# PROPOSED WASTEWATER TREATMENT FACILITY AND ASSOCIATED INFRASTRUCTURE ON REMAINDER OF FARM NO. 695, BONNIEVALE, WESTERN CAPE

**DEA&DP Reference Number: 16/3/3/6/B1/4/1145/22**

## EXECUTIVE SUMMARY

### PROJECT DESCRIPTION:

Cleaning and pasteurization activities at the Lactalis (previously Parmalat) dairy / cheese factory off the R317 in Bonnievale produces industrial effluent on a daily basis. Currently, partially treated effluent is stored and irrigated on surrounding land in accordance with requisite approvals. An increase in production at this facility however warrants a dedicated Wastewater Treatment Works (WWTW) to improve the quality of the effluent prior to irrigation or discharge.

Application is therefore being made for the following:

A Wastewater Treatment Works with the capacity to treat a maximum of 2 500m$^3$ of waste effluent per day with a development footprint of approximately 10 277.84m$^2$. The WWTW comprises of the following:

- Inlet Channel and screens to remove course material. Two skips are proposed to temporarily store coarse and fine screenings.
- Equalisation/buffer dam that can cater for 24 hours production (2500m$^3$), which will serve to equalise the pH and overall composition of the effluent prior to the treatment process.
- "DAF" (dissolved air flotation unit) that will be housed in a brick wall structure with IBR roof cladding with the associated tank blower, drywell for feed pumps, a sump, vertical shaft mixers, decanter feed pumps, decanter units, polyelectrolyte makeup unit, poly dosing pumps, laboratory, staff amenities, control room, motor control room (MCC) and standby generator.
- Clarifier (26 m round concrete structure).
- Activated Sludge Reactor with mechanical slow speed surface aerators. This rectangular concrete structure is divided into two zones, an aerobic zone and an anoxic zone. The reactor also includes smaller structures like a recycle chamber, RAS recirculation sump, WAS extraction sump, deaeration tank and an activated sludge contact zone.
- Service Water Tank.
- Yard including a skip collection area for solid by-products and parking.

As detailed in Section 3.3 above, associated infrastructure includes:

- A compacted gravel access road of approximately 580 m in length with a maximum width of 8 m. Allowance will be made for stormwater side drains. Approximately 165 m of the road comprise an existing gravel road.
- An approximately 1500 m long service trench of approximately 2 m wide with additional allowance of 2 m on either side (6 m in total) given the non-granular nature of the subsurface material. The trench will house:

    - A rising main of approximately 1500 m in length, 273 mm diameter and throughput capacity of 2500 m³ / day (28 ℓ/s), to carry untreated effluent from the factory to the new Wastewater Treatment Works (WWTW);
    - A pipeline of approximately 1500 m in length, 273 mm diameter and throughput capacity of 2500 m³ / day (28 ℓ/s), to convey treated effluent from the WWTW to the discharge point at the Breede River (at the factory riverbank);
    - Electrical supply cable (1000kVA). The supply will tap off from the overhead line next to the R317;
    - A potable water supply pipeline (1500 m long, 25 mm diameter and 250ml/s throughput capacity).
- Calamity / emergency temporary effluent retention dam of 2 000 m³ at the factory pump station. This will entail a semi-submerged, plastic-lined soil dam, which will normally be empty, only to be used in case of emergency to prevent contamination of the Breede River. This dam can accommodate 24-hours' worth of effluent production. Most repairs / biological rectification will be resolved within a 24-hour timeframe, however, as a backup, the effluent can also be pumped to the existing 600 000m³ effluent storage dam for irrigation until the issue has been resolved. Trenches will be installed around the yard area where the calamity dam is proposed and where the existing pumping infrastructure is located. These trenches will serve to prevent river contamination in the event of a primary system failure.

The treatment process will generate treated effluent, as well as a sludge by-product (solid waste). The proposal is to discharge the treated effluent (treated to General Limit Values) to the Breede River and to continue to irrigate the existing irrigation area located approximately 3 km south of the factory. According to the facility's Water Use Licence, such discharge to the river may only take place during the winter months (April to August) and high flows measured upon confirmation of flow indicators by the Responsible Authority during other months.

The sludge will be removed by Interwaste and will be taken to a licenced composting facility as the sludge is appropriate for such beneficiation, ultimately preventing disposal to landfill.

Relevance of the development to listed activities is that approximately 670 m² of the service trench, pipelines and infrastructure lies within 32 m of watercourses (Breede River and one of its unnamed tributaries), that the outfall infrastructure at the Breede River will require excavation and movement of more than 10 m³, that the facility constitutes a wastewater treatment facility with the capacity to treat 2 500 m³ of effluent per day, that the proposal is on land that was used for agriculture in the past, that the road will be 8 m wide and that a portion of the road will intersect indigenous vegetation, and that a portion of the service trench and roadway will require removal of Endangered Breede Shale Renosterveld.

A Water Use Licence was issued in 2021 for the WWTW and associated infrastructure, as well as the proposed discharge of treated effluent to the Breede River and continued irrigation with treated wastewater.

## SITE SENSITIVITY / BASELINE ENVIRONMENTAL CONDITIONS

### FRESHWATER IMPACT ASSESSMENT

- The WWTW and associated infrastructure can impact on the following freshwater resources:
    - The section of the Breede River adjacent to and downstream of the proposed discharge point as well as its riparian zone.
    - The river ecosystem of the unnamed tributary of the Breede River that enters the Breede River.

    - A disused dam (in the footprint of the WWTW) and artificially excavated drainage which likely served as an overflow from the disused dam when this dam was still in use. This drainage was incorrectly mapped as a non-perennial river feature and does not constitute a watercourse.
- The affected watercourses are currently moderately to largely altered but they have moderate to high conservation importance.
- The pristine drainage in the valley to the west of the proposed WWTW can in no way be impacted as it is located in an adjacent (westward draining) catchment.
- The water quality of the section of the Breede River flowing past the Lactalis factory near Bonnievale is not pristine and it was found that currently, the factory does not have a significant effect on the water quality in the Breede River.
- Furthermore, it was found that the continued irrigation with treated wastewater will impact on surface water resources in the irrigation area, namely:
    - An unchanneled valley-bottom wetland within the 'Soutpans Tributary', an unnamed tributary of the Soutpansrivier which ultimately flows into the Breede River.
    - The riverine section of the Soutpans Tributary, below the unchanneled valley-bottom wetland.
    - The valley- bottom wetland which constitutes most of the Soutpans Tributary.
- These systems were also found to be largely modified, with poor water quality due to exiting impacts on these watercourses which include the current effluent irrigation practices. The watercourses have moderate and moderate-high conservation importance.
- The construction and operation of the WWTW and associated infrastructure will result in several negative impacts on the above-mentioned freshwater resources. These were assessed, and where possible, mitigation proposed to reduce the significance of the impacts.
- The specialist concluded that with the full implementation of the mitigation and recommendations, the impacts can be reduced to acceptable levels, and hence, it would be appropriate for the development to be approved.

**BOTANICAL ASSESSMENT (COMPLIANCE STATEMENT)**

- While 3 site alternatives were initially considered (2019), one site was screened out due to botanical sensitivity and the other from an operational perspective. The 2022 botanical impact assessment therefore focussed on the Option 2 site (erroneously referred to by the specialist as Alternative 3, however this has no material implication).
- There is a single vegetation type in the Lactalis study area, namely Breede Shale Renosterveld (Endangered).
- There is no natural vegetation remaining in the footprint of the WWTW and most of the road and service trench routing due to past transformation (disused dam, ploughing, agriculture, road infrastructure, etc.).
- There is no evidence of recolonisation of natural vegetation in the ploughed lands that have now been left fallow for some years.
- A portion (approximately 80 m) of the of the road and service trench infrastructure intersects with a small patch of extremely degraded and disturbed (but not ploughed) Breede Shale Renosterveld, west of the R317.
- Owing to the highly disturbed condition of most of the Lactalis study area, no plants species of conservation concern (SCC) were recorded.
- The direct loss of the vegetation intersecting with the road and service trench footprint and the cumulative loss of the Endangered vegetation type was considered to be Very Low negative post the little mitigation that is possible in this instance.
- Overall, the specialist concluded that the impacts are acceptable and that it is

degraded sites such as the preferred site alternative that should be considered for infrastructure development. Approval of the development is therefore supported by the botanist.

**GEOHYDROLOGICAL IMPACT ASSESSMENT**

- The groundwater quality in the monitoring boreholes, hydro-census boreholes, effluent dam and seepage ponds are of poor to dangerous quality according to drinking water limits for conductivity, total dissolved solids, sodium and chloride concentrations.
- No boreholes, registered and unregistered, within a 1km radius of the site are used for drinking water.
- Over irrigation is a concern, with excessive volumes of effluent currently irrigated resulting in a perched water table and ponding.
- During the construction phase of the WWTW, associated infrastructure and emergency detention dam, leakage from the proposed construction represents a minor risk of contamination. Reduced natural infiltration and recharge due to the construction footprint is considered to be a minor risk of very low impact.
- While leakage of treated effluent would improve the natural groundwater quality in some aspects, the untreated effluent is likely to have a detrimental effect. This is considered to be a minor risk of very low impact.
- The quality of the effluent in the seepage ponds and effluent storage dam is classified as very high risk in terms of sodium absorption and very high risk in terms of salinity hazard. This means that the current effluent stored is not suitable for irrigation.
- The proposed WWTW will result in the production of improved effluent quality.
- The risk of exposure to groundwater is low as the groundwater is not used as a source of water in the area.
- Impacts can be reduced to acceptable levels.

**ARCHAEOLOGICAL & PALEONTOLOGICAL ASSESSMENT**

- The geology was found to not be favourable for the manufacture of stone artefacts. An equid radius was uncovered during the geotechnical testing at the Option 2 WWTW site (identified from photographs by Dr Teresa Steele). The bone is not mineralised and, from its colour, must have been enclosed by soil. It did not appear to be associated with anything else and there was no way to tell if it was archaeological or not. On its own it is assumed to be of no significance.
- No significant impacts are expected on archaeological resources.
- The SAHRIS Palaeo-sensitivity map shows the site as being of potentially very high palaeontological sensitivity. For this reason, and because the surface rocks on site did not look promising from a palaeontological point of view, a desktop study was commissioned in order to determine whether this was a significant issue or not. Dr John Almond notes that the underlying rocks are potentially fossiliferous but that weathering and tectonism often compromise fossil preservation. From the many photographs provided to him, he saw no reason for concern, at least at the surface, although evidence for tectonic deformation was largely absent.

**SOCIO-ECONOMIC**

The Lactalis factory is major employer in this area with approximately 1 000+ people directly and indirectly. The construction of the WWTP will allow the factory to continue with its current scale of operations. The cleaned water from this WWTP will be used to continue farming on the existing farms which will enhance economic activity in the region.

This WWTP will require regular maintenance, and this will be done by small local contractors in the region. This in turn will result in some contribution to the economy.

## ALTERNATIVES

Three site / location alternatives were considered in the 2019 study. It was found that the Option 2 site location is a good site as it has been placed an acceptable buffer distance from the sensitive receptors (300m from Uitsig community and approximately 700m from Bonnievale Winery & adjacent small holding). This option would therefore not result in an unacceptable visual impact. In addition, it's in the "trough" / "valley" of two adjacent hills further reducing the visual impact. The site location for Option 2 WWTW & associated infrastructure is in an area that used to be an effluent dam site historically and has been mostly disturbed / transformed already. The WWTW is needed and desired at this location because it will have a low impact to aquatic and terrestrial biodiversity, low visual impact, low nuisance impact (odours) and overall low environmental impact given the proposed location and buffer area from sensitive receptors. Site / location Options 1 and 3 were disregarded (screened out) and is therefore not further presented as a comparative assessment in this BAR.

In terms of technology alternatives, three aerobic and one anaerobic option were considered for treatment of the effluent. Technology alternative Option A1 (CAS treatment) is preferred and the only feasible and reasonable option. CAS is the most commonly used in approximately 250 Lactalis Dairy farms around the world. CAS is flexible, robust and cost-effective. Operational and maintenance costs are expected to be lower than the other options investigated. This technology is the only reasonable and feasible option due to influent and effluent, operational / maintenance and cost considerations. The difference in costs to build and costs to operate are in the order of millions and therefore CAS is the only feasible and reasonable option available to Lactalis SA. It is a flexible and robust system that works well for dairy industries around the world.

No further layout, operational or other alternatives were revealed in the investigation.

Should the status quo remain and the WWTW not be constructed (no-go alternative):

- Significant socio-economic impacts are likely to occur as downscaling and related job losses at the Lactalis factory may be prudent due to required decrease in production to reduce effluent volumes generated.
- There is a significant high risk of water pollution (detrimental) should the effluent dam banks burst and should additional untreated effluent be discharged into the Breede River.
- The degradation of water quality in the riverine and wetland habitat of the Soutpans Tributary will continue.
- Degradation and continuation of groundwater and soil pollution, air quality (odours) and nuisance impacts that are currently occurring and would continue to occur should the WWTW not be constructed as a result of the current poor quality of effluent being irrigated.

Therefore, the no-go option is not deemed reasonable or feasible.

## IMPACT SUMMARY

| **DESIGN / CONSTRUCTION PHASE IMPACTS** | **Preferred Option 2 site location and CAS technology alternative** | | **No-Go Alternative** | |
|---|---|---|---|---|
| | No Mitigation | With Mitigation | No Mitigation | With Mitigation |

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| Air Quality Impacts - Dust | Low - Medium Negative | Low Negative | N/a | N/a |
| Visual Impact | Low – Medium Negative | Low Negative | N/a | N/a |
| Archaeological / Palaeontological Impact | Low Negative | Low Negative | N/a | N/a |
| Botanical – Loss of endangered Breede Shale Renosterveld | Low Negative | Very Low Negative | N/a | N/a |
| Freshwater impact: Loss of dam and artificial drainage | Low Negative | Low Negative | N/a | N/a |
| Freshwater impact: Buffer encroachment into Breede River | Medium Negative | Low-Medium Negative | N/a | N/a |
| Freshwater impact: Alteration and loss of riparian habitat along Breede River through construction of new outlet point for discharge of treated effluent | Medium Negative | Low Negative | N/a | N/a |
| Freshwater impact: Physical destruction and / or damage to river corridors as a result of construction related activities | Low - Medium Negative | Very Low Negative | N/a | N/a |
| Freshwater impact: Accumulation of sediment in watercourses, as a result of unmanaged runoff from land that is disturbed during construction | Low - Medium Negative | Very Low Negative | N/a | N/a |
| Freshwater impact: Pollution of watercourses, as a result of contaminated runoff from construction areas | Low - Medium Negative | Very Low Negative | N/a | N/a |
| Freshwater impact: Contamination of soils and underlying sub-surface water through infiltration of construction related pollutants. | Low - Medium Negative | Very Low Negative | N/a | N/a |
| Freshwater impact: Increased disturbance to aquatic and semi-aquatic fauna | Low Negative | Very Low Negative | N/a | N/a |
| Noise and vibration nuisance impacts | Low negative | Very Low Negative | N/a | N/a |
| Traffic and Safety Impacts | Low negative | Low negative | N/a | N/a |
| Soil and Groundwater contamination | Low-Medium Negative | Low Negative | N/a | N/a |
| Groundwater impact form surface runoff | Very Low Negative | Very Low Negative | N/a | N/a |
| Socio-economic impact | Medium Positive | Medium Positive | N/a | N/a |
| **OPERATIONAL PHASE IMPACTS** | **Alternative 1 (Cultivation of 18.5 ha – PREFERRED)** | | **No-Go Alternative** | |
| | No Mitigation | With Mitigation | No Mitigation | With Mitigation |
| Air Quality Impacts – Odour | Medium Negative | Low Negative | High Negative | High Negative |
| Noise Impacts | Low Negative | Low Negative | N/a | N/a |
| Freshwater Impact (WWTW and infrastructure): Increase in the volume and velocity of stormwater runoff from the WWTW site, which could affect the | Low Negative | Very Low Negative | N/a | N/a |

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| hydrological functioning of nearby watercourses | | | | |
| Freshwater impact (WWTW and infrastructure): Pollution of nearby watercourses through runoff of potentially polluted stormwater from the WWTW site | Medium Negative | Low - Medium Negative | N/a | N/a |
| Freshwater impact (WWTW and infrastructure): Pollution of watercourses as a result of leakages from wastewater pipelines or pumpstations | High Negative | Low Negative | N/a | N/a |
| Freshwater impact (WWTW and infrastructure): Localised alteration of the hydrology of the Breede River at and downstream of the new effluent discharge point. | Medium Negative | Low - Medium Negative | N/a | N/a |
| Freshwater impact (WWTW and infrastructure): Pollution of the Breede River through input of treated wastewater effluent at the new discharge point. | High Negative | Medium Negative | N/a | N/a |
| Freshwater impact (continued irrigation with treated wastewater): Transformation of non-perennial drainage lines flowing down the slopes of the irrigation area. | Medium Negative | Medium Negative | High Negative | High Negative |
| Freshwater impact (continued irrigation with treated wastewater): Loss and transformation of aquatic habitat through the establishment and operation of irrigation dams in watercourses | Medium – High Negative | Medium Negative | High Negative | High Negative |
| Freshwater impact (continued irrigation with treated wastewater): Alteration of the flow regime of the Soutpans Tributary as a result of the dams and irrigation return flows | High (-) | Medium Negative | High Negative | High Negative |
| Freshwater impact (continued irrigation with treated wastewater): Pollution of the Soutpans Tributary, possibly extending into the main Soutpansrivier watercourse during periods of higher flow | High (-) | Medium – High Negative | High Negative | High Negative |
| Visual Impact | Low – Medium Negative | Low – Medium Negative | N/a | N/a |
| Socio-economic impact | High Positive | High Positive | N/a | N/a |

## KEY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The key findings of the Environmental Impact Assessment are as follows:

- Based on the 2019 study, site Options 1 and 3 were screened out due to botanical sensitivity and proximity to sensitive receptors. Site option 2 was deemed most appropriate, and therefore taken forward for assessment in this application.
- From a social perspective, the visual, odour and noise impacts are anticipated to be at acceptable levels. Odour is expected to be improved compared to the current olfactory conditions associated with the irrigation of effluent.
- No impacts are expected to occur on heritage, archaeological or palaeontological resources. HWC concurred with this determination.
- While there will be a small loss of highly degraded Breede Shale Renosterveld, an Endangered vegetation type, the related impact is rated to have very low negative significance if the natural vegetation along the pipeline route is restored post installation.

- The facility has the potential to alter groundwater quality, however, the specialist indicated that the significance is very low in this regard.
- The most notable effect of the proposal will be the impacts on freshwater resources. A thorough specialist study was undertaken, and several freshwater impacts were identified. Where possible, rigorous management and mitigation measures (including buffers) were proposed to reduce the potential of the impacts occurring and/or limit the significance of impacts to acceptable levels of change. On balance, the specialist concluded that the facility and proposal is appropriate / acceptable, provided full implementation of the mitigation and recommendations.
- The NO-GO alternative, assumes the status quo, which assumes that the WWTW will not be built and that untreated, poor quality effluent will continue to be stored and irrigated, impacting on the surrounding communities (odour, nuisance) as well as biophysical aspects (soil, groundwater and freshwater ecosystems).
- At present, the status quo is unacceptable. Treatment of the effluent is unavoidable and it is therefore a necessity that the WWTW be built to reduce the significance of impacts.
- Should the WWTW not be built (NO-GO), the DEA&DP / BGCMA / DWS may issue a Directive to Lactalis to stop operation. This would have a detrimental socio-economic impact given the hundreds of people who are dependent on the operating of the business. It is therefore not recommended that the plant be shut down but rather that the WWTW be allowed with mitigation measures to control environmental impacts.
- Overall, the investigation and assessment did not reveal any fatal flaws associated with the proposal. The conclusion of this EIA is that the WWTW should be built and become operational as quickly as possible so that the facility may operate in accordance with their existing Water Use License and limit their operational impact on the environment.

The preferred alternative with proposed mitigation presents responsible development of critical infrastructure. Therefore, the EAP recommends approval of the development (with Option 2 site location and CAS technology alternative), subject to the following conditions:

- Compliance with the EMPr
- Compliance with all specialist mitigation and recommendations
- Compliance with all additional mitigation contained in this BAR
- Compliance to the Water Use Licence conditions
- Duty of care principle must be observed at all times.

In this recommendation, the EAP is also guided by the Water Use Licence that has already been issued for the development and operations, suggesting that the water authorities deemed the proposal to be acceptable.