2C (CMI) KZN 100242	Construction and Domestic	Remainder of Farm Zaaifontein 1074	37 774	29° 35' 29.8" E 28° 16' 16.9" S
BH 8 Bedford left Bank	Construction and Domestic	Farm Bedford 21845, P6	36 500	S 28°14' 15" E 29 34' 56.9"

2. Taking of a maximum quantity of twelve million cubic metres per annum (12 000 000 m^3/a) of water from Bramhoekspruit as detailed in Table 2

3. Taking of a maximum quantity of one hundred and five thousand cubic metres per annum (105 000 m^3/a) of water from Farm Dam 1 as detailed in table 2

Table 2: Authorised Water use activities

Water Resource	Purpose	Properties	Quantity (m3/a)	Coordinates
Bramhoekspruit, a tributary of Tugela River	Industrial operational purposes	Portion 3 of Farm Braamhoek 1220	12 000 000	S 28º 18' 42.03" E 29º 34' 45.03"
Farm Dam 1	Domestic purpose	Remainder of Farm Zaaifontein 1074	105 000	S 28º 17' 08.02" E 29º 35' 03.09"

4. The quantity of water authorized to be taken in terms of his licence may not be exceeded without prior authorization by the Department.

5. 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.

6. The above-mentioned volume may be reduced when the licence is reviewed.

7. The Licensee shall continually investigate new and emerging technologies and put into practice water efficient devices or apply technique for the re-use of water containing waste, in an endeavor to conserve water at all times.

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

8.1 The daily quantity of water taken must be metered or gauged and the total recorded at the last day of each month; and

8.2 The Licensee shall keep record of all water taken and a copy of the records shall be forwarded to the Provincial Head each year with the annual water balance

9. No water taken may be pumped, stored, diverted, or alienated for purposes other than intended in this licence, without written approval by the Responsible authority or his/her delegated nominee.

10. The Licensee shall install and monitor appropriate water measuring devices to measure the amount of water abstracted, received and/or consumed, as applicable to the infrastructure.

11. 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.

12. Licensee shall submit pump test data of the borehole pumps to the Department within three months of the effective date of this licence.

APPENDIX III

Section 21 (b) of the Act: Storing of Water

1. Storing of water

1.1. The Licensee is authorized to store water into three (3) dams located on the properties and geographic location indicated in Table 3.

Table 3: Authorized water use activities

Dam Name	Property	Capacity (m^3)	Co-ordinates
Farm Dam	Remainder of Farm Zaaifontein 1074	50 000	S 28°17'07.9" E 29°35'29.7"
Bedford Dam in the Wilge River	Farm Bedford 3 no 1845	22 300 000	S 28°14'17.79" E 29°35'6.26"
Bramhoek Dam in the Bramhoekspruit, a tributary of the Tugela river	Portion 3 of farm Braamhoek 1220	26 260 000	S 28°18'42.03 " E 29°34'45.9"

1.2. No additional storage works by means of which water can be impounded may be constructed on the property without the prior without prior authorization by the Department.

2. Monitoring Requirements

2.1. Suitable measuring structures must be constructed to measure the flows entering and leaving the dam and this information must be available to the Provincial Head on request.

2.2. The Licensee shall establish a monitoring programme where in the date and time of monitoring in respect of each sample taken and shall be recorded together with the results of the analysis as well as other significant information (low flow, flooding, pollution incident.

2.3. The water level in the dam and the quantity of water stored shall be recorded at the last day of each month.

3. Dam Safety Requirements

3.1. The operation and maintenance of all dam facilities classified as a dam with a safety risk, must be carried out under supervision of a Professional Civil Engineer, Registered under the Engineering Profession of South Africa Act, 1990 (Act 114 of 1990)

3.2. All dams with a safety risk must be registered with the Department Dam Safety Office.

3.3. The Licensee shall supply any information, drawings, specifications, design assumptions, calculations, documents and test result when requested by the Provincial Head.

3.4. An approved professional person must be appointed to carry out a dam safety evaluation every five years and must:

3.4.1. Consider whether the safety norms pertaining to the design, construction, monitoring, operation, performance and maintenance of the dam satisfy acceptable dam engineering practices.

3.4.2. Compile a report on the matters contemplated above according to the prescribed requirements and submit the signed and dead and dated report to the owner of the dam within the prescribed period.

3.5. The Licensee is not exempted from compliance with the Regulations published under Government Notice R1560 of 25 July 1986, read with Chapter 12 of the Act.

4. Operation of Dams

4.1. The as-built drawing and specifications of the three dams must be submitted to the Provincial Head for his/her records.

4.2. The Government reserves the right to construct storage works at any time in any stream and to store all surplus water reaching the dams and to control the allocation of such water.

4.3. During operation, the releases shall never be less than the figures in Table 4.

Table 4: Bedford Dam Daily average Releases

Month	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sep
Release (m^3/h)	82.8	100.8	118.8	154.8	208.8	187.2	162	126	100.8	90	79.2	79.2

4.4. During operation, the releases shall never be less than the figures in Table 5.

Table 5: Braamhoek Dam Daily Average Release

Month	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sep
Release (m^3/h)	234	288	342	450	612	540	468	360	288	252	216	216

4.5. The releases at each dam must not drop below the values in table 4 and 5 above at any time after first filling, without the express written permission of the Provincial Head.

4.6. Each dam must be fettered with a 1000 mm and a 3000m valve to release flood flows in addition to the low flow valves mentioned above.

4.7. The dams must have suitable energy breaks to dissipate the energy of released water from the valves and spillways to prevent erosion. The upper dam (Bedford Dam) shall have a weir installed downstream so as to discharge an even flow across the width of the natural stream bed.

4.8. During the wet season the flood releases must generally be in the proportions 25% of net inflow for the upper (Bedford Dam) dam and 75% for the lower (Bramhoek Dam) dam until the system volume reaches optimum operating level. The dams will then each release minimum flows accordingly to Table 4 for Bedford Dam and Table 5 for Bramhoek Dam the tables above.

4.9. A permanent record must be kept of calculations and releases rates and times from both dams. This must be made available

4.10 The system volumes of the two dams and the releases must be monitored on a daily basis. If there is an increase in volume to above 29 500 000m³ at Braamhoek Dam, the releases rates shall be calculated such that the excess volume would be released over the next 18 hours, while ignoring the inflow rate. The 29 500 000 m³ is based on 0.5 meters freeboard in the lower dam when the upper dam is at Lowest Draw down Level (LDL).

4.11 Whenever flow releases are increased, they must not be increased to more than 50% above the previous release at any one adjustment. Should the calculations show that an increase of more than 50% is needed, the releases must immediately be increased by only 30% and the calculations must be repeated 3 hours later and the balance of the adjustment made then. Should this require a further increase of 30% or more than the increase must be 30% and the calculation repeated every 3 hours till the inflow stabilizes.

4.12. Should increase inflow cause the system volume to exceed 30 000 000m³, then releases must be recalculated and adjusted every 3 hours until the buffer volume falls below this level.

4.13. Should increase inflow cause the system volume to exceed 31 000 000m³ then releases must be recalculated and adjusted every hour until the volume falls below this level, thereafter 3 hourly adjustments shall continue.

4.14. In the unlikely event that the lower dam (Bramhoek Dam) exceeds spillway level as a result of the flood water and generation operation, generation may continue provided the release valves on the dam are progressively closed as the spillage increases. Generation shall be restricted to keep total discharges within 120% of the discharge rate that would have been released through the Bramhoek Dam valves according to the calculations. Valves may be reopened progressively once spillway discharge decreases below the calculated release. (The spillway discharge curve must be calculated and kept available on the operating system).

4.15. Should flooding continue over the spillway after generation has ceased, it can be left to occur naturally, but accurate records of generation and pumping times and spillage shall be kept for use in the event of downstream claims.

4.16. The release from the upper (Bedford Dam) dam shall continue to be calculated and adjusted hourly according to the system volume, and the lower (Bramhoek Dam) dam releases must come into line with these calculations as the spillway discharge decreases.

4.17. Recreational water use is not allowed on the dams during normal operations for safety reasons except for fishing for ecological monitoring purposes.

4.18. The waterworks(s) must be equipped by the Licensee at his own cost, with self-registered water meter(s) approved by the Provincial Head, these meter(s) must be maintained and kept in a working condition to the satisfaction of the Provincial Head. The meter(s) can at any time be sealed by the Department and it can be requested from the Licensee to keep an accurate record of the readings, as well as the dates and periods that abstraction took place. Such records must be made available to any authorized official of the Department if the Department or a responsible authority needs the information.

APPENDIX IV

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 authorizes Eskom Ingula Pumped Storage Scheme the operation for section 21 (c) and (i) water use activities as set out in table 6 and in the corresponding and applicable water use licence application reports submitted to the Department or the Responsibility Authority:

Table 6: Authorised Water activities

Number of Crossings	Activities	Length (m)	Property	Coordinates	
				End	Start
Section 1					
1	Pre-Fab Culvert on the tributary of the Klip River	14.64	Portion 1of Farm Trekboer 1002	S 28º 20' 28" E 29º 3' 2 55"	S 28º 20' 28.1" E 29º 32' 57.6"
2	Pre-Fab Culvert on the tributary of the Klip River	14.64	Portion 1of Farm Trekboer 1002	S 28º 21' 26" E 29º 53' 58"	S 28º 21' 26" E 29º 43' 58"
3	Pre-Fab Culvert on the tributary of the Klip River	14.64	Portion 1of Farm Trekboer 1002	S 28º 21' 34" E 29º 34' 51"	S 28º 21' 35.7" E 29º 34' 49.15"
Section 2					
1	Pre-Fab Culvert (malachite) on the tributary of the Klip River	20.74	Portion 1 of the Farm Braamhoek 1220	S 28º 18' 50.6" E 29º 34' 0.51"	S 28º 18' 50" E 29º 34' 0.1"
2	Pre-Fab Culvert (Devil) on the tributary of the Klip River	29.28	Remainder Portion of the Farm Braamhoek 1220	S 28º 18' 0.9" E 29º 33' 41"	S 28º 18' 50.6" E 29º 33' 42.9"
3	In-Situ Culvert(Stanleys) on the tributary of the Klip River	20.0	Remainder Portion of the Farm Braamhoek 1220	S 28º 17' 36" E 29º 33' 38"	S 28º 17' 26.4" E 29º 33' 35.1"
4	Pre-Fab Culvert(Snipe) on the tributary of the Klip River	15.86	Remainder Portion of the Farm Braamhoek 1220	S 28º 17' 13" E 29º 33' 36"	S 28º 17' 13.7" E 29º 33' 37.5"
5	In-Situ Culvert (Wattle) on the tributary of the Klip River	20.00	Remainder Portion of the Farm Braamhoek 1220	S 28º 17' 11.0" E 29º 33' 56"	S 28º 17' 12" E 29º 33' 56"

Number of Crossings	Activities	Length (m)	Property	Coordinates	
				End	Start
6	In-Situ Culvert (MAT) on the tributary of the Klip River	27.20	Farm Zaaifontein 1074	S 28º 16′ 58″ E 29º 35′ 16″	S 28º 16′ 57.6″ E 29º 35′ 17.2″
7	Reconstruction of gullies 1	690	Portion 3 of the Farm Braamhoek 1220	S 28º 17′ 19.8″ E 29º 34′ 41.9″	S 28º 17′ 36.4″ E 29º 34′ 35.4″
8	Reconstruction of gullies 2	631	Portion 3 of the Farm Braamhoek 1220	S 28º 17′ 21.2″ E 29º 34′ 50.5″	S 28º 17′ 37.3″ E 29º 34′ 41.8″
9	Reconstruction of gullies 3	244	Portion 3 of the Farm Braamhoek 1220	S 28º 17′ 22.3″ E 29º 34′ 58.6″	S 28º 17′ 29.0″ E 29º 35′ 0.0″
10	Portable Supply Stream Crossings #1 on the tributary of the Klip River	32.2	Remainder Portion of the Farm Zaaifontein 1074	S 28º 16′ 28.3″ E 29º 35′ 19.1″	S 28º 16′ 29.6″ E 29º 35′ 19.5″
11	Portable Supply Stream Crossings #2 on the tributary of the Klip River	16	Remainder Portion of the Farm Zaaifontein 1074	S 28º 16′ 45.8″ E 29º 35′ 28.5″	S 28º 16′ 45.8″ E 29º 35′ 28.9″
12	Portable Supply Stream Crossings #3 on the tributary of the Klip River	20	Remainder Portion of the Farm Zaaifontein 1074	S 28º 16′ 30.9″ E 29º 35′ 25.3″	S 28º 16′ 30.1″ E 29º 35′ 26.1″
13	Portable Supply Stream Crossings #4 on the tributary of the Klip River	12	Remainder Portion of the Farm Zaaifontein 1074	S 28º 16′ 35.5″ E 29º 35′ 28.2″	S 28º 16′ 35.7″ E 29º 35′ 28.1″
14	Sewer Mainline Crossing on the Tributary of the Klip River	10	Remainder Portion of the Farm Zaaifontein 1074	S 28º 16′ 57.6″ E 29º 35′ 17.0″	S 28º 16′ 57.4″ E 29º 35′ 17.5″
15	Infrastructure Culverts # 1(Cable Access Culvert) on the Tributary of the Klip River	12	Remainder Portion of the Farm Zaaifontein 1074	S 28º 16′ 36.6″ E 29º 35′ 18.2″	S 28º 16′ 36.4″ E 29º 35′ 19.4″
16	Infrastructure Culverts # 2(CAT Main Access) on the Tributary of the Klip River	12	Remainder Portion of the Farm Zaaifontein 1074	S 28º 16′ 38.8″ E 29º 35′ 22.4″	S 28º 16′ 38.5″ E 29º 35′ 21.9″
17	Infrastructure Culverts # 3 (Trencon Culvert) on the Tributary of	26.4	Portion 3 of the Farm Zaaifontein 1074	S 28º 16′ 38.2″ E 29º 35′ 11.5″	S 28º 16′ 38.0″ E 29º 35′ 12.0″

Number of Crossings	Activities	Length (m)	Property	Coordinates	
				End	Start
	the Klip River				
18	Infrastructure Culverts # 4 (Primary WTW culvert) on the Tributary of the Klip River	12	Portion 3 of the Farm Zaaifontein 1074	S 28º 16' 59.1" E 29º 35' 29.9"	S 28º 16' 59.6" E 29º 35' 29.7"
19	Improvements of storm water drainage feeding into the inlet of Devil's culvert	29.28	Remainder Portion of the Farm Braamhoek 1220	S 28º 18' 50" E 29º 34' 61"	S 28º 17' 29.0" E 29º 35' 0.0"
20	Storm water culvert from MAT		Remainder Portion of the Farm Zaaifontein 1074	S 28º 16' 56" E 29º 35' 17"	S 28º 16' 56" E 29º 35' 17"
21	Crossing# 1 near borehole 3		Remainder Portion of the Farm Zaaifontein 1074	S 28º 16' 28.59" E 29º 35' 19.0"	S 28º 16' 28.7" E 29º 35' 17"
22	Crossing #2 (middle of borehole 3 & 4)		Remainder Portion of the Farm Zaaifontein 1074	S 28º 16' 17.8" E 29º 35' 29.9"	S 28º 16' 18.3" E 29º 35' 30"
23	Crossing #3 near borehole 4		Remainder Portion of the Farm Zaaifontein 1074	S 28º 16' 25.9" E 29º 35' 24.5"	S 28º 16' 25.3" E 29º 35' 24.4"

1.2 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 authorized by this licence.

1.3 The conditions of the authorization must be brought to the attention of all persons (employees, sub-consultants, contractors etc.) associated with the undertaking of these activities. The Licensee must take such measures that are necessary to bind such persons to the conditions of this licence.

1.4 A copy of the water use licence and reports set out under condition 1.2 of Appendix IV must be on site at all times

1.5 Suitably qualified person(s), appointed by the Licensee, and approved in writing by the Provincial Head, must be responsible for ensuring that the activities are undertaken in compliance with the specifications as set out in reports submitted to the Department or the Responsible Authority and the conditions of this licence

2. Further Studies and Information Requirements

2.1. An EMP and rehabilitation plan for the decommissioning of any of the water use activities listed in Table 1 must be submitted five (5) years before commencing with closure to the Provincial Head written approval.

2.2. For all the activities listed under condition 1.1, Table 6, 'as-built' plan(s) and engineering drawing (s) prepared by a registered professional engineer, must be submitted to the Provincial Head within three (3) months of completion of new activities, including existing parallel infrastructure, of the date of issuing of this licence. These plans (s) and drawing (s) must indicate the watercourse (s) including wetland boundaries and layout and structure location (s) of all infrastructure impeding and/or diverting flow of watercourses as well as alterations to watercourse(s) on the properties.

2.3. A Storm Water Management Plan must be compiled and submitted to the Provincial Head for written approval before construction may commence.

2.4. The storm water management plan should be designed in a way that ensures that post-development run-off does not exceed pre-development values in:

2.4.1. Peak discharge for any given storm,
2.4.2. Total volume of run-off for any given storm,
2.4.3. Frequency of run-off volumes,
2.4.4. Pollutant and debris concentrations reaching watercourses, and
2.4.5. Increase in run-off due to a higher water table resulting from tree clearing practices

2.5. Raw water and sewer pipe line crossings have to be complied with, before any construction activities may commence:

2.5.1. The length of one solid pipe with no joints to span across the riparian area and/or 1:100 year flood line (whichever is the greatest) to avoid spillages into the watercourse.

2.5.2. The pipe will be equipped with non-return valves over the riparian area and/or 1:100 year flood line (whichever is the greatest) in relation to other sections of the adjoining pipeline to facilitate no return flow to the watercourse in the event of a spill.

3. Protective Measures

3.1. Storm Water Management

3.1.1. Storm water 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 (promoting limiting vegetation clearance at a time) 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 watercourse (s).

3.1.1.2. Storm water must be diverted from construction works, access roads and linear infrastructure and must be managed in such a manner as to disperse runoff and to prevent the concentration of storm water flow;

3.1.1.3. The velocity of storm water discharge must be attenuated and the banks of the watercourses protected;

3.1.1.4. Storm water leaving the Licensee's premises/servitude (s) must in no way be contaminated by any substance, whether such substance is a solid, liquid, vapor or gas or a combination thereof which is produced, used, stored, dumped or spilled on the premises;

3.1.1.5. Drainage next to the activity listed Table 6 must be diverted away from the watercourses (s) to ensure that any contaminated runoff does not flow directly into the watercourse (s) as a storm water discharge; and

3.1.1.6. Sheet runoff from, hardened and compacted surfaces and access roads must to be curtailed.

3.2. Structures, Construction Area 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 (or depth), width the length of structures must be limited to the minimum dimension necessary to accomplish the interned function.

3.2.3. Structures must not be damaged by floods exceeding's the magnitude of floods occurring on average once in every 100 years.

3.2.4. Structure must be non-erosive, structurally stable and must not induce any flooding or safety hazard.

3.2.5. Structures must be inspected regular 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 two (2) weeks after construction has been completed.

3.2.7. During construction, erosion berms should be installed for the entire life-of-project to prevent gully formation depending on the success of re-vegetation and rehabilitation, according to the slope (Table 7). The designs and placement of the berms must be done by a registered, professional, independent Civil Engineer and approved in writing by the Provincial Head before construction commences.

Table 7: Berm placement for erosion protection.

Track Slope	Berm Placement
<2%	Every 50 m
2% - 10%	Every 25 m
10% - 15%	Every 20 m
<15%	Every 10 m

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

3.2.11. Silt and sediment trap systems shall be established at both sides of each watercourse crossing to collect silt and sediment spilled from the construction activities. The licensee shall keep maintenance and cleaning register of all silt and sediment traps and make this part of the auditing process (condition 5). Recovered, non-polluted silt and sediment can be used in the rehabilitation process.

3.2.12. The length of the solid raw water and sewer pipe, where applicable, must have no joints across the riparian area and/or 1:100 year flood line (whichever is the greatest) to avoid a pillages into the watercourses.

3.2.13. No structures are to be placed within the 1:100 year flood line and/or the delineated riparian areas unless authorized in this license.

3.2.14. The structure of access road, raw water and sewer pipe line crossing the watercourse(s) must be non-erosive, where applicable, structurally stable and may not induce any flooding (also sub-surface poor drainage). Accumulation of debris, blockage, erosion of abutments and overflow must be inspected regularly and damaged areas must be repaired immediately.

3.2.15. Once the installation of the any pipe has been completed, all construction material e.g excess plastic will be removed, and the banks of the stream in the position of the pipe trench will be stabilized and rehabilitated. The same applies to rehabilitation of insitu wetland soils that must be supervised by a registered, independent, qualified, professional wetland specialist. Reporting as per condition 4.7.

3.2.16. All pipe lines must be constructed in such a way so as to allow any spills from the pipeline to be quickly observed and repaired.

3.2.17. Both raw water and sewer pipe lines should be regularly monitored and maintained (properly logged and records kept for audit purposes) to ensure that any problems with the pipe line are rectified before it can impact any watercourse and to enforce water resource management.

3.2.18. All pipe lines crossing watercourses (underground and surface crossings) shall be equipped with calibrated flow and pressure meter and other leak detectors that respond

to a central control room, which is manned 24 hours of the day. The Licensee must have in place a procedure that addresses understanding of the flow, pressure and leak detector readings, emergency response, notifications, training, spill cleanup and record keeping for audit purposes.

3.2.19. Any access roads or pipe line crossings must be:
3.2.19.1. Non-polluting with respect to silt and littler that can be deposited into a watercourse;
3.2.19.2 Watercourse crossings to facilitate the movement of aquatic and non-aquatic organisms and fauna; and
3.2.19.3 Watercourse crossings to facilitate the pre-construction movement of water (surface and sub-surface) through the landscape.

3.3 Water Quality

3.3.1. The Licensee shall sample the water quality monthly (operation) for the variables mentioned in Table 8 at monitoring points both upstream and downstream of the activities and report to the Responsible Authority within thirty (30) days after the results of each sampling event is received:

Table 8: Water quality parameters relevant for sampling.

Variable	**Limit**
Flow (us)	**Not applicable**
Temperature (°C)	<10% variation
pH	7.7 – 8.7
Electrical conductivity (EC) (mS/m)	<12.0
Suspended solids (SS) (mg/ë)	<20
Dissolved oxygen (mg/e")	<8.0
Turbidity (NTU)	<0
Alkalinity (mg $CaCO^3$/è)	<40
Aluminum (Al) (mg/ è)	<0.265
PO4 (mg/ è)	<0.5
NO^3/NO^2(as N) (mg/ è)	<6
*BTEX, TPH (mg/ è)	<0.1

The variables may be amended on discretion of the Responsible Authority.
Only an accredited (SANS 17025) laboratory to be used for analysis.
** Sample this parameter only during the construction phase.*

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

3.3.3. Monitoring must be undertaken as set out in section 5 of Appendix IV.

3.3.4. Activities that lead to elevated levels of turbidity of any watercourse (s) must be prevented, reduced or otherwise remediated. Activities must be scheduled to take place during the 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 written approval before these activities commence. Natural in stream hydrology is to be used to determine which months constitute the low flow months.

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

3.3.6 A qualified person must be appointed to assess the quality of water both upstream and downstream of the activities prior to commencement of construction.

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

3.3.8 Vehicles and other machinery must be serviced well outside the 1:100 year flood line or delineated riparian habitat, whichever is the greatest. Oils and other potential pollutants must be disposed of at an appropriate authorized site, with the necessary agreement from the owner of such a site.

3.3.9 Any hazardous substances must be handled according to the relevant legislation relating to transport, storage and use of the substance and all storage facilities must be equipped with large, clearly readable material safety data sheets (MSDs).

3.3.10 All reagent storage tanks and reaction units must be supplied with a bunded area built to cater for at least 110% of the capacity of the facility and provided with sumps and pumps 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.

3.3.11 No ammonium nitrate dry explosives will be used that have a negative or polluting impact on water quality of a watercourse. The Licensee must to analyze water samples for NH^3 (0.1 mg/l), NH4 (1.0 mg/l) and NO^3 (0.4 mg/l as N) in the case where blasting operations are required (and record these for auditing purposes), where the limits are indicated in brackets. Reporting is part of condition 3.3.1.

3.3.12 The Licensee shall actively participate in any Catchment Management Agency's related activity.

3.4 Flow

3.4.1 The Licensee must determine flood lines (1:50 and 1:100 year) prior to construction to ensure risks are adequately managed. Flood lines must be clearly indicated on the site plan(s) and drawing along with all wetland boundaries.

3.4.2 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 authorized attenuation volumes.

3.4.3 Appropriate design and mitigation measure must be developed to minimize impacts on the natural flow regime of the watercourse i.e. through placement of structures. Supports and to minimize turbulent flow in the watercourse.

3.4.4 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.

3.4.5 The development must not impede natural drainage lines unless authorized by this licence.

3.4.6 Place infrastructure (pipe lines) 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 a watercourse is permanent, the pipe line trench must be staged across part of the channel to maintain flows, where applicable flows must not be stopped.

3.4.9 All rock and rubble must be removed from the watercourse once construction has been completed. Any rock placed in the watercourse to enhance the dissolved oxygen content of the water must adhere to the same criteria, namely only smooth rock surfaces to be placed within the watercourse.

3.4.10 Trench breakers must be installed along the pipe line trench/horizontal drilling opening. A material with low hydrological conductivity in the form of trench breakers shall be packed around the pipe and shall be installed at regular intervals to prevent the pipe line behaving as a conduit and to intercept any concentrated flow down the pipe line route. Spacing between trench breakers shall vary depending on the slope of the landscape – the steeper the slope the smaller the distance between trench breakers. Spacing should be such that flows backing up behind one trench breaker extend back to the base of the previous trench breaker.

3.4.11 Transfer rates must be managed in sympathy with natural flow conditions to limit rapid fluctuations of water levels and to recorded continuously at various flow meters and gauging stations. The effectiveness of this condition must be evaluated when practicing condition 5.2 of Appendix IV.

3.4.12 Manage the rate and timing of transfers in harmony with the natural flow regime of the receiving rivers, using the results from the gauging stations so that the impacts of the transfers on naturally high or low rates in the rivers are not exacerbated. The effectiveness of this condition must be evaluated when practicing condition 5.2 of Appendix IV.

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 authorized in this license.

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, where possible.

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 maintain 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 minimize noise and mechanical vibrations in the vicinity of the watercourses. Noise levels (noise resulting from the construction activities) to be below 35dB from 18:00 – 06:00 daily within watercourse areas.

3.5.12 The necessary erosion prevention mechanisms must be employed to ensure the sustainability of all structures and activities and to prevent instream sedimentation.

3.5.13 Soils that have become compacted through the water use activity must be loosened to an appropriate depth to allow seed germination.

3.5.14 Slope/bank stabilization measures must be implemented with a 1:3 ratio of flatter and vegetated with indigenous vegetation immediately after the shaping.

3.5.15 Stockpiling of removed soil and sand must be outside 1:100 flood line or delineated riparian habitat, whichever is the 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 that leads to compaction of soils and vegetation must 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 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 should be promoted within the proposed development areas in order to protect soil and to reduce the percentage of the surface area which is paved, hardened and/or compacted.

3.5.19 Run-off from paved, hardened and/or compacted surfaces should be slowed down by the strategic placement of berms.

3.5.20 For horizontal drilling, the Licensee shall:

3.5.20.1 Ensure depth is sufficient to avoid cave-ins and minimize risk of bed collapse and fact-outs during boring.

3.5.20.2 Ensure depth does not result in exposure of assists if channel experience bed and bank degradation.

3.5.20.3 Bore entry and exit locations must be located outside the following designated areas: at least 40m away from the edge of any watercourse (1:100-year flood line/riparian habitat/ boundary of a wetland)

3.5.21 For trenching, the Licensee shall:

3.5.21.1. The direction and alignment of the pipe line must be perpendicular to the direction of the slope of flow across a watercourse. Where this is not feasible, appropriate measures to reduce the risk of preferential flow path development and associated erosion must be put in place.

3.5.21.2. A construction servitude not exceeding 5m in width shall be maintained at all times when working within the 1:100 year flood line, riparian habitat and the delineated areas of a wetland (permanent, seasonal and temporary zones) and a 40m buffer zone outside these indicated areas. This zone to be demarcated on site and strictly monitored and recorded.

3.5.21.3 Lay pipes and cables across the watercourse on the downstream side of channel bedrock outcrops.

3.5.21.4 Avoid outside bends, choose a straight section of the watercourse to cross.

3.5.21.5 Avoid concrete caps and casings at shallow depths which must become exposed by bed lowering.

3.5.21.6 Trench must be open for minimal length of time

3.5.21.7 Additional disturbances from temporary coffer dams or diverting flows around the work site, vehicle and machinery accessing and crossings, arterial stockpile, etc. must be minimized.

3.5.21.8 Adequate bank stabilization measures must be implemented. Only riparian vegetation in the immediate Path of the pipe line shall be removed.

3.5.21.9 Areas in and around river crossing should not be cleaned, graded and trenched more than a week before pipe laying. Backfilling must be implemented immediately after pipe laying and must restore the channel shape and bed level to pre-construction condition.

3.5.21.10 Adequate measures must be implemented to prevent instream siltation during the construction phase.

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 microorganism 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 indigenous seed mix in consultation with indigenous plant expert, ensuing 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 Topsoil must be stripped and redistributed.

4.5 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.

4.6 The Provincial Head must sign a release form indicating that rehabilitation was done satisfactory according to specification as per this license.

4.7 A photographic record must be kept as follows and submitted with reports as set out in condition 5 Appendix IV:

4.7.1 Dated photographs of all the sites to be impacted before construction commences;
4.7.2 Dated photographs of all the sites during construction on a monthly basis; and
4.7.3 Dated photographs of all the sites after completion of construction, seasonally

4.8 Rehabilitation structures must be inspected regularly for the accumulation of debris, blockages instabilities and erosion with concomitant remedial and maintenance actions.

4.9 The original contours must be established over the pipe line. After the backfill has subsided, the contour must follow the surrounding contours to stop irregular flows or blockage of biotic movement.

4.10 A wetland Management and Rehabilitation Plan must be compiled by a wetland specialist when wetlands are affected and submitted to the Provincial Head for written approval

4.11 Wetland crossing(s) must be inspected by a wetland specialist prior to construction to determine baseline conditions. This should be repeated during and after rehabilitation measures have been implemented to assess the success of rehabilitation and erosion control measures. Reporting on these conditions is part of condition 4.6 of Appendix IV.

5. Monitoring and Reporting

5.1 The Responsible Authority must be notified in writing one week prior to commencement of the licensed activities and again upon completion of the activities.

5.2 A comprehensive and appropriate environmental assessment and monitoring programme (including bio-monitoring with inclusion of fish species composition and changes) to determine the impact, change, deterioration and improvement of the aquatic associated with the activities listed under condition 1.1 as well as compliance to these water use license conditions must be developed and submitted to the Provincial Head for written approval before commencement and must subsequently be implemented as directed.

5.3 Six (6) monthly monitoring reports must be submitted to the Responsible Authority until otherwise agree in writing with the Provincial Head.

5.4 A suitable qualified and responsible person must be retained by the Licensee who must give effect to the various conditions and to ensure compliance thereof pertaining to all activities impeding and/or diverting flow of watercourses as well as alterations to watercourses on the propert(ies) as set out in condition 1.1.

5.5 Internal and external audit shall be undertaken as set out in condition 11 and 12 of Appendix I of this licence.

5.6 The audit reports must include but are not limited to:

5.6.1 Reporting in respect of the monitoring programme referred to in condition 5.2 and all other reporting and compliance conditions outlined in this licence;
5.6.2 A record of implementation of all mitigation measures including a record of corrective actions; and
5.6.3 Compensation measures for damage where mitigation measures have failed to adequately protect the in-stream and riparian habitat or any other characteristic of the watercourse

5.7 The Licensee must apply in writing to the Provincial Head for alternative reporting arrangements for which written approval must be provided.

6. Other Water Users

6.1 The Licensee must prevent adverse effect on other water users. All complaints must be investigated by a suitably 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 shall be dealt with in accordance with Section 19 and 20 of 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 Responsible Authority.

7.4 The Licensee shall keep all record relating to the compliance or non-compliance with the conditions of this licence in good order. Such records shall be made available to the Responsible Authority within 14 (fourteen) days of receipt of a written request by the Department for such records.

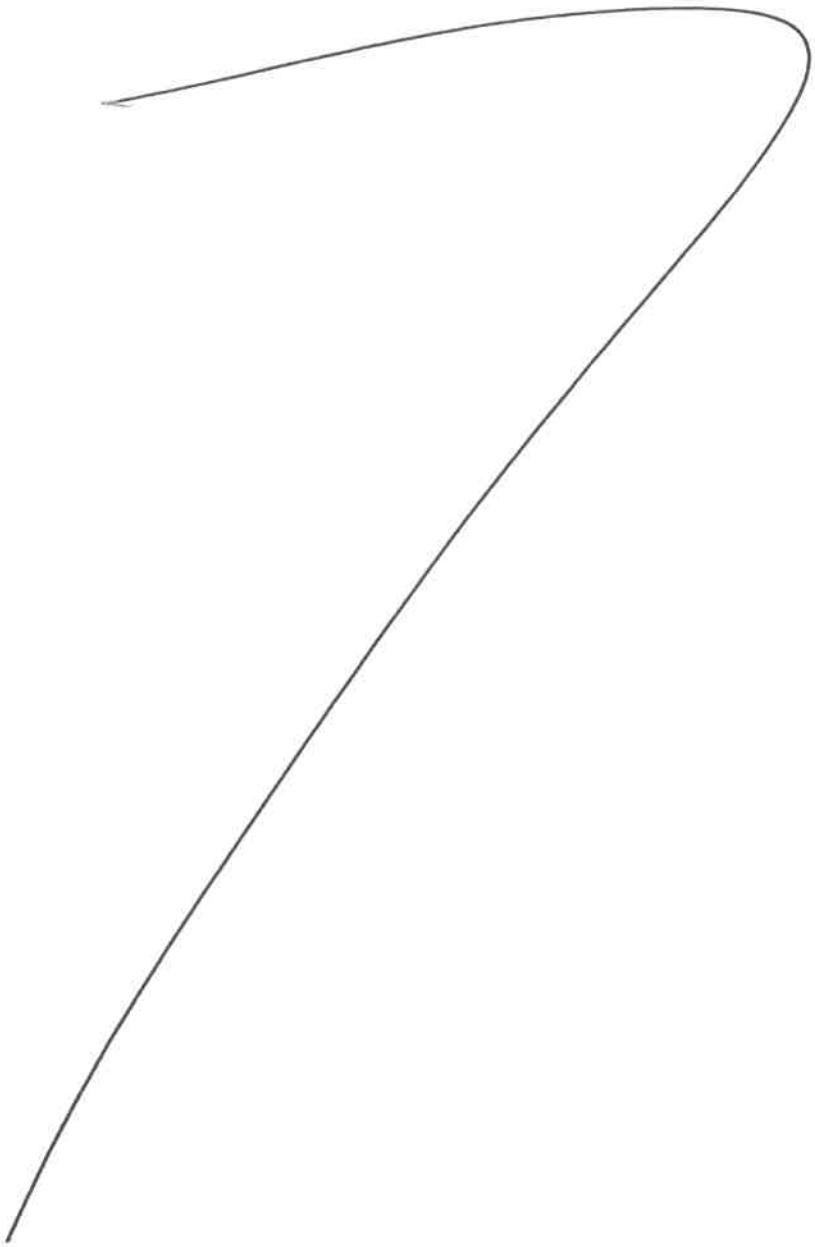
7.5 The Licensee shall keep an incident report and complaints register, which must be available to any external auditors and the Department.

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, maintenance and liabilities associated with the rehabilitation programmes as set out in this license.

8.2 The Department may at any stage of the process request proof of budgetary provisions for rehabilitation and closure of the activity/project.

8.3 The Licensee is fully responsible and accountable for any negative impacts on the watercourse(s) and the modeling, monitoring and mitigation thereof; until such time that no negative impacts are experienced and/or foreseen.



APPENDIX V

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 Waste Water to be Discharged

1.1 The licensee is authorized to discharge treated waste water from the main waste water treatment (Permanent structure) in terms of water use activities detailed in table 9

Table 9: Authorised Water use activities

Purpose	Properties	Maximum waste water be discharged (m^3/a)	Coordinates discharge point
Discharge to Klip River Tributary	Remainder Portion Farm Zaaifontein 1074	73 000	E 29° 35' 27.1 S 28° 17' 20.6"

1.2 The quantity of treated waste water authorized to be discharges in terms of this license and must not be exceeded

2. Quality of Waste Water to be Discharged

2.1 The quality of waste water discharged into the Klip River Tributary shall not exceed the following limits as stipulated on table 10

Table 10: Authorised Water use activities

Variables	**Klip River**
pH	5.5 -9.5
Electrical conductivity (mS/m)	70mS/m above intake to a maximum of mS/m
Nitrate as (N) (mg/l)	15mg/l
Ammonia as (N) (mg/l)	5.0mg/l
Chemical demand Oxygen(COD) (mg/l)	75mg/l after removal of algae
Faecal coliform units (cfu)	1000 cfu per 100ml
Orthophosphate (mg/l)	10mg/l
Suspended Solids (mg/l)	25mg/l
Chlorine as Free Chlorine (mg/l)	0.25mg/l

2.2 The Licensee must establish an integrated monitoring programme to monitor the impact of storm water discharges and incidental discharges including waste water and other spillages and unauthorized discharge within the Licensee's area of jurisdiction in terms of the limits in table 10.The integrated monitoring programme must be submitted to the Department for approval within six months after issuance of licence.

3. Monitoring

3.1 Quantity monitoring

3.1.1 The quantity of effluent discharged into the Klip River Tributary shall be metred and recorded daily

3.1.2 The quantity of waste water disposed of each month shall be calculated and recorded

3.1.3 Monitoring of the quantity of waste water shall be done at the point where waste water is discharged into the Klip River Tributary

3.2 Quality Monitoring

3.2.1. Monitoring points for quality shall be at the outlet point of the Waste water Treatment Works (WWTWs) (Table 9 Appendix V) where the wastewater is discharge into the Klip River Tributary; and

3.2.2 In the Klip River Tributary at points upstream and downstream of the discharge point at monitoring points identified in consultation with the Provincial Head and approved by the Provincial Head.

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

3.2.4 Monitoring points shall not be changed prior to notification to and written approval by the Provincial Head.

3.2.5 The samples taken at the WWTWs, at the Klip River upstream and downstream of the WWTWs shall be analyzed for the variables at the frequencies in Table 11.

Table 11: Monitoring Frequency

Variable	Frequency
Ph	Monthly
Electrical Conductivity (EC) (mS/m)	Monthly
Chemical oxygen demand (COD) (mg/e)	Monthly
Faecal Coliforms/E. Coli (CFU/100 ME)	Monthly
Ammonia (ionized and un-ionised) as Nitrogen (NH^3 as N) (mg/e)	Monthly
Nitrate/Nitrite as Nitrogen (NO^3/NO^2 as N) (mg/e)	Monthly
Ortho-Phosphate as Phosphorous (PO4 as P) (mg/e	Monthly
Suspended Solids (mg/l)	Monthly
Chlorine as free Chlorine (mg/l)	Monthly

3.2.6 The Licensee shall submit the results of analysis for the monitoring requirements to the Provincial Head on a monthly basis under Reference number 27/2/1/V112/4/5/2.

3.3 Bio-Monitoring

3.3.1 The Licensee shall conduct do bio-monitoring on an annual basis at the monitoring site shown in table 12 to determine the impact, change, deterioration and improvement of the aquatic system associated with the activities in 1.1 of Appendix IV; and to qualify and quantify the impact on biological system in the water environment in the area directly affected by WWTWs and Settlement Pond activities as well as downstream from these activities.

Table 12: Bio-monitoring points

Monitoring site	Description	Coordinates	
A2-STWB	Upstream Ngogo (background site)	S 28.278866	E 29.592700
A2 STWU	Midstream NGOGO	S 28.287257	E 29.592155
A2 STWD	Downstream NGOGO	S 28.293922	E 29.603011
A1 STWU	Upstream	S 28.276000	E 29.561000
A1 STWD	Downstream	S 28.286500	E 29.565500
Wilge-down	Downstream	S 28.231021	E 29.533674
Site 5	Downstream Braamhoekspruit	S 28.336191	E 29.591200
Site 4	Upstream Braamhoekspruit	S 28.29120	E 29.55934
Site 7	Bedford Source	S 28.22758	E 29.61696
Site 1	The Neck	S 28.23275	E 29.58010
Site 2	Rail Corner	S 28.21922	E 29.57466
Site 3	Dlamini's Drift	S 28.22576	E 29.55115

3.3.2 A report on 3.3.1 together with aquatic macro-invertebrates and habitat integrity shall be submitted to the Provincial Head on an annual basis. Aquatic macro-invertebrates must be sampled using the latest SASS (South African Scoring System) method. Habitat integrity must be assessed using the Rapid Bio assessment Analysis (C.J.Kleynhans 1999) method described by the Department (SASS 2002).

4. Method of Analysis

4.1. Analysis shall 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).

4.2. Any laboratory used for monitoring or analytical work must take steps to ensure method validation e.g. participate in inter-laboratory testing.

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

5. Sludge Management

5.1. Wastewater sludge from drying beds and other solids waste, for instance grit and screenings shall be handled, stored, transported, utilized or disposed of in such manner as not to cause any dour, flies, health hazard, secondary pollution or other nuisance.

5.2 Sludge emanating from the treatment process must be quantified, analyzed, dealt with according to the requirements of chapter 5 of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) and the Guideline for the Utilization and Disposal of Wastewater Sludge (volume 1-5), dated March 2006 and any updates thereafter, to the satisfaction of the Provincial Head.

5.3 Any wastewater sludge or any other solids waste may be alienated for utilization or disposal thereof, only in terms of written agreement and provided that the responsibility for complying with the requirements contained in this licence is accepted by Licensee and such other party jointly and separately.

5.4 The Contractor shall collect all wastewater & sludge, subject to wastewater treatment & discharge the effluent provided it meets the DWA special Standard at the upper site or the DWA General Standard at the lower site.

6. Storm Water Management

6.1 Storm water leaving the Licensee's premises shall in no way be contaminated by any substantive, whether such substance is a solid, liquid, Vapor or gas of a combination thereof which is produced, used, stored dumped or spilled on the premises.

6.2 Increased runoff due to vegetation clearance and 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 streams.

6.3 The Licensee shall ensure that no storm water will ingress into the wastewater system and that no wastewater ingress into the storm water system.

6.4 Wastewater impoundments must be designed, constructed and managed to ensure that there is sufficient capacity the 1:50 year flood event, with a minimum of 0.5 m freeboard. Freeboard will be defined as the difference between the water level and the crest of the overflow.

6.5 Waste water systems must be properly maintained on a continuous basis.

6.6 Storm water shall be diverted from the impoundments and roads and shall be managed in such a manner as to disperse runoff to prevent the concentration of the storm water flow.

6.7 Cut-off drains shall be provided around the WWTWs to prevent storm-water ingress into the surrounding of the works. These drains shall be designed to contain the maximum runoff, which could be expected over a period of 24 hours with a frequency of once in every 20 years.

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

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

7. **Construction, Operation and Maintenance of the Wastewater Treatment Works.**

7.1 The Licensee must carry out and complete all activities, including the decommissioning of Bio filters, construction of Activated Sludge and the final plans must be approved by the Provincial Head.

7.2 The construction of the WWTWs must be carried out under the supervision of a professional Civil Engineer in terms of the Engineering Profession of South African Act, 1990 (Act 114 of 1990), as approved by the designer.

7.3 Within 30 days after the completion of the activities referred here in accordance with the relevant provisions of this Licensee must in writing, under reference: 27/2/1/V112/4/5/2 informs the Provincial Head thereof. This must be accompanied by a signature of approval from the design plans referred to in the report.

7.4 The Licensee must ensure that the disposal of the effluent, the operation and maintenance of the system are done according to the provisions in the report.

7.5 The WWTWs must be supervised and controlled by suitably qualified and experienced employees of the Licensee who shall have under his/her control adequate number of operators who have been classified in terms of Regulation 2834 dated 27 December 1985 or any update thereafter and in terms of section 26 of the Act, to ensure proper functioning of the works and processes at all times.

7.6 The Licensee shall ensure that suitably qualified and experienced mechanical and electrical artisans shall be available to be called in for inspection and maintenance of the work.

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

8. Pipelines

8.1 The pipelines used for the conveyance of effluent shall be painted in a conspicuous color 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 water containing waste 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 unauthorized use thereof.

8.3 Pollution caused by spills from the conveyances must be prevented through proper maintenance and effective measures.

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

9. Malfunctions

9.1 Accurate and up-to-date records shall be kept of all system malfunctions resulting in non-compliance with the requirements of this licence. The records shall be available for inspection by the Provincial Head upon request.

9.2 Such malfunctions shall be tabulated under the following headings with a full explanation of all the contributory circumstances:

9.2.1. Operating errors;
9.2.2. Mechanical failures (including design, installation or maintenance)
9.2.3. Environmental factors (e.g. Flood)
9.2.4. Loss of supply services (e.g. power failure); and
9.2.5 Other cause.

9.3 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 and environmental pollution, health risks or which is a contravention of the license conditions.

9.4 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:

9.4.1 Correct the impacts resulting from the incident;
9.4.2 Prevent the incident from causing any further impacts; and
9.4.3 Prevent a recurrence of a similar incident.

10. Contingency Plans and Incident Reporting

10.1 The Licensee must develop and implement and Emergency and Contingency plan.

10.2 The Licensee must implement and promote an environmental call and reporting center where the following can be reported:

10.2.1 Illegal disposal of waste and/or littering:
10.2.2 Broken ruptured or leaking pipelines wasting potable water;
10.2.3 Open or leaking taps on the property of the Licensee;
10.2.4 Open manholes;
10.2.5 Leaking or broken sewerage lines and pipes;
10.2.6 Overflowing manholes and pump stations;
10.2.7 Possible offenders of any environmental regulations, by-laws and/or ordinances; and
10.2.8 Any other aspect that might hamper the effective management of the water resources.

10.3 The Licensee must compile an environmental call and reporting center protocol, that must be included in the plan, and which will investigate every complaint within 24 hours of its being reported;

10.4 The Licensee must rectify all valid issues reported within 7 days of the issue being reported to the Licensee. All incidents shall be recorded in an incident register which will include reasons for non-rectification of issues raised

10.5 Statistical summary of malfunctions and incidents shall be included in the Annual Report.

11. Access Control, Fencing and Notices

11.1 The sites of the WWTWs shall be adequately fenced to prevent entry of animals and unauthorized persons.

11.2 Strict access procedures must be followed in order to gain access to WWTWs property. Access must be limited to authorized employees of the Licensee and their Contractors only.

11.3 Notices manufactured of durable weatherproof material prohibiting unauthorized entry and warning against the use of the water containing waste for drinking and washing purpose shall be displayed at prominent places along all fences and at entrance gates. Such notices shall be worded in the official languages applicable in the area.

12. Reporting

12.1 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 resources and must furthermore co-operate other water users in the catchment to determine the mass balance for the water resources reserve compliance point.

12.2 The Licensee shall submit the results of analysis for the monitoring requirements under conditions 3 appendix V to the Provincial Head on a monthly basis under Reference number. 27/2/1/V112/4/5/2

13. Integrated Water and Waste Management

13.1 The Licensee must submit integrated water and waste Management plan (IWWMP), which must together with the 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 license.

13.2 The IWWMP and RSIP shall thereafter be updated and submitted to the Provincial Head for approval, annually.

13.3 The Licensee must, at least 180 days prior to the intended closure of any facility, 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.

APPENDIX VI

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

1. Disposing of Water Containing Waste

1.1 The licensee is authorized to dispose waste water containing waste from the WWTW'S as stipulated on table 13

Table 13: Authorised water use Activities (Storage of Waste Water Use from Sewage Treatment Works)

Purpose	Properties	Total Water (m^3/a)	Capacity (m^3)	Area of Facility (ha)	Coordinates
Discharge to land based facility Sewage Treatment Works Lower Works 3	Portion 3 of Braamhoek farm no, 1220	10 950	30	1	S 28° 17' 19.8" E 29° 35' 26.4"
Discharge to land based facility Sewage Treatment Works Main Works 2 (Permanent)	Remainder Portion Farm Zaaifontein Treatment 1074 (Main Works 2 STW) Permanent Structure	73 000	200	1	E 29° 35' 26.411 S 28° 17' 19.8"

3. Groundwater Monitoring

3.1The Licensee shall conduct ground water monitoring on a quarterly basis for the variables shown in Table 14 at the monitoring points shown in Table 15 and the results must be submitted to the Provincial Head on an annual basis.

Table 14: Groundwater monitoring variables and frequency

Groundwater Variables	Frequency
Electrical Conductivity (mS/m)	Quarterly
Sodium (mg/l)	Quarterly
Magnesium (mg/l)	Quarterly
Calcium (mg/l)	Quarterly
Chloride (mg/l)	Quarterly
Sulphate (mg/l)	Quarterly
Nitrate (mg/l)	Quarterly
Fluoride (mg/l)	Quarterly
Iron mg/l)	Quarterly
pH	Quarterly

Table 15: Details of monitoring borehole

Borehole	Co-ordinates
WSP MW - 1	28°18'24.4"S 29°34'16.8"E
WSP MW - 2	28°18'36.8"S 29°34'11.6"E
WSP MW - 3	28°17'38.O"S 29°36'19.1"E
WSP MW - 4	28°17'13.3"S 29°35'16.7"E
WSP MW - 5	28°17'08.7"S 29°35'36.5"E
WSP MW - 6	28°17'08.6"S 29°35'05.9"E
WSP MW - 7	28°16'54.5"S 29°35'06.9"E

3.2 Monitoring network shall be set up as an early warning system to detect any polluted seepage that might occur from the wastewater system.

3.3 If ground water pollution has occurred or may possibly occur, the licensee must conduct necessary investigations and implement additional monitoring and rehabilitation measures which must be to the satisfaction of the Provincial Head.

3.4 Monitoring boreholes shall be clearly marked and numbered, and must be equipped with lockable caps. The Department reserves the right to sample monitoring boreholes at any time and to analyses these samples, or to have samples taken and analysed.

4. Water Resource Protection

4.1 The impacts of the activities of Ingula Pumped Storage Scheme on ground water must not exceed the ground water quality reserve for the area detailed in Table 16.

Table 16: Ground Water Quality Reserve

Parameter	Ground Water Quality Reserve
Electrical Conductivity (mS/m)	< 150
Sodium (mg/l)	<200
Magnesium (mg/l)	<100
Calcium (mg/l)	<150
Chloride (mg/l)	<200
Sulphate (mg/l)	<400
Nitrate (mg/l)	<10
Fluoride (mg/l)	<1.0
pH	5.0-9.5

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. Quantity of Underground Water to be Removed

1.1 As part of the operational process to move water between Bedford and Braamhoek Dam to generate electricity, various sources of leakage is collected. The Licensee is authorized to remove water found underground as stipulated in Table 17.

Table 17: Authorized water use activities (Removal of underground water)

Purpose	Properties	Total Water (m^3/a)	Coordinates
Removing water found underground due to operational activities for electricity generation	Remainder portion of farm Zaaifontein 1074 (tunnels)	441 504	E 029°35'11.7" S 28°16'55.5"

1.2 The quantity of the water authorized to be removed in terms of the licence may not be exceeded without prior authorization by the Responsible authority.

2. Monitoring

2.1 Quality Monitoring

2.1.1 The quality of the water removed underground shall be monitored for the variable at the frequency at show in Table 18 the results must be submitted to the Provincial Head on an annual basis.

Table 18: Monitoring water removed underground

Variable	Frequency
Electrical Conductivity (mS/m)	Monthly
Sodium (mg/l)	Monthly
Total Dissolved Solids (TDS) mg/l	Monthly
Calcium (mg/l)	Monthly
Magnesium (Mg) mg/l	Monthly
Chloride (mg/l)	Monthly
Sulphate (mg/l)	Monthly
Nitrate (mg/l)	Monthly
Fluoride (mg/l)	Monthly
Iron mg/l)	Monthly

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

2.1.3 The water collected from operational processes for electricity generation including groundwater (seepage) must be treated at a treatment plant for oil removal prior to entering the operational water storage facility.

2.2 Quantity Monitoring

2.2.1 The quantity of water removed from underground must be metered, calculated and recorded on a daily basis.

3. Method of analysis

3.1 Analysis shall be carried out in accordance with methods as prescribed in condition 4 of appendix V.

4. Malfunctions

4.1 The Regional Director must be informed of any incident that may lead to underground water being disposed of contrary to the provisions of this license by submitting a report containing the following information:

4.1.1 Nature of the incident (e.g. operating malfunction, mechanical failures, environmental factors, loss of water services, etc)

4.1.2 Actions taken to rectify the situation and to prevent pollution or any other damage to the environment.

4.1.3 Measures to be taken to prevent re-occurrence of any similar incident.

5. Precautionary measures

5.1 The Licensee shall follow acceptable maintenance and operational practices to ensure the consistent, effective and safe performance of underground water removal system.

5.2 Reasonable measure must be taken to provide for mechanical, electrical or operational failures and malfunctions of underground water removal system

[END OF LICENCE]