ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR A GLASS BOTTLE MANUFACTURING PLANT PROPOSED BY SAB AND PARTNERS

Portion 1/238, Leeuwkuil 596 IQ, Gauteng

Prepared for: The South African Breweries (Pty) Limited

Authority Ref: GDARD: Gaut 002/18-19/I0001

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EXECUTIVE SUMMARY

1. INTRODUCTION

This Executive Summary provides a synopsis of the Environmental Impact Assessment Report (EIAR) prepared as part of the Scoping and Environmental Impact Assessment (hereafter collectively referred to as "S&EIA") process that is being undertaken for the proposal by The South African Breweries (Pty) Limited (SAB) and future partners to develop and operate a glass bottle manufacturing plant on Portion 1 of Portion 238 (a portion of portion 149) of the farm Leeuwkuil 596 IQ in Vereeniging, Gauteng.

1.1 Opportunity to Comment

This Environmental Impact Assessment Report has been distributed for a 30-day comment period from **13 November 2018 to 14 December 2018** in order to provide interested and affected parties (I&APs) with an opportunity to comment on any aspect of the proposed project and the findings of the S&EIA process. Copies of the full report have been made available on the SLR Consulting (South Africa) (Pty) Ltd (SLR) website (at https://slrconsulting.com/za/slr-documents/sab-glass-bottle-plant) and at the public library in Vereeniging.

Any comments should be forwarded to SLR at the address, telephone/fax numbers or e-mail address shown below. For comments to be included in the updated Scoping Report, comments should reach SLR by **no later than 14 December 2018**.

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1.2 Project Background

SAB utilizes large numbers of glass bottles for the beer they produce and distribute. SAB, with future majority Black owned partner(s), intend to enter the glass bottle manufacturing industry in order to transform its glass bottle procurement spend, whilst providing a unique opportunity for new Black economic entrant(s). Development of the facility would also contribute toward meeting the conditions of the SAB and Anheuser-Busch InBev Africa (Pty) Limited merger, as well as improving SAB's preferential procurement spend from black-owned suppliers. SAB is likely to only be a minority shareholder in the future business.

The proposed glass bottle manufacturing plant would produce green and amber coloured bottles using two gas fired furnaces. The facility would comprise a batch plant, main manufacturing building and warehouse. The annual production target would be approximately 290 000 tons of glass bottles. The facility would be located on Portion 238 (a portion of portion 149) of the farm Leeuwkuil 596 IQ in Vereeniging, Gauteng (see Figure 0).

SLR has been appointed as the independent environmental consultants to undertake the S&EIA for the proposed glass bottle manufacturing project.

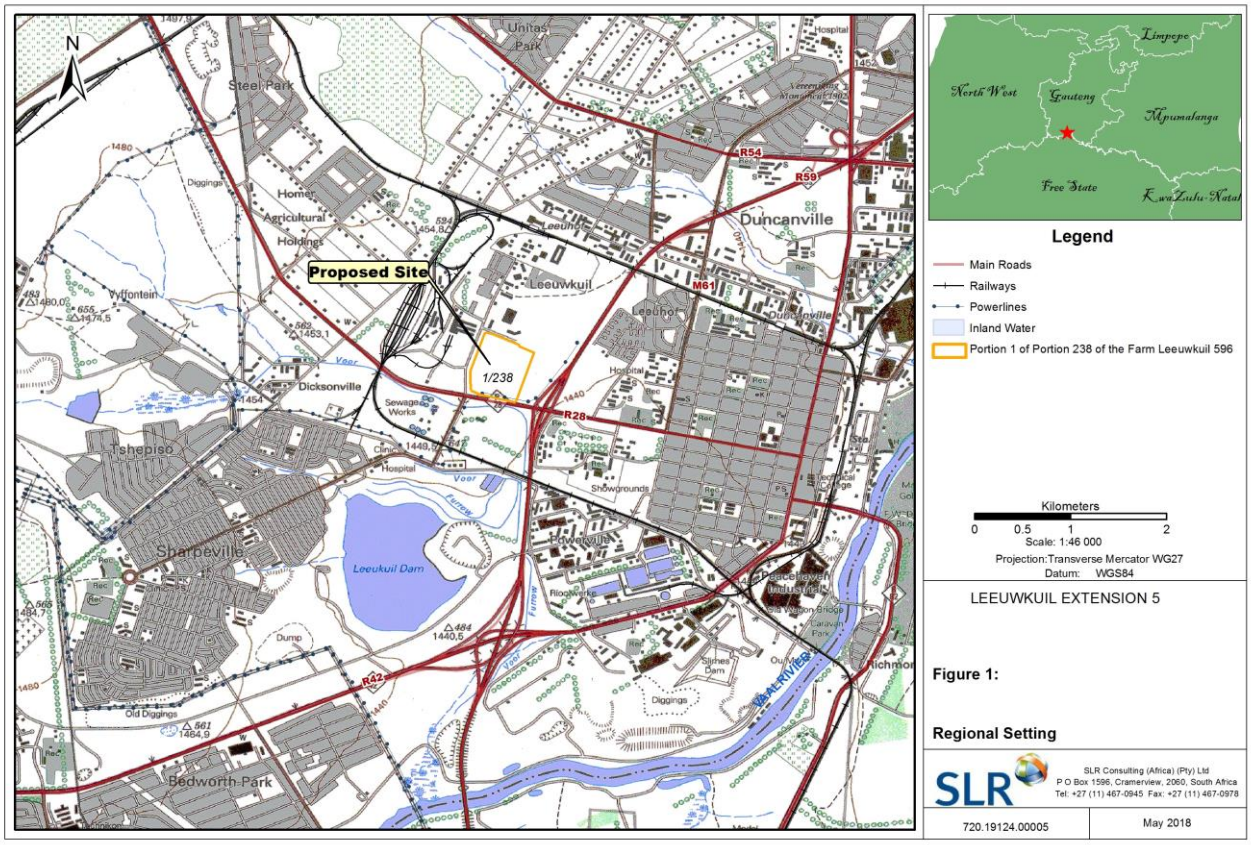


FIGURE 0: LOCATION OF THE PROPOSED GLASS BOTTLE MANUFACTURING PLANT. THE PROPOSED DEVELOPMENT FOOTPRINTS IS SHOWN (ORANGE OUTLINE)

1.3 Summary of Authorisation Requirements

The Environmental Impact Assessment (EIA) Regulations 2014 (as amended), promulgated in terms of Chapter 5 of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), as amended, provide for the control of certain listed activities. Such activities are prohibited from commencing until written authorisation is obtained from the competent authority, which in this case is the Gauteng Department of Agriculture and Rural Development Planning (GDARD). The proposed project triggers activities contained in Listing Notice 1 and 2 and thus require a S&EIA process to inform the application for Environmental Authorisation. The project also triggers a waste management activity listed under the schedule made in terms of the National Environmental Management Waste Act, 2008 (No. 59 of 2008) (NEMWA), and thus requires a Waste Management Licence. Given that the GDARD is the competent authority for both the Waste Management Licence and Environmental Authorisation, application has been made to them for an Integrated Environmental Authorisation in terms of Section 24L of the NEMA (ref: Gaut 002/18-19/I0001).

In addition, the proposed project also requires an Atmospheric Emissions Licence (AEL) from the Sedibeng District Municipality in terms of the National Environmental Management: Air Quality Act (NEM: AQA) (No. 39 of 2004). Application has been made to the Air Quality Officer for an AEL.

The policy and legislative context within which the project is proposed are presented in Section 2 of the EIA Report.

2. EIA METHODOLOGY

2.1 Scoping Phase

The Scoping Phase complied with the requirements of NEMA and the EIA Regulations 2014, as amended. This involved a process of notifying I&APs of the proposed project and S&EIA process in order to ensure that all potential key environmental impacts, including those requiring further investigation, were identified.

The Scoping Report, which was prepared in compliance with Appendix 2 of the EIA Regulations 2014, as amended, was accepted by GDARD on 15 October 2018.

2.2 EIA Phase

2.2.1 Specialist Studies

Twelve specialist studies were undertaken to address the key issues identified during the Scoping Phase, namely: vegetation; soil and land capability; surface water; groundwater; heritage; biodiversity; traffic; social; economic; air quality; visual and noise. The scope of work for each of these studies was defined in Section 9 of the Scoping Report.

2.2.1 Integration and Assessment

The specialist information and other relevant information has been integrated into this report, which also include a Construction and Operation Environmental Management Programme (EMPr). This report provides an opportunity for I&APs to comment on the proposed project and findings of the S&EIA process.

After closure of the comment period, all comments received on the draft EIAR will be incorporated and responded to in a Comments and Responses Report. The report will then be updated to a final EIAR, which will include the Comments and Responses Report, and will be submitted to GDARD for consideration and decision-making.

3. NEED AND DESIRABILITY

The Scoping Report provides an overview of the need and desirability for the proposed project by considering how the project is aligned with the strategic context of national development policy and planning, broader societal needs and regional and local planning as appropriate. The National Development Plan (NDP) 2030 identifies economic growth, exceeding 5% per annum, as a key to eradicating poverty and inequality between people in South Africa. The Gauteng Provincial Spatial Development Framework 2030 targets an integrated, connected space that provides for the needs of all. Relevant spatial development strategies include prioritising infill development and densification, developing economic clusters that benefit from synergies and unlock the

advantages of agglomeration and protecting valuable resources and high potential agricultural land. The Integrated Development Plan and Spatial Development Frameworks of both the Sedibeng District and Emfuleni Local municipalities target economic growth to revive the economy and provide economic and employment opportunities. The Leeuwkuil industrial area is identified as a target for densification with commercial and light industrial use. The project will have local benefits through the provision of employment opportunities and stimulation of opportunities for local goods and service providers.

4. PROJECT DESCRIPTION

The EIA Report includes a general description of the proposed project and a comparative assessment of project alternatives.

4.1 Summary of Property/Site Information

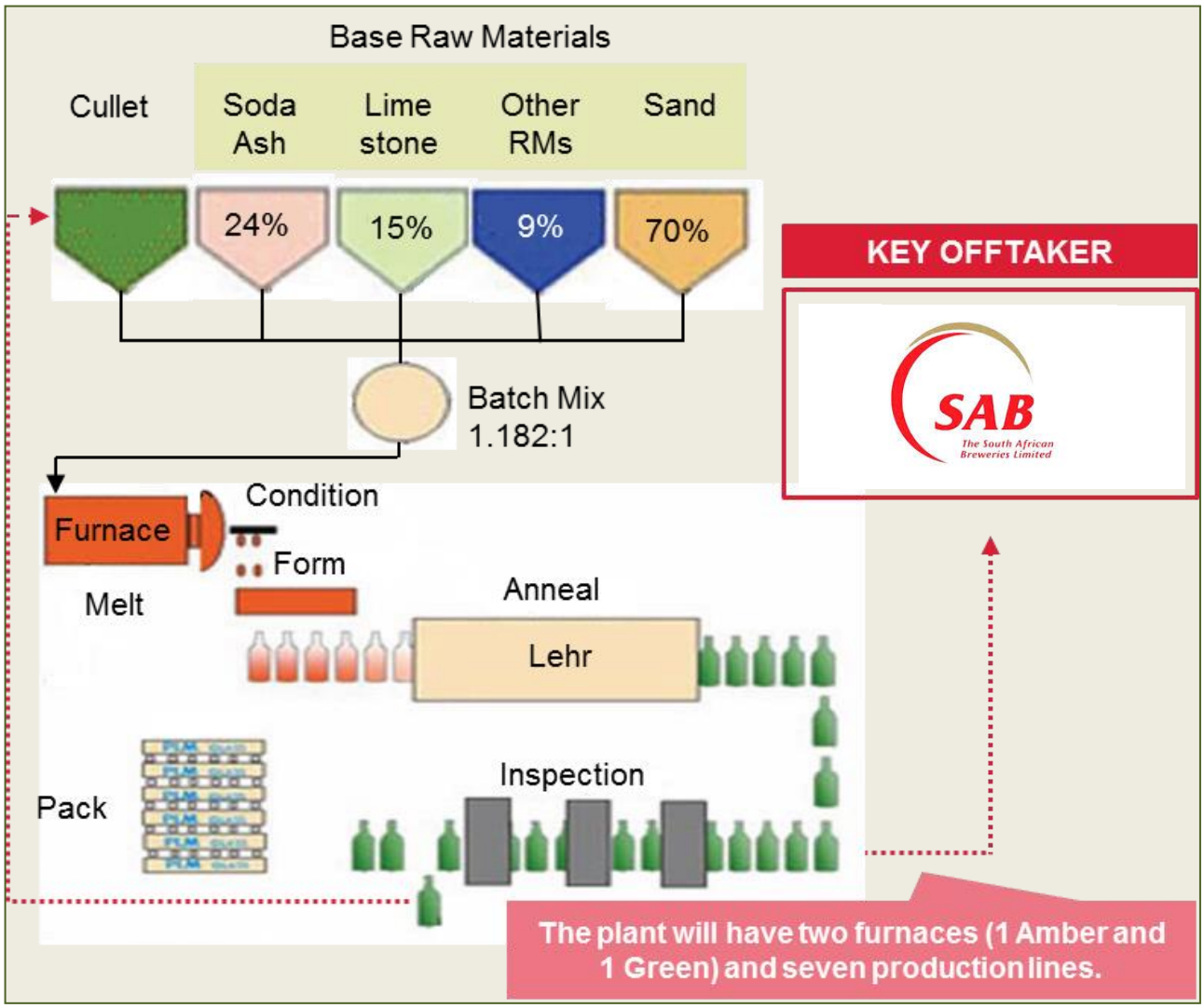
Farm name:	Portion 238 (a portion of portion 149) of the farm Leeuwkuil 596 IQ. NB - there is a town planning application underway to subdivide and rename this as Portion 295 of the farm Leeuwkuil 596 IQ.
Physical address:	Corner of Boy Louw Street (R 28) and Lager Avenue, Vereeniging
Surveyor General 21 digit code:	T0IQ00000000059600238
Property size:	Currently 67.26 ha, but the subdivided portion will be 29.23 ha
Development footprint size:	Approximately 15 000 m² (15 ha)
Local municipality	Emfuleni Local Municipality in the Sedibeng District Municipality
Centre coordinates of site:	Latitude (S): 26°40'3.60"S
	Longitude (E): 27°54'9.10"E

4.2 Description of the Proposed Glass Bottle Manufacturing Project

SAB, with Black owned partner(s), is intending to enter the glass bottle manufacturing industry in order to transform its glass bottle procurement spend, while at the same time providing a unique opportunity for new Black economic entrant(s). Ownership of the plant is still being determined and SAB is only likely to be a minority shareholder in the future business.

The proposed plant would produce green and amber coloured bottles. The facility would comprise a batch plant, main manufacturing building with gas fired furnaces and a warehouse. The annual glass bottle production target would be approximately 290 000 tons. Glass is a non-crystalline amorphous solid made of the fusion of a diverse range of non-organic oxides found in sand, soda ash, limestone and other raw materials.

The conceptual process flow of the proposed project is illustrated in the diagram below and the main components are described in the text.



4.2.1 Batch Plant

The batch plant building would be used to receive, store and mix the raw materials required in glass manufacture. The key raw materials are sand, soda ash and limestone, with a number of other raw materials also required. Recycled glass, known as cullet, would also be utilised as a raw material. The raw materials are stored in a variety of silos, hoppers and bunds, before being mixed according to specific recipes for each glass product. Once mixed, the raw material batches would be conveyed across to the main manufacturing building.

4.2.2 Main Manufacturing Building

The main manufacturing building would comprise a single large covered hall, approximately 45 000 m^2 in extent. The building consists of three areas (named the Furnace, Hot End and Cold End areas) in which, the glass is melted, formed into bottles and inspected for quality and defects.

4.2.2.1 Furnaces

The two furnaces would utilise natural gas or Liquid Petroleum Gas (LPG) as a heat source. The green glass furnace would have capacity to melt 390 metric tons per day (mtpd). This furnace would feed to three bottle manufacturing lines. The amber glass furnace, with a capacity to melt 530 mtpd, would feed to four bottle

manufacturing lines. In the furnace the raw materials would be melted into glass at temperatures of up to 1 530°C and degassed. Emissions from the furnaces would be cleaned in order to comply with the minimum emissions standards and released via a stack.

4.2.2.2 **Hot End**

In the Hot End the molten glass would be channelled to a series of glass forming machines that cool and meter the glass before using mechanical and pneumatic means to create the specific glass containers. The bottles would be hot end coated to enhance surface resistance and cooled in an annealing oven in a controlled manner, so as to avoid internal stresses.

4.2.2.3 **Cold End**

At the Cold End the bottles would be further coated and then subject to inspection for defects by high precision equipment that measure capacity, dimensions, impact, pressure resistance and other tests. Bottles that do not meet specifications would be crushed and conveyed back to the furnaces where the cullet is re-used in the raw material mix. Completed bottles would be packaged by automated palletizers and moved to the warehouse for storage and distribution.

4.2.3 Warehouse

The warehouse building would have an area of approximately 40 000 m^2. Storage of the bottles would be in plastic wrapped, bulk pallets up to three pallets high. Pallets would be mobilized using single or dual fork lifts and loaded onto trucks for distribution to customers.

4.2.4 Utilities

The glass production process requires several utility systems (gas and liquids) for operation. Support services associated with the proposed project would include an office building, canteen and gate house. The facility would also have a gas station to regulate gas supply, a diesel fuel oil storage facility as a back-up furnace fuel, diesel generators for emergency electricity supply and emergency water storage.

4.2.5 Associated Services

Access and Transport: Access to the facility would be via Lager Avenue, off the R28. Transport of goods to, and products from, the facility would be by truck.

Water: Potable and process water would likely be sourced from the Emfuleni Local Municipality via a new bulk water connection from the Rand Water connection in Botha Street.

Power: Electrical power would likely be sourced from the Emfuleni Local Municipality. The electrical connection would be via underground cables from the substation located adjacent to the R 59.

Gas: The proposal is to source gas for the furnaces from the existing pipeline that runs on the facility-side of the R59. A connection metering station and underground pipe would be installed

Sewage: Sewage generated at the facilities would likely be treated in an on-site package plant. Treated effluent will be used for local irrigation or discharged to the environment.

Waste: Wastes generated by the plant and associated operations will be separated at source, as much as is feasible, and then directed to appropriate recycling, re-use or disposal facilities.

4.2.6 Efficiency and Sustainability

It is SAB's intention that the future owners of the plant give consideration to all reasonable and feasible sustainability measures for incorporation within the facility. Such measures should be considered in the plant technology and operations as well as in ancillary services such as offices, ablutions, workshops, warehouses and parking. It must be noted that the actual sustainability measures and equipment specifications for the facility that would be constructed will be subject to confirmation during the detailed design phase.

4.2.7 Employment

It is anticipated that construction would result in the generation of up to 800 direct and indirect job opportunities. Operation of the facility would create approximately 280 permanent employment opportunities. Employees would be sourced, as much as is possible, from local communities and the greater Vereeniging area.

4.3 Summary of project alternatives

Vereeniging was selected as the target area as it has good regional transport linkages, the required services and infrastructure (notably gas and roads) and requires economic stimulation. SAB own land in areas which are identified in local and regional planning documents for commercial and industrial development/expansion. In selecting the site (Portion 238), consideration was given during pre-feasibility investigations to commercial, logistical, environmental, social and technical factors. In proposing the plant layout consideration was given to a number of local features, adjacent users and access, operational efficiency, geotechnical and hydrological parameters. Only the preferred site and layout were investigated in the EIA phase.

Design alternatives that were considered during pre-feasibility investigations included the furnace fuel and furnace type, production line configuration and emissions control mechanisms. The alternatives selected for consideration in the EIA phase included two regenerative-type, natural gas fired furnaces producing green glass in three and amber in four production lines. Emissions controls would ensure compliance with NEM:AQA emissions standards as a minimum, moving toward best-in-class where possible. Only the preferred designs were investigated in the EIA phase.

The No-Go alternative will also be investigated in the EIA phase.

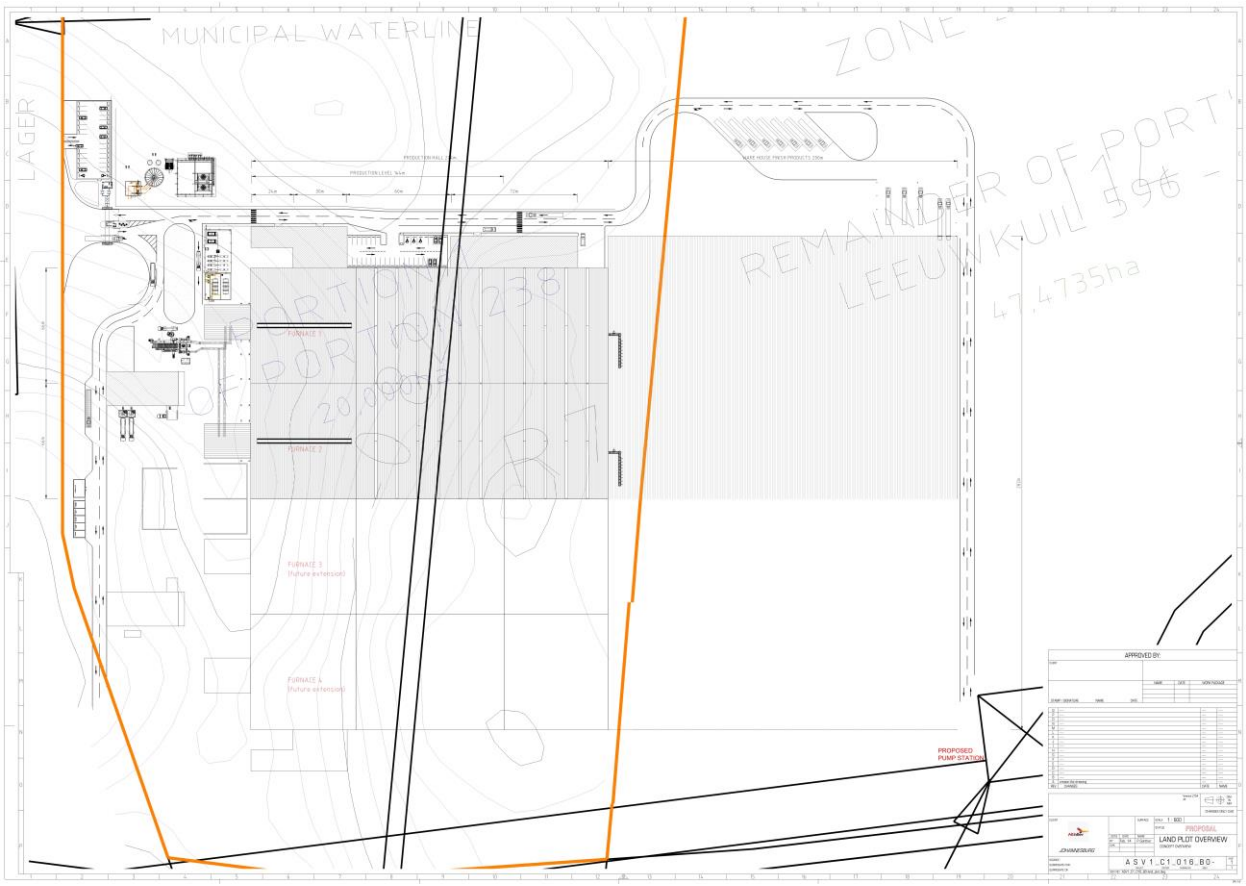


FIGURE 01: CONCEPTUAL PROJECT LAYOUT

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The Scoping Report includes a description of relevant environmental (geographical, physical, biological, social, economic, heritage and cultural) aspects associated with the project site.

5.1 Climate

The project area falls within the Highveld climatic zone, which is generally associated with a cool temperate climate with high extremes between maximum summer and winter temperatures. The area is characterised by summer rainfall with a mean annual precipitation of 660 mm. Average daytime temperatures are 16.3°C in winter and 26°C in summer. The period wind field for the Sharpeville air quality monitoring station (AQMS) shows that the wind flow is dominated by north-westerly winds. Winds are usually from the north-east and north-west during autumn and winter with winds from the north-east more dominant during summer. Winter has the highest frequency of calm periods.

Ambient air quality in the project area (determined from the Sharpeville AQMS and a short-term on-site monitoring campaign) showed exceedances of the NAAQS daily and annual average concentration for both $PM_{2.5}$ and PM_{10}. Local sources contribute to $PM_{2.5}$ concentrations at low wind speeds, including domestic fuel burning, informal waste burning, and vehicle entrainment on unpaved roads. The highest PM_{10} concentrations are associated with wind speeds above 6 m/s and originate to the north and north-east.

5.2 Biophysical Characteristics

The project site is largely flat, with a slight fall to the south, and is located at elevations of between 1440 and 1460 m above mean sea level. Soil in the area is classified as Sterkspruit Form 1200 Bethulie Family. These are duplex soils where the B horizon is sufficiently hard and dense to be an impediment to both root growth and water movement. Such soils are considered to have a low agricultural potential and are highly susceptible to erosion. No evidence of contamination was noted in test pit samples and concentrations are considered to represent baseline conditions. The geology of the site comprises intercalated shales and quartzitic sandstones with limited mudstone occurrence, all of the Ecca Group. These Karoo sediments are potentially underlain by dolomites of the Malmani sub-group. This presents potential risk of subsidence and/or sinkhole formation.

On-site noise levels are comparable to what is typically expected within rural/suburban areas, as are levels at the closest residential establishments (correctional services staff accommodation), and off-site east of Lager Rd. At the informal residential structures south of the R28, the day-time noise levels typical of urban areas prevailed primarily due to traffic noise. As expected, the highest day-time noise levels were recorded at the residential site near to the R 59. Due to the presence of main roads and high traffic volumes (on the R59 and R28), baseline night-time noise levels are somewhat higher at the residential areas than typically expected within suburban areas

Vegetation on site is mapped as Soweto Highveld Grassland (Mucina and Rutherford 2012). However, field investigation found that the study area has been extensively disturbed due to historic and ongoing anthropogenic activities. Although the vegetation is indigenous, it is no longer representative of Soweto Highveld Grassland and comprises secondary grassland. The vegetation is generally uniform across the site and no faunal species of conservation concern were noted in the grassland. A number of man-made channels have resulted in wet areas which provide suitable habitat for wetland plants as well as the protected species *Crinum macowanii* (least concern on a National level according to the GDARD red and orange plant list). The overall habitat integrity of the site is considered to be moderately low and the only faunal species noted were those adapted to high levels of anthropogenic activity. The site is not protected in terms of the NEMPAA nor is it mapped as sensitive or important by any of the relevant conservation planning tools.

Surface water in the project area drains via an unnamed tributary to the Vaal River. No natural freshwater resources (including watercourses or wetlands) occur within the proposed development footprint. The site has a series of excavated (man-made) drainage channels intended to convey storm water from adjacent roads and properties to formal concrete-lined drainage channels, associated with the R59 and R28 roads. Some of the channels terminate in blind endings on the site. The average ground water level within the project area ranges from 10 m to 45 m below ground level. Groundwater yields are expected to be in the range of 0.2 to 0.8 l/s. There are no known groundwater users in the immediate vicinity of the site.

Although the Leeuwkuil and greater Vereeniging area has a long development history, with coal having been discovered in the region in 1879, no heritage resources are known from the project area or immediate surrounds. From a paleontological perspective the site falls in the Volksrust Formation which could have fossil plants of the *Glossopteris* flora.

The SAB Vereeniging Depot is located directly north of the site. Land west of Lager Road is largely unoccupied, except for the Vereeniging Fresh Produce Market in the north-west. Located south of the R28 are the Emfuleni

Waste Water Works and the kraals and housing of the informal grazers. Land to the east of the R59 is unoccupied up to Grey Street. Beyond this are a number of schools and school hostels. The Leeuhof residential area is in the north east, across the R59. The land north of the property and east of the SAB Depot is vacant (owned by SAB). North of this are the Vereeniging Correctional Centre, a Telkom site, A Department or Roads and Transport site and the Wise Owl Pre-school. SAB are the property owners. The only observed utilisation of the site is the informal grazing of livestock.

5.3 Socio-economic Characteristics

The project site is in the Emfuleni Local Municipality (ELM). The ELM is the westernmost of the three local municipalities comprising the Sedibeng District Municipality in Gauteng Province. The site falls within Ward 11 of the ELM, and is flanked by Wards 12 and 15. The project site is located 2 km west of Vereeniging, currently one of the most important industrial manufacturing centres in South Africa. The local economy is heavily dependent on the steel industry, which has been shrinking over the past decade. The region faces many economic challenges including a poorly performing economic growth rate, high poverty levels, inequalities in terms of incomes, limited employment opportunities as well as youth unemployment.

The area is urban to peri-urban in character with a strong industrial component. Overall the scenic quality rating is low to moderate because of the general sense of deterioration / degradation to the landscape. The site does not evoke a strong or positive sense of place.

The project site is bordered by roads on three sides with Lager Road to the west, the R28 to the South and the R 59 to the east. All of these roads fall under the jurisdiction of the Emfuleni Local Municipality. The site is accessed from Lager Road. Traffic count data from 2018 showed that the Boy Louw-Theunis Kruger Streets intersection operates (for most directions) below acceptable levels of service. All of the other local intersections operate at acceptable levels of service.

The current land-use of the site, or lack thereof, means that the site has almost no direct, indirect or induced effects on the local, regional and national economy. No formal employment results from the site and there is no contribution towards socio-economic development. The informal grazing of livestock is the only current beneficial use of the site. The livestock are owned by about 50 members of the Emfuleni Livestock Committee.

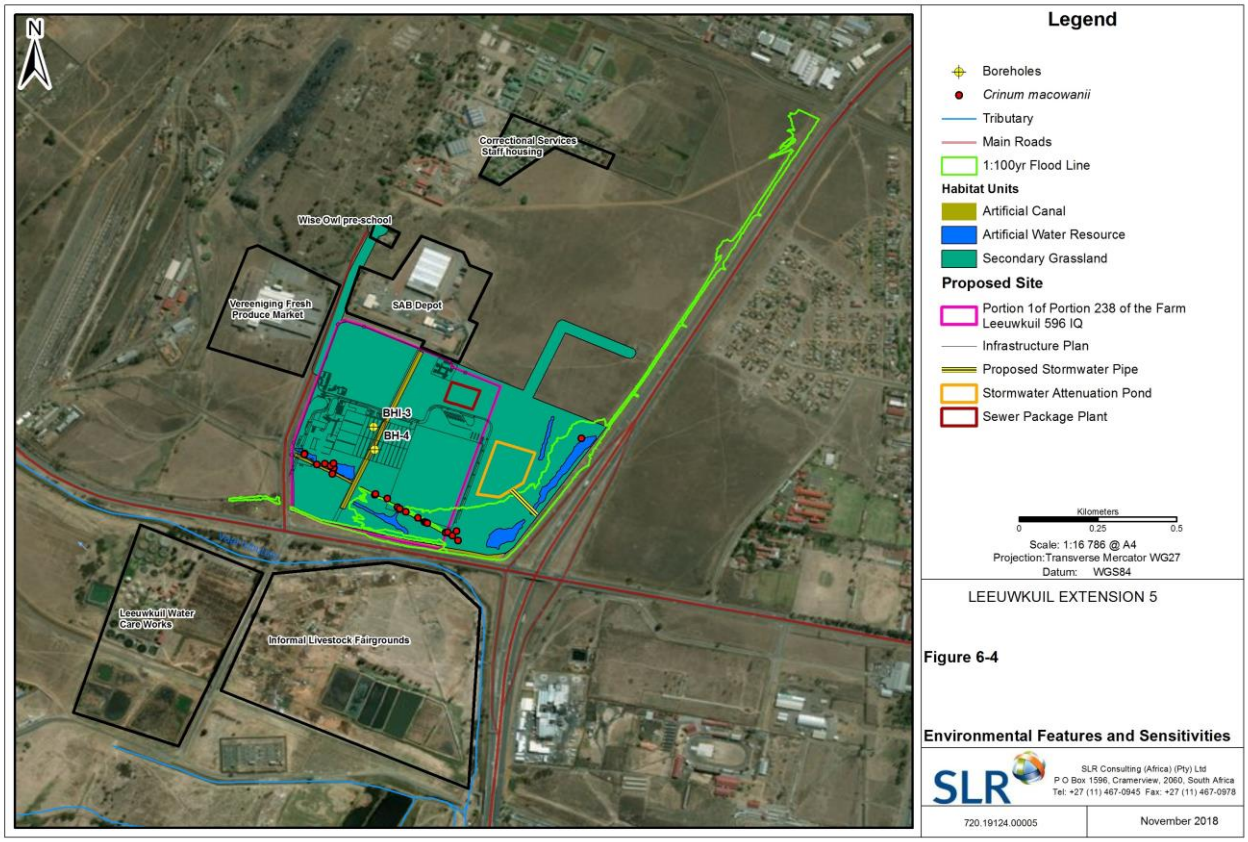


FIGURE 02: ENVIRONMENTAL SENSITIVITIES

6. KEY PROJECT ISSUES

The following key project issues have been identified by the S&EIA project team, with input from I&APs:

Issue	Phase	Response
Air Quality		
Dust generated from vegetation clearing, soil grubbing, material handling and the movement of vehicles on unsurfaced area. Wind erosion from exposed materials. Resulting in increased dustfall on a local scale and higher particulate matter loads.	C	Air quality is a concern as the site is within the Vaal Triangle Air-shed Priority Area. Ambient concentrations for $PM_{2.5}$ and PM_{10} have been recorded to exceed NAAQS daily and annual average limits. Nearby third party receptors may be sensitive to health risks from air quality.
Fuel combustion in the furnaces and ovens could result in sulfur dioxide (SO_2) and nitrogen oxides (NO_X) emissions. Entrainment from vehicles on paved roads and materials handling at batch plant could result in increased dustfall on a local scale and higher particulate matter loads ($PM_{2.5}$ and PM_{10}).	O	It is important that the plant complies with the prescribed minimum emission standards and does not substantially increase ambient concentrations (notably particulates) beyond its boundaries. Air quality issues were investigated by a specialist.

Issue	Phase	Response
Greenhouse gas ($CO2_e$) emissions from the operations are likely to arise primarily from fuel combustion in the furnaces/vehicles and the decarbonisation of raw materials (direct) and consumption of imported electricity (indirect).	O	Energy efficient, gas fired furnaces were selected to reduce greenhouse gas emissions. Greenhouse gas ($CO2_e$) emissions for the 2020 base year were estimated and reduction targets proposed.
Soil and land capability		
Soil could be lost under infrastructure as well as compacted or contaminated during construction activities.	C	Soil is vital for plant growth and overall ecological function. Disturbance and loss should be prevented. Local duplex soil types are susceptible to erosion. Agricultural potential of the site is low. Avoidance of soil loss, compaction or contamination during construction requires planning and management.
Noise		
Primary noise sources are likely to be traffic, earth moving machinery, warning hooters on reversing vehicles	C	Ambient noise levels are typical for the local suburban matrix. Main roads and high traffic volumes (on the R59 and R28) result in somewhat elevated noise levels. It is important that the plant complies with the prescribed noise guidelines and does not substantially increase ambient noise levels beyond its boundaries. Noise issues were investigated by a specialist.
Vehicle traffic, facility warning and information signals, rotating machinery (motors, fans, pumps), turbulent fluid flow, electrical equipment, furnaces and production lines, material handling and maintenance works may result in noise	O	
Vegetation		
Vegetation would be lost under infrastructure as well as disturbed by construction activities. Local vegetation is of the Soweto Highveld Grassland type which is not well conserved.	C	The site has evidence of historical and current disturbance which is likely to reduce the ecological importance of the vegetation type. The site is not mapped as sensitive in the provincial biodiversity conservation plan. It is considered unlikely that the site hosts significant flora. An Ecological Assessment was commissioned.
Aquatic Habitat		
Aquatic resources present on the site would be altered and surface water flows would be redirected. Changes to the quality and volume of run-off water arising from the site could influence downstream aquatic habitats.	C	The site has no natural water features, with the unnamed tributary of the Vaal River being the nearest resource. The aquatic resources present on site appear to be the result of constructed storm water drainage channels. A Fresh Water Resource Verification and Delineation Study and a Surface Water Study were commissioned.
Fauna		
Habitat loss from vegetation and soil clearance, as well as disturbing activities, would chase locally occurring fauna away.	C	The disturbed nature of the site has long limited the habitat and food availability at the site to only common faunal species. It is considered unlikely that the site hosts significant fauna. An Ecological Assessment was commissioned.
Surface Water		
Disturbance of vegetation and the soil profile could result in increased sedimentation of storm water.	C	There are no natural water resources on or immediately adjacent to the site. The application of regular construction management

Issue	Phase	Response
Spillages of chemicals and hydrocarbons from construction activities could contaminate storm water.		measures are anticipated to be appropriate to limit risks to storm water quality during construction.
Handling of particulates (e.g. sand, limestone) could result in increased sediments. Spillages of dangerous goods (e.g. diesel, HFO) could contaminate storm water. The impermeable surfaces (e.g. ~15 ha roof, roads, paving) would increase the volume of runoff and reduce the time of concentration. The increased peak flow generated by the site could cause floods during a storm event.	O	The facility design will give consideration to safe handling and storage of dangerous goods. Operational run-off rates will not exceed pre-development levels. A storm water management plant will be developed to detail controls on water quality and run-off. A Surface Water Study was undertaken by a specialist..
Ground Water		
Spillages of chemicals and hydrocarbons from construction activities could contaminate storm water and soils. If the spillage volume was significant, it could potentially impact the quality of groundwater.	C	Storage and handling of chemicals and hydrocarbons would need to be undertaken in a manner to ensure containment appropriate to the risk posed by the material.
Spillages of chemicals and hydrocarbons from activities could contaminate groundwater. Similarly the runoff from material storage and handling areas may contain contaminants that could seep to groundwater. These could result in a lowering of the quality of groundwater on the site.	O	Groundwater in the region is unlikely to be highly sensitive, nor is significant local use anticipated. Storage and handling of chemicals and hydrocarbons would need to be undertaken in a manner to ensure containment appropriate to the risk posed by the material. A Groundwater Study was undertaken by a specialist..
Heritage		
Development of infrastructure could disturb cultural heritage material, graves and other archaeological material.	C	Initial archaeological work in the area has shown that site is not sensitive in terms of archaeology. The site may be sensitive from a palaeontological point of view A Heritage Impact Assessment was commissioned to identify archaeological heritage and to assess the potential impact on heritage resources.
Land Use and Users		
Land use in the area is generally industrial/commercial or institutional. An anomaly in this regard is the Wise Owl Pre-school, on Lager Street. The location of the school within an industrial area is not ideal. Although owned by SAB, they have not utilised the site. A number of cattle owners, based at the Leeuwkraal Communal Kraal, graze their livestock periodically. At development the property would be fenced and this area would no longer be available for livestock grazing.	C	The municipal SDF identifies the greater Leeuwkuil area for commercial and light industrial use through the densification of open areas. Thus the proposed development is appropriate in terms of the planning and with the other immediately adjacent land uses/users. SAB and the municipality are, in conjunction with the school principal, developing a relocation plan for the Wise Owl Pre-school The reduction in grazing land would likely mean that less livestock could be sustained in the area, or more feed would have to be obtained. A Social Impact Assessment and an Economic Impact Assessment assessed the potential impact on users of the site and adjacent land.

Issue	Phase	Response
Traffic		
The proposed project would result in an increase in traffic volumes, which may affect the level-of-service (LOS) on the existing road network (i.e. increased vehicle trips). Construction traffic is not anticipated as a concern due to its relatively short duration.	O	Operations would result in many vehicles, including light and heavy vehicles, accessing the site on a 24-hr basis. Many of the local roads are designed for high traffic volumes (being Class 1 and 2 roads) and are anticipated to be able to handle the additional traffic. Functionality of the local intersections during peak traffic periods requires investigation. A Traffic Impact Assessment was commissioned.
Visual		
The proposed project could change the fabric and character of the landscape due to its physical presence. The project would be visible (day and night), particularly from view points on the R59 and R28 roads.	C	The removal of vegetation, earthworks, construction camps, building of structures, etc. would be visible from surrounding areas
	O	The visibility of the project would be influenced by its physical presence and the movement of trucks to and from the site. The most significant contribution to visibility and the impact on visual quality would be the scale and bulk of the structures. The potential visual impact of the project was assessed through a Visual Impact Assessment.
Social		
Construction could result in various social impacts with both positive and negative effects: • nuisance type impacts (noise and dust) which could impact sensitive receptors; • public safety may also be influenced as a result of increased traffic and presence of construction workers; • employment opportunities and flow of revenue to local construction companies and service providers, supporting the local economy; and • loss of grazing land	C	Nuisance and safety issues to nearby receptors will be identified across all environmental aspects and measures implemented to prevent or manage such impacts. The Wise Owl Pre-school would be relocated. The loss of grazing is unavoidable, but potentially offset by the other economic benefits. Employment and economic opportunities, both direct and indirect, are likely and commitments will be made to enhance the local influence of these benefits. Mechanisms to ensure appropriate corporate social investment in local communities will be investigated. A Social Impact Assessment was commissioned to assess the potential impact the proposed project would have.
Operations could result in various social impacts with both positive and negative effects: • Reduced air quality could have nuisance and health impacts on local receptors; • The sense of place will be altered by the large structures; • employment opportunities and flow of revenue to local companies and service providers, supporting the local economy; and • opportunities for skills transfer and other corporate social initiatives to improve the economic status of local communities.	O	

Issue	Phase	Response
Economic		
Construction could result in direct employment, the flow of revenue to local companies and service providers, as well as the trickle down of these economic benefits to the local community.	C	The substantial capital investment is likely to increase land values, unless other negative environmental and social impacts affect adjacent land use. The project would generate significantly more employment and economic value than the site currently does. These factors will contribute to economic growth and socio-economic development in the area. Mechanisms to enhance the local influence of these benefits and ensure appropriate corporate social investment in local communities will be investigated. The economic impact of the project was assessed through an Economic Impact Assessment.
Operations could result in various beneficial economic impacts: • the land value of the site and adjacent properties is likely to increase following the investment; • net positive employment; • a cash injection to the local and regional economy; and • facilitation of local socio-economic development through mechanisms such as training skills transfers, entrepreneurship and learnership programmes, local investment and corporate-social investment etc.	O	

7. Impact Assessment Conclusions

A summary of the potential impacts associated with the proposed project is provided below and in Table 0-1. Specialist input was sourced to assess likely impacts of the proposed project on the biophysical, socio-economic and cultural aspects of the environment. The findings of the specialist studies and other relevant information have been integrated and synthesised into this EIAR.

The mitigated assessment assumes that technical design controls, as included in the project scope, together with mitigation measures included in the environmental management programme (EMPr) would be included in the detailed design of the plant and implemented when the plant is constructed and operated. The assessment assumed the relocation of the Wise Owl pre-school prior to construction.

TABLE 0-1: SUMMARY OF THE SIGNIFICANCE OF POTENTIAL IMPACTS ASSOCIATED WITH PROPOSED PROJECT

Potential impact	Significance of impacts	
	Without mitigation	With mitigation
Increase in ambient air concentrations	H	L to M
Loss of agricultural soil resources through physical disturbance	M	VL to L
Loss of agricultural soil resources through contamination	L to M	VL
Increase in disturbing noise levels affecting potential human receptors	M	L
Loss of terrestrial habitat and biodiversity through physical disturbance	M	L
Loss of wetland habitat and biodiversity through physical disturbance	L	VL

Potential impact	Significance of impacts	
	Without mitigation	With mitigation
Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality	L to M	L to VL
Alteration of drainage patterns affecting the flow of water in downstream systems	M	L
Discharges from project affecting the quality of downstream freshwater resources	* Assessed under aquatic habitats	
Contamination of groundwater quality affecting the aquifer	L to M	VL
Alteration of the visual environment	M	L
Economic impact (positive and negative)	H+	H to VH+
Social benefits associated with employment and economic development	L+	M+
Changes in land value	M	L+
Reduction in grazing land affecting livelihoods of local farmers	L	VL+
Disturbance to third party road users by project-related traffic	H	L+
Increase in safety risks to third parties and communities	H	L
Change in land use affecting sense of place	L	VL
Disturbance of ground resulting in damage to heritage resources	No impact	

VH – Very High; H – High; M- Medium; L – Low; VL – Very Low; + denotes a positive impact;

The majority of potential biophysical impacts associated with the proposed glass bottle manufacturing plant would be short-term and limited either to the site or neighbouring land. These include impacts on soils, terrestrial habitats and biodiversity, wetlands, drainage patterns, groundwater aquifers and the visual environment. The ecology of the site and surrounds has been subject to historical and current disturbances. The potential impacts on biophysical aspects are considered to be of **LOW** or **VERY LOW** significance with mitigation.

Operational activities present the most potential for negative air quality impacts as these activities would be conducted over a long period and in an area with already elevated ambient concentrations. More significant impacts are predicted to occur due to $PM_{2.5}$ and PM_{10} emissions from material handling at the batch plant. Design controls and additional mitigation (as recommended by the air quality specialist) would reduce potential impacts. The impact on air quality and the related inhalation health impacts is considered to be of **HIGH** significance without mitigation and **LOW to MEDIUM** significance with design controls and additional mitigation. Maintenance of a high efficiency for emissions controls during operations will be important.

The nearest residential area to the project site is the staff accommodation associated with the correctional services facility and the informal cattle kraals. Potential noise impacts on these receptor groups could be significant during all project phases, more especially at night. Noise controls that focus on mitigating noise emissions at source have been designed into the plant with the addition of a noise screen between the plant and the correctional services staff accommodation. With these design controls and mitigation measures, potential noise impacts could be reduced to **LOW** significance.

Potential discharge of treated effluent from the on-site sewage package plant could impact on the aquatic ecosystem in the downstream Vaal tributary. However the treatment plant would be operated to treat effluent to drinking water standards and the volume is ~1% of discharge from the Leeuwkuil works. Therefore any impacts on downstream aquatic habitats are considered to be of **VERY LOW to LOW** significance with mitigation.

Economic impacts associated with employment and economic development is considered to be of **HIGH** significance even without mitigation. With mitigation this is considered to be of **HIGH to VERY HIGH** significance. The substantial capital investment is likely to increase land values, unless other negative environmental and social impacts affect adjacent land use. The project would generate significantly more employment and economic value than the site currently does. These factors would contribute to economic growth and socio-economic development in the area. The related social benefits are also considered to be positive in nature. Key to realising the **MEDIUM** positive mitigated significance of social benefits associated with increased employment and economic development is to recruit employees and procure services locally as far as possible and implement corporate social responsibility initiatives in the local area.

A reduction in grazing land used by the Emfuleni Livestock Group could affect the livelihoods of local farmers. Even without mitigation this is predicted by the specialist to be of **LOW** significance. Where the Emfuleni Livestock Group is given preference in Corporate Social Responsibility initiatives, the significance of potential impacts is considered to be **VERY LOW positive**.

The project has the potential to present safety risks to third parties through project-related traffic on public roads and uncontrolled access to the site. However with design controls and mitigation, potential safety impacts are considered to be of **VERY LOW** significance. In the case of project-related traffic, proposed road and pedestrian accommodation upgrades would result in a **LOW positive** improvement of the road network.

No impacts on heritage and cultural resources are expected as no heritage resources occur on the project site and palaeontological resources, if they do exist, would be located well below the foundations of the plant.

Proceeding with the project attracts potentially significant economic benefits and potential negative environmental and social impacts of moderate or lower significance. Not proceeding with the project retains the status quo, but with a loss in employment opportunities, revenue generation and related social benefits, which could potentially be generated by the development. The project is located within an area earmarked for commercial and industrial development in the local municipality's spatial development framework and, apart from the Wise Owl pre-school, is surrounded by compatible commercial and industrial type activities.

7.1 Opinion of Environmental Assessment Practitioner

It is the opinion of SLR that in terms of the sustainability criteria described in this report, there is no reason why the proposed project, with implementation of the proposed mitigation measures, should not receive a favourable decision. The management and mitigation measures recommended for the proposed project are detailed in the Environmental Management Programmes for construction and operation (see Appendix 8).

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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
AB InBev	Anheuser-Busch InBev Africa (Pty) Limited
AQMS	air quality monitoring station
BID	Background Information Document
CBAs	Critical Biodiversity Areas
CEAPSA	Certified Environmental Practitioner of South Africa
CR	Critical Endangered
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DRDLR	Department of Rural Development and Land Reform
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIS	Ecological Importance and Sensitivity
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EN	Endangered
ESA	Ecological Support Areas
FEPAs	Freshwater Ecosystem Priority Areas
GDARD	Gauteng Department of Agriculture and Rural Development
GDRDLR	Gauteng Department of Rural Development and Land Reform
GDP	Gross Domestic Product
GN	Government Notice
HWC	Heritage Western Cape
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IFC	International Finance Corporation
IUCN	International Union Conservation of Nature
LC	Least Concern
LOS	Level-of-Service
MAP	Mean Annual Precipitation

Acronym / Abbreviation	Definition
MAR	Mean Annual Runoff
NAAQS	National Ambient Air Quality Standard
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (No. 107 of 1998)
NEM:AQA	National Environmental Management Air Quality Act, 2004 (No. 57 of 2003)
NEM:BA	National Environmental Management Biodiversity Act, 2004 (No. 10 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003)
NEM:WA	National Environmental Management Waste Act, 2008 (No. 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Areas 2011
NHRA	National Heritage Resources Act, 1999 (No. 25 of 1999)
NPAES	National Protected Areas Expansion Strategy
NT	Near Threatened
NWA	National Water Act, 1998 (No. 36 of 1989)
PES	Present Ecological State
PSDF	Provincial Spatial Development Framework
Pr.Sci.Nat.	Registered Professional Natural Scientists
SAB	The South African Breweries (Pty) Limited
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resource Information System
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SCC	species of conservation concern
SDF	Spatial Development Framework
SDM	Sedibeng District Municipality
SLR	SLR Consulting (South Africa) (Pty) Ltd
S&EIA	Scoping and Environmental Impact Assessment
VU	Vulnerable

1 INTRODUCTION

This chapter describes the purpose of this report, provides a brief description of the project background, summarises the legislative authorisation requirements, provides the terms of reference and describes the structure of the report.

1.1 PURPOSE OF THIS REPORT

This Environmental Impact Assessment Report (EIAR) has been compiled and distributed for review and comment as part of a Scoping and Environmental Impact Assessment (hereafter collectively referred to as "S&EIA") process that is being undertaken for the proposal by The South African Breweries (Pty) Limited (hereafter referred to as "SAB"), on behalf of SAB and its future Black owned business partner(s), to develop and operate a majority Black owned, glass bottle manufacturing plant in Vereeniging, Gauteng.

This EIAR presents the:

- legislative requirements;
- approach to the S&EIA methodology;
- proposed project activities;
- key characteristics of the receiving environment;
- findings of specialist studies;
- assessment of potential impacts of the proposed project; and
- mitigation and management measures necessary to avoid or reduce potentially significant impacts.

Interested and Affected Parties (hereafter collectively referred to as "I&APs") are asked to comment on the EIAR (see Section 1.6). The document will then be updated into a final report, giving due consideration to the comments received. The EIAR will be submitted to the Gauteng Department of Agriculture and Rural Development for decision-making as part of the application for an Integrated Environmental Authorisation in terms of Chapter 5 of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), as amended and Chapter 5 of the National Environmental Management: Waste Act, 2008 (No. 59 of 2008) (NEMWA).

1.2 PROJECT BACKGROUND

The SAB utilizes large numbers of glass bottles for the beer that it produces and distributes. Together with future Black owned business partner(s), SAB is proposing to enter the glass bottle manufacturing industry in order to transform its glass bottle procurement spend, whilst providing a unique opportunity for new Black economic entrant(s). The intention is for the facility to be majority Black owned which would also contribute towards the conditions imposed on Anheuser-Busch InBev SA/NV in its merger with SABMiller. Ownership of the plant is still being determined and SAB is likely to only be a minority shareholder in the future business. Any authorisations issued to SAB for the project would thus have to be transferred to the future owners.

The proposed glass bottle manufacturing plant would produce green and amber coloured bottles. The facility would comprise a batch plant, main manufacturing building with gas fired furnaces and a warehouse. The annual glass bottles production target would be approximately 290 000 tons. The proposed facility would be

located on Portion 238[1] (a portion of Portion 149) of the farm Leeuwkuil 596 IQ. The property is owned by SAB. The site is located within the Emfuleni Local Municipality in Vereeniging, Gauteng Province.

SLR Consulting (South Africa) (Pty) Ltd (hereafter referred to as "SLR"), has been appointed as the independent environmental consultant to undertake the S&EIA process for the proposed glass bottle manufacturing plant.

1.3 SUMMARY OF AUTHORISATION REQUIREMENTS

The EIA Regulations 2014 (as amended), promulgated in terms of Chapter 5 of NEMA, provide for the control of certain listed activities. Such listed activities are prohibited from commencing until written authorisation is obtained from the competent authority, which in this case is the Gauteng Department of Agriculture and Rural Development (GDARD). The proposed glass bottle manufacturing project triggers the need for an S&EIA process in order for GDARD to consider the application for Environmental Authorisation.

The project also triggers a waste management activity listed under the schedule made in terms of the National Environmental Management: Waste Act, 2008, and thus requires a Waste Management Licence from the GDARD. As the GDARD is the competent authority in both cases, application has been made to GDARD for an Integrated Environmental Authorisation (Gaut 002/18-19/I0001).

In addition, the proposed project also requires an Atmospheric Emissions Licence from the Sedibeng District Municipality in terms of the National Environmental Management: Air Quality Act, 2004 (No. 39 of 2004) (NEM:AQA).

1.4 TERMS OF REFERENCE

SLR, as the independent environmental assessment practitioner (EAP), is responsible for undertaking the required environmental regulatory process and conducting the public participation process. The terms of reference for the environmental regulatory process are to:

- make application for Environmental Authorisation of the project in terms of NEMA;
- make application for a Waste Management Licence of the project in terms of NEM:WA;
- make application for an Atmospheric Emissions Licence of the project in terms of NEM:AQA;
- ensure the S&EIA is undertaken in accordance with the requirements of NEMA, NEM:WA and the EIA Regulations 2014 (as amended);
- ensure the S&EIA is undertaken in an open, participatory manner to ensure that all potential impacts are identified;
- undertake a formal public participation process, which includes the distribution of information to I&APs and provides the opportunity for I&APs to raise any concerns/issues, as well as an opportunity to comment on all S&EIA documentation;

[1] A town planning application has been completed to subdivide and rename this as Portion 295 of the farm Leeuwkuil 596 IQ.

Separate electronic file

FIGURE 1-1: REGIONAL SETTING OF THE PROPOSED GLASS BOTTLE MANUFACTURING PLANT

- commission specialist studies to assess key issues and concerns identified during the scoping process; and
- integrate all the information, including the findings of the specialist studies and other relevant information, into an Environmental Impact Assessment Report (EIAR) to allow an informed decision to be taken on authorisations for the proposed project.

1.5 STRUCTURE OF THIS REPORT

This EIAR has been prepared in compliance with Appendix 3 of the EIA Regulations, 2014 (as amended) and is divided into various chapters and appendices, the contents of which are outlined below.

Section	Contents
Executive Summary	Provides a comprehensive synopsis of the Environmental Impact Assessment Report.
Chapter 1	**Introduction** Describes the purpose of this report, provides a brief description of the project background, summarises the legislative authorisation requirements, provides the terms of reference, describes the structure of the report, and outlines the opportunity for comment.
Chapter 2	**Legislative requirements** Outlines the key legislative requirements applicable to the proposed project.
Chapter 3	**S&EIA methodology** Outlines the methodology for the assessment and consultation process undertaken in the S&EIA. Also includes a summary of the public participation process undertaken to date and the results thereof.
Chapter 4	**Need and desirability** Provides an overview of the need and desirability for the proposed project by considering how the project is aligned with the strategic context of national development policy and planning, broader societal needs and regional and local planning, as appropriate.
Chapter 5	**Project description** Provides general applicant and project information; presents a description of the proposed project; and a description of the project alternatives.
Chapter 6	**Description of the affected environment** Describes the existing biophysical and social environment that could potentially be affected by the proposed project.
Chapter 7	**Impact description and Assessment** Describes and assesses the potential impacts on the affected environment as related to the proposed project. It also presents mitigation/management or optimisation measures that could be used to reduce the significance of any negative impacts or enhance any benefits, respectively.
Chapter 8	**Conclusion and Recommendations** Provides conclusions to the EIA and summarises the project controls, mitigation and monitoring measures that would be implemented for the proposed project.
Chapter 9	**References** Provides a list of the references used in compiling this report.
Appendices	Appendix 1: EAP undertaking Appendix 2: Curricula Vitae (including registrations) of the EAPs Appendix 3: Authority Correspondence Appendix 3.1: GDARD Acceptance of the Scoping Report Appendix 3.2: DWS Correspondence Appendix 3.3: AEL Correspondence Appendix 4: Method of impact identification and assessment

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1.6 OPPORTUNITY TO COMMENT

This EIAR has been distributed for a 30-day comment period from **13 November 2018 to 14 December 2018** in order to provide I&APs with an opportunity to comment on any aspect of the proposed project and the findings of the S&EIA process. Copies of the full report have been made available on the SLR website (at https://slrconsulting.com/za/slr-documents/sab-glass-bottle-plant) and at the following location:

Name of Facility	Physical Address and tel.
Vereeniging Public Library	Corner Leslie and Market Street, Vereeniging

Any comments should be forwarded to SLR at the address, telephone/fax numbers or e-mail address shown below. For comments to be included in the updated EIAR, comments should reach SLR by **no later than 14 December 2018**.

SLR Consulting (South Africa) (Pty) Ltd
Attention: Matthew Hemming

PO Box 1596, Cramerview 2060

Tel: (011) 467 0945
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E-mail: mhemming@slrconsulting.com

2 LEGISLATIVE REQUIREMENTS

This chapter outlines the key legislative requirements applicable to the proposed project.

2.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998

The National Environmental Management Act, 1998 (No. 107 of 1998), as amended, establishes principles and provides a regulatory framework for decision-making on matters affecting the environment. Section 2 of NEMA sets out a range of environmental principles that are to be applied by all organs of state when taking decisions that significantly affect the environment. Included amongst the key principles is that all development must be socially, economically and environmentally sustainable and that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. The participation of I&APs is stipulated, as is that decisions must take into account the interests, needs and values of all I&APs.

Chapter 5 of NEMA provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for granting of environmental authorisations. To give effect to the general objectives of Integrated Environmental Management (IEM), the potential impacts on the environment of listed or specified activities must be considered, investigated, assessed and reported on to the competent authority. Section 24(4) provides the minimum requirements for procedures for the investigation, assessment, management and communication of the potential impacts.

In terms of the management of impacts on the environment Section 24N details the requirements for an Environmental Management Programme (EMPr).

2.1.1 EIA Regulations 2014

The EIA Regulations, 2014[2] promulgated in terms of Chapter 5 of NEMA, and published in Government Notice (GN) No. R982 provide for control over certain listed activities. These activities are detailed in Listing Notice 1 (as amended by GN No. 327 of 7 April 2017), Listing Notice 2 (as amended by GN No. 325 of 7 April 2017) and Listing Notice 3 (as amended by GN No. 324 of 7 April 2017). The undertaking of activities specified in the Listing Notices is prohibited until Environmental Authorisation has been obtained from the competent authority. Such Environmental Authorisation, which may be granted subject to conditions, will only be considered once there has been compliance with the EIA Regulations, 2014.

The EIA Regulations, 2014 set out the procedures and documentation that need to be complied with when applying for Environmental Authorisation. A Basic Assessment process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notices 1 and/or 3 and a Scoping and EIA process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notice 2.

[2] as amended by GN No. 326 of 7 April 2017

SAB's proposed glass bottle manufacturing project includes activities specified in listing notices 1 and 2 (see Table 2-1), thus it is necessary that a Scoping and EIA process is undertaken in order for GDARD to consider the application in terms of NEMA.

TABLE 2-1: NEMA LISTED ACTIVITIES APPLIED FOR AS PART OF THE PROPOSED PROJECT

No.	Activity description	Description of activity in relation to the proposed project
Listing Notice 1 (as amended by GN No. 327 of April 2017)		
27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Development of the glass bottle manufacturing plant will require the clearance of approximately 14 ha of indigenous vegetation.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	Development of the glass bottle manufacturing plant, located inside the urban area, will result in more than 5 ha of land previously used for agriculture being developed as an industrial site.
Listing Notice 2 (as amended by GN No. 325 of April 2017)		
4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	Operation of the glass bottle manufacturing plant may cumulatively require for more than 500 cubic metres of dangerous goods to be stored on site.
6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding - (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies;	The gas furnaces of the glass bottle manufacturing plant will release emissions to the atmosphere, and this requires a licence in terms of the NEM:AQA.
Listing Notice 3 (as amended by GN No. 324 of April 2017)		
	none	na

2.1.2 Gauteng Provincial Environmental Management Framework Standard

The Gauteng Provincial Environmental Management Framework (GPEMF) Phase 2 is a tool developed to streamline the requirements for an environmental impact assessment (EIA), reduce timeframes for approvals and to contribute towards reducing the cost of doing business in Gauteng. In this tool, a number of the NEMA listed activities are excluded from the requirement to obtain an environmental authorisation. These excluded activities are applicable only in Environmental Management Zones 1 and 5 of the GPEMF, 2015.

It is noted that while the proposed glass bottle manufacturing site falls within the extent of Zone 1 of the GPEMF, the activities which are triggered by the project are not excluded by the GPEMF. Thus Environmental Authorisation is required.

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008

The National Environmental Management: Waste Act, 2008 (No. 59 of 2008) regulates all aspects of waste management and has an emphasis on waste avoidance and minimisation. NEM:WA creates a system for listing and licensing waste management activities which may have a detrimental effect on the environment. Listed waste management activities (GN R 921, November 2013) above certain thresholds are subject to a process of impact assessment and licensing. The assessment and reporting process in support of a Waste Management Licence must be undertaken in accordance with the EIA Regulations, 2014. These Regulations define the requirements for the submission; processing, consideration and decision of applications authorisation of listed activities (refer to Section 2.1.1). Activities listed in Category A require a Basic Assessment process, while activities listed in Category B require a Scoping and EIA process in order for GDARD to consider the application in terms of NEM:WA.

The recycling of glass cullet in the proposed glass bottle manufacturing plant triggers a listed activity in terms of NEM:WA and thus a Waste Management Licence will be required by SAB. The waste management activities for which authorisation has been applied are shown in Table 2-2. As an S&EIA process is already being conducted in terms of the NEMA, such process will inform the Waste Management Licence application.

Given that the GDARD is the competent authority for both the Waste Management Licence and Environmental Authorisation, application was made for an Integrated Environmental Authorisation in terms of Section 24L of the NEMA (Ref: Gaut 002/18-19/I0001).

NEM:WA also provides for the setting of national norms and standards for various waste management activities. A number of norms and standards have been published. The Norms and Standards for Waste Storage (GN R. 926 of 2013) are relevant to the project with regards to cullet storage.

TABLE 2-2: LISTED WASTE MANAGEMENT ACTIVITIES APPLIED FOR AS PART OF THE PROPOSED PROJECT

No.	Activity description	Description of activity in relation to the proposed project
Category A of GN No. R 921, November 2013 (as amended)		
3	The recycling of general waste at a facility that has an operational area in excess of 500 m^2, excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises.	Glass cullet sourced from a variety of suppliers will be incorporated into the glass manufacturing process. This constitutes the recycling of waste.
12	The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity)	Facilities will be constructed to enable cullet to be recycled into the glass manufacturing process.

2.3 NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004

The National Environmental Management: Air Quality Act, 2004 (No. 39 of 2004) regulates all aspects of air quality, including: prevention of pollution and environmental degradation; providing for national norms and standards regulating air quality monitoring, management and control; and licencing of activities that result in atmospheric emissions and have or may have a significant detrimental effect on the environment. The NEM:AQA has established a National Framework for Air Quality Management with various standards being implemented.

In terms of Section 22 of NEM:AQA, no person may conduct a listed activity (as per GN No. 893, 22 November 2013) without an Atmospheric Emission Licence (AEL). Glass production is identified as a listed activity (Sub-category 5.8) in terms of NEM:AQA and thus an AEL is required by SAB. See Table 2-3 for the relevant minimum emission standards.

The design of the proposed glass manufacturing plant includes a Ceramic Candle Filter designed to achieve emissions lower than those indicated in Table 2-3.

TABLE 2-3: MINIMUM EMISSION STANDARDS FOR SUB-CATEGORY 5.8

Description	The production of glass containers, flat glass, glass fibre and mineral wool.		
Application	All installations producing 100 ton per annum or more.		
Substance or mixture of substances		**Plant Status**	**mg/Nm^3 under normal conditions of 10% O2, 273 Kelvin and 101.3 kPa**
Common name	**Chemical symbol**		
Particulate Matter	N/A	New	30
Oxides of nitrogen	NOx expressed as NO_2	New	1500
Sulphur Dioxide (**gas** fired furnace)	SO_2	New	800

2.3.1.1 National Ambient Air Quality Standards

National Ambient Air Quality Standards (NAAQS) were determined based on international best practice for inhalable particulate matter ($PM_{2.5}$), thoracic particulate matter (PM_{10}), sulfur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), ozone, lead and benzene. The NAAQS permit a frequency of exceedance (FOE) of 1% per year (88 hours or 4 days per year for 1-hour and 24-hour average concentrations) for some pollutants.

Simulated ambient air pollutant concentrations will be assessed against NAAQS (Table 2-4), where $PM_{2.5}$; PM_{10}; SO_2; and, NO_2 are the criteria pollutants of concern.

TABLE 2-4: NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	Limit Value (µg/m³)	Limit Value (ppb)	Frequency of Exceedance	Compliance Date
C_6H_6	1 year	10	3.2	0	Immediate – 31 Dec 2014
	1 year	5	1.6	0	1 Jan 2015
CO	1 hour	30000	26000	88	Immediate
	8 hour[(a)]	10000	8700	11	Immediate
Pb	1 year	0.5	-	0	Immediate
NO_2	1 hour	200	106	88	Immediate
	1 year	40	21	0	Immediate
PM_{10}	24 hour	120	-	4	Immediate – 31 Dec 2014
	24 hour	75	-	4	1 Jan 2015
	1 year	50	-	0	Immediate – 31 Dec 2014
	1 year	40	-	0	1 Jan 2015
$PM_{2.5}$	24 hour	65		4	Immediate – 31 Dec 2015
	24 hour	40	-	4	1 Jan 2016 – 31 Dec 2029
	24 hour	25	-	4	1 Jan 2030
	1 year	25	-	0	Immediate – 31 Dec 2015
	1 year	20[(a)]	-	0	1 Jan 2016 – 31 Dec 2029
	1 year	15	-	0	1 Jan 2030
SO_2	10 minutes	500	191	526	Immediate
	1 hour	350	134	88	Immediate
	24 hour	125	48	4	Immediate
	1 year	50	19	0	Immediate

2.3.1.2 Air Quality Management Plan for the Vaal Triangle

The Vaal Triangle Air-shed was the first priority area in South Africa, declared by the Minister in April 2006, and was identified as an area with poor ambient air quality that required specific air quality management action to rectify the situation. An Air Quality Management Plan must be developed for the area. The plan will include the establishment of emissions reduction strategies and intervention programs based on the findings of a baseline characterisation of the area. The implication of this is that all contributing sources in the area will be assessed to determine the emission reduction targets to be achieved over the following few years.

In May 2009 the DEA published the Air Quality Management Plan for the Vaal Triangle Air-Shed Priority Area. Regulations for implementing and enforcing the Vaal Triangle Air-Shed Priority Area Air Quality Management Plan were also promulgated.

It is noted that the proposed glass bottle manufacturing site falls within the extent of the Vaal Triangle Air-Shed Priority Area and that the requirements of the Air Quality Management Plan require consideration when the application for an AEL is made.

2.3.1.3 National Dust Control Regulations

The National Dust Control Regulations (NDCR) was gazetted on 1 November 2013 (No. 36974). The purpose of the regulations is to prescribe general measures for the control of dust in all areas including residential and light commercial areas. The standard for acceptable dustfall rate is set out in Table 2-5. The method to be used for measuring dustfall rate and the guideline for locating sampling points shall be ASTM D1739: 1970, or equivalent method approved by any internationally recognized body. The measurement of dustfall and the submission of a dust mitigation plant is only applicable to those installation identified, and notified by written notice, by the local air quality officer. Dustfall is assessed for nuisance impact and not an inhalation health impact.

TABLE 2-5: ACCEPTABLE DUSTFALL RATES

Restriction Area	Dustfall Rate (mg/m².day, 30 day average)	Permitted Frequency of Exceeding Dustfall Rate
Residential area [a]	D<600	Two in a year, not sequential months
Non-residential area [b]	600<D<1200	Two in a year, not sequential months

Notes:

(a) Applicable at the sensitive receptors and residential areas near the site
(b) Applicable within the industrial area

2.3.1.4 National Atmospheric Emission Reporting Regulations

The purpose of these Regulations is to regulate reporting of data and information from an identified point, non-point and mobile sources of atmospheric emissions to an internet-based National Atmospheric Emissions Inventory System towards the compilation of atmospheric emission inventories. The NAEIS is a component of the South African Air Quality Information System (SAAQIS). Its objective is to provide all stakeholders with relevant, up to date and accurate information on South Africa's emissions profile for informed decision making.

The Regulations set out that any person who undertakes a listed activity in terms of section 21(1) of the Act must report their emissions in the format required for National Atmospheric Emissions Inventory System and should be in accordance with the atmospheric emission license or provisional atmospheric emission license. As per the regulation, the operator and/or their data provider must register on the NAEIS within 30 days after

commencing with proposed activities. A data provider must submit the required information for the preceding calendar year to the NAEIS by 31 March of each year. Records of data submitted must be kept for a period of 5 years and must be made available for inspection by the relevant authority.

2.3.1.5 National Greenhouse Gas Emission Reporting Regulations

The purpose of these Regulations is to introduce a single national reporting system for the transparent reporting of greenhouse gas emissions, which will be used -

1. to update and maintain a National Greenhouse Gas Inventory;
2. for the Republic of South Africa to meet its reporting obligations under the United Framework Convention on Climate Change (UNFCCC) and instrument treaties to which it is bound; and
3. to inform the formulation and implementation of legislation and policy.

The Regulations require that facilities with more than 10 MW_{th} installed capacity register at the Department of Environmental Affairs and report their greenhouse gas emissions on an annual basis. Refer to Appendix 5.2 for a preliminary calculation of potential greenhouse gas emissions.

2.3.1.6 National Pollution Prevention Plans Regulations

The purpose of these Regulations is to prescribe the requirements that pollution prevention plans of greenhouse gases declared as priority air pollutants need to comply with section 29(3) of the Act. A first pollution prevention plan must cover a period from the date of promulgation of these Regulations up to 31 December 2020 and the subsequent pollution prevention plans must cover periods of five calendar years each.

The estimated emission of the SAB plant will exceed 100,000 tons of CO_{2e} per year, and SAB will therefore also have to submit a pollution prevention plan in terms of the National Pollution Plan Regulations. Refer to Appendix 5.2.

2.4 NATIONAL HERITAGE RESOURCES ACT, 1999

The National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA) provides for the identification, assessment and management of the heritage resources of South Africa. Section 38(1) of the NHRA lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed project include the following:

"(a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; …

(c) Any development or other activity which will change the character of a site;

(i) exceeding 5 000 m² in extent".

The NHRA requires that a person who intends to undertake a listed activity notify the relevant provincial heritage authority at the earliest stages of initiating such a development. The relevant provincial heritage authority would then in turn, notify the person whether a Heritage Impact Assessment (HIA) should be submitted. However, according to Section 38(8) of the NHRA, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment

Conservation Act (No. 73 of 1989) (now replaced by NEMA) or any other applicable legislation. The decision-making authority should, however, ensure that the heritage evaluation fulfils the requirements of the NHRA and take into account in its decision-making any comments and recommendations made by the relevant heritage resources authority.

An application was submitted to the South African Heritage Resources Association (SAHRA) on 11 June 2018 (SAHRA Case No. 12574). SAHRA required that a phase 1 Heritage Impact Assessment should be done by an accredited specialist. SAHRA also required that if located in potentially fossiliferous superficial deposits, a Palaeontological Desk Top study should be done. A Heritage Impact Assessment and Palaeontological Desk Top study were undertaken (see Appendix 5.9). These reports have been supplied to SAHRA.

2.5 NATIONAL WATER ACT, 1998

The National Water Act, 1998 (No. 36 of 1998) (NWA) provides a legal framework for the effective and sustainable management of water resources in South Africa. It serves to protect, use, develop, conserve, manage and control water resources as a whole, promoting the integrated management of water resources with the participation of all stakeholders. This Act also provides national norms and standards, and the requirement for authorisation (either a Water Use Licence or General Authorisation) of water uses listed in Section 21 of the Act.

None of the direct project activities trigger the need for a Water Use Licence in terms of Section 21 of the NWA. However, various components of the proposed support infrastructures are anticipated to trigger water uses in terms of Section 21 of the NWA. This includes:

- the bulk potable water supply pipeline (~250 mm diameter) crossing the Vaal Tributary at two locations;
- the discharge of treated wastewater from the package sewage treatment plant; and
- irrigation of treated wastewater from the package sewage treatment plant.

It is likely that these activities could be approved by the DWS via a General Authorisation rather than through a water use licensing process. The Minister has published General Authorisations, which replace the need for a water user to apply for a licence in terms of the NWA, provided that the water use is within the limits and conditions of the General Authorisation (GA). See the sections below.

2.5.1 General Authorisation for water uses defined in in Section 21 (e) or Section 21(f)

The proposed package plant for the on-site treatment of sewage will generate treated waste water (~ 180 kl/day) that requires to be managed. The two options available include release to the environment and irrigation to land.

General Authorisation (GN R 399 of 2004, as amended by GN 665) permits the discharge of up to 2 000 cubic metres of wastewater on any given day into a water resource provided the discharge complies with the general wastewater limit values set out in the GA, does not alter the natural ambient water temperature and is not complex industrial wastewater.

Irrigation of waste water to land is a controlled activity in terms of Section 37 of the NWA. General Authorisation (GN R 398 of 2004, as amended by GN 665) permits the irrigation of up to 2000 cubic metres of domestic and biodegradable industrial waste water on any given day subject to waste water limit values, provided that the irrigation does not impact on the water resource, any other persons water use, property or land and is not detrimental to the health and safety of the public.

Treated waste water produced by the proposed package plant will meet the waste water limits set in the GA and would be discharged/irrigated at a rate lower than permitted in the GA. Application has been made to the DWS for General Authorisation.

2.5.2 General Authorisation for Water Uses defined in Section 21 (c) or Section 21(i)

General Authorisation (GN R 509 of 2016) introduced the concept of the “regulated area of a watercourse" for section 21(c) or (i) water uses. In terms of the Notice this means:

a. The outer edge of the 1 in 100 year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;

b. In the absence of a determined 1 in 100 year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or

c. A 500 m radius from the delineated boundary (extent) of any wetland or pan.

The applicant has confirmed that project infrastructure is designed to fall outside of the 1:100 flood lines and regulated area of a watercourse (see Section 6.2.8.2). As a result there is no direct water use for the project in terms of Section 21(c) or (i) of the NWA. However, the alternative bulk water supply pipeline from the Rand Water connection in Botha Road would cross the Vaal Tributary at two locations (likely pinned to the existing road bridge). At these locations the pipeline would enter the regulated area of a watercourse and this has the potential to influence the flow and characteristics of the watercourse.

General Authorisation (GN R 509 of 2016) provides for water users to exercise section 21 (c) or (i) water uses without a water use licence, provided that the use has a low risk class as determined through the Risk Matrix. Scientific Aquatic Services undertook the DWS risk assessment for the bulk water pipeline at the watercourse crossing and confirmed that the activity has a low risk (see Appendix 5.6). Application has been made to the DWS for General Authorisation.

2.6 NATIONAL ENVIRONMENTAL MANAGEMENT: PROTECTED AREAS ACT, 2003

The National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003) (NEM:PAA), as amended, provides for the protection and conservation of ecologically viable areas representative of South Africa’s biological diversity and its natural landscapes and seascapes.

The proposed project footprint does not overlap with any existing protected areas or any areas identified for protected area expansion (see Section 6.2.8 for further information on protected areas).

2.7 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004

National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004) (NEM:BA) provides for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection.

NEM:BA regulates the carrying out of restricted activities, without a permit, that may harm listed threatened or protected species or activities that encourage the spread of alien or invasive species. NEM:BA also makes provision for the publication of bioregional plans and the listing of ecosystems and species that are threatened or in need of protection. Within the published bioregional (spatial) plan, terrestrial and aquatic features that are critical for conserving biodiversity and maintaining ecosystem functioning are indicated as Critical Biodiversity Areas (CBAs). Bioregional plans provide the guidelines for avoiding the loss or degradation of natural habitat in CBAs with the aim of informing EIAs and land-use planning, including Environmental Management Frameworks (EMFs), Spatial Development Frameworks (SDFs) and Integrated Development Plans (IDPs).

Chapter 3 of the "Guideline regarding the determination of bioregions and the preparation of and publication of bioregional plans" requires environmental decision-makers who are required by NEMA to apply the NEMA Section 2 principles in their decision-making to consider, amongst other things, sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems, which require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure. CBAs identified in a bioregional plan should be considered to be such areas and should, therefore, be considered by decision-makers in the course of the decision making process. Thus bioregional plans should be considered by competent authorities in their decision-making regarding an application for Environmental Authorisation.

Alien and Invasive Species Regulations (GN R 598 of 2014) as well as the Alien and Invasive Species List (GN R 864 of 2016) have been published to regulate the monitoring, control and eradication for listed invasive species. The Regulations are effective from 1 October 2014 and it is therefore necessary for all land owners on whose land alien and invasive species occur to make the necessary arrangements to be compliant with these Regulations. This may include studies to identify the existence of alien and invasive species, the determination of the category in the Alien and Invasive Species List and the implementation of programmes to combat or control such species.

2.8 LEGISLATION CONSIDERED IN THE PREPARATION OF THE EIAR

In accordance with the EIA Regulations 2014 (as amended), all legislation and guidelines that have been considered in the S&EIA process must be documented. Table 2-6 below provides a summary of the applicable legislative context and policy.

TABLE 2-6: LEGAL FRAMEWORK

Applicable legislation and guidelines	Relevance or reference
National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA)	Refer to Section 2.1.
EIA Regulations 2014, as amended (GN No. R982), Listing Notice 1 (GN No. R983), Listing Notice 2 (GN No. R984) and Listing Notice 3 (GN No. R985)	Refer to Section 2.1.1 and Table 2-1. The proposed project triggers activities listed in all three Listing Notices and, therefore, requires an EIA process to inform the application for Environmental Authorisation. This EIAR has been compiled in accordance with Appendix 3 of the EIA Regulations 2014.
National Environmental Management Waste Act, 2008 (No. 59 of 2008) (NEM:WA) and associated regulations.	Refer to Section 2.2
National Environmental Management Air Quality Act, 2004 (No. 57 of 2003) (NEM:AQA).	Refer to Section 2.3.
National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA)	Refer to Section 2.4.
National Water Act, 1998 (No. 36 of 1989) (NWA)	Refer to Section 2.5.
General Authorisations published in terms of the NWA.	Refer to Sections 2.5.1 and 2.5.2
National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003) (NEM:PA)	Refer to Section 2.6.
National Environmental Management Biodiversity Act, 2004 (No. 10 of 2004) (NEM:BA).	Refer to Section 2.7.
National Forests Act, 1998 (No 84 of 1998)	This Act provides for the sustainable management and development of forests for the benefit of all, including providing special measures for the protection of certain forests and trees. Licensing is required for the destruction of certain indigenous trees. The proposed project would not entail any activities to which the Act applies.
Mountain Catchment Areas Act, 1970 (No 63 of 1970)	This Act provides for the conservation, use, management and control of land situated in mountain catchment areas. The proposed project would not entail any activities to which the Act applies.
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) and the Conservation of Agricultural Resources Act Regulations, 1984 (GN No. 1048)	The CARA provides for control over the utilization of the natural agricultural resources in order to promote the conservation of the soil, water sources, vegetation and the combating of weeds and invader plants. Land owners on whose land declared weed species occur must make the necessary arrangements to be compliant with the CARA Regulations.
Occupational Health and Safety Act, 1993 (No. 85 of 1993) and Major Hazard Installation Regulations	This Act provides for the health and safety of persons at work and the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work. Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees. The applicant will need to ensure compliance with the requirements of the Act during both construction and operations. Such requirements are not considered in the EIA.
The Spatial Planning and Land Use Management Act, 2013	SPLUMA aims to develop a new framework to govern planning

Applicable legislation and guidelines	Relevance or reference
(No. 6 of 2013) (SPLUMA)	permissions and approvals, sets parameters for new developments and provides for different lawful land uses in South Africa. SPLUMA is a framework law, which means that the law provides broad principles for a set of provincial laws that will regulate planning. SPLUMA also provides clarity on how planning law interacts with other laws and policies. SAB has made application for a subdivision and rezoning of the property to enable the project. Such requirements are not considered in the EIA.

2.9 GUIDELINES, POLICIES, PLANS AND FRAMEWORKS

The guidelines listed below have been or will be taken into account during the S&EIA process.

TABLE 2-7: GUIDELINE AND POLICY FRAMEWORK

Guideline	Governing body	Relevance
Public participation guideline in terms of NEMA (2017)	DEA	The purpose of this guideline is to ensure that an adequate public participation process is undertaken during the Scoping and EIA Process.
Guideline on need and desirability (2017)	DEA	This guideline informs the consideration of the need and desirability aspects of the proposed project.
GDARD Requirements for Biodiversity Assessments (2012)	GDARD	This document sets out the GDARD requirements for biodiversity assessment methods and reporting.
National Development Plan 2030	NPC	The National Development Plan 2030 (NDP) is the overarching development planning policy for the country, to which all other development planning, in particular spatial planning, must be aligned. The NDP outlines South Africa's Vision, and provides the Framework for eliminating poverty and reducing inequality by 2030.
Medium-Term Strategic Framework (MTSF) 2014-2019	NPC	Provides Government's Strategic Plan for the 2014-2019 electoral term.
Gauteng Vision 2055 (Gauteng City Region) 2012	GPG	The Gauteng Vision 2055 "plan", envisages an integrated, globally competitive Gauteng City Region (GCR). This plan calls for: - Establishment of a shared vision and strategy; - Enhanced co-operation and coordination amongst all regional stakeholders; - Improved governance practices; - Better urban management; - A focus on acting together in the global arena.
Gauteng Strategic Plan 2015-2019	GPG	In order to realise the NDP, Gauteng Provincial Government (GPG) has taken active decisive steps to make Gauteng an integrated city-region characterised by social cohesion and economic inclusion over the next five-to-fifteen years. The Province has adopted a ten-pillar programme of Transformation, Modernisation and Re-industrialisation. Municipalities were tasked to integrate the ten-pillars into their IDPs. The

Guideline	Governing body	Relevance
Gauteng Employment Growth and Development Strategy, 2009-2014	GPG	Provides a set of strategic choices and programmes that will build a strong and sustainable Gauteng economy in which all can access economic opportunities and enjoy decent work.
Gauteng Spatial Development Framework 2030	GPG	The Gauteng Spatial Development Framework (GSDF) 2030 envisions a province that is an integrated, connected space that provides for the needs of all who are born in or drawn to the province. Economic growth is spread widely, beyond the core areas, to nodes and multi-modal activity corridors. To realise the spatial development vision, all developments in the province need to adhere to six spatial development principles: (i) liveability, (ii) concentration, (iii) connectivity, (iv) conservation, (v) diversity, and (vi) viability.
Sedibeng Growth and Development Strategy (SGDS) 2	SDM	The shared, long-term vision set out in the Growth and Development Strategy is that in 2030 Sedibeng is well known as a leading "Metropolitan River City" with a strong, diverse economy and high quality standard of living. It is a city success story where all its residents enjoy a healthy and safe environment and where everyone works, learns, earns and plays together. The Growth and Development Strategy provides a plan of action for growth and development that aligns with and translates national and provincial objectives into practical interventions.
Sedibeng District Municipality, Integrated Development Plan (2017-2021)	SDM	The IDP aims to guide the municipality in the collective endeavours of building a better life for all our communities. The IDP aims to realize the NDP and the SGDS through: - Reinventing the Economy; - Renewing our communities; - Reviving a Sustainable Environment; - Reintegrating the region; - Releasing Human Potential; - Good Governance; and - Deepening Democracy.
Sedibeng District Municipality, Spatial Development Framework (2014- 2017)	SDM	The overarching key issues for spatial planning of the Sedibeng District can be summarized as follows: 1. Sedibeng needs to develop policies that support inherent strengths and intrinsic potentials of the area across municipal and provincial boundaries; 2. Current disjointed policies need to be reformulated to address the strategic development of the District as a functional entity; 3. Law enforcement needs to be improved; 4. Policy and strategy is required for integrated planning, densification and the prevention of sprawl; and 5. Development needs to be focused on areas that will have the largest impact and will facilitate sustainable development by addressing the social, environmental and economic elements of the district.
Vaal 21 Initiative	SDM	Vaal 21 initiative was introduced and approved by SDM to bring together all the municipalities along the Vaal River to leverage off the potential of the river to enhance development. The Vaal 21 initiative will be implemented through a set of GDS and IDP flagship projects. The Vaal 21 municipalities have committed

Guideline	Governing body	Relevance
		themselves to collectively grow and stimulate the Vaal region economy.
Emfuleni Local Municipality, Integrated Development Plan (2017/18 – 2020/21)	ELM	The IDP reflects the municipalities' alignment to the NDP, the GPG programme of Transformation, Modernisation and Re-industrialisation and the seven strategies of the SGDS. The ELM is committed to fast-track and accelerate service delivery through the theme of 'Getting the Basics Right: Our Programme for Restoration'.
Emfuleni Local Municipality, Spatial Development Framework (2017-2025)	ELM	The SDF is an overall strategic land development document that provides municipal-wide strategic direction in terms of spatial development patterns, the promotion of economic development in close proximity to residential developments, the conservation of valued environmental assets, the enhancement of the effectiveness of public capital projects, the optimization of existing and planned municipal engineering infrastructure, the promotion of tourism and agricultural industries, and the reversing of distorted spatial human settlement patterns.

3 EIA METHODOLOGY

This chapter outlines the assessment methodology and I&AP consultation process followed in the S&EIA process.

3.1 DETAILS OF THE EIA PROJECT TEAM

As noted in Chapter 1, SLR has been appointed by SAB as the independent EAP to undertake the S&EIA for the proposed glass bottle manufacturing project. The details of the EAP project team that are undertaking this S&EIA are provided in Table 3-1.

SLR has no vested interest in the proposed project other than fair payment for consulting services rendered as part of the S&EIA process and has declared its independence as required by the EIA Regulations 2014 (as amended). An undertaking by the EAP is provided in Appendix 1.

TABLE 3-1: DETAILS OF THE EIA PROJECT TEAM

General				
Organisation	SLR Consulting (South Africa) (Pty) Ltd			
Postal address	PO Box 1596, Cramerview, 2060			
Tel No.	(011) 467 0945			
Fax No.	(011) 467 0978			
Name	**Qualifications**	**Professional registrations**	**Experience (Years)**	**Tasks and roles**
Jonathan Crowther (SLR)	M.Sc. (Env. Sci.). University of Cape Town	Pr.Sci.Nat., CEAPSA, Member IAIAsa	30	Report and process review
Matthew Hemming (SLR)	M.Sc. (Cons. Biol.), University of Cape Town	Pr.Sci.Nat., Member IAIAsa	12	Management of the S&EIA process, including public consultation, process review, specialist study review and report compilation.

3.1.1 Qualifications and Experience of the EAPs

Jonathan Crowther is the Operations Manager of SLR for the Environmental Management Planning and Approvals team in Africa. He holds a Master's Degree in Environmental Science and has 30 years of relevant experience. He has expertise in a wide range of environmental disciplines, including EIAs, EMPs, Environmental Planning and Review and Public Consultation. Jonathan is a Registered Professional Natural Scientists (Pr.Sci.Nat.) and a Certified Environmental Practitioner of South Africa (CEAPSA).

Matthew Hemming holds a Master's Degree in Conservation Biology and has over 12 years of experience in a range of environmental disciplines, including EIAs, EMPs, Environmental Auditing and Monitoring in South Africa. He has expertise in a wide range of projects, including oil / gas, mining and infrastructure. He is a Registered Professional Natural Scientist.

Relevant curricula vitae (including proof of registrations) are attached in Appendix 2.

3.1.2 Details of contributing Specialists

Table 3-2 below provides details of the contributing specialists.

TABLE 3-2: SPECIALIST STUDIES UNDERTAKEN TO INFORM THE EIA

Aspect	Company and Lead Specialist Name	Qualifications	Professional Registrations	Experience	Reference
Air Quality	Airshed Planning Professionals: Terri Bird	PhD (Wits)	Pr. Sci. Nat. (114332)	6 years	Appendix 5.1
Greenhouse Gas	Promethium Carbon: Robbie Louw and Karien Erasmus	B Eng (Chem), Hons BCom Bachelor of Honours Sustainable Development (Cum Laude)		15 years 8 years	Appendix 5.2
Soil and Land use	SLR Consulting: Carl Steyn	M.Sc Agric. (Soil Science)	Pri.Sci.Nat (400022/02)	25 years	Appendix 5.3
Noise	Airshed Planning Professionals: Renee von Gruenewaldt	M.Sc. (Meteorology)	Pri.Sci.Nat	M.Sc. (Meteorology)	Appendix 5.4
Biodiversity (Terrestrial)	Scientific Terrestrial Services: Nelanie Cloete	M.Sc. (Botany and Environmental Management)	Pri.Sci.Nat (400503/14)	10 years	Appendix 5.5
Biodiversity (Aquatic)	Scientific Aquatic Services: Steve van Staden	M.Sc. (Environmental Management)	Pri.Sci.Nat (400134/05)	15 years	Appendix 5.6
Surface Water	SLR Consulting: Kevin Bursey and Chenai Makamure	M.Sc. (Hydrology) M.Sc. (WREM-Integrated Watershed Modelling and Management)	Pr.Sci.Nat (Water Resources) – 114422 Pr.Sci.Nat (Water Resources) (400150/16)	15 years 12 years	Appendix 5.7

Aspect	Company and Lead Specialist Name	Qualifications	Professional Registrations	Experience	Reference
Hydrogeology	SLR Consulting: Arnold Bittner and Gwendal Madec	M.Sc. Geology M.Sc. Hydrogeology	Pr.Sci.Nat. (400072/99) Pr.Sci.Nat. (400225/10)	26 years 17 years	Appendix 5.8
Geotechnical	SLR Consulting: Carl Fietze	BSc (Hons) Engineering Geology	South African National Institute Rock Engineering	18 years	Not included
Heritage Impact Assessment	Julius Pistorius cc: Julius Pistorius	D.Phil. Archaeology	ASAPA	27 years	Appendix 5.9
Palaeontological Assessment	Marion Bamford Consulting: Marion Bamford t/a	PhD (Wits) Palaeontology	In progress	22 years	
Traffic	WSP: Herbert Phahlane	M-Tech (Transportation Engineering)	Pr. Tech. Eng (2016 700 19	16 years	Appendix 5.10
Visual	Graham A Young Landscape Architect: Graham Young	BL(Toronto)	SACLAP 87001	40 Years	Appendix 5.11
Social Impact Assessment	Nomad Consulting: Danielle Sanderson	M.Soc.Sci. (Environmental Management)	n/a, There is no registration body for social impact assessors	11 years	Appendix 5.12
Economic	Mercury Financial Consultants: Werner Neethling				Appendix 5.13

3.2 ASSUMPTIONS AND LIMITATIONS

The assumptions and limitations pertaining to this S&EIA are listed below:

- It is assumed that SLR has been provided with all relevant project information and that it was correct and valid at the time it was provided.
- There will be no significant changes to the project description or surrounding environment between the completion of the S&EIA process and implementation of the proposed project that could substantially influence findings and recommendations with respect to mitigation and management, etc.
- The assumptions and limitations of each specialist investigation are noted in the specialist reports.

3.3 SCOPING PHASE

3.3.1 Objectives

In accordance with Appendix 2 to the EIA Regulations, 2014 (as amended), the objectives of the Scoping process were to:

- identify the relevant policies and legislation relevant to the activity;
- present the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- identify and confirm the preferred activity, technology and sites related to the project proposal;
- identify the key issues to be addressed in the assessment phase;
- agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required, as well as the extent of further consultation to determine the risks and impacts the activity will impose on the preferred site through the life of the activity; and
- identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of residual risks that need to be managed and monitored.

The Scoping process consisted of a series of steps to ensure compliance with these objectives and the EIA Regulations 2014. The process involved an open, participatory approach to ensure that all impacts are identified and that decision-making takes place in an informed, transparent and accountable manner. A flowchart indicating the generic S&EIA process is presented in Figure 3-1.

3.3.2 Scoping Process

Details of the Scoping process, including the public participation undertaken as part of the process, were documented in the Scoping Report (SLR, September 2018). The Scoping Report was submitted to and accepted by the GDARD in terms of Regulation 21 and 22 of the EIA Regulations. GDARD's acceptance of Scoping is included in Appendix 3.1.

Refer to Table 3-4 and the Comments and Response Report for the requirements which GDARD specified should be addressed in the EIAR.

3.3.3 Application for Authorisation in terms of the NWA

SLR and SAB met with the DWS on 13 July 2018. The purpose of the meeting was to discuss available capacity at the Leeuwkuil Water Care Works to determine and inform the handling of domestic sewage from the

project, and the positioning of the attenuation pond in support of the project's storm water management system. It was indicated that the Leeuwkuil Water Care Works could not be relied on and as such a project-specific package plant would be required. Options for discharge from the package plant could include use for irrigation on-site, discharge into the existing storm water channels (if they have the capacity) or discharge via a pipeline into the Vaal Tributary. Subject to design and location detail, authorisation of such options would likely be via General Authorisation. The storm water attenuation pond should be located outside of 1:100 year floodline, or a water use licence would be required. See meeting notes in Appendix 3.2.

A follow up meeting with the DWS was held on 4 October 2018. At this meeting it was agreed that the discharge or irrigation of treated waste water from the sewage package plant could potentially be generally authorised, as long as the volumes and quality complied with the GA. It was further agreed that construction of the bulk water pipeline across the Vaal tributary (two crossings) could potentially be generally authorised, as long as a risk assessment undertaken in terms of the GA confirmed a low risk. See meeting notes in Appendix 3.2.

Application for General Authorisation of these water uses will be submitted to the DWS on the e-WULA application portal. Proof of the application will be included in Appendix 3.2.

3.3.4 Application for Atmospheric Emissions Licence

SLR met with the Air Quality Officer of the Sedibeng District Municipality on 30 May 2018. The purpose of the meeting was to introduce the project and discuss the likely requirements for an application for an atmospheric emissions licence.

An "Application Form for Atmospheric Emissions Licence" will be submitted to the SDM in the near future. SDM correspondence is presented in Appendix 3.3.

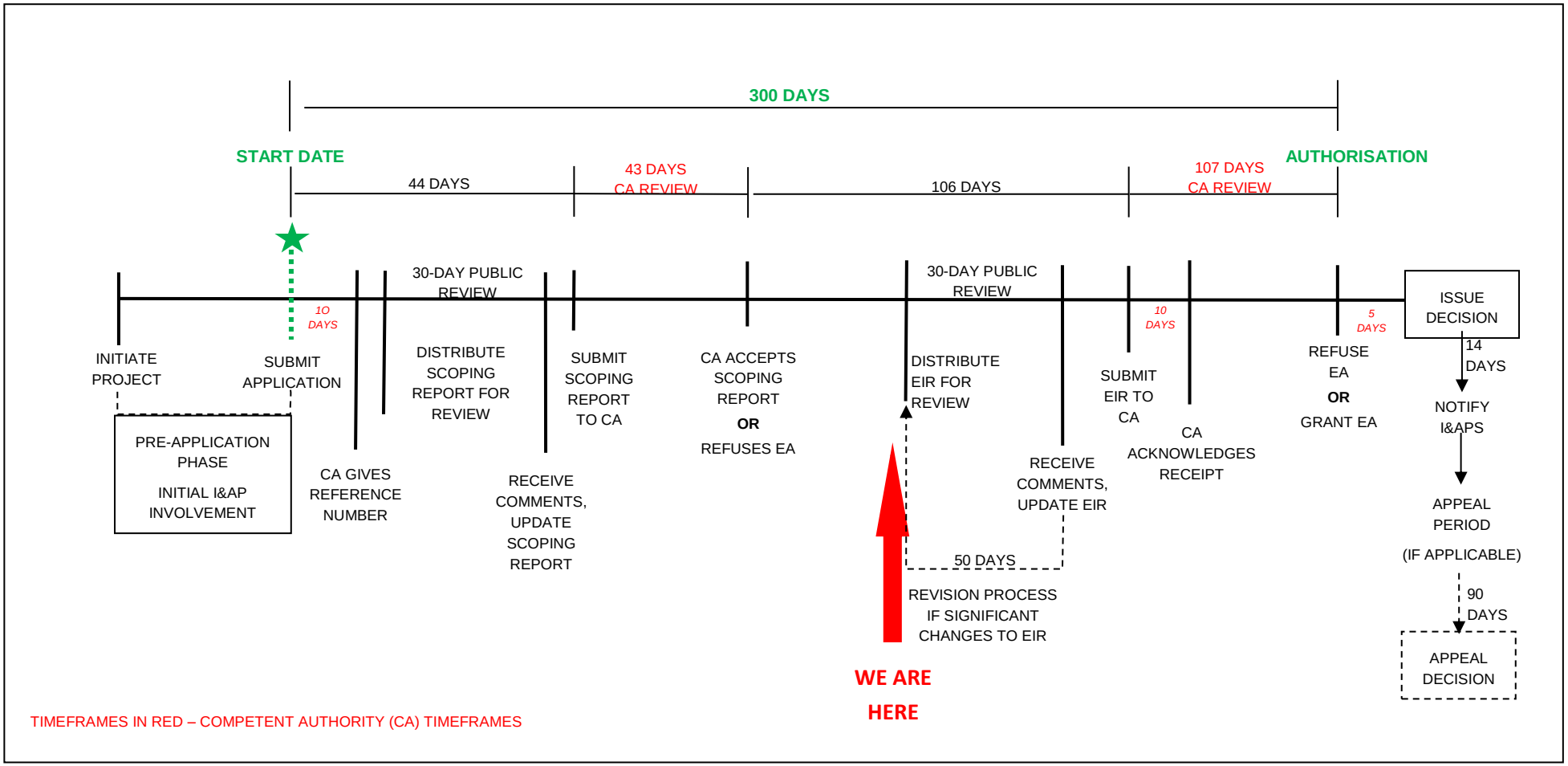

FIGURE 3-1: FLOW DIAGRAM SHOWING THE S&EIA PROCESS

3.4 EIA PHASE

3.4.1 Objectives

In accordance with Appendix 3 of the EIA Regulations, 2014 (as amended) the key activities of the EIA phase are to:

- determine the policies and legislation relevant to the activity and document how the proposed activity complies with and responds to the policy and legislative context;
- describe the need and desirability of the proposed activity in the context of the development footprint on the approved site as contemplated in the accepted Scoping Report;
- identify feasible alternatives related to the project proposal;
- ensure that all potential key environmental issues and impacts that would result from the proposed project are identified;
- assess potential impacts of the proposed project alternatives during the different phases of project development;
- identify the most ideal location of the activity within the development footprint of the approved site based on the lowest level of environmental sensitivity identified during the assessment;
- present appropriate mitigation or optimisation measures to avoid, manage or mitigate potential impacts or enhance potential benefits, respectively;
- identify residual risks that need to be managed and monitored; and
- provide a reasonable opportunity for I&APs to be involved in the EIA process.

Through the above, ensure informed, transparent and accountable decision-making by the relevant authorities.

3.4.2 Specialist Studies

Thirteen specialist studies were undertaken to address the key issues identified during the Scoping phase. The terms of reference of these studies were included in the Scoping Report, which was accepted by GDARD. The specialist reports were structured in terms of Appendix 6 of the EIA Regulations, 2014 (as amended). A list of the studies undertaken and the authoring specialists is provided in Table 3-2. Copies of each study are included in Appendix 5.

Specialist studies involved the gathering of data relevant to identifying and assessing environmental impacts that may occur as a result of the proposed project. These impacts were then assessed by the specialists according to pre-defined rating scales (see Appendix 4). The specialists recommended appropriate mitigation or optimisation measures to minimise potential impacts or enhance potential benefits, respectively. Information derived from the specialist studies has been integrated into this report.

3.4.3 Public Participation Process

Public participation tasks undertaken during the EIA phase are indicated in Box 3-1. The list of I&APs who have commented during the S&EIA process is provided in Table 3-1. All written comments received have been collated, and responded to, in a Comments and Responses Report (see Appendix 6.3). The key environmental issues identified by the project team, with I&AP input, are summarised in Box 3-2.

BOX 3-1: TASKS UNDERTAKEN FOR THE PUBLIC PARTICIPATION PROCESS DURING EIA

- **Notice of GDARD acceptance of Scoping**
  Registered I&APs were notified of the GDARD decision to accept the Scoping Report. See Appendix 6.2.

- **Register of I&APs and comments**
  SLR has maintained a register of I&APs and all comments received from I&APs. To date ~90 I&APs have been registered on the project database (see Appendix 6.1). All comments and the EAP/project response thereto are included in the Comments and Response Report (see Appendix 6.3).

- **Notice of Review of EIAR**
  Registered I&APs and commenting authorities were notified of the opportunity to review and comment on the EIAR. See Section 1.6 for details.

TABLE 3-3: LIST OF I&APS THAT SUBMITTED WRITTEN CORRESPONDENCE DURING THE PUBLIC PARTICIPATION PROCESS

State Departments and Organs of State	
GDARD	
Emfuleni Local Municipality	Sedibeng District Municipality
GPG: Department of Agriculture, Forestry and Fisheries	Eskom
Department of Correctional Services	GPG: Department of Rural Development and Land Reform
Ward 11: Cllr Radebe	Commission on Restitution of Land Rights: Gauteng
South African Heritage Resources Agency	
General I&APs	
Emfuleni Livestock Executive Committee (Mr. Moshoeshoe)	Sasol Satellite Operations
Patrick Sibusi	Joseph Radebe
Wise Owl Pre-School (Mrs de Klerk)	Muzi Nhlapo
Macckens Cleaning and Services	Trevor Mbusi Mfeka
F.Hamman	Malekgale Nhlapo
Koen Ra	Moshe Dickson Mateane
Barbara Simangele Melato	Nkosana Nhlapo
Nometi Maria Maphutsi	Mr. Maimane
Sigi	Lizette Venter

BOX 3-2: KEY ISSUES IDENTIFIED DURING PUBLIC PARTICIPATION*

- **Leeuhof Correctional Centre**
  - Sewage pump not maintained by the municipality and sewage runs
  - into the veld next to the nursery school.
  - Effluent disposal from the facility and impact on Vaal River.
  - Electricity substation will need upgrading.

- **Wise Owl Pre-school**
  - Possible relocation of the school due to proposed development
  - Roles and responsibilities for relocation – who will be the parties.
  - No existing contract with the municipality.

- **Emfuleni Livestock Executive Committee**
  - The site is used daily for cattle grazing and this would be lost.
  - Consider the upgrade of the local railway (Transnet Leeuhof Depot)
  - to provide commuter services for this project. This area is difficult to get to.
  - We want to know what impact the project will have on the farmers.
  - We need to know what the requirements are to become part of the
  - BBBEE component of the project.
  - Opportunities to invest in the local communities must be considered.
  - Impact of the project on the pre-school.

- **Emfuleni Local Municipality: Properties Development representative**
  - Fencing of the property to indicate it was private land.

* the verbatim issues and concerns raised by I&APs to date are documented in the Comments and Responses Report (see Appendix 6.3)

3.4.4 Compilation and Review of draft EIR

This draft EIAR has been prepared in compliance with in compliance with Appendix 3 of the EIA Regulations 2014 (as amended) (see Table 3-4). This report aims to present all information in a clear and understandable format, suitable for easy interpretation by I&APs and authorities, and to provide an opportunity for them to comment on the proposed project and findings of the S&EIA process (see Section 1.6 for details of the comment period).

The assessment of environmental impacts was undertaken in terms of the methodology approved by GDARD in the Scoping Report (see Appendix 4). The findings from the specialist studies and other relevant information have been integrated into this report.

All I&APs registered on the project database (see Appendix 6.1) have been notified of the review and comment period. Proof of notification will be included in the final EIAR.

TABLE 3-4: REQUIREMENTS OF AN EIAR IN TERMS OF APPENDIX 3 OF THE EIA REGULATIONS 2014 (AS AMMENDED)

Appendix 3	Content of an EIAR	Completed (Y/N or N/A)	Location in report
2(a)	*(i & ii) Details and expertise of the EAP who prepared the report.*	Y	Section 3.1 & Appendix 2
(b)	*The location of the activity, including:*	Y	Section 5.1.2.
	(i) The 21 digit Surveyor General code of each cadastral land parcel;	Y	
	(ii) Where available, the physical address and farm name; and	Y	
	(iii) Where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties.	N/A	
(c)	*A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is:*	Y	Figure 1-1, and Figure 5-1
	(i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	N/A	
	(ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	N/A	
(d)	*A description of the scope of the proposed activity, including:*		
	(i) All listed and specified activities triggered and being applied for;	Y	Table 2-1
	(ii) A description of the associated structures and infrastructure related to the development.	Y	Table 2-1 and Section 5.2
(e)	*A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.*	Y	Chapter 2
(f)	*A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.*	Y	Chapter 4
(g)	*A motivation for the preferred development footprint within the approved site.*	Y	Section 5.3
(h)	*A full description of the process followed to reach the proposed development footprint within the approved site, including:*		
	(i) Details of the development footprint alternatives considered;	Y	Section 5.3
	(ii) Details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Y	Section 3.4.3 and 3.4.5. Appendix 6
	(iii) A summary of the issues raised by I&APs, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Y	Box 3.2 Comments and Response Report in Appendix 6.3

Appendix 3	Content of an EIAR	Completed (Y/N or N/A)	Location in report
	(iv) The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Y	Chapter 6
	(v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts: *(aa) can be reversed;* *(bb) may cause irreplaceable loss of resources; and* *(cc) can be avoided, managed or mitigated.*	Y	Chapter 7.
	(vi) The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Y	Appendix 4
	(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Y	Chapter 7.
	(viii) The possible mitigation measures that could be applied and level of residual risk;	Y	Chapter 7 and Appendix 8
	(ix) If no alternative development locations for the activity were investigated, the motivation for not considering such;	Y	Alternatives are considered in Section 5.3
	(x) A concluding statement indicating the preferred alternative development location within the approved site;	Y	Section 5.3
(i)	*A full description of the process undertaken to identify, assess and rank the impacts the activity and associated infrastructure will impose on the preferred location through the life of the activity, including:*		Section 3.4, Appendix 4 and Chapter 7
	(i) A description of all environmental issues and risks that were identified during the EIA process; and	Y	Chapter 7 and Appendix 6.3
	(ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Y	Chapter 7
(i)	*An assessment of each identified significant impact and risk, including:* *(i) Cumulative impacts;* *(ii) The nature, significance and consequence of the impact and risk;* *(iii) The extent and duration of the impact and risk;* *(iv) The probability of the impact occurring;* *(v) The degree to which the impact and risk can be reversed;* *(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and* *(vii) The degree to which the impact and risk can be mitigated.*	Y	Chapter 7
(k)	*Where applicable, a summary of the findings and recommendations of*	Y	Chapter 7 and

Appendix 3	Content of an EIAR	Completed (Y/N or N/A)	Location in report
	any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.		Appendix 8
(l)	*An environmental impact statement which contains:*		
	(i) A summary of the key findings of the EIA;	Y	Chapter 8
	(ii) A map at an appropriate scale which superimposes the activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and	Y	Figure 5-1
	(iii) A summary of the positive and negative impacts of the proposed activity and identified alternatives.	Y	Chapter 8
(m)	*Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMP as well as for inclusion as conditions of authorisation.*	Y	Chapter 7 and 8 and Appendix 8
(n)	*The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.*	Y	Section 5.3
(o)	*Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.*	Y	Chapter 7
(p)	*A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.*	Y	Section 1.1
(q)	*A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.*	Y	Section 8.2
(r)	*Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised.*	N/A	-
(s)	*An undertaking under oath or affirmation by the EAP in relation:* *(i) The correctness of the information provided in the report;* *(ii) The inclusion of comments and inputs from stakeholders and I&APs;* *(iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and* *(iv) Any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by I&APs.*	Y	Appendix 1

Appendix 3	Content of an EIAR	Completed (Y/N or N/A)	Location in report
(t)	*Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.*	N/A	-
(u)	*An indication of any deviation from the approved Scoping Report, including the plan of study, including:* *(i) Any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and* *(ii) A motivation for the deviation.*	N/A	-
(v)	*Any specific information that may be required by the competent authority.* *GDARD's acceptance of the Scoping Report (11 October 2018) listed the following requirements:*		
	1. The EIAR must comply with Regulation 23 of the Environmental Impact Regulations, 2014 as amended.	Y	This table
	2. All planned specialist studies must be undertaken by qualified specialist(s) and must comply with the GDARD Requirements for Biodiversity Assessments and (be) signed off by specialist(s) registered with (the) South African Council for Natural Scientific Professions (SACNASP).	Y	Refer to Table 3-2 and Appendix 5
	3. All maps must be in colour, have a legend and be to correct scale.	Y	All figures
	4. The proposed plant falls within a sensitive area as per C-Plan Version 3.3. The Department has noted that this application for Environmental Authorisation, Air Emissions License is still on the scoping stage. However, all mitigation measures to lessen the damage to sensitive environment especially to wetland crossing must be clearly stated in the draft EIAR. Furthermore, the site has an area which looks like a river, or wetland, there are wetland plants in the river therefore, investigations need to be conducted to ascertain the stream that was observed on site.	Y	Refer to Section 6.2.8.3 Appendix 5.6.
	5. The development need to assess the impacts this development will have on people living across the road as well as develop buffers for the residents living near the plant.	Y	Refer to Chapter 7
	6. A detailed storm water management plan for this development must be compiled and approved by the local authority before incorporating such plan into the EIAR.	Y	Refer to Section 5.2.3.2
	7. Comments for service delivery from municipality which include electricity, water, sewage, storm water and traffic impact must be included in the Draft EIAR.	Y	Refer to Appendix 7
	8. Alternatives which consider the use of sustainable development means which involve the use of solar geyser, rainfall harvesting etc. must be part of the Draft EIAR to be submitted.	Y	Refer to Section 5.2.4
	9. The final scoping report covers the property/locality, design	Y	Refer to

Appendix 3	Content of an EIAR	Completed (Y/N or N/A)	Location in report
	alternatives and the no-go alternative that must still be included in the Draft EIAR.		Section 5.3
	10. The report must contain a layout plan overlain with sensitivity and such map must be created in accordance with GDARD Requirements for Biodiversity Assessment.	Y	Refer to Figure 6-4
(m)	*Any other matter required in terms of section 24(4)(a) and (b) of the Act.*	N/A	-

3.4.5 Completion of the EIA Phase

The following steps are envisaged for the remainder of the S&EIA process (see Figure 3-1):

- After closure of the comment period, the EIAR will be updated and finalised. All comments received on the draft EIAR will be assimilated and, where relevant, responded to in a Comments and Responses Report that will be appended to the final report.
- The EIAR will be submitted to GDARD for consideration and decision-making.
- After GDARD has reached a decision, all I&APs on the project database will be notified of the outcome of the application and the reasons for the decision.
- A statutory appeal period in terms of the National Appeal Regulations (GN No. R993) will follow the issuing of the decision. In terms of Regulation 4(1)(a), an appellant must submit an appeal to the appeal administrator, and a copy of the appeal to the applicant, any registered I&AP and any organ of state with interest in the matter within 20 days from the date that the notification of the decision for an application for an Environmental Authorisation was sent to the registered I&APs by the applicant.

4 NEED AND DESIRABILITY

The DEA guideline on need and desirability (GN R 891, 20 October 2017) notes that while addressing the growth of the national economy through the implementation of various national policies and strategies, it is also essential that these policies take cognisance of strategic concerns such as climate change, food security, as well as the sustainability in supply of natural resources and the status of our ecosystem services. Thus, the over-arching framework for considering the need and desirability of development in general is taken at the policy level through the identification and promotion of activities / industries / developments required by civil society as a whole. The DEA guideline further notes that at a project level (as part of an EIA process), the need and desirability of the project should take into consideration the content of regional and local plans, frameworks and strategies.

In light of the above, this section aims to provide an overview of the need and desirability for the proposed project by firstly, highlighting glass bottle manufacturing in the South African context and, secondly, how this industry is aligned with the strategic context of national development policy and planning, broader societal needs and regional and local planning, as appropriate.

4.1 NATIONAL POLICY AND PLANNING FRAMEWORK

This section aims to provide an overview of the national and regional policy and planning context relating to the glass bottle manufacturing sector within South Africa.

4.1.1 National Development Plan 2030

The National Development Plan (NDP) 2030 provides the context for all growth in South Africa, with the overarching aim of eradicating poverty and inequality between people in South Africa through the promotion of development. The NDP provides a broad strategic framework, setting out an overarching approach to confronting poverty and inequality based on the six focused and interlinked priorities. One of the key priorities is “faster and more inclusive economic growth”. In order to transform the economy and create sustainable expansion for job creation, an average economic growth exceeding 5% per annum is required. The NDP sets out that transforming the economy also requires changing patterns of ownership and control.

It is also acknowledged that environmental challenges are in conflict with some of these development initiatives. As such, it is emphasised that there is also a need to:

- protect the natural environment;
- enhance the resilience of people and the economy to climate change;
- reduce carbon emissions in line with international commitments;
- make significant strides toward becoming a zero-waste economy; and
- reduce greenhouse gas emissions and improve energy efficiency.

4.1.2 New Growth Path

The New Growth Path (NGP) (2011) reflects the commitment of Government to prioritise employment creation in all economic policies and sets out the key drivers and sectors for employment which will be the focus of Government. The sectors identified for prioritisation include infrastructure, agriculture, mining, manufacturing, tourism and the green economy.

4.1.3 Regional and Local Policy and Planning Framework

This section aims to provide an overview of the regional and local policy and planning context relating to the proposed development.

4.1.3.1 Gauteng

The Gauteng Provincial Spatial Development Framework 2030 (PSDF) sets out the key spatial challenges faced by the Province and the proposed spatial policies, which have been formulated to address these challenges. As such, it supports the spatial development vision to achieve the Gauteng of 2030, an integrated, connected space that provides for the needs of all who are born in or drawn to the province. Economic growth is spread widely, beyond the core areas, to nodes and multi-modal activity corridors. To realise the spatial development vision, all developments in the province need to adhere to six spatial development principles: (i) liveability, (ii) concentration, (iii) connectivity, (iv) conservation, (v) diversity, and (vi) viability.

Four interrelated spatial development strategies are to be followed:

1. Capitalising on proximity, by directing higher densities closer to economic nodes and public transport networks, and improving conditions in areas closer to economic opportunities, to ensure even greater benefits for the people and economy of these areas.

2. Managing new settlement development, to prioritise infill development and densification, rather than expanding residential development outwards, so new settlements are functional and integrated units of the polycentric provincial network and based not only on the availability of land.

3. Building an economic network, through a system of high-order nodes and activity corridors, developing economic clusters that benefit from synergies and unlock the advantages of agglomeration.

4. Creating a viable and productive hinterland, by protecting valuable resources and high potential agricultural land from harmful development, and managing water resources frugally and effectively.

To realise the specific provincial spatial, economic and social objectives, two instruments are proposed: (i) spatial development coordination; and (ii) spatial targeting. These two instruments will be used to coordinate government action, target public investment and crowd in private sector investment to achieve a balanced, polycentric provincial spatial network/form.

4.1.3.2 Sedibeng Integrated Development Plan and Spatial Development Framework

The Local Government: Municipal Systems Act, (Act 32 of 2000) stipulates that all Municipalities are required to prepare an Integrated Development Plan and that a Spatial Development Framework (SDF) be a component of the IDP. The Spatial Planning and Land Use Management Act (SPLUMA) provides a framework for spatial planning and land use management and Chapter 4 addresses the preparation requirements and content of an SDF.

The Sedibeng District Municipality IDP (2017 to 2021) articulates the broad development approach for the district municipal area, within which the development planning for each local municipality is contextualised. The IDP aims to realize the NDP, the Gauteng Strategic Plan and the Sedibeng Growth and Development Strategy through its seven pillars being:

- Reinventing the Economy;
- Renewing our communities;
- Reviving a Sustainable Environment;
- Reintegrating the region;
- Releasing Human Potential;
- Good Governance; and
- Deepening Democracy.

As such, it sets out the strategies and deliverables for each priority area as well as detailing sector plans and projects.

The Spatial Development Framework (SDF) developed by the SDM forms an integral element of the IDP. The SDF seeks to address numerous spatial and developmental challenges of the District, such as:

- Fragmented and dispersed settlement patterns;
- Dilapidated and minimal bulk services infrastructure;
- High levels of unemployment;
- Lack of investment in developable land;
- Industrial decline;
- Non-functional public transport system;
- Lack of investment in the agriculture and tourism sectors respectively; and
- Environmental degradation and water challenges.

The SDF aims to *inter alia* promote the well-being of the people in the area by proposing development strategies that would promote sustainable development. The SDF notes that "the economy of the Sedibeng District is not performing well relative to other areas of Gauteng". Various economic projects have been identified to address this. Of relevance in this case: "Establishing mechanisms that benefit owners and potential end users for releasing large parcels of potentially economically productive land for development". The SDF notes that large amounts of developable land are vacant within the current Urban Development Boundaries.

The SDF has identified a precinct development plan for the Vereeniging Fresh Produce Market site. This aims to allow for its expansion and renovation, as well as for the accommodation of subsidiary businesses (e.g. wholesale). It is also makes provision for the creation of sites suitable for new commercial and light industrial developments, improvement of local accessibility and connectivity with the immediate surroundings.

4.1.3.3 Emfuleni Local Municipality

The Emfuleni Local Municipality's IDP (2017/18 – 2020/21) identifies industry and commercial projects as key economic activities. The Emfuleni Municipality's SDF (2017) forms an integral component of the IDP. The SDF identifies the Leeuwkuil industrial area as a target for densification and indicates that vacant industrial stands within this industrial area should become occupied before additional land is made available for industrial and commercial development within Emfuleni. Leeuwkuil should be reserved for commercial and light industrial uses. Heavy industrial uses should be excluded from this development to avoid polluting uses next to the existing and proposed residential areas neighbouring this industrial area. The location of Leeuwkuil next to the R59 makes it suitable for commercial uses, which require access from major roads.

4.2 CONSISTENCY WITH POLICY AND PLANNING CONTEXT

The previous sections have considered the policy and planning context at national, regional and local level, which are relevant to the proposed glass bottle manufacturing plant. As highlighted above, there is a drive from national and provincial Governments to stimulate development and grow the economy of South Africa with a strong focus on job creation in all sectors. Industry and manufacturing have been identified as drivers of economic growth and job creation, and are furthermore considered particularly important in the Gauteng provincial economy.

The proposed project is considered to be consistent with and in support of the broad national policy framework for the development of industry and manufacturing in South Africa. At the regional level, it is deemed consistent with the Gauteng PSDF and the SDF of Sedibeng and will contribute to the regional GDP. The proposed SAB project would be located inside of the urban edge, where residential, commercial and industrial land uses are considered appropriate. At the local level the proposed glass bottle manufacturing plant will be located within the existing Leeuwkuil industrial area that is the target of increased density and compactness. The project will have local benefits through the provision of employment opportunities and stimulation of opportunities for local goods and service providers.

One of SAB's major goals in developing the project is to create a unique opportunity for new Black economic entrant(s) in the manufacturing industry. SAB's intent is that the proposed glass bottle manufacturing plant will be majority Black owned. The project will also contribute toward meeting the conditions imposed on Anheuser-Busch InBev SA/NV in its merger with SABMiller.

4.3 CONSISTENCY WITH NEMA PRINCIPLES

The national environmental management principles contained in NEMA serve as a guide for the interpretation, administration and implementation of NEMA and the EIA Regulations. In order to demonstrate consistency with the NEMA principles, a discussion of how these principles are taken into account during the EIA process is provided in Table 4-1 below.

TABLE 4-1: CONSIDERATION OF THE NEMA PRINCIPLES IN RELATION TO THE PROPOSED PROJECT

National Environmental Management Principles	Comment
(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.	Manufacturing has been identified as a key driver of economic growth and job creation and as such the proposed glass bottle manufacturing plant is anticipated to serve the developmental interests of people. The S&EIA process identifies the needs and interests of potentially affected parties and attempts to address issues and concerns raised through the course of the study.
(3) Development must be socially, environmentally and economically sustainable.	Government has set development goals aimed at reducing poverty, unemployment and inequality. The contribution of the manufacturing sector in this regard is promoted in the national, regional and local policy and planning frameworks, thus the proposed development is deemed acceptable in principle. The specific sustainability of the proposed project is assessed during the S&EIA process.
(4)(a) Sustainable development requires the consideration of all relevant factors including the following: *(i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;* *(ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;* *(iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;* *(iv) that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;* *(v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;* *(vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*	The S&EIA process considers potential social, economic, biophysical impacts that could result through the implementation of the proposed glass bottle manufacturing plant. Measures to avoid, minimise and/or remedy potential pollution and/or degradation of the environment that may occur as a result of the proposed project are detailed in the EMPr.
(4)(a)(vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and	Assumptions, uncertainties and limitations associated with the compilation of the EIAR are discussed in Section 3.2. Compliance with the various legislative requirements is presented in Section 2.8.
(4)(a)(viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.	The S&EIA process considers and assesses the identified potential social, economic and biophysical impacts of the project (refer to Section 7). The EMPr provides the recommended management measures to mitigate the significance of identified impacts.
(4)(b) Environmental management must be integrated,	The S&EIA process that is being followed recognises that all elements

National Environmental Management Principles		Comment
	acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.	of the environment are linked and interrelated. GDARD, as the decision-making authority, will be responsible for taking all aspects of the environment, including whether or not the potential impacts of the project would unfairly discriminate against any person, into consideration when making a decision regarding the proposed project.
(4)(c)	*Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.*	
(4)(d)	*Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.*	The proposed glass bottle manufacturing plant is not anticipated to limit access to environmental resources that meet basic human needs.
(4)(e)	*Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.*	SAB is committed to comply with environmental health and safety consequences of its existing operation and will continue to do so in relation to the proposed glass bottle manufacturing plant.
(4)(f)	*The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.*	The public participation process has been undertaken in accordance with the requirements of the EIA Regulations 2014 (see Section 3.3). In addition, a pre-application Public Participation Process was undertaken for the project, which included meetings with key stakeholders and distribution of a BID for comment (see Box 3-1 and Sections 1.6 and 3.4.4**Error! Reference source not found.**).
(4)(g)	*Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.*	The S&EIA process will take into the account the interests, needs and values of all I&APs, through the submission of comments on the proposed project, during the Scoping and EIA phases of the project. Thus, the decision-makers will have all the necessary information before them on which to base an informed decision.
(4)(h)	*Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.*	The Scoping Report and EIAR prepared for the proposed project will be made available to communities for review and comment (see Sections 1.6 and 3.4.4).
(4)(i)	*The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.*	The S&EIA process considers identified potential social, economic, biophysical impacts of the project in an integrated manner. The significance of these impacts is assessed in the EIA phase according to pre-defined rating scales (see Appendix 4).
(4)(j)	*The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.*	SAB (and its appointed contractors) would be required to comply with the requirements of the Occupational Health and Safety Act. An Environmental Awareness Plan has been prepared for the construction phase, which will require staff be informed about any aspects of their work that may pose a danger to the environment.
(4)(k)	*Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.*	As mentioned previously, the public consultation process is being undertaken in accordance with the requirements of the EIA Regulations 2014 (as amended) and will allow for the distribution of

National Environmental Management Principles	Comment
	the Scoping Report and EIAR for public review and comment. This information will be provided in an open and transparent manner.
(4)(l) There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.	The public participation process for the proposed project provides an opportunity for the Organs of State to provide comment on the proposed project and address any potential conflicts between policies or other developmental proposals administered by them that may be in conflict with the proposed project before decision-making.
(4)(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.	It is not anticipated that the proposed project would result in any conflicts between organs of state.
(4)(n) Global and international responsibilities relating to the environment must be discharged in the national interest.	GDARD, as the decision-making authority, will be responsible for taking cognisance of any international obligations that could have an influence on the project.
(4)(o) 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.	The S&EIA process considers and assesses the identified potential social, economic, biophysical impacts of the project (refer to Section 7).
(4)(p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.	As the holder of the authorisation, SAB will be responsible for the implementation of the measures included in the EMPr.
(4)(q) The vital role of women and youth in environment management and development must be recognised and their full participation therein must be promoted.	The public participation process for the proposed project has been and will continue to be inclusive of women and the youth.
(4)(r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.	The S&EIA process undertaken for the proposed project identified relevant sensitive and/or vulnerable areas and assessed potential impacts. Appropriate mitigation measures were proposed.

4.4 SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES

Although glass is manufactured from natural resources and requires significant heat input, glass is 100% recyclable and can be recycled endlessly without loss in quality or purity. As a result significant amounts of raw materials are saved and natural resources are preserved. Glass recycling also helps in saving energy as cullet melts at a lower temperature than raw materials. Consequently, less energy is required for the melting process. An estimated 80% of recovered glass containers are made into new glass bottles. It is therefore a sustainable packaging material which also has many other benefits over alternative packaging materials.

The nature of large industrial developments is such that impacts on biodiversity, habitats and ecosystem services are probable. To limit such impacts it is necessary to locate industrial developments at sites of low sensitivity. The proposed project site is located within an established industrial area that is located within the urban boundary of Emfuleni. The site has been impacted on by historical agriculture and current overgrazing

and urbanisation. It is not anticipated to contain sensitive ecological features nor to form part of a system providing significant ecological services.

The biophysical impacts of the proposed project will be further investigated in the EIA phase by the appointment of relevant specialist. The results of these studies will be included in the EIAR. Measures to mitigate the impacts to these resources will be included in the EIAR.

4.5 PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

Community/society priorities are officially expressed through public documents including the provincial and municipal growth and development strategy and spatial development framework documents. The Emfuleni Local Municipalities SDF 2025 identifies that Emfuleni requires approximately 700 ha of land for industrial and commercial development during the period 2017-2020 and an additional 240 ha during the period 2020-2025. The SDF 2025 aims to increase the density and compactness of the region by targeting development on appropriate parcels of land. In this regard the proposed glass bottle manufacturing project site falls within an area defined in the SDF 2025 as an Industrial and Commercial Expansion Zone. The area is noted as being “an established industrial area, which is still largely vacant”. It is proposed in the SDF 2025 that the vacant industrial stands within this industrial area become occupied before additional land is made available for industrial and commercial development within Emfuleni. Leeuwkuil should be reserved for commercial and light industrial uses.

The proposed project could benefit society and the surrounding communities both directly and indirectly by generating additional employment at the proposed operation and by stimulating the local economy through service and supply chain requirements. Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees. Through employment, persons at the facility will also gain skills involved in the glass bottle manufacturing sector.

The socio-economic impacts of the proposed project will be assessed in the EIA phase following the completion of the social and economic specialist studies. The results of these studies will be included in the EIAR. Measures to mitigate the impacts to these resources will be included in the EIAR.

5 PROJECT DESCRIPTION

This chapter provides general project information; presents a description of the preferred project scope; and discusses the project alternatives that were considered in determining the preferred project scope.

5.1 GENERAL PROJECT INFORMATION

5.1.1 Applicant Details

The South African Breweries (Pty) Limited is sponsoring the project and is acting as the applicant on behalf of the yet-to-be-determined project owners. Ownership of the plant is still being determined and SAB is likely to only be a minority shareholder in the future business. Any authorisations issued to SAB for the project would be transferred to the future owners.

Name:	The South African Breweries (Pty) Limited
Address:	65 Park Lane, Sandown, Sandton
Responsible person:	Duncan Pask
Position:	Company Secretary
Tel:	011 881 8193
E-mail:	Duncan.Pask@za.ab-inbev.com

5.1.2 Summary of Property/Site Information

Farm name:	Portion 238 (a portion of portion 149) of the farm Leeuwkuil 596 IQ. NB - A town planning application is underway to subdivide this property and rename the site as Portion 295 of the farm Leeuwkuil 596 IQ.	
Physical address:	Corner of Boy Louw Street (R 28) and Lager Avenue, Vereeniging	
Surveyor General 21 digit code:	T0IQ00000000059600238	
Property size:	Currently 67.26 ha, but the subdivided portion will be 29.23 ha	
Development footprint size:	Approximately 150 000 m² (15 ha)	
Local municipality	Emfuleni Local Municipality in the Sedibeng District Municipality	
Centre coordinates of site:	Latitude (S):	26°40'3.60"S
	Longitude (E):	27°54'9.10"E

5.2 DESCRIPTION OF THE PROPOSED GLASS BOTTLE MANUFACTURING PLANT

The proposal is for SAB, with Black owned business partner(s), to develop and operate a glass bottle manufacturing plant on Portion 238 (a portion of portion 149) of the farm Leeuwkuil 596 IQ. As indicated previously, ownership of the plant is still being determined and SAB is only likely to be a minority shareholder in the future business.

The proposed glass bottle manufacturing plant would produce green and amber coloured bottles. The facility would comprise a batch plant, main manufacturing building with gas fired furnaces and a warehouse (Figure 5-1). The annual glass bottle production target would be approximately 290 000 tons. The description below presents the current, preferred project concept as informed by the technical and environmental inputs to date.

It must be noted that the actual plant layout and technical specifications for the facility that would be constructed will be subject to confirmation during the detailed design phase.

5.2.1 Project phases

The project will comprise two distinct phases, namely construction and operation.

5.2.1.1 Construction

The key construction activities associated with the proposed project include:

- Site establishment of construction phase facilities;
- Clearing of vegetation in accordance with the relevant vegetation management procedures;
- Stripping and stockpiling of soil resources and earthworks in accordance with the relevant soil conservation procedures;
- Transportation of construction phase materials and staff (via existing roads);
- Collection, storage and removal of construction related waste; and
- Construction of all buildings, services and infrastructure required for the operational phase.

The construction phase facilities would include:

- Parking area for cars and equipment;
- Mobile site offices;
- Portable ablution facilities;
- Change houses and clinic;
- Contractor's laydown areas;
- Workshops;
- Stores for the storing and handling of fuel, lubricants, solvents, paints and construction materials;
- Wash bay;
- Construction waste collection and storage facilities;
- Temporary electricity supply (diesel generators);
- Portable water supply (bowsers);
- Portable diesel supply (bowsers);
- Soil stockpiles;
- Water management infrastructure;

- Security and access control.

Construction facilities will be removed at the end of the construction phase (unless incorporated into the operational phase facilities). Final design and construction of the facility would take approximately 2 years from receipt of the required approvals.

5.2.1.2 Operations

The key operational activities associated with the proposed project include:

- Arrival and departure of personnel (in shifts);
- Delivery of raw materials, supplies and packaging by truck;
- Delivery of cullet from external sources by truck;
- Batching of raw materials;
- Melting to glass;
- Forming bottles from molten glass gobs;
- Treatment of bottles in the ovens (lehr);
- Annealing, cooling down and surface treatment of bottles;
- Inspection of bottles for defects.
- Palletising and shrink-wrapping of bottles.
- Storage of product;
- Loading and distribution of product by truck; and
- Disposal of wastes.

The main operational phase facilities would include:

- Batch plant, including raw material and cullet storage;
- Furnace 1 and 2;
- Exhaust system /chimney;
- Production, annealing, cold end areas (including stores and workshops);
- Finished goods warehouse;
- Truck parking lots;
- LPG and diesel systems;
- Water supply system;

- Electrical substation emergency generators;
- Raw material and cullet handling area;
- Car parking lots and entrance;
- Trucks entrance gate; and
- Offices, canteen and locker rooms.

These facilities and operations are described in the sections that follow. It is expected that the ramp up to full production, including optimisation of all processes, will take three years. The plant is anticipated to be operational for a minimum of 25 years, but likely much longer.

5.2.1.3 Decommissioning and Closure

As indicated, the design life of the plant is 25+ years. However, with scheduled maintenance and ongoing equipment replacement/upgrades, it is likely the plant will operate for many decades longer than this. The duration of operations would ultimately be subject to industry and market economy drivers. Given that the plant is likely to operate for many decades, a specific decommissioning and closure plan has not yet been developed.

Decommissioning of the facility would require the dismantling of the equipment, the sale and final disposal of all components, the decontamination of any contaminated areas and the rehabilitation of the site to a condition suitable for an end land use. The details and requirements of decommissioning and closure are not considered in any further detail in this report as they are so far in the future that currently available information is unlikely to be relevant.

Separate electronic file

FIGURE 5-1: CONCEPTUAL SITE DEVELOPMENT PLAN

5.2.2 General Overview

The proposed glass bottle manufacturing plant would produce green and amber coloured bottles using two gas fired furnaces. The facility would comprise a batch plant, main manufacturing building and warehouse supported by a number of utility systems. The conceptual process flow diagram of the proposed project is illustrated in Figure 5-2 below.

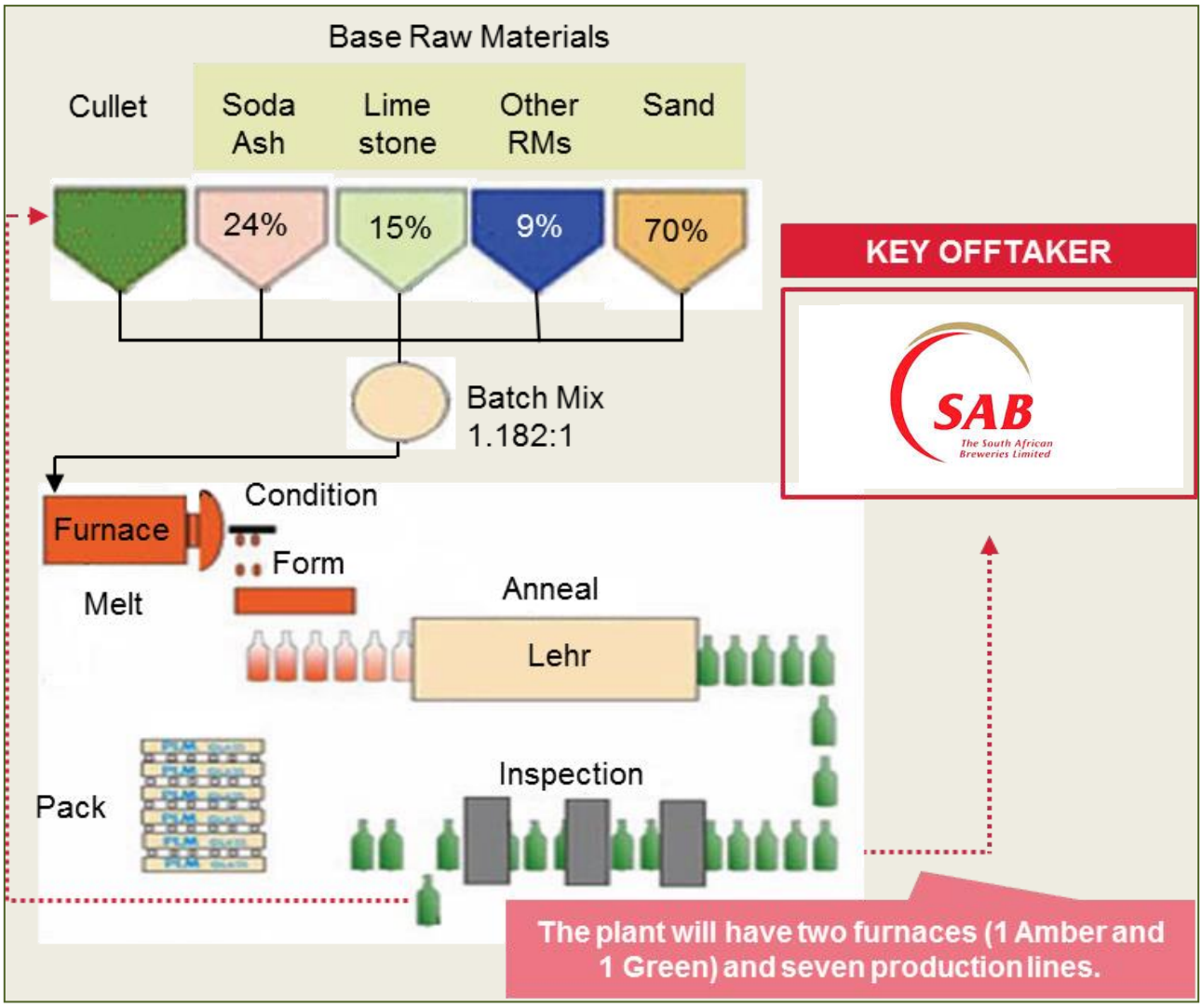

FIGURE 5-2: CONCEPTUAL PROCESS FLOW

5.2.2.1 Batch Plant

The batch plant building would have a footprint of approximately 2 100 m^2 and would be used to receive, store and mix the various raw materials required in glass bottle manufacture. The key raw materials are sand, soda ash and limestone, with a number of other raw materials also required. These would be delivered by trucks. The raw materials are stored in a variety of silos, hoppers and bunds. These materials would be mixed according to specific recipes for each glass product. Once mixed, the raw material batches would be conveyed across to the furnaces in the main manufacturing building by a complex system of conveyors, bucket elevators, dosing and weighing devices. The batch plant control system ensures that the raw materials are mixed together

in a precise manner to assure good and stable glass quality. The batch plant would have control equipment to limit particulate emissions.

5.2.2.1.1 Cullet

The use of cullet in the manufacturing process would replace an equivalent volume of other raw materials required in the raw material batches and thus reduce the consumption of such materials. Cullet also requires less energy to melt than the equivalent raw materials, thereby making the manufacturing process more energy efficient.

The cullet (waste or broken glass) return system is a key part of the batch plant and which enables the use of internal and external cullet in the raw material batching and melting process.

Internal cullet would be derived from the plant, at various stages in the manufacturing process, where molten glass, broken glass and out of specification product is collected and returned to the batch plant. The re-use of the internal cullet will ensure that no waste glass is generated.

External cullet would be derived from the post-consumer collection and recycling of glass bottles which are then supplied to the batch plant. The volume of external cullet to be used will depend on the bottle specifications and the availability of cullet. The source of, collection and supply mechanisms for external cullet are not currently known. It is likely that an independent glass collection and recycling operation would have to be established by operators in the recycling market.

5.2.2.2 Main Manufacturing Building

The main manufacturing building would comprise a single large hall, approximately 45 000 m^2 in extent, covered in metal sheeting. The building consists of three areas (named the Furnace, Hot End and Cold End areas) in which, the glass is melted, formed into bottles and inspected for quality and defects. The facility would have both a green and amber glass furnace. The green glass system would have the capacity to melt 390 metric tons per day (mtpd) and would feed to three bottle manufacturing lines. The amber glass furnace, with a capacity to melt 530 mtpd, would feed to four bottle manufacturing lines. Refer to **FIGURE 5-3** for conceptual images of the main manufacturing building and its components.

5.2.2.2.1 Furnaces and fore hearth

The two furnaces would utilise natural gas as the heating medium. Diesel and/or Liquid Petroleum Gas (LPG) would be available as a back-up heat source. At the furnace area the raw materials would be melted into glass at temperatures of up 1 530°C. Each furnace is built of refractory material bricks inside a steel structure. Furnace operations are regulated by a control system comprising of thermocouples, flowmeters and pressure indicators, which assures stable furnace operations. The heating system includes gas burners with support from electrodes. The glass is melted and refined in the main tank. A working tank with a fore hearth distributes the molten glass to the glass forming machines. The furnaces have regenerative chambers for heat recovery to ensure maximum energy efficiency. Emissions from the furnaces would be cleaned, most probably via a ceramic candle filter, so as to comply with the minimum emissions standards prescribed by NEM:AQA and released via a stack.

5.2.2.2.2 Hot end

In the Hot End the molten glass would be channelled to a series of glass forming machines that cool and meter the glass before using mechanical and pneumatic means to create the specific glass containers. The feeder mechanism cuts gobs from the molten glass beam drawn from the fore hearth. The gobs are formed into bottles by either a blow-blow process or a press-blow process. The formed bottles are taken from the machine, placed on a conveyor and directed to the annealing oven (lehr).

5.2.2.2.3 Annealing Lehr

After cooling down on the conveyor the bottles are heated up to around 550°C and then cooled in an annealing oven in a controlled manner. The cooling is so as to avoid internal stresses. Bottles are moved through the lehr on a belt running at a controlled speed. A system of burners, ventilators, flaps and control equipment maintain a stable temperature curve and control cooling conditions.

5.2.2.2.4 Cold End

On leaving the lehr the bottles start the Cold End process. This involves the bottles being further coated and then subject to inspection for defects by high precision equipment that measure capacity, dimensions, impact, pressure resistance and other tests. The bottles are also subject to further inspection by optical equipment. Bottles that do not meet specifications would be rejected, crushed and conveyed back to the batch plant where the cullet is re-used in the raw material mix.

5.2.2.2.5 Palletizing and Shrinking

Completed bottles would be packaged onto pallets by automated palletizers in multi-layer stacks. The pallets are moved on a system of rails to the shrink device. The pallet is wrapped in heated plastic foil, which shrinks to provide a rain and dust proof cover. The pallets are then railed to the warehouse for storage.

5.2.2.3 Warehouse

The warehouse building would be approximately 40 000 m^2 in extent. Bulk, wrapped pallets would be stacked up to three pallets high. Pallets would be mobilized using single or dual fork lifts and loaded onto trucks for distribution to customers. A further 40 000 m^2 will be developed adjacent to the warehouse. This concreted area will be utilised for vehicle parking and configuration, pallet stockpiling and other such activities.

5.2.2.3.1 Utility Systems

The glass production process requires several utility systems for operation. These include both gas and fluid based systems such as:

Gaseous	Fluids
Compressed Air	Cooling water
Vacuum	Scrapper water
Furnace combustion air	Emergency cooling water
Fore hearth combustion air	Osmosis water
Furnace cooling air	Industrial and potable water

IS machine cooling air	Fire water
Servo motor cooling air	Effluent water
Natural gas	Lubricants
LPG	Diesel

The utilities such as water supply systems, cooling water, cullet water as well as combustibles such as LPG and diesel are placed outside of the main manufacturing building.

The gas supply system provides gas primarily to the furnaces and fore hearth, but also to the lehrs, shrink system and workshops.

Cooling water is required for the furnace electrodes and equipment cooling. The heat is dissipated from the water via a hybrid cooling tower.

The cullet water system is used to handle hot waste glass out of the furnace. This is collected in a flooded chute which delivers waste glass to the scrapper system. The cullet water, hot and contaminated with glass particles is cooled down and clarified in dedicated plant. A slant plate clarifier removes all particles while cooling towers cool the water. The treated water is returned to the cullet water system.

5.2.3 Associated services

5.2.3.1 Access

Access to the facility is via Lager Avenue, off the R28. Transport of goods to, and products from, the facility would be by truck. The location of the access route is shown in Figure 1-1. The Traffic Impact Assessment indicated that a number of road upgrades were required (see Appendix 5.10).

5.2.3.2 Storm Water Management

SCIP Engineering Group (Pty) Ltd prepared a storm water management plan (SWMP) for the project in line with the Emfuleni Municipal standards. The SWMP aims to address runoff reduction, storm water quality and quantity. Storm water infrastructure will consist of surface flow, a piped storm water network, a new concrete lined channel and a new attenuation pond. The existing storm water channel (from the SAB Depot) running through the site will be diverted and directed along the northern perimeter of the site. The storm water attenuation pond is proposed to (as a minimum) accommodate a volume of 350 m^3/ha or the 1:25 year post-development run-off accumulated by the site, whichever is the greatest.

5.2.3.3 Electricity supply

Electrical power would be sourced from the Emfuleni Local Municipality. The electrical connection will be via underground cables from the substation located adjacent to the R 59. The substation may be upgraded. A second alternative under investigation is direct supply from Eskom (from the same substation) which may be required due to security of supply concerns.

FIGURE 5-3: CONCEPTUAL IMAGES OF THE PLANT

5.2.3.4 Bulk water supply

Potable and process water would likely be sourced from the Emfuleni Local Municipality via an existing bulk connection on Lager Avenue. A second alternative was investigated due to supply and pressure concerns in the existing system. The likely preferred option is a new 250 mm diameter bulk water pipeline from the Rand Water connection in Botha Street. The pipeline would follow the same route as the existing pipes that supply Larger Road and would be pinned to the road bridges when crossing over the Vaal tributary.

5.2.3.5 Sewage and grey water

The Emfuleni Local Municipality and the DWS confirmed that sewage and grey water generated at the facility could not be directed to municipal system as the local Leeuwkuil Water Care Works already operates in excess of its design capacity. Although an upgrade has been planned, the timing and actual capacity that this would provide are uncertain.

The project has thus elected to implement a dedicated sewage package plant to treat the sewage and grey water generated at the facility. The sewage package plant would be designed and operated to ensure compliance with the DWS's general limit values for discharge to the environment. Options that were investigated for management of the treated waste water included:

- re-use in the process;
- use for irrigation on site;
- discharge via a channel into the existing storm water channels; and
- discharge via a pipeline into the Vaal Tributary.

The re-use of treated waste water will be implemented as much as possible within the plant, but there will still be a substantial volume requiring management. Treated waste water will be utilised for irrigation of vegetation in the undeveloped area. Application will be made to DWS for General Authorisation of this use. It is unlikely that there is adequate area for all treated waste water to be irrigated on site and the balance of the treated waste water will be discharged to the R59 drainage channel. Application will be made to DWS for General Authorisation of this use.

5.2.3.6 Gas supply

The proposal is to source natural gas for the furnaces from a pipeline that runs on the facility-side of the R59. A connection metering station and underground pipe will be installed by the gas supplier.

5.2.3.7 Waste

Wastes generated by the plant and associated operations will be separated at source, as much as is feasible, and then directed to appropriate recycling, re-use or disposal facilities. A Waste Management Plan is included in the EMPr.

5.2.4 Efficiency and Sustainability

It is SAB's intention that the future owners of the plant give consideration to all reasonable and feasible sustainability measures for incorporation within the facility. Such measures should be considered in the plant technology and operations as well as in ancillary services such as offices, ablutions, workshops, warehouses

and parking. It must be noted that the actual sustainability measures and equipment specifications for the facility that would be constructed will be subject to confirmation during the detailed design phase.

SAB and AB InBev have committed to several ambitious Sustainability Goals to be achieved by 2025 in the areas of Water Stewardship, Smart Agriculture, Climate Action, Circular Packaging and Entrepreneurship. These sustainability goals form part of the companies' Better World concept which aims to align the companies environmental, social and alcohol responsibilities to make the world a better place. Although SAB may not be directly involved in the future plant, it is SAB's intention to ensure that the Black majority partners include all reasonable and feasible sustainability measures within this facility. Measures incorporated in the current plant design are described below:

The plant's furnaces and fore hearths are gas fired, which is a cleaner-burning and more efficient fuel source than any of coal, heavy fuel or diesel. The plant will be equipped with regenerative, end-port fired furnaces which are the most efficient melting technology available. Energy from the furnace exhaust gases are used to pre-heat the furnace combustion air. Additionally the burner and exhaust systems are alternated to either side of the furnace to assure the optimal accumulation of heat for the pre-heating system.

The compressed air systems are significant consumers of energy within the plant. Highly efficient, centrifugal compressors and variable speed drive motors have been specified, which ensures high efficiencies and reduces the requirement for air blow-off.

The plant will include a heat recovery system to utilise waste heat from the compressors to heat water. This hot water will be used in the plant for heating as well as hot water applications (e.g canteens and showers).

The cooling water system that has been specified is a closed loop system that requires only very small amounts of make-up water. Additionally the cullet water system is also a closed loop system in which the water is cooled, cleaned and reused. Hybrid cooling towers have been specified which minimise evaporative water losses. These systems save on water consumption.

The building concept has provided for the use of natural light and ventilation where possible. It is SAB's intention to ensure that the facility's electricity requirements are derived from sustainable sources as much as this is feasible.

5.2.5 Employment

It is anticipated that construction would result in the generation of up to 800 direct and indirect job opportunities. Operation of the facility would create approximately 280 permanent employment opportunities. Employees would be sourced, as much as is possible, from local communities and the greater Vereeniging area.

5.3 SUMMARY OF PROJECT ALTERNATIVES CONSIDERED IN THE EIA PROCESS

A summary of the project alternatives considered during the preliminary design and S&EIA process are described in the Table below. The current, preferred project concept as informed by the technical and environmental inputs to date is as described in Section 5.2 of this report. It must be noted that the actual plant layout and technical specifications for the facility that would be constructed will be subject to confirmation during the detailed design phase.

TABLE 5-1: COMPARISON OF PROJECT ALTERNATIVES CONSIDERED

No.	Alternatives	Description
1. Property or Locality Alternatives		
1.1	Property and location on site	Vereeniging was selected as the target area for the proposed project as it is an area with good regional transport linkages and has the required services and infrastructure (notably gas and roads). The pre-feasibility phase confirmed the availability of essential services to the facility. Sedibeng and Emfuleni municipalities require economic stimulation and would benefit from a project of this magnitude. Local and regional planning documents indicate that there are a number of areas identified for commercial and industrial development/expansion. SAB are the owners of a number of properties in Vereeniging. All of these were considered as site alternatives during a pre-feasibility phase. Consideration was given to commercial, logistical, environmental, social and technical factors during the pre-feasibility. Portion 238 was selected as the preferred site for the glass bottle manufacturing plant and no fatal flaws were noted. In proposing the plant layout consideration was given to a number of local features, adjacent users and access, operational efficiency, geotechnical and hydrological parameters. The preferred plant layout as presented in the EIAR was significantly influenced by potential geotechnical constraints. Only the preferred site and layout have been investigated in the EIA phase. Note that the actual plant layout that would be constructed will be subject to the detailed design phase.
2. Design Alternatives		
2.1	Furnace fuel and furnace type	Diesel, heavy fuel, coal and natural gas were considered as furnace fuels. Natural gas was selected as the only viable alternative. It is a cleaner burning and more efficient fuel than the others. Use of natural gas instead of the other fuels will result in significantly lower emissions of greenhouse gases and a lower carbon footprint per unit of glass produced. Regenerative, end-port fired furnaces were selected as these are the most efficient melting technology available to the industry. Only the natural gas option has been investigated in the EIA phase.
2.2	Production lines	The front end engineering and design for the glass bottle manufacturing plant investigated the feasibility of a number of different furnace and production line scenarios in order to achieve the required target output. The preferred concept was for a two furnace plant, with the green glass furnace (390mtpd) feeding three bottle manufacturing lines and the amber glass furnace (530 mtpd) feeding four bottle manufacturing lines. This configuration was Only the preferred two furnace concept option has been investigated in the EIA phase.
2.3	Emissions control	The glass bottle manufacturing plant will, as a minimum, comply with the minimum emissions standards set by the NEM:AQA. SAB is investigating the use of additional control equipment to ensure the lowest emissions from the furnaces as well as other processes. The selection of the emissions control equipment was guided by the Air Quality Impact Assessment. Use of an electrostatic precipitator was considered but was estimated to not achieve compliance with all of the parameters in minimum emissions standards for category 5-8. The use of a Ceramic Candle Filter was selected as the preferred emissions control option in order to comply with the minimum emissions standards for category 5-8. Only the preferred Ceramic Candle Filter emissions control option has been investigated in the EIA phase. Note that the actual specifications of emissions control equipment for construction will be subject to the detailed design phase.
2.4	Sustainability Measures	Refer to section 5.2.4 for information on the sustainability measures considered in the current, preferred project concept. While other measures may be available, the affordability of these has not been tested.

No.	Alternatives	Description
		It must be noted that the actual sustainability measures and equipment specifications for the facility that would be constructed will be subject to confirmation during the detailed design phase.
3. "No-Go" Alternative		
3.1	No-go	The No-Go alternative represents the option not to proceed with the proposed glass bottle manufacturing project, which leaves the project areas of influence in their current state except for variation by natural causes and other human activities. It thus represents the current status quo and the baseline against which all potential project-related impacts are assessed. The EIA has considered the no-go alternative.

6 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter provides currently available information on relevant environmental aspects (geographical, physical, biological, social, economic, heritage and cultural) associated with the project site. Where appropriate, the various descriptions include information derived from the specialist studies and models.

6.1 CLIMATE AND AIR QUALITY

The project area falls within the Highveld climatic zone, which is generally associated with a cool temperate climate with high extremes between maximum summer and winter temperatures. The area is characterised by summer rainfall with a mean annual precipitation of 662 mm. Average daytime temperatures are 16.3°C in winter and 26°C in summer with night time temperatures in winter dropping to approximately 0.5°C. The area is prone to frost.

6.1.1 Rainfall

The southern Gauteng area is classified as a summer rainfall area, with a Mean Annual Precipitation (MAP) of between 620 mm and 710 mm (DWS). The average rainfall measurement at Vaalplaats, located 23 km to the South, over the past 88 years is 703 mm (see Table 6-1). Most rainfall occurs during summer, particularly during November, December and January. Examination of the daily rainfall records for Vaalplaats indicates that while the MAP is fairly low, there has been significant rainfall on occasions (up to 54% of MAP in 30 days).

Month	Vaalplaats - C2E001 (mm)	438734 W (mm)	438550 W (mm)	Average (mm)
January	122.1	69.7	64.2	85.3
February	92.3	95.5	95.4	94.4
March	80.3	101.0	105.1	95.5
April	50.9	98.3	122.4	90.5
May	21.1	81.0	74.7	58.9
June	8	75.6	73.1	52.2
July	7.2	41.9	54.2	34.4
August	9.9	18.4	19.5	16.0
September	23.1	6.9	7.5	12.5
October	72.6	5.6	6.5	28.2
November	100.3	7.6	7.4	38.4
December	115.1	22.5	20.8	52.8
Total	**702.9**	**624.1**	**650.8**	**659.2**

TABLE 6-1: MONTHLY RAINFALL AT LOCAL DWS WEATHER STATIONS (1926 TO 2018)

6.1.2 Wind

The period wind field for the Sharpeville air quality monitoring station (AQMS) shows that the wind flow is dominated by north-westerly winds, followed by winds from the north-east. Calm conditions occurred 8.5% of the period summarised. Day-time winds are more frequently higher than 5 m/s, and predominantly from the

west and north-west. Night-time (18:00 to 05:00) shows more calm conditions (12.7%) with winds equally dominant from the north-east and north-west.

The seasonal wind field for Sharpeville (see Figure 6-1) shows the winds usually from the north-east and north-west during autumn and winter with winds from the north-east more dominant during summer. Spring-time winds show a predominance of north-westerly winds with the winds more frequently above 5 m/s. Winter has the highest frequency of calms at 14%, while spring shows the most infrequent calm conditions (3.9%).

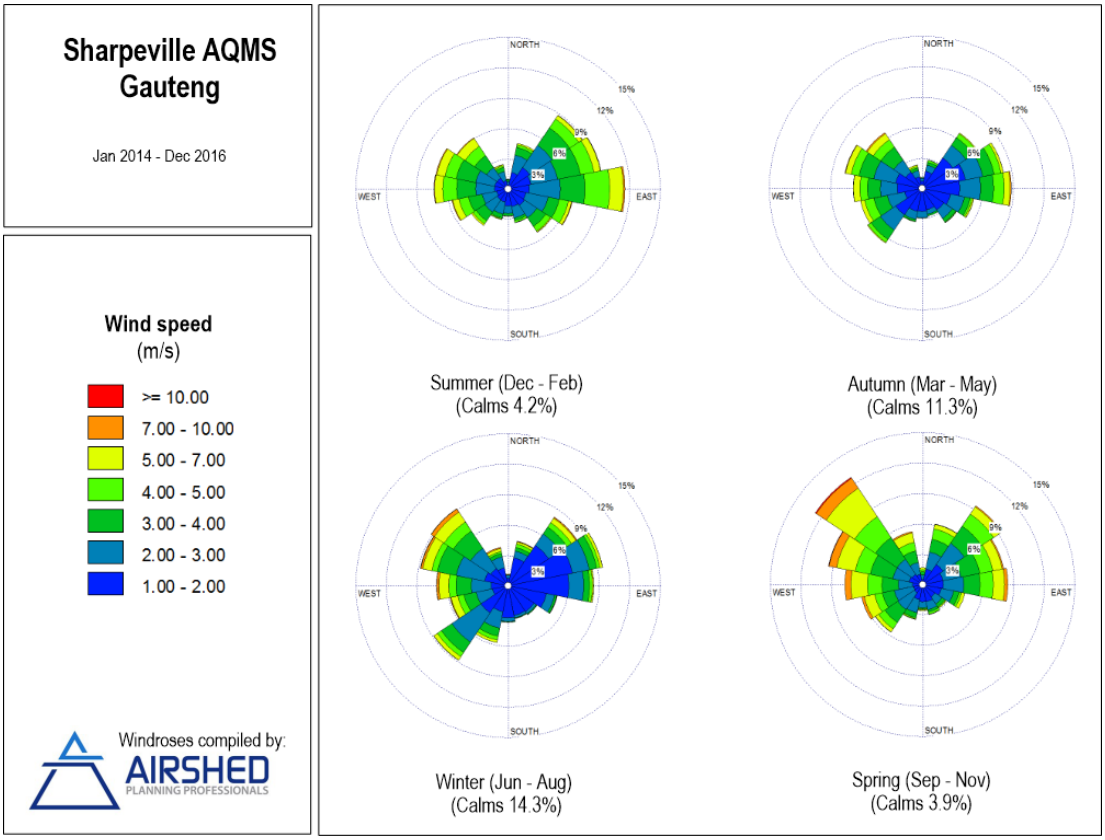

FIGURE 6-1: SEASONAL WIND ROSE FOR SHARPVILLE (2014 TO 2017)

(source: Airshed)

6.1.3 Air Temperature

Monthly temperatures statistics from hourly data recorded at the Sharpeville AQMS (2013 to 2015) show that minimum temperatures can drop below 0°C between June and September, while maximum temperatures exceed 30°C between August and April. The period reported for the Sharpeville AQMS is within the range of the long-term average for the area.

6.1.4 Ambient Air Quality

6.1.4.1 On-site baseline monitoring

A short-term on-site air quality monitoring campaign was conducted by Airshed Panning Professionals in April/May of 2018 for PM_{10} and $PM_{2.5}$, NO_2 and SO_2. During the campaign daily PM_{10} NAAQ limit concentration (75 µg/m^3) was exceeded on six days. The comparison with the Sharpeville AQMS daily averages over the same period shows good correlation; where four days of exceedances co-occur at both locations. The days of exceedance are not associated with above average wind speeds and overnight temperatures were relatively

low, suggesting poor dispersion conditions for accumulated particulates. Calculated ambient SO_2 concentrations, based on the passive sampling, are likely to compliant with the annual NAAQS. Annualised NO_2 concentration, based on the two contiguous 14-day exposure period, are likely to be compliant with the annual NO_2 standard.

6.1.4.2 Sharpeville AQMS

The air quality monitoring station closest to the proposed facility and considered to be representative of ambient air quality at the site is the Sharpeville AQMS. Verified data for the period 1 January 2014 to 31 December 2016 was obtained. Non-compliance with the applicable NAAQS was recorded for:

- annual average NO_2 concentration in 2015; and
- PM_{10} and $PM_{2.5}$ daily and annual concentrations for all years summarised (see Figure 6-2).

The highest NO_2 concentrations were recorded during 2015 at the Sharpeville station, where the annual average NAAQS concentration was exceeded. Compliance with hourly and annual NAAQS were recorded for 2014 and 2016. Sources contributing to NO_2 concentrations at Sharpeville originate to the north-west and north-north-east of the station at wind speeds above 8 m/s. Local sources contribute at low speeds and could be associated with vehicle activity and domestic fuel burning.

Exceedances of the NAAQS daily limit concentration for $PM_{2.5}$ numbered between 27 (2015) and 43 (2016) days during the assessment period. Annual average concentrations also exceeded the NAAQS for all three years, despite low data availability in 2016. Between 2014 and 2016, daily PM_{10} concentrations exceeded the NAAQ limit concentration a maximum of 185 days (in 2016) and a minimum of 25 days (2014). Annual average concentrations exceeded NAAQS during all three years with a maximum of 95.9 µg/m^3 during 2016. Local sources contribute to $PM_{2.5}$ concentrations at low wind speeds, including domestic fuel burning, informal waste burning, and vehicle entrainment on unpaved roads. While local sources also contribute to PM_{10} concentrations, the highest PM_{10} concentrations are associated with wind speeds above 6 m/s and originate to the north and north-east.

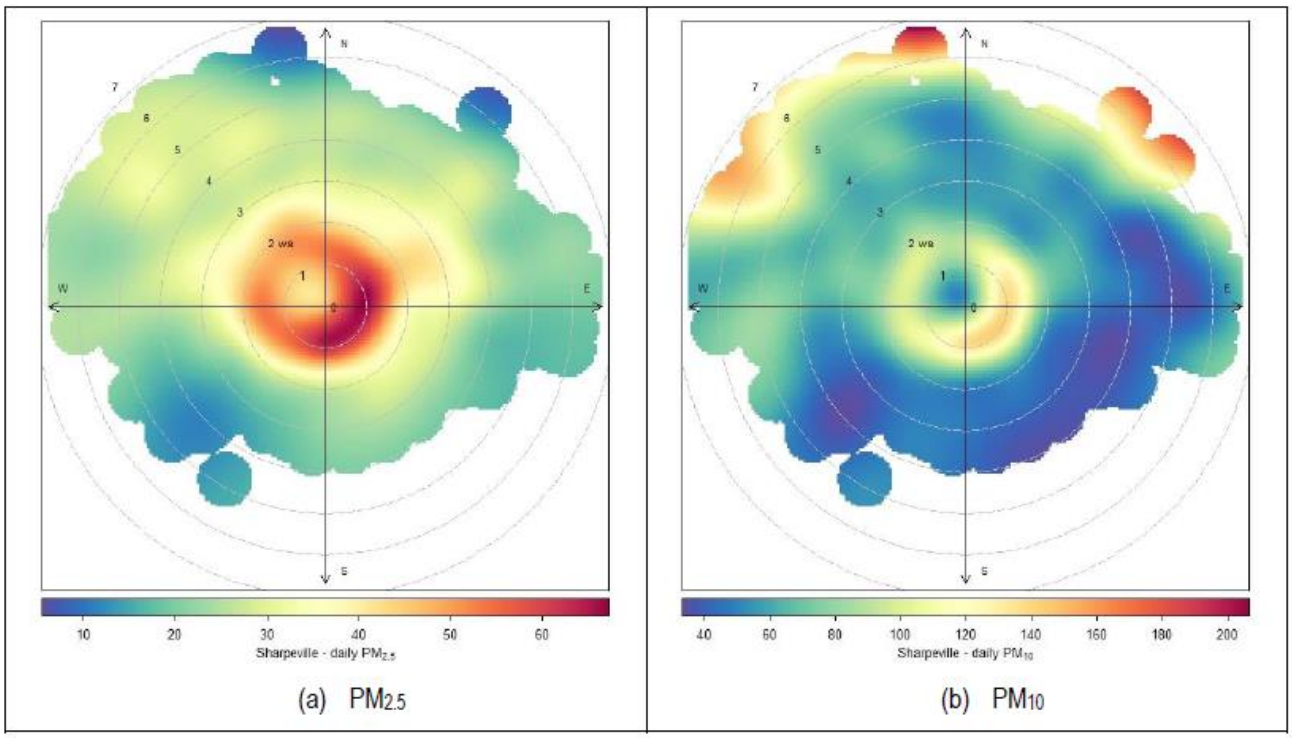

FIGURE 6-2: DAILY PM2.5 AND PM10 POLAR PLOTS FOR SHARPVILLE AQMS

6.2 BIOPHYSICAL CHARACTERISTICS

The following photographs, taken in April 2018, provide a representative view of the current status of the site.

Photo 2:From the R28 looking North

Photo 3: From SAB Depot entrance looking

6.2.1 Topography

The project site is located at elevations of between 1 440 and 1 460 m above mean sea level. The site is flat with a slight fall to the south. At the eastern edge the site also slopes down toward the east.

6.2.2 Soils and Land Capability

SLR undertook a soil and contaminated land assessment of Portion 1 of Portion 238 (see Appendix 5.3). A total of seventeen (17) test pits were excavated. All the soil in the area can be classified as Sterkspruit Form 1200 Bethulie Family, consisting of an orthic A horizon with a prismacutanic B horizon. These are duplex soils where strong structure in the B horizon (with a marked increase in clay content compared to the overlying horizon) separates it from the A horizon at clear/ abrupt boundary. The B horizon is sufficiently hard and dense to be an impediment to both root growth and water movement. Such duplex soils are highly susceptible to erosion.

The soils are considered to have a low agricultural potential. The rooting depth is limited by the prismacutanic B horizon and the soils are highly erodible due to the high Na content. These soils should be managed carefully to limit erosion. Although the site is zoned agricultural, it is earmarked for industrial and commercial use in the local municipal spatial development framework.

No evidence of soil contamination was noted in test pit samples and concentrations are considered to represent baseline conditions.

6.2.3 Geology

The geology of the site comprises shale, sandstone, coal and mudstone of the Ecca Group. This group is part of the Karoo Supergroup. The Karoo sediments across the site are underlain by dolomites of the Malmani sub-group. The Ecca group sediments encountered during field investigation consisted of intercalated shales and quartzitic sandstones, limited mudstone was recorded. Dolomite may be encountered at depth and its occurrence presents potential risk of subsidence and/or sinkhole formation. Previous third party geotechnical investigations conducted over a wider area recorded dolomite being encountered at depths of between 15 and 40 m below ground level (mbgl).

SLR undertook a geotechnical investigation and dolomite stability study for the proposed project site in order to advise SAB on the dolomitic risks and provide recommendations on the foundation designs. Boreholes drilled as part of this investigation to depths of between 55 m and 60 m, respectively, did not intersect dolomite. It is therefore assumed that the dolomite in the area of the drilled boreholes occurs at depths greater than 60 mbgl (SLR, 2018d). The geotechnical reports are not included in the EIAR as they do not provide information relevant to the impact assessment.

6.2.4 Noise

6.2.4.1 Ambient Noise Levels

Noise sensitive receptors located in close proximity to the project site include the Wise Owl Pre-school (~300 m north) and staff accommodation at the Correctional Services facility (~600 north). Other potential noise sensitive receptors include:

General public:

- Residents of Sharpeville, Vereeniging, Leeuhof, Unitas Park, Homer, and Steelpark;
- Individual dwellings at the informal livestock fairground; and,
- The Roods Gardens Agricultural Holdings.

Industrial and commercial activities:

- Industrial activities just north of the project site;
- Industrial activities just northwest of the project site; and,
- Leeuwkuil.

Baseline noise levels were measured by Airshed Panning Professionals at five locations in and around the site in November 2017. Birds, insects and vehicles are the main contributors to the baseline acoustic environment of the area. The lowest baseline noise levels, measured during the survey, were 47.7 dBA during the day and 45.3 dBA during the night. On-site levels are comparable to what is typically expected within rural/suburban areas, as are levels at the closest residential establishments (correctional services staff accommodation), and off-site east of Lager Road. At the informal residential structures south of the R28, the day-time noise levels typical of urban areas prevailed primarily due to traffic noise. As expected, the highest day-time noise levels were recorded at the residential site near to the R 59. Due to the presence of main roads and high traffic volumes (on the R59 and R28), baseline night-time noise levels are somewhat higher at the residential areas than typically expected within suburban areas.

6.2.5 Vegetation

Vegetation on site is identified as Soweto Highveld Grassland by Mucina and Rutherford, 2011. Although this vegetation type is classified as Endangered, a field investigation by Scientific Terrestrial Services (STS) in April 2018 (see Appendix 5.5) found that the study area is no longer representative of this vegetation type, due to historic and ongoing anthropogenic activities. The area was historically used for crop cultivation (prior to 1980). Although the vegetation has recovered to the extent that it is considered as 'indigenous vegetation' (as defined by the EIA Regulations, 2014), ecologically it is considered as secondary grassland[3]. The area is currently subjected to extensive livestock grazing and is dominated by increaser 2 and 3 grass species such as *Sporobolus africanus, Eragrostis chloromelas*, and *Aristida congesta*. These species are indicative of overgrazing. The forb layer is dominated by *Berkheya carlinopsis* and *Haplocarpha lyrate*, as well as alien invasive species such as *Cirsium vulgare*, *Conyza podocephala*, and *Verbena bonariensis.* The vegetation is generally uniform across the site and no faunal species of conservation concern were noted in the grassland. The floral sensitivity of the secondary grassland habitat is considered moderately low.

[3] Secondary grasslands are those that have undergone extensive modification and a fundamental shift from their original state (e.g. to cultivated areas), but have then been allowed to return to a 'grassland' state (e.g. when old cultivated lands are re-colonised by a few grass species. Although secondary grasslands may superficially look like primary grasslands, they differ markedly with respect to species composition, vegetation structure, ecological functioning and the ecosystem services they deliver." (Cadman, 2013)

The STS field investigation noted a number of wet areas in the southern and eastern portion of the study area. These have formed due to ponding of water as a result of canals/ berm on the site. Although the soils are typical of wetland soil, the vegetation did not reflect any distinction between terrestrial and wetland vegetation. The wet areas are classified as artificial wetlands (refer to Section 6.2.8.3), but provide suitable habitat for wetland plants as well as the protected species *Crinum macowanii*. This species is noted as least concern on a National level according to the GDARD red and orange plant list. The extent of the artificial wetland habitat was mapped and is shown in Figure 6-3, along with the locations of *Crinum macowanii* occurrence. The wet area habitat is considered of intermediate sensitivity.

Two other plant species of conservation concern (SCC) are likely to occur within the study area, namely *Crinum bulbispermum* and *Hypoxis hemerocallidea.* The study area falls within the known distribution range of these species as well as provide suitable habitat for these species. Both species are considered to be declining within the Gauteng Province according to the GDARD red an orange plant list, although they are considered to be of least concern on a National level. These species were not observed during the field surveys.

6.2.6 Fauna

The study area has historically been utilised for crop cultivation, and although the area has managed to re-establish itself to some extent, the area is currently subjected to continuous grazing by domestic livestock. The herdsmen of these cattle have numerous dogs that hunt any visible vertebrates. This together with the construction of the roads, surrounding the area, as well as the construction and excavation of the formalised and unformal canals in the southern and eastern portion of the study area, has resulted in degradation of the habitat of the area. As such the habitat integrity is considered to be moderately low.

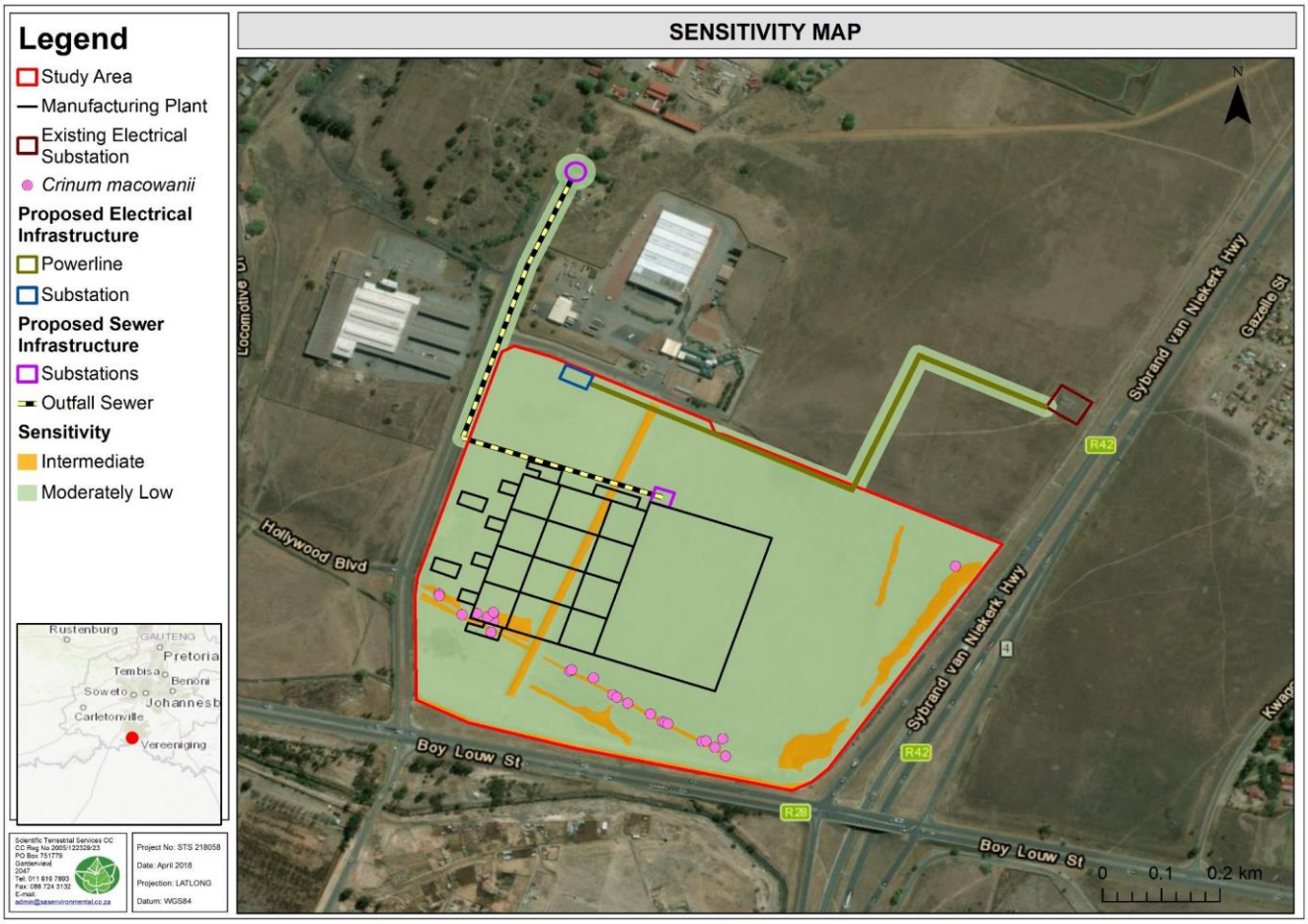

FIGURE 6-3: HABITAT SENSITIVITY MAP

(source: STS)

The faunal diversity associated with the study area is considered to be moderately low and comprised mainly of common faunal species adapted to high levels of anthropogenic activities. Species encountered during the field assessment include avifaunal species such as *Vanellus coronatus* (Crowned Lapwing), *Euplectes orix* (Southern Red Bishop), *Vanellus armatus* (Blacksmith Lapwing), *Streptopelia capicola* (Cape Turtle Dove) mammal species such as *Cryptomys hottentotus* (Common Mole Rate) as well as invertebrate species such as *Junonia orithya madagascariensis* (Eyed Pansy), *Danaus chrysippus aegyptius* (African Monarch), and *Phymateus morbillosus* (Common Milkweed Locust).

During the site investigation, no faunal species of conservation concern were observed. Furthermore, due to the degraded and secluded nature of the study area, specialised habitat requirements of most faunal SCC, distribution ranges and high levels of anthropogenic activity, it is deemed unlikely that any SCC will occur within the study area at present.

6.2.7 Conservation Characteristics

Soweto Highveld Grassland has a conservation status of endangered (Mucina and Rutherford) due to the low levels of conservation. Under the National Threatened Ecosystems (2011) listing the Soweto Highveld Grassland is considered as a 'vulnerable ecosystem'. This information is reflected in the GDARD's C-Plan (V3.3) with the area being considered as sensitive. As explained in Section 6.2.5, the site is no longer representative

of Soweto Highveld Grassland and it therefore should not be considered as sensitive. Additionally, the site and the associated bulk service infrastructure is not associated with any areas or features of conservation concern, namely Critical Biodiversity Areas (CBAs), Ecological Support areas (ESAs), wetlands, rivers or ridges according to the Gauteng Conservation Plan (V3.3) (see Separate electronic file

Figure 6-4).

The site is not protected in terms of the NEMPAA. The nearest protected area is the Leeuwkuil Nature Reserve, located about 600 m south of the site. The study area does not fall within a focus area as per the National Protected Areas Expansion Strategy (NPAES, 2009), and as such are not earmarked for conservation within the near future. There are no Important Bird Areas within 5km of the site. Thus the site is not of conservation concern. The environmental sensitivities of the site are indicated in Separate electronic file

Figure 6-4.

6.2.8 Freshwater resources

6.2.8.1 Hydrology

The region falls into the Upper Vaal Water Management Area. The project area is located in the central part of the northern half of quaternary catchment C22F, which is divided by the Vaal River. This catchment has an area of 440 km^2 and a mean annual runoff of 9.91 million m^3. The closest watercourse is the Vaal tributary, an un-named perennial river which flows in an easterly and then southerly direction. The Vaal tributary is located some 200 m south of the site.

The site is located in a relatively flat, slightly undulating area with many localised depressions found where storm water will pond temporarily and infiltrate or evaporate following a storm event. A number of man-made drainage features are present on the site. These earth channels and berms aim to convey water from Lager Street and the SAB Depot across the site to the south and east (see Figure 6-5). It is notable that all of the man-made drainage features on the site terminate in blind endings, having never been connected to the concrete-lined drainage channels. This has resulted in the development of a number of wet areas on the site (see Section 6.2.8.3).

The surrounding properties have a series of excavated (man-made) drainage channels which were created to convey storm water from adjacent roads and properties. The main features are two formal concrete-lined drainage channels, associated with the R59 and R28 roads. These drain south and east respectively before joining at a point south of the site and flowing under the R28 to join the unnamed Vaal tributary (see Photos below). At this point the unnamed Vaal tributary flows east and then south in a concrete-lined channel.

Separate electronic file

FIGURE 6-4: ENVIRONMENTAL FEATURES AND SENSITIVITIES OF THE STUDY AREA

R28 drainage channel close to the confluence with R59 drainage channel

Culvert underneath the R28 Road

Vaal tributary upstream of the confluence

Concrete lined Vaal tributary downstream of the confluence

6.2.8.2 Flood Lines

SLR delineated flood-lines for the site and surroundings in order to inform the infrastructure layout for the project, understand and manage the risks of fluvial flooding to the operation associated with the R59 and R28 drainage channels (see Appendix 5.7). The HEC-RAS 5.0.3 model was used to undertake one dimensional steady state hydraulic modelling of the flood lines that would result from a 1:50 year and a 1:100 year flood events. The proposed storm water attenuation pond was originally located within the 1:100 year floodline but was subsequently moved. The modelling concluded that the entire infrastructure of the proposed project is situated outside of the 1:100 year flood-lines. See Figure 6-5.

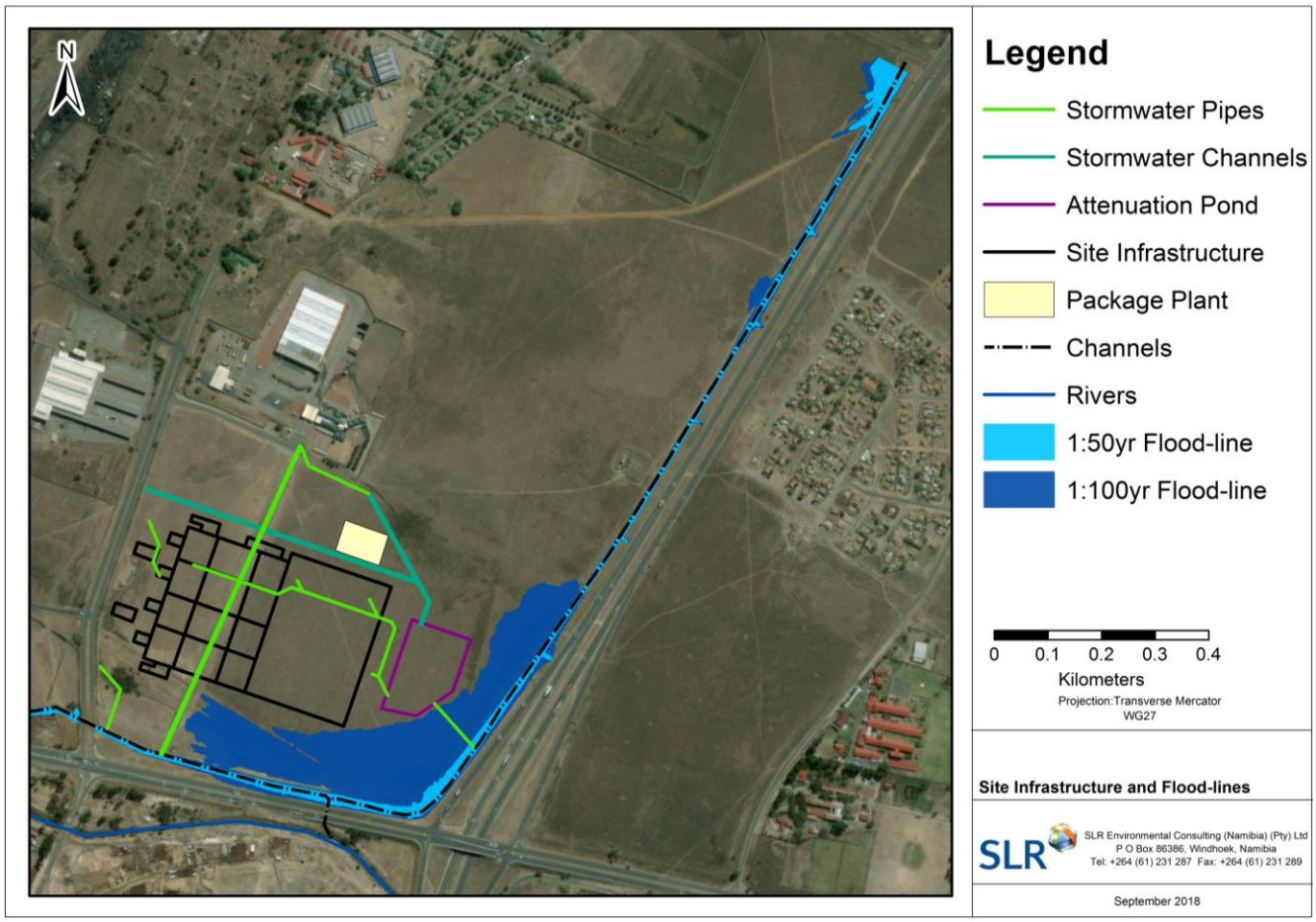

FIGURE 6-5: 100YR FLOOD-LINES AND INFRASTRUCTURE

6.2.8.3 Wetlands

According to the NFEPA data there are no wetland features located within the site, however one natural wetland feature is situated within 500 m of the proposed infrastructure. During fieldwork Scientific Aquatic Services (SAS) determined that the wetland shown in the NFEPA data (approximately 200 m to the north-west) is in fact a former coal stockpile at the Transnet siding. SAS (see Appendix 5.6) confirmed that no natural freshwater resources (including watercourses or wetlands) occur on the site and that there are no naturally occurring wetlands within 500 m of the proposed development footprint (see Figure 6-6).

During their site visit, SAS identified a number of 'wet' areas on the site. However, based on their observations and through consultation of historical imagery SAS confirmed that these water resources should be classified as artificial and anthropogenically derived. SAS note that the wet areas are not visible in historical imagery of the site prior to development of the SAB Depot. The wet areas have been formed by the construction of the canals (largely for storm water from the SAB Depot) and adjacent earth berms (excavated from the channels) which cause the ponding of water. The inundation of these areas following rainfall has resulted in the formation of soil forms typical of wetland areas (e.g. gleyed soils with mottles). While there are some hydrophilic plant species present, the observed vegetation did not depict any distinction between terrestrial and wetland vegetation. The extent of the wet areas were delineated by SAS (see Figure 6-6). Due to the artificial nature of these features, they are considered to have low/no ecological importance and sensitivity.

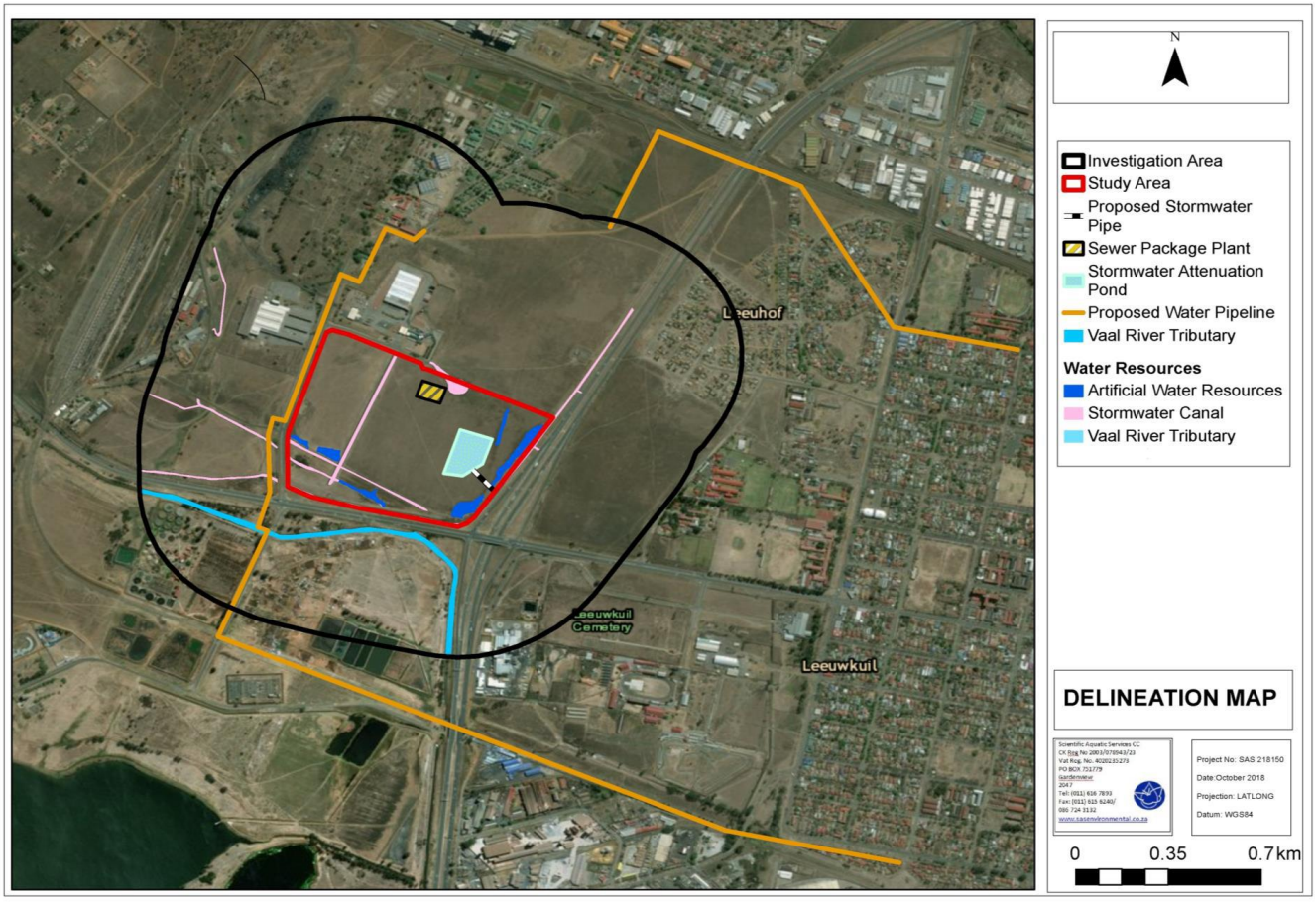

FIGURE 6-6: DELINEATED WATER RESOURCES WITHIN THE STUDY AREA

(source: SAS)

6.2.8.4 Water Quality

SLR collected two water samples in the Vaal Tributary on 20 August 2018, at locations upstream and downstream of the proposed project site (see Appendix 5.7). Water quality of the samples were analysed at a SANAS accredited laboratory and the results were benchmarked against various standards including the SANS 241:2015 Drinking Water Standards and the in-stream water quality guidelines quality guidelines for the Vaal Barrage Reservoir catchment. The two sites have very similar water quality for all parameters. Electrical conductivity (EC) exceeds all standards except the SANS 241 Aesthetic limits, and this is attributed to the elevated levels of ions, such as chloride, calcium, magnesium, manganese and sodium as detailed below. The elevated ions can be attributed to the diffuse anthropogenic sources located upstream of the WWTW where organic salts and inorganic matter can be washed off the streets and or discharge points from industrial sites upstream.

6.2.9 Geohydrology

SLR undertook a groundwater study for the site (see Appendix 5.8). Two monitoring boreholes (Bh3 and Bh4) were drilled on the site to depths of 50m and 45m and intersected quartzite and shale of the Vryheid Formation of the Ecca Group (Karoo). The underlying dolomite of the Malmani Subgroup was not intersected.

In addition, the up to 15 m thick Tertiary alluvial cover, comprising gravel and clay, forms a layer of low permeability, thereby protecting the underlying Karoo aquifer from pollution.

Static water levels observed in on-site boreholes were 3.97 mbgl and 3.30 mbgl respectively. Based on the water levels established in the boreholes it can be deduced that groundwater flow is from the north-west to the south east of the site. The boreholes intercepted a fractured aquifer. Test pumping of the two monitoring boreholes confirmed the moderate aquifer potential of the Vryheid Formation sediments. Both boreholes are moderately yielding with Bh3 being pump tested at 2.6m3/h and Bh4 at 3.0m3/h.

Water quality from site boreholes exceeded the SANS 241:2015 operational and aesthetic limits for Al and Fe respectively. The NO_3 concentration in the boreholes was equal to the SANS 241:2015 acute health limit. There are no known groundwater users in the immediate vicinity of the site.

According to the Aquifer Vulnerability/Classification/Susceptibility Maps of South Africa, the aquifer has a low vulnerability and classifies as a minor aquifer with a resulting low susceptibility to contamination. The findings of the groundwater study confirm the classification of the project area as being underlain by a moderately-yielding aquifer system of variable water quality.

6.3 SOCIO-ECONOMIC

6.3.1 Heritage Resources

Although the Leeuwkuil and greater Vereeniging area has a long development history, with coal having been discovered in the region in 1879, no heritage resources are known from the project area or immediate surrounds. The Phase I Heritage Impact Assessment (see Appendix 5.9) undertaken by Dr Julius Pistorius did not reveal the presence of any of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in the project area.

From a palaeontological perspective the site falls in the Volksrust Formation which could have fossil plants of the *Glossopteris* flora. The SAHRIS map indicates that area is of high palaeontological sensitivity. Prof. Bamford undertook a desktop Palaeontological Impact Assessment (see Appendix 5.9) and confirmed, from the examination of borehole core logs, the there are no potentially fossiliferous rocks above 35 m below ground in the north and above 20 m below ground in the south. Furthermore, no fossils have been reported from this region.

6.3.2 Human utilisation

The target property is bordered by roads on three sides with Lager Road to the west, the R28 (Boy Louw) to the south and the R 59 (Sybrand van Niekerk) to the east. The SAB Vereeniging Depot is located directly north of the site. Land west of Lager Road is largely unoccupied, except for the Vereeniging Fresh Produce Market in the north-west. Located south of the R28 are the Emfuleni Waste Water Works and the kraals and housing of the informal grazers. The Leeuwkuil light industrial area is located in the south-east, being south of the R28 and east of the R59. Land to the east of the R59 is unoccupied up to Grey Street. Beyond this are a number of schools and school hostels. The Leeuhof residential area is in the north east, across the R59. The land north of the property and east of the SAB depot is vacant (owned by SAB). The Vereeniging Correctional Centre, a Telkom site, a Department of Roads and Transport site and the Wise Owl Pre-school are located to the north. All of these are accessed from Lager Road. Sharpeville is located to the south-west, see Figure 6-7.

SAB are the owners of the property. The only observed utilisation of the unfenced site is the informal grazing of livestock. The livestock owners are represented by the Emfuleni Livestock Committee. The livestock are kept at kraals to the south of the site, across Boy Louw Street (R28). The area consists of kraals, informal accommodation for herdsmen and shepherds, as well as enclosures for other livestock and informal facilities for people who work at the site. The kraals were positioned at this site in (circa) 2000 by the ELM as the previous locality was developed into the Tshepiso township.

Separate electronic file

FIGURE 6-7: CURRENT LAND USES OF THE STUDY AREA

6.3.3 Land Claim

The Department of Rural Development and Land Reform has indicated that there is a single land claim over the Farm Leeuwkuil 596 IQ. The claim has apparently been made by an individual who is a direct descendant of an individual who was a sharecropper on an undefined portion of the property. It is not clear if the claim affects a portion of Farm Leeuwkuil 596 IQ relevant to the project.

The claim is not being processed by the Land Claims Commission as it was made in terms of the Restitution of Land Rights Amendment Act, 2014, which has been declared invalid by the Constitutional Court.

6.3.4 Visual

6.3.4.1 Scenic Quality

The area is urban to peri-urban in character with a strong industrial component. It comprises a mixture of land use interspersed with vacant open land and intersected with road, rail and utility rights of way. The project site is located adjacent to two large warehouses to its north, within open land to its immediate east. Overall the scenic quality rating is low to moderate because of the general sense of deterioration / degradation to the landscape, the presence of industry, power and rail utility activities along with areas of litter and the presence of alien invader tree species.

6.3.4.2 Sense of Place

The sense of place for the study area derives from the combination of all landscape types and their impact on the senses. The study area is common within the sub-region and shows signs of deterioration due to industrial and utility activities. It does not evoke a strong or positive sense of place.

6.3.5 Roads and Traffic

6.3.5.1 Road Network

The site is accessed from and located east of Lager Road which is a Class 4a road, aligned north-south. This road has two lanes per direction from the intersection with the R 28 Road until just north of the site. It is a single land north and south of this. The Sybrand Van Niekerk Freeway (R59/P156/2) is a Class 1 major arterial road located to the east of the site. This dual carriageway road follows a north-south alignment with two lanes per direction. Boy Louw Street (R28/P88-1) is a Class 2 collector street (dual carriageway with two lanes per direction) south of the site which follows an east-west alignment (see Figure 6-8). All of these roads fall under the jurisdiction of the Emfuleni Local Municipality.

6.3.5.2 Local Traffic

Traffic counts conducted by WSP (see Appendix 5.7) in 2018 indicated that weekday traffic peaks at all local intersections occur between 7 and 8 am in the morning and 4 and 5 pm in the afternoon. The Boy Louw Street and Theunis Kruger Street intersection currently operates (for most directions) below acceptable levels of service. All of the other local intersections operate at acceptable levels of service (LOS in terms of SIDRA).

FIGURE 6-8: ROAD NETWORK AND TRAFFIC COUNT LOCATIONS

(source: WSP)

6.3.5.3 Rail network

A Transnet industrial rail siding is located approximately 900 m west of the site with an associated railway network which runs north from the siding and then branches to the east and west, and south of the siding turning to the east.

6.3.6 Socio-Economic

The project site is located in the Emfuleni Local Municipality (ELM), the westernmost of the three local municipalities comprising the Sedibeng District Municipality. It covers an area of 987 km². The project site is located 2 km west of Vereeniging, a main town centre located where the Klip River drains into the Vaal River. The site falls within Ward 11 of the ELM, and is flanked by Wards 12 and 15. According to available demographic information the ELM has a population of approximately 730 000 people, comprising mostly Sotho speaking (52%), black Africans (85%). Approximately 65% of the population is economically active with the official unemployment rate at roughly 35%. Rates of municipal service delivery (flush toilets, refuse removal, piped water and electricity) are generally high compared to national averages.

6.3.6.1 Social Factors

Nomad Socio-Economic Management and Consulting undertook a social impact assessment for the project (see Appendix 5.12) to define the social profile of the area. Nomad reviewed available information, interviewed representatives of the various key local communities and land users and examined findings of relevant specialist studies.

From a planning context, Leeuwkuil is an established industrial area that is still largely vacant. The area is earmarked by the ELM for commercial and light industrial development and should be occupied before additional land is made available for commercial and light industrial use (Emfuleni SDF, 2017). Land use in the Leeukuil Industrial, Vereeniging Industrial and Leeuhof/Duncanville Industrial areas were examined. Residential and education uses in the region were noted (see Figure 6-7), most notably the Wise Owl Pre-school and the residential houses at the Correctional Services Facility. Cattle kraals, run by members of the Emfuleni Livestock Executive Committee, exist across the R 28 from the site.

The kraals consist of numerous cattle kraals, informal accommodation for herdsmen and shepherds, as well as enclosures for other livestock and informal facilities for people who work at the site. The kraals were moved here by the ELM (circa the year 2000), as the previous site was used for the development the Tshepiso township area (2.5 km southwest of the site). The cattle, which can number up to 1 000 head, are owned by approximately 50 individual farmers or owners, most of which live within the Emfuleni area, and depend on livestock for their income. There are approximately 30 people who sleep at the kraals overnight. These individuals are men, aged between 20 and 40 years old. The cattle are grazed on land surrounding the kraals, Sharpeville, the Leeuwkuil Dam, the abattoir (across the R59), the Leeuwkuil industrial area around the current SAB depot, and near Leeuhof. The secretary of the Emfuleni Livestock Executive Committee indicated that the proposed project site is one of the key areas for grazing and is used daily. The site comprises about 10% of the grazing to which members of the Emfuleni Livestock Committee have access to.

According to Census 2011 statistics, the local communities (Wards 11 and 15 of Emfuleni) are statistically low to middle-income households, with the median household income of between R 19 201 to R 38 400 Rand. Unemployment is moderate in comparison to national averages at 23%; however, this is low in comparison to the 33% unemployment across the Emfuleni Local municipality. The majority (79%) are employed in the formal sector, whilst 2% are employed in the informal sector and 4% in private households. No information is available on where the local persons are employed.

Potential issues and concerns identified through the SIA, which are potentially additional to the issues tabled directly with the EAP, are indicated in Table 6-2.

TABLE 6-2: SUMMARY OF ISSUES RAISED THROUGH SIA PROCESS

Key stakeholder	Issues raised
Wise Owl Pre-School parents.	• Lack of knowledge about current tenure status, as no formal contract in place with the municipality for past five years. • Confusion around who owns the land and who will be responsible for relocating the school • Sewage draining from the broken sewage pump north of the school. • The children who come to the school are transported mainly by taxis, as parents work in this area or in Vereeniging and come from Sebokeng. • If relocated the school would still need to be on a similar area so the children can be transported by taxis as they do now. • We have had to rezone the site of the school as it was a small shop previously, at a big expense to the school. Also cleaned and developed the site, including fences, from our own budget and fund raising and through
Eureka School (Kwagga street, Leeuhof) - School for the intellectually challenged	• 450 learners, 140 in hostel (boarding), and 120 staff. • Air pollution and odour may be an issue.

Key stakeholder	Issues raised
General Smuts High school (Van Riebeek Street, Leeuhof)	• 1537 learners, 115 staff, 90 onsite boarders (30 staff and 60 learners) • May have issue with the type of industry, particularly the air pollution and odour. • Area is run-down, and drugs are a problem in school and in the community. • Security is also an issue – the school is part of a local community policing forum.
Emfuleni Livestock Executive Committee	• The site is used daily for cattle grazing and this would be lost. • Potential economic benefits through employment and possible business opportunities.

6.3.6.2 Economic Factors

Mercury Financial Consultants (Pty) Ltd undertook an economic impact assessment (see Appendix 5.13) of the proposed project. This included gathering information on economic policy and the baseline economic environment. This is described below.

The Gauteng Province is the economic hub of South Africa, contributing approximately 35% towards the South African GDP. This results in the Gauteng economy being highly integrated with that of South Africa. Thus, the economic challenges that have adversely affected the national growth rate have had a similar impact on the province. Gauteng faces a number of economic challenges, including high poverty levels, inequalities in terms of incomes and opportunities as well as youth unemployment.

Vereeniging is currently one of the most important industrial manufacturing centres in South Africa, with its main products being iron, steel, pipes, bricks, tiles and processed lime. Vereeniging furthermore has several Eskom thermal power plants. Unfortunately the steel industry has been shrinking, having grown only 1% over the last 30 years (AppLED, 2015) and available production capacity has not been fully utilised in the past few years. Many jobs have been lost in the steel and related industries. The region in which the proposed project will be located faces many economic challenges. These include a poor performing economic growth rate, high poverty levels, inequalities in terms of incomes, limited employment opportunities as well as youth unemployment. According to the 2015 Local Economic Development (LED) Strategy Report (AppLED, 2015) compiled for ELM, the overall number of people living in poverty has increased by 21.8% from 2001 to 2013.

The current land-use of the site, or lack thereof, means that the site has almost no direct, indirect or induced effects on the local, regional and national economy. No formal employment results from the site and there is no contribution towards socio-economic development. The informal grazing of livestock is the only current beneficial use of the site. According to 2016/2017 municipal valuation records Portion 238 was valued at R14.50/m^2. The adjacent and similarly vacant Portion 237 was valued at R24/m^2. If the land were to be utilised for intensive agriculture (e.g. maize farming), and having a medium production potential, its value would be between R 1.5 and R 2.5/m^2, according to information sourced from ABSA. This value is substantially lower than the municipal valuation of the properties in the area. From an employment perspective, agricultural use of the property is only likely to able to sustain direct employment for one individual. The net present value of such employment over the life of the proposed project would be approximately R2.16 million. The maximum net present value of the revenue that could be derived from agricultural use (maize farming) of the land (assuming maximum yields) would be R 4.7 million.

7 IMPACT DECRIPTION AND ASSESSMENT

This chapter describes and assesses the significance of potential impacts related to the proposed glass bottle manufacturing plant, as described in Section 5. The potential impacts described in this chapter have been identified by the EIA project team with input from specialists and I&APs. The sequence in which these issues are listed are in no order of priority or importance.

The methodology used to determine the significance of potential impacts is presented in Appendix 4. The assessment and rating of potential impacts has been informed by the specialist studies (see Appendix 5).

All identified impacts are considered in a cumulative manner such that the impacts of the current baseline conditions on and surrounding the site and those potentially associated with the project are discussed and assessed together.

Mitigation measures to avoid, reduce, remediate or compensate for potential impacts are provided, as are optimisation measures to enhance the potential benefits. The mitigated assessment assumes that technical design controls, as included in the project scope (see Section 4) as well as mitigation measures (see Appendix 8), would be included in the detailed design of the plant and implemented when the plant is constructed and operated.

7.1 IMPACT ON BIOPHYSICAL ENVIRONMENT

7.1.1 Issue: Increase in ambient air concentrations

Description of impact:

Development of the site and operation of the plant presents activities that would contribute to ambient air concentrations. Pollutants of concern associated with the proposed project include particulate matter (PM), sulfur dioxide (SO_2) and nitrogen dioxide (NO_2). The site is located within the Vaal Triangle Airshed Priority Area where existing land uses currently result in reduced ambient air quality. Ambient concentrations for $PM_{2.5}$ and PM_{10} in the region have been recorded to exceed South African daily and annual average limits. Baseline ambient SO_2 and NO_2 concentrations near the proposed facility are compliant with South African daily and annual average limits. The existing land uses in the region together with the proposed project present the potential for elevated/cumulative impacts.

The construction phase presents activities that are temporary in nature. The operational phase would present more long term activities and related emission sources. It is expected that residential and educational facilities would be most vulnerable to health risks from air quality. The assessment assumes that the Wise Owl pre-school would be relocated prior to construction. Potential air quality impacts on biodiversity are discussed in Section 0.

Greenhouse gas (CO_{2e}) emissions from the operations are likely to arise primarily from fuel combustion in the boilers/vehicles (direct) and the consumption of imported electricity (indirect).

Modelled Air Quality

Airshed Planning Professionals (Pty) Ltd (Airshed) undertook a specialist air quality impact assessment for the proposed facility (see Appendix 5.1). The air quality study assumed that emissions from the furnaces and main glass manufacturing buildings would be extracted and passed through a scrubber system to meet the national minimum emission standards for Subcategory 5.8. Natural ventilation of the batch plant building was quantified for handling of raw materials. The estimation of total emissions was based on information provided by the facility design engineers, including design controls. As no emissions factors exist for $PM_{2.5}$ particles, these were conservatively estimated at the same rate as PM_{10} rates.

The study identified the potentially sensitive receptors within 5 km of the site. Airshed developed a comprehensive emissions inventory for the facility operations using engineering designs and emissions factors with consideration to point and fugitive sources. The potential emissions and the dispersion thereof were modelled using the AERMOD (version 7.12.1.0), which is a Gaussian plume model designed to predict pollution concentrations from continuous point, flare, area, line, and volume sources. Emissions associated with the normal operation of the glass manufacturing facility were estimated and subject to dispersion modelling.

The main findings of the assessment were:

- Gaseous pollutants (SO_2, and NO_2) were predicted to comply with the NAAQS across the domain for all applicable time periods.
- Particulate emissions, particularly those associated with the batch plant, may result in off-site exceedances of the $PM_{2.5}$ and PM_{10} standards (see Figures below). The exceedances could affect nearby industrial activities and residential areas.
    - Particulate emission control systems, such as baghouses or fabric filters, are recommended for the batch plant.
    - Regular sweeping and/or watering of the facility access road (assumed to be paved or tarred) would reduce the silt content of particulates on the road surface, controlling the extent of the impact to the site.
- Dustfall rates are predicted to comply with the NDCR at the facility boundary.

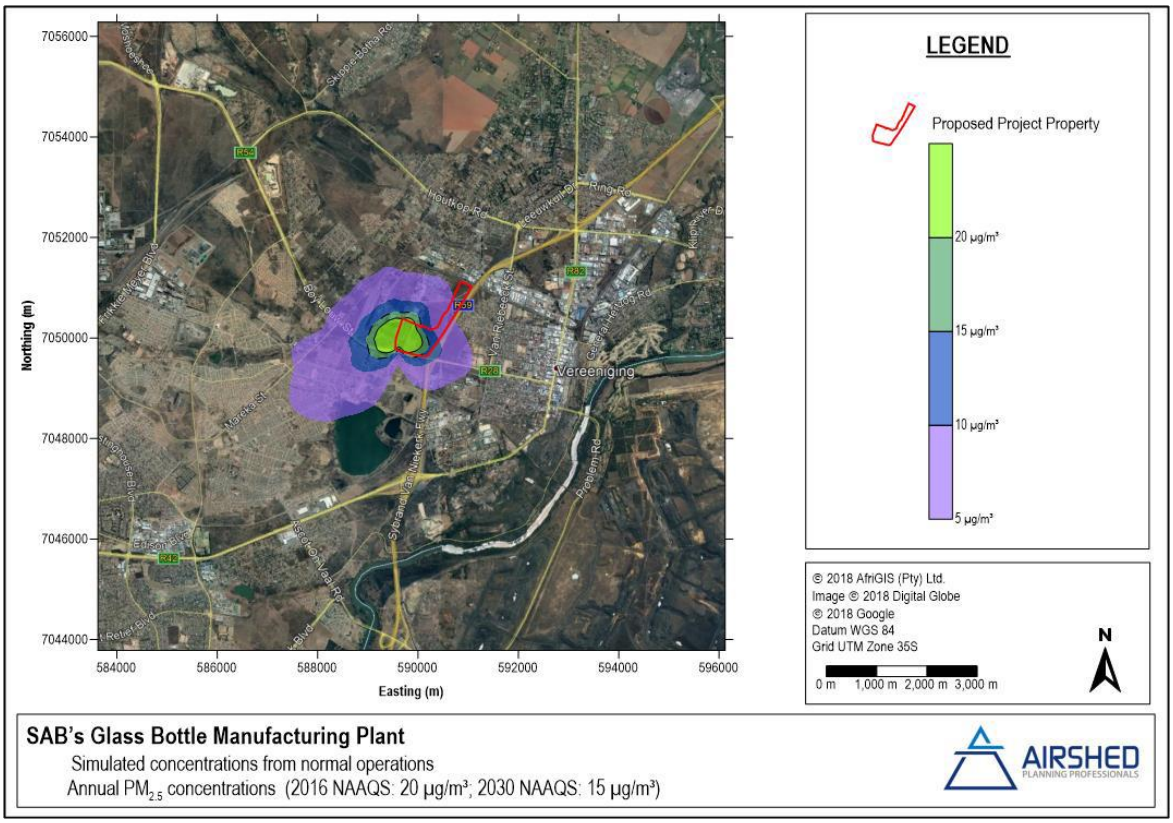

FIGURE 7-1: SIMULATED ANNUAL PM2.5 CONCENTRATIONS

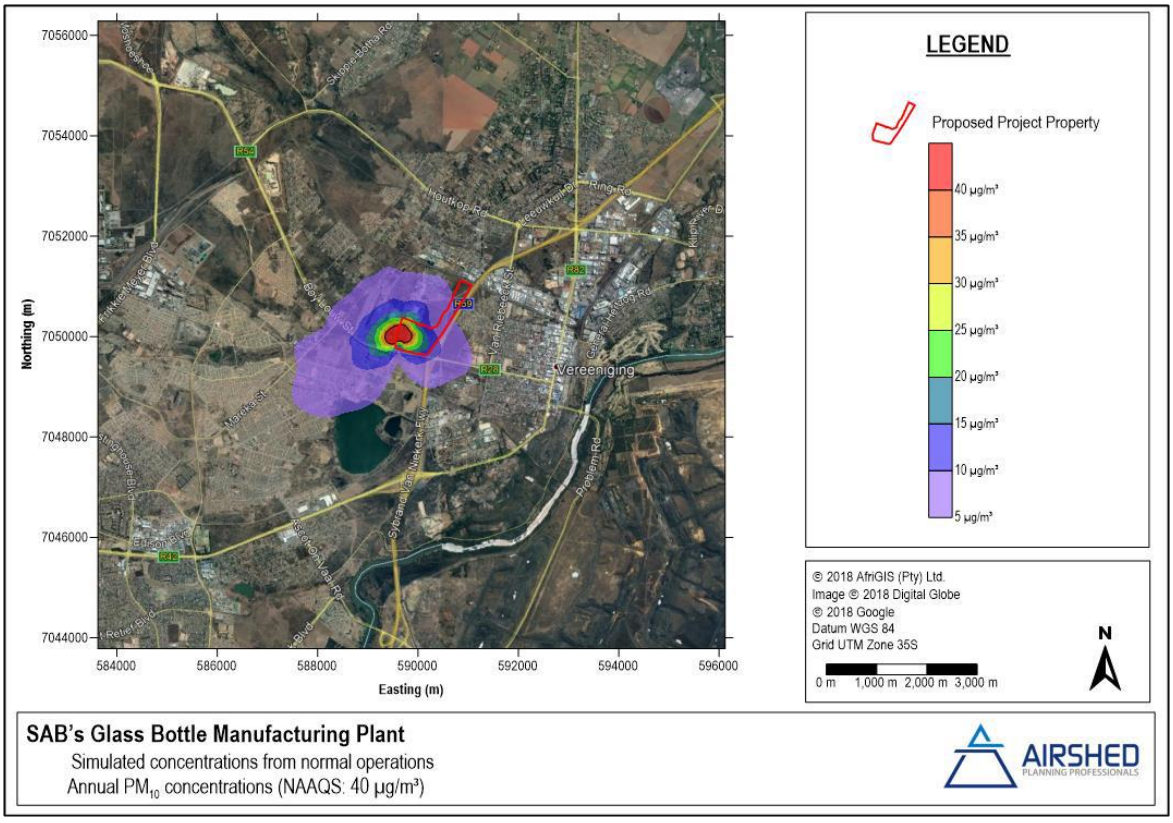

FIGURE 7-2: SIMULATED ANNUAL PM10 CONCENTRATIONS

(source: Airshed)

Impact assessment:

During construction dust generated from vegetation clearing, soil grubbing, material handling and the movement of vehicles on unsurfaced areas may contribute to elevated particulate matter levels in the air. In addition wind erosion from exposed materials could also contribute to elevated particulate matter levels. This could result in increased dustfall on a local scale and higher particulate matter loads. Emissions would also be generated by vehicles and other combustion-driven equipment (e.g. generators) that release nitrogen oxides (NO_X), carbon dioxide (CO_2), carbon monoxide (CO) and volatile organic compounds (VOC). With mitigation, and given that the construction phase is short term/temporary, the overall intensity and consequence of potential impacts would be low. The related significance is considered to be **LOW** without mitigation and **VERY LOW** with mitigation (Airshed Planning Professionals, 2018a). The impact assessment is not presented in a table.

Operational activities present the most potential for negative air quality impacts. Gaseous pollutants would be generated from fuel combustion in the furnaces (sources of SO_2 and NO_X), emissions generated by vehicle engines and other combustion-driven equipment (e.g. generators) (sources of NO_X, CO_2, CO and VOC). Particulate emissions would arise from materials handling in the batch plant and entrainment from vehicles on paved roads (contributing to increased dustfall and particulate fractions). All of these activities would be conducted over for the life of the plant. For the operational phase, air quality modelling predicted the following:

- Simulated SO_2 and NO_2 concentrations would be compliant with the hourly, daily, and annual NAAQS beyond the site boundary, if the furnaces meet the relevant Minimum Emission Standards.
- Dustfall rates would be below the National Dust Control Regulations (NDCR) limits for residential areas and non-residential areas off-site.
- PM_{10} concentrations may result in off-site exceedances with the National Ambient Air Quality Standards (NAAQS) over daily (up to 600 m off-site) and annual (up to 250 m off-site) periods.
- $PM_{2.5}$ concentrations may (conservatively) result in off-site exceedances with the National Ambient Air Quality Standards (NAAQS) over the daily (up to 2 900 m off-site) and annual (up to 600 m off-site) periods.

Following the initial modelling that informed the above results, PM_{10} and $PM_{2.5}$ concentrations were reconsidered in a scenario with additional mitigation. In this regard, the model predicted that with additional mitigation (i.e. 98% efficiency on the emission controls at the batch plant) compliance with PM_{10} and $PM_{2.5}$ NAAQS could be achieved at the site boundary.

The assessment considers the more significant impacts associated with $PM_{2.5}$ and PM_{10} emissions. The impact on air quality and the related inhalation health impacts is considered to be of **HIGH** significance without mitigation and **LOW to MEDIUM** significance with design controls and additional mitigation (see Table 7-1).

Mitigation:

The following measures are recommended (see EMPr in Appendix 8):

- Relocate the Wise Owl pre-school prior to construction.
- Design and manage the furnaces as per the Subcategory 5.8 listed activity under NEMAQA.
- Design and manage the emissions control equipment on the batch plant to achieve 98% control efficiency.
- Mitigation of vehicle entrainment emissions from the paved access roads using a mechanical sweeper (or watering); strict enforcement of speed limits (maximum 20 km/h on access roads); covers for vehicles; and regular clean-ups of road spillages.

Monitoring

The following monitoring is recommended (see EMPr in Appendix 8):

- Dustfall and fine particulate monitoring.
- Emissions monitoring in accordance with the reporting requirements for Category 5-8.
- Implementation of the reporting procedures.

TABLE 7-1: INCREASE IN AMBIENT AIR CONCENTRATIONS

Issue: Increase in ambient air concentrations		
Phases: All, primarily operations		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Prominent change, disturbance or nuisance	Minor change, disturbance or nuisance
Extent	Long-term	Long-term
Duration	Local area, beyond the site boundary	Whole site
Consequence	High	Medium
Probability	Probable	Possible
Significance	High	Low to Medium
Nature of cumulative impacts	The baseline $PM_{2.5}$ and PM_{10} concentrations are already non-compliant with NAAQS. Depending on the type of developments within the area, additional contributions to air quality impacts could occur.	
Degree to which impact can be reversed	Fully on cessation of operations.	
Degree to which impact may cause irreplaceable loss of resources	Possible.	
Degree to which impact can be mitigated	High for direct impacts, but low for the existing ambient.	
Residual impacts	With design controls and mitigation it is unlikely that air quality health issues would be felt beyond the life of the project.	

7.1.2 Issue: Loss of agricultural soil resource through physical disturbance

Description of impact:

Construction and operation of the infrastructure and related services has the potential to damage soil resources through physical disturbance including removal, compaction and/or erosion.

Soil, and more specifically topsoil, is considered a valuable resource that supports a variety of ecological systems including providing a growth medium for most vegetation. Its disturbance and loss should be prevented wherever this is avoidable. Given the potential for the plant to have a life in excess of 20 years, the loss of soil is considered from the perspective of its value as a growth medium to support rehabilitation and landscaping of disturbed areas post construction and its beneficial use to third parties where excess soil cannot be used on site.

Impact assessment:

Site preparation and earthworks will require the removal and stockpiling of soil. Improper recovery and separation of soil could result in topsoil being left under infrastructure or mixed with fill and spoil material and thus lost. Improper handling of the soils could compromise the soil structure and functionality. Vehicle and machinery movement could result in the compaction of soil. In the case of compaction the soils' functionality would firstly be compromised through a lack of rooting ability and aeration, and secondly the compacted soils are likely to erode because with less inherent functionality there would be little chance for the establishment of vegetation and other matter that naturally protects the soils from erosion. Disturbed and exposed soils are susceptible to erosion (through action of wind or water) as a result of the lack of vegetative cover and friability of the soil structure. The soil on site is considered to be highly erodible and if erosion occurred on disturbed areas the soils would be lost from the site.

The above impacts are expected to occur during the construction phase. It is expected that a site boundary would be established at the start of construction and that impacts would therefore be limited to the project site. During operations, once landscaping has taken place, no further physical disturbance of soils is expected.

Stripping and handling of soils would affect the inherent functionality of the soil and the soil would be permanently lost from the area. The soils on site are however considered to be of low to moderate agricultural potential. With mitigation that ensures appropriate stripping, handling and beneficial use of topsoil the significance of any impacts can be reduced. The loss of agricultural soil resources through physical disturbance is considered to be of **MEDIUM** significance without mitigation and **VERY LOW to LOW** significance with mitigation (see Table 7-2 below).

Mitigation:

The following measures are recommended (see EMPr in Appendix 8):

- Limit the project footprint to that identified in this report.
- Establish the site boundary (as presented in this report) at the start of construction and keep all activities within this boundary.
- Restrict vehicle and machinery movement to designated areas.

- Strip, store and maintain soils in line with the soil management plan (including measures for erosion control).
- Rehabilitate and landscape disturbed areas not occupied by infrastructure.
- Identify beneficial uses for excess topsoil that cannot be used on site. This could include sale to third parties.

TABLE 7-2: LOSS OF AGRICULTURAL SOIL RESOURCE THROUGH PHYSICAL DISTURBANCE

Issue: Loss of agricultural soil resources through physical disturbance		
Phases: Planning and Design, Construction		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Moderate change or disturbance	Moderate change or disturbance
Extent	Long-term	Short-term
Duration	Whole site	A part of the site
Consequence	Medium	Low
Probability	Definite	Probable
Significance	Medium	Very Low to Low
Nature of cumulative impacts	Loss of soils due to other developments within the same area could contribute to cumulative impacts. The area, however, is earmarked for industrial use as part of the municipal SDF and therefore a cumulative loss of soils across the earmarked area is unavoidable.	
Degree to which impact can be reversed	The loss of in-situ soils is irreversible, however where mitigation can be applied the soil can be used for beneficial uses.	
Degree to which impact may cause irreplaceable loss of resources	High	
Degree to which impact can be mitigated	Moderately high	
Residual impacts	Once soil is removed from in-situ and handled, the area of land and natural soil functionality would be permanently lost. The beneficial use of the soil would limit the residual impact.	

7.1.3 Issue: Loss of agricultural soil resource through contamination

Description of impact:

Construction and operation of the plant site and related services has the potential to damage soil resources through contamination.

Soil, and more specifically topsoil, is considered a valuable resource that supports a variety of ecological systems including providing a growth medium for most vegetation. Its disturbance and loss should be prevented wherever this is avoidable. Given the potential for the plant to have a life in excess of 20 years, the loss of soil is considered from the perspective of its value as a growth medium to support rehabilitation and

landscaping of disturbed areas post construction and its beneficial use to third parties where excess soil cannot be used on site.

The loss of soil and related agricultural potential and its impact on land uses is discussed separately in Section 7.2.4.

Impact assessment:

Contamination of soil resources could occur through potential spillages from the use and handling of fuels, lubricants and other potential contaminants. Additionally dirty surface water runoff or effluent from activity areas and poor waste management practices could result in soil contamination. This could alter the soil composition, negatively impacting on the chemistry of the soils such that current growth conditions are impaired. Contamination of soils also has the potential to indirectly (through runoff and seepage) impact surface and groundwater resources (discussed further in Sections 7.1.9 and 7.1.10).

Sources of contamination exist during both the construction and operational phases. During construction the scale of events would be small. Although events may occur frequently, these would generally be of a negligible intensity. Standard construction controls should eliminate the majority of the risk. Contamination of soil resources is considered to be of **LOW** significance without mitigation and **VERY LOW** significance with mitigation (not shown in the table).

During operations it is expected that the scale and frequency of contaminant events would be relatively low given the control measures that are planned for the project. Contamination of soil resources is considered to be of **LOW to MEDIUM** significance without mitigation and **VERY LOW** significance with mitigation (see Table 7-3 below).

Mitigation:

The following measures are recommended (see EMPr in Appendix 8):

- Contain potential contamination at source.
- Prevent and manage spills.
- Manage waste generated on site.
- Handle major spillage incidents in accordance with the emergency response procedure.

TABLE 7-3: LOSS OF AGRICULTURAL SOIL RESOURCE THROUGH CONTAMINATION

Issue: Loss of agricultural soil resources through contamination		
Phases: All		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Prominent change or disturbance	Moderate change or disturbance
Extent	Medium term	Short term
Duration	A part of the site	A part of the site
Consequence	Medium	Low
Probability	Probable	Conceivable

Significance	Low to Medium	Very Low
Nature of cumulative impacts	Contamination incidents from/of surrounding land uses could add to the loss of resources if not mitigated.	
Degree to which impact can be reversed	Partially reversible where bioremediation of soils takes place.	
Degree to which impact may cause irreplaceable loss of resources	High	
Degree to which impact can be mitigated	High	
Residual impacts	With mitigation, no residual impacts are expected.	

7.1.4 Issue: Increase in disturbing noise levels affecting potential human receptors

Description of impact:

Construction and operation of the plant as well as project-related traffic presents activities that would contribute to current ambient noise levels. Project activities have the potential to cause a noise disturbance and/or nuisance at potentially sensitive receptors. A maximum increase in noise levels of 3 dBA above background levels was used to inform the assessment (IFC noise guideline). For a person with average hearing acuity, an increase of less than 3 dBA in the general ambient noise level is not detectable (Airshed Planning Professionals, 2018a).

Noise pollution will have different impacts on different receptors because some are very sensitive to noise and others are not. It is expected that residential and educational facilities would be most vulnerable to noise disturbances from the proposed project. The assessment assumes that the Wise Owl pre-school would be relocated prior to construction. The noise threshold expected to cause a behavioural response by cattle is 85 to 90 dB. Potential noise impacts on biodiversity are discussed in Section 7.1.7.

Modelled Noise Levels

Airshed Planning Professionals (Pty) Ltd (Airshed) undertook a specialist environmental noise impact study for the proposed facility (see Appendix 5.4). In the assessment of simulated noise levels, reference was made to the IFC noise level guidelines for residential, institutional and educational receptors, which is in line with the SANS 10103 ratings. Noise levels for various activities at the project site were provided by the proponent and emissions from diesel powered mobile equipment were estimated as a function of the power rating of the equipment engine. A noise propagation model was used to calculate noise levels over an area of 5.4 km east-west by 5.3 km north-south. The area was divided into a grid matrix with a 50-m resolution and noise sensitive receptors were included as discrete receptors.

Noise modelling predicted noise levels at the identified noise sensitive receptors due to the project. The maximum noise levels were anticipated to be in the region of 65 dBA. The noise modelling predicted that during the day an increase of 6.1 dBA is expected at the correctional services staff accommodation (potentially affecting four staff houses) and an increase of 10.2 dBA is expected at the informal livestock kraals. At night, the modelling predicted an increase of 4.9 dBA at the correctional services staff accommodation, ~ 6dBA at Sharpeville and Roods Gardens AH and a 13.6 dBA increase at the informal livestock kraals.

The main findings of the impact assessment are:

- On average, noise impacts are expected to be more notable to the south-east during the day and to the south-west during the night.
- The noise levels from the project operations are predicted to exceed the selected noise criteria up to a distance of 700 m for day-time activities and up to 1800 m for night-time activities.
- Construction and closure phase noises are expected to be similar or slightly lower than simulated noise levels of the operational phase.

Impact assessment:

The noise levels predicted as a result of operations could result in moderate change or discomfort to human receptors. In terms of SANS 10103 (2008) these predicted increases in noise levels are expected to result in 'little' to 'medium' reaction from the correctional services staff during the day and 'little' reaction at night. Strong' community reaction may also arise from the informal livestock kraals during the day and night. Higher increases (10 to 17 dBA) were predicted at the SAB Depot and Fresh Produce Market, but as these are significantly less sensitive receptors a strong reaction is not anticipated.

When considering material handling and vehicle movement on site, these will make use, to varying degrees, of reverse alarms and hooters. If unmitigated these could result in numerous noise complaints, especially where these activities take place at night.

Even with the increased noise it is considered unlikely that cattle at the informal livestock kraals would exhibit a behavioural response.

Impacts are expected in both the construction and operational phases. The impact on human noise receptors is considered to be of **MEDIUM** significance without mitigation and **LOW** significance with mitigation (see Table 7-4 below).

Mitigation:

The following measures are recommended (see EMPr in Appendix 8):

- Design and construct the plant to have the lowest noise emissions where possible.
- Enclose noise generating equipment and machinery.
- Implement a maintenance programme to keep all equipment and machinery in proper working order.
- Limit non-routine noisy activities to day-time hours.
- Relocate the Wise Owl pre-school prior to construction.
- Establish a noise screen/barrier between the site and the correctional services staff accommodation.
- If monitoring indicates noise levels at the informal livestock kraals exceed 85 dBA, implement screens.

- Register and address any noise complaints.

Monitoring

The following monitoring is recommended (see EMPr in Appendix 8):

- Annual noise monitoring at the staff accommodation at the Correctional Services.
- Noise monitoring in response to complaints received.

TABLE 7-4: INCREASE IN DISTURBING NOISE

Issue: Increase in disturbing noise levels affecting potential human receptors		
Phases: All, primarily operations		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Moderate change, disturbance or discomfort	Negligible change, disturbance or nuisance
Extent	Long-term, to end of operations	Long-term, to end of operations
Duration	Beyond the site boundary, affecting immediate neighbours	Whole site
Consequence	Medium	Low
Probability	Probable	Probable
Significance	Medium	Low
Nature of cumulative impacts	Developments within the area could contribute to increased noise impacts on third party receptors. The developments, however, are likely to fit within the existing and planned commercial/industrial use of the area.	
Degree to which impact can be reversed	Low.	
Degree to which impact may cause irreplaceable loss of resources	Not applicable.	
Degree to which impact can be mitigated	Medium to High.	
Residual impacts	With mitigation it is unlikely that noise induced stress and related health issues would be felt beyond the life of the project.	

7.1.5 Issue: Loss of terrestrial habitat and biodiversity through physical disturbance

Description of impact

Construction of the plant infrastructure and related services has the potential to damage soils and vegetation and the biodiversity these support through physical removal and disturbances, both direct and indirect.

Natural habitat and biodiversity are considered important natural resources that support sustainable ecological systems and ultimately provide ecosystem services that add value to human life. Although the site potentially

hosted Soweto Highveld Grassland (classified as Endangered) it currently consists of secondary grassland, which had previously undergone extensive modification and then subsequently returned to a 'grassland' state. The secondary nature of the vegetation, ongoing grazing regime and development in surrounding areas has resulted in limited species diversity and a habitat that is considered to be of moderately low to low ecological importance and sensitivity.

Impact assessment

Site preparation and earthworks would result in removal of vegetation and soils. The development of infrastructure over these areas would completely transform the site, rendering it unavailable as habitat for flora and fauna. Vehicle and machinery movement, material storage and handling and other construction activities are likely to result in trampling of vegetation and compaction of soils in the adjacent areas. This would dramatically reduce the habitat quality and alter biodiversity. Such areas could be partially restored during landscaping and rehabilitation such that certain naturally occurring flora and fauna occupy the site. Approximately 15.3 ha would be permanently lost as natural habitat, while the balance of the property (~8.7 ha) would be of reduced value to naturally occurring biodiversity.

The increased level of activity (the presence of people, vehicles, machinery and related noise) would render the site and adjacent surrounds less suitable as habitat for faunal species, except those adapted to high levels of anthropogenic activities. The loss and transformation of habitat as well as increased levels of disturbance would also render the site less suitable as a corridor for the movement of biodiversity between remaining habitats in the region. The establishment and spread of alien invasive floral species as a result of disturbances could further degrade habitat and limit food availability of various faunal species.

The above impacts are expected to mainly occur during the construction phase. During operations, once landscaping has taken place and a site boundary established, no further physical disturbance of vegetation is expected. However the activity and noise disturbances would continue for the duration of the operation. The impact on the terrestrial biodiversity resources is considered to be of **MEDIUM** (during construction) and **VERY LOW** (during operations) significance without mitigation and **LOW** (during construction) and **VERY LOW** (during operations) significance with mitigation (see Table 7-5 below).

Mitigation

The following measures are recommended (see EMPr in Appendix 8):

- Implement soil mitigation measures.
- Manage waste generated on site.
- Limit the project footprint to that identified in this report.
- Restrict vehicle and machinery movement to designated areas.
- Provide appropriate sanitary facilities.
- Manage alien invasive plant species
- Rehabilitate and landscape disturbed areas not occupied by infrastructure.
- Utilize locally appropriate, indigenous plant species in the landscaping.
- Promote natural landscapes rather than park-type landscapes.
- Handle major spillage incidents in accordance with the emergency response procedure.

TABLE 7-5: LOSS OF TERRESTRIAL HABITAT AND BIODIVERSITY

Issue: Loss of terrestrial habitat and biodiversity through physical disturbance		
Phases: Primarily construction, limited risk during operations		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Moderate change or disturbance (Minor during operations)	Minor (Slight) change or disturbance (Negligible during operations)
Extent	Long-term, to end of operations (Medium-term during operations)	Medium-term (Very short during operations)
Duration	Beyond the site boundary, affecting immediate neighbours	Whole site.
Consequence	Medium (Low during operations)	Low (Very Low during operations)
Probability	Definite/ Continuous (Possible during operations)	Definite/ Continuous (Conceivable during operations)
Significance	Medium (Very Low during operations)	Low (Very Low during operations)
Nature of cumulative impacts	The loss of natural habitat would be cumulative with other historic and ongoing transformation of grassland for development. The area is earmarked for development (at municipal and provincial level) and does not form part of provincial biodiversity conservation targets.	
Degree to which impact can be reversed	Removal of the facility and rehabilitation of the land would reverse the impact, at least in part. However, this is considered unlikely. Once developed as an industrial site, future use would likely remain industrial/commercial. The impact is not reversible.	
Degree to which impact may cause irreplaceable loss of resources	Low. The site does not host any species of conservation concern or other irreplaceable resources.	
Degree to which impact can be mitigated	Moderate.	
Residual impacts	The permanent loss of approximately 15.3 ha of natural habitat.	

7.1.6 Issue: Loss of wetland habitat and biodiversity through physical disturbance

Description of impact

Construction of the plant infrastructure and related services has the potential to damage wetlands (soils and vegetation) and the biodiversity these support through physical removal and disturbances, both direct and indirect.

Wetlands are important freshwater resources that ultimately provide essential ecosystem services (e.g. water purification, water retention, flood reduction). Although the site contains 'wet' areas, SAS confirmed that these water resources should be classified as artificial and anthropogenicaly derived. The 'wet' areas have been formed by the construction of the canals (largely for storm water from the SAB Depot) and adjacent earthen

berms (excavated from the channels) which cause the ponding of water. Due to the artificial nature of these features, they are considered to have low/no ecological importance.

Impact assessment

The development of infrastructure over the 'wet' areas would completely transform the site, rendering it unavailable as wetland habitat. In addition the diversion of surface water flow from the SAB Depot and Lager Street in designed channels will render the area dry. Approximately 0.6 ha of 'wet' areas would be permanently lost as habitat, and the *Crinum macowanii* individuals that occur would be destroyed. These impacts would occur during the construction phase.

Construction and operation of a potable water pipeline over the Vaal tributary in the road reserve and using the existing bridge) is considered to have negligible risk to the watercourse.

The impact on the wetland habitat is considered to be of **LOW** significance without mitigation and **VERY LOW** significance with mitigation (see Table 7-6 below). Operation of the plant is not anticipated to result in loss of wetland habitat.

Mitigation

The following measures are recommended (see EMPr in Appendix 8):

- Limit the project footprint to that identified in this report.
- Restrict vehicle and machinery movement to designated areas.
- Rescue and replant *Crinum macowanii* individuals.

TABLE 7-6: LOSS OF WETLAND HABITAT AND BIODIVERSITY

Issue: Loss of wetland habitat and biodiversity through physical disturbance		
Phases: Construction		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Minor (Slight) change or disturbance	Negligible change
Extent	Whole site.	A part of the site.
Duration	Medium-term	Medium-term
Probability	Low	Very Low
Consequence	Probable	Conceivable
Significance	Low	Very Low
Nature of cumulative impacts	The loss of wetland habitat would be cumulative with other historic and ongoing transformation for development. The area is earmarked for development (at municipal and provincial level) and does not form part of provincial biodiversity conservation targets.	
Degree to which impact can be reversed	Removal of the facility and rehabilitation of the land would reverse the impact, at least in part. However, this is considered unlikely. Once developed as an industrial site, future use would likely remain industrial/commercial. The impact is not reversible.	

Degree to which impact may cause irreplaceable loss of resources	Low. The wet areas area an artificial resource. The species of conservation concern can be recovered and replanted.
Degree to which impact can be mitigated	Moderate.
Residual impacts	The permanent loss of approximately 0.6ha of artificial wet areas.

7.1.7 Issue: Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality

Description of impact

Aquatic habitats are considered important natural resources that support sustainable ecological systems and ultimately provide essential ecosystem services (e.g. water purification, water retention, flood reduction). The nearest natural freshwater resource to the site is the Vaal tributary. Adjacent to the site are man-made concrete drainage channels (along the R59 and R 28 roads) which join and ultimately feed, via the Vaal tributary, into the Vaal River, which is of strategic importance to Gauteng. The aquatic habitat in the Vaal tributary is currently of a low ecological state and sensitivity. Water quality and aquatic habitats in these systems are under threat due to anthropogenic stresses.

Contaminated run-off from the site and the release of treated effluent from the sewage package plant has the potential to affect freshwater habitats through changes in flow and water quality, thus affecting aquatic biodiversity in the downstream environment.

Impact assessment

Earthworks during construction could increase sediment loads in storm water runoff and contaminants arising from spillages of fuels, lubricants and paints as well as poor waste management could reach the drainage channels adjacent to the site (150 m to south and east) and be transported downstream to the Vaal tributary. This would further reduce the already poor water quality in the Vaal tributary and impact aquatic habitat and related biodiversity.

During operations attenuated storm water from the site would be clean (as dirty activities would only be undertaken within contained areas) and therefore would not contribute to any contamination impacts. Sediments accumulating on the roads and paved surfaces may be washed to the Vaal tributary.

The sewage package plant would be designed and operated to achieve effluent qualities compliant with the DWS discharge standards and the quality parameters in the Leeuwkuil Water Care Works licence (Department of Water and Sanitation, 2014) (i.e. drinking water standards). The released effluent would enter the Vaal tributary just upstream of the Leeuwkuil Water Care Works' discharge point. Baseline water quality in the Vaal tributary (as at August 2018) is poor with numerous parameters (e.g. electrical conductivity, chloride, calcium, magnesium, manganese, sodium and faecal coliforms) exceeding the SANS 241:2015 Drinking Water Standards and in-stream water quality guidelines for the Vaal Barrage Reservoir catchment. The baseline water quality has already caused a change in the aquatic biodiversity. Where poor quality discharge is released into the environment, this would further degrade aquatic habitats and related biodiversity. Where discharge of treated

effluent is at the same quality as the majority of the flow in the Vaal tributary, it is not anticipated to cause a detectable impact to freshwater habitat or aquatic biodiversity. The discharged water quality would be better than the baseline water qualities (as at August 2018) in the Vaal tributary.

The discharge volumes from the sewage package plant would be ~1 % of the approved discharge flows from the Leeuwkuil Water Care Works to the Vaal tributary. The biodiversity specialist is of the opinion that this additional flow would not significantly alter the aquatic habitats or related biodiversity within the system.

Construction impacts would be of short duration and would occur away from the natural water resource. Any contamination, if significant, could be long-term. During operations impacts are likely to be limited to those associated with discharge from the site, as soils/vegetation would not continue to be disturbed and contaminants would be contained and handled in bunded areas. Large discharges from the storm water attenuation pond would only occur during high storm events, which would likely flush the system.

The assessment considers the more significant impacts associated with discharges during operations. Disturbance of the downstream natural aquatic habitat and related biodiversity is assessed to be of **LOW to MEDIUM** significance without mitigation and **LOW to VERY LOW** significance with mitigation (see Table 7-7 below).

Mitigation

The following measures are recommended (see EMPr in Appendix 8):

- Undertake the primary earthworks activities in the drier winter months.
- Implement soil management measures.
- Operate the sewage treatment plant to achieve the DWS discharge standards.
- Only release treated effluent which complies with the standards authorised in terms of the National Water Act.
- Construct conservancy tanks for the treatment plant to store effluent during periods of maintenance.

Monitoring

The following monitoring is recommended (see EMPr in Appendix 8):

- Test the quality of the effluent prior to release to ensure that only effluent of an acceptable standard is being released to the receiving environment.
- Monitor water quality in the Vaal tributary.

TABLE 7-7: DISTURBANCES OF AQUATIC HABITAT AND RELATED BIODIVERSITY

Issue: Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality		
Phases: All, primarily operations		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Minor change or disturbance	Minor change or disturbance
Extent	Long term, to end of operations	Long term, to end of operations

Duration	Local area, extending beyond the site boundary	Local area, extending beyond the site boundary
Consequence	Medium	Medium
Probability	Possible	Unlikely
Significance	Low to Medium	Very Low to Low
Nature of cumulative impacts	The contribution of the project to the cumulative impact is insignificant.	
Degree to which impact can be reversed	The impact could begin to be reversed on cessation of discharge.	
Degree to which impact may cause irreplaceable loss of resources	Unlikely. Existing ambient conditions in the Vaal tributary are such that the discharge is unlikely to cause irreplaceable loss.	
Degree to which impact can be mitigated	Mitigation is not required as it forms plant of the plants design and operating conditions.	
Residual impacts	None.	

7.1.8 Issue: Alteration of drainage patterns affecting the flow of water in downstream systems

Description of impact

Water for the project will be sourced from Rand Water via the Emfuleni Local Municipality and therefore no water will be abstracted from the site or from nearby water resources.

The project will introduce large areas of impermeable land cover, which could if not mitigated, increase the volume of runoff generated during a storm event. This could alter drainage patterns and result in the flooding of downstream systems (flash floods). Where any discharges take place this could increase flows within downstream systems and the risk of flooding. Discharges from the project site include treated domestic sewer effluent, treated industrial plant effluent and attenuated storm water.

Post development Flood-lines

SLR undertook a further assessment to ascertain the impacts of the discharge of storm water flow and treated sewage effluent post the development (see Appendix 5.7). Outflow from the storm water attenuation pond would be 6.5m^3/s into the R59 drainage channel. Under 1:100 year return events the effluent discharge is less than 0.04% of the total volume. Project Jordan, potentially located on land near to the glass bottle manufacturing plant, would also contribute to increased peak flows in the R59 channel, with a total discharge estimated at 6.5m^3/s.

It is likely that the project's discharge at the 1:100 year storm return would increase the flood height and would have a limited effect on the low-lying areas of the site. By limiting the project's discharge rate to less than 3.5 m^3/s (i.e. with a larger attenuation pond) any flooding risk to the site could most likely be prevented. However, when combined with proposed discharges from Project Jordan the potential flood height at the 1:100 year storm return could inundate portions of the plant and the attenuation pond. This can be attributed to increased storm water flow rates and the backwater as a result of the downstream culvert being at the same invert level as the channels and the Vaal tributary. If both projects are developed, a reduced outflow rate from

(both) attenuation ponds would be required to prevent flooding of the project site. A discharge rate of approximately 2 m^3/s at the 1:100 year storm event would have negligible impacts on pre-development flood-lines. This would require substantially larger storm water attenuation ponds at both projects. Alternatively the glass bottle manufacturing plant's platform could be raised above the potential flood water surface elevation by lifting it by approximately 80 cm (at the lowest elevation). Upgrading of storm water channels, if required, should be considered in consultation with other developers.

Impact assessment

A storm water management plan for the site, as required by the municipality, has been developed as part of the rezoning of the land and the development of the site within an urban area. Implementation of the project would result in increased runoff flows due to hardstanding areas within the plant. The storm water management plan includes provision for an upstream perimeter cut-off drain to minimise the volume of runoff entering the site (this will divert runoff from the SAB Vereeniging Depot and Larger Street) and a separate system for the collection of runoff. In addition, an attenuation pond would be used to absorb the increased runoff volumes and attenuate the flow to 1:25 year pre-development flood rates. The pond capacity would accommodate a volume of 350 m^3/ha or the 1:25 year post-development run-off accumulated by the site, whichever is the greatest. The attenuation pond overflow would accommodate the 1:50 year flood. These storm water management measures would ensure that storm water run-off would have minimal effects on the natural flow regime, under regular rainfall events. The development should consider a larger attenuation pond to limit storm water discharges to less than 3.5 m^3/s.

Operation of the sewage package plant would result in the generation of ~180 m^3 of treated sewage effluent per day (0.002 m^3/s). While a number of alternatives for reuse and recycling of the treated effluent would be investigated, it is likely that most (or all) of the treated effluent would be discharged to the Vaal tributary, via the R59 concrete channel. In dry periods the flow in the Vaal tributary is driven by discharge from the Leeuwkuil Water Care Works, which is licenced to discharge 7.3 million m^3 per annum (0,23 m^3/s) (Department of Water and Sanitation, 2014). The discharge volume from this sewage package plant would contribute an additional 1 % (maximum) to the flows within the Vaal tributary.

Alterations to drainage patterns would commence at the start of the construction phase as the site is developed, and reach a maximum discharge volume during operations. Without considering the flood-lines and in the absence of storm water controls, this could result in a prominent change in drainage patterns. With planned design controls and mitigation, only storm events greater than 1:50 year intensity would likely result in noticeable increases in runoff and collection within the system. This would however be for short periods of time, during/following a storm event.

An alteration of drainage patterns affecting the flow of water in downstream systems is assessed to be of **MEDIUM** significance without mitigation and **LOW** with mitigation (see Table 7-8 below).

Mitigation

The following measures are recommended (see EMPr in Appendix 8):

- Inspect and maintain the storm water management system in a functional state.
- Reuse and recycle treated effluent within the plant as far as possible.

- Design the storm water attenuation pond with a maximum discharge rate of 3.5 m^3/s at the 1:100 year return event.
- Ensure the discharge channels have suitable gradient and liner to provide effective operation and prevention of erosion.
- Develop and maintain a dynamic climatic water balance for the site to inform water uses on site, attenuation of storm water and discharge requirements.

Monitoring

The following monitoring is recommended (see EMPr in Appendix 8):

- Measure flows within the plant and discharge volumes on a continuous basis (i.e. flow meters).
- Undertake regular inspections and maintenance of the drainage channel.

TABLE 7-8: ALTERATION OF DRAINAGE PATTERNS AFFECTING THE FLOW OF WATER IN DOWNSTREAM SYSTEMS

Issue: Alteration of drainage patterns affecting the flow of water in downstream systems		
Phases: All, primarily operations		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Prominent change or disturbance	Moderate change or disturbance
Extent	Beyond the site boundary, affecting immediate neighbours	A part of the property
Duration	Long-term	Long-term
Consequence	Medium	Medium
Probability	Probable	Possible
Significance	Medium	Low
Nature of cumulative impacts	Where developments take place upstream of the site and within the same sub-catchment, discharges (depending on the discharge flow and rate) could increase flow in the system and increase the risk of downstream flooding. In this case further limitation of storm water discharge rates may be required, or the plants floor level should be raised.	
Degree to which impact can be reversed	Fully on cessation of discharge.	
Degree to which impact may cause irreplaceable loss of resources	Unlikely.	
Degree to which impact can be mitigated	High with the implementation of appropriate engineering design.	
Residual impacts	None expected.	

7.1.9 Issue: Discharges from the project affecting the quality of downstream freshwater resources

Potential contamination impacts on surface water resources as a result of runoff or discharge from the project has been assessed from the perspective of aquatic ecosystems (see Section 7.1.7). It is assumed that if impacts on freshwater resources are mitigated in a way that addresses potential impacts on the aquatic ecoystem, then any potential impacts on human uses of downstream resources would indirectly be mitigated. A separate assessment has therefore not been included.

7.1.10 Issue: Contamination of groundwater quality affecting the aquifer

Description of impact

Groundwater is a valuable resource and is defined as water which is located beneath the ground surface in rock pore spaces and in the fractures of lithologic formations. Activities on surface could result in seepage of contaminants into the groundwater system.

Impact assessment

Water for the project will be sourced from Rand Water via the Emfuleni Local Municipality and therefore no groundwater will be abstracted from the site. Borehole abstraction was considered as an alternative supply option; however, due to the presence of dolomites in the region this option presents potentially significant risks to the facilities (and other areas) ground stability and has not been considered further.

Seepage from spillages of fuels, lubricants and other potential contaminants as well as dirty surface water runoff or untreated effluent from activity areas could result in contamination of groundwater resources. Based on the material, expected size and expected frequency of spills a moderate reduction in groundwater quality could occur. Even though sources of contamination can be temporary in nature, related potential contamination can be long term. It is however, expected that any potential contaminant plume would be restricted to the plant site due to the slow circulation of groundwater within the geological formations that occur on site. The nearest known groundwater users to the site are located between 1 and 2 km from the site (based on the DWS National Groundwater Archive). The aquifer on site (the Rippon Formation) has a low permeability and water circulates slowly within the formation therefore contaminant impacts on third party users are not anticipated.

During construction the scale of spills and related seepage events would be small. Although events may occur frequently, these would generally be of a negligible intensity. Standard construction controls should eliminate the majority of the risk. Contamination of soil resources is considered to be of **LOW** significance without mitigation and **VERY LOW** significance with mitigation (not shown in the table).

During operations contamination of the aquifer is unlikely given the control measures that are planned for the project. Contamination of the aquifer is assessed to be of **LOW to MEDIUM** significance without mitigation and **VERY LOW** significance with mitigation (see Table 7-9 below).

Mitigation

The following measures are recommended (see EMPr in Appendix 8):

- Store and handle all contaminants in areas with engineered containtment.
- Manage waste generated on site.
- Implement spill prevention and effluent design controls measures.
- Implement soil mitigation measures.

Monitoring

The following monitoring is recommended (see EMPr in Appendix 8):

- Monitor groundwater quality.

TABLE 7-9: CONTAMINATION OF GROUNDWATER

Issue: Contamination of groundwater quality affecting the aquifer		
Phases: Planning and Design, Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance	Minor (Slight) change or disturbance
Extent	Long-term	Medium-term
Duration	Whole site	A part of the site boundary
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	Low to Medium	Very Low
Nature of cumulative impacts	Developments within the area could contribute to groundwater impacts depending on the type of development and if it is associated with any potential groundwater contamination sources.	
Degree to which impact can be reversed	Possible with pumping and treatment, although due to the dolomites this would need to be done in a manner that mitigates stability risks.	
Degree to which impact may cause irreplaceable loss of resources	Unlikely, with mitigation.	
Degree to which impact can be mitigated	High	
Residual impacts	Once soil is removed from *in situ* and handled, the area of land and natural soil functionality would be permanently lost.	

7.1.11 Issue: Alteration of the visual environment

Description of impact

Development of the plant and related services infrastructure has the potential to alter the visual environment and aesthetics of the site.

Visual/aesthetic value is the emotional response derived from the experience of the environment with its natural and cultural attributes. The response is usually to both visual and non-visual elements and can embrace sound, smell and any other factors having a strong impact on human thoughts, feelings and attitudes (Young, 2018).

Impact assessment

Development of the site will result in a series of structures which do not currently exist. These structures would have a physical presence and would change the fabric and character of the landscape. However, within the context of existing industrial developments along the R59 highway and on nearby sites, the proposed structures would not contrast strongly with existing activities or facilities. While the site is highly visible, the most prominent public views are from the R59 and R28 roads. The users of these roads are likely to be sensitised to industrial development in this area. Residents of Leeuhof, the Correctional Services complex and institutions to the east of the R59 highway could have a higher sensitivity to the project. Other than for local road users, the visual exposure to the project would generally be a middle ground or more distant view.

The visual impact would occur incrementally during construction, reaching a peak as the structures are erected and then declining partially as the cladding, finishes and landscaping are installed. The impact on the visual environment is considered to be of **MEDIUM** significance without mitigation and of **LOW** significance with mitigation during operations (see Table 7-10below).

Mitigation

Limited mitigation is available during the construction phase however this is only expected to be for a two year period. The following measures are recommended for construction (see EMPr in Appendix 8):

- Only remove vegetation and topsoil where this is necessary.
- Implement dust suppression during construction.
- Rehabilitate and landscape disturbed areas not occupied by infrastructure.
- Establish indigenous tree screens along all the north, east and south of the site.
- Utilize locally appropriate, indigenous plant species in the landscaping.
- Maintain landscaped areas as natural rather than park-type landscapes.
- Paint structures with colours that reflect and compliment the surrounding landscape.
- Cladding and external surfaces of structures should be articulated or textured to create interplay of light and shade.
- Install light fixtures that provide precisely directed illumination.
- Avoid high pole top security lighting along the periphery of the site.
- Minimise the number of light fixtures, including security lighting, to the minimum required.

TABLE 7-10: ALTERATION OF THE VISUAL ENVIRONMENT

Issue: Alteration of the visual environment		
Phases: All		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Moderate change, disturbance or discomfort	Minor (Slight) change, disturbance or nuisance
Extent	Long term, to end of operations	Long term, to end of operations
Duration	Local area, extending far beyond site boundary.	Beyond the site boundary, affecting immediate neighbours
Consequence	High	Medium
Probability	Possible/frequent	Conceivable
Significance	Medium	Low
Nature of cumulative impacts	The development fits within the existing and planned commercial/industrial use of the area. Thus while the change is noticeable at the site scale, it is not considered significant at the area scale.	
Degree to which impact can be reversed	Removal of the facility and rehabilitation of the land would reverse the impact. However this is considered unlikely. Once developed as an industrial site, future use would likely remain industrial/commercial. The impact is not reversible.	
Degree to which impact may cause irreplaceable loss of resources	While the visual environment and aesthetics of the site will be altered, the development will have its own character and no irreplaceable loss is anticipated.	
Degree to which impact can be mitigated	Appropriate use of architectural style, building materials and landscaping can mitigate that visual impact to a large degree.	
Residual impacts	No residual impact is anticipated. Once built the structure will form part of the altered visual environment and aesthetics of the site.	

7.2 IMPACT ON SOCIO-ECONOMIC ENVIRONMENT

7.2.1 Issue: Economic impact (positive and negative)

Description of the impact

The development of a project of this nature has the potential to impact on the economy both positively through potential growth in the industry and agricultural sectors and diversification of the local economy and negatively through the potential loss of existing economic activities. This section focuses on the potential positive and negative economic impacts associated with the project and assesses these collectively.

The loss of grazing land affecting the livelihoods of farmers is assessed separately in Section 7.2.4.

Predicted Economic Values

The anticipated capital to establish the proposed glass bottle manufacturing operations is approximately R 3 billion of which, R 1.8 billion will be foreign investment. The proposed development is expected to increase the value of the current vacant land to equivalent or well above the going rate for other industrial land (i.e. > R75.37/m^2). The operation of the facility would create 289 employment opportunities. Based on a current

annual labour value of R128.6 million per annum, this equates to a net present value of R 1.4 billion over the 30 years of operational life. The annual revenue from the facility is expected to be R 1.7 billion (once the plant reaches optimal efficiency, in 2018 terms), which equates to R 18.6 billion over the 30 years life of operation. Even when excluding the capital financial contribution, this project would contribute significantly more to the national and local economy in comparison to current or potential alternative land uses.

Impact assessment

There is predicted to be a direct positive economic impact on the local, regional and national economies in both the construction and operational phases. Approximately 800 temporary and 289 permanent jobs would be created in the construction and operational phases respectively. Direct benefits would be derived from wages, taxes and profits. Indirect benefits would be derived through the procurement of goods and services, and the increased spending power of employees. Positive economic impacts could include (Mercury Financial Consultants, 2018):

- Revenue generation of approximately R18.6 billion over the life of the project in present terms;
- An estimated amount of R36.8 million (for the construction phase) and R1.4 billion (over the life of the plant) in present value would be spent on employment;
- Increase in secondary sectors supported by the demand of the project for construction materials, equipment, goods and services required for the ongoing plant operations.

In addition to the direct and indirect economic impacts discussed above, the project will through its corporate social investments, would contribute towards the local economic development in the area. The operation of the plant is anticipated to have the following positive socio-economic benefits to its employees and surrounding communities:

- Development of skills through its skills development plan;
- Learnership programmes to provide learners with an occupational qualification;
- Investment in infrastructure development through local economic development and integrated development programmes;
- SMME development.

The land needed for the project is owned by SAB and would likely be transferred to the owners of the plant. Therefore no negative economic loss is expected, even in the unmitigated scenario.

When considering alternative land uses feasible for the project site such as agriculture (specifically maize farming which would yield the best economic results), the economic study calculated that the economic benefits of the plant (R18.6 billion over a 30 year period) are predicted to significantly outweigh the maximum revenue of R 4.7 million that could be realised from commercial farming.

The impact would occur from the start of the construction phase through to the operational phase. The overall significance is likely to be a **HIGH positive** without mitigation increasing to a **VERY HIGH positive** with mitigation (see Table 7-11 below).

Mitigation

The following measures are recommended (see EMPr in Appendix 8):

- Implement recruitment and procurement policies and procedures.
- Implement local corporate social investment strategies.
- Implement influx management plan.
- Implement health management plan for employees.

TABLE 7-11: ECONOMIC IMPACT (POSITIVE AND NEGATIVE)

Issue: Economic impact (positive and negative)		
Phases: All		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Prominent change or improvement	Substantial change or improvement
Extent	Long-term	Very long, permanent
Duration	Local area, extending far beyond the site boundary	Local area, extending far beyond the site boundary
Consequence	High	Very High
Probability	Probable	Probable
Significance	High (positive)	Very High (positive)
Nature of cumulative impacts	Any other feasible developments within the area would contribute to a positive economic impact.	
Degree to which impact can be reversed	Not applicable	
Degree to which impact may cause irreplaceable loss of resources	Not applicable	
Degree to which impact can be mitigated	High	
Residual impacts	Positive economic impacts could extend beyond the life of the plant through training and skills development.	

7.2.2 Issue: Social benefits associated with employment and economic development

Description of the impact

Unemployment is a key issue for the Vereeniging area. There are a high number of job seekers and discouraged workers, in part due to due to general economic downturn in South Africa and the decline in the steel and mining sectors. Low investment into the region combined with the generally poor economic conditions and high unemployment have led to the local and regional areas experiencing an economic depression.

The glass bottle manufacturing plant would be a substantial investment that has the potential to provide direct economic benefit at the local and regional level. Employment and economic development has the potential to

improve livelihoods of individuals living in the local area through increased disposable income for individuals and households and the flow of revenue into local services and support sectors.

Impact assessment

A potential positive local social impact could occur in both the construction and operational phases. The direct impact of employment opportunities and indirect local economic improvement as well as local economic investment and development could contribute towards improving the quality of life for local communities. This may include increased disposable income for individuals and households.

New employment opportunities are likely to be of direct economic benefit at the local and regional level. The number of new employment opportunities associated with the project may, however, be limited for local people, as professional and skilled positions are likely to be brought in from other areas of South Africa or from outside South Africa. In addition, contractors may make use of existing staff during construction, which could limit the real number of new skilled, semi-skilled and unskilled opportunities. Despite this, there is likely to be an increase in employment locally, as the high number of opportunities during construction (800) is likely to have a notable impact on the temporary employment sector. During operations, it is expected that any skilled individuals brought into the area would likely become local residents, potentially contributing towards local economic stability. Specific internal policy to provide opportunity to local persons would maximise the benefit.

The investment of capital into a new development project, such as the proposed project and the operation of the plant, would likely have a trickle-down effect in terms of supporting local industries and the flow of revenue into local services and construction sectors. This in turn supports the development of the local economy through enabling businesses to grow or maintain their economic contribution. A substantial operation such as the glass bottle manufacturing plant will require a wide variety of support services and material inputs which would provide opportunity for local businesses and service providers. The sourcing, management and provision of external cullet is a potential business opportunity. Where economic benefits are spread out over municipal or regional economies, the economic impact on local communities would likely be diluted.

The proposed development, although sponsored initially by corporate investors, would be majority Black-Owned and would be the first Black-Owned glass bottle manufacturing plant in South Africa. It is anticipated that the Broad-Based Black Economic Empowerment (BBBEE) partner may be a consortium of companies and/or individuals, who may be from the local area (Vereeniging) or further afield (Johannesburg/another province). The involvement of BBBEE owners and their compliance with relevant BBBEE codes would contribute to the project benefitting historically disadvantaged individuals.

The degree to which this project would benefit local people and communities depends on a number of factors. This includes, the number of new opportunities realised locally (i.e. not through existing contractors with staff from outside the local area), and the manner in which income is used to benefit households and individuals (that is, spending on positive aspects such as education and food versus on negative social behaviour such as drug and alcohol abuse). The latter aspect is outside of the control of the project, but the former can be improved through specific internal policy and implementation thereof.

Social benefits during the construction phase would be temporary (for a period of two years) and would likely be diluted due to the largely industrialised nature of the area and the very large local urban population. Greater benefits, however, could be secured where local labour and procurement are prioritised during the construction phase. A similar situation is expected during the operational phase, although employment could be longer and for the duration of the plant's operations. Nonetheless, the promotion of employment in South Africa is always supported and is seen as a direct positive benefit of the project. Permanent employment of local people would help in improving the livelihoods of individuals living in the local area.

The impact would occur from the start of the construction phase through to the operational phase. The overall significance is likely to be a **LOW** positive without mitigation increasing to a **MEDIUM** positive with mitigation (see Table 7-12below). Key to realising the mitigated significance is to recruit employees and procure services locally as far as possible.

Mitigation

The following measures are recommended (see EMPr in Appendix 8):

- Implement recruitment and procurement policies to prioritise local content and local employment.
- Implement local corporate social investment strategies.
- Implement health management plan for employees.

TABLE 7-12: SOCIAL BENEFITS

Issue: Social benefits associated with employment and economic development		
Phases: All		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Minor change or improvement (Negligible during construction)	Minor change or improvement
Extent	For the construction period (2 years) and then long term, to end of operations	For the construction period (2 years) and then long term, to end of operations
Duration	Regional / National	Regional / National
Consequence	High (Low during construction)	High (Medium during construction)
Probability	Unlikely (Probable during construction)	Conceivable (Probable during construction)
Significance	Low (positive)	Medium (positive)
Nature of cumulative impacts	Any other feasible developments within the area would contribute to positive social benefits.	
Degree to which impact can be reversed	Not applicable, as this is a positive impact.	
Degree to which impact may cause irreplaceable loss of resources	Not applicable, as this is a positive impact.	

Degree to which impact can be mitigated	Possible for mitigation to increase the positive significance of potential impacts.
Residual impacts	Residual impacts can occur, either positive or negative, depending on the manner in which income is used to benefit households and individuals (that is, spending on positive aspects such as education and food versus on negative social behaviour such as drug and alcohol abuse).

7.2.3 Issue: Changes in land value

Description of the impact

Development and operation of the site could impact on land values both positively and negatively. Positive impacts are observed where the project site value is expected to increase due to the capital investment and the fact that land zoned for industrial purposes in the project locality is valued higher than agricultural land. Negative impacts are observed when the value of land surrounding operations is compromised by unacceptable negative environmental and social impacts.

Impact assessment

Based on municipal valuations, the value of land with infrastructure is significantly higher than that for vacant land or even vacant agricultural land with medium agricultural potential. This provides an indication that the establishment of infrastructure will significantly increase the value of the land (Mercury Financial Consultants, 2018). Even without mitigation, an increase in property value is expected.

In the unmitigated scenario it is probable that land surrounding the project would experience unacceptable social and environmental impacts, which would likely cause a loss in related land values. In the scenario where the project successfully implements the stipulated environmental and social management measures, these impacts can be managed to acceptable levels. Although it is difficult to predict the potential changes in land value of surrounding properties, with mitigation it is expected that these would be positive (Mercury Financial Consultants, 2018).

The overall significance is likely to be a **MEDIUM negative** without mitigation increasing to a **LOW positive** with mitigation (see Table 7-13).

Mitigation

The measures recommended in the EMPr (see Appendix 8) should be implemented to prevent unacceptable negative environmental and social impacts.

TABLE 7-13: CHANGES IN LAND VALUE

Issue: Changes in land value		
Phases: All		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Moderate change or disturbance	Moderate change or improvement
Extent	Long term	Long-term

Duration	Beyond the site boundary, affecting neighbours	Beyond the site boundary, affecting neighbours
Consequence	Medium	Medium
Probability	Probable	Possible
Significance	Medium	Low (positive)
Nature of cumulative impacts	Any other feasible developments within the area could contribute to changes in land value, either positively or negatively.	
Degree to which impact can be reversed	Reversing negative impacts would be possible.	
Degree to which impact may cause irreplaceable loss of resources	Not applicable	
Degree to which impact can be mitigated	High	
Residual impacts	Changes in land value could extend beyond the life of the plant depending on the post-operational land use.	

7.2.4 Issue: Reduction in grazing land affecting livelihoods of local farmers

Description of impact

The project site is open land comprising secondary grasslands which is used for informal livestock grazing. The livestock grazing is undertaken by the Emfuleni Livestock group through the Leeuwkuil Communal Kraal.

The dryland agricultural potential of soils that would be disturbed by the project is considered to be medium to low due to poor internal drainage which will become waterlogged during wet seasons. The topsoil is sandy, erodible and has low natural fertility and would require careful nutrient management for crop production.

The proposed project site (Erf 238) was zoned for agricultural use. The proposed development is in keeping with the proposed and surrounding land use for the area, namely industrial use and will contribute towards the economic development and infill of industrial area within the Vereeniging area as indicated in the Spatial Development Framework.

Impact assessment

Development of the plant, with a site boundary of 29.3 ha, would result in a permanent change and a loss of this land for grazing purposes. The site constitutes approximately 10% of the total informal grazing land used within the immediate area of the kraals and is used throughout the year. The site is located on privately-owned land (owned by SAB) and there is no formal agreement in place (legal or verbal) to use this site for grazing. However this land together with the surrounding vacant land is indicated to have been used informally for grazing for about 18 years (by the Emfuleni Livestock Executive Committee). The proximity of the site to the kraals is a key factor in its daily use, however, other areas already used for grazing could continue to be used. While the livestock owners do not have any legal right to the use of the land, they do rely on the land to support their livelihoods.

The loss of grazing land, especially in winter, could result in the farmers needing to buy additional feed to supplement grazing of the cattle. Although this is already a common practise during winter months and when the grass has been burned. The specialist is of the opinion that the loss of grazing land is unlikely to undermine future grazing practices but may increase existing grazing pressures.

The impact would occur from the start of the construction phase through to the operational phase. The overall significance is likely to be a **LOW** negative without mitigation increasing to a **VERY LOW** positive with mitigation and implementation of the potential benefits (see Table Table 7-14 below).

Mitigation

No direct mitigation is possible and as potential alternative land in the area is already being used for grazing. However, as the impact is of low significance, mitigation is not required. The only concession would be for grazing to continue on areas surrounding the site until such time as SAB chooses to develop or sell the land. Where Corporate Social Responsibility initiatives (or similar plans) are considered for the project, preference should be given to the Emfuleni Livestock Group (see EMPr in Appendix 8).

TABLE 7-14: REDUCTION IN GRAZING LAND

Issue: Reduction in grazing land affecting livelihoods of local farmers		
Phases: All		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Minor change or disturbance	Negligible change (positive)
Extent	Long term	Long term
Duration	Whole site	Whole site
Consequence	Medium	Low
Probability	Possible	Possible
Significance	Low (negative)	Very low (positive)
Nature of cumulative impacts	Where other developments are established within the kraal's informal grazing area, the cumulative loss of grazing land would increase.	
Degree to which impact can be reversed	Unlikely	
Degree to which impact may cause irreplaceable loss of resources	The loss of land as a resource for informal grazing would be permanent.	
Degree to which impact can be mitigated	Possible to some extent through Corporate Social Responsibility initiatives.	
Residual impacts	No residual impacts expected	

7.2.5 Issue: Disturbance to third party road users by project-related traffic

Description of impact

The positioning of the project with good access to the R28 and R59 roads is important as the facility would receive large volumes of raw materials and distribute large volumes of glass bottles. The existing road network surrounding the site is a well-established public road network used for motorised transport. It provides good access to Gauteng. Increased traffic on existing public road networks and introduction of heavy vehicles, in both the construction and operational phases, can result in reduced road capacity, greater accidents (for people and animals) and/or increased road damage. This in turn can put pressure on the relevant roads authority to increase the maintenance programmes and/or upgrade the roads. Provision for non-motorised transport is poor in the local area is poor.

The assessment below considers the level of service (LoS) (road capacity) affecting third party road users and safety related impacts of third party road users. From a capacity perspective, only intersections that would operate at an unacceptable LoS with the addition of the project are considered below. The assessment assumes that the Wise Owl pre-school would be relocated prior to construction.

Modelled Future Traffic

WSP undertook a traffic impact assessment of the proposed development on the existing surrounding road network (see Appendix 5.10). The study identified the surrounding road network, intersection geometry and controls, determined current traffic conditions through a traffic count survey at five key intersections, predicted operational trips for the project based on client inputs as well as for the future land use and assessed the effect of future peak hour traffic on the level of service of the key intersections. The proposed development is to be serviced by one full access from Lager Road and would generate a maximum of 811 trips in both the weekday AM and PM peak hours.

WSP reported that the baseline operating conditions at the key intersections is good to very good, except for the Boy Louw Street (R28) / Theunis Kruger Street intersection where current levels of service are 'not acceptable'. The investigation identified concerns with the level of service at two intersections with the addition of the glass bottle manufacturing plant. Levels of service were predicted to decline at the Boy Louw Street (R28) / Theunis Kruger Street and Boy Louw Street (R28) / Lager Road intersections. WSP also noted that there are currently no existing paved sidewalks or bus/taxi laybys available near the vicinity of the proposed development.

Impact assessment

Project-related traffic has the potential to cause congestion on the roads due to an increase in light and heavy vehicles, degrade roads due to the type of vehicles and/or a result in a number of incidents which could cause serious injury and/or death to third parties including pedestrians and animals. This applies to both the construction and operational phases. The construction phase would present abnormal heavy loads, although these are expected to be infrequent, while the construction and operational phases would require the transport of hazardous materials. In the absence of mitigation that focuses on increasing the LoS of relevant intersections, the use of the Boy Louw Street (R28) and Theunis Kruger Street intersection and the access point to the plant would present a potential risk to third party road users.

The overall significance is likely to be a **HIGH** (negative) without mitigation improving to **LOW** (positive) with design controls and mitigation (see Table 7-15 below).

Mitigation

The following measures are recommended (see EMPr in Appendix 8):

- Relocate the Wise Owl pre-school prior to construction.
- Implement traffic upgrades in line with traffic specialist study.
- Maintain road and traffic upgrades.
- Maintain all equipment and vehicles in proper working order
- Take care when placing signage in close proximity of access points.
- Co-ordinate the transport of any abnormal heavy loads with the relevant roads department.
- Comply with Hazchem requirements for the transport of any hazardous substances.
- Report any issues pertaining to damages and poor road conditions in close proximity of the project to the applicable authority and custodian of the respective roads.
- Handle any road accident involving or caused by project related traffic in accordance with the emergency response procedure.

Monitoring

The following monitoring is recommended (see EMPr in in Appendix 8):

- Monitor and evaluate use of relevant road intersections.

TABLE 7-15: DISTURBANCE BY PROJECT-RELATED TRAFFIC

Issue: Disturbance to third party road users by project-related traffic		
Phases: All		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Moderate disturbance	Prominent improvement
Extent	Long term	Short term
Duration	Local area, beyond the site boundary	Whole site
Consequence	High	Medium
Probability	Definite	Conceivable
Significance	High (negative)	Low (positive)
Nature of cumulative impacts	Not expected, as the assessment took into account the future land use of the whole site (light manufacturing) and not only the project's contribution. This provides for 35 % spare capacity in the proposed road upgrades.	
Degree to which impact can be reversed	Any accidents that occur as a result of project related traffic is non-reversible.	
Degree to which impact may cause irreplaceable loss of resources	Could result in serious injury or death of people or animals.	
Degree to which impact can be mitigated	High	

Residual impacts	Any accidents that occur as a result of project related traffic would likely have residual impacts. The potential for accidents would, however, cease if and when operations cease.

7.2.6 Issue: Increase in safety risks to third parties and communities

Description of the impact

The development and operation of the plant includes a number of activities that could present safety risks to third parties and communities. Traffic safety risks as a result of project-related traffic are assessed in Section 7.2.5. The assessment assumes that the Wise Owl pre-school would be relocated prior to construction.

Impact assessment

There will be a change in nature of the site during the construction phase, as the site currently comprises open grassland. The risk to the pre-school is considered to be the main potential impact but the applicant has committed to support the local municipality in the relocation of the pre-school. This process has already been initiated.

The introduction of construction activities, large machinery and vehicles, and the presence of a large number of construction workers could negatively affect public safety. The safety risk to the herdsmen and cattle (grazing around the site and crossing Boy Louw Street) and pedestrians (crossing the open land) could be increased during construction. The site is however likely to be fenced off to prevent accidental or deliberate access to the site. In the absence of mitigation, any potential injury to third parties or animals could be severe and have a long term impact.

The overall significance is likely to be **HIGH** without mitigation reducing to **LOW** with planning, design controls and mitigation (see Table 7-16 below).

Mitigation

The following measures are recommended (see EMPr in Appendix 8):

- Relocate the Wise Owl pre-school prior to construction.
- Fence the site at the start of construction to prevent accidental or deliberate access to the site.
- Maintain security and access control.
- Undertake regular patrols of the plant perimeter.
- Undertake community awareness programme.
- Handle any injury or death in accordance with the emergency response procedure.

TABLE 7-16: INCREASE IN SAFETY RISKS TO THIRD PARTIES AND COMMUNITIES

Issue: Increase in safety risks to third parties and communities
Phases: All

Criteria	Without Mitigation	With Mitigation
Intensity	Prominent change or disturbance	Negligible change or disturbance
Extent	Long-term	Long-term
Duration	Beyond the site boundary, effecting neighbours	Beyond the site boundary, effecting neighbours
Consequence	High	Medium
Probability	Probable	Conceivable
Significance	High	Low to Medium
Nature of cumulative impacts	Unless multiple developments occur in the area at the during the same time period, cumulative impacts are unlikely.	
Degree to which impact can be reversed	Any accidents that occur as a result of uncontrolled third party access to the site would be non-reversible.	
Degree to which impact may cause irreplaceable loss of resources	Could result in serious injury or death of people or animals.	
Degree to which impact can be mitigated	High	
Residual impacts	Any accidents that occur as a result of access to the site would likely have residual impacts.	

7.2.7 Issue: Change in land use affecting sense of place

Description of the impact

The development of the site from open grassland to an industrial site will change the nature of the site. A number of impacts of varying spatial scale and significance have been identified through the EIA process. These have the potential to change the way the site is experienced. The activities and land-uses within the area are common within the sub-region and show signs of deterioration due to industrial and utility activities. The general landscape does not evoke a strong or positive sense of place (Young, 2018). The more significant receptor groups are expected to be the informal grazing activities, residential areas and commercial facilities located within 300 m of the project site and to a lesser extent, similar land uses up to approximately 2 km from the site (Nomad Consulting, 2018). The majority of receptors are on the local highways, and these receptors are exposed to existing industrial uses.

Potential air quality and noise impacts have been assessed in Sections 7.1.1 and 7.1.4 respectively. The assessment below assumes that the pre-school would be relocated prior to construction.

Impact assessment

The proposed development will be industrial in nature and will transform the largely underdeveloped site of open grassland into an industrial facility. The proposed development would however correspond with the industrial nature of some of the surrounding land uses (e.g. fresh produce market, substation, service yards, and the SAB depot) and is consistent with the areas being zoned as industrial.

The only community/group that uses the proposed development site is the cattle herders, and there is no apparent social connection to the site, other than informal use (i.e. grazing) (Nomad Consulting, 2018). Other nearby land uses such as residential and educational areas are expected to have varying levels of social connection to the area surrounding the site. The development does however correspond with the industrial nature of some of the surrounding land uses (e.g. substation, service yards, and the SAB Depot) and is consistent with the area being zoned as industrial (Nomad Consulting, 2018).

Changes introduced into the existing landscape as a result of the project would start at the construction phase and continue through to operations. It is expected that once the development is in place and the presence of the plant becomes a familiar component of the environment, the operational phase should have a negligible change on the overall sense of place.

In the absence of mitigation, a minor change or disturbance is expected. With mitigation this can be reduced. The overall significance is likely to be a **LOW to MEDIUM** without mitigation and **LOW to VERY LOW** with mitigation (see Table 7-17 below).

Mitigation

The following measures are recommended (see EMPr in Appendix 8):

- Effective implementation of all mitigation measures as outlined in the EMPr to reduce the overall impact on the environment and surrounding land uses.

TABLE 7-17: CHANGE IN LAND USE AFFECTING SENSE OF PLACE

Issue: Change in land use affecting sense of place		
Phases: All		
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Moderate change or disturbance	Minor change or disturbance
Extent	Long-term	Long-term
Duration	Beyond the site boundary, affecting immediate neighbours	Beyond the site boundary, affecting immediate neighbours
Consequence	Medium	Medium
Probability	Probable	Conceivable
Significance	Low to Medium	Low to Very Low
Nature of cumulative impacts	The development fits within the existing and planned commercial/industrial use of the area. Thus while the change is noticeable at the site scale, it is not considered significant at the area scale.	
Degree to which impact can be reversed	Removal of the facility and rehabilitation of the land would reverse the impact, at least in part. However, this is considered unlikely. Once developed as an industrial site, future use would likely remain industrial/commercial. The impact is not reversible.	
Degree to which impact may cause irreplaceable loss of	While the sense of place will be altered, the development will have its own character and no irreplaceable loss is anticipated.	

resources	
Degree to which impact can be mitigated	Appropriate use of architectural style, building materials and landscaping as well as on-going maintenance can mitigate the impact to a large degree.
Residual impacts	No residual impact is anticipated. Once built the structure will form part of the altered environment and aesthetics of the site.

7.3 IMPACT ON HERITAGE RESOURCES (INCLUDING PALAEONTOLOGICAL RESOURCES)

7.3.1 Issue: Disturbance of ground resulting in damage to heritage resources

Description of impact

Construction of the plant infrastructure and related services has the potential to damage or uncover heritage resources through direct physical disturbance.

Heritage resources are places or objects of cultural significance and are protected by the National Heritage Resources Act, 1999. The Heritage Impact Assessment undertaken for the site did not identify any heritage resources on the site. The desktop Palaeontological Impact Assessment indicated that although the region potentially has fossils, borehole drilling on the site did not identify sediments which could contain fossils.

Impact assessment

Given that no heritage resources, of the type and range outlined in Section 3 of the National Heritage Resources Act, 1999 occur on the site, **NO IMPACT** is anticipated during the construction or operational phase. Once excavations commence it is however possible that heritage resources may be exposed by project activities, and in such cases a Chance Find Protocol must be implemented.

Mitigation

No mitigation measures are recommended, except in the case of the uncovering of a heritage resource:

- Implement Chance Find Protocol (see EMPr in Appendix 8).

7.4 DECOMMISSIONING AND CLOSURE IMPACTS

At the time when the facility is decommissioned and closed, which is likely to be more than 25 years in the future, the local environment and regulatory context would likely have changed significantly from the current state. Future use of the site has not been considered, but given the location it is unlikely to be anything other than commercial or industrial use.

It is therefore not currently reasonable or feasible to undertake a comprehensive assessment of the decommissioning and closure related impacts.

7.5 NO-GO ALTERNATIVE IMPACTS

Description of impact

The No-Go alternative represents the option not to proceed with the proposed glass bottle manufacturing plant project, which would leave the project's area of influence (i.e. Portion 238, Leeuwkuil and the surrounding area) in its current state (refer to the baseline description presented in Chapter 6), except for variation by natural causes and other human activities.

Impact assessment

The No-Go alternative would prevent any of the potentially negative environmental impacts (refer to Sections 7.1 to 7.3) from occurring, but would also forego the possible advantages of the proposed project (e.g. economic stimulation, job creation and community upliftment).

Given the location of the project in an established (but still developing) industrial area, and assuming that all mitigation measures as outlined in the EMPr would be implemented, the overall impact of the project is assessed as being generally low negative to neutral on the biophysical aspects and low to significantly beneficial in certain socio-economic aspects. No fatal flaws or negative impacts of medium or greater significance have been identified. It follows that the impact of the No-Go alternative would be neutral tending to negative in certain aspects.

The overall significance of the No-Go alternative is likely to be a **LOW** without mitigation and **MEDIUM** with mitigation. It is therefore not recommend that the No-Go alternative be implemented.

8 CONCLUSION AND RECOMMENDATION

This chapter summarises the key findings of the study, makes a conclusion regarding the impact assessment findings and presents the EAP's recommendation on issuing of Environmental Authorisation for the proposed project.

8.1 SUMMARY AND CONCLUSION

The applicant, The South African Breweries (Pty) Limited is facilitating the application for a glass bottle manufacturing plant which would be developed and operated as a majority Black Owned (>51%) plant. The proposed plant would produce green and amber coloured bottles. The facility would comprise a batch plant, main manufacturing building with gas fired furnaces and a warehouse. The annual glass bottles production target would be approximately 290 000 tons. The proposed facility would be located on Portion 238 of the farm Leeuwkuil 596 IQ located in Vereeniging, Gauteng Province. The property is owned by SAB.

The development and operation of the proposed glass bottle manufacturing plant includes activities listed under the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), promulgated in terms of Chapter 5 of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), as amended. The proposed project triggers a waste management activity listed under the schedule made in terms of the National Environmental Management: Waste Act, 2008. As the Gauteng Department of Agriculture and Rural Development is the competent authority in both cases, application has been made for an Integrated Environmental Authorisation (Gaut 002/18-19/I0001). In addition, the proposed project also requires authorisation from the Department of Water and Sanitation (DWS) for specific water uses under Section 21 of the National Water Act, 1998 (No. 36 of 1998) (NWA).

Specialist input was provided to assess likely impacts of the proposed project on the biophysical, socio-economic and cultural aspects of the environment. The findings of the specialist studies and other relevant information have been integrated and synthesised into this EIAR. The two main objectives of this EIAR are, firstly, to assess the environmental significance of impacts resulting from the proposed glass bottle manufacturing plant activities and to suggest ways of mitigating negative impacts and enhancing benefits, and secondly to provide I&APs with an opportunity to comment on the environmental impacts of the proposed project.

A summary of the assessment of potential environmental impacts associated with the proposed project is provided in Table 8-1. The assessment assumed the relocation of the Wise Owl pre-school prior to construction.

The mitigated assessment assumes that technical design controls, as included in the project scope, together with mitigation measures included in the environmental management programme (EMPr) would be included in the detailed design of the plant and implemented when the plant is constructed and operated. As a result the majority of potential biophysical impacts associated with the proposed glass bottle manufacturing plant would be short-term and limited either to the site or neighbouring land. These include impacts on soils, terrestrial habitats and biodiversity, wetlands, drainage patterns, groundwater aquifers and the visual environment. The potential impacts on biophysical aspects are considered to be of **LOW** or **VERY LOW** significance with mitigation.

TABLE 8-1: SUMMARY OF SIGNIFICANCE OF THE POTENTIAL IMPACTS OF THE PROPOSED PROJECT

Potential impact	Significance of impacts	
	Without mitigation	With mitigation
Increase in ambient air concentrations	H	L to M
Loss of agricultural soil resources through physical disturbance	M	VL to L
Loss of agricultural soil resources through contamination	L to M	VL
Increase in disturbing noise levels affecting potential human receptors	M	L
Loss of terrestrial habitat and biodiversity through physical disturbance	M	L
Loss of wetland habitat and biodiversity through physical disturbance	L	VL
Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality	L to M	L to VL
Alteration of drainage patterns affecting the flow of water in downstream systems	M	L
Discharges from project affecting the quality of downstream freshwater resources	* Assessed under aquatic habitats	
Contamination of groundwater quality affecting the aquifer	L to M	VL
Alteration of the visual environment	M	L
Economic impact (positive and negative)	H+	H to VH+
Social benefits associated with employment and economic development	L+	M+
Changes in land value	M	L+
Reduction in grazing land affecting livelihoods of local farmers	L	VL+
Disturbance to third party road users by project-related traffic	H	L+
Increase in safety risks to third parties and communities	H	L
Change in land use affecting sense of place	L	VL
Disturbance of ground resulting in damage to heritage resources	No impact	

VH – Very High; H – High; M- Medium; L – Low; VL – Very Low; + denotes a positive impact;

Operational activities present the most potential for negative air quality impacts as these activities would be conducted over a long period and in an area with already elevated ambient concentrations. More significant impacts are predicted to occur due to $PM_{2.5}$ and PM_{10} emissions from material handling at the batch plant. Design controls and additional mitigation (as recommended by the air quality specialist) would reduce potential impacts. The impact on air quality and the related inhalation health impacts is considered to be of **HIGH** significance without mitigation and **LOW to MEDIUM** significance with design controls and additional mitigation. Maintenance of a high efficiency for emissions controls during operations will be important.

The nearest residential area to the project site is the staff accommodation associated with the correctional services facility and the informal cattle kraals. Potential noise impacts on these receptor groups could be significant during all project phases, more especially at night. Noise controls that focus on mitigating noise

emissions at source have been designed into the plant with the addition of a noise screen between the plant and the correctional services staff accommodation. With these design controls and mitigation measures, potential noise impacts could be reduced to **LOW** significance.

Potential discharge of treated effluent from the on-site sewage package plant could impact on the aquatic ecosystem in the downstream Vaal tributary. However the treatment plant would be operated to treat effluent to drinking water standards and the volume is ~1% of discharge from the Leeuwkuil works. Therefore any impacts on downstream aquatic habitats are considered to be of **VERY LOW to LOW** significance with mitigation.

Economic impacts associated with employment and economic development is considered to be of **HIGH** significance even without mitigation. With mitigation this is considered to be of **HIGH to VERY HIGH** significance. The substantial capital investment is likely to increase land values, unless other negative environmental and social impacts affect adjacent land use. The project would generate significantly more employment and economic value than the site currently does. These factors would contribute to economic growth and socio-economic development in the area. The related social benefits are also considered to be positive in nature. Key to realising the **MEDIUM** positive mitigated significance of social benefits associated with increased employment and economic development is to recruit employees and procure services locally as far as possible and implement corporate social responsibility initiatives in the local area.

A reduction in grazing land used by the Emfuleni Livestock Group could affect the livelihoods of local farmers. Even without mitigation this is predicted by the specialist to be of **LOW** significance. Where the Emfuleni Livestock Group is given preference in Corporate Social Responsibility initiatives, the significance of potential impacts is considered to be **VERY LOW positive**.

The project has the potential to present safety risks to third parties through project-related traffic on public roads and uncontrolled access to the site. However with design controls and mitigation, potential safety impacts are considered to be of **VERY LOW** significance. In the case of project-related traffic, proposed road and pedestrian accommodation upgrades would result in a **LOW positive** improvement of the road network.

No impacts on heritage and cultural resources are expected as no heritage resources occur on the project site and palaeontological resources, if they do exist, would be located well below the foundations of the plant.

Proceeding with the project attracts potentially significant economic benefits and potential negative environmental and social impacts of moderate or lower significance. Not proceeding with the project retains the status quo, but with a loss in employment opportunities, revenue generation and related social benefits, which could potentially be generated by the development. The project is located within an area earmarked for commercial and industrial development in the local municipality's spatial development framework and, apart from the Wise Owl pre-school, is surrounded by compatible commercial and industrial type activities.

8.2 OPINION OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

The key principles of sustainability, including ecological integrity, economic efficiency, and equity and social justice, are integrated below as part of the supporting rationale for recommending an opinion on whether the proposed project should be approved.

Ecological integrity

The key ecological impact would be the loss of approximately 29 ha of indigenous vegetation, which was previously Soweto Highveld Grassland (Endangered) and is considered as a 'vulnerable ecosystem'. Fieldwork confirmed that the grassland is secondary in nature and degraded due to intensive grazing. The area does not have a designated CBA status. It was assessed as being of moderately low ecological sensitivity. The specialist advised that the 'wet' areas on site (<0.6 ha) are not natural wetlands and should be classified as artificial and anthropogenicly derived. They were considered to have low/no ecological importance and sensitivity. The disturbance of grassland and wetland habitat that would result from the development of the project structures and supporting infrastructure is considered of negligible significance as these areas are not ecologically sensitive nor are they of conservation significance. Identified individuals of *Crinum macowanii* should be rescued and relocated. It is also recommended that the future landscaped areas be managed as natural areas.

Discharge of treated sewage effluent could pose a risk to the downstream aquatic environment. However, as the treated effluent would be of the same quality as the majority of the flow in the Vaal tributary, it is not anticipated to cause a detectable impact to freshwater habitat or aquatic biodiversity. It is also unlikely that the additional flow (~1 % of the volume of discharge from the Leeuwkuil Water Care Works) would result in any impact to the aquatic environment.

Economic efficiency

Due to the scale of investment and revenue, the proposed project could contribute significantly to local economy through the provision of employment opportunities for individuals and procurement opportunities for locally based enterprises. Land value, direct revenue and employment value that could be derived from the project significantly outweigh the maximum values that could be realised from the current use or even commercial farming. The positioning of the project with good access to major highways is important as the facility would receive large volumes of raw materials and distribute large volumes of glass bottles. Overall, the proposed development is considered to be economically efficient.

Equity and social justice

The proposed project is considered to be consistent with and in support of the broad national policy framework for the development of the manufacturing industry in South Africa. On a regional and local level the proposed project is in line with the planning frameworks for the region. With the recent rezoning of the site, the proposed project would be in line with the consent use of the zoning.

The proposed development would be the first Black-Owned glass bottle manufacturing plant in South Africa. The involvement of BBBEE owners and their compliance with relevant BBBEE codes would contribute to the project, its suppliers and product off-takers benefitting historically disadvantaged individuals. The realization of project benefits to local participants would require specific internal policy and locally focussed Corporate Social Responsibility initiatives.

The proposed project would, however, have a direct impact on residents living at the correctional services facility, the informal cattle kraals and, to a lesser degree, Leeuhof in terms of traffic, noise and visual impacts. However, with the implementation of the recommended mitigation measures it is believed that these impacts can be sufficiently mitigated. From an air quality perspective the project could further impact the already reduced ambient air quality. Modelling predicted compliance with relevant standards for SO_2 and NO_2 concentrations as well as dustfall rates. Compliance with the PM_{10} and $PM_{2.5}$ concentrations could be achieved

with additional mitigation (i.e. 98% efficiency on the emission controls at the batch plant). The assessment assumed the relocation of the Wise Owl pre-school prior to construction.

Conclusion and Recommendation

It is the opinion of SLR that in terms of the sustainability criteria described above there is no reason why the proposed project, with implementation of the proposed mitigation measures, should not receive a favourable decision. The management and mitigation measures recommended for the proposed project are detailed in the Environmental Management Programmes for construction and operation (see Appendix 8).

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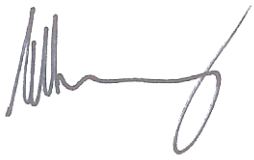
APPENDICES

APPENDIX 1: EAP UNDERTAKING

I, Matthew Hemming, the Environmental Assessment Practitioner responsible for compiling this report, undertake that:

- the information provided herein is correct;
- comments and inputs from stakeholders and I&APs have been recorded;
- inputs and recommendations from the specialist reports have been included where relevant; and
- information and responses provided to stakeholders and I&APs by the EAP is correctly reflected in this report.



_____ Date: ___9 November 2018_____

Signature of the EAP

_____ Date: ___9 November 2018_____

Signature of the Reviewer

APPENDIX 2: CURRICULA VITAE (INCLUDING REGISTRATIONS) OF THE PROJECT TEAM

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APPENDIX 3: AUTHORITY CORRESPONDNCE

Appendix 3.1: GDARD Acceptance of the Scoping Report

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Appendix 3.2: DWS Correspondence

separate electronic file

Appendix 3.3: AEL Correspondence

separate electronic file

APPENDIX 4: METHOD OF IMPACT IDENTIFICATION AND ASSESSMENT

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APPENDIX 5: SPECIALIST STUDIES

Appendix 5.1: Air Quality Impact Assessment
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Appendix 5.2: Climate Change Assessment
separate electronic file

Appendix 5.3: Soil Assessment
separate electronic file

Appendix 5.4: Noise Impact Assessment
separate electronic file

Appendix 5.5: Terrestrial Ecology Assessment
separate electronic file

Appendix 5.6: Aquatic Ecology Assessment
separate electronic file

Appendix 5.7: Surface Water Study
separate electronic file

Appendix 5.8: Groundwater Study
separate electronic file

Appendix 5.9: Heritage Impact Assessment
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Appendix 5.10: Traffic Impact Assessment
separate electronic file

Appendix 5.11: Visual Impact Assessment
separate electronic file

Appendix 5.12: Social Impact Assessment
separate electronic file

Appendix 5.13: Economic Impact Assessment
separate electronic file

APPENDIX 6: PUBLIC PARTICIPATION PROCESS

Appendix 6.1: I&AP database

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Appendix 6.2: I&AP submissions during EIA phase

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Appendix 6.3: Comments and Responses Report

separate electronic file

APPENDIX 7: CONFIRMATION OF ZONING/SERVICES (EMFULENI LOCAL MUNICIPALITY)

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APPENDIX 8: ENVIRONMENTAL MANAGEMENT PROGRAMME

Appendix 8.1: Construction EMPr

separate electronic file

Appendix 8.2: Operations EMPr

separate electronic file

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