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WATER USE AUTHORISATION: SECTION 27 MOTIVATION

LAFARGE TSWANA QUARRY MINE, NEAR BODIBE, DITSOBOTLA LOCAL MUNICIPALITY, NORTH WEST PROVINCE

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MOTIVATION IN TERMS OF SECTION 27(1) OF THE NATIONAL WATER ACT, 1998

S27 (a) Existing Lawful Water Uses

An existing lawful water use licence refers to the use of water which has taken place anytime during a period of two years before the establishment of the National Water Act. Lafarge Industries Ltd has been operating for over 60 years. No existing lawful water uses exist for the quarry, however the following activities have been operational and are being applied for through a Water Use License Application:

- Section 21 (a) of Act - Taking water from a water resource (one borehole to the west of the quarry).
- Section 21 (b) of Act – Storing water (Water stored in sump for dust suppression).
- Section 21 (j) of 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 (Dewatering operation located at Quarry Dam 1).
- Section 21 (f) of Act - Discharging waste or water containing waste in a water resource through a pipe, canal, sewer, sea outfall or other conduit (the discharging of stormwater to the Polfontein Spruit River).
- Section 21 (g) of Act - Disposing of waste in a manner which may detrimentally impact on a water resource (Stormwater runoff from the crushing plant area to Quarry Dam 2, stormwater runoff from workshops and administration buildings to Quarry Dam 1, limestone stockpiles).
- Section 21 (i) of Act – Altering the bed, banks, course or characteristics of a watercourse (Vehicle tracks, rail and road crossings through wetlands/Polfontein Spruit).

Additionally, there are seven licensed water users downstream of the Tswana Quarry. Details of the water users according to the 2022 DWS Water Authorisation and Registration Management System (WARMS) can be found in the table below (Extracted from JG Afrika Hydrology Impact Assessment, 2022). Currently no water is extracted by the quarry from the Polfontein Spruit River, which feeds into the Molopo River downstream. Therefore, downstream existing water users will not be negatively affected by the authorisation of the water uses mentioned above for the Tswana Quarry.

Registration/ Water Use No.	Sector	Volume m3/year	Source	Quaternary	Location
26020341/3	Water Supply Service	62	Molatedi Dam	D41A	-25.8561 S ; 25.50842 E
26020341/4	Water Supply Service	0.8	Pella Dam	D41A	-25.8561 S ; 25.5084 E
26020341/5	Water Supply Service	2	Madikwe Dam	D41A	-25.8807 S ; 25.5113 E
26033621/3	Water Supply Service	3650000	Scheme	D41A	-25.8572 S ; 25.5089 E
26038234/2	Industry (Non-Urban)	3326	Molopo River	D41A	-25.8864 S ; 25.5817 E
26048937/2	Mining	300	Molopo River	D41A	-25.9365 S ; 25.5969 E
26057310/5	Industry (Urban)	5300000	Scheme	D41A	-25.8572 S ; 25.5089 E

S27 (b) The need to redress the results of past racial and gender discrimination

Lafarge recognises the need to redress the imbalances of the past and regards Black Economic Empowerment (BEE) to be one of the supporting pillars of the Transformation Process in South Africa. Lafarge draws on Corporate Centre for its human resource management and development strategies and planning which supports employment equity. Employment opportunities are directed towards local people, upholding the affirmative action, equal employment policies of the company. The following plans

are implemented at Lafarge to assist in the implementation of Mining Charter objectives to redress imbalances of the past:

Training:

All employees, especially designated group members, are encouraged to participate in voluntary programmes that increase their skills or knowledge. Selection of candidates for Company training programmes is made solely on the basis of performance, development and potential without regard to race, creed, colour, sex, national origin, age or disability or any of the other categories of discrimination described in the Employment Equity Act.

Development:

Departmental managers ensure that procedures are established to ensure the upward mobility and growth of all suitably qualified employees, with due emphasis being placed on the promotion of designated employees.

Promotions and transfers are carried out without regard to race, sex, colour, creed, age, national origin or disability or any other discriminatory category. Exceptions may occur that fall within the implementation of the Company's employment equity initiatives, after due consideration of the inherent requirements for the position.

Compensation, benefits, use of facilities:

Each operating unit ensures that there is no unfair discrimination in matters of compensation and benefits for its employees. All Company facilities are continued to be maintained on a non-racially segregated and equal basis and with due regard to access and mobility for disabled employees.

Social and recreational activities:

All Company sponsored social and recreational activities are on a non-segregated basis. Management and supervisory personnel encourages all employees to participate in Company sponsored social and recreational activities to the fullest extent possible.

S27 (c) Efficient and Beneficial Use of Water in the Public Interest

One of the principles of the National Environmental Management Act (Act No. 107 of 1998 as amended) (NEMA) in section 2 (4) (o), states: "The environment is held in public trust for the people, the beneficial use of **environmental resources** must serve the public interest and the environment must be protected as the people's common heritage."

As a public trustee of the water resources, the Department of Water and Sanitation (DWS) must ensure that **water** is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all users.

Within the surrounding towns of the Tswana Quarry, groundwater is used extensively for municipal, domestic, industrial and agricultural practices. Water demands from groundwater sources are therefore highly stressed. Therefore, water is pumped only from one borehole located to the west of the Tswana Quarry Mine to two Jojo tanks, which are then distributed throughout site for various uses. The greatest volumes of water, besides for domestic use, are used for dust suppression, equating to 24 528m³/year. According to the Water Balance Specialist Report, water quantities pumped from the borehole were significantly higher than estimates. This was likely linked to community members puncturing the pipes leading to the Jojo tanks to provide drinking water for their livestock.

Prior to the development of the Quarry Dams, no wetlands, beside the Polfontein Spruit, were found in the area. The operation of the mine has therefore resulted in the creation of numerous artificial wetlands. Although these wetlands may change form over time with increased mining, the area will still experience a net gain of wetlands at the end of the mine life span. These wetlands (specifically Quarry Dam 1 and 2,) may offer a place of refugia for wildlife, particularly during dryer seasons when other wetlands have dried up. Other benefits arising from wetland areas include sediment trapping, nitrate assimilation, food for livestock, flood attenuation, erosion control and carbon storage.

Currently rainfall and runoff is captured within the open pit of the quarry, reducing the contributions to the Polfontein Spruit River, compared to natural flows. However, Lafarge is in the process of applying for a water use license to pump the water within the pit into the Polfontein Spruit. As long as water quality is of good standard, the released water will increase flows to the Polfontein Spruit. This will be highly beneficial to the seven licensed water users downstream of the quarry which abstract water from the river for water services, mining and industrial activities.

S27 (d) The Socio-economic Impact of (i) the Water Uses(s) if authorised; or, (ii) of the Failure to authorise the Water Uses

The authorisation of water uses for the Tswana Quarry Mine will provide the following socio-economic benefits:

- The North West Province is a growing market surpassing national trends in the cement industry and, as such, demand for Lafarge's products in the North West Province has already exceeded existing production capacity. The continued operation of the mine is therefore required to meet the growing product demand and ensure that provincial and national economic development is not hampered;
- Job retention - approximately 345 people are employed on a permanent basis in addition to temporary and contract employment;
- Local economic benefits are derived as a result of wage income and increased demand for goods;
- Training is provided to employees resulting in an improvement of the local skills base;
- Support is given to the local and national economy by the purchase of goods and services;
- Lafarge will achieve profits from the increase in the production of cement resulting in increased tax revenues for the government;
- Lafarge will continue to support projects that will benefit the local community leading to improved living conditions and improvement of skills;
- Support to local municipality in terms of road repairs, road construction, upgrading of youth centres, town clean-up, water supply etc;
- Support to schools in terms of adopt a school, fundraising campaigns, sport activities, giving books to learners, waste recycling projects;
- Support to small enterprises namely historically disadvantage communities, courier services, tent hiring, shirt printing, gardening services, maintenance contractors etc; and
- Initiation of historically disadvantaged community business forums.

If the water uses are not approved the continuation of the Tswana Quarry Mine and future expansion of the Lafarge cement production line will not occur. As such the socio-economic benefits outlined above

will not be achieved. Consequently, the South African economy will be negatively affected and the livelihood of communities will not improve as expected.

S27 (e) Catchment management strategy applicable to the relevant water resource

The Tswana Quarry Mine is situated in the Molopo River Catchment within the Quaternary Catchment D41A of the Crocodile West and Marico Catchment Management Area. The Polfontein Spruit flows alongside the northern boundary of the Tswana Quarry and flows into the Lotlhakane tributary which drains into the Molopo River. The Molopo River is located approximately 42 km downstream of the project site.

The Crocodile West and Marico Catchment Management Strategy highlight the importance of groundwater, through strategy 1.3, and suggest that the quality and quantity of this water resource be monitored (DWAF, 2004). Lafarge has upheld this policy through a Geohydrological Report for the Tswana Quarry Mine which has indicated recommendations for borehole use to reduce stress to groundwater supplies. The report highlighted that the study area is situated on a special aquifer system which is associated with boreholes with an average yield of between 0.8 and 1.5 l/s. It was noted that exceptionally high yielding boreholes are found in the area. Twelve boreholes were observed in the immediate vicinity of the study area, although the Tswana Quarry Mine only makes use of one borehole.

The following recommendations have been suggested:

- A geophysical survey should be completed to determine the best positions for drilling of monitoring boreholes.
- At least two monitoring boreholes must be drilled in the vicinity of the project site. Depending on the subsurface structures the area just northeast and southeast of the project site should be explored for the drilling of the monitoring boreholes.
- The monitoring boreholes should be yield tested in order to obtain the necessary aquifer parameters like transmissivity and hydraulic conductivity for input in the calibration of the numerical groundwater flow and transport model.
- A numerical groundwater flow and transport model must be compiled and calibrated in order to determine the potential risk for contamination of the aquifer.
- The monitoring boreholes should never be utilised for abstraction purposes.

S27 (f) The likely effect of the water use to be authorised on the water resource and on other water users

The possible impacts of the Tswana Quarry Mine relates to the pit wetlands on site (referred to as W1, W2 in the Wetland Specialist Report and Quarry Dam 1 and 2 in the Water Balance Report), and the Polfontein Spruit wetland which is found 100m outside the mine boundary.

The relevant impacts for the pit wetlands (Quarry Dam 1 and 2) include:

- The contamination of the wetlands through the spillage of hydrocarbons such as fuel and oils. Hydrocarbons are toxic and could lead to loss of aquatic biodiversity. This level of impact is one which should not happen if preventative measures such as drip trays are employed. During the site assessment, performed by JG Afrika, no signs of hydrocarbon contamination were noted in the Quarry Dam 1 and surrounding vegetation. Rather hydrocarbon contamination was found within the immediate vicinity of the contamination source (i.e. the diesel tank is bunded, there are oil separators to separate out hydrocarbons from water emanating from the service bay, the workshop area is roofed and any sources of hydrocarbons in this area are bunded). This highlights that the risk of contamination of the wetland is low.

- Future loss or change of wetlands as a result of mining activities. The loss of wetlands will result in a loss of aquatic biodiversity. It should be noted that over time, the depression wetlands might be replaced by pit wetlands which will be expected to have a longer persistence. This impact is unavoidable and is in the “Repair/Restore” level of the hierarchy.
- Abstraction of water for uses in the mine such as dust suppression. Water abstraction will result in a lowered water surface and loss of wetland space and habitat. This is a minor impact which is only likely to become an issue during periods of exceptionally low rainfall.
- Seepage from the wetlands (which may contain stormwater runoff contaminants) may contaminate the groundwater resources. The recommendations and conclusion of the geohydrological specialist report should be kept in mind in terms of monitoring.

The relevant impacts on the Polfontein Spruit include:

- Close proximity of the mine edge to the wetland edge. The mining right area lies well within the 500 m radius around the Polfontein Spruit channel, and at a few points, is within 100 m of the delineated edge of the system. Observations both on the ground as well as in figure 16 (according to the wetland report), indicate that the floor of the pit is at an elevation of approximately 1.5 m lower than the water surface in the Polfontein Spruit. It is therefore theoretically possible that the mine is creating a cone of depression in the water table which would be affecting the channel. The Polfontein Spruit could therefore be deprived of some water. There is, however, presently no discernible impact in the intervening area or on the two sides of the channel.
- Increased mining could result in an increase in exposed soil surfaces which may lead to greater erosion rates. These eroded soils may wash off into the wetlands increasing turbidity.
- The ongoing excavation of pits in the wetland to either provide open water or to extract material for block making. The degradation would have reduced wetland condition and functionality.
- Spillage of domestic sewage into downstream environments.
- Disturbance of the wetland in the lower area as a result of past draining and agricultural activities. These former two points have not been caused by Lafarge but rather are a result of past activities.

It is to be noted that, although there has been mining activity at the site for some 40 years, the mine only approached to within 100 m of the delineated channel in 2016. However, as noted above, there appears to be no visible impacts on the wetland as a result of the incursion. Therefore, it is considered that, if the proposed mitigatory measures are applied (Refer to the JG Afrika Wetland Report and Hydrological Report), there are no new risks to the Polfontein Spruit system.

S27 (g) The Class and the Resource Quality Objectives of the Water Resource

The Tswana Quarry Mine is situated in the Molopo River Catchment within the Quaternary Catchment D41A. This catchment has been designated a water resource class II. Class II refers to “the configuration of Ecological Categories of the water resources within a catchment that results in an overall condition of that water resource which is moderately altered from its predevelopment condition” (Department of Water and Sanitation, Notice 562 of 2019). It is recommended that this quaternary catchment remain in an ecological category D.

The resource quality objectives for the above catchment according to the National Water Act (Act 36 of 1998), Government Gazette Notice 1388 of 8th December 2017, are represented in the table below:

Sub-component	Resource Quality Objective	Indicator/Measure	Numerical Limit
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Quantity	Groundwater flow patterns based on piezometric elevations in aquifer units should not be reversed from its natural flow directions toward the local drainages. Discharge areas (i.e. Malapo Eye) should be protected against total depletion of water table (i.e. as the case is for Grootfontein Eye and Bodibe Eye	Water Levels - Depth to groundwater level from ground elevation. Time series water level monitoring (Monthly) vs. abstractions and rainfall input. Abstraction of groundwater within prescribed zones from the river course/wetland/eye-spring).	Dolomite aquifer systems: Saturation levels should not be lowered >6 metres below an average water level depth of ~19 m in the dolomite water area. Water level recession rate must be less than 0.75 m/a. Abstraction zoning: should be regulated (1000 m for karst aquifer systems).
	Groundwater balance (aquifer recharge and irrigation abstraction) needs to be assessed for wet and dry cycles (to secure groundwater yields during dry periods). Proper irrigation schedules need to be developed and applied at all times (100% compliance).	Abstraction - Volume (Q). Time series of abstraction-rainfall-water level of aquifer system. Annual groundwater balance (aquifer recharge and irrigation abstraction) needs to be for wet and dry cycles.	Annual abstraction should not be larger than 65% of average annual recharge (i.e. SI of 65%).
	Water balance Status	Calculation of Stress Indexes (Aquifer Unit Use/ Aquifer Unit Recharge) as percentages.	
Quality	Nitrate values in the recharge area must be maintained to support domestic water users. (Agricultural sources for nitrate).	Nutrients - Nitrate (NO ₃ -N, mg/l). Bi-annual Monitoring Monthly monitoring at DWS gauging stations.	Nitrate: Less than 1.0 mg/l; Annual long-term trend should not approach the 95th percentile (3.0 mg/l).
	Salinity levels should not increase. Concentrations must be maintained at levels to secure a healthy water quality status.	Salts - Electrical Conductivity. Monthly monitoring at DWS gauging stations.	Electrical Conductivity: 50 mS/m; Annual long-term trend should not approach the 95th percentile (80 mS/m)8.
	Industrial/agricultural pollutants for Molopo, Grootfontein, Itso seng (Bodibe) Eyes	Sulphates SO ₄ concentrations) Monthly water quality monitoring at source areas (eye's and well fields)	SO ₄ : Less than 5.0 mg/l; Annual long-term trend should not approach the 95th percentile (30 mg/l).
Protection Zone	Protection of Intergranular and Fractured Aquifers: Protect lower sections of Madibe, Polfontein Spruit and Molopo River against industrial/ agricultural/microbial pollution.	Distance from drainage valley: based on 50 Day travel time (microbial) and 365 day dilution period (inorganic constituents).	<1000m protection zoning (DLMT aquifers) <500m protection zoning (hard rock aquifers).
		Distance from discharge area of dolomite eyes: based on 50 Day travel time (microbial) and 365 day dilution period (inorganic constituents)	<1000m protection zoning (hard rock aquifers)

When looking at the site-specific PES, wetland 1 (Dam 1 within the quarry boundary) and wetland 2 (Dam 2 within the quarry boundary) were identified as having a PES Category B. These wetlands were taken as being "natural", although it is known that they are an unnatural consequence of the mining operations. It was determined that the condition of each wetland would remain the same for the next five years. The Channelled Valley Bottom Wetland (situated north of the quarry around the Polfontein Spruit River) was given a PES Category E. This was largely due to degradation of the system from past agricultural activity and livestock grazing.

S27 (h) Investments already made and to be made by the Water User in Respect of the Water Use in Question

Lafarge currently operates 166 cement plants in 50 countries around the world with a production capacity in excess of 200 million tons. With the South African domestic market for cement growing, Lafarge is likely to continue to invest in its South African plants and mines to expand production and ultimately profits. Increased expansion and profits may lead to further local employment opportunities and support to local municipalities, schools and community upliftment projects.

S27 (i) The Strategic Importance of the Water Use to be Authorised

The continued operation of the Tswana Quarry Mine will be of strategic importance to Lafarge South Africa (Pty) Ltd, the local community and the South African economy in general. The mine provides the raw materials which are essential for the cement production process at the Lafarge Cement Facility. The operation also employs 345 people, falling in line with the IDP vision for the Ditsobotla Local Municipality which states “*A developmental Municipality dedicated to the social and economic upliftment of its communities*”. The continued operation will therefore improve socio-economic development as stated in the above sections.

S27 (j) The Quality of Water in the Water Resource which may be required for the Reserve and for Meeting International Obligations

The groundwater quality, in terms of bacterial coliforms, has been up to standard. Future monitoring however, should include testing of chemical constituents (EMPr, 2015). The mined material, limestone, has also been approved as non-hazardous and so will not lead to contamination or pollution of the area and the Polfontein Spruit which flows from it. Additionally, the watercourse is not utilised by residence for drinking purposes, resulting in no potential health risks to the local community.

Please refer to the water monitoring results attached in Appendix C in the Water Use Authorisation Technical report for details.

The Stormwater Management Plan (JG Afrika, August 2022) provides the following recommendations to prevent contamination of the watercourses through runoff:

- Several stormwater channels should be constructed;
- Regular maintenance of stormwater infrastructure to prevent pooling/flooding; and
- Regular clearing of sediment built up from conveyor belt spillages.

S27 (k) The Probable Duration of any undertaking for which a Water Use is to be Authorised

The licence is required for the duration of the life of the mine which is of 90 years. It is however noted that water uses are licensed for 20 years and are subject to review every five years. It is therefore recommended that the Section 21 water uses for the Tswana Quarry be issued for a period of 20 years.

References:

Department of Water Affairs and Forestry, South Africa. 2004. Crocodile (West) and Marico Water Management Area: Internal Strategic Perspective of the Marico-Upper Molopo & Upper Ngotwane catchments. Prepared by Goba Moahloli Keeve Steyn in association with Golder and Associates and Tlou and Matji (Pty) Ltd. DWAF Report No. P WMA 03/000/00/0404.