Application for an Environmental Authorisation for the proposed relocation of the bulk chemical storage facility at Anglo American Platinum's Rustenburg Base Metals Refiners (RBMR), North West Province

Draft Environmental Impact Assessment Report (Draft EIR)

DEDECT Reference Number: NWP/EIA/47/2020

Report Prepared for

Anglo American Platinum's RBMR

Report Number 561608/ Draft EIR

Report Prepared by

srk consulting

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Executive Summary

Introduction

Who is conducting the EIA/EMPr?

SRK Consulting (SA) (Pty) Ltd (SRK) has been appointed by Anglo American Platinum's Rustenburg Base Metals Refiners (RBMR) as the independent Environmental Assessment Practitioner (EAP) to conduct the Environmental Authorisation (EA) application process for the proposed relocation of the bulk chemical storage facility.

The reports and documentation for the EA application process will be compiled and finalised for submission to the North West Department of Economic Development, Environment, Conservation (DEDECT) for consideration and decision making.

Who will evaluate the EIA/EMPr?

Before the proposed development can proceed, approval has to be obtained from the DEDECT. The Scoping Report was submitted to the DEDECT for review and the DEDECT approved the Scoping Report and associated Plan of Study on 19 March 2021. In the approval, the DEDECT advised the project team as to how the project should proceed for the Impact Assessment Phase of the project. The current Impact Assessment Phase entails detailed specialist investigations, reporting and further stakeholder involvement. Only once a Final Environmental Impact Assessment Report (EIR) and EMPr have been submitted to DEDECT, can a decision be taken as to whether the project may proceed or not.

Description of the Proposed Development

The proposed project will include decommissioning of the current bulk chemical storage facility and construction and operation of a new bulk chemical storage facility as follows:

- Decommissioning of the Current Plant: The following actions will be implemented to affect demolition of the existing chemical tanks infrastructure:
    - Chemical tanks will be emptied;
    - Existing infrastructure will be removed to ground level including:
        - Removal of building material. Building material will be crushed and disposed of onto a registered waste disposal facility or re-used, recycled where possible; and
        - Dismantling and removal of the tanks and associated infrastructure.
    - All infrastructure for which there is no approved third-party post closure use will be dismantled. Infrastructure where there is a third-party use will be legally transferred to the relevant parties and any other valuable items salvaged during demolition will be sold;
    - All equipment will be rinsed and cleaned in accordance with the Material Safety Data Sheet (MSDS) for the chemicals (attached as Appendix E);
    - Equipment and materials will be sold and removed from the site;
    - Removal of any hazardous material and re-used, recycled in line with Anglo American Platinum's Zero Waste to Landfill (ZW2L) goal. Disposing it at a licenced facility will be a last resort;
    - Removal of any general waste and re-use, recycling it at registered waste facilities; and
    - Excavation, removal and replacement of contaminated soil/substrate and treatment and re-use thereof or disposal as a last resort at a registered waste disposal facility.

- Rehabilitation of the affected area: The area where the current facility is located will require rehabilitation. Remediation of the affected area will include:
    - Geotechnical investigations will be conducted on the ingress by acids encountered on the fill material and the underlying norite rock;
    - The geological map from the Council for Geosciences indicates that the site is underlain by gabbro, norite and anorthosite of the Pyramid Gabbro-norite (Vg). Very soft gabbro norite rock is encountered from a depth of 1.2m below ground level. Studies indicates ground water level to be between 15 to 30m;
    - Contaminated ground will be excavated, removed and be treated and re-used or disposed-off as a last resort to an authorized landfill site; and
    - Suitable material will be imported. All backfilling and compaction and testing thereof will be done in accordance with the Engineer's specifications.
- Construction of the new plant and associated infrastructure: The proposed bulk chemical storage facility relocation project will include the construction of the following:
    - Construction of chemical tanks (8 for caustic soda, 2 for sulphuric acid and 2 for Formalin);
    - Construction of parking and weighbridge areas;
    - Construction and installation of the Motor Control Centre (MCC) with a total installed load on the MCC is a small load of 1.13 MW with 525V (classified as Medium Voltage).
    - Resurfacing of the existing gravel access road with tar for the transportation of imported chemicals; and
    - Construction of a rail siding from the existing railway line to the bulk chemical storage facility for the transportation of locally acquired chemicals.

Project Need and Desirability

The environmental right is contained in the Constitution of the Republic of South Africa, Act 108 of 1996 (hereafter referred to as "The Constitution"). Section 24 of the Constitution enshrines environmental rights in South Africa, which are interpreted to have a two-fold purpose. The first part guarantees a healthy environment to every person. The second part mandates the State to ensure compliance with the first part. The State is prohibited from infringing on the right to environmental protection and is further required to provide protection against any harmful conduct towards the environment.

The construction and installation of the proposed bulk chemical storage facility will reduce the risk of failure of the current facility which would have environmental, socio-economic as well as health and safety implications.

Various monitoring and preventative measures have been put in place and implemented to avoid any further spills at the current plant, including repairs that have been implemented around the bund to attempt to contain any further contamination or leaks. These measures are unfortunately not long-term solutions and they will not contain a catastrophic failure or major rain event. The ingress of caustic soda into the substrate under the bunds has led to the supporting soil to heave, causing catastrophic damage to the concrete and steel structures within the existing bunds. The heaving is predicted to continue for the foreseeable future and will increase with the advent of the rainy season and any further leaks, which are highly likely. The caustic ingress has now also compromised all the lining systems, and due to an initial poor design, effluent is seeping out of the bund. Further, the supporting plinths off all the tanks are extremely compromised and their integrity cannot be assured.

With the unpredictable rainfall pattern, RBMR needs to ensure100% integrity of the structures at the plant. The behaviour of the underground soil movements is unpredictable. i.e. when and how much of the heaving is going to continue. The unforeseen and unpredictable nature of the heaving soils within the various bunds, combined with the condition of the steel and concrete structures and walls makes

this project a necessity. In addition, the project presents RBMR with an opportunity to construct a new bulk chemical storage facility that will comply with international standards.

Should the application for an EA to construct a new bulk chemical storage facility be rejected, and there is failure at the current plant, the implication far reaching from both an environmental, socio-economic and plant safety perspective including:

- Contamination of land and water resources;
- Health and safety of all personnel and operational risk for the entire RBMR operation;
- Loss of revenue in terms of interest of deferred cash (approx. R11 Billion/month) (only considering major Platinum Group Metals (PGM) and base metals at current prices), which represents approximately 2% of South Africa's Gross Domestic Product (GDP),
- Impact on RBMR's image and reduced market image, and
- Loss of employment.

Alternatives Considered

Three alternatives were considered in terms of the location of the proposed bulk chemical storage facility as follows:

- Preferred Option: Located in a brownfields area outside the RBMR boundary;
- Alternative 1: Located inside RBMR boundary to the east of the Copper tank house; and
- Alternative 2: Located within the RBMR boundary (brownfields) to the East of the Nickel Tank House.

A technical evaluation of the options was undertaken, and the preferred option was chosen as it would result in:

- Reduced vehicle - pedestrian interaction by reducing number of chemical offloading trucks;
- Elimination of rail deliveries traffic within the RBMR facility; and
- Reduced congestion at RBMR entrance Gates & Weighbridge.

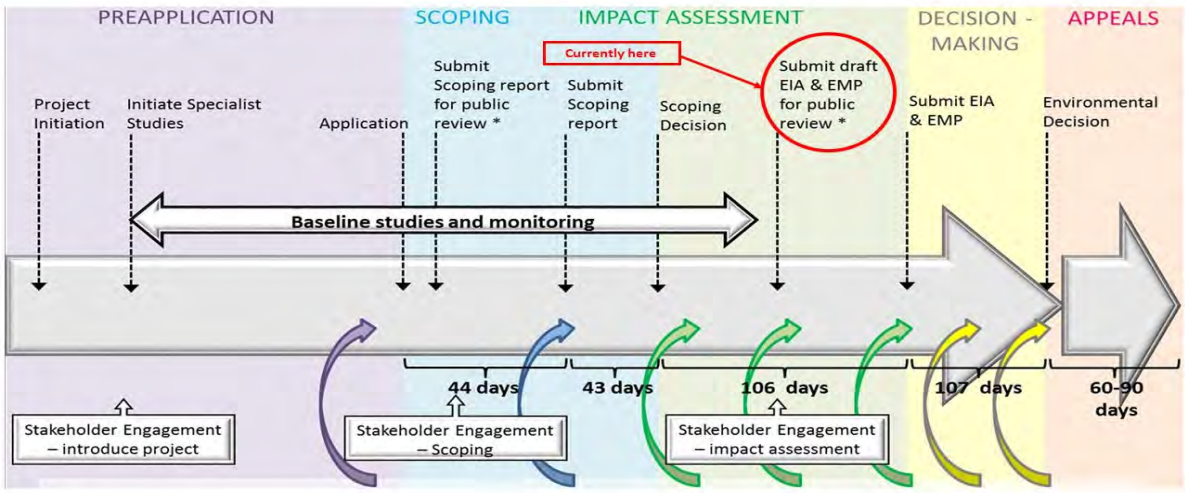
The assessment will also include the "no-go "option.

Environmental Assessment Process

Approach to the Environmental Impact Assessment

An EIA seeks to identify the environmental consequences of a proposed project from the beginning and helps to ensure that the project will be environmentally acceptable over its life cycle and integrated into the surrounding environment in a sustainable way. The project triggers activities listed in GNR325 (Listing Notice 2) of the NEMA and requires that a full EIA (scoping and impact assessment phases) be conducted.

Similar to the scoping phase of the process, two parallel processes were followed during the impact assessment phase being the technical assessment process and stakeholder engagement process. A summary of this process is shown in Figure ES-1.



srk consulting	**RBMR BULK CHEMICAL STORAGE FACILITY RELOCATION PROJECT** OVERVIEW OF THE PROCESS	Project No. 561608

Figure ES-1: Illustration of the EIA process being followed

Stakeholder Engagement Process

The process commenced with a pre-application consultation meeting that was held with the DEDECT on 11 August 2020 to discuss and confirm the possibility of declaration of a Section 30 A Emergency situation and the EIA process. The Department declined to grant RBMR with permission to commence with construction before the EA has been issued but indicated that due to the condition of the current plant, the DEDECT would be willing to assist in fast tracking the EIA process and shorten decision timeframes where possible. The DEDECT also emphasized that there would be no guarantees with respect to fast tracking of the process.

Activities that have been undertaken for the public involvement process during the pre-application process are:

- Development of a stakeholder database: The stakeholder database comprises a variety of stakeholders identified from previous projects in the area, newly identified stakeholders through the initial registering process of this project.

The opportunity to participate in the EIA and to register as an Interested and Affected Party (I&AP) was announced in August 2020 through the following means:

- Letter of invitations to register and background information documents were sent to stakeholders on 03 September 2020;
- Media advertisements in English and Setswana were placed in the Rustenburg Herald on 11 September 2020;
- Site notices were erected at several places in and around the proposed study area on 09 September 2020;
- Collation of comments received into a Comments and Responses Register (CRR); and

- Obtaining and documenting registration and comment sheets.

The Draft Scoping Report was made available for a 30-day commenting period from 19 October to 17 November 2020. All issues, comments and suggestions received from stakeholders were reviewed and collated into a CRR. Where necessary, comments from stakeholders were incorporated into the Final Scoping Report that was submitted to DEDECT for decision making. Key stakeholder telephonic discussions to provide the project background were held with the Department of Mineral Resources (DMR) in January 2021 and a site visit was undertaken with the DEDECT in February 2021.

The main comments received to date are provided in Table ES-1.

Table ES – 1: Key Comments Received to Date

Comment	Response
An A3 layout plan showing all sensitive environmental features to be affected by the development, if any, and clearly indicate where each development will be located.	An A3 layout plan of the proposed bulk chemical storage facility, including sensitive environmental features is included in Appendix F of this report.
An A3 locality map to be included in the report.	An A3 locality map is included in Appendix D of this report.
A record of material safety data sheets (MSDS) for each chemical handled at the plant during decommissioning must be provided.	A copy of the MSDS's for each chemical handled at the current plant during decommissioning has been included in Appendix E.
Detailed Cleaning procedures of the tanks during decommissioning must be provided; procedures must be in accordance to the recommendations of the material safety data sheet of the chemicals.	A description of the cleaning procedures complying with the recommendations of the MSDS's is included in Section 5.
Environmental Impact Assessment Report which includes all specialist studies undertaken must be submitted to all other relevant authorities for comment and their comments including comments from interested and affected parties must be included in the final Environmental Impact Assessment report to be submitted to this Department for consideration.	This EIA Report includes: • Specialist Studies (Appendix G). Findings from the specialist studies have been incorporated in the baseline characterisation and the impact assessment sections of the report as well as in the EMPr (Appendix I). • Comments received from commenting authorities to date (Appendix H 9). The EIA Report will be made available to commenting authorities and I&APs and any comments received will be included in the final report to be submitted to the DEDECT for decision making.
Environmental Management Programme (EMPr) - An EMPr for the construction and operational phases of the project must be developed to identify and mitigate potential	• An EMPr complying with the requirements of Appendix 4 of GNR326 is included in Appendix I.

Comment	Response
environmental and social impacts associated with the proposed activity on the receiving environment. The contents of the EMPr must comply with the guidelines as stipulated in Regulations 23(4) of Government Notice R.326 of 04 December 2014 as amended.	

The availability of the Draft EIR for review and comment will be communicated to the registered I&AP's and commenting authorities. The Draft EIR will be made available to public review for a period of 30 days.

The stakeholders will be notified of DEDECT's final decision on the project once it has been communicated to the EAP and applicant (RBMR).

Profile of the receiving Environment

A summary of the main baseline aspects is included in Table ES-2, with more detail included in Section 10 of the report.

Table ES – 2: Summary of the Profile of the Receiving Environment

Aspect	Description
Climate	The proposed bulk chemical storage facility will be located in the Rustenburg Local Municipal area. Rustenburg falls within the Summer Rainfall Climatic Zone. The area is characteristically warm with erratic and variable rainfall, ranging from 450 to 750 mm per annum. The rainfall in the area is almost exclusively due to thunderstorms that occur during the summer months (October to March); whilst winter months are normally dry. The region is classed under the calm category whereby wind speeds are relatively low, with between 19 and 24 days of frost per year. The area is fog free and hailstorms are a rare occurrence.
Topography	The region of Rustenburg Local Municipality comprises of escarpment hills and lowlands with parallel hills, plains, slightly undulating plains and undulating hills. A large series of ridges and koppies are situated mostly in the central parts, with various mountain ranges and ridges making up the most prominent topography of the area of Bafokeng. The area is mostly dominated by flat undulating slope ranging from 0 to 9%. However, the central part of the area is characterised by elevated slope ranging from 9 to 15% covering the MPE and Kgaswane Mountain Reserve. Some patches of the medium elevated slope ranging between 15 to 25% are also found in the central part. The elevation is an average of 1180 Meters Above Mean Sea Level (mamsl). The RBMR is located in an area with an elevation of between approximately 1 140 mamsl and 1 180 mamsl.
Geology	The project area is located in the Bushveld Igneous complex, in an area characterised by Gabbro and norite, with interlayered anorthosite..
Soils, land use and land capability	The soils are classified as moderate to deep clayey loam soils. The net primary agriculture production is classified as low (4-6%).
Air Quality	RBMR conducts air quality monitoring in and around the plant. The assessments include: Stack emission monitoring: The results show that at the time when the sampling was conducted, emissions from the RBMR were complying with the requirements of their Air Emission Licence (AEL). Dust Fallout in residential areas around the plant: The results show that dust fallout levels in all the monitored areas are below the SANS 1929:2005 Ambient Air Quality evaluation criteria for dust fall out monitoring for residential areas. The Rustenburg LM has three ambient air monitoring stations that monitor the levels of priority pollutants. The results from the sampling show that generally there is an

Aspect	Description
	improvement in the ambient air in the Rustenburg Local Municipality due to less exceedances recorded.
Surface Water	The RBMR is situated within the Hex River catchment just upstream from the Bospoort Dam (Quaternary catchment A22H). Various continuous, seasonal or event-linked discharges of affected process water takes place into seasonal tributaries of the Hex River, which drains the processing areas. The tributaries affected by Anglo's Rustenburg Process Division that drain into the Hex River are the Klipfonteinspruit. The water quality issues identified associated with the Rustenburg Process Operations are as follows: Raised salinity, calcium, magnesium, sodium, sulphate, chloride, nickel and inorganic nitrogen are indicative of the water type associated with the processing activities of the Rustenburg Process Division; Nitrate and salinity contamination are the most prominent parameters sourced from the processing activities. The salt loads in the receiving environments, particularly chloride, sulphate, sodium and calcium, and the base metal nickel, especially in the Klipfonteinspruit were also identified as being of concern. The sampling upstream and downstream of the Klipfonteinspruit revealed significant deteriorating conditions from the upstream to the downstream locality at RBMR. Sulphate, fluoride and nickel concentrations revealed the most significant increases and may be as a direct result of process water from the RBMR dams which are dominated by these constituents. The process water dams at RBMR were sampled and the water quality profiles for most of the sampled dams are similar with Sodium (Na) and Potassium (K) as the main contributing cation and sulphate as the main contributing anion. Fluctuating concentrations of TDS and metals were recorded in all samples.
Groundwater	Three distributed components of the groundwater system have been identified, of which all three have been affected to some extent. These form part of the lower part of the Main Zone and the Critical Zone of the Layered Bushveld Igneous complex. There are three aquifer types identified in the area; floodplain alluvial aquifers. Deep aquifer system and shallow bedrock aquifers in the weathered zone. In terms of the Parsons Aquifer classification system the aquifers in the project area are classified as minor or non-aquifers. RBMR is currently undertaking annual groundwater quality monitoring at 15 boreholes located in and around the RBMR. According to the groundwater monitoring report, the larger part of the surface area underlying the actual refinery is lined by concrete surfaces, but historical leaks and dumping caused the formation of a large diffuse source area for contamination. Seepage and leachate formation thus still emanate from the RBMR area and remediation plans target the RBMR as the priority area. The RBMR is situated on the southern banks of the Klipfonteinspruit directly opposite the Waterval Processing area. The groundwater flow and mass transport from the site is northwards in the direction of the Klipfonteinspruit. The annual report on Groundwater Monitoring 2018/2019 indicates that significant pollution impacts from the RBMR occur on the groundwater environment. This processing complex consists of a large base metal refinery area with associated effluent dams for storage of process water. The most notable of these are the sodium sulphate solution area to the south-east of the refinery where highly concentrated sodium sulphate solution by-product is treated and dried. The groundwater pollution in this area is by far the dominant impact of the RBMR area as a result of leachate formation as well as seepage from effluent dams where historical liners were not fully impervious.
Wetlands	According to the wetlands study that was conducted for the RBMR and surrounding areas, there are no wetlands associated with the proposed bulk chemical storage facility site. This is supported by the South African National Biodiversity Institute (SANBI) National Wetlands database which show no wetlands located in the area.
Heritage Resources	The cultural landscape within which the Project is located is characterised by the archaeological features, representing primarily the Farming Community period, specifically the LFC. This notwithstanding, other archaeological material representing the MSA and the historical period (including the historical built environment and burial grounds) are present within the regional study area. The field assessment undertaken found that there are no heritage resources located on the proposed project site.

Aspect	Description
Biodiversity	The biodiversity assessment identified three floral habitat units within the study area, namely the Transformed Habitat, Degraded Thornveld Habitat and Degraded Grassland Habitat. These habitat units are considered a single unit for the fauna, namely, Degraded Habitat. The study area is situated within an area that comprises peri-urban development with mining infrastructure surrounding the study area. Only a small corridor to the north exists which is fenced from other natural areas. Within the study area the habitat has been exposed to various historic disturbances, resulting in degraded habitat with generally low floral and faunal abundance and diversity. Much of the study area is dominated by species associated with disturbance, including alien and invasive plants (AIPs). Faunal assemblages within the area composed of commonly occurring and widespread species that have adapted to the peri- urban surroundings. The assessment found that the proposed bulk chemical storage facility will not have an impact on any Species of Conservation Concern (SCC) in terms flora and fauna and that, due to degraded nature of the environment and historical impacts they also say the likelihood of any SCC occurring there is low. It must however be noted that clearance of vegetation for the construction of the bulk chemical storage facility will still result in loss of biodiversity and habitats for flora and fauna.
Areas of Conservation Concern	The proposed bulk chemical storage facility is not located on a Critical Biodiversity Areas (CBAs) or Ecological Support areas (ESAs) and the biodiversity status of the area is classified as hardly protected. In addition, there are no protected areas that are located in close proximity to the RBMR. There are no protected and conservation areas that are in close proximity to the proposed site.
Visual	The project area is located within the jurisdiction of the Rustenburg Local Municipality within the Bojanala District Municipality in the North West Province. Photshaneng and Bokamoso are the closest residential areas, approximately 6.5 km North and North East respectively of RBMR and Rustenburg is the closest town, being approximately 4.9 km North Westerly of the complex.
Socio-Economy	This site falls within the Bojanala Platinum District and Rustenburg Local Municipality. The RLM accommodates about 16% of the provincial population, and it is estimated that it will in future experience significant population growth (up to 32.9% of the provincial population growth). Rustenburg town represents the centre of population concentration, employment opportunities and shopping opportunities. This attracted urban development towards the town. With 645 000 people, the Rustenburg Local Municipality housed 1.1% of South Africa's total population in 2017. Based on the present age-gender structure and the present fertility, mortality and migration rates, Rustenburg's population is projected to grow at an average annual rate of 1.7% from 645 000 in 2017 to 700 000 in 2022. The primary sector consists of two broad economic sectors namely the mining and the agricultural sector. Between 2007 and 2017, the agriculture sector experienced the highest growth in 2017 with an average growth rate of 43.3%. The mining sector reached its highest point of growth of 19.5% in 2015. The agricultural sector experienced the lowest growth for the period during 2015 at -18.2%, while the mining sector reaching its lowest point of growth in 2014 at -13.0%. Both the agriculture and mining sectors are generally characterised by volatility in growth over the period. The secondary sector consists of three broad economic sectors namely the manufacturing, electricity and the construction sector. Between 2007 and 2017, the manufacturing sector experienced the highest growth in 2010 with a growth rate of 3.6%. The construction sector reached its highest growth in 2007 at 14.6%. The manufacturing sector experienced its lowest growth in 2010 of -11.6%, while construction sector reached its lowest point of growth in 2010 with -4.6% growth rate. The electricity sector experienced the highest growth in 2009 at 10.9%, while it recorded the lowest growth of -13.4% in 2008.

Anticipated Impacts

Anticipated impacts that have been identified by the project team are summarised in Table ES-3.

Table ES – 3: Anticipated Impacts

Element of Environment	Potential Impact Descriptions
Socio-Economic	Possible limited and temporary job opportunities during the construction phase of the Bulk Chemical Storage Facility
Hydrogeology	Possible groundwater contamination from hydrocarbons leaking from construction vehicles.
Surface water	Possible, but unlikely surface water contamination.
Air Quality	Possible, but unlikely impact on air quality in the area.
Noise	Possible generation of noise during the construction phase of the bulk chemical storage facility
Heritage Resources	Possible, but highly unlikely impact on heritage resources due to chance finds
Visual	It is not anticipated that any additional visual impacts will be associated with the proposed bulk chemical storage facility
Soils/Land Use/Land Capability	Localised loss of soil resource and change in land capability and land use due to the clearance of vegetation is expected.
Visual	It is not anticipated that any additional significant visual impacts will be associated with the proposed bulk chemical storage facility
Traffic	Possible impacts on traffic due to transportation of construction material
Biodiversity	Loss of biodiversity due to vegetation clearance for construction.
Wetland	None, there are no wetlands that are located on the proposed Bulk Chemical Storage Facility site.

Specialist Studies

The Department of Environment, Forestry and Fisheries (DEFF) environmental screening tool classified the area as being an area of high biodiversity value. The following specialist studies were conducted as part of the EIA:

- Biodiversity;
- Heritage Resources; and
- Stormwater Management Plan (SWMP).

The generic Terms of Reference (ToR) for each specialist study were to:

- Describe the existing baseline characteristics of the study area and place this in a regional context;
- Identify and assess potential impacts resulting from the project (including impacts associated with the construction and operation of the project), using SRK's prescribed impact rating methodology;
- Identify and describe potential cumulative impacts resulting from the proposed development in relation to proposed and existing developments in the surrounding area;
- Recommend mitigation measures to avoid or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring programme, if applicable.

Certain impacts that are anticipated to be of limited or lower significance, either by virtue of the scale of the impacts, their short duration (e.g. construction phase only), disturbed nature of the receiving

environment and/or distance to communities were assessed by the EAP Team and have been reported directly into the EIA Report.

The baseline characterisation of the environment (biodiversity, , heritage resources, historical wetlands reference) included in Section 10 of this EIR is based on findings from the specialist studies conducted for the project, existing monitoring reports and environmental GIS databases from the Department of Water and Sanitation (DWS), South African National Biodiversity Institute (SANBI) and DEFF.

Summary of Findings from Quantitative Impact Assessment

This section contains a summary of the quantitative assessment of potentially positive and negative environmental impacts that could possibly be caused by the proposed bulk chemical storage facility.

The impacts are linked to the activities conducted for the proposed development, broadly relating to construction and operational phases of the proposed new bulk chemical storage facility and the decommissioning of the current facility. Specific emphasis was placed on any relevant environmental, social and economic impacts identified by the specialist studies, comments received during the stakeholder engagement process, issues highlighted by relevant authorities; as well as a professional judgement of the EAP team through appraisals on the project description, listed activities and the receiving environment.

The objectives for each of the potential environmental impacts identified was to determine their significance and to identify mitigation measures that may be implemented to reduce the impacts to an acceptable level where required.

The anticipated impacts were rated against a set impact rating methodology ranging from Low to High. The anticipated impacts for the proposed project, which were rated low (-) to medium low (-), with the socio-economic impact rating as low (+). The summary of the quantitative impact assessment can be found in Table ES- and Table ES-5. .

Table ES- 4: Summary of potential Impacts (construction and operation of the preferred option and alternatives)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
Construction	Socio-Economic	Possible boost in short term employment and local small business opportunities.	Low (+)	Low (+)	Low (+)	Low (+)
		Potential impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		Health and safety risk as a result of the movement of vehicles increasing the risk of accidents	Low (-)	Low (-)	Low (-)	Low (-)
		Health risk due to contagious diseases (such as the Corona virus) due to working in close proximity to each other	Low (-)	Low (-)	Low (-)	Low (-)
		Potential squatting of job seekers.	Low (-)	Low (-)	Low (-)	Low (-)
	Groundwater	Local spillages of oils from vehicles and machinery leading to groundwater contamination.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
		Improper storage and handling of hazardous materials leading to groundwater contamination.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
	Surface Water Quality	Potential deterioration in water quality as a result of accidental spillages of hazardous substances such as hydrocarbons from vehicles and machinery used during the construction of the new facility.	Medium-Low (-)	Low (-)	Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
		Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
		Deterioration of water quality as a result of improper handling/ of chemicals.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
		Poor stormwater management leading to runoff from stockpiled material removed causing pollution of the water resources.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
		Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
		Increase of surface runoff and potentially contaminated water that needs to be contained in the areas where site demolition occurred.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
	Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	Low (-)	Low (-)	Low (-)	Low (-)
		Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	Low (-)	Low (-)	Low (-)	Low (-)
	Climate change	Emissions of Green House Gases as a result of the use of vehicles and machinery used during the construction activities.	Low (-)	Low (-)	Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
	Heritage and Palaeontology Resources	Although no heritage resources were identified, there is potential for chance findings of heritage resources.	Low (-)	No impacts	Low (-)	N/A
	Flora	Loss of vegetation species including vegetation species of conservational concern due to indiscriminate movement of vehicles and personnel.	Low (-)	No impacts	Low (-)	N/A
		Proliferation of alien invasive species due to ineffective management and control of alien invasive plant species.	Low (-)	No impacts	Low (-)	N/A
	Fauna	Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	Low (-)	No impacts	Low (-)	N/A
	Visual	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	Low (-)	Low (-)	Low (-)	Low (-)
		Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	Low (-)	Low (-)	Low (-)	Low (-)
	Noise	The use of vehicles and machinery during the construction phase may generate nuisance noise in the immediate vicinity	Low (-)	Low (-)	Low (-)	Low (-)
	Soil, Land use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	Low (-)	No impacts	Low (-)	N/A

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
		Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	Low (-)	No impacts	Low (-)	N/A
		Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	Low (-)	No impacts	Low (-)	N/A
		Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to stripping and stockpiling footprint areas.	Low (-)	No impacts	Low (-)	N/A
	Traffic	Increase in traffic volumes as a result of transportation of materials for construction, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		The increase in traffic within the RBMR precinct as a result of transportation of construction material leading to congestion within RBMR.	No impacts anticipated.	High (-)	N/A	High (-)
	Waste Management	Poor waste management during construction could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
		contamination of surface runoff resulting in the deterioration of water quality of the watercourse.				
		Stockpiling material from the decommissioned plant may result in secondary pollution and contamination of the watercourses.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
Operational	Groundwater	Improper storage and handling of hazardous materials leading to groundwater contamination.	Low (-)	Low (-)	Low (-)	Low (-)
		Improper management and maintenance of oil sumps can result in groundwater contamination	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
	Surface Water Quality	Spillage of chemicals (acid, formalin and caustic soda) from the bulk chemical storage facility due to failure.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		Surface water contamination as a result of improper chemical storage/handling;	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		Contamination of runoff by poor materials/waste handling practices.	Low (-)	Low (-)	Low (-)	Low (-)
		Contaminated dirty water runoff from the chemical storage site to surrounding areas resulting in the impact on local surface water quality.	Low (-)	Low (-)	Low (-)	Low (-)
	Biodiversity	Continued loss of Loss of floral and faunal habitat, species and SCC due to ineffective rehabilitation and edge effects.	Low (-)	No impact	Low (-)	N/A

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
	Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	Low (-)	Low (-)	Low (-)	Low (-)
		Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	Low (-)	Low (-)	Low (-)	Low (-)
		Improper handling and storage of formalin may result in release of formaldehyde from the formalin surface into the atmosphere.	Low (-)	Low (-)	Low (-)	Low (-)
	Traffic	Increase in traffic volumes as a result of transportation of chemicals to the bulk storage facility, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	Low (-)	Low (-)	Low (-)	Low (-)
		The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	Low (-)	Low (-)	Low (-)	Low (-)
		The increase in traffic within the RBMR precinct as a result of transportation of chemicals to the bulk chemical storage facility leading to congestion within RBMR.	No impact	High (-)	N/A	High (-)
	Noise	The use of vehicles and machinery during operation may generate nuisance noise in the immediate vicinity	Low (-)	Low (-)	Low (-)	Low (-)
	Waste Management	Poor waste management during the operation of the bulk chemical storage facility could result in the	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
		contamination of surface runoff which may result in the deterioration of water quality of the watercourse.				
		Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)

Table ES - 5: Summary of Findings from Quantitative Impact Assessment (Decommissioning of Current Plant)

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**	**Environmental Impact Significance After Mitigation**
Social-economic	Possible boost in short term employment and local small business opportunities.	Low (+)	Low (+)
	Potential impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly.	Medium-Low (-)	Low (-)
	Health and safety risk as a result of the movement of vehicles increasing the risk of accidents	Low (-)	Low (-)
	Health risk due to contagious diseases (such as the Corona virus) due to working in close proximity to each other	Low (-)	Low (-)
	Potential squatting of job seekers.	Low (-)	Low (-)
Groundwater	Local spillages of oils from vehicles and machinery leading to groundwater contamination.	Low (-)	Low (-)
	Improper storage and handling of hazardous materials leading to groundwater contamination.	Low (-)	Low (-)
	Potential groundwater contamination from poor management of runoff from rinsing water/solution which my percolate into the groundwater.	Medium-Low (-)	Low (-)
Surface Water Quality	Potential deterioration in water quality as a result of accidental spillages of hazardous substances such as hydrocarbons from vehicles and machinery used during the decommissioning and closure of the current facility.	Medium-Low (-)	Low (-)
	Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	Medium-Low (-)	Low (-)
	Deterioration of water quality as a result of improper handling/ of chemicals.	Medium-Low (-)	Low (-)
	Poor stormwater management leading to runoff from stockpiled material removed causing pollution of the water resources.	Medium-Low (-)	Low (-)
	Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	Medium-Low (-)	Low (-)
	Increase of surface runoff and potentially contaminated water that needs to be contained in the areas where site demolition occurred.	Medium-Low (-)	Low (-)
	Potential water contamination from poor management of runoff from rinsing water/solution	Medium-Low (-)	Low (-)

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**	**Environmental Impact Significance After Mitigation**
Wetlands and Aquatic Ecosystems	No impacts anticipated		
Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	Low (-)	Low (-)
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	Low (-)	Low (-)
Climate change	Emissions of Green House Gases as a result of the use of vehicles and machinery used during the decommissioning and closure activities.	Low (-)	Low (-)
Heritage and Palaeontology Resources	No impacts anticipated		
Biodiversity	No impacts anticipated		
Visual	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	Low (-)	Low (-)
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	Low (-)	Low (-)
Noise	The use of vehicles and machinery during the decommissioning and closure phase may generate nuisance noise in the immediate vicinity	Low (-)	Low (-)
Soils, land use and land capability	Potential for leakage of chemicals into soils prior to rehabilitation.	Low (-)	Low (-)
Traffic	Increase in traffic volumes as a result of transportation of materials from the current plant site during and after decommissioning and closure, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	Medium-Low (-)	Low (-)
	The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	Medium-Low (-)	Low (-)
Waste Management	Poor waste management during decommissioning and closure could result in the contamination of surface runoff resulting in the deterioration of water quality of the water resources.	Medium-Low (-)	Low (-)

Environmental Management Programme

An EMPr was compiled in accordance with Appendix 4 of GNR 326 of the NEMA. The EMPr provides effective management and mitigation measure pertaining to the proposed development relating to the identified environmental impacts. The management and mitigation measures in the EMPr are deemed adequate to minimise and/avoid the negative impacts of the proposed development and to enhance the positive impacts.

Conclusion and Recommendations

SRK has undertaken the EIA and EMPr for the proposed bulk chemical storage facility in accordance with the requirements of the NEMA. This has included a comprehensive stakeholder engagement process which has sought to identify stakeholders, provide these parties with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the Impact Assessment Phase of this study.

To date, there are no fatal flaws or red flags that have been identified for the proposed project. Findings from specialist studies have been incorporated into this EIR and accompanying EMPr. It is the considered opinion of the EAP that the potential socio-environmental impacts associated with the bulk chemical storage facility are low and it is not anticipated that the construction and operation of the facility will result in any detrimental environmental impacts. The design and engineering of the facility is such that negative environmental impacts will be minimised. The design of the project includes provision of lined sumps that will minimise the contamination of water resources and the SWMP compiled for the project will also ensure that clean and dirty water is separated and managed in an environmentally acceptable manner.

An EMPr has also been developed as part of this EIA to ensure the mitigation of these impacts as far as practicable. It is anticipated that it will be possible to successfully mitigate the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented. The EMPr is considered to assist the project in striving towards the principles of the NEMA.

The project team believes that the EIA undertaken for the proposed bulk chemical storage facility fulfils the process requirements of the NEMA. It is recommended that the proposed project is allowed to proceed, given that failure to implement the project would result in far reaching negative impacts. The construction and operation of the bulk chemical storage facility should be conducted under duty of care and must be in accordance with the recommendations that were included in this EIR, the accompanying EMPr, SWMP and Material Safety Data Sheets (MSDSs) for chemicals at the current plant.

YOUR COMMENT ON THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

This Draft EIR will be available for comment for a period of 30 days from 2 June 2021 to 3 July 2021. Copies of the Draft EIR have been made available at the following public places for review:

Public Place	Locality	Telephone
Rustenburg Library	Heystek/Thabo Mbeki Drive, Rustenburg	014 590 3701 plouw@rustenburg.gov.za
SRK	OneDrive	A link will be created and shared with the stakeholders
SRK	Dropbox	A link will be created and shared with the stakeholders
SRK Website	www.srk.co.za	(012) 361 9821

An electronic copy will also be available on CD on request from the stakeholder engagement officers. I&AP's are requested to provide comments and information on the following aspects of the proposed project:

1. Information on how I&AP's consider that the proposed activities will impact on them or their socio-economic conditions;
2. Written responses stating their suggestions to mitigate the anticipated impacts of each activity;
3. Information on current land uses and their location within the area under consideration;
4. Information on the location of environmental features on site to make proposals as to how and to what standard the impacts on site can be remedied; and
5. How to mitigate the potential impacts on their socio-economic conditions and to make proposals as to how the potential impacts on their infrastructure can be managed avoided or remedied.

DUE DATE FOR COMMENT

3 July 2021

Please submit comments to the stakeholder engagement officers:

Vusi Masango / Ndomupei Masawi
SRK Consulting
P O Box 35290, Menlo Park, 0102
Phone: (012) 361 9821
Fax: (086) 231 3497
Email: vmasango@srk.co.za/nmasawi@srk.co.za

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by Rustenburg Base Metal Refiners (RBMR) The opinions in this Report are provided in response to a specific request from RBMR to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features, as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

AAP	Anglo American Platinum
AEL	Air Emission Licence
AIP	Alien Invasive Plant
BA	Basic Assessment
BMR	Base Metals Refiners
CA	Competent Authority
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Areas
CO	Carbon monoxide
CO_2	Carbon Dioxide
CRR	Comments and Responses Report
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DEDECT	North West Department of Economic Development, Environment, Conservation
DEFF	Department of Environment, Forestry and Fisheries (formerly DEA and DEAT)
DM	District Municipality
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
EFC	Early Farming communities
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
ESA	Ecological Support Areas
ESA	Early Stone Age
GDP	Gross Domestic Product
GIS	Geographic Information Systems

GN	Government Notice
GNR	Government Notice Regulation
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IWWMP	Integrated Water and Waste Management Plan
K	Potassium
LFC	Late Farming Communities
LSA	Later Stone Age
LM	Local Municipality
mamsl	Meters Above Mean Sea Level
MAR	Mean Annual Rainfall
mbs	Depth of groundwater level from surface
MC	Magnetic Concentrator
MCC	Motor Control Centre
Mn	Manganese
MSA	Middle Stone Age
MSDS	Material Safety Data Sheets
Na	Sodium
NAAQS	National Ambient Air Quality Standards
NEM: AQA	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NEM: WA	National Environmental Management: Waste Act 2008 (Act No. 59 of 2008)
NEM:BA	National Environmental Management: Biodiversity Act 2004 (Act No. 10 of 2004)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NFA	National Forestry Act, 1998 (Act No. 84 of 1998)
NHRA	National Heritage Resources Act, 1999(Act No 25 of 1999)
NOx	Nitrogen Oxides
NWA	National Water Act, 1998 (Act No. 36 of 1998)
O_2	Oxygen
O_3	Ozone
P	Phosphorus

PAIA	Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)
PCD	Pollution Control Dam
PGM	Platinum Group Metals
PM	Particulate Matter
PoS	Plan of Study
PPP	Public Participation Process
PSM	Palaeosensitivity Map
RBMR	Rustenburg Base Metals Refiners
RLM	Rustenburg Local Municipality
S&EIA	Scoping and Environmental Impact Assessment
SACNASP	South African Council for Natural Science Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
Sb	Antimony
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SO_2	Sulphur dioxide
SWMP	Stormwater Management Plan
TDS	Total Dissolved Solids
ToR	Terms of Reference
WML	Waste Management Licence
WRD	Waste Rock Dump
WUL	Water Use Licence

1 Introduction

1.1 Background

Anglo American Platinum's Rustenburg Base Metals Refiners (RBMR) requires chemical reagents that are critical in the processing of minerals at their Magnetic Concentrator (MC) Plant and BMR plants. The chemicals are received, stored and distributed from a centralised bulk chemical storage facility shown in Figure 1-1 as the current plant.

srk consulting	**RBMR Bulk chemical storage facility Relocation** Project Location	Project No. 561608

Figure 1-1: Project Location

However, continuous leaks and loss of bund integrity have resulted in the contamination of the current site's substrate resulting in heaving of the foundations. It is therefore essential that he bulk chemical storage facility to be relocated. It is suspected that the heaving of the foundation has been a comibation of issues which include:

- Soil movement that has led to the installed tanks moving (tilting) due to prolonged acid seepage (mixture of caustic and sulphuric acid) onto the ground over the years, the ground has saturated and heaved, leading to structural damage (civil).
- The area (acid offloading tank farm) is more the 35 years, and the infrastructure has reached end of useful life. Inspection and maintenance of the area is ongoing.

- Drought and flood rainfall cycles in the area have also contributed to the heaving which in turn resulted in the tilting of the tank structures and the bund wall infrastructure being compromised.

The damage to the current plant was first observed in the sulfuric acid bund in 2018. It was determined that the root cause was a leak from the caustic bund into the sulfuric bund. The heaving soils caused the sulfuric bund walls to lean over. At the time the problem was first identified, RBMR instituted repairs to the facility, which was followed by a complete replacement of all the soils within the sulfuric acid bund and the rebuilding of all the concrete bund walls in 2019.

Subsequently, another caustic leak into the newly repaired bund occurred and caused catastrophic damage to the newly repaired sulfuric acid bund. This time the heaving resulted in the failure of the flange of the sulfuric acid tank. Emergency measures were put in place and sulfuric acid was transferred to adjacent tanks. An additional project was launched to attempt to isolate individual caustic tanks in order to complete a soil replacement and concrete repair. This was however abandoned, due to persistent leaks and unsafe working conditions around the plant. All work completed was nullified as soon as a spill or rain event occurred. Figure 1-2 provides photos of the current bulk chemical storage facility.

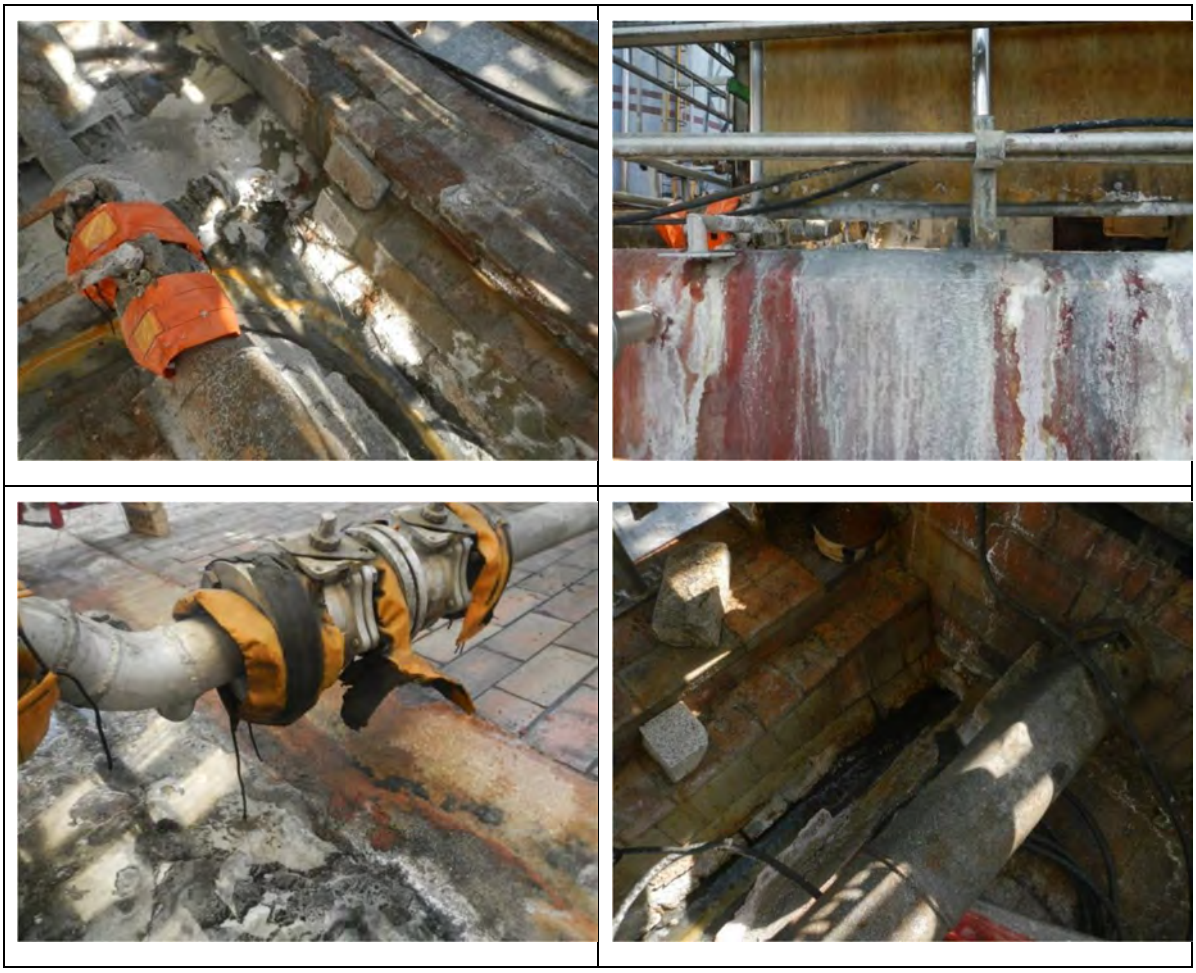
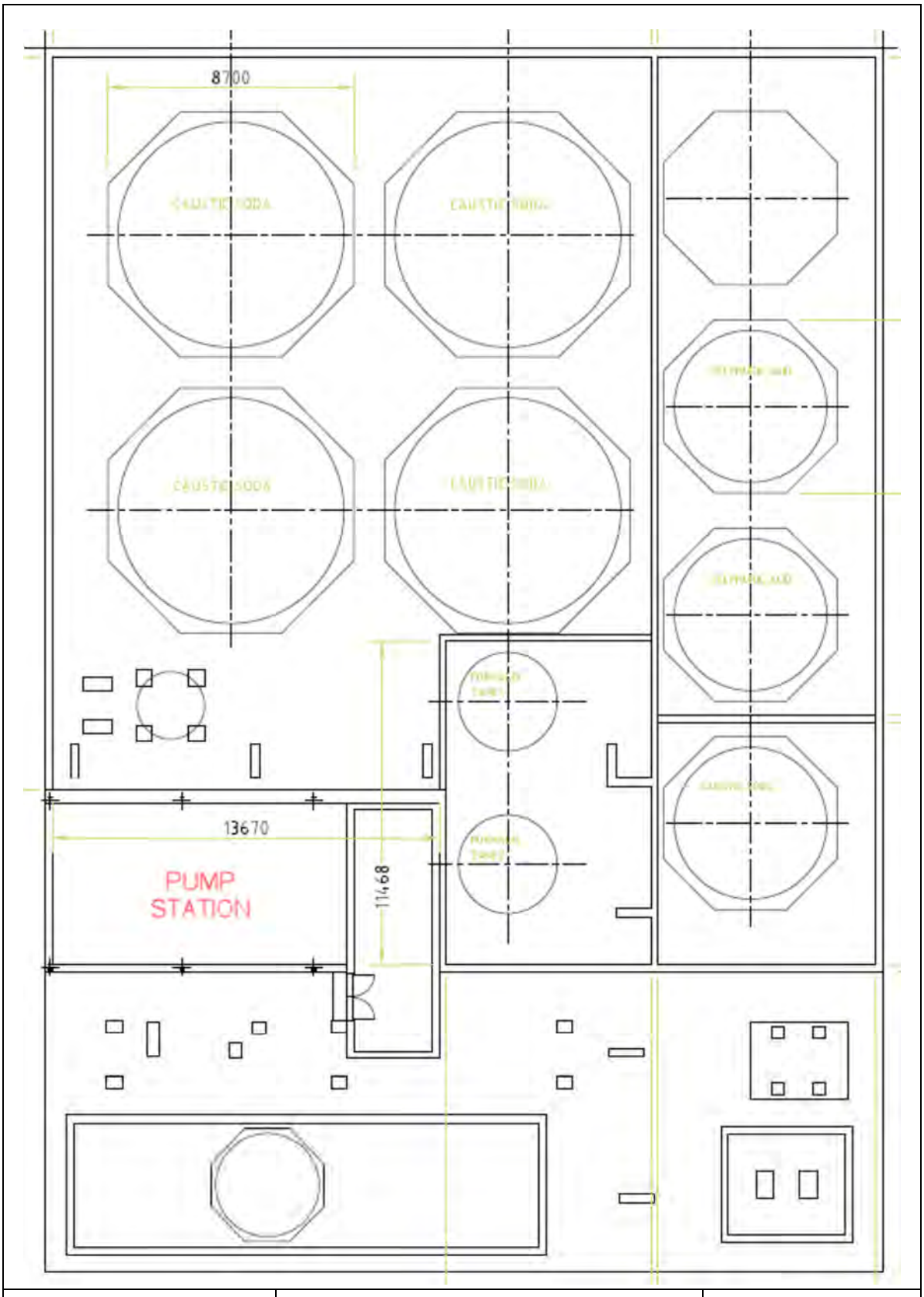


Figure 1-2: Situation at the Current Bulk chemical storage facility

In addition to implementing repairs to the plant, RBMR also appointed a specialist to undertake a weekly monitoring programme of laser scanning of the bunded area, which commenced in October 2018. Figure 1-3 provides the location and layout of the current bulk chemical storage facility at RBMR and Table 1-1 provides a summary of the movements observed up to the time of the last monitoring report (Croeser Structural Engineering, 2020).



srk consulting	**RBMR Bulk chemical storage facility Relocation** Current Plant Layout	Project No. 561608

Figure 1-3: Current Layout Plan of the Tanks

Table 1-1: Summary of Tank Movements

Tank No	Chemical Stored	Scan 20(02/06/2020)	Scan 21(15/06/2020)	Scan 22(29/06/2020)
Tank 1	Caustic Soda	The tank and surroundings are stable with little to no movement. Slab South west has lifted **270mm**	The tank and surroundings are stable with little to no movement. Slab South west has lifted **285mm**	The tank and surroundings are stable with little to no movement. Slab South west has lifted **282mm**
Tank 2		The tank is stable. Bund wall on North side stable. Bund wall on East side **117mm** upwards movement	The tank is stable. Bund wall on North side stable. Bund wall on East side **123mm** upwards movement	The tank is stable. Bund wall on North side stable. Bund wall on East side **129mm** upwards movement
Tank 3		The tank is stable. Bund wall on the East side **117mm** upwards movement	The tank is stable. Bund wall on East side **117mm** upwards movement	The tank is stable. Bund wall on East side **117mm** upwards movement
Tank 4		The tank is stable with little to no movement. Slab on North West has lifted about **270mm**	The tank is stable with little to no movement. Slab on North West has lifted about **285mm**	The tank is stable with little to no movement. Slab on North West has lifted about **282mm**
Tank 5	Sulphuric Acid	The tank is leaning to the South East side. The Top of the tank has an offset of **342mm**. The slab in the area lifted **189mm**. North bund wall has been demolished. East Bund wall **67mm** lift and **108mm** movement in east direction. West bund wall **117mm** lift. Bottom movement: South direction: **73mm** East Direction: **47mm**	The tank is leaning to the South East side. The Top of the tank has an offset of **360mm**. The slab in the area lifted **86mm.** North bund wall has been demolished. East Bund wall **67mm** lift and **102mm** movement in east direction. West bund wall **117mm** lift. Bottom movement: South direction: **80mm** East Direction: **51mm**	The tank is leaning to the South East side. The Top of the tank has an offset of **367mm**. The slab in the area lifted **71m**m. North bund wall has been demolished. East Bund wall **67m**m lift and **106mm** movement in east direction. Bottom movement: South direction: **80mm** East Direction: **51mm**
Tank 6		The tank is leaning to the South West side. The Top of the tank has an offset of **208mm**. East Bund wall **67mm** lift and **108mm** movement in East direction. West bund wall **117mm** lift. Bottom movement: South direction: 28mm West Direction: **22mm**	The tank is leaning to the South West side. The Top of the tank has an offset of **220mm**. East Bund wall **67mm** lift and **108mm** movement in East direction. West bund wall **117mm** lift. Bottom movement: South direction: **28mm** West Direction: **22mm**	The tank is leaning to the South West side. The Top of the tank has an offset of **212mm**. East Bund wall 67mm lift and **108mm** movement in East direction. West bund wall **117mm** lift. Bottom movement: South direction: **28mm** West Direction: **22mm**
Tank 7		The tank and surroundings are stable with little to no movement.	The tank and surroundings are stable with little to no movement.	The tank and surroundings are stable with little to no movement.

RBMR decided in late 2019 that a repair of the current facility would not be possible and that a new facility was urgently required. A summary of the chemical tanks required at the new location is provided in Table 1-2.

Table 1-2: Details of the tanks requiring relocation

Tank Description	No. of Tanks	Volume per tank (m^3)	Tank Dimensions
Caustic Storage	8	539	Ø7950mm x 10 865mm High
Sulphuric Acid	2	271	Ø5510mm x 11 358mm High
Formalin	2	13	Ø2450mm x 2722mm High

The decommissioning of the current plant and the construction and operation of a new bulk chemical storage facility triggers activities listed in terms of Listing Notices 1 (Activities 24, 27, 31, 60 and 64) and Listing Notice 2 (Activities 4 and 7) of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended) and will require an Environmental Authorisation (EA) from the North West Department of Economic Development, Environment, Conservation (DEDECT). Since the project triggers activities in Listing Notice 2 of the NEMA, a full Environmental Impact Assessment (EIA) including Scoping and Impact Assessment will be followed as stipulated in Government Notice Regulation (GNR) 326 of the NEMA.

SRK Consulting (SA) (Pty) Ltd (SRK) has been appointed by RBMR as the independent Environmental Assessment Practitioner (EAP) to conduct the EA application process for the project. The reports and documentation for the EA application process will be compiled and finalised for submission to the DEDECT for consideration and decision making. Where required, the DEDECT will consult with other government authorities as required in terms of Section 24(K) of the NEMA.

2 Purpose of this Study

2.1 The objectives of this Report

The objectives of the EIA/EMPr will be to:

- Identify and assess the environmental (biophysical, socio-economic, and cultural) impacts of the construction, operation, decommissioning and post closure impacts of the proposed project. The cumulative impacts of the proposed development will also be identified and evaluated;
- Identify and evaluate potential management and mitigation measures that will reduce the negative impacts of the proposed development and enhance the positive impacts;
- Compile monitoring, management, mitigation and training needs in the EMPr; and
- Provide the DEDECT with sufficient and accurate information in order to make a sound decision on the proposed development.

This report will be submitted to the DEDECT for review and decision making.

2.2 Report Index in Relation to the NEMA Regulations

Regulation 2, Appendix 3 of GNR 982 published in terms of NEMA stipulates the minimal requirements and issues that need to be addressed in the EIR. This report strives to address all these requirements as per regulations. Table 2-1 indicates the regulations that have been addressed and the section of the EIR where these requirements can be found.

Table 2-1: Requirements of Appendix 3 of Regulation 2 of GNR 982

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIR	Section
Appendix 3 (a)	Details of – the EAP who prepared the report; and the expertise of the EAP, including a curriculum vitae.	Section 2.3.2 Appendix A
Appendix 3 (b)	The location of the activity, including – The 21-digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name; Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties.	Section 4
Appendix 3 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Figure 5-1
Appendix 3 (d)	A description of the scope of the proposed activity, including – All listed and specified activities triggered; A description of the activities to be undertaken, including associated structures and infrastructure.	Section 8.3 Section 5
Appendix 3 (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development	Section 8

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIR	Section
	planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	
Appendix 3 (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.	Section 7
Appendix 3 (g)	A motivation for the preferred development footprint within the approved site.	Section 6.4 Section19.1.1 Section 19.2
Appendix 3 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including-	…
	Details of the development footprint alternatives considered;	Section 6
	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 11
	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 11.5
	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 10
	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 the impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed, or mitigated.	Section 12
	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Section 9.3
	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 geographic, physical, biological, social, economic, heritage and cultural aspects;	Section 12
	The possible mitigation measures that could be applied and level of residual risk;	Section 12
	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	Not Applicable
	A concluding statement indicating the preferred alternative development location within the approved site.	Section 19

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIR	Section
Appendix 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including- a description of all environmental issues and risks that were identified during the environmental impact assessment process; and 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;	Section 9
Appendix 3 (j)	An assessment of each identified potentially significant impact and risk, including- cumulative impacts; the nature, significance and consequences of the impact and risk; the extent and duration of the impact and risk; the probability of the impact and risk occurring; the degree to which the impact and risk can be reversed; the degree to which the impact and risk may cause irreplaceable loss of resources; and the degree to which the impact and risk can be mitigated.	Section 12
Appendix 3 (k)	Where applicable, a summary of the findings and recommendations of 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.	Section 10 Section 12
Appendix 3 (l)	An environmental impact statement which contains- i. a summary of the key findings of the environmental impact assessment; ii. a map at an appropriate scale which superimposes the proposed 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 iii. a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Section 19
Appendix 3 (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 EMPr as well as for inclusion as conditions of authorisation.	Section 12 Section 18
Appendix 3 (n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.	Section 6
Appendix 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.	Section 18
Appendix 3 (p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	Section 13
Appendix 3 (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.	Section 18
Appendix 3 (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.	Section 16

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIR	Section
Appendix 3 (s)	An undertaking under oath or affirmation by the EAP in relation to: i. the correctness of the information provided in the reports; 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 interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.	Section 20
Appendix 3 (t)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Not Applicable
Appendix 3 (u)	An indication of any deviation from the approved scoping report, including the plan of study, including- v. any deviation from the methodology used in determining the significance of potential; vi. environmental impacts and risks; and vii. a motivation for the deviation.	Not Applicable
Appendix 3(v)	Any specific information that may be required by the competent authority.	Not Applicable
Appendix 3(w)	Any other matter in terms of Section 24(4)(a) and (b) of the NEMA.	Not Applicable

2.3 Contact Details

2.3.1 Applicant

Table 2-2 presents the details of the applicant and facility owner's representative.

Table 2-2: Applicant Contact Details

Contact details of the Applicant:
Anglo American Platinum's Rustenburg Base Metals Refinery (RBMR)
Physical Address: 55 Marshall Street, Marshall Town, Johannesburg, 2001
Contact Person: Prakashim Moodliar
Tel: 011 373 6292
E mail: Platinum.Environmental@angloamerican.com

2.3.2 Environmental Assessment Practitioner

SRK was established in 1974 and has since undertaken a large variety of environmental studies. SRK is a South African founded international organisation of professionals providing a comprehensive range of consulting services to natural resource industries and organisations. South African offices are staffed with over 350 professional consultants in nine offices, operating in a range of disciplines, mainly related to the environment, water, social and mining sectors. Back-up and peripheral expertise are available within these offices for all environmental projects.

SRK has been appointed by RBMR as the EAP. The EAPs involved in the compilation of this EIR and their contact details are provided in Table 2-3.

Table 2-3: EAP Contact Details

EAP Name	Contact Number	Fax Number	Email Address
Ndomupei Masawi	012 361 9821	012 361 9912	nmasawi@srk.co.za
Manda Hinsch	012 361 9821	012 361 9912	mhinsch@srk.co.za
Vusi Masango	012 361 9821	012 361 9912	vmasango@srk.co.za

The project manager, Ndomupei Masawi is a registered Professional Natural Scientist (SACNASP Reg Number 400045/14) and EAP (EAPASA Reg Number 2020/401) with a Master's degree in Environmental Management, Geographic Information Systems (GIS) and Remote Sensing. She has more than 14 years of Integrated Environmental Management and project management experience. Her experience includes compiling Environmental Management Programmes, undertaking Public Participation Processes, providing GIS Services and undertaking the processes and assessments to support applications for Environmental Authorisations, WULs, Waste Management Licences and Air Emission Licences, for roads, railway lines, power stations, airports, dams, housing developments, schools in South Africa, Tanzania, Botswana, Lesotho, Zimbabwe and Uganda. She has also recently completed her Post Graduate Diploma in Integrated Water Resource Management. Ms Masawi is a Registered EAP with the EAPASA (Reg:2020/401).

Manda Hinsch is an experienced and professionally certified environmental assessment practitioner with over 38 years of experience. Manda has an honour's degree in Water Utilisation from the University of Pretoria in South Africa. Manda is a Principal Environmental Consultant and Partner of SRK Consulting (South Africa), and presently heads the Pretoria Business Unit in SRK. She has worked on a wide range of water and environmental projects throughout Africa. She serves as project partner on large environmental and social impact assessments including in the mining sector.

Vusi Masango currently employed by SRK Consulting as a Junior Scientist in the Pretoria office in the Environmental Department. Vusi has completed a National Diploma in Agricultural Science at Tshwane University of Technology in 2012 and is busy with his Bachelor of Arts in Environmental Management in Unisa. Vusi also attended the following courses (Report Writing, Microsoft word level 1 and Microsoft Excel level). He has more than 7 years' experience in stakeholder engagement as well as water quality monitoring.

The Curriculum Vitae of the EAP team and the background on experience gained by SRK in the field of Environmental Impact Assessments is provided in Appendix A and Appendix B respectively.

2.3.3 Competent Authority Details

The details of the competent authorities are provided in Table 2-4.

Table 2-4: Competent Authority Details

Department	Contact Person	Contact Details	
DEDECT	Ms Queen Imasiku	Tel	018 389 5099
		Email	qimasiku@nwpg.gov.za

2.3.4 Local Authority Details

The project area is located within the jurisdiction of the Rustenburg Local Municipality, Bojanala District Municipality in the North West Province. Photshaneng and Bokamoso are the closest residential

areas, approximately 6.5 km North and North East respectively of RBMR and Rustenburg is the closest town, being approximately 4.9 km North Westerly of the complex.

Details of the relevant municipality are provided in Table 2-5.

Table 2-5: Local and District Municipality Details

Department	Contact Person	Contact Details	
Bojanala Platinum District Municipality	Mr P Shikwane / Ms Tsholofelo B Dikgole	Tel	014 590 4502
		Email	tsholofelod@bojanala.gov.za/ pogisos@bojanala.gov.za
Rustenburg Local Municipality	Lillian Sefike/ Kelebogile Mekgoe (Environmental Officer)	Tel	0145903075
		Email	lsefike@rustenburg.gov.za/ kmekgoe@rustenburg.gov.za

Figure 2-1 provides an illustration of the relevant district and local municipalities surrounding the proposed project.

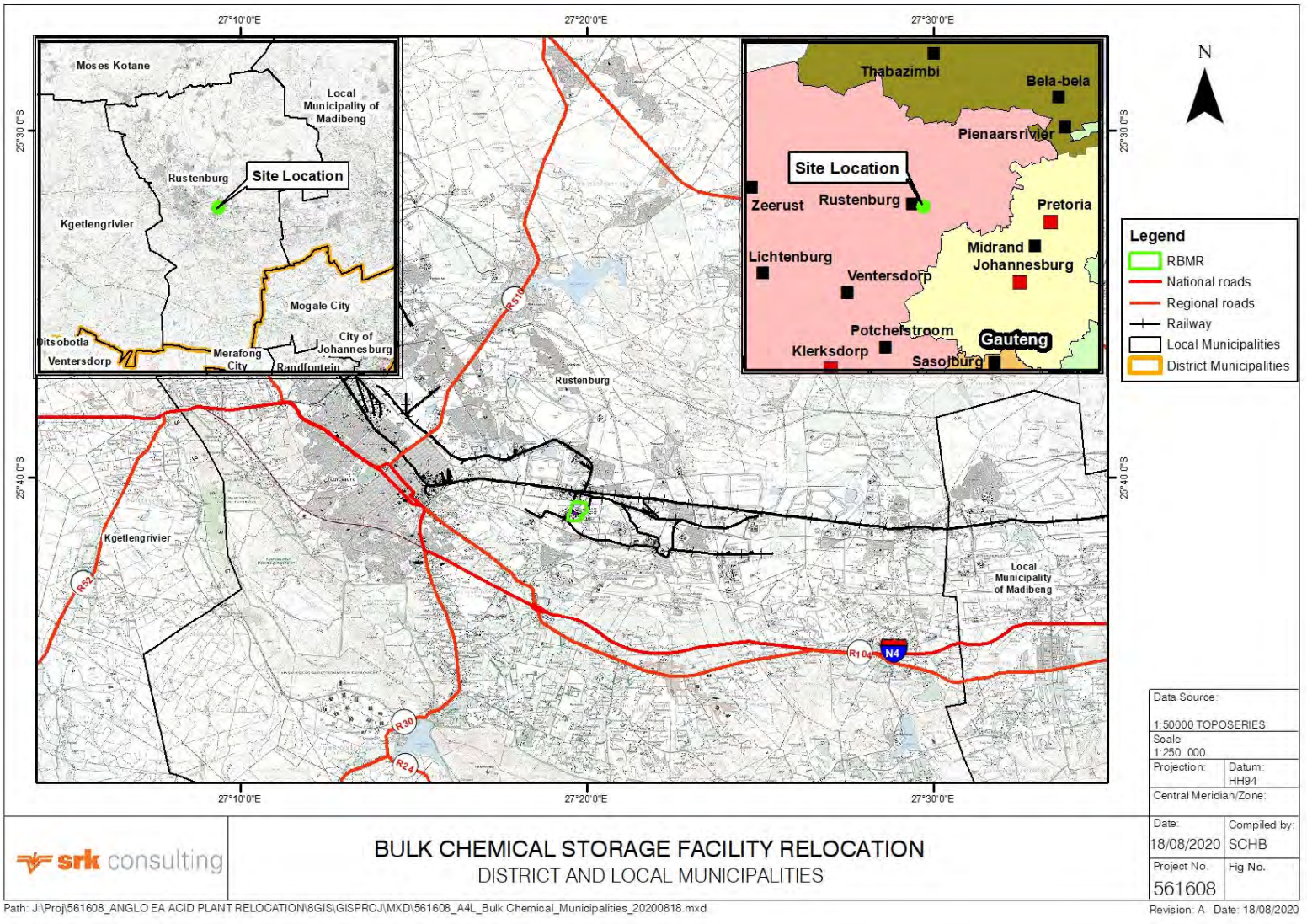


Figure 2-1: Relevant District and Local Municipalities Relevant to the Proposed Project

3 Environmental Authorisation Application Process

The project triggers activities listed in Listing Notice 1 and 2 of the NEMA and requires that a full EIA (Scoping and EIR/EMPr) process be followed as part of the EA application process. The first phase of the EA application process was the Scoping Phase, which informed the Impact Assessment Phase. The Scoping Phase provided Interested and Affected Parties (I&APs) an opportunity to provide the EAP with issues and concerns with respect to the proposed project in order to inform the technical studies that were evaluated in this the EIA phase of the project.

The Scoping Report provided a guide to the EIA process and specialist studies by:

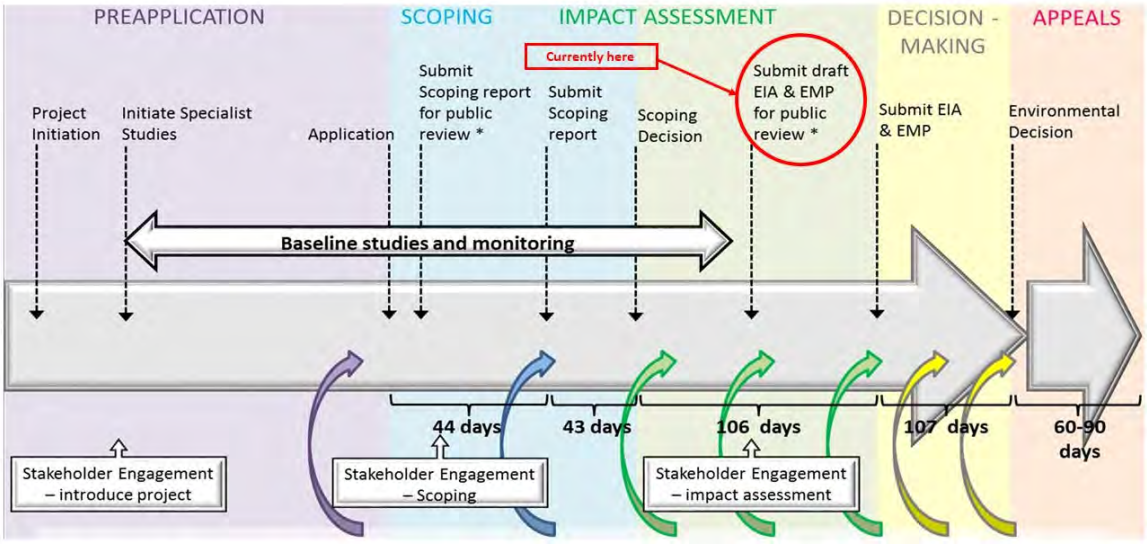
- Providing an overview of the legal requirements with regard to the proposed project, the proposed project description and anticipated environmental and social issues and impacts that will be further investigated in the EIA; and
- Setting out the scope of the EIA process and the Terms of Reference (ToR) for specialist studies (where applicable) and outlining the approach and methodologies to be used in the EIA process, e.g. the proposed impact rating methodology. The Scoping Report was submitted to the DEA for approval.

The DEDECT accepted the Scoping Report and accompanying Plan of Study (PoS) on 19 March 2021 (Appendix C), allowing the Impact Assessment Phase to commence. The EIA Phase entails the following:

- Incorporating specialist findings into the Draft EIR as per the approved Plan of Study contained in the Scoping Report;
- Conducting a quantitative impact assessment as per the approved Plan of Study contained in the Scoping Report;
- Compiling the EMPr; and
- Stakeholder Consultation

Stakeholder engagement is a key element of the environmental decision-making process, and stakeholder engagement formed part of the Scoping Phase and will form part of the Impact Assessment Phase as described in Section 11.

Figure 3-1 provides an illustration of the proposed EIA process that is being followed.



srk consulting	**RBMR BULK CHEMICAL STORAGE FACILITY RELOCATION PROJECT** Overview of the Process	Project No. 561608

Figure 3-1: Overview the Environmental Impact Assessment Process

4 Project Location

The proposed project is located on the farm portion as illustrated in Figure 4-1 and the layout plan in Figure 4-2. Table 4-1 provides a description of the proposed activities located on the property.

Table 4-1: List of Affected Farms and Farm Portions Illustrating the Relevant Activities

Farm and 21 Digit Survey General Code	Portions	Owner	Proposed Activities
Waterval 303 JQ T0JQ00000000030300042	42	Anglo Platinum's RBMR	Decommissioning of an existing bulk chemical storage facility within the existing complex and construction and operation of a new bulk chemical storage facility and associated infrastructure outside the RBMR boundary.

The affected property is owned by the applicant, RBMR.

An A 3 map of the project locality map is included in Appendix D.

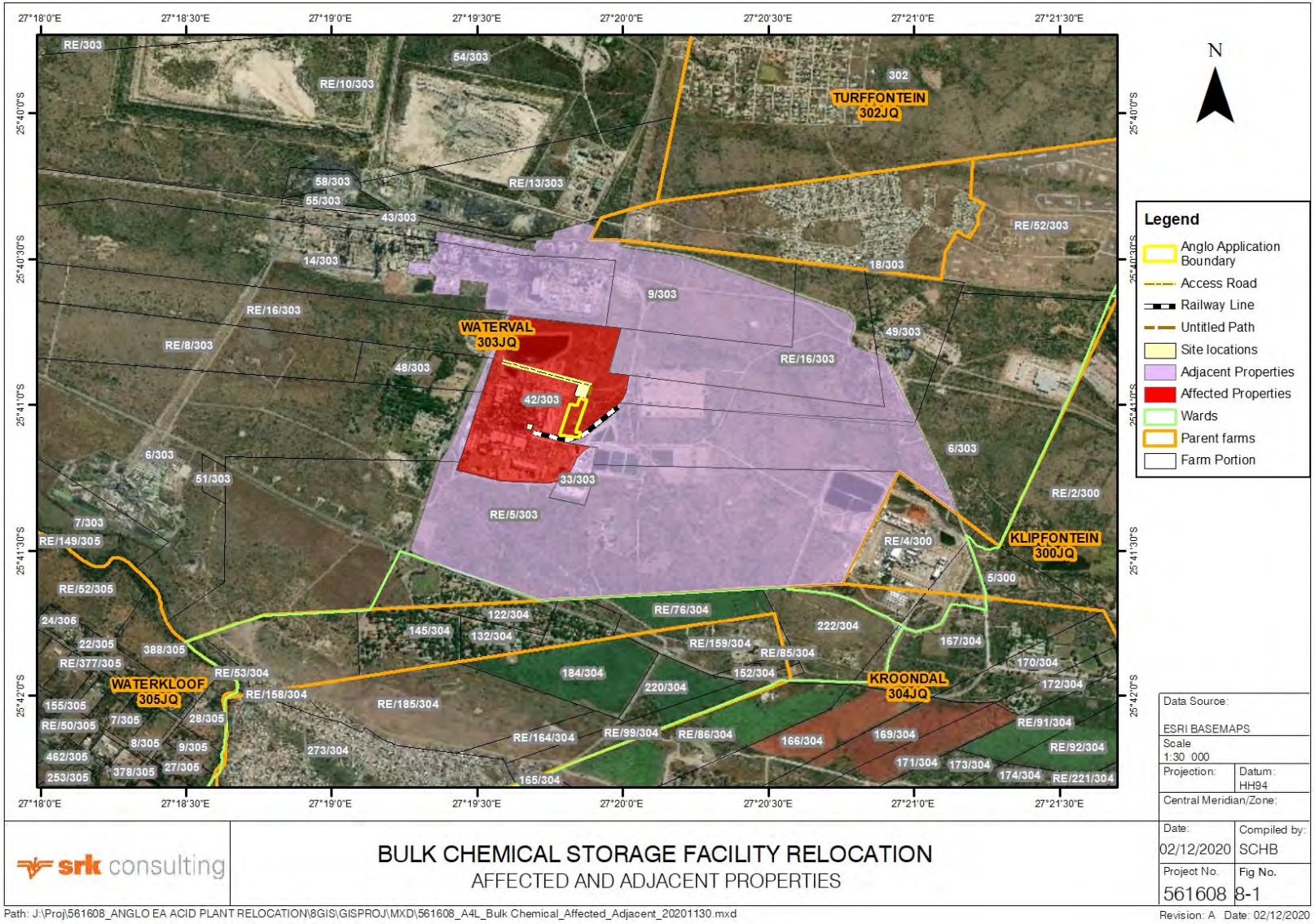


Figure 4-1: Affected Property

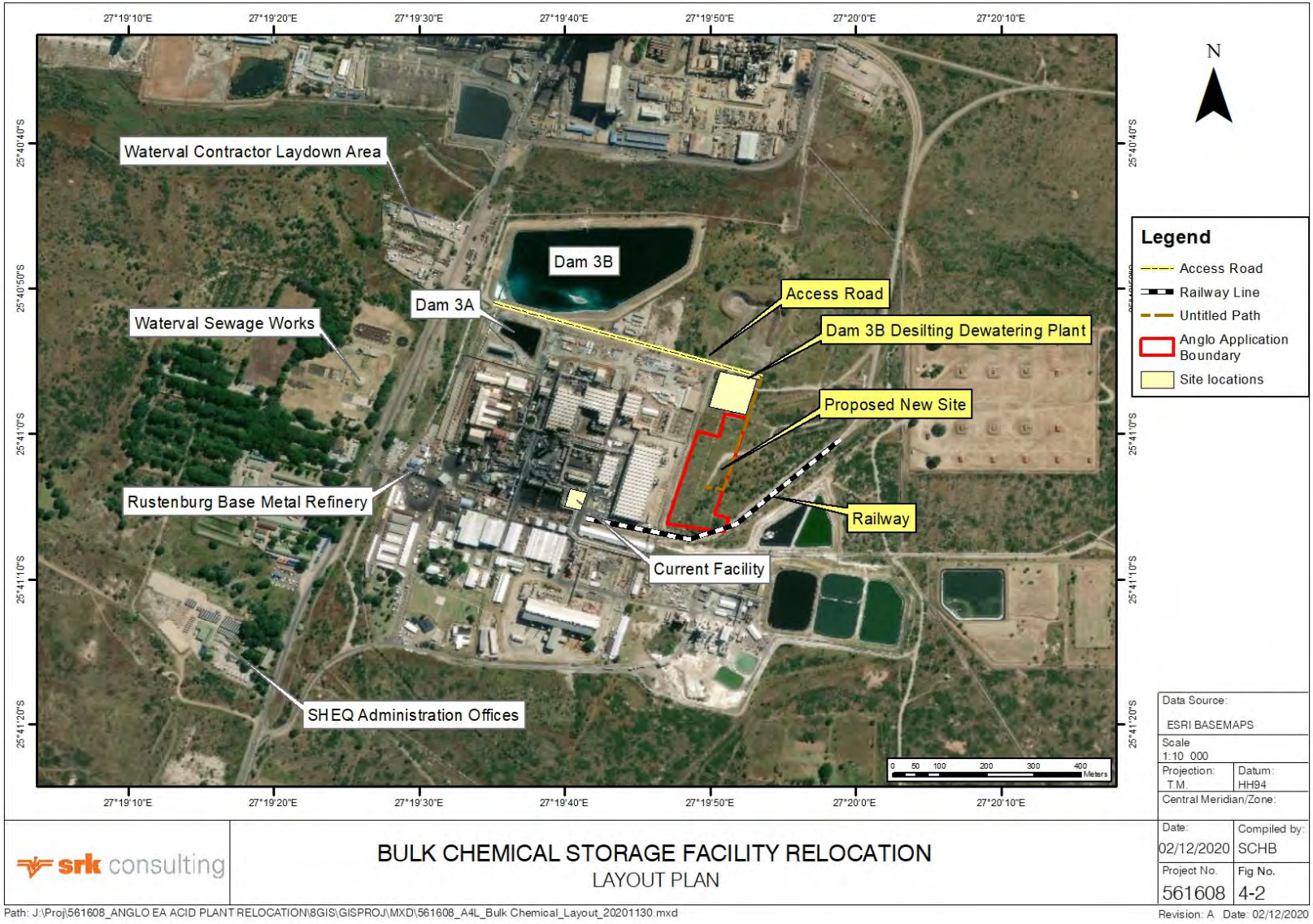


Figure 4-2: RBMR Layout Plan

5 Project Description

The proposed project will include decommissioning of the current bulk chemical storage facility and construction and operation of a new bulk chemical storage facility.

5.1 Decommissioning of the Current Plant

The following actions will be implemented to affect demolition of the existing chemical tanks infrastructure:

- Chemicals in the current bulk chemical's facility will be utilized in the operation until the operational allowable minimum tank levels are reached. The remaining chemicals in the tanks, will then be drained into the section's designated bunded area and pumped via the area's spillage pump to the current neutralisation plant on site.
- Once all excess chemicals have been discharged to the neutralization facility on site, a specialist waste management contractor will be utilized to rinse the tanks in accordance with the Material Safety Data Sheets (MSDS) of each chemical prior to the tanks being removed from site. For the detailed rinsing and effluent management procedure, refer to Appendix E.
- Existing infrastructure will be removed to ground level including:
    - Removal of building material. Building material will be treated/re-used or recycled or disposed as a last resort onto a registered waste disposal facility; and
    - Dismantling and removal of the tanks and associated infrastructure.
- All infrastructure for which there is no approved third-party post closure use will be dismantled. Infrastructure where there is a third-party use will be legally transferred to the relevant parties and any other valuable items salvaged during demolition will be sold;
- All remaining chemicals in the redundant equipment will be neutralised prior to being rinsed with water before third party removal/disposal in accordance with the Material Safety Data Sheet (MSDS) for the chemicals (attached as Appendix E);
- Equipment and materials will be sold and removed from the site;
- Removal of any hazardous material will be re-used or recycled. Disposal will be done as a last resort at a licenced facility;
- Removal of any general waste and re-use, recycling or disposal as a last resort at a registered waste disposal facility; and
- Excavation, removal and replacement of contaminated soil/substrate and treatment, re-use, recycling or disposal as a last resort at a registered waste disposal facility.

5.2 Rehabilitation of the current plant area

The area where the current facility is located will require rehabilitation. Remediation of the affected area will include:

- Geotechnical investigations will be conducted on the ingress by acids encountered on the fill material and the underlying norite rock;
- The geological map from the Council for Geosciences indicates that the site is underlain by gabbro, norite and anorthosite of the Pyramid Gabbro-norite (Vg). Very soft gabbro norite rock is encountered from a depth of 1.2m below ground level. Studies indicates ground water level to be between 15 to 30m;

- Contaminated soil will be excavated, removed, re-used, recycled and disposal only, as a last resort to an authorized landfill site. and
- Suitable material will be imported. All backfilling and compaction and testing thereof will be done in accordance with the Engineer's specifications.

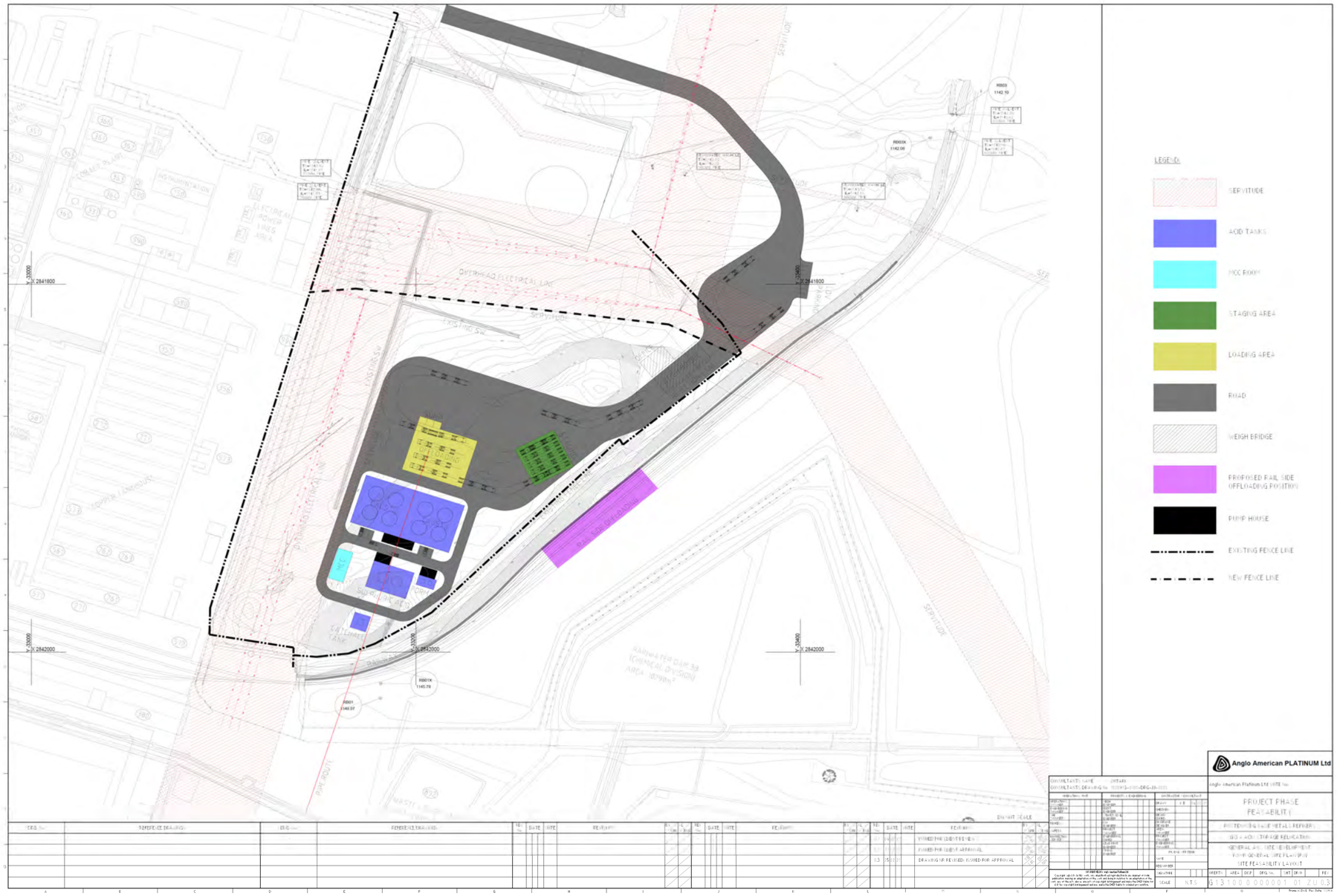
5.3 Construction of the new plant and associated infrastructure

The proposed bulk chemical storage facility relocation project will include the construction of the following:

- Construction of chemical tanks (8 for caustic soda, 2 for sulphuric acid and 2 for Formalin);
- Construction and installation of the Motor Control Centre (MCC) with a total installed load on the MCC is a small load of 1.13 MW with 525V (classified as Medium Voltage).
- Construction of parking and weighbridge areas;
- Resurfacing of the existing gravel access road with tar for the transportation of imported chemicals; and
- Construction of a rail siding from the existing railway line to the bulk chemical storage facility for the transportation of locally acquired chemicals.

The layout plans of the proposed bulk chemical storage facility are provided in Figure 5-1 and Figure 5-2.

An A3 copy of the bulk chemical storage facility is included in Appendix F.



srk consulting

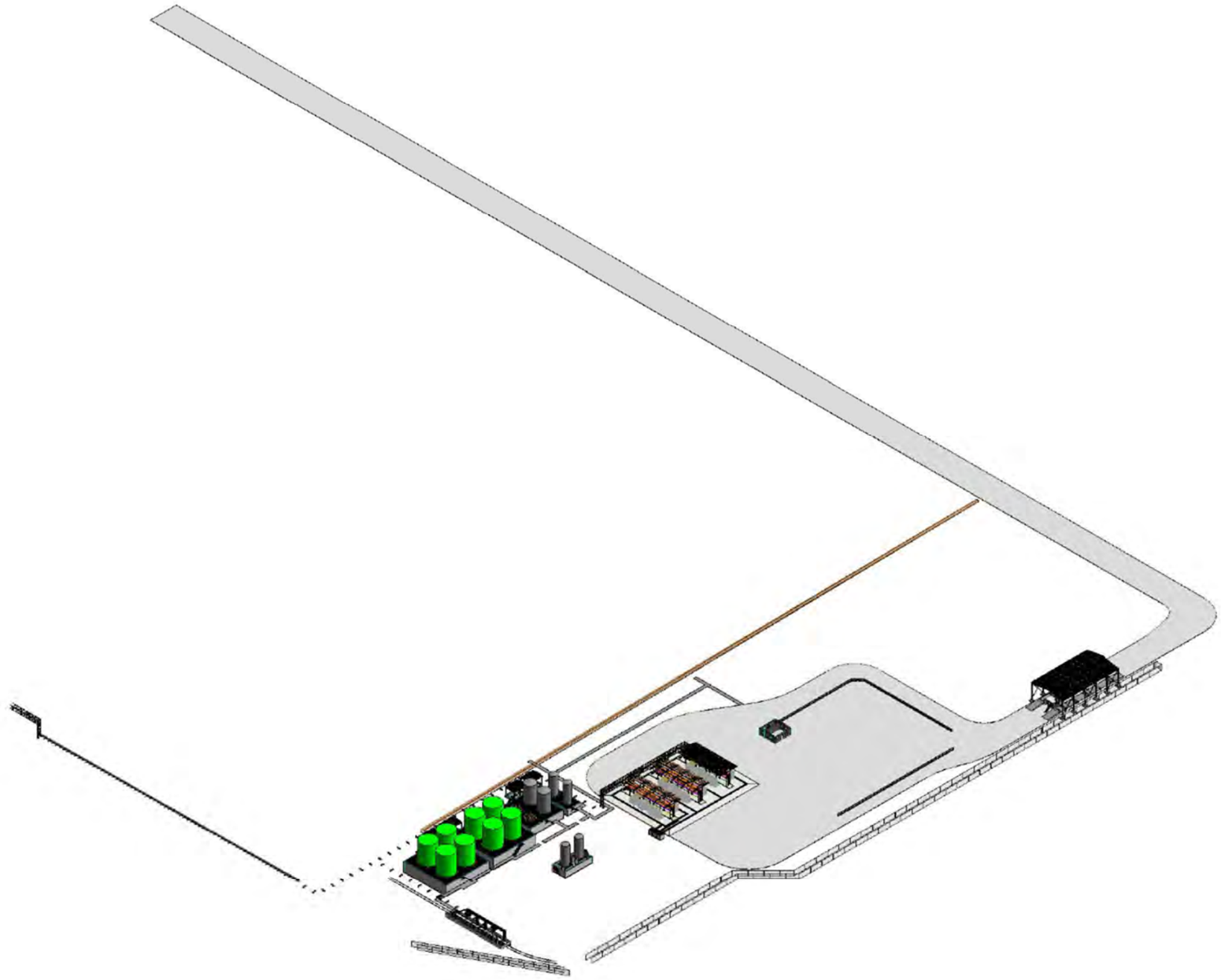
RBMR BULK CHEMICAL STORAGE FACILITY RELOCATION

PROPOSED PROJECT LAYOUT PLAN

Project No.

561608

Figure 5-1: Proposed Layout Plan of the bulk chemical storage facility



srk consulting	**RBMR BULK CHEMICAL STORAGE FACILITY RELOCATION** 3 D LAYOUT	Project No. 561608

Figure 5-2: Proposed 3 D Layout Plan of the bulk chemical storage facility

5.3.1 Construction

The bulk chemical storage facility and associated infrastructure will be constructed in a brownfield area located next to the RBMR facility. RBMR will appoint contractor (s) for the construction process, which will be carried out under the instruction of the RBMR production manager. The generic construction process will entail:

- Earthworks : Establishment of foundations.
- Civil works:
    - Erection of structures and general building activities associated with the bulk chemical storage facility, road pavement and rail siding;
    - Foundation excavations and compaction;
    - Concrete work including the mixing of concrete;
    - Steelwork including grinding and welding; and
    - Rehabilitation of disturbed areas after general site construction is completed.

5.3.2 Operation

The operation of the plant will be undertaken within the existing RBMR structures. All chemicals will be delivered to the plant by road (imported chemicals) and by rail (locally acquired chemicals), where the chemicals will be offloaded into the different assigned tanks as shown in Figure 5-2.

5.4 Employment

RBMR will appoint contractors for the construction phase of the project. The contractors responsible for the construction of the plant will appoint a team manager and a supervisor who will ensure that:

- All work to be conducted have been assessed in terms of risk;
- Risk assessments are developed according to operating procedures;
- All personnel are trained on procedures;
- Employees competence are tested and insured; and
- Rules and procedures are enforced.

6 Alternatives Considered

According to GNR 326 promulgated in term of the NEMA, feasible alternatives need to be considered and assessed during the scoping Phase of the project. During the scoping phase, based on professional judgement of the EAP, the engineering design consultants and I&AP comments, alternatives have been considered for the location of the bulk chemical storage facility. Three possible locations within and around the RBMR were considered. In addition to these alternatives, the "no–go" alternative was also assessed. All alternatives, including the no-go option will be subject to the impact assessment.

Three location alternatives were considered.

6.1 Preferred Option

The preferred site alternative is the brownfield area located to the East of the Copper Tank house, outside the RBMR's current boundary fence as shown in Figure 6-1.

srk consulting	**RBMR BULK CHEMICAL STORAGE FACILITY RELOCATION** PROJECT LOCATION	Project No. 561608

Figure 6-1: Location of the Preferred Option

6.2 Alternative 1

Alternative 1 is sited within the RBMR boundary (brownfields) to the East of the Copper Tank house as shown in Figure 6-2.

srk consulting	**RBMR BULK CHEMICAL STORAGE FACILITY RELOCATION** ALTERNATIVE 1 LOCATION	Project No. 561608

Figure 6-2: Location of Alternative 1

6.3 Alternative 2

Alternative 2 is located within the RBMR boundary (brownfields) to the East of the Nickel Tank House as shown in Figure 6-3.

srk consulting	**RBMR BULK CHEMICAL STORAGE FACILITY RELOCATION** ALTERNATIVE 2 LOCATION	Project No. 561608

Figure 6-3: Location of Alternative 2

6.4 Location Trade-off

RBMR undertook an assessment of the desirability of the locations and technical issues as summarised in Table 6-1.

Table 6-1: Technical Assessment of Alternatives

Item Description	Preferred Option	Alternative 1	Alternative 2
Operation would minimize interactions with operations and reduce construction delays.	Positive	Negative	Negative
Reduced movement of traffic inside of the base metal refinery.	Positive	Positive	Negative
An installation of dedicated weighbridge	Negative	Negative	Negative
Close proximity of the reagent tank to the railways.	Positive	Positive	Negative
Modification to the railway system to enable the trailers to be parked would be required.	Negative	Negative	Negative
The offloading pumping systems will reduce power requirements and reduce piping runs.	Positive	Positive	Negative
The close proximity to existing piping rack, thus reducing piping lengths	Positive	Positive	Negative
Close proximity to MV substation 990SGM001, thus reducing cable length distances.	Positive	Positive	Negative
Adequate space for the turning circles of the delivery trucks and parking bays.	Positive	Positive	Negative
Requirement for major earthwork, including possibility of hard rock, requiring either blasting and/or alternative methods to be established in the next phase of the project.	Negative	Negative	Negative
Integration of the control system to PCS7	Positive	Positive	Negative
Access to existing roads, of less than 500m	Negative	Negative	Positive
New turnstiles, and security fence	Negative	Negative	Positive
Requirement for a dedicated weighbridge with its control room for ablutions.	Negative	Negative	Negative

The preferred option was based on:

- Reduce vehicle - pedestrian interaction by reducing number of acid offloading trucks;
- Eliminate rail deliveries traffic within the RBMR facility; and
- Reduce congestion at RBMR entrance Gates and Weighbridge.

Furthermore, this option will be engineered to mitigate many of the significant risks identified and associated with this option.

6.5 No-Go Alternative

The assessment will include a no-go option as required by the EIA regulations. This would therefore entail the continuous use of the existing bulk tank farm. However, it must be noted that although various monitoring and preventative measures have been put in place and implemented to avoid any further spills, repairs have been implemented around the bund to attempt to contain any further contamination or leaks, these measures are unfortunately not long-term solutions and they will not contain a catastrophic failure or major rain event. The mitigation of the heaving of soils will in itself

require major earthworks with associated impacts. One can confidently say that the heaving will continue with the advent of the rainy season. With the unpredictable rainfall pattern, RBMR needs to ensure 100% integrity of the structures at the plant. The behaviour of the underground soil movements is unpredictable. i.e. when and how much of the heaving is going to continue. The unforeseen and unpredictable nature of the heaving soils within the various bunds, combined with the condition of the steel and concrete structures and walls makes this project an extreme emergency.

Should the current plan fail, the implication of it are far reaching from both an environmental, socio-economic and plant safety perspective (See Section 7).

7 Need and Desirability of the Proposed Project

The environmental right is contained in the Constitution of the Republic of South Africa, Act 108 of 1996 (hereafter referred to as "The Constitution") Section 24 of the Constitution enshrines environmental rights in South Africa, which are interpreted to have a two-fold purpose. The first part guarantees a healthy environment to every person. The second part mandates the State to ensure compliance with the first part. The State is prohibited from infringing on the right to environmental protection and is further required to provide protection against any harmful conduct towards the environment.

The construction and installation of the proposed bulk chemical storage facility will reduce the risk of failure of the current facility which would have environmental, socio-economic as well as health and safety implications.

Various monitoring and preventative measures have been put in place and implemented to avoid any further spills at the current plant, including repairs done around the bund to attempt to contain any further contamination or leaks. These measures are unfortunately not long-term solutions and they will not contain a catastrophic failure or major rain event. The ingress of caustic soda into the substrate under the bunds has led to the supporting soil to [1]heave, causing catastrophic damage to the concrete and steel structures within the existing bunds. The heaving is predicted to continue for the foreseeable future and will increase with the advent of the rainy season and any further leaks, which are highly likely. The caustic ingress has now also compromised all the lining systems, and effluent is seeping out of the bund. Furthermore, the supporting plinths off all the tanks are extremely compromised and their integrity cannot be assured.

With the unpredictable rainfall pattern, RBMR needs to ensure100% integrity of the structures at the plant. The behaviour of the underground soil movements is unpredictable. i.e. when and how much of the heaving is going to continue. The unforeseen and unpredictable nature of the heaving soils within the various bunds, combined with the condition of the steel and concrete structures and walls makes this project a necessity. In addition, the project presents RBMR with an opportunity to construct a new bulk chemical storage facility that will comply with international standards.

Should the application for an EA to construct a new bulk chemical storage facility be rejected, and there is failure at the current plant, the implication is far reaching from both an environmental, socio-economic and plant safety perspective.

7.1 Environmental Implications in case of a failure

Environmentally, a failure of the a single bund would result in an environmental disaster should the RBMR not be able to contain the runoff from the plant, with potential for the chemicals to ultimately flow into the surrounding environment, contaminating ground and surface water resources and land.

7.2 Health and Safety Implication in case of a failure

Without a competent bund all personnel and the entire BMR operation is at extreme risk both from a safety and operational perspective. RBMR is currently monitoring the situation to ensure a timeous response should a failure occur. However, should a catastrophic failure occur, it may result in multiple fatalities.

Ground **heave** is the upward movement of the ground usually associated with the expansion of **clay** soils which swell when wet. As the soil generally cannot expand downwards or sideways, the result is that the exposed upper surface of the soil rises up[1]

7.3 Socio-Economic Impacts In case of a failure

In a case where there is failure resulting in the discontinuation of caustic or acid, the whole platinum value chain will be affected, deferring Anglo American Platinum (AAP)'s production for the duration of the stop. This would have economic implications for Anglo platinum operation in terms of the loss of interest of the deferred cash the company's reputation and reduced market confidence and potential to access external funding in the future. It is estimated that the financial cost of such failure would be in the order of R 11 billion rand a month in deferred cash (only considering major Platinum Group Metals (PGM) and base metals at current prices), which represents approximately 2% of South Africa's Gross Domestic Product (GDP).

A total failure of the plant would cause serious job and tax revenue loss, making it imperative to ensure that such failure does not occur.

7.4 Needs and Desirability as per Government Regulation Notice 792 of 2012

The needs and desirability assessment of the proposed bulk chemical storage facility as per GNR 792 of 2012 is provided in Table 7-1.

Table 7-1: Need and Desirability Assessment of the Proposed Bulk Chemical Storage Facility

Questions (Notice 792, NEMA, 2012)		Response
PART I: NEED		
1.	Is the land use associated with the activity being applied for considered within the timeframe intended by the existing approved SDF agreed to be the relevant environmental authority?	No. The proposed project will be located on a property owned by the RBMR property and has no bearing on the SDF.
2.	Should the development, or if applicable, expansion of the town/area concerned in terms of this land use occurs here at this point in time?	Yes. Authorising the project will allow RBMR to construct and operate a new plant that meets international standards and will ensure that failure of the current plant and associated impacts is avoided.
3.	Does the community/area need the activity and the associated land use concerned? This refers to the strategic as well as local level.	Yes. Authorising the project will allow RBMR to construct a new bulk chemical storage plant and avoid failure and associated impacts at the current plant.
4.	Are the necessary services with adequate capacity currently available (at the time of application) or must additional capacity be created to cater for the development?	No additional capacity will be required for the project. The bulk chemical storage plant will be constructed by a contractor and operation will be undertaken by current RBMR personnel. It is not envisaged that additional water and power will be required from the providers as a result of the plant.
5.	Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of the services and opportunity cost)?	Not applicable. The objective of the project is to construct and operate a bulk chemical storage facility for RBMR precinct and will have no bearing on the infrastructure planning of the municipality.
6.	Is the project part of a national programme to address an issue of national concern or importance?	The objective of the project is to construct and operate a bulk chemical storage facility at RBMR, which will reduce potential environmental impacts that may be incurred should the project not be authorised in terms of potential failing of the plant

Questions (Notice 792, NEMA, 2012)		Response
		which may result in contamination of water resources should the RBMR not be able to contain the chemicals. The protection of water resources forms part of the National Water Resources Strategy II that was adopted by the Government in 2013. The water resource protection theme emphasises the need to protect our freshwater ecosystems, which are under threat because of pollution from many sources. The NWRS (II) states that South Africa's water ecosystems are not in a healthy state. Of the 223 river ecosystem types, 60% are threatened, with 25% of these critically endangered. Less than 15% of river ecosystems are located within protected areas, many of which are threatened and degraded by upstream human activities.
PART II: DESIRABILITY		
7.	Is the development the best practicable environmental option for this land/site?	Yes. Authorising the construction of the bulk chemical storage facility will result in a reduction in potential environmental impacts that may be incurred should the proposed project not be authorised, and the current plant fails. Failure of the current plant has potential to contaminate water resources and land. The biodiversity and heritage resources assessment undertaken found no fatal flaws associated with the site, with no species of conservation concern and heritage resources on the site.
8.	Would the approval of this application compromise the integrity of the existing approved and credible IDP and SDF as agreed to by the relevant authorities?	No. The project has no bearing on the IDP or SDF of the Rustenburg LM, Bojanala DM and/or North West Province. The objective of the project is to construct and operate a bulk chemical storage plant which will reduce the risk of failure of the current plant.
9.	Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?	No. The project will be located on the RBMR property and will have no implications on the integrity of the EMFs.
10.	Do location factors favour this land use at this place? (this relates to the contextualization of the proposed land use on this site within its broader context).	Yes. The proposed site is not earmarked for any particular municipal land use. The proposed bulk chemical storage facility will be located on the RBMR property, just outside the current RBMR boundary, which will allow the RBMR to integrate the plant with the rest of the plant whilst: • Reducing the vehicle - pedestrian interaction by reducing number of acid offloading trucks; • Eliminating rail deliveries traffic within the RBMR facility; and • Reducing congestion at RBMR entrance Gates and Weighbridge.

Questions (Notice 792, NEMA, 2012)		Response
		The RBMR will ensure mitigation of significant impacts that may occur as a result of the project.
11.	How will the activity of the land use associated with the activity being applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	The biodiversity and heritage specialist studies found no sensitive natural and cultural areas located on the proposed project site. The wetlands assessment conducted for RBMR also found that there are no wetlands associated with the proposed project.
12.	How will the development impact on people's health and well-being? (E.g. In terms of noise, odours, visual character and sense of place, etc.)?	During construction, there will be particulate emissions (dust) related to debris handling, materials transportation, storage, handling and transfer; open areas (windblown dust). Gas emissions are also expected to occur due to vehicle and construction equipment activity (exhaust fumes). These impacts, however, taking into consideration, the area where the proposed bulk chemical storage facility will be located, are expected to be of low significance and can be mitigated and managed to acceptable levels, with a post mitigation impact that is negligible. Movement of construction vehicles and machinery result in the production of construction related noise which may cause a nuisance to people working and living in the vicinity of the RBMR. However, the implementation of appropriate mitigation measures would reduce the noise levels to remain within applicable and acceptable SANS levels (SANS 10103:2008). Occupational health and safety standards will apply. It is expected that the project will not have an impact on the visual character and sense of place, especially since the bulk chemical storage facility will be located in close proximity to the RBMR plant.
13.	Will the proposed activity or the land use associated with the activity being applied for, result in unacceptable opportunity costs?	No. The objective of the project is to construct and operate a bulk chemical storage facility, which will result in a reduction in potential environmental impacts that may be incurred should the plant not be authorised in terms of potential failure of the plant which would result in contamination of land and on water resources. The property affected by the proposed facility is owned by the RBMR and is currently no earmarked for other use.
14.	Will the proposed land use result in unacceptable cumulative impacts?	No. It is expected that the project may result in negligible cumulative impacts on water and air quality. The impacts will be short lived, during the construction phase. It is however expected that implementation of the mitigation measures included in the EMPr will reduce the significance of the impact.

8 Legal and Policy Framework

Table 8-1 provides a summary of the applicable legislation, policies and guidelines identified as relevant to the proposed project. In addition, a description of how the proposed activity complies with

and responds to the legislation and policy context, is provided. This list is not exhaustive but rather represents an indication of the most applicable pieces of environmental legislation relevant to the project.

Table 8-1: Policy and Legislative Context of Proposed Project

Legislation	Description and Relevance	Responsible Authority
Constitution of the Republic of South Africa, (Act No. 108 of 1996)	Chapter 2 – Bill of rights Section 24 – Environmental Rights *The proposed activities shall be implemented in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated (as per the accompanying EMPr that was compiled to guide the process) in order to protect the environmental rights of South Africans.*	N/A
Promotion of Access to Information Act, 2000 (Act No. 2 of 2000) (PAIA)	The Promotion of Access to Information Act (Act No. 2 of 2000) (PAIA) recognises that everyone has a right of access to any information held by the state and by another person when that information is required to exercise or protect any right. The purpose of the Act is to promote transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their right. *The EIA/EMPr process was undertaken in terms of the NEMA, where the associated stakeholder consultation process was aligned with the PAIA in the sense that all I&APs were given an opportunity to register as an I&AP prior to the initiation of the project and all registered stakeholders were in turn provided a fair opportunity to review and comment on any draft reports submitted to the DEDECT for decision making.*	N/A
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)	Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment) Section 28 – Duty of care and remediation of environmental damage *Environmental management principles have been incorporated into this EIR and accompanying EMPr, which the applicant will be required to comply with to ensure that negative impacts on the environment are avoided or kept to a minimum and that positive impacts are enhanced.*	DEDECT
NEMA EIA Regulations 2014 (Government Notice (GN) 324, 325 and 327), as amended	The EIA Regulations (GNR 326) were promulgated in terms of Sections 24 of the NEMA, to manage the process, methodologies and requirements for the undertaking of an EIA. The GNR 326 stipulates that the applicant for activities listed under GNR 324, 325 or 327 must appoint an independent EAP to manage the EIA process. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental impact on the environment, and which may not commence without an EA from the Competent Authority (CA). EA required for Listed Activities is subject to the completion of either a Basic Assessment (BA) process or full Scoping and Environmental Impact Assessment (S&EIA) with applicable	

Legislation	Description and Relevance	Responsible Authority
	timeframes associated with each process. The EA must be obtained prior to the commencement of those listed activities. *The project triggers activities listed in Listing Notices 1 (GNR 327) and 2 (GNR 325) and requires a full EIA (scoping and impact assessment). The applicable listed activities that will be triggered by the project are summarised in Table 8-2.*.	
Department of Environmental Affairs (DEA) Integrated Environmental Management Guideline Series, Guideline 5: Assessment of the EIA Regulations, 2012 (Government Gazette 805)	*Environmental impacts will be generated primarily during the construction of the new bulk chemical storage facility and the decommissioning and closure of the current plant. These, together with associated operational phase impacts have been assessed in Section 12 of this report.*	
Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004	*An Environmental Assessment is required for the proposed project as activities are triggered under GNR 325 and GN R327 of the NEMA.*	
Review in Environmental Impact Assessment, Integrated Environmental Management, Information Series 13, Department of Environmental Affairs and Tourism (DEAT), Pretoria.		
DEA Integrated Environmental Management Guideline Series, Guideline 7: Public Participation in the Environmental Impact Assessment Process, 2012 (Government Gazette 807)	*Public participation is a requirement of the EIA Process and has been undertaken as stipulated in Chapter 6 of the NEMA, taking into account various public participation guidelines as stipulated in Section 11.*	
National Water Act, 1998 (Act No. 36 of 1998) (NWA)	*The proposed project does not constitute a water use as per Section 21 of the NWA. A Water Use Authorisation will therefore not be required.*	Department of Water and Sanitation (DWS)
National Environmental Management Waste Act (Act No. 59 of 2008) (NEM: WA)	*The project does not trigger activities listed in GNR921 of the NEM: WA and will therefore not require a Waste Management Licence (WML).The principles of the act, focusing on the waste hierarchy (Figure 8-1)*	DEDECT/ Department of Environment, Forestry & Fisheries (DEFF)

Legislation	Description and Relevance	Responsible Authority
	of avoidance and reduction, re-use, recycling, recovery and treatment and disposal has been taken into consideration in the development of the EMPr during the EIA.  **Figure 8-1: Waste Hierarchy**	
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA)	Air quality management Section 32 – Dust control. Section 34 – Noise control. Section 35 – Control of offensive odours. *No listed activities in terms of NEM: AQA will be triggered as a result of the proposed project, however the principles of the act, focusing on minimisation of pollutant emissions will be taken cognisance of in the development of the EMPr during the EIA.*	DEFF and Rustenburg Local Municipality

Legislation	Description and Relevance	Responsible Authority
National Forestry Act, 1998 (Act No. 84 of 1998) (NFA)	The NFA protects against the cutting, disturbance, damage, destruction or removal of protected trees. *The proposed project will include the clearance of vegetation and trees from the project footprint. A biodiversity assessment conducted as part of the EIA found that there are no Species of Conservation Concern (SCC) that will be affected by the proposed project. However, the clearance of vegetation will still result in loss of biodiversity and mitigation measures have been included in this EIA and accompanying EMPr.*	Department of Environment, Forestry and Fisheries (DEFF)
National Disaster Management Act, 2002 (Act No. 57 of 2002)	Annexure 3 of the Department of Environment, Forestry and Fisheries (DEFF) Disaster Management Directions of 5 June 2020. The Directions require that a person (proponent/ applicant, specialist, EAP) or other professional) who undertakes actions as part of an environmental authorisation process must: • Prepare a written Public Participation Plan (PPP) or Stakeholder Engagement Plan, containing proposals on how the identification of and consultation with all potential Interested and Affected Parties (I&APs) will be ensured in accordance with regulation 41(2)(a) to (d) of the Environmental Impact Assessment (EIA) Regulations (2014, as amended) or proposed alternative reasonable methods as provided for in regulation 41(2)(e) of the EIA Regulations, for the purposes of the application and submit such plan to the competent authority; • Request a meeting or pre-application discussion with the relevant competent authority to determine the reasonable measures to be followed to identify potential I&APs and register IA&Ps for purposes of conducting public participation on an application requiring adherence to Chapter 6 of the EIA Regulations as set out in the PPP and obtain agreement from the relevant competent authority on the Public Participation Plan; o For new applications, the PPP agreed with the competent authority, must be attached to the application form; and o Unless part of a site visit, virtual or telephonic meetings to be arranged with the relevant competent authority as set out in Annexure 2. *A pre-application discussion was held with the DEDECT on 11 August 2020 where the proposed stakeholder engagement process was discussed. A stakeholder engagement plan was compiled and submitted to the DEDECT with the application. The stakeholder engagement plan will be implemented throughout the EIA process.*	DEFF

Legislation	Description and Relevance	Responsible Authority
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA)	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources. The Act provides for listing of threatened or protected ecosystems, in one of four categories: critically endangered, endangered, vulnerable or protected *The management and control of alien invasive species on the impacted areas during all the phases of the project will be governed by the NEM: BA. The NEM: BA ensures that provision is made by the site developer to remove any alien species, which have been introduced to the site or are present on the site. As such, the management and control of potential alien invasive plant species have been included in the impact assessment section (Section 12) and mitigation measures have been included in the accompanying EMPr.*	DEFF/DEDECT
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)	Control measures for erosion Control measures for alien and invasive plant species *The EMPr includes measures to control and manage alien invasive plant species.*	DEFF
National Heritage Resources Act, 1999(Act No 25 of 1999) (NHRA)	Heritage Permit for structures 60 years or older. *A heritage specialist was appointed to undertake a phase 1 Heritage Impact Assessment (HIA) for the proposed project as part of the EIA process. The specialist found that there are no heritage resources located on the project site. However, the specialist provided mitigation measures that must be implemented should by chance graves and heritage resources be affected by the project.*	North West Heritage Resource Authority
Restitution of Land Rights Act, 1994 (Act No. 22 of 1994), as amended in 2014.	Land Claims. *The proposed plant location is owned by the applicant, RBMR.*	Department of Rural Development and Land Reform

8.1 Provincial and Municipal Bylaws

The Bojanala Platinum District Municipality, Rustenburg Local Municipality and the North West Province have developed bylaws and various policies relating to waste disposal, water, economic development, air quality, etc. The proposed project must ensure that such policies and bylaws are adhered to as far as possible during the construction and operation of the bulk chemical storage facility and associated infrastructure.

8.2 Guidelines

The following documents have been taken into account in the impact assessment process and compilation of the EMPr of the proposed project:

- North West Provincial Biodiversity Management Plan;
- Rustenburg Local Municipality Integrated Development Plan (IDP) (2019-2020);
- Bojanala Platinum District Municipality Spatial Development Framework (SDF) (2007);
- DWS, 2010. Operational Guideline: Integrated Water and Waste Management Plan. Resource Protection and Waste;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline G1 Storm Water Management;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline G3. Water Monitoring Systems;
- Department of Water Affairs and Forestry, 2008. Best Practice Guideline G4: Impact Prediction;
- DEAT. 2002. Integrated Environmental Management, Information series 3: Stakeholder Engagement. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEAT. 2002. Integrated Environmental Management, Information series 12: Environmental Management Programmes. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEA. 2010. Companion to the EIA Regulations 2010 for Comment, Integrated Environmental Management Guideline Series 5, Department of Environmental Affairs;
- DEA. 2010. Companion to the EIA Regulations 2010 for Comment, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs;
- DEA. 2012. Companion to the EIA Regulations 2010, Integrated Environmental Management Guideline Series 5, Department of Environmental Affairs;
- DEA. 2012. Companion to the EIA Regulations 2010, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs; and
- Western Cape Department of Environmental Affairs and Tourism. 2010. EIA Guideline and Information Document Series: Guideline on Need and Desirability.

8.3 Listed Activities Triggered

The proposed projects triggers activities listed in Listing Notices 1 and 2 of the NEMA and requires an EA from the DEDECT. A summary of the activities is provided in Table 8-2.

Table 8-2: NEMA Listed Activities Triggered by the proposed project

Government Notice and Activity Number	Relevant Activity as per the relevant Listing Notice	Describe the portion of the development as per the project description that relates to the applicable listed activity
Listing Notice 1 (GNR 327): Activity 24	*The development of a road—* *(i) [a road] for which an environmental authorisation was obtained for the route* *determination in terms of activity 5 in Government Notice 387 of 2006 or activity* *18 in Government Notice 545 of 2010; or* *(ii) [a road] with a reserve wider than 13,5 meters, or where no reserve exists where* *the road is wider than 8 metres;*	The proposed project will include tarring of an existing gravel access road.
Listing Notice 1 (GNR 327): Activity 27	*The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—*	Construction of the proposed plant will require clearance of land with a footprint more than 1 hectare and less than 20 ha.
Listing Notice 1 (GNR 327): Activity 31	*The decommissioning of existing facilities, structures or infrastructure…*	The relocation of the bulk chemical storage facility will require the decommissioning of the existing plant.
Listing Notice 1 (GNR 327): Activity 60	*The expansion and related operation of facilities or infrastructure for the bulk transportation of dangerous goods—* *(ii) in liquid form, outside an industrial complex or zone, by an increased throughput capacity of 50 cubic metres or more per day;*	The proposed project will require transportation of chemicals considered to be dangerous goods.
Listing Notice 1 (GNR 327): Activity 64	*The expansion of railway lines, stations or shunting yards where there will be an increased development footprint, excluding—*	A railway siding running from the existing railway line running in RBMR will be constructed for the transportation of chemicals to the new plant.
Listing Notice 2 (GNR 325): Activity 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.*	The proposed bulk chemical storage facility will have storage capacity of more than 500m^3.

Government Notice and Activity Number	**Relevant Activity as per the relevant Listing Notice**	**Describe the portion of the development as per the project description that relates to the applicable listed activity**
Listing Notice 2 (GNR 325): Activity 7	*The development and related operation of facilities or infrastructure for the bulk transportation of dangerous goods– ii) in liquid form, outside an industrial complex, using pipelines, exceeding 1 000 metres in length, with a throughput capacity of more than 50 cubic metres per day; or*	The plant will require pipelines that will be used to transport chemicals from the bulk chemical storage facility to the RBMR facilities where the chemicals will be used.

9 Environmental Impact Assessment Methodology

The Scoping Report was submitted to the DEDECT with the Plan of Study on 12 December 2020. The DEDECT accepted and approved the PoS on 19 March 2021, allowing the EAP team to conduct the EIA phase.

A quantitative impact assessment methodology was used for the EIA. This method makes use of the basic risk assessment approach of deriving an expression for risk from the product of likelihood (probability) and consequences.

The main objective of the impact assessment is to identify the negative impacts that can be avoided and/or mitigated and the benefits of the positive impacts during the construction and operation phases of the cement-ash mixing plant on the environment.

9.1 Baseline Characterisation of the Environment

The Department of Environment, Forestry and Fisheries (DEFF) environmental screening tool classified the area as being an area of high biodiversity value. The following specialist studies were conducted as part of the EIA:

- Biodiversity;
- Heritage Resources; and
- Stormwater Management Plan.

The generic terms of reference (ToR) for each specialist study were to:

- Describe the existing baseline characteristics of the study area and place this in a regional context;
- Identify and assess potential impacts resulting from the project (including impacts associated with the construction and operation of the project), using SRK's prescribed impact rating methodology;
- Identify and describe potential cumulative impacts resulting from the proposed development in relation to proposed and existing developments in the surrounding area;
- Recommend mitigation measures to avoid or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring programme, if applicable.

Certain impacts that are anticipated to be of limited or lower significance, either by virtue of the scale of the impacts, their short duration (e.g. construction phase only), disturbed nature of the receiving environment and/or distance to communities, will be assessed by EAP Team and have been reported directly into the EIA Report.

The baseline characterisation of the environment (biodiversity, geohydrology, heritage resources, wetlands, air quality and hydrology) included in Section 10 of this EIR is based on findings from the specialist studies conducted for the project. In addition, the EAP also made use of existing monitoring reports to describe the environmental status quo of the area.

The impact assessment and mitigation measures included in Section 10of this report and the accompanying EMPr were also based on findings and recommendations from the specialist studies.

The specialist studies reports have been attached as Appendix G

9.2 Identification of Key Issues

Anticipated impacts that have been identified by the project team are summarised in

Table 9-1. A comprehensive quantitative impact assessment has been conducted for the project and the findings are included in Section 12 of this report.

Table 9-1: Summary of Potential Environmental Impacts Associated with the Proposed Development

Element of Environment	Potential Impact Descriptions
Socio-Economic	Possible limited and temporary job opportunities during the construction phase of the Bulk Chemical Storage Facility
Hydrogeology	Possible groundwater contamination from hydrocarbons leaking from construction vehicles.
Surface water	Possible, but unlikely surface water contamination.
Air Quality	Possible, but unlikely impact on air quality in the area.
Noise	Possible generation of noise during the construction phase of the bulk chemical storage facility
Heritage Resources	Possible, but highly unlikely impact on heritage resources due to chance finds
Visual	It is not anticipated that any additional visual impacts will be associated with the proposed bulk chemical storage facility
Soils/Land Use/Land Capability	Localised loss of soil resource and change in land capability and land use due to the clearance of vegetation is expected.
Visual	It is not anticipated that any additional significant visual impacts will be associated with the proposed bulk chemical storage facility
Traffic	Possible impacts on traffic due to transportation of construction material
Biodiversity	Loss of biodiversity due to vegetation clearance for construction.
Wetland	None, there are no wetlands that are located on the proposed bulk chemical storage facility site.

The EIA specialists have incorporated the findings from the specialist studies into the impact assessment process and quantified the impacts as described in Section 9.3

The assessment also took into account any anticipated cumulative impacts.

9.3 Quantitative Impact Assessment

The anticipated impacts associated with the proposed project were assessed according to SRK's standardised impact assessment methodology, which is presented below. This methodology has been utilised for the assessment of environmental impacts where the consequence (severity of impact, spatial scope of impact and duration of impact) and likelihood (frequency of activity and frequency of impact) have been considered in parallel to provide an impact rating and hence an interpretation in terms of the level of environmental management required for each impact.

The first stage of any impact assessment is the identification of potential environmental activities[2], aspects[3] and impacts, which may occur during the commencement, and implementation of a project.

[2]An ***activity*** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation.

[3]An ***environmental aspect*** is an 'element of an organisations activities, products and services which can interact with the environment'. The interaction of an aspect with the environment may result in an impact.

This is supported by the identification of receptors[4] and resources[5], which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. Environmental impacts[6] (social and biophysical) are then identified based on the potential interaction between the aspects and the receptors/resources.

The significance of the impact is then assessed by rating each variable numerically according to defined criteria as outlined in Table 9-2.

The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity[7], spatial scope[8] and duration[9] of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity[10] and the frequency of the impact[11] together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance rating matrix table as shown in Table 9-3.

This matrix thus provides a rating on a scale of 1 to 150 (low, medium low, medium high or high) based on the consequence and likelihood of an environmental impact occurring.

Natural and existing mitigation measures, including built-in engineering designs, are included in the pre-mitigation assessment of significance. Measures such as demolishing of infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

[4] ***Receptors*** comprise, but are not limited to people or man-made structures.

[5] ***Resources*** include components of the biophysical environment.

[6] ***Environmental impacts*** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and palaeontology. In the case where the impact is on human health or well-being, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.

[7] ***Severity*** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.

[8] ***Spatial scope*** refers to the geographical scale of the impact.

[9] ***Duration*** refers to the length of time over which the stressor will cause a change in the resource or receptor.

[10] ***Frequency of activity*** refers to how often the proposed activity will take place.

[11] ***Frequency of impact*** refers to the frequency with which a stressor (aspect) will impact on the receptor.

Table 9-2: Criteria for Assessing Significance of Impacts

SEVERITY OF IMPACT	RATING
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful	5

SPATIAL SCOPE OF IMPACT	RATING
Activity specific	1
RBMR specific (within the RBMR boundary)	2
Local area (within 5 km of the plant boundary)	3
Regional (Greater Rustenburg area)	4
National	5

DURATION OF IMPACT	RATING
One day to one month	1
One month to one year	2
One year to ten years	3
Life of operation	4
Post closure / permanent	5

CONSEQUENCE

FREQUENCY OF ACTIVITY / DURATION OF ASPECT	RATING
Annually or less / low	1
6 monthly / temporary	2
Monthly / infrequent	3
Weekly / life of operation / regularly / likely	4
Daily / permanent / high	5

FREQUENCY OF IMPACT	RATING
Almost never / almost impossible	1
Very seldom / highly unlikely	2
Infrequent / unlikely / seldom	3
Often / regularly / likely / possible	4
Daily / highly likely / definitely	5

LIKELIHOOD

Table 9-3: Interpretation of Impact Rating

Likelihood \ Consequence	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
7	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
8	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
9	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
10	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

	High	76 to 150	Improve current management
	Medium High	40 to 75	Maintain current management
	Medium Low	26 to 39	
	Low	1 to 25	No management required

SIGNIFICANCE = CONSEQUENCE x LIKELIHOOD

10 Description of the Baseline Environment

The following section presents an overview of the biophysical and socio-economic environment in which the proposed project is located, so as to:

- Understand the general sensitivity of and pressures on the affected environment;
- Inform the identification of potential issues and impacts associated with the proposed project, which were assessed; and
- Conceptualise practical mitigation measures.

This section has been compiled, based on the following:

- Available information from the existing specialist studies and monitoring reports. The specialist reports are attached as Appendix G;
- Existing information on the environmental parameters of the area;
- Agricultural GIS;
- SANBI; and
- South African Weather Service.

10.1 Climate

Rustenburg falls within the Summer Rainfall Climatic Zone. The area is characteristically warm with erratic and variable rainfall, ranging from 450 to 750 mm per annum. The rainfall in the area is almost exclusively due to thunderstorms that occur during the summer months (October to March); whilst winter months are normally dry. Temperatures vary between the extremes of – 6.0°C and 40°C, with an average of 19°C. The region is classed under the calm category whereby wind speeds are relatively low, with between 19 and 24 days of frost per year. The area is fog- free and hailstorms are a rare occurrence.

The mean circulation of the atmosphere is predominantly anti-cyclonic throughout the year, except near the surface where meso-scale circulations prevail. Fine conditions and light variable winds with a northerly component occur over the region. Elevated inversions, which occur as a result of the anti-cyclonic subsidence, suppress the diffusion and vertical dispersion of pollutants by reducing the depth of the mixing layer.

Seasonal variations in the position and the intensity of the high-pressure cells determine the extent to which the tropical easterly circulation and the circumpolar westerlies are able to impact on the atmosphere over the region. The tropical easterlies, and the occurrence of easterly waves and lows, affect the region throughout the year resulting in airflow with a north-easterly to north- westerly component, but their influence is generally weaker during the winter months.

The winter weather is dominated by perturbations in the westerly circulation as a result of the succession of cold fronts moving over the region. The passage of a cold front is characterised by pronounced variations in wind direction, wind speed, temperature, humidity and surface pressure. Airflow ahead of the cold front has a distinct north north-westerly to north-easterly component.

Following the cold front, the northerly wind is replaced by winds with a distinct southerly component.

During the summer months, the anti-cyclonic belt weakens and shifts southwards, allowing the tropical easterly flow to resume its influence over the region. The predominant wind is from the south west with greater variation during summer months (Figure 10-1) (Anglo, 2016).

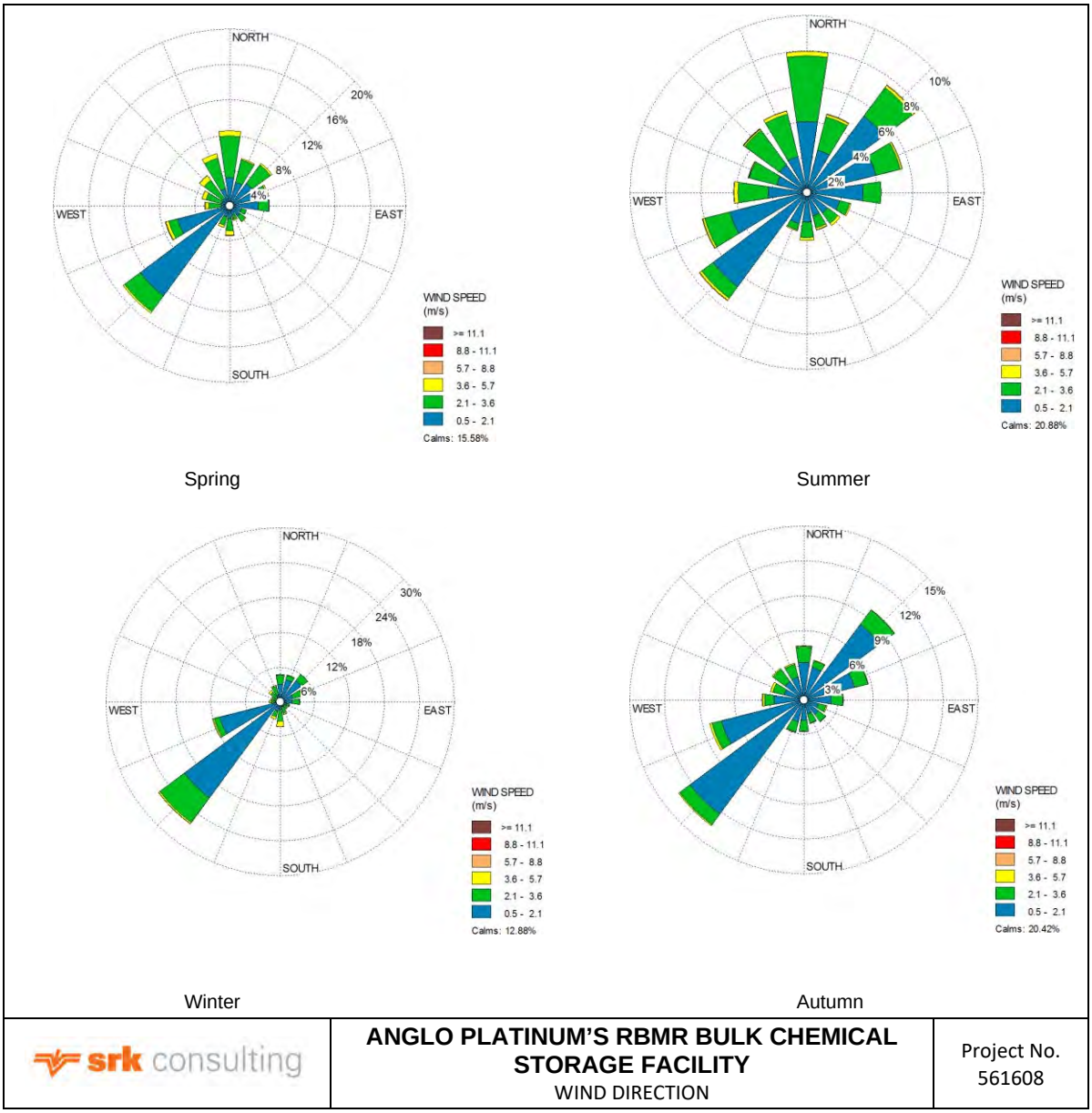


Figure 10-1: Wind Roses for the project area

10.2 Topography

The region of Rustenburg Local Municipality comprises of escarpment hills and lowlands with parallel hills, plains, slightly undulating plains and undulating hills. A large series of ridges and koppies are situated mostly in the central parts, with various mountain ranges and ridges making up the most prominent topography of the area of Bafokeng. The area is mostly dominated by flat undulating slope ranging from 0 to 9%. However, the central part of the area is characterised by elevated slope ranging from 9 to 15% covering the MPE and Kgaswane Mountain Reserve. Some patches of the medium elevated slope ranging between 15 to 25% are also found in the central part. The elevation is an average of 1 180 Meters Above Mean Sea Level (mamsl) (Anglo, 2016).

The study area consists of wide-stretched, flat to gently sloping foot slopes (with a 1 - 4% gradient) sloping to the drainage lines (watercourses) which eventually feed the Boskop Dam in the north. The Hex River is the main drainage line cutting south-north through the area while minor non-perennial drainage lines occur throughout the area. A rocky ridge, stretching south north, occurs to the east of the site, with slopes varying from moderate to steep (Anglo, 2016).

The RBMR is located in an area with an elevation of between approximately 1 140 mamsl and 1 180 mamsl as shown in Figure 10-2.

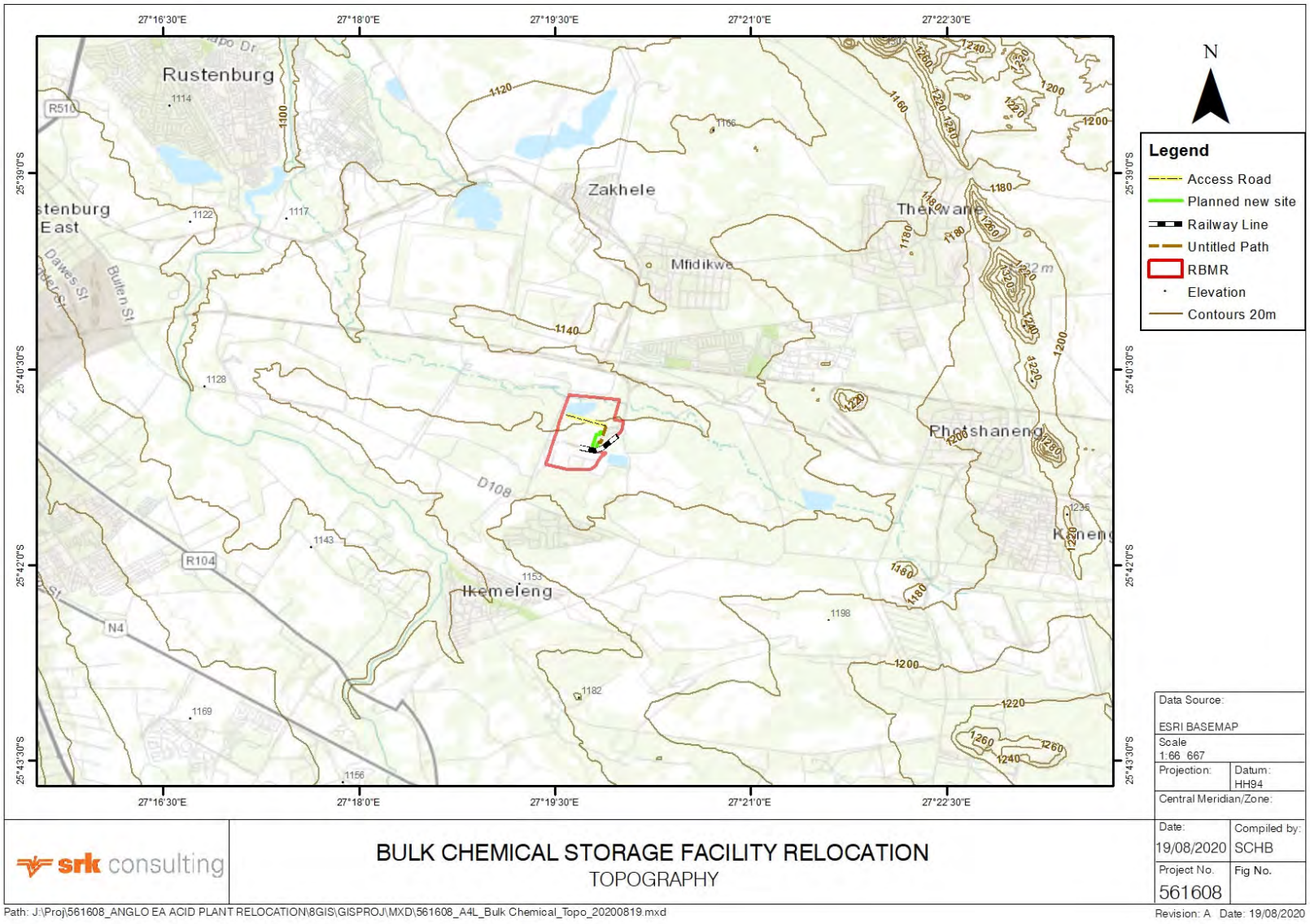


Figure 10-2: Topography

10.3 Geology

The project area is located within one of the largest layered mafic intrusions in the world, namely the Bushveld Igneous Complex. The Bushveld Igneous Complex system is divided into an eastern and western limb with a further northern extension. It contains some of the richest ore deposits on Earth.

The Bushveld Igneous Complex is extensive in size, covering an area of 65 000 km^2; stretching approximately 350 km east to west and 250 km north to south. It is roughly saucer-shaped with the edges dipping inwards towards the centre. At the rim of the 'saucer', pyroxenites, norites, gabbro's and chromatids are found inter-layered in a variety of combinations (Anglo, 2016).

The Bushveld Igneous Complex comprises a suite of layered ultramafic/mafic rock, up to nine (9) km thick (known as the Rustenburg Layered Suite), roofed by Rooiberg Group Felsic volcanic and granophyre's and a suite of late Bushveld granites. This layered suite is preserved in five (5) lobes: the far western, western, eastern and northern, and the south-eastern lobe. According to Cawthorne et al 1999, the Rustenburg Layered Suite, which ranges in composition from dunnite to ferro diorite, is subdivided into five (5) composite zones as provided in Figure 10-3.

Marginal Zone (this is not always present, comprises up to 880m of heterogeneous noritic rocks along the basal contact of the Bushveld Igneous Complex);

- Lower Zone (this comprises of dunnites, harzburgites and pyroxenites);
- Critical Zone (this is characterised by spectacular layering and hosts world-class chromite and platinum deposits in several reefs);
- Main Zone (this is the thickest zone, comprising of a succession of gabbronorites in which olivine and chromite are absent and anorthosites are rare); and
- Upper Zone (this is 200m thick and is characterised by lithologies of Anorthosite, troctolite and ferro gabbro to diorite).

Unique to the Bushveld Igneous Complex is the presence of two (2) stratiform deposits, known as the Merensky reef and the UG2 reef, that can be traced for hundreds of kilometres along the rim of the deposits and contain economically exploitable quantities of PGMs. The Bushveld Igneous Complex remains Anglo American Platinum's primary source of reserves and resources (RDNW(KL) 6/2/2/195(4), 2009).

PGM's are recovered from the tabular Merensky reef that is present along the entire strike length of the South Eastern parts of the Bushveld Igneous Complex. The UG2 (present only in certain pockets along the South Eastern limb) also contains economic quantities of PGM's. The Merensky reef is the predominant ore body, but the UG2 reef is also mined in certain pockets (Anglo, 2016).

The project area is characterised by gabbro and norite, with interlayered anorthosite (Figure 10-3)

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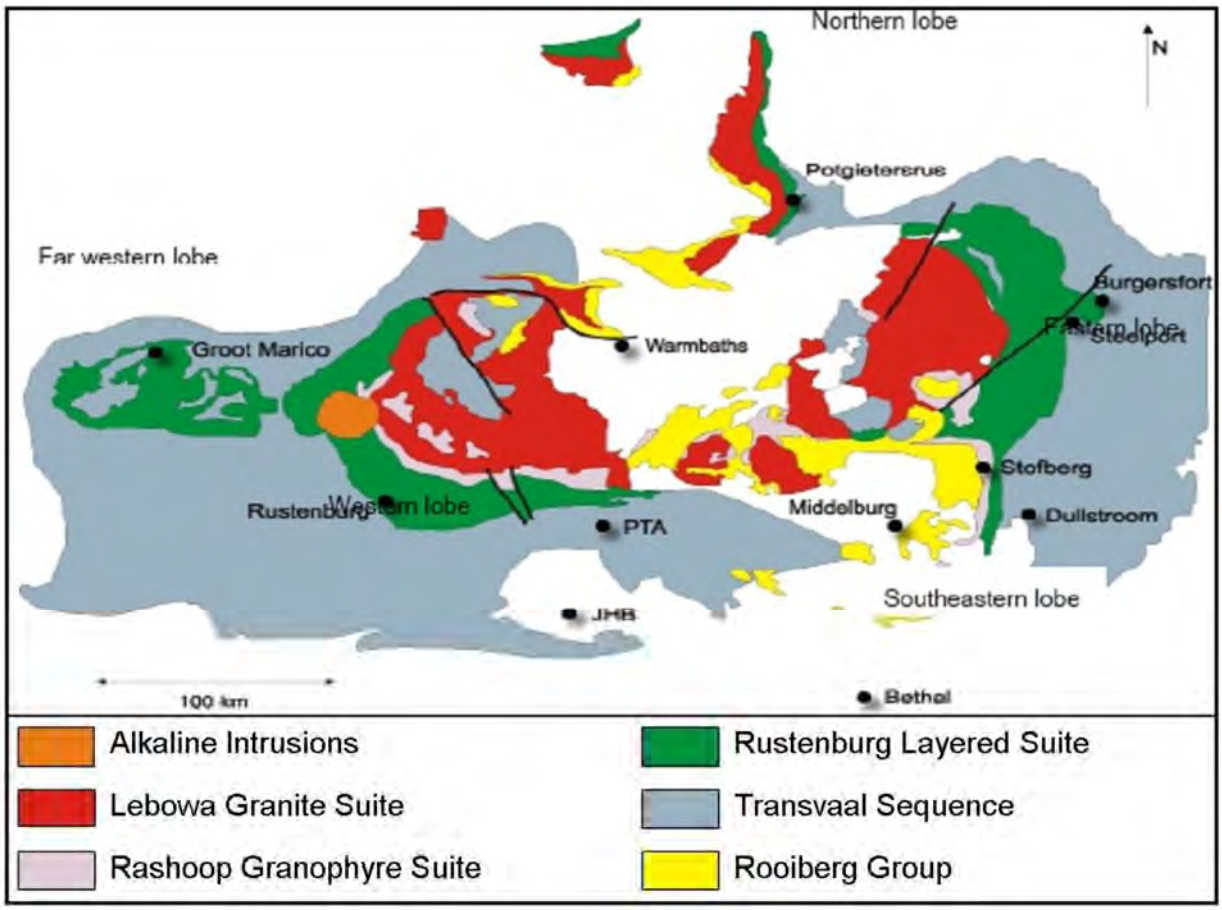

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Figure 10-3: General Geology

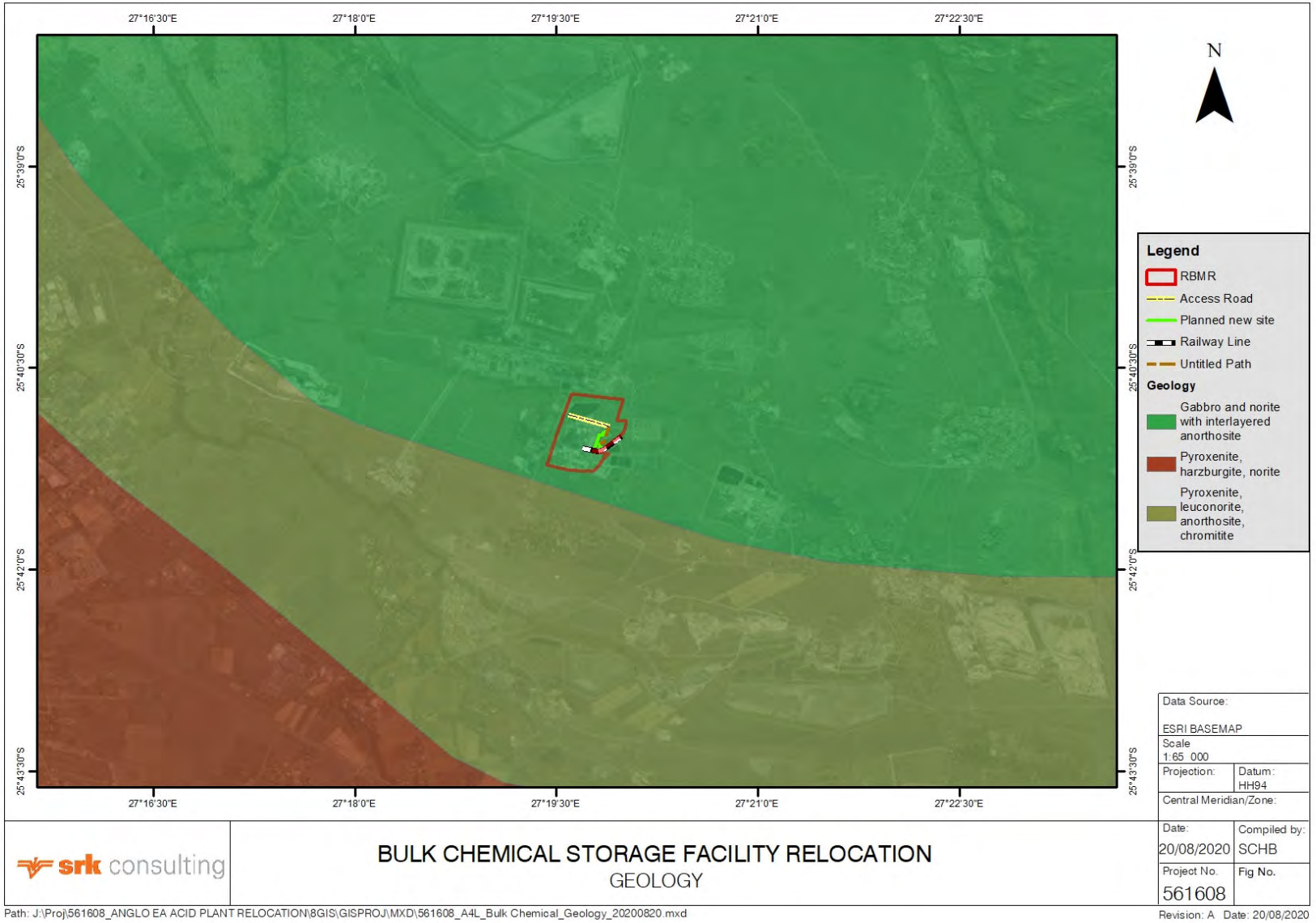

Figure 10-4: RBMR Geology

10.4 Soils and Land-Use and Land capability

The soils of the region are derived from norite which is a mafic rock, rich in basic cations. Generally, the soils are deep, dark brown to black, clayey and have a very coarse blocky or prismatic structure with distinctive slickened sides. Calcium carbonate nodules are abundant throughout the soil profile and on the soil surface. Soils in the wetter areas (along the riverbanks etc.) are generally underlain by gleied material while soils in the drier regions are abruptly underlain by norite. The dominant soil forms in the region are Arcadia and Rensburg. Shallower soils occur between rocky outcrops. These soils show less structure and are better described by the Milkwood form which comprises of the Melanic A (dark, well-structured A) horizon directly overlying unweathered rock.

A study conducted by Clean Stream Environmental Services in 2015 identified a total of 5 soil units; Ar1, Ar2, Ar/R, Hu and R. The soils are classified as moderate to deep clayey loam soils.

The net primary agriculture production is classified as low (4-6%) (Figure 10-5). The area covered by Rustenburg Section is predominantly used for subsistence farming, in the form of ad hoc grazing of the livestock from many of the formal and informal settlements in the area. The remaining land uses consist of mining, residential and to a limited extent, conservation. It must however be noted that the land has already been changed as a result of the construction of the existing RBMR plant. The area where the Bulk chemical storage facility will be located in characterised by plant infrastructure, concrete paving and tarred roads.

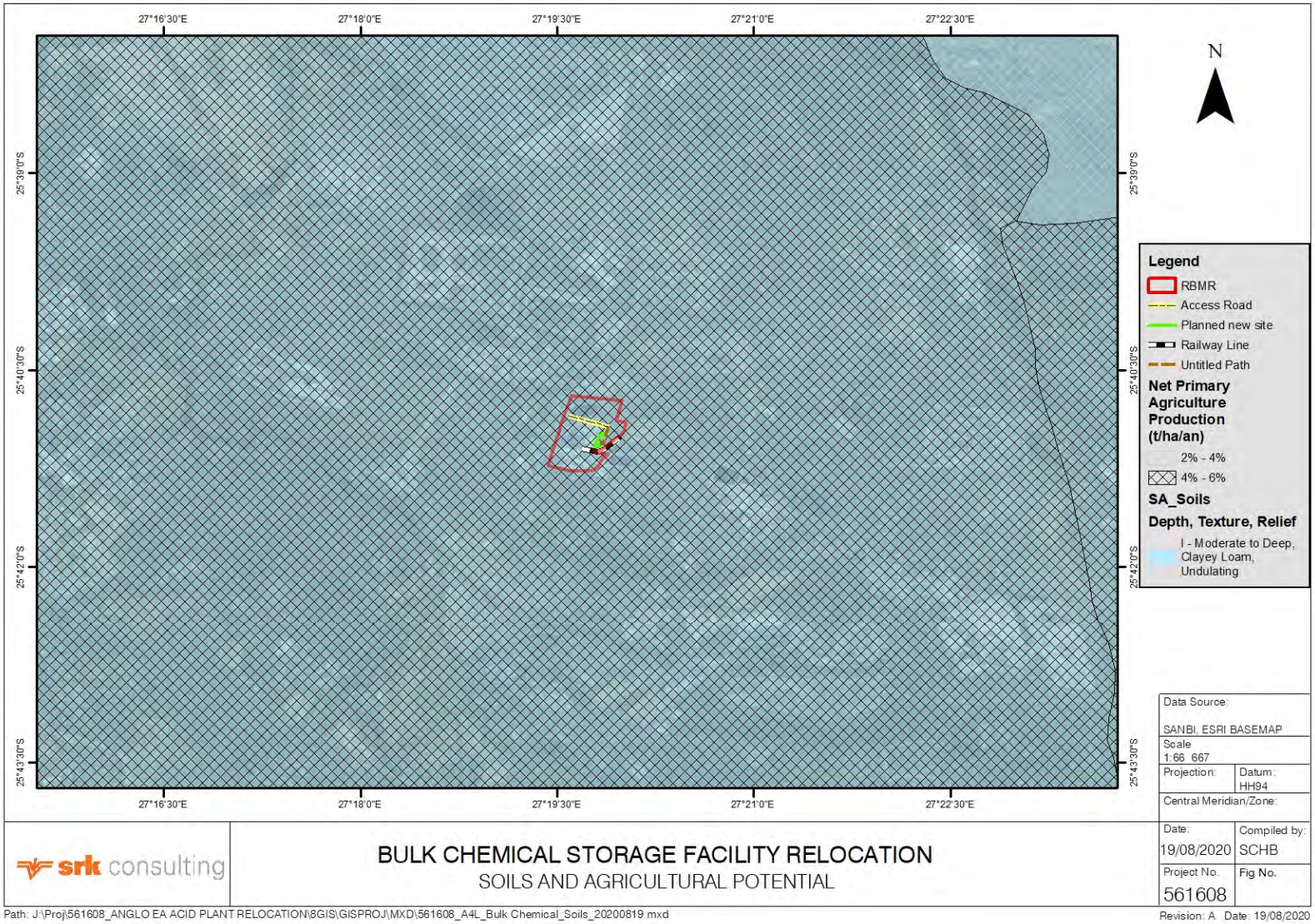

Figure 10-5: Soils

10.5 Air Quality

10.5.1 Ambient Air

The Rustenburg Local Municipality has three ambient Air Monitoring stations that monitors the levels of priority pollutants. The three Air Monitoring stations are situated at Boitekong Library, Reatile Educational Centre at Tlhabane and Marikana at Regional Community Centre. The following pollutants and meteorological parameters are monitored on a continuous basis:

- Pollutants: Sulphur dioxide (SO_2), Nitric oxide (NO), Nitrogen dioxide (NO_2), Nitrogen oxides (NO_x), Carbon monoxide (CO), Ozone (O_3), Particulate matter (PM_{10}) and Particulate matter ($PM_{2.5}$); and
- Meteorological parameters: Wind speed and direction, ambient temperature, relative humidity, atmospheric pressure and global radiation (Rusteburg LM, 2019/2020).

The results from the sampling show that generally there is an improvement in the ambient air in the Rustenburg Local Municipality due to less exceedances recorded.

From an air quality perspective, the winter period, especially June and July offer the conditions necessary for pollution episodes. These months have low rainfall and low temperatures, factors which could create less turbulence and possible atmospheric stability. In the event of such stable atmospheric conditions, pollutants could be trapped degrading air quality. (Rusteburg LM, 2019/2020)

The pollutants and meteorological data monitored by the RLM Air Monitoring network from the Ambient Air Quality 2018 Report indicates the average, maximum and minimum $PM_{2.5}$ daily concentrations as captured in Table 10-1. This information is based on a daily averaged data. No exceedances of the $PM_{2.5}$ daily average NAAQS was recorded during this reporting period. (Rusteburg LM, 2019/2020)

Table 10-1: Data statistics for $PM_{2.5}$ daily average concentrations for the RLM monitoring network stations for November 2018

Station	Particulate Matter – PM2.5 (µg/m³)			
	Average	Max	Min	Date of Max
Boitekong	11.99	23.79	4.65	15/11/2018
Marikana	12.35	22.44	6.88	01/11/2018

The data statistics for the SO_2 daily average data are presented in Table 10-2, which show that no exceedances of the 48-ppb daily guideline were recorded during the 2018 reporting period

Table 10-2: Statistical analysis of the SO_2 daily averaged data November 2018

Station	Sulphur dioxide – SO_2 (ppb)			
	Average	Max	Min	Date of Max
Boitekong	8.64	23.60	0.60	13/11/2018
Marikana	3.03	7.28	0.82	29/11/2018
Reatile	-	-	-	-

10.5.2 Dust

In addition to the stack emissions monitoring, RBMR is also conducting monthly dust fallout monitoring at seven locations around the plant. (Aquatico, 2020)

The results from the latest sampling round are provided in Table 10-3.

Table 10-3: Dust Fallout Sampling Results (July-August 202)

VARIABLE	Dust - Insoluble	Dust - Soluble	Dust - Rate	Dust - Rate	Complies with / exceeds dustfall guideline
UNITS	g/m²/day	g/m²/day	g/m²/day	mg/m²/day	
ASSESSMENT SET	0.6	-	0.6	600	
DB Bokamoso	0.241	0.03	0.271	271	Complies
DB Mfidikwe	0.396	0.036	0.432	432	Complies
DB Photsaneng	0.178	0.027	0.205	205	Complies
DB Thekwane 1	0.046	0.027	0.073	73	Complies
DB Thekwane 2	0.03	0.028	0.058	58	Complies
DB Zakhele	0.163	0.025	0.188	188	Complies

The results show that dust fallout levels in all the monitored areas are below the SANS 1929:2005 Ambient Air Quality evaluation criteria for dust fall out monitoring for residential areas.

10.6 Surface Water

10.6.1 Hydrology and Drainage

Anglo Platinum Limited Rustenburg Base Metal Refiners is situated within the Crocodile West and Marico WMA in the North West Province. The project area is situated within quaternary catchment A22H.

The nearest perennial river to the project site is the Hex River flowing at ±2.5 km on the west of the RBMR. Surface contours show general drainage lines for RBMR moving from southeast towards the northwest discharging surface runoff first into Klipfonteinspruit and later into the Hex River. Drainage lines within RBMR Plant boundary have been modified by mining activities such as mine dumps, access roads, haul roads, surface water impoundments and other mining infrastructure. Hex River flowing in the northerly direction drains into Bospoort Dam situated ±12 km north of RBMR.

10.6.2 Receiving Environment Water Quality

Various continuous, seasonal or event-linked discharges of contaminated process water takes place into seasonal tributaries of the Hex River, which drains the processing areas. The tributaries affected by the Rustenburg Process Division that drain into the Hex River are the Klipfonteinspruit and Klipgatspruit. (Aquatico , 2018/2019)

Raised salinity, calcium, magnesium, sodium, sulphate, chloride, nickel and inorganic nitrogen are indicative of the water type associated with the processing activities of the Rustenburg Process Division, whilst raised ammonium and phosphate in the receiving environment is due to sewage pollution (non-RPM related). The Integrated Water and Waste Management Plan (IWWMP) for Anglo's Rustenburg Process Division recommends that impacted or affected water at the business units in the particular catchments be contained within the operation's dirty water circuit to minimize the pollution potential towards the different streams, and ultimately to the Hex River and Bospoort Dam. Discharges

and seepages of process dams should be prevented, and their freeboard maintained. Water from the process dams should not be allowed to enter the receiving environment untreated as impacted water could contaminate natural watercourses and groundwater. (Aquatico , 2018/2019)

Nitrate and salinity contamination are the most prominent parameters sourced from the processing activities. Additionally, of concern are the salt loads in the receiving environments, particularly chloride, sulphate, sodium and calcium, and the base metal nickel, especially in the Klipfonteinspruit. Although discharges, effluents and dam overflows are kept to a minimum, the groundwater, of which quality is poor in some areas, could contribute to baseflow in rivers. (Aquatico , 2018/2019)

Organic pollution most probably from sewage and industrial effluents is also a hazard in the greater Hex River catchment. Various point and diffuse sources of pollution (most of which are not RPM-related) are suspected to contribute towards the organic and nutrient load of the Hex River. These include sewage discharges from formal and informal settlements and treatment plants. A nutrient impact downstream from Waterval Sewage, which is a Central Services responsibility, on the Klipfonteinspruit is evident although the point of actual discharge is unknown and should be investigated. (Aquatico , 2018/2019)

10.6.3 Receiving environment at RBMR

The upstream locality of RBMR, (Klipfonteinspruit between PMR and RBMR on old road to magazine) was sampled in January, February and April 2019, recording dry conditions throughout the rest of the annual period. The downstream locality of RBMR was sampled throughout the year. The average water quality revealed significant deteriorating conditions from the upstream to the downstream locality at RBMR. Sulphate, fluoride and nickel concentrations revealed the most significant increases and may be as a direct result of process water from the RBMR dams which are dominated by these constituents. (Aquatico , 2018/2019)

10.6.4 Process Water at RBMR

The Process water dams at RBMR are sampled by RBMR staff and samples are then submitted to Aquatico for analysis. Most RBMR pollution control dam samples were submitted throughout the annual period on a quarterly basis. Water quality profiles for most of the sampled dams at RBMR are similar with Sodium (Na) and Potassium (K) as the main contributing cation and sulphate as the main contributing anion. The concentrations (mq/l) were however different between the dams, with on average, acidic water quality being found at K160 and K161, while most other analysed dam samples had alkaline water quality. RBMR dams 3A and 3B (K160 and K161) also recorded significantly high metal concentrations (copper, nickel, etc.). Fluctuating concentrations of TDS and metals were recorded in all samples. (Aquatico , 2018/2019)

A summary of the surface water quality monitoring points is presented in Table 10-4.

Table 10-4: Summary of Surface Water Quality Monitoring Points at RBMR (Aquatico, 2018/2019)

Site Name	Site description	Y-coordinates	X-coordinates
K023	Klipfonteinspruit at base of RBMR dump	-25.67855	27.33039
K028	Klipfonteinspruit after confluence of RBMR west ditch system at Waterval smelter bridge	-25.67849	27.32638
K012	Klipfonteinspruit between PMR and RBMR on old road to magazine	-25.68096	27.34029

Site Name	Site description	Y-coordinates	X-coordinates
K024	Outflow of RBMR Dam 3 stormwater dam	-25.68091	27.32634
K044	Trench to the west of the RBMR dam 3B	-25.68087	27.32612
K059	Culvert at railway entry to RBMR	-25.68543	27.3306
K062	Spillway overflow RBMR stormwater dam 3B	-25.68015	27.32625
K158	RBMR Dam1	-25.68188	27.32676
K159	RBMR Dam2	-25.68163	27.32644
K160	RBMR Dam3A	-25.68157	27.32700
K161	RBMR Dam3B	-25.68034	27.32847
K162	RBMR Triangular Dam	-25.68511	27.33229
K163	RBMR SSSS Dam	-25.68618	27.33532
K187	Trench upstream of RBMR at culvert on access road to South gate	-25.68735	27.32416
K220	RBMR Effluent dam 1	-25.685799	27.331835
K221	RBMR Effluent dam 2	-25.685799	27.331835
K222	RBMR Effluent dam 3	-25.685799	27.331835
K223	RBMR E&S feed dam 1	-25.687804	27.330812
K224	RBMR E&S feed dam 2	-25.687661	27.330610

Figure 10-6 provides the location of the surface water monitoring points at the RBMR.

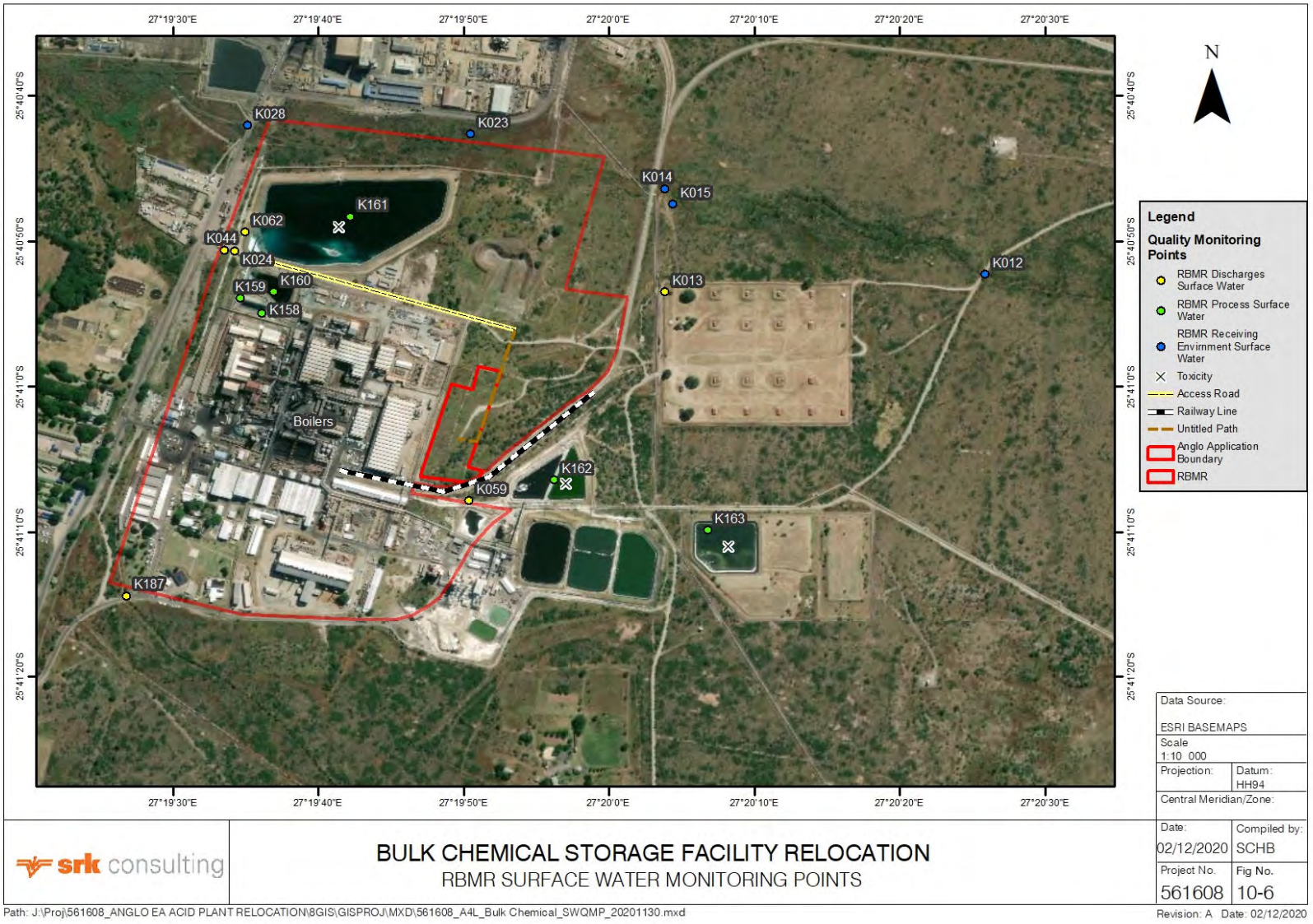

Figure 10-6: RBMR Surface water monitoring points and the major catchment basin

10.7 Geohydrology

Three distributed components of the groundwater system have been identified, of which all three have been affected to some extent. These form part of the lower part of the Main Zone and the Critical Zone of the Layered Bushveld Igneous complex.

10.7.1 Aquifers

There are three aquifer types identified in the RPM-RS lease area that are listed and briefly characterized in Table 10-5. Apart from the floodplain alluvial type aquifers and the deep aquifer system, the remaining aquifers identified are collectively regarded as shallow bedrock aquifers in the weathered zone. In terms of the Parsons Aquifer classification system, the aquifers in the project area are classified as minor or non-aquifers. (Aquatico , 2018/2019)

Table 10-5: Types and characteristics of groundwater systems

Type of aquifer		Main characteristics
Shallow Groundwater systems	Floodplain alluvial aquifers	Restricted to alluvium along the Hex River. Groundwater quality is generally good, water levels between 1 and 10 mbs, yields of up to 10 l/s.
	Shallow bedrock aquifer	Developed in transmissive fractures and grains in shallow weathered zone. Occur most widespread over the lease area in the weathered zone within 25 mbs. Rest water levels 3-20 mbs, qualities generally good (TDS of 450) but can be poor where compartments occur. Yields between 0 to 4 l/s with a mean around 0.3 l/s.
Deep aquifer system		Very heterogeneous, developed in transmissive fractured in the solid bedrock at depths of more than 50 mbs. Rest water levels deeper than 30mbs, qualities generally poor with salinity often in excess of 2000 mg/l TDS.

10.7.2 Groundwater

Groundwater studies have been conducted and a decision was taken to combine and reinterpret all available geohydrological information. Seven boreholes were historically used to monitor groundwater impacts at RBMR. The distribution and number of monitoring boreholes were insufficient during previous monitoring years, after which boreholes were drilled and existing ones were added to the more extensive monitoring programme. A total of 15 boreholes were monitored in the RBMR area during the 2018/2019 monitoring period. A summary of the groundwater monitoring points is provided in Table 10-6 and the monitoring points are shown in (Aquatico , 2018/2019)

Table 10-6: Summary of Groundwater Monitoring Points (Aquatico, 2018/2019)

Site Name	Site description	Y-coordinates	X-coordinates	Monitoring Frequency
BMRWWTW	Downgradient of Waterval treatment works	-25.680378	27.325227	Quarterly
S011	BMR downgradient west towards Klipfonteinspruit	-25.681508	27.325960	Quarterly
S102	BMR downgradient north of north dump towards Klipfonteinspruit	-25.679347	27.331812	Quarterly

Site Name	Site description	Y-coordinates	X-coordinates	Monitoring Frequency
S120	BMR downgradient north of SSS effluent dams	-25.684282	27.332675	Quarterly
S160	BMR downgradient north-east of north dump towards Klipfonteinspruit	-25.679735	27.332518	Quarterly
S230	BMR downgradient of SSS effluent dams	-25.685518	27.335377	Quarterly
S386	BMR upgradient east of BMR rainwater dam	-25.681567	27.329112	Quarterly
S388	Borehole west of BMR magazines	-25.682787	27.333922	Quarterly
S389	BMR upgradient south of north dump	-25.682130	27.332737	Quarterly
S403	BMR downgradient east of SSS effluent dams	-25.685688	27.336937	Quarterly
S405	BMR upgradient south of BMR rainwater dam	-25.681318	27.328167	Quarterly
S409	BMR downgradient north towards Klipfonteinspruit	-25.679103	27.328003	Quarterly
S410	BMR downgradient north-east towards Klipfonteinspruit	-25.679132	27.330390	Quarterly
S418	BMR downgradient northwest of SSS effluent dams	-25.685108	27.331415	Quarterly
NB52	BMR upgradient of SSS effluent dams	-25.689740	27.334303	Quarterly

The larger part of the surface area underlying the actual refinery is lined by concrete surfaces, but historical leaks and dumping caused the formation of a large diffuse source area for contamination. Seepage and leachate formation thus still emanate from the RBMR area and remediation plans target the RBMR as the priority area. The RBMR is situated on the southern banks of the Klipfontein Spruit directly opposite the Waterval Processing area. The groundwater flow and mass transport from the site is northwards in the direction of the Klipfontein Spruit. (Aquatico , 2018/2019)

The annual report on Groundwater Monitoring 2018/2019 Report indicates that significant pollution impacts from the RBMR occur on the groundwater environment. This processing complex consists of a large base metal refinery area with associated effluent dams for storage of process water. The most notable of these are the sodium sulphate solution area to the south-east of the refinery where highly concentrated sodium sulphate solution by-product is treated and dried. The groundwater pollution in this area is by far the dominant impact of the RBMR area as a result of leachate formation as well as seepage from effluent dams where historical liners were not fully impervious. (Aquatico , 2018/2019)

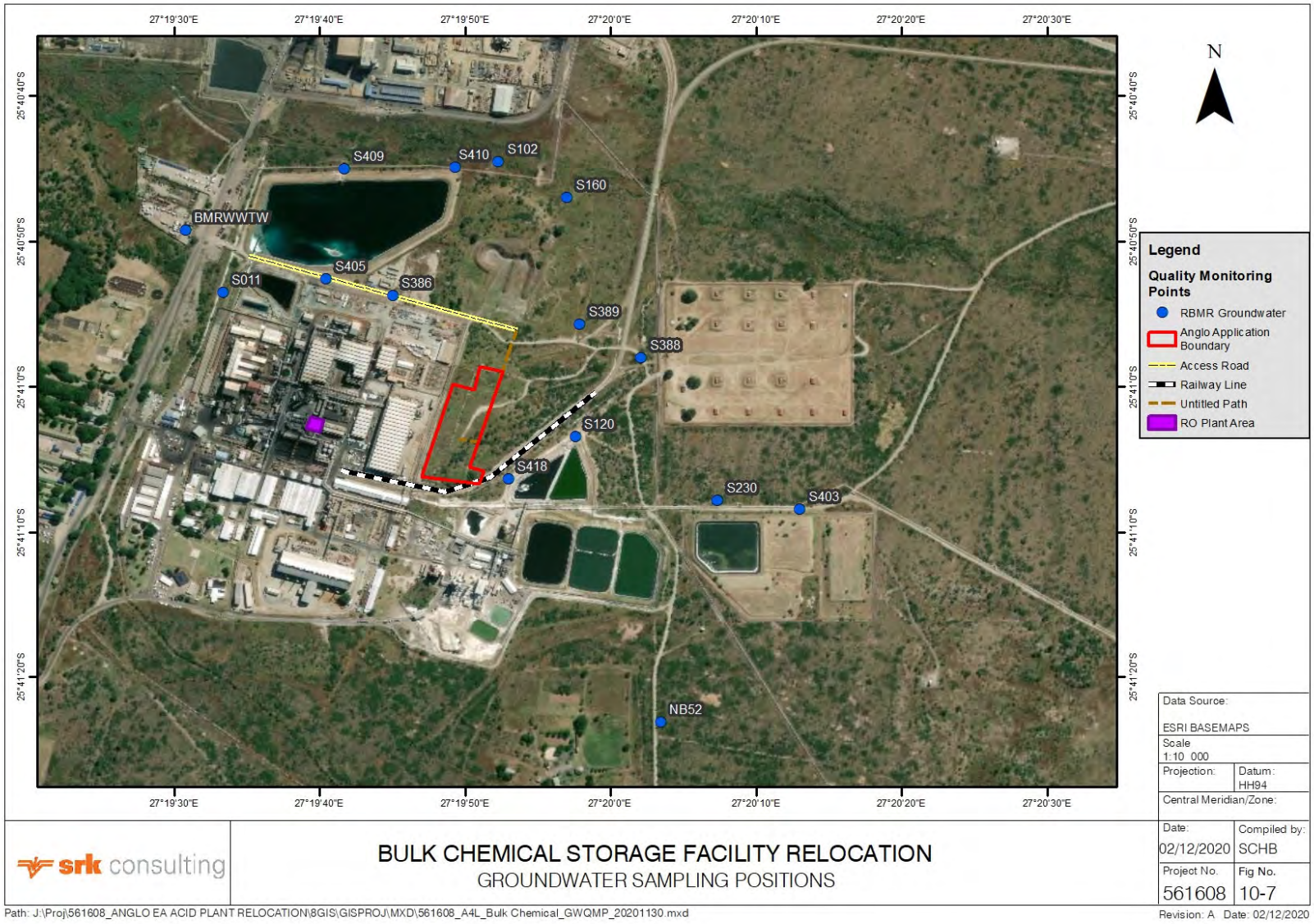

Figure 10-7: Groundwater Sampling Positions

10.7.3 Groundwater Users

Groundwater users at and downstream of the RBMR were identified as follows:

- Domestic and limited agricultural use on farm smallholdings along the Hex River takes place. The source is the Hex River valley aquifer and the UG2 pyroxenite aquifer.
- Historical use (domestic, livestock, and gardens) of groundwater in the townships of Mfidikwe (Klipgat sub-catchment), Kwa Photsaneng (Klipgat sub-catchment) and Thekwane (Klipgat and Paardekraal sub-catchments) was recorded but studies in Mfidikwe and Thekwane during 2007 could not locate any active groundwater use. The source was the shallow weathered bedrock aquifer. The communities indicated that only municipal water is currently being utilised. (Aquatico , 2018/2019)

10.8 Wetlands

According to the South African National Biodiversity Institute (SANBI) National Wetlands database, there are no wetlands associated with the proposed bulk chemical storage facility site (Figure 10-8).

This is supported by a wetlands delineation that was conducted for the Rustenburg Platinum Mines Ltd area, which includes the RBMR area. The delineation found that there are no wetlands associated with or within 500m of the RBMR and the proposed bulk chemical storage facility (SAS, 2015).

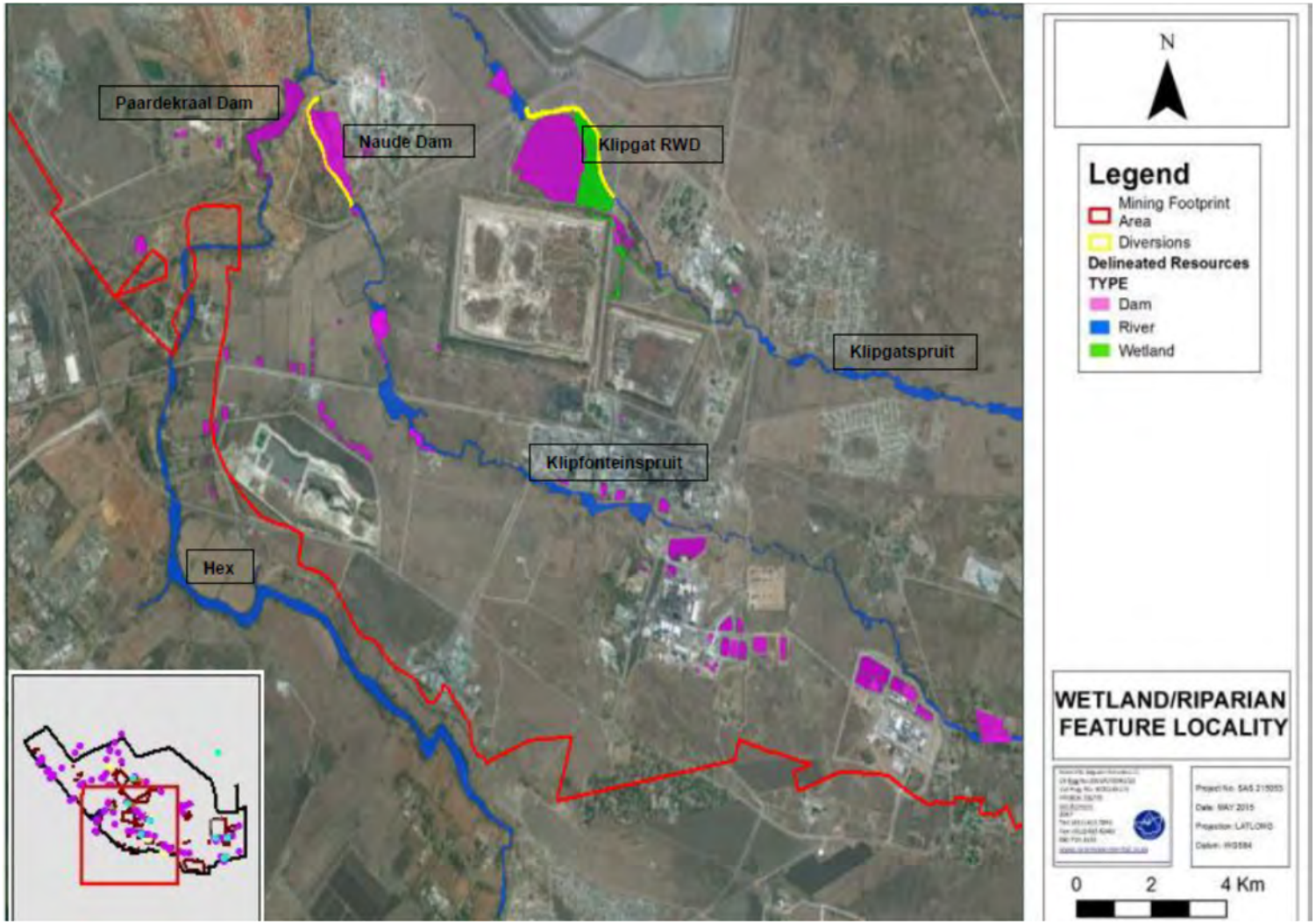

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Figure 10-8: Rivers and Wetlands relating to the Study Area

10.9 Areas of Conservation Concern

Areas of high biodiversity was identified from the North West Province Biodiversity Sector Plan and includes, amongst others, Critical Biodiversity Areas (CBAs) and Ecological Support areas (ESAs). The RBMR is not located on a CBA or ESA and the biodiversity status of the area is classified as hardly protected (Figure 10-9). In addition, there are no protected areas that are located in close proximity to the RBMR.

The affected area where the proposed bulk chemical storage facility will be located is highly disturbed due to the construction and operation of the RBMR.

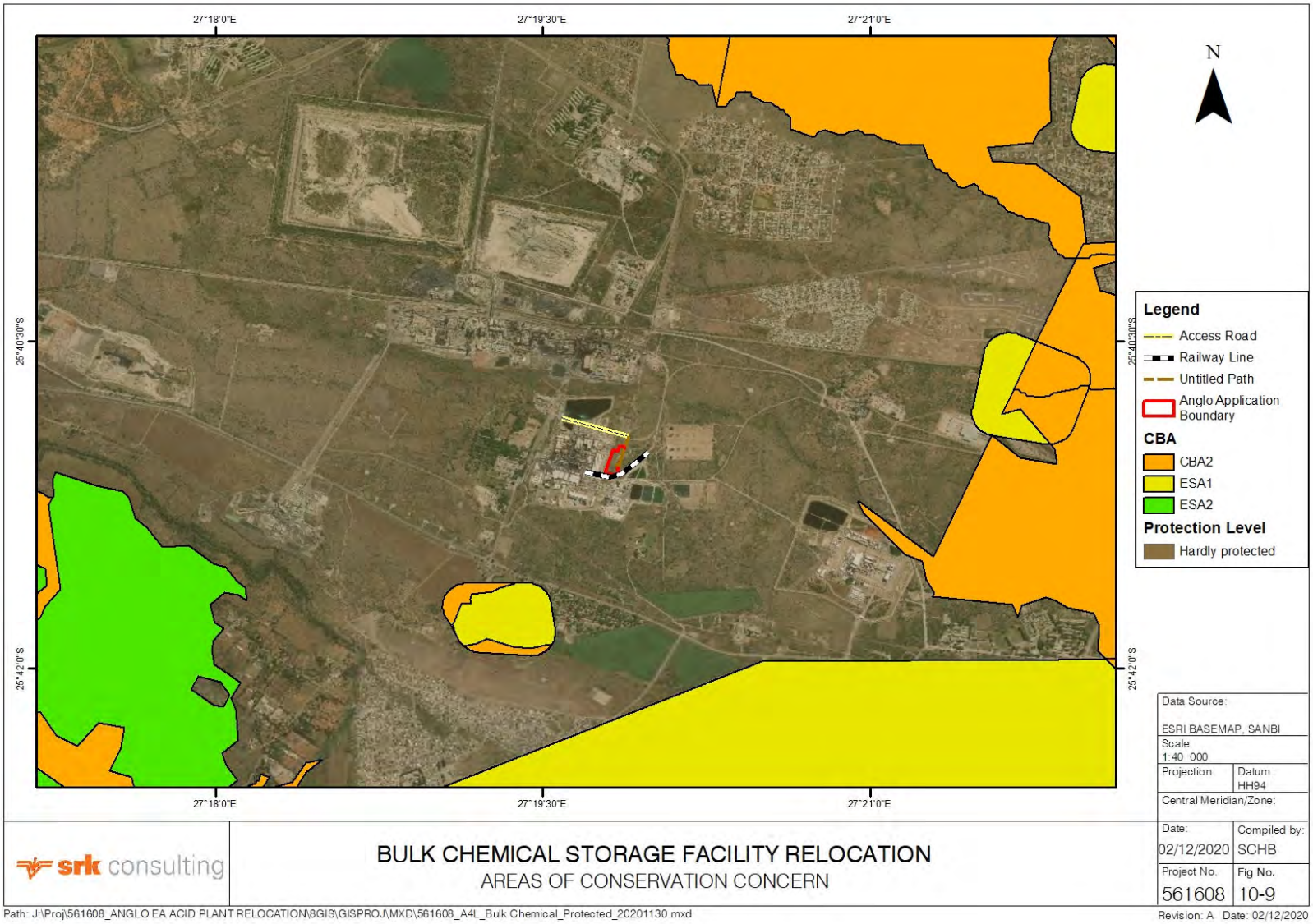

Figure 10-9: Areas of Conservation Concern

10.10 Visual

The project area is located within the jurisdiction of the Rustenburg Local Municipality within the Bojanala District Municipality in the North West Province. Photshaneng and Bokamoso are the closest residential areas, approximately 6.5 km North and North East respectively of RBMR and Rustenburg is the closest town, being approximately 4.9 km North Westerly of the complex.

Due to current operations at RBMR and its associate mines in close vicinity to the proposed chemical storage facility location, it is expected that the facility will not result in any significant additional visual impacts. The impact assessment section of the report includes an assessment of the visual impacts and the EMPr provides for practical mitigation measures that may be implemented to avoid and/or minimise the impacts.

10.11 Biodiversity

A specialist was appointed to undertake a biodiversity assessment. The study found that overall, the habitat within which the study area is located is typical of an peri-urban setting and includes built-up areas (industrial, commercial and for human settlement), degraded areas that support a high abundance of Alien And Invasive Plant (AIP) species, agricultural fields, and some patches of natural veld. These anthropogenic areas reduce the potential for important landscape processes, such as fire and migration, to operate. The study area itself comprises of what appears to be an old Waste Rock Dump (WRD), established 1975, and is moderately vegetated by medium-height microphyllus (i.e. fine-leaved) acacias. Adjacent to the WRD is an open grassland with stormwater infrastructure interspersed which was installed to manage drainage in 2011 (STS, 2020).

The study area falls within the Marikana Thornveld vegetation type (listed as endangered in Mucina and Rutherford, 2006), i.e. the reference state. Mucina and Rutherford (2006) describe the Marikana Thornveld as Open Vachellia karoo woodland, occurring in valleys and slightly undulating plains, and some lowland hills. The remaining patches of natural veld within the study area have, however, been exposed to various historic and ongoing impacts/disturbances, rendering the remaining savanna a poor representative of the reference state. The historic and ongoing impacts/disturbances were identified as follows:

- Clearing of vegetation on several separate occasions but notable transformation occurred throughout the study area;
- Waste Rock Dump established in 1975;
- Historic alteration of the degraded grassland through earthworks and stormwater infrastructure establishment;
- Encroachment of woody species (both indigenous and alien); and
- Long-term fragmentation of the study area from source populations necessary for proper re-establishment of vegetation and of animal species. This fragmentation comprises the construction of buildings and major roads around the study area.

Within the anthropogenically altered landscape, conditions for fauna and flora are suboptimal due to a lack of suitable habitat and habitat fragmentation. Ongoing anthropogenic activities within and around this habitat unit have pushed out populations of species that would normally be expected to occur in such an area.

10.11.1 Habitat Unit Identification and Sensitivity Analysis

During the field assessment, three floral habitat units were identified within the study area, namely the Transformed Habitat, Degraded Thornveld Habitat and Degraded Grassland Habitat as shown in Figure 10-10. These habitat units are considered a single unit for the fauna, namely, Degraded Habitat. The study area is situated within an area that comprises peri-urban development with mining infrastructure surrounding the study area. Only a small corridor to the north exists which is fenced from other natural areas. Within the study area the habitat has been exposed to various historic disturbances, resulting in degraded habitat with generally low floral and faunal abundance and diversity. Much of the study area is dominated by species associated with disturbance, including alien and invasive plants (AIPs). Faunal assemblages within the area composed of commonly occurring and widespread species that have adapted to the peri- urban surroundings.

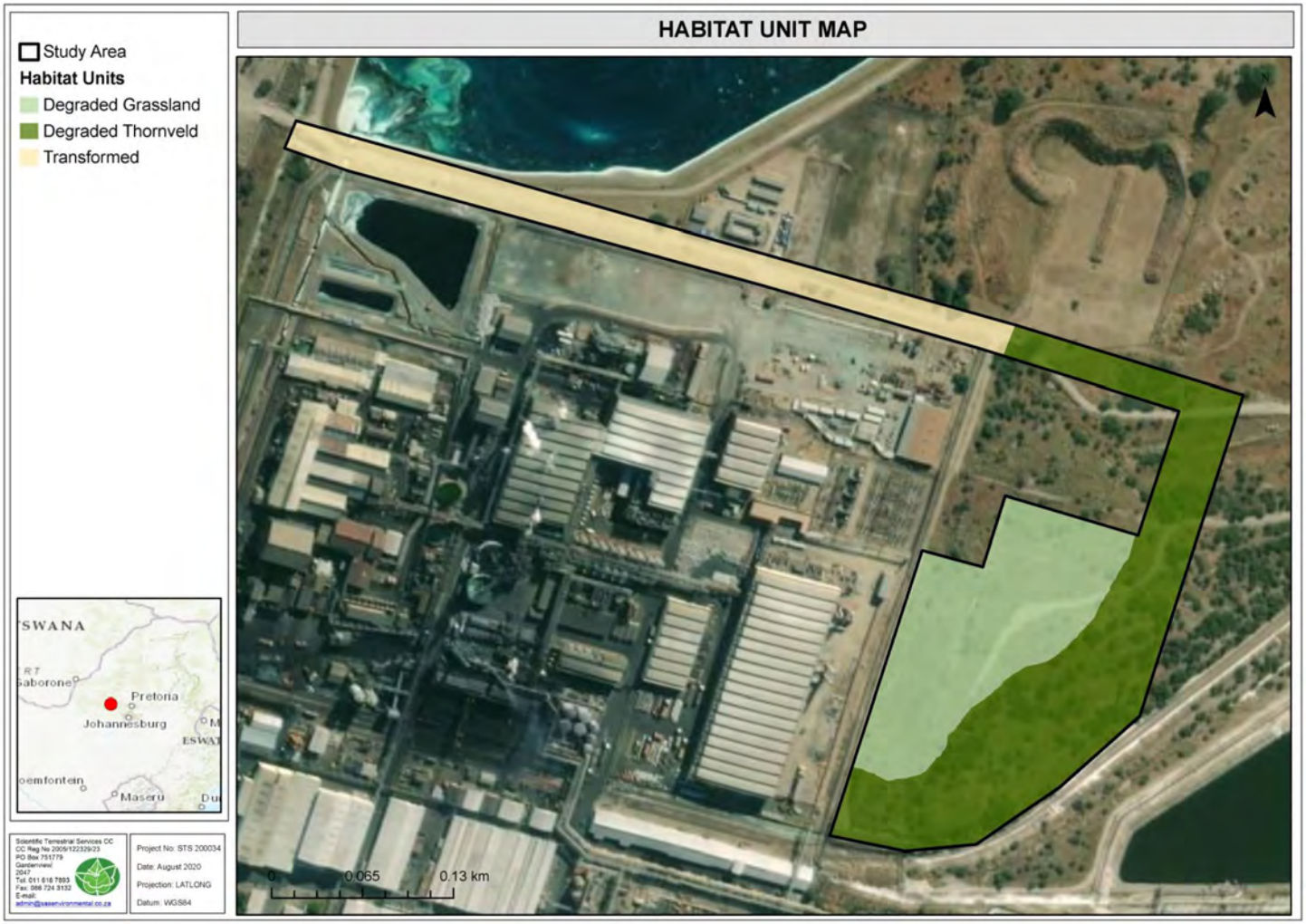

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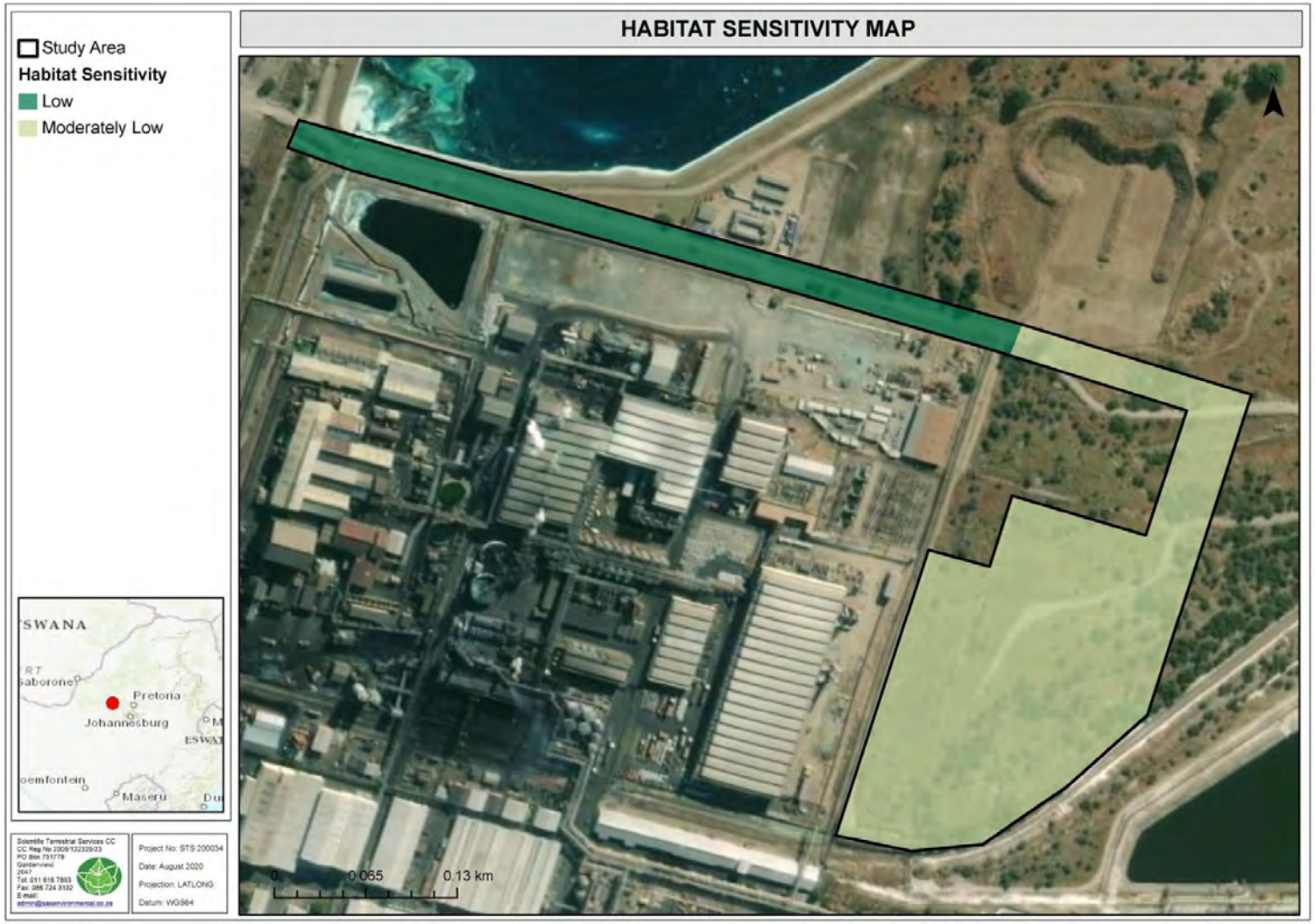
Figure 10-10: Habitat Units associated with the study area (STS, 2020)

A biodiversity sensitivity assessment was conducted and the area's ecological sensitivity – depicting a combined fauna-flora sensitivity was mapped (Figure 10-11). The areas are depicted according to their sensitivity in terms of the presence or potential for SCC, habitat integrity and levels of disturbance, threat status of the habitat type, the presence of unique landscapes and overall levels of diversity.

Table 10-7 presents the sensitivity of each identified habitat unit along with an associated conservation objective and implications for development.

Table 10-7: A summary of the sensitivity of each habitat unit and implications for development (STS, 2020)

Habitat Unit	Sensitivity	Conservation Objective	Development Implications
Degraded Thornveld and Degraded Grassland Habitats	Moderately Low	Optimise development potential while improving biodiversity integrity of surrounding natural habitat and managing edge effects.	This habitat unit is of moderately low ecological importance and sensitivity due to the level of historic habitat modification and the high degree of fragmentation limiting the potential for fauna and flora to augment the habitat. The likelihood of a high abundance and diversity of faunal species utilising these areas is low, with the potential for indigenous plants to flourish also being low. Lastly, no floral or faunal SCC are expected to occur on the site. Development within the anthropogenically altered landscapes will have a low impact on native faunal and floral biodiversity; however, were development to proceed, edge effects would need to be mitigated – most notably the spread of AIP species. It is advised that an AIP management plan be implemented to control the spread of listed invaders.
Transformed	Low	Optimise development potential.	This habitat unit is of low ecological importance and sensitivity and development related activities are unlikely to have any significant impact on the faunal community. This portion of the study area is an existing road and road verge which offer little value in terms of faunal habitat and do not provide important ecoservices or functions.



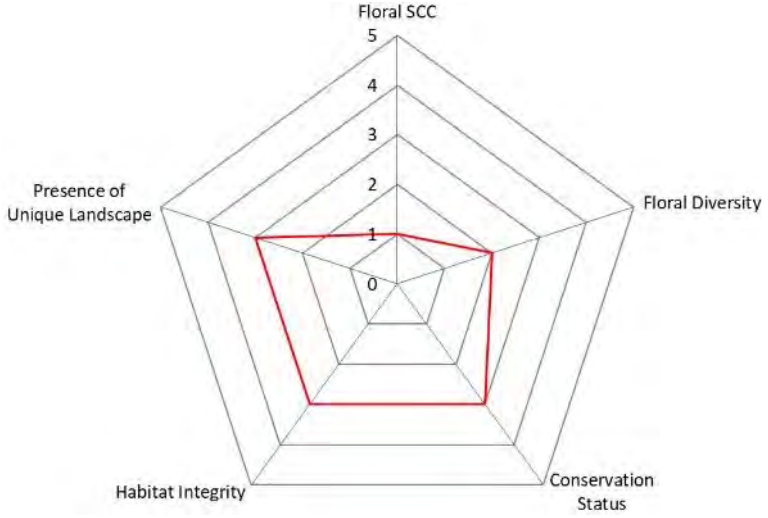
srk consulting	ANGLO PLATINUM'S RBMR BULK CHEMICAL STORAGE FACILITY HABITAT SENSITIVITY	Project No. 561608

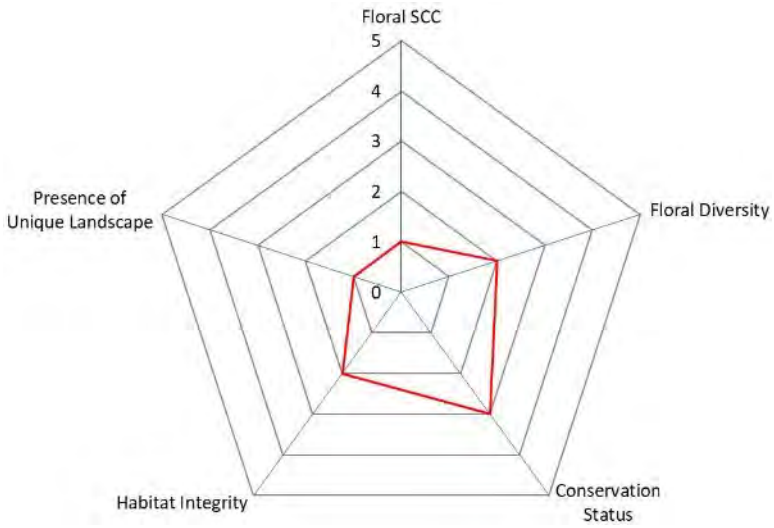
Figure 10-11: Habitat sensitivity map for the study area (STS, 2020)

10.11.2 Floral Assessment

A summary of the floral assessment is presented in Table 10-8.

Table 10-8: Floral Assessment Results (STS, 2020)





REPRESENTATIVE PHOTOGRAPHS AND SENSITIVITIES OF THE GRASSLAND HABITAT WITHIN THE STUDY AREA

Degraded Thornveld

Degraded Grassland with encroaching AIPs

Representative Photos:

Left: Degraded Thornveld and areas encroached by *Dichrostachys cinerea* (Sickle bush). Right: Photos representative of the degraded grassland. Hardened surfaces can be seen.

SCC Discussion

During the field assessment, no floral SCC were recorded within the study area. Activities associated with earthmoving, railway construction, WRD establishment and water management installation has potentially destroyed potential habitat for the establishment and persistence of SCC on the site. The absence of suitable dispersal corridors, as a result of peri-urban development, together with the removal of many dispersal agents has significantly reduced the potential of SCC re-establishment and persistence. Habitat for floral species within the anthropogenically modified landscape has been modified to the extent where the likelihood of SCC establishment is low.

Ecological Discussion

From a floral perspective, the Degraded Grassland Habitat and Degraded Thornveld Habitat Unit have been exposed to several historic disturbances resulting in sub-optimal habitat conditions, decreased habitat integrity and a low species diversity. This is evident when comparing the identified habitat units to reference vegetation type, which is expected to be species rich. The degraded nature of the study area thus supports species that favor disturbed conditions, e.g. alien and invasive species such as *Melia azedarach* (NEMBA Category 1b), *Tecoma stans* (NEMBA Category 1b), *Tipuana tipu* (NEMBA Category 3), *Agave sisalana* (NEMBA Category 2), *Cereus jamacaru* (NEMBA Category 1b), *Argemone ochroleuca* (NEMBA Category 1b), *Flaveria bidentis*, as well as native weedy species such as *Tagetes minuta* and *Sesbania bispinosa* which have established within the study area. Although the study area supports a small number of indigenous trees, the habitat units are mostly homogenous throughout supporting an overall low species richness of indigenous species.

The proposed development is likely to have an impact on the overall functioning of the system. The major mechanisms which drive the development and maintenance of savanna's are fire and herbivory, the suppression of these factors on the surrounding vegetation will impact the overall functioning of the system. Furthermore, the fragmented nature of the study area and the absence of suitable dispersal corridors and reduced abundance of faunal dispersal agents will limit the rate at which vegetation re-establishes within the study area.

Business Case and Conclusion:

The overall sensitivity of the floral habitat units is moderately low. Anthropogenic activities and proliferation of alien plant species have resulted in the degradation of the available habitat and the proposed development is not deemed likely to have significant negative impacts on the species poor floral assemblages. Although habitat modifications have occurred vegetation has re-established relatively well although species diversity remains low. Regardless, it is imperative that the development footprint be restricted to the approved demarcated area, and edge effects strictly managed so as to limit the impact on the surrounding natural vegetation.

Important considerations:

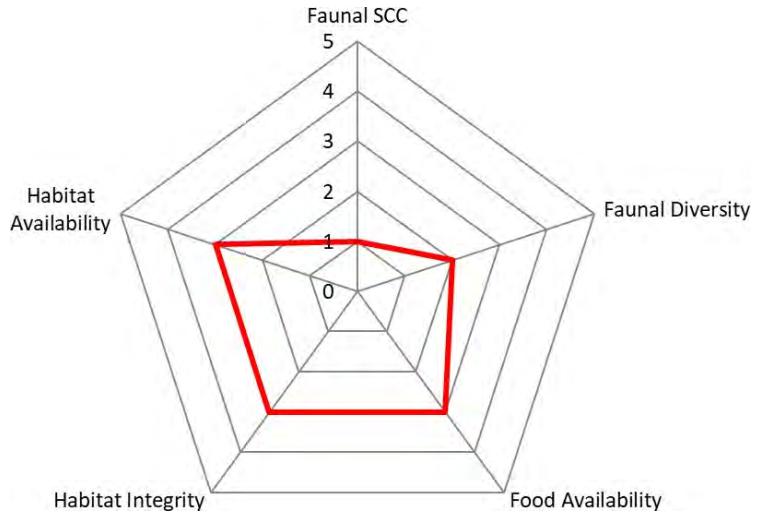
- Several AIPs occur within the study area of which some species are listed as NEMBA category 1b and NEMBA category 3. The NEMBA regulations do not require that Category 3 species be removed but rather that further planting, propagation, or trade of these species is prohibited. It is still recommended that these species be monitored to ensure they do not spread to adjacent areas where they do not yet occur. Category 1b species require compulsory control;
- The proposed development is unlikely to significantly impact SCC species as none were found in the study area; however, species may disperse and establish within the study area. It is therefore recommended that if any SCC (as identified in section 4.3) are found within the footprint area they should be rescued and relocated by a suitably qualified specialist and either relocated to suitable habitat (outside the development footprint) within the study area, or moved to registered nurseries such as the Agricultural Research Council (ARC) or the South African National Biodiversity Institute (SANBI); and
- According to the North West Biodiversity Sector Plan the study area is not considered to be of importance and no conservation status has been issued.

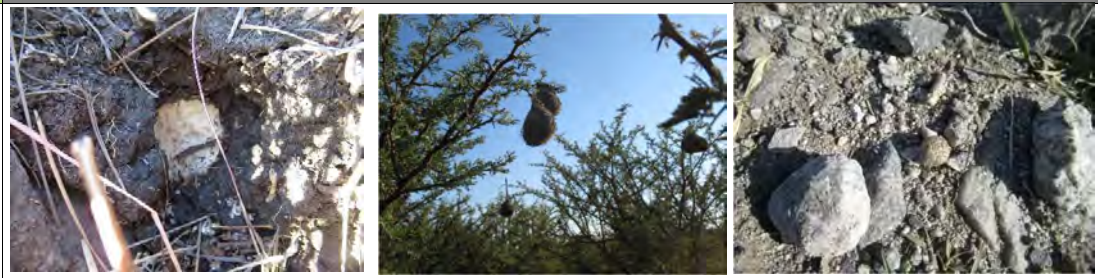
10.11.3 Faunal Assessment

A summary of findings from the faunal assessment is presented in Table 10-9.

Table 10-9: Faunal Assessment Results (STS, 2020)

Degraded Habitat Sensitivity	Moderately Low	FAUNAL SPECIES OBSERVED DURING THE FIELD ASSESSMENT





Left - Evidence of a rodent feeding on a tubor. Middle - *Pleceus velatus* (Southern Masked Weaver) nests and Right - *Lepus saxatilis* (Scrub Hare) dropping

Left - *Cisticola lais* (Wailing Cisticola). Middle - *Pachydactylus affinis capensis* (Thick-Toed Gecko) and Right –Hairy Darkling Beetle (Tenebrionidae).

SCC Discussion

No faunal SCC were encountered during the field assessment, and the probability of any such species utilising the study area is highly unlikely as habitat within the study area is historically transformed and currently degraded and highly fragmented providing unsuitable habitat to support faunal SCC. The study area is almost completely fenced-off from the surrounding natural areas where suitable habitat for SCC could occur, thereby limiting the potential for these species to utilise the study area.

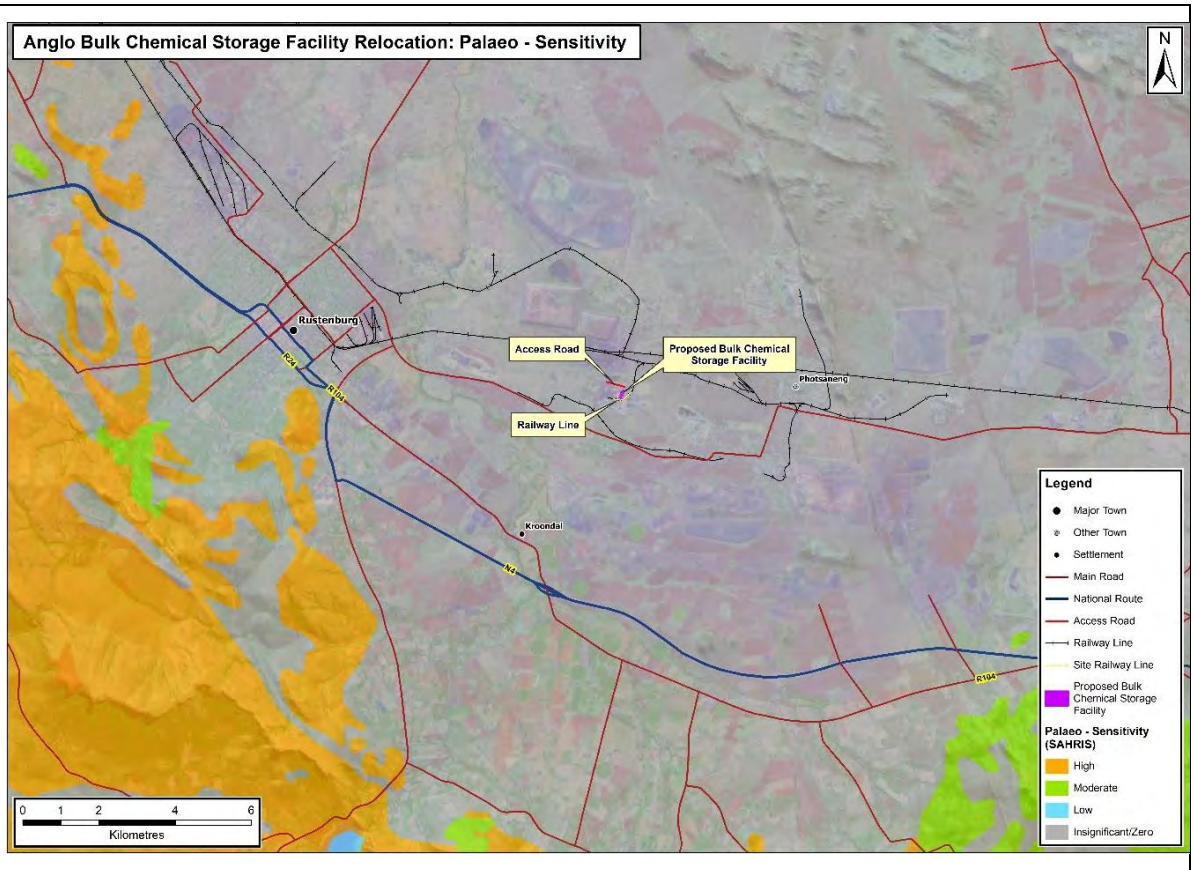
Ecological Discussion
Faunal species diversity within the study area was moderately low due to the highly fragmented nature of the habitat and the large-scale transformation which surrounds the area. Species observed were limited to common and widely occurring species known to survive in areas of decreased sensitivity that have integrated well into peri-urban environments. Limited potential for important landscape processes such and fire and herbivory to occur exists due to this peri-urban setting, nor is this location considered an ecological support area. This area lacks potential as a location for faunal conservation due to its degraded nature. The habitat within the study area is fragmented and isolated (fenced-off) from surrounding natural habitat via man-made barriers such as railway tracks, built-up areas and wired fences. These barriers influence the presence of expected fauna – although this applies mostly to larger mammal species. Smaller mammals can move through fences to inhabit the study area, e.g. the burrows of rodents were observed on site. Mammal species also likely to utilise the study area for foraging include *Herpestes sanguinea* (Slender Mongoose), whilst species such as *Lemniscomys rosalia* (Single-striped Grass Mouse) and *Mus musculus* (House mouse) are likely to permanently reside and forage within the study area. The Degraded Grassland Habitat is more suitable for granivorous species as the dense, patchy graminoid layer produces an abundance of seed. The Degraded Thornveld would have been favoured by mammals and avifauna as the more complex structure offers both opportunity for foraging and shelter. Rocky areas where boulders were stacked along the WRD offer reptiles suitable shelter and basking areas. The Degraded Grassland Habitat is also expected to harbor a low diversity of common reptilian species. Reptile species that may occur within the study area are likely to be the more common, non-threatened species that are mobile enough to migrate to more suitable refugia within areas surrounding the study area or which are well adapted to inhabiting human dominated and developed areas. No amphibian species were encountered during the field assessment and due to the lack of any wetland, riparian or suitable water habitat within the study area it is unlikely that any notable amphibians occupy the study area.
Business Case and Conclusion:
The overall sensitivity of the faunal habitat associated with the study area was considered moderately low, based on habitat and food availability. The faunal habitat has been altered as a result of historic and ongoing mining activities and the establishment of a railway line adjacent the site. The impact that the proposed development will have on faunal habitat, diversity and SCC, is not considered detrimental, due to the lack of sensitive species and/or habitat to harbor sensitive and range-restricted species. Several sections within the study area have been compromised by the proliferation of AIPs. To prevent further habitat loss for fauna in any adjacent natural areas, it is recommended that an alien and invasive control plan be implemented for the study area during construction activities. It is important that cleared alien plants not be dumped within the adjacent habitat.

10.11.4 Species of Conservation Concern (SCC)

No floral or faunal Species of Conservation Concern (SCC) were noted and none are expected to occur within the study area. There are several floral SCC which have a low probability of occurring on the site. These species are provincially important and if found should be rescued and relocated to similar habitat within the study area before any construction commences. The rescue and relocation must be under the supervision of a qualified specialist and relocation should be to suitable, similar habitat near its original location, but outside of the development footprint. No faunal SCC were encountered during the field assessment within the study area. It is furthermore considered unlikely that any faunal SCC will permanently utilise the study area, due to the location of the study area within a peri- urban setting and the limited habitat and food resources necessary to support expected faunal SCC.

10.12 Heritage Resources

According to the Heritage Scoping Assessment, the project area is predominantly underlain by geological layers comprising the Bushveld Complex (Johnson, et al., 2006). These layers are comprised of intrusive igneous rocks and are of zero or insignificant palaeontological sensitivity[2] (SAHRA, 2013). Figure 10-12 presents the palaeontological sensitivity of the area within which the Project is located, adapted from the South African Heritage Resources Information System (SAHRIS) Palaeosensitivity Map (PSM).



srk consulting	**ANGLO PLATINUM'S RBMR BULK CHEMICAL STORAGE FACILITY** PALAEONOLOGY	Project No. 561608

Figure 10-12: Palaeontological Context of the Project

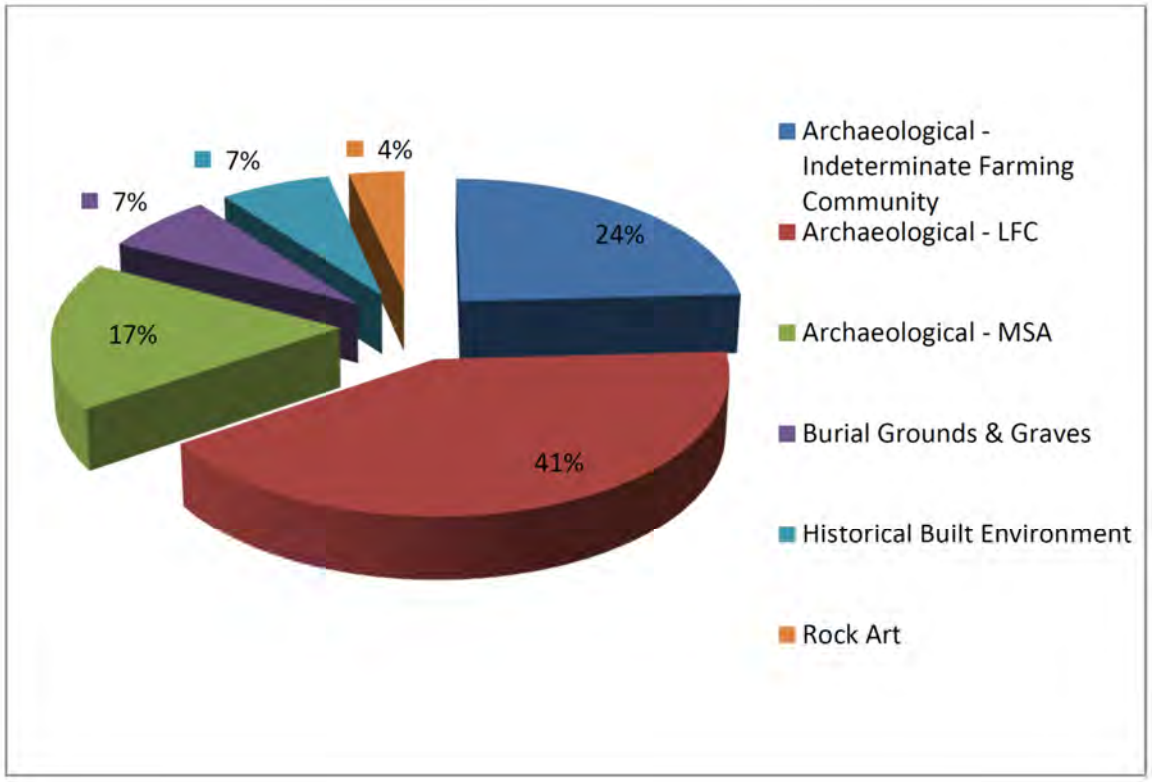
The cultural heritage baseline description considered the predominant cultural landscape based on the identified heritage resources within the regional and local study area. Table 10-10 presents the broad timeframes for the major periods of the past in South Africa.

Table 10-10: Archaeological Periods in South Africa

The Stone Age	Early Stone Age (ESA)	2 million years ago (mya) to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era[3])
Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period		1500 CE to 1994 (Behrens & Swanepoel, 2008)

In total, 29 heritage resources were identified in the literature applicable to the regional, local and site-specific study areas. Figure 10-13 presents the breakdown of the identified heritage resources in terms of the archaeological periods. The predominant tangible heritage resources recorded in the area under consideration demonstrate affiliations with Farming Community Period, particularly the LFC and including one expression of rock art linked to this time period. This notwithstanding, expressions of the MSA and historical period (including burial grounds and graves and the historical built environment) have been recorded in the greater study area.

This section defines the cultural landscape through providing a brief description that offers the reader contextual information, as well as assists the identification of potential risks and impacts to the heritage resources.



srk consulting	**ANGLO PLATINUM'S RBMR BULK CHEMICAL STORAGE FACILITY** REGIONA HERITAGE CONTEXT	Project No. 561608

Figure 10-13: Heritage Resources Identified within the Regional Study Area

The Stone Age in southern Africa comprises three broad periods, namely the ESA, MSA and LSA. These periods are characterised by the lithic tools and material culture produced by the various hominid species through time.

The ESA occurred between 2 mya and 250 kya. Lithics from this period comprise predominantly of large hand axes and cleavers made of coarse-grained materials (Esterhuysen & Smith, 2007). These tools are associated with *Australopithecus* and early *Homo* hominid species.

The MSA dates between approximately 300 kya and 20 kya. High proportions of minimally- modified blades, created using the Levallois technique, the use of good quality raw material and the use of bone tools, ochre and pendants characterise the early MSA lithic industries (Clark, 1982; Deacon & Deacon, 1999). These tools were made and used by archaic *Homo sapiens.*

The LSA dates from approximately 40 kya to the historical period. LSA lithics are specialised as specific tools each have specific uses (Mitchell, 2002). Assemblages from this period commonly include diagnostic tools such as scrapers and segments and may include bone points as well.

A review of the available literature demonstrated that the regional study area contains few expressions of the Stone Age (five records or 17% of the previously identified heritage resources). All these records represent the MSA and occur as scatters of artefacts and one isolated lithic (Huffman & Schoeman, 2002; Higgitt, et al., 2015).

The farming community period correlates to the movements of Bantu-speaking agro- pastoralists moving into southern Africa. Heritage resources associated with this period, specifically the LFC, were recorded in the regional study area. The 20 resources representing the LFC and indeterminate farming

community period combined account for 69% of the identified heritage resources in the regional study area. These heritage resources occur as:

- Artefact scatters including decorated and undecorated pottery, grinding stones and hammer stones (van Schalkwyk & Pelser, 1999; Higgitt, et al., 2015);
- One instance of Rock Art engravings (Huffman & Schoeman, 2002); and
- Stonewalling of varying complexity, both with and without additional archaeological artefacts (van Schalkwyk & Pelser, 1999; 2001; Huffman & Schoeman, 2002; Coetzee, 2008; WITS, 2010; Higgitt, et al., 2015).

Archaeological material cultural remains serve as tangible markers of previous occupation. The most visible indicators include ceramics and stonewalling. Stonewalling is the most visible and easily identifiable indicator of occupation. Several variations based on construction technique, coursing, height, shape and internal divisions are known to occur within southern Africa (Huffman, 2007).

Molokwane type settlements are most commonly identified in the literature applicable to the area under consideration. These types of settlements are characterised by:

- Multiple arcs in the outer wall delineating the back courtyards of individual households surrounding a core;
- Small livestock kraals between cattle enclosures and front courtyards; and
- Daga houses in the centre establishing bilobial arrangement of households.

Table 10-11: Stonewalling types within the regional study area

Central Cattle Pattern			
Moor Park Cluster		**Ntsuanatsatsi Cluster**	
Moor Park	14^{th} to 16^{th} century	Type N	15^{th} to 17^{th} century
Melora	16^{th} century onwards	Badfontein / Bokoni	16^{th} century
Kwamaza	18^{th} century to historic period.	Doornspruit	19^{th} century
		Klipriviersberg	19^{th} century
		Type V	19^{th} century
		Molokwane	
		Type Z	19^{th} century
		Type B	19^{th} century
		Tukela	19^{th} century

Ceramics were an active part of cultural group dynamics, providing a social function through conveying symbols and metaphors. Because of this, archaeologists can use ceramics to show a relative cultural-historical temporal sequence to recognise ceramic users in the archaeological record (Huffman, 2007). Ceramic classification is universally used by archaeologists to establish relative cultural-historical temporal sequences within southern African Farming Communities. In this way, relative dates can be assigned to sites, as well as inferring tenuous cultural similarities or associations.

Table 10-12: Ceramic facies within the local study area

Facies	Period	Characteristics
Ntsuanatsatsi	1450 - 1650 CE	Broad stamping in the neck and stamped arcades on the shoulder. Appliqué.
Uitkomst	1650 – 1820 CE	Stamped arcades, appliqué and blocks of parallel incisions. Also includes stamping and chord impressions.
Rooiberg	1650 – 1750 CE	Stamped rim band and a mixture of stamped and incised bands with arcades and triangle in the neck.

The historical period is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is artificial, as there is a large amount of overlap between the two.

The town of Kroondal is approximately 10 km away from the town of Rustenburg. Kroondal was established in 1843 on the farm Kronendal (which is now also known as Kroondal) (Tourism North West, 2020). The farm was registered in 1858 in the name Jan Michiel van Helsdingen. A German Lutheran mission was established on the farm. When the mission society could not afford to pay maintenance for anyone but the missionaries, workers left the mission station and settled nearby as independent farmers. The town was surveyed in 1889 and the school was established in 1892.

Rustenburg was originally settled in the 1840s by burghers led by Andries Pretorius (Tourism North West, 2020). The town was founded in 1851 and is the third oldest town within the former Transvaal Province.

Within the literature survey, four records of historical resources were identified. These resources account for 14% of the identified heritage resources. These resources occur as:

- Two instances of individual graves (van Schalkwyk & Pelser, 1999; 2001); and
- The historical built environment, including structural remains and the historical townscape of Kroondal (van Schalkwyk & Pelser, 1999).

10.13 Socio – Economical Environment

This site falls within the Bojanala Platinum District and Rustenburg Local Municipality (RLM). The RLM accommodates about 16% of the provincial population, and it is estimated that it will in future experience significant population growth (up to 32.9% of the provincial population growth). Rustenburg town represents the centre of population concentration, employment opportunities and shopping opportunities. This attracted urban development towards the town. With 645 000 people, the Rustenburg Local Municipality housed 1.1% of South Africa's total population in 2017. Based on the present age-gender structure and the present fertility, mortality and migration rates, Rustenburg's population is projected to grow at an average annual rate of 1.7% from 645 000 in 2017 to 700 000 in 2022 ((Rusteburg LM, 2019/2020).

The primary sector consists of two broad economic sectors namely the mining and the agricultural sector. Between 2007 and 2017, the agriculture sector experienced the highest growth in 2017 with an average growth rate of 43.3%. The mining sector reached its highest point of growth of 19.5% in 2015. The agricultural sector experienced the lowest growth for the period during 2015 at -18.2%, while the mining sector reaching its lowest point of growth in 2014 at -13.0%. Both the agriculture and mining sectors are generally characterised by volatility in growth over the period (Rusteburg LM, 2019/2020).

The secondary sector consists of three broad economic sectors namely the manufacturing, electricity and the construction sector. Between 2007 and 2017, the manufacturing sector experienced the highest growth in 2010 with a growth rate of 3.6%. The construction sector reached its highest growth in 2007 at 14.6%. The manufacturing sector experienced its lowest growth in 2010 of -11.6%, while construction sector reached its lowest point of growth in 2010 with a -4.6% growth rate. The electricity sector experienced the highest growth in 2009 at 10.9%, while it recorded the lowest growth of -13.4% in 2008 (Rusteburg LM, 2019/2020).

The RBMR Rustenburg Operations employs locals as far as possible and have implemented several community initiatives, both of which are improving the local socioeconomic situation in the area (Rusteburg LM, 2019/2020).

11 Stakeholder Engagement Process

The stakeholder engagement process forms an important part of the scoping phase of the project. The stakeholder engagement process is primarily aimed at affording I&AP's the opportunity to gain an understanding of the proposed project. In addition, the purpose of consultation with the landowners, key stakeholders, and I&AP's is to provide them with the necessary information about the proposed project so that they can make informed decisions as to whether the project will affect them, and provide the EIA team with local knowledge of the area and raise concerns relating to the biophysical, socio-economic and cultural impacts that may arise.

The stakeholder engagement process will be conducted in terms of NEMA, which provides clear guidelines for stakeholder engagement during an EIA as summarised in Table 11-1.

Table 11-1: NEMA Stakeholder Guidelines

NEMA Section	Applicability to Stakeholder Engagement
Chapter 1	Outlines the principles of environmental management, several pertaining to public consultation (e.g. Chapter 1, subsections (2), (3), (4) (f), (g), (h), (k), (q) and (r).
Chapter 6	Regulations 39 – 44 of the amended EIA Regulations GNR 326, promulgated on 8 December 2014 and amended on 7 April 2017, specify the minimum requirements for stakeholder engagement in an EIA process conducted under the NEMA.
Section 24J of the NEMA	In 2017, the Minister of Environmental Affairs published, Section 24J of the NEMA in terms of**,** Public Participation Guidelines which guide the Public Participation Process in order to give effect to Section (2)(4)(f), (o) and 24 (1A)(C) of the NEMA.

All the above guidelines have been incorporated into this stakeholder engagement process. The DEDECT was identified as the competent authority who will make a decision on the application. Identified commenting authorities on this application include:

- DWS – NW Regional Office;
- SAHRA – NW Provincial Department;
- Rustenburg Local Municipality;
- Bojanala Platinum District Municipality;
- Eskom; and
- Royal Bafokeng Nation.

The stakeholder engagement plan was submitted to the DEDECT with the application.

11.1 Authority Pre-Application Consultation

A pre-application consultation meeting and site was held with the DEDECT at the RBMR on 11 August 2020. The purpose of the meeting was to:

- Notify the DEDECT of the project and application;

- To discuss and confirm the proposed processes (Section 30 A Emergency situation and EA), including the required specialist studies;
- To discuss the stakeholder engagement process to be followed; and
- To discuss any other DEDECT requirements.

During the Section 30 A emergency situation discussion, the DEDECT indicated that the proposed project does not qualify to be treated as an emergency situation as it did not meet all the criteria in the definition. The Department therefore declined to grant RBMR with permission to commence with construction before the EA has been issued. The DEDECT however indicated that they would be willing to assist in fast tracking the EIA process and shorten timeframes where possible but also emphasized that there would be no guarantees with respect to fast tracking of the process.

A copy of the pre-application authority consultation meeting presentation and attendance register and response from the DEDECT are included in Appendix H 1.

11.2 Stakeholder Identification Interested and Affected Parties

Interested and Affected Parties (I&APs) were identified using the existing database from previous projects, GIS and cadastral information. The affected and adjacent property owners were identified using the surveyor general website, www.deedsweb.gov.za. In addition, registered I&AP's were also sourced from responses to the advertisements, site notices and written notification to I&AP's associated with the project. I&APs will also include the staff working at RBMR who were notified of the proposed project and EIA process.

The identification, registration, and comments from I&APs will be an on-going activity and the I&APs register will be maintained for the duration of the EIA process, where the details of stakeholders are captured and automatically updated upon communication with the EAP. Please refer to Appendix H2 for a copy of the I&AP register.

The affected properties are provided in Table 11-2.

Table 11-2: List of Affected Farm and Farm Portions

Farm	Portions	21 Digit Survey General Code
WATERVAL 303 JQ	42	T0JQ00000000030300042

Table 11-3 provides a list of the adjacent properties.

Table 11-3: List of Adjacent Farms and Farm Portions

Farm	Portions	21 Digit Survey General Code
WATERVAL 303 JQ	33/303	T0JQ00000000030300033
	73/303	T0JQ00000000030300073
	74/303	T0JQ00000000030300074
	75/303	T0JQ00000000030300075
	76/303	T0JQ00000000030300076
	67/303	T0JQ00000000030300067
	68/303	T0JQ00000000030300068
	69/303	T0JQ00000000030300069
	70/303	T0JQ00000000030300070

Farm	Portions	21 Digit Survey General Code
	71/303	T0JQ00000000030300071

A map of the affected and adjacent farm portions and farm portions of the site are illustrated in Figure 11-1.

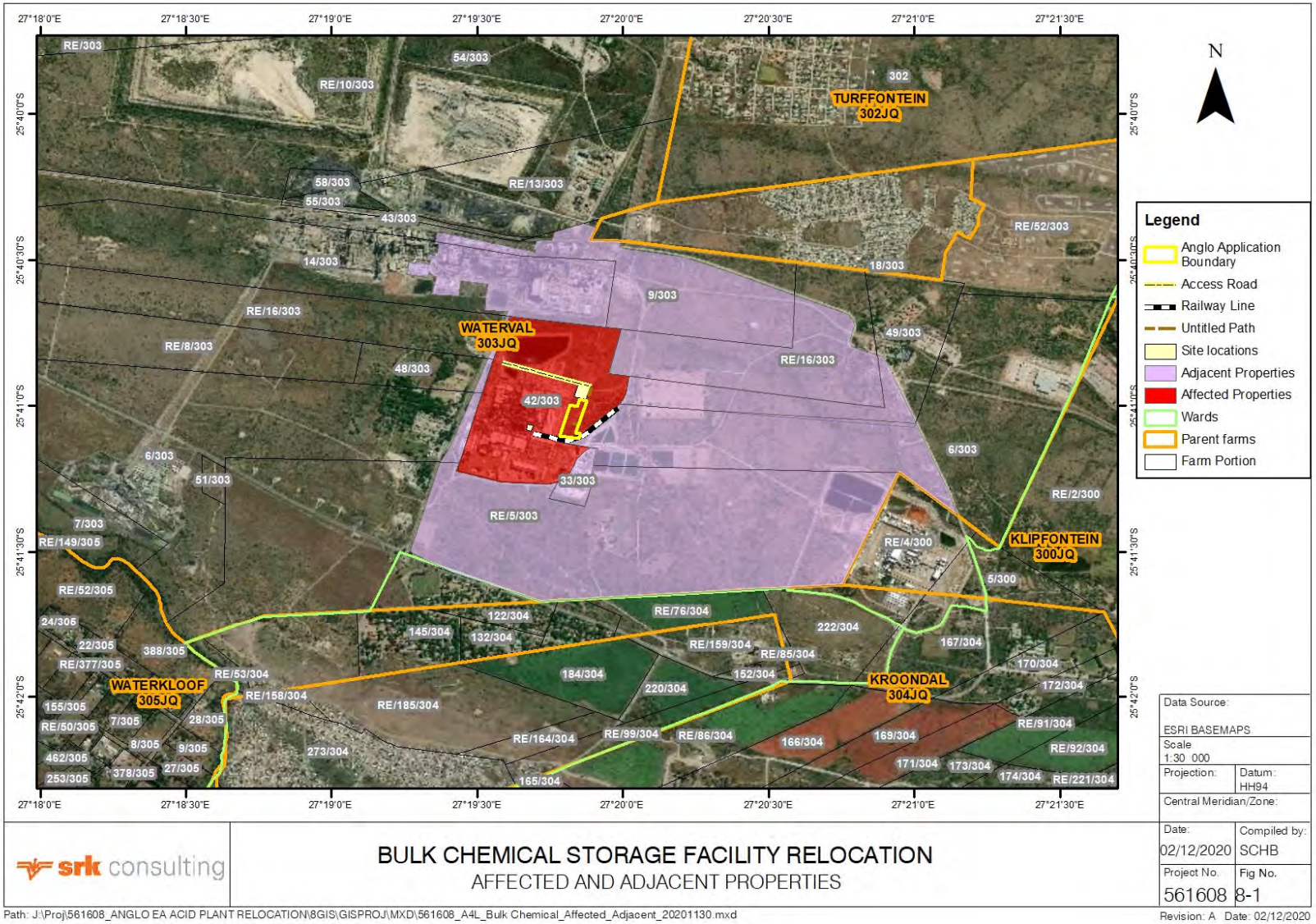


Figure 11-1: Affected and Adjacent Properties

11.3 Project Announcement

Stakeholders were provided with the opportunity to participate and register as I&AP's during the announcement phase of the project. SRK made use of various methods to inform stakeholder of RBMR's intention to undertake the required and environmental processes and EA application.

11.3.1 Distribution of Notification Letters

Notification letters were sent to identified I&AP's on 03 September 2020, informing them of the proposed project. A copy of the notification letter is attached as Appendix H 3.

11.3.2 Site Notice Placements

Sites notice boards (Size A2: 600 mm X 420 mm) notifying stakeholders and I&AP's of the proposed Bulk chemical storage facility were placed at conspicuous places in the project area on 09 September 2020. A copy of the site notices and proof of their placement is provided in Appendix H 4 Table 11-4 provides a list of these site locations.

Table 11-4: Site Notice Location and Coordinates

Site Notice	Location	Coordinates	
		Longitude	Latitude
1	Notice Board at Anglo Canteen Area	27°19'32.01"E	25°41'9.73"S
2	Anglo Big Notice Board	27°19'36.17"E	25°41'9.53"S
3	Cross Road from Anglo to Waterkloof	27°20'8.21"E	25°41'50.97"S
4	Rustenburg Library	27°14'14.10"E	25°40'10.63"S

11.3.3 Newspaper Advertisements

Newspaper advertisements notifying stakeholders about the proposed project and the opportunity to participate in the EIA process were placed in the newspapers listed in Table 11-5 on 11 September 2020 and can be found in Appendix H 5.

Table 11-5: Newspaper Advertisements

Newspaper Advertisements			
Newspaper	**Distribution**	**Languages**	**Date**
Rustenburg Herald	32 000	English and Tswana	11 September 2020

11.4 Draft Scoping Report Phase

11.4.1 Notification of the Availability of the Draft Scoping Report for Public Review

The availability of the draft Scoping Report was announced by means of SMSs, letters and emails to registered I&APs.

11.4.2 Public Review of the Draft Scoping Report

The draft Scoping Report was compiled in terms of the requirements of GNR 326 and made available for a 30-day commenting period from 19 October 2020 to 17 November 2020. Copies of the draft Scoping Report were made available at the venues listed in Table 11-6.

Table 11-6: List of places the Draft Scoping Report was placed for public review

Public Place	Locality	Telephone
Rustenburg Library	Heystek/Thabo Mbeki Drive, Rustenburg	014 590 3701 plouw@rustenburg.gov.za
SRK	OneDrive	A link was created and shared with the stakeholders
SRK	Dropbox	A link was created and shared with the stakeholders
SRK Website	www.srk.co.za	(012) 361 9821

The draft Scoping Report was also made available to the competent and commenting authorities during the 30-day review and comment period.

11.4.3 Key Stakeholder Discussions

A telephonic key stakeholder discussion as held with the DMR North West Province on 11 January 2021. The purpose of the meeting was to provide a description of the proposed project and clarify the role of the DMR. The DMR indicated that it had no objection to the proposed project.

In addition, a site visit was also undertaken with the DEDECT. During the site visit, the DEDECT requested that RBMR must submit confirmation from the Contractors confirming the required treatment and handling of the current tanks before hand-over to the Contractor.

11.5 Key Comments Received

The comments received from the Rustenburg Local Municipality and the SAHRA indicated that the authorities had no objections to the proposed project. The main comments received from the stakeholders to date that have been incorporated in the EIR are provided in Table 11-7.

Table 11-7: Key Comments Received to Date

Comment	Response
An A3 layout plan showing all sensitive environmental features to be affected by the development, if any, and clearly indicate where each development will be located.	An A3 layout plan of the proposed bulk chemical storage facility, including sensitive environmental features is included in Appendix F of this report.
An A3 locality map to be included in the report.	An A3 locality map is included in Appendix D of this report.
A record of material safety data sheets (MSDS) for each chemical handled at the plant during decommissioning must be provided.	A copy of the MSDS's for each chemical handled at the current plant during decommissioning has been included in Appendix E
Detailed cleaning procedures of the tanks during decommissioning must be provided; procedures must be in accordance to the recommendations	A description of the cleaning procedures complying with the recommendations of the MSDS's is included in Section 5.

Comment	Response
of the material safety data sheet of the chemicals.	
Environmental Impact Assessment Report which includes all specialist studies undertaken must be submitted to all other relevant authorities for comment and their comments including comments from interested and affected parties must be included in the final Environmental Impact Assessment report to be submitted to this Department for consideration.	This EIA Report includes: • Specialist Studies (Appendix G). Findings from the specialist studies have been incorporated in the baseline characterisation and the impact assessment sections of the report as well as in the EMPr (Appendix I). • Comments received from commenting authorities to date (Appendix H 9). The EIA Report will be made available to commenting authorities and I&APs and any comments received will be included in the final report to be submitted to the DEDECT for decision making.
Environmental Management Programme (EMPr) - An EMPr for the construction and operational phases of the project must be developed to identify and mitigate potential environmental and social impacts associated with the proposed activity on the receiving environment. The contents of the EMPr must comply with the guidelines as stipulated in Regulations 23(4) of Government Notice R.326 of 04 December 2014 as amended.	• An EMPr complying with the requirements of Appendix 4 of GNR326 is included in Appendix I.

11.6 Environmental Impact Assessment Phase

The EAP will continue to engage with stakeholders throughout the process. The Final Scoping Report and PoS was accepted by the DEDECT on 19 March 2021 Appendix C), allowing the impact assessment phase of the process to commence. This draft EIR has been compiled in terms of Appendix 3 of GNR 326 promulgated in terms of the NEMA and includes an EMPr that has been compiled in terms of Appendix 4 of GNR326.

11.6.1 Notification of the Availability of the Draft EIR/EMPr Report

The draft EIR and EMPr will be made available for a 30-day review and comment period between 2 June and 3 July 2021. Registered I&AP's will be notified of the availability of the draft EIR and EMPr Report through email, fax, SMS and posted registered letters.

11.6.2 Key Stakeholder Meeting/s

Where requested by the stakeholders, a public meeting may be held during the public review and comment period of the impact assessment phase of the project, ensuring that the COVID-19 Regulation requirements are met. Should a meeting be required, where possible online meetings will be held, and where stakeholders do not have internet access, the meetings will be held with no more

than 50 stakeholders in attendance. Stakeholders will be informed of the COVID-19 Regulation requirements that will be enforced during the meeting.

Where necessary, comments and issues raised by I&AP's during the commenting period will be incorporated into the Final EIR and EMPr with the relevant response issued by the EAP. The Final EIR and EMPr will then be submitted to the DEDECT for decision making. The comments will also be collated into the CRR that will form an Appendix to the Final EIR.

11.7 Authority Consultation

Authority consultation is considered an on-going process until a decision is made on the environmental application.

Other authorities that will be included are the local and district municipalities, ward councillors, and others identified during the scoping phase of the project.

11.8 Comments and Response Report

All issues and concerns raised by I&AP's throughout the process will be recorded and responded to in the Comments and Responses Report (CRR) which will form part of the reports to be submitted to DEDECT for decision making. A copy of the CRR is attached as Appendix H 6.

12 Quantitative Impact Assessment Results

Environmental impacts on the biophysical and socio-economic environment, which could potentially occur throughout the construction and operational phases of the proposed project are described in the following sections.

12.1 Planning/Pre-construction Phase

The potential impacts associated with the planning stage (pre-construction phase) of the project include:

- Infrastructure placement and design leading to overall loss of floral and faunal SCC; and
- Poor planning leading to an increased construction footprint.

According to the biodiversity assessment, during the pre-construction phase of the project there is potential for failure to relocate floral SCC to suitable habitat outside the development footprint. This would result in permanent loss of floral SCC from the study area.

The potential failure to design and implement an Alien and Invasive Plant (AIP) Management/Control plan before the commencement of construction activities, will result in the spread of AIPs from the development footprint to surrounding natural habitat, leading to potential loss of floral species diversity from surrounding natural habitat.

The results from the quantification of the identified potential impacts associated with the planning phase of the project are summarised in Table 12-1.

Table 12-1: Summary of the potential impacts that can be expected during the planning phase

Activity	Nature **of potential impact/risk**	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Planning	Planning of infrastructure placement and design within sensitive habitat	2	1	3	1	2	18	Low (-)	**Floral and Faunal Habitat and Diversity** • Minimise loss of indigenous vegetation where possible through planning and where necessary by avoiding vegetation removal and incorporating the recommendations of the biodiversity report as well as other specialist studies; and • Prior to the commencement of construction activities, an AIP Management/Control Plan should be compiled for implementation: o Removal of alien invasive species should preferably commence during the pre-construction phase and continue throughout the construction and operational phases. AIPs should be cleared within the study area before any vegetation clearing activities commence, thereby ensuring that no AIP propagules are spread, or soils contaminated with AIP seeds during the construction phase; and o An AIP Management/Control Plan should be implemented by a qualified professional. No chemical control of AIPs to occur without a certified professional. **Floral SCC** • Should there be any floral SCC that will be affected by the construction activities, must be marked and where possible,relocated to suitable habitat surrounding the disturbance footprint. Permits might be required from the relevant authority. Further consultation with the relevant authority (NWDEDECT - North West Department: Economic Development, Environment, Conservation and Tourism) will be required to determine whether a permit process needs to be followed.	1	1	3	1	2	15	Low (-)
	Poor planning leading to an increased footprint.	2	1	3	1	2	18	Low (-)		1	1	3	1	2	15	Low (-)

12.2 Construction Phase

12.2.1 Socio Economic

The project will result in the generation of some employment during the construction phase. It is expected that contractors will be appointed by RBMR for the construction of the proposed bulk chemical storage facility. The appointed contractors will be responsible for the recruitment of labour, both casual and specialised, through the Department of Labour.

It is expected that the positive impacts (creation of employment and temporary boost in local business) will be temporary (construction phase only).

The construction of the bulk chemical storage plant could potentially result in the following negative socio-economic impacts:

- Generation of dust due to vegetation clearance and movement of construction vehicles and machinery which could potentially resulting in a health and nuisance impact;
- Impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly;
- Health and safety risk as a result of the movement of construction vehicles increasing the risk of accidents; and
- Squatting of job seekers.

Due to the location of the bulk chemical storage facility, in an area mainly used for industrial and mining purposes, it is expected that during the construction phase, the potential negative impacts on the socio-economic environment will be of medium-low (-) to low (-) significance.

From a socio – economical perspective, there is no preferred alternative as the impact on the socio – economic environment remains relatively consistent throughout the proposed alternatives.

The cumulative impact on the socio-economic environment during the construction phase of the Bulk chemical storage facility will be negligible.

The mitigation measures have been included in Table 12-2 and have also been incorporated into the EMPr.

12.2.2 Biodiversity

Flora: Construction of the bulk chemical storage facility will require site clearing and the removal of vegetation. It must be noted that during the biodiversity assessment, no SCC were identified, however, there is potential that some SCC may have been missed. The construction of the bulk chemical storage facility may therefore result in loss of faunal and floral habitat, diversity and the possible loss of floral SCC. Proliferation of AIP species that colonise in areas of increased disturbances and that outcompete native species, including the further transformation of adjacent natural habitat will lead to loss of favourable faunal and floral habitat outside of the direct development footprint, including a potential to decrease in species diversity and a potential loss of faunal and floral SCC.

Improper dumping of construction material within areas where no construction is planned, will lead to further habitat disturbance – allowing the establishment and spread of AIPs resulting in loss of preferred faunal and floral habitat, diversity and SCC as AIPs outcome and replace these species.

Possible increased fire frequency during construction can lead to loss or alteration of floral and faunal habitat and species diversity. Construction activities will result in dust generation which will accumulate on the surrounding floral individuals, altering the photosynthetic ability of plants and potentially further

decreasing optimal growing/re-establishing conditions. This will result in decline in plant functioning leading to loss of floral species and habitat for optimal growth.

In addition, potentially poorly managed edge effects including:

- Ineffective rehabilitation of compacted areas, bare soils, or eroded areas leading to continual proliferation of AIP species in disturbed areas and subsequent spread to surrounding natural areas altering the floral habitat; and
- Compaction of soils outside of the study area due to indiscriminate driving of construction vehicles through natural vegetation.

The direct impact of the proposed relocation of the bulk chemical storage facility on the floral ecology of the study area is not anticipated to be detrimental, with impact significance varying between low and very - low (-) for the degraded habitats prior to mitigation measures being implemented. If mitigation measures are implemented very low (-) and low impact (-) significance are anticipated for the study area. Very-low (-) level impact on floral SCC are anticipated due to the unfavourable habitat and their observed absence from the study area.

Due to the study area being surrounded by man-made barriers such as roads, mining infrastructure, railways and other developments, the surrounding natural vegetation within the local region is unlikely to be impacted upon by the proposed development. Locally the long-term loss of habitat will incur the greatest impact as the site will be transformed into infrastructure. As part of the rehabilitation actions, disturbed areas not within the development footprint must be rehabilitated appropriately and AIP establishment controlled within such areas.

The project will contribute to the loss of floral habitat, diversity and potential SCC within the direct footprint of the proposed development, loss of surrounding floral diversity and floral SCC through the displacement of indigenous flora by AIP species – especially in response to disturbance in natural areas.

The alternative sites are located within the RBMR, an area that has already been sterilised following the commencement of construction and operation of the various RBMR operations, where clearance of vegetation has already been undertaken as part of the RBMR construction process. As such, the alternatives will have no impact on flora.

Fauna: The proposed development footprint is approximately 5.4 ha and is anticipated to have a limited impact on faunal communities. The habitat integrity of majority of the study area has been degraded and completely altered from its natural state, and only a few commonly occurring faunal species were observed utilising the habitat. With mitigation measures implemented, the direct and indirect impacts on the floral ecology can be reduced to low and very-low levels.

The study area is surrounded by man-made barriers such as roads, railways, fences and other developments, and it is thus also not anticipated any migratory routes for faunal species will be impacted by the proposed development. As part of the rehabilitation actions, disturbed areas not within the development footprint must be rehabilitated appropriately and AIP establishment controlled within such areas.

Potential faunal impacts include:

- Loss of faunal habitat and ecological structure; and
- Loss of faunal Species of Conservation Concern.

The proposed development will result in a loss of faunal habitat from the area; however, the study area is associated with a moderately low diversity of fauna and no SCC were recorded. The proposed development is thus not likely to have a significant negative impact on faunal communities.

Despite the fragmented habitat and levels of habitat transformation and disturbance, the study area still provides habitat for common and widespread faunal species that have integrated well within the peri-urban setting. Overall, the Degraded Habitat is associated with only a moderately low diversity and abundance of faunal species. The major impact will result of the long term alteration of habitat from a disturbed and degraded natural landscape inhabited by common faunal species into a human modified location storing dangerous chemicals.

Mitigation efforts should be aimed at limiting edge effects from construction activities to the surrounding area and implementing an AIP management plan.

No faunal SCC were observed within the study area. The peri-urban setting, historic anthropogenic activities, lack of suitable available habitat and the level of transformation within study area has resulted in the exclusion of faunal SCC from the study area. Although it is unlikely that any faunal SCC will permanently reside within the study area, it is possible that such species are present within the surrounding natural habitat – albeit only temporarily for foraging purposes. The proposed development will result in higher levels of anthropogenic activities and could increase disturbance in the area.

The impact significance on faunal SCC within the study area is considered to be very low but could be higher for surrounding natural areas outside of the study area where more suitable habitat is available.

It is expected that due to the location of the two alternatives, within the RBMR where, that the faunal impacts for the alternatives will be lower than the preferred option.

12.2.3 Groundwater

The use of earth moving machinery and construction vehicles on site poses the risk of chemical spillages including fuel and oils, which may leach into the groundwater. The removal of vegetation could furthermore lower the evapotranspiration rates and will also allow a greater volume of potentially contaminated water to percolate to the underlying aquifer in the event of an accidental spill from the machinery. It must however be noted that the removal of vegetation will be limited to the required footprints for the infrastructure, and therefore, the impact on evapotranspiration is therefore expected to be negligible.

Site clearing and grubbing is unlikely to materially affect the groundwater within the project area. However, care should be taken during the utilisation and storage of hydrocarbons and chemicals, which may have an impact on groundwater quality as a result of spillages and uncontrolled release.

Potential discharges to ground surface, and subsequent impact on the groundwater system, could potentially occur as a result of:

- The use of earth moving machinery and construction vehicles on site poses the risk of chemical spillages including fuel and oils; and
- Improper storage and handling of hazardous materials.

The impacts on groundwater due to the construction of the bulk chemical storage facility are expected to be of medium-low (-) significance.

Due to the location of the two alternatives, within the RBMR where the surfaces are tarred and concrete paved, it is expected that the groundwater impacts will be lower (negligible) than for the preferred option.

The cumulative impact on groundwater during the construction phase of the bulk chemical storage facility will be negligible.

12.2.4 Surface Water

The potential impacts on surface water during the construction phase of the proposed project are as follows:

- Accidental spillages of hazardous substances from construction vehicles used during construction, as well as from hazardous storage areas;
- Contamination of runoff by poor materials/waste handling practices;
- Debris from poor handling of materials and/or poor waste management practises;
- Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality; and
- Increase of surface runoff and potentially contaminated water that needs to be controlled in the areas where site clearing occurred.

It is expected that without the implementation of mitigation measures, the impacts on the surface water quality and the hydrology of the area will be of medium-low (-) significance, which can be reduced to low (-) significance with the implementation of mitigation measures.

Due to the location of the two alternatives, within the RBMR where the surfaces are tarred and concrete paved and there are dedicated drains and channels for stormwater management, it is expected that the hydrological impacts will be lower than for the preferred option.

The cumulative impact on surface water during the construction phase of the bulk chemical facility will be negligible.

12.2.5 Wetlands

There are no wetlands located on the footprint of the proposed bulk chemical storage facility, as such no impacts on aquatic ecosystems are anticipated. The impacts on wetlands will be same for the alternatives and preferred option.

12.2.6 Air Quality and Climate Change

The movement of construction vehicles and earth moving machinery will likely result in an increase in nuisance dust, PM_{10} and $PM_{2.5}$, carbon emissions and ambient air pollution. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust.

The impacts on air quality is calculated to be of low (-) significance and can be reduced to very-low (-) significance when the mitigation measures have been implemented.

The movement of vehicles and earth moving machinery may also result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area. The impact on climate change was calculated to be of very low (-) significance and can be mitigated to negligible (-) significance.

The air quality impacts will be the same for both the preferred option and alternatives identified.

The cumulative impact on air quality and climate change during the construction phase of the Bulk chemical storage facility will be negligible.

12.2.7 Noise

The use of construction vehicles and machinery may result in an increase in ambient noise in the immediate vicinity of the project. However, due to the proposed location of the Bulk chemical storage facility, where significant activities are already taking place at the RBMR, the significance of the

increased ambient noise levels is expected to be of low (-) significance (before and after the implementation of mitigation measures).

The noise impacts will be the same for both the preferred option and alternatives identified.

The cumulative noise impacts during the construction phase of the bulk chemical storage facility will be negligible.

12.2.8 Visual

The following potential impacts on the visual character of the area as a result of the proposed project are envisaged during the construction phase:

- Visual intrusion as a result of the movement of machinery; and
- Indirect visual impact due to dust generation, as a result of the movement of vehicles and materials, to and from the site area.

It is also expected that due to the proposed location of the bulk chemical storage facility, where significant activities are already taking place on RBMR, the significance of the visual impacts will be of low (-) significance (before and after the implementation of mitigation measures).

Due to the location of the alternatives, within RBMR where the surrounding communities will not be affected by the construction activities, therefore the visual impacts as a result of the alternatives will be lower than for the preferred option.

The cumulative visual impact during the construction phase will be negligible.

12.2.9 Soils, Land Use and Land Capability

The area where the bulk chemical storage facility will be located in was historically used as a Waste Rock Dump but has not been used as such in recent times. The construction of the preferred option will require stripping of the topsoil for construction and paving of the ground with concrete and tar resulting in the loss of soil potential on approximately 5.4 ha of land.

The potential impacts on soil, land use and land capability is considered to be of low (-) significance for the preferred option. However, since the alternatives are located in an area already affected by the RBMR infrastructure, the construction of the alternatives would have no impact on soils, land use and land capability.

There will be negligible cumulative impact on soils due to the construction of the bulk chemical storage facility.

12.2.10 Heritage

The bulk chemical storage facility will be located within an area where if there were any heritage resources, these would have already been affected by the construction of the RBMR. It is therefore expected that the construction of the bulk chemical storage facility will have no impact on any heritage resources.

It must however be noted that due to the nature of heritage resources, there may be chance findings of heritage resources that were not identified during the specialist studies. Where there are chance findings of heritage resources, the Chance Findings Procedure (CFP) developed by the specialist (or internal CFP, if available) must be implemented.

12.2.11 Traffic

Most of the traffic will be associated with the delivery of construction material to the site. The material will be transported to the site via public roads, but that will only require on average a few trucks a day.

Therefore, limited impact on public traffic is expected. The significance of the impacts on traffic was classified as medium-low (-) significance, which can be mitigated to low (-).

The traffic impacts will be the same for both the preferred option and alternatives identified.

The cumulative impact on traffic during the construction phase will be negligible.

12.2.12 Waste Management

Poor waste management practices during the construction phase will result in:

- Contamination of surface runoff resulting in the deterioration of water quality of the watercourse.
- Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.

The potential impacts from improper management of waste are expected to have a medium-low (-) impact, and these can be mitigated to low (-) significance should it occur.

The results of the quantitative impact assessment for the construction phase are provided in Table 12-2.

Table 12-2: Quantitative Impact Assessment Results for the Construction Phase of the Preferred Option

Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Social-economic	Possible boost in short term employment and local small business opportunities.	2	2	2	2	2	24	Low (+)	• Where possible, favour employment of locals. • Ensure that speed limits and rules for RBMR are strictly enforced. • No fires are allowed on the site, unless in areas demarked and managed for this purpose. • All workers will be made aware of fire risks. • All workers must be provided with PPE and RBMR and contractors must ensure that their personnel make use of PPE where necessary. • Limit the aerial extent to the approved footprint.	1	1	2	3	5	32	Low (+)
	Potential impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly.	3	1	1	5	1	30	Medium-Low (-)		2	1	2	2	2	20	Low (-)
	Health and safety risk as a result of the movement of vehicles increasing the risk of accidents	2	1	3	1	2	18	Low (-)		1	1	3	1	2	15	Low (-)
	Health risk due to contagious diseases (such as the Corona virus) due to working in close proximity to each other	2	2	2	2	2	24	Low (-)		1	1	3	1	2	15	Low (-)
	Potential squatting of job seekers.	2	1	3	1	2	18	Low (-)		1	1	3	1	2	15	Low (-)
Groundwater	Local spillages of oils from vehicles and machinery leading to groundwater contamination.	2	3	2	3	2	35	Medium-Low (-)	• No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment will be clearly demarcated and will not be allowed to contaminate any surface runoff. • Sufficient areas shall be provided for the maintenance and washing of vehicles. • Refuelling of vehicles will only be allowed in designated areas. • All construction equipment shall be parked in a demarcated area. Drip trays shall be used when equipment is parked for long periods of time. • Surface bulk storage of hydrocarbons must be situated in a dedicated area, which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the substance. • Bunded areas shall have capacity to be able to contain 110% of the total volume being stored. • Bund areas must be impermeable. • Contaminated water shall be pumped into a container for appropriate removal and disposal. • Regular inspections shall be carried out to ensure the integrity of the bund walls. • All servicing of earth moving equipment and vehicles shall be conducted in designated areas.	2	1	2	2	2	20	Low (-)
	Improper storage and handling of hazardous materials leading to groundwater contamination.	2	3	2	3	2	35	Medium-Low (-)		2	1	2	2	2	20	Low (-)
Surface Water Quality	Potential deterioration in water quality as a result of accidental spillages of hazardous substances such as hydrocarbons from vehicles and machinery used during the construction of the current plant.	2	3	3	2	2	32	Medium-Low (-)	• Ensure the clean and dirty water segregation. • Spill kits to be made available at areas of possible spillages of hazardous substances. • Remediation of spillages must be conducted on a continual basis. • Contaminated runoff will be contained and re-used where necessary. • No direct discharge of polluted water to the environment is permitted. • Vehicle and personnel movement within watercourses and wetland areas shall be strictly prohibited.	2	2	2	2	2	24	Low (-)
	Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	2	3	2	3	2	35	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Deterioration of water quality as a result of improper handling/ of chemicals.	2	3	2	3	2	35	Medium-Low (-)		2	2	2	2	2	24	Low (-)

Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
	Poor stormwater management leading to runoff from stockpiled material removed causing pollution of the water resources.	2	3	2	2	2	28	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	2	3	2	2	2	28	Medium-Low (-)		2	2	2	1	2	18	Low (-)
	Increase of surface runoff and potentially contaminated water that needs to be contained in the areas where site demolition occurred.	2	3	2	2	2	28	Medium-Low (-)		2	2	2	1	2	18	Low (-)
Wetlands and Aquatic Ecosystems	No impacts are anticipated.															
Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	2	2	2	2	2	24	Low (-)	• Mitigation measures may be implemented to reduce dust levels from the entrainment of dust. These measures will range from watering of roads, application of a chemical dust suppressant and/or paving of roads. • A speed limit of 40 km/h or less shall apply to limit vehicle entrained dust from the unpaved roads. • All equipment used in the construction phase must undergo maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution. • Chemical toilets (if used) must be emptied / serviced on a regular basis. Proof of this must be kept on file.	2	2	2	2	1	18	Low (-)
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	2	2	2	2	2	24	Low (-)		2	2	2	2	1	18	Low (-)
Climate change	Emissions of Green House Gases as a result of the use of vehicles and machinery used during the construction activities.	2	2	2	2	2	24	Low (-)	• All the vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.	2	2	2	2	1	18	Low (-)
Heritage and Palaeontology Resources	Although no heritage resources were identified, there is potential for chance findings of heritage resources.	2	1	3	1	2	18	Low (-)	• Implement the Chance Find Protocol (CFP0 as follows: ***Archaeological Heritage*** The regional cultural landscape includes archaeological resources and the RBMR may encounter such resources during Project activities. Should these heritage resources be encountered, all RBMR staff and contractors must implement the following steps: • All activities within the immediate vicinity must be halted and the archaeological heritage resource must be avoided. • The staff member or contractor who identified the Chance Find must inform the appropriate Responsible Person as to the find (Site Manager, Site Foreman or Environmental Control Officer [ECO]). • The Responsible Person, together with the person who identified the find, must record the details of the encounter. Such details include, but are not limited to, the time and date of the encounter, the context of the find and photographs indicating the scale of the find. and • The Responsible Person must contact a suitably qualified archaeologist to notify them of the find. The archaeologist will be able to advise RBMR on the significance of the find and the way forward. The way forward may require a site inspection and/or notification of the relevant Heritage Resource Authorities (HRAs). ***Burial Grounds and Graves*** The RBMR may encounter previously unidentified burial grounds	1	1	2	2	1	12	Low (-)

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**							**Impact Management Actions (Proposed Mitigation Measures)**	**Environmental Impact Significance After Mitigation**						
		Consequence			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**		**Consequence**			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**
		Severity	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**				**Severity**	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**		
									or individual graves during Project-related activities. Should these heritage resources be encountered, all RBMR staff and contractors must implement the following steps: • All activities within the immediate vicinity must be halted and the archaeological heritage resource must be avoided. • The staff member or contractor who identified the Chance Find must inform the appropriate Responsible Person as to the find (as with the archaeological resources). • The Responsible Person, together with the person who identified the find, must record the details of the encounter. Such details include, but are not limited to, the time and date of the encounter, the context of the find and photographs indicating the condition and (where possible) the age of the find. • RBMR must notify the South African Police Services (SAPS) of the find. • The Responsible Person must notify the Burial Grounds and Graves (BGG) Unit of the South African Heritage Resources Agency (SAHRA). • The SAPS and SAHRA BGG Unit8 must undertake a site inspection to determine the temporal context of the grave(s) to confirm whether the grave(s) is (are) forensic, an authentic burial grave (i.e. a grave older than 60 years old) or archaeological (i.e. a grave older than 100 years). The SAPS and SAHRA BGG Unit will also determine whether additional graves or burials exist within the vicinity of the chance find. • The SAPS and SAHRA BGG Unit will advise RBMR of any requirements RBMR must undertake to mitigate or avoid any impacts to the chance find.							
Flora	Loss of vegetation species including vegetation species of conservational concern due to indiscriminate movement of vehicles and personnel.	2	1	3	1	2	18	Low (-)	*Development footprint* • The construction footprint must be kept as small as possible in order to minimise impact on the surrounding environment (edge effect management). • Removal of vegetation must be restricted to what is absolutely necessary and should remain within the approved development footprint. Where possible / feasible, any remaining natural areas should be utilised as part of the landscaping of the proposed development. • Smaller species that are not as readily able to move out of an area ahead of ground clearing activities such as scorpions and reptiles will be less mobile during rainfall events and cold days (winter). As such should any be observed in the construction site during clearing and construction activities, they are to be carefully and safely moved to an area of similar habitat outside of the disturbance footprint. Construction personnel are to be educated about these species and instructed not to kill them. Smaller scorpion species and harmless reptiles should be carefully relocated by a suitably nominated construction person. For larger venomous snakes, a suitably trained specialist, or on-site personnel, should be contacted to carry out the relocation of the species, should it not move off on its own. • Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities. Additional road construction should be limited to what is absolutely necessary, and the footprint thereof kept to a minimal.	1	1	2	2	1	12	Low (-)
	Proliferation of alien invasive species due to ineffective management and control of alien invasive plant species.	2	1	3	1	2	18	Low (-)		1	1	2	2	1	12	Low (-)
Fauna	Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	2	1	3	1	2	18	Low (-)		1	1	2	2	1	12	Low (-)

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**							**Impact Management Actions (Proposed Mitigation Measures)**	**Environmental Impact Significance After Mitigation**						
		Consequence			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**		**Consequence**			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**
		Severity	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**				**Severity**	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**		
									• No hunting or trapping of faunal species is to be allowed by construction personnel. • Care should be taken during the construction and operation of the proposed development to limit edge effects to surrounding natural habitat. This can be achieved by: o Demarcating all footprint areas during construction activities. o No construction rubble or cleared alien invasive species are to be disposed of outside of demarcated areas and should be taken to a registered waste disposal facility. o All soils compacted as a result of construction activities outside of the final operational area shouldbe ripped, profiled and reseeded. o Manage the spread of AIP species, which may affect remaining natural habitat within surrounding areas. Specific mention in this regard is made to Category 1b species identified within the development footprint areas contained in Appendix F of the Ecological Assessment Report). • No dumping of litter, rubble or cleared vegetation on site should be allowed. Infrastructure and rubble removed as a result of the construction activities should be disposed of at an appropriate registered dump site away from the development footprint. No temporary dump sites should be allowed in areas with natural vegetation. It is advised that waste disposal containers and bins be provided during the construction phase for all construction rubble and general waste. Vegetation cuttings must be carefully collected and disposed of at a separate waste facility. • If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder floral rehabilitation later down the line. Spill kits should be kept on-site within workshops. In the event of a breakdown, maintenance of vehicles must take place with care, and the recollection of spillage should be practised, preventing the ingress of hydrocarbons into the topsoil. and • Upon completion of construction activities, it must be ensured that no bare areas remain, and that indigenous species be used to revegetate the disturbed area. *Alien Vegetation* • Edge effects arising from the proposed development, such as erosion and alien plant species proliferation, which may affect adjacent natural areas, need to be strictly managed. Specific mention in this regard is made of Category 1b AIP species (as listed in the NEMBA Alien species lists, 2016), in line with the NEMBA Alien and Invasive Species Regulations (2014) areas contained in Appendix F of the Ecological Assessment Report. • Ongoing alien and invasive plant monitoring and clearing/control should take place throughout the construction and operational phase of the development, and a 30m buffer surrounding the study area should be regularly checked for AIP proliferation and to prevent spread into surrounding natural areas. and • Alien vegetation that is removed must not be allowed to lay on							

Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
									unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility which complies with legal standards. *Fires* • Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed. *Floral and Faunal SCC* • The relocation success of floral SCC, if any, should be monitored during the construction phase to ensure immediate actions can be taken if it becomes evident that relocation is not successful. • No collection of floral SCC or medicinal floral species must be allowed by construction personnel. • Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC outside of the proposed development footprint area. • No trapping or hunting of fauna whatsoever must be allowed. • It is recommended that the perimeter fence allows for movement of small mammals, such as palisade fencing, as opposed to solid constructions such as walls. Should the perimeter be walled in, it is recommended that small openings be left to allow for continuous movement of small mammal species. Such openings must be continuously monitored and cleared of debris to ensure continued movement is possible. and • Should the presence of any faunal SCC be noted, or their breeding sites be located, within the development footprint a suitably qualified specialist should be consulted on the best way to proceed. *Rehabilitation* • Any areas that have been left bare as a result of the construction activities should be rehabilitated using indigenous species.							
Visual	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	2	1	2	2	2	20	Low (-)	• The number of construction vehicles and machinery to be used shall be kept to a minimum. • Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents. • Materials transported on public roads must be covered. and • Where possible, rehabilitation of the work areas shall be undertaken in tandem with construction to ensure that areas stripped of vegetation are kept to a minimum.	1	1	2	2	1	12	Low (-)
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	1	2	2	2	20	Low (-)		1	1	2	2	1	12	Low (-)
Noise	The use of vehicles and machinery during the construction phase may generate nuisance noise in the immediate vicinity	2	2	2	2	2	24	Low (-)	• Correct Personal Protective Equipment (PPE) must be worn at all times by the personnel at the site. • All equipment should be provided with standard mufflers. Muffling units on vehicles and equipment must be kept in good working order. • Staff working on site should wear ear protection equipment where necessary. • All equipment must be kept in good working order • Equipment must be operated within specifications and capacity (e.g. no overloading of machines). • Regular maintenance of equipment must be undertaken.	2	1	2	2	2	20	Low (-)

Aspect	Nature **of potential impact/risk**	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Soil, Land use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	2	1	2	2	2	20	Low (-)	• Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEMWA or can be removed by a service provider that is qualified to clean the soil. • Spill kits shall be made available and all personnel shall be trained, and training records shall be made available on request. • The time in which soils are exposed during construction activities should remain as short as possible. • Erosion control measures shall be implemented where deemed necessary. • In general, all steep slopes steeper than 1:3 or where the soils are more prone to erosion must be stabilised. • If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion. • Runoff from stockpiles shall be detained in order to support growth of vegetation. • Runoff from the stockpiles shall be suitably managed to ensure that the runoff volumes and velocities are similar to pre disturbed levels. • Vegetation shall be used to promote infiltration of water into the stockpile instead of increasing runoff. • A monitoring programme will be implemented if the stockpiles are not used within the first year whereby the vegetation of the stockpiles is monitored in terms of basal cover and species diversity. • If it is noticed that the vegetation on the stockpiles is not sustainable, appropriate corrective actions shall be taken to rectify the situation. • Stockpiles shall be maintained until the topsoil is required for rehabilitation purposes. • Topsoil stockpiles shall be monitored regularly to identify alien vegetation, which shall be removed as soon as possible to prevent further distribution of any alien vegetation.	1	1	1	2	1	9	Low (-)
	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
	Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
	Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to stripping and stockpiling footprint areas.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
Traffic	Increase in traffic volumes as a result of transportation of materials for construction, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	3	3	2	2	2	32	Medium-Low (-)	• Speed limits will be reduced to 40 km/h or less to reduce dust and noise generation. • The number of construction vehicles and trips shall be kept to a minimum. • All the vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.	2	2	2	2	2	24	Low (-)
	The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	3	3	2	2	2	32	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	The increase in traffic within the RBMR precinct as a result of transportation of construction material leading to congestion within RBMR.	No impacts anticipated.														
Waste Management	Poor waste management during construction could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	3	3	2	2	2	32	Medium-Low (-)	• Waste management will be undertaken in line with the Anglo-American Platinum's Zero Waste to Landfill (ZW2L) goal, ensuring re-use and recycling of waste as much as possible. Where re-use, recycling or disposal of waste is required, the following shall apply:	2	2	2	2	2	24	Low (-)

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**							**Impact Management Actions (Proposed Mitigation Measures)**	**Environmental Impact Significance After Mitigation**						
		Consequence			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**		**Consequence**			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**
		Severity	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**				**Severity**	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**		
	Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	3	3	2	2	2	32	Medium-Low (-)	*Separation of waste* • All waste shall be separated into general waste and hazardous waste. • Hazardous waste shall not be mixed with general waste • General waste can further be separated in waste that can be recycled and/or reused, if possible • No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste. • Where necessary dedicate a storage area on site for collection of waste. *Storage of waste* • General waste will be collected in an adequate number of litter bins located throughout the site. • Bins must have lids in order to keep rainwater out. • Bins shall be emptied regularly to prevent the bins from overflowing. • All work areas shall be kept clean and tidy at all times. • All waste management facilities will be maintained in good working order. • Waste shall be stored in demarcated areas according to type of waste. • Flammable substances must be kept away from sources of ignition and from oxidizing agents. • No builder's rubble shall be disposed of to the riparian area. • If builder's rubble is not removed immediately it shall be stockpiled outside the 1:50 year flood line and outside the sensitive riparian areas. • Demolition waste and surplus concrete shall be re-used, recycled or disposed (last resort) of responsibly. • Waste shall not be buried or burned on site. *Disposal of hazardous waste* • No dumping shall be allowed in or near the site. • Hazardous containers shall be re-used, recycled or disposed (last resort) of at an appropriate licensed site. • Hazardous waste will be removed and managed by an approved service provider. • A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste. • The safe disposal certificates shall be stored and provided on request. *Disposal of general waste* • No dumping shall take place in or near the project site. • All general waste shall be re-used, recycled or disposed (last resort) of to a licensed landfill site. • Demolition waste and builder's rubble shall be used as cover material at an appropriate licensed landfill site.	2	2	2	2	2	24	Low (-)
	Stockpiling material from the decommissioned plant may result in secondary pollution and contamination of the watercourses.	3	3	2	2	2	32	Medium-Low (-)		2	2	2	2	1	18	Low (-)

Table 12-3: Summary of the potential impacts that can be expected during the construction phase for the Alternative Options

Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Social-economic	Possible boost in short term employment and local small business opportunities.	Same as for the Preferred Option.														
	Potential impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly.															
	Health and safety risk as a result of the movement of vehicles increasing the risk of accidents															
	Health risk due to contagious diseases (such as the Corona virus) due to working in close proximity to each other															
	Potential squatting of job seekers.															
Groundwater	Local spillages of oils from vehicles and machinery leading to groundwater contamination.	1	1	2	2	1	12	Low (-)	• No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment will be clearly demarcated and will not be allowed to contaminate any surface runoff. • Sufficient areas shall be provided for the maintenance and washing of vehicles. • Refuelling of vehicles will only be allowed in designated areas. • All construction equipment shall be parked in a demarcated area. Drip trays shall be used when equipment is parked for long periods of time. • Surface bulk storage of hydrocarbons must be situated in a dedicated area, which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the substance. • Bunded areas shall have capacity to contain 110% of the total volume stored. • Bund areas must be impermeable. • Contaminated water shall be pumped into a container for appropriate removal and disposal. • Regular inspections shall be carried out to ensure the integrity of the bund walls. • All servicing of earth moving equipment and vehicles shall be conducted in designated areas.	1	1	1	1	1	6	Low (-)
	Improper storage and handling of hazardous materials leading to groundwater contamination.	1	1	2	2	1	12	Low (-)		1	1	1	1	1	6	Low (-)
Surface Water Quality	Potential deterioration in water quality as a result of accidental spillages of hazardous substances such as hydrocarbons from vehicles and machinery used during the construction of the current plant.	1	1	2	2	1	12	Low (-)	• Ensure the clean and dirty water segregation. • Spill kits to be made available at areas of possible spillages of hazardous substances. • Remediation of spillages must be conducted on a continual basis. • Contaminated runoff will be contained and re-used where necessary. • No direct discharge of polluted water to the environment is permitted. • Vehicle and personnel movement within watercourses and wetland areas shall be strictly prohibited.	1	1	1	1	1	6	Low (-)
	Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	1	1	2	2	1	12	Low (-)		1	1	1	1	1	6	Low (-)
	Deterioration of water quality as a result of improper handling/ of chemicals.	1	1	2	2	1	12	Low (-)		1	1	1	1	1	6	Low (-)

Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
	Poor stormwater management leading to runoff from stockpiled material removed causing pollution of the water resources.	1	1	2	2	1	12	Low (-)		1	1	1	1	1	6	Low (-)
	Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	1	1	2	2	1	12	Low (-)		1	1	1	1	1	6	Low (-)
	Increase of surface runoff and potentially contaminated water that needs to be contained in the areas where site demolition occurred.	1	1	2	2	1	12	Low (-)		1	1	1	1	1	6	Low (-)
Wetlands and Aquatic Ecosystems	No impacts are anticipated.															
Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	Same as for the Preferred Option.														
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.															
Climate change	Emissions of Green House Gases as a result of the use of vehicles and machinery used during the construction activities.															
Heritage and Palaeontology Resources	No impacts are anticipated.															
Flora	No impacts are anticipated.															
Fauna																
Visual	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	1	1	2	2	1	12	Low (-)	• The number of construction vehicles and machinery to be used shall be kept to a minimum. • Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents. • Materials transported on public roads must be covered. • Where possible, rehabilitation of the work areas shall be undertaken in tandem with construction to ensure that areas stripped of vegetation are kept to a minimum.	1	1	1	1	1	6	Low (-)
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	1	1	2	2	1	12	Low (-)		1	1	2	2	1	6	Low (-)
Noise	The use of vehicles and machinery during the construction phase may generate nuisance noise in the immediate vicinity	Same as for the Preferred Option.														
Soil, Land use and Land Capability	No impacts are anticipated.															

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**							**Impact Management Actions (Proposed Mitigation Measures)**	**Environmental Impact Significance After Mitigation**						
		Consequence			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**		**Consequence**			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**
		Severity	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**				**Severity**	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**		
Traffic	Increase in traffic volumes as a result of transportation of materials for construction, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	Same as for the Preferred Option.														
	The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.															
	The increase in traffic within the RBMR precinct as a result of transportation of chemicals to the bulk chemical storage facility leading to congestion within RBMR.	4	2	4	4	4	80	High (-)	• The impacts on RBMR traffic management cannot be mitigated should the alternative options be implemented.	4	2	4	4	4	80	High (-)
Waste Management	Poor waste management during construction could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	Same as for the Preferred Option.														
	Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.															
	Stockpiling material from the decommissioned plant may result in secondary pollution and contamination of the watercourses.															

12.3 Operational Phase

Impacts during the operational phase will result largely due to improper or inadequate maintenance of the plant.

12.3.1 Groundwater

Potential discharges to ground surface, and subsequent impact on the groundwater system, could potentially occur as a result of improper storage and handling of hazardous materials, including the chemicals to be stored at the facility.

In addition, improper management and maintenance of oil sumps to be used at the facility may result in groundwater contamination.

The impact of operational activities on groundwater is classified to be of medium-low (-) and low (-) significance, which can be mitigated to very low (-).

The potential groundwater impacts will be the same for both the preferred option and alternatives identified.

12.3.2 Biodiversity

Potential biodiversity impacts associated with the operational phase include:

- Flora: During the operational phase, the potential failure to monitor the success of relocated floral SCC (if applicable) will result in loss of SCC. Increased introduction and proliferation of alien plant species due to a lack of maintenance activities, or poorly implemented and monitored AIP Management programme can lead to ongoing displacement of natural vegetation outside of the footprint area, which will cause ongoing or permanent loss of faunal and floral habitat, diversity and potential SCC. Increased human presence in the area once operational, potentially leads to the persecution of fauna in the adjacent natural habitat, or an increased risk of fire frequency impacting on floral and faunal communities outside of the development footprint. This will result in loss of faunal and floral habitat, medicinal flora and SCC, as well as overall species diversity within the local area. Potential chemical spillages from the bulk chemical storage facility can result in loss and degradation of faunal and flora habitat and faunal and floral species and the potential for contaminants to enter the groundwater and the resulting cascade of impacts.
- Fauna: The proposed development footprint is approximately 5.4 ha and is anticipated to have a limited impact on faunal communities. The habitat integrity of majority of the study area has been degraded and completely altered from its natural state, and only a few commonly occurring faunal species were observed utilising the habitat. With mitigation measures implemented, the direct and indirect impacts on the floral ecology can be reduced to low and very-low levels. In addition, higher levels of traffic within the study area will increase the potential for collision of vehicles with fauna resulting in loss of fauna. The study area is surrounded by man-made barriers such as roads, railways, fences and other developments, and it is thus also not anticipated any migratory routes for faunal species will be impacted by the proposed development. As part of the rehabilitation actions, disturbed areas not within the development footprint must be rehabilitated appropriately and AIP establishment controlled within such areas.

Since the preferred option is located in an area surrounded by vegetation, albeit disturbed vegetation, it is expected that impacts on biodiversity will be higher than for the alternatives which are located within the RBMR where no vegetation exists.

12.3.3 Surface Water

The potential impacts on surface water during the operational phase of the proposed project are as follows:

- Surface water contamination as a result of improper chemical storage/handling;
- Contamination of runoff by poor materials/waste handling practices;
- Impact on the Mean Annual Runoff (MAR); and
- Contaminated dirty water runoff from the plant and chemical storage site to surrounding areas resulting in the impact on local surface water quality.

It is expected that without the implementation of mitigation measures, the impacts on the hydrology will be of medium-low (-) significance, which can be reduced to very low (-) significance with the implementation of mitigation measures.

Once the SWMP associated with the bulk chemical storage facility has been constructed, it is expected that the potential impacts on surface water will be the same for both the alternatives and the preferred option.

12.3.4 Air Quality

The movement of vehicles transporting chemicals to the facility will likely result in an increase in nuisance dust, PM_{10} and $PM_{2.5}$. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust around the facility.

The impacts on air quality is calculated to be of very-low (-) significance and can be reduced to negligible (-) significance when the mitigation measures have been implemented.

The movement of vehicles may also result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area. The impact on climate change was calculated to be of very low (-) significance and can be mitigated to negligible (-) significance.

In addition to the above, formalin to be stored at the bulk chemical storage facility is also considered volatile as the formaldehyde can evaporate easily from the formalin surface. However, according to the (WRC, 2011) , formaldehyde does not raise any serious human health or environmental concerns, provided it is properly handled and stored. When released into the air, it is rapidly broken down by photolysis. When released into water, it is biodegraded within a few days. It is therefore expected that should any air quality impacts occur from storage of formalin at the bulk chemical storage facility, the impacts will be short lived and be of low significance.

The air quality impacts will be the same for both the preferred option and alternatives identified.

The cumulative impact on air quality and climate change during the construction phase of the bulk chemical storage facility will be negligible.

12.3.5 Traffic

Most of the traffic will be associated with the delivery of chemicals to the site. The chemicals will be transported to the site via public roads and the rail road, but that will only require a few trucks a day. Therefore, limited impact on public traffic is expected. The significance of the impacts on traffic was classified as low (-) significance, which can be mitigated to very-low (-).

The traffic impacts for the surrounding area will be the same for both the preferred option and alternatives identified. However, due to space constraints within the current RBMR plant,

implementation of the alternatives will have a negative impact on traffic movement within the plant. The preferred option would:

- Reduce vehicle - pedestrian interaction by reducing number of acid offloading trucks;
- Eliminate rail deliveries traffic within the RBMR facility; and
- Reduce congestion at RBMR entrance Gates and Weighbridge.

The cumulative impact on traffic during the operational phase will be negligible.

12.3.6 Noise

The use of vehicles, rail system and machinery for transportation of chemicals to RBMR and offloading of chemicals may result in an increase in ambient noise in the immediate vicinity of the project. However, due to the proposed location of the bulk chemical storage facility, where significant activities are already taking place at the RBMR, the significance of the increased ambient noise levels is expected to be of low (-) significance (before and after the implementation of mitigation measures).

The noise impacts will be the same for both the preferred option and alternatives identified.

12.3.7 Socio-Economic

The bulk chemical storage facility will be operated by the RBMR personnel, as such no socio-economic impacts are expected.

12.3.8 Waste Management

Poor waste management practices will result in:

- Contamination of surface runoff resulting in the deterioration of water quality of the watercourse.
- Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.

The potential impacts from improper management of waste are expected to have a medium-low impact, and these can be mitigated to low (-) significance should it occur.

The results of the quantitative impact assessment for the operational phase are provided in Table 12-2.

Table 12-4: Quantitative Impact Assessment Results for the Operational Phase for the Preferred Option

Activity	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Groundwater	Improper storage and handling of hazardous materials leading to groundwater contamination.	2	2	2	2	2	24	Low (-)	• RBMR shall implement the SWMP that has been developed for the bulk chemical storage plant. • The bulk chemical storage facility shall be regularly inspected and where required maintenance must be done as soon as possible. • Clean surface runoff emanating from the area between the proposed loading bay and the desilting dewatering plant to be channelled into a clean natural trench which will report at the proposed oil trap from where the clean runoff will flow to grade. • The stormwater channels and berms to be maintained regularly to ensure that no vegetation and silt obstruct the flow within the channels and along the berms. • Stormwater channels to be lined. • Culvert openings should be constructed at the positions where the proposed channel crosses the roads. The culvert openings should be sized to capacities that can convey the channel flow as per the 1:50 year storm event without overtopping. • The proposed dirty water system to discharge dirty runoff collected from the area between the Acid Tanks into the proposed dirty water channel running on the western side of the Acid Tanks which further discharges into a proposed sump at the north western end of the Acid Tanks foot print. A proposed sump at the chemical loading are will collect contaminated water due to activities occurring below the proposed loading area roof and this water will either be pumped directly into the CatchAll Tank or pumped into the dirty channel sump. • Bunding walls to be constructed around acid tanks to provide emergency containment in an event of tank failure, to prevent mixing of different acids around the tanks and to stop chemical leakage that could result in surface and groundwater contamination. A 1.5m sump to be installed in each bund to temporarily store contaminated water which will be pumped to CatchAll Tank. Contaminated water collected in the CatchAll Tank will be pumped to the E&S for equalization and thereafter recycled. • All proposed stormwater storages/sumps should be maintained to prevent silt potentially reducing the capacities of the sumps. • Stormwater discharge points forming part of the stormwater management plan discharging to the nearest watercourses/natural environment should be positioned outside of the 1:100-year flood lines. • The sumps shall be regularly inspected to ensure the integrity of the liner system. The sumps shall also be emptied on a regular basis avoid overflowing or spillage from sumps. • RBMR shall ensure that required services are sufficient for the bulk chemical storage facility and should it be required, spare equipment such as pumps must be kept on site. • All vehicles shall be on a preventative maintenance schedule to ensure that the equipment is in a good working order to prevent the leakages of oil and diesel. • An inspection programme shall be implemented to ensure that all the mechanical equipment is inspected regularly to ensure the optimal functioning of the equipment. • Bunding areas shall be provided for chemical storage and parking areas. • Spill kits shall be readily available to clean up spillages. • Vehicle parking and chemical loading areas shall be concrete paved. • Contaminated soil shall be removed and treated, re-used or disposed of to an appropriate licensed landfill site or can be removed by a service provider that is qualified to clean the soil. • No direct discharge of polluted water to the environment is permitted, other than may be provided for in the RBMR Water Use Licence, and under appropriate control in terms of the RBMR Water Use Licence. • Runoff from the chemical storage areas shall be contained and managed.	2	1	2	2	2	20	Low (-)
	Improper management and maintenance of oil sumps can result in groundwater contamination	3	3	2	2	2	32	Medium-Low (-)		2	2	2	2	1	18	Low (-)
Surface Water Quality	Spillage of chemicals (acid, formalin and caustic soda) from the bulk chemical storage facility due to failure.	2	3	3	2	2	32	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Surface water contamination as a result of improper chemical storage/handling.	2	3	2	3	2	35	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Contamination of runoff by poor materials/waste handling practices.	2	2	2	2	2	24	Low (-)		2	2	2	1	2	18	Low (-)
	Impact of the project on the MAR of the area calculated to be by approximately 0.0006% at a quaternary scale.	2	2	2	1	2	18	Low (-)		1	1	2	2	1	12	Low (-)
	Contaminated dirty water runoff from the chemical storage site to surrounding areas resulting in the impact on local surface water quality.	2	2	2	2	2	24	Low (-)		2	2	2	1	2	18	Low (-)
Biodiversity	Continued loss of Loss of floral and faunal habitat, species and SCC due to ineffective rehabilitation and edge effects.	2	1	2	2	2	20	Low (-)	*Development footprint* • Continuous monitoring of the infrastructure should be carried out to avoid chemical spills in the future. • No dumping of litter or garden refuse must be allowed on-site. As such it is advised that vegetation cuttings from landscaped areas be carefully collected and disposed of at a separate waste facility. *Alien Vegetation* • Edge effects arising from the proposed development, such as erosion and alien plant species proliferation, which may affect adjacent natural areas, need to be strictly managed. Specific mention in this regard is made of Category 1b AIP species (as listed in the NEMBA Alien species lists, 2016), in line with the NEMBA Alien and Invasive Species Regulations (2014) (Appendix F of the Ecological Assessment Report).	1	1	2	2	1	12	Low (-)

Activity	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
									• Ongoing alien and invasive plant monitoring and clearing/control should take place throughout the operational phase, and the project perimeters should be regularly checked for AIP establishment to prevent spread into surrounding natural areas. • Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility, which complies with legal standards. *Floral and Faunal SCC* • Should the presence of any faunal SCC be noted, or their breeding sites be located within the operational footprint, a suitably qualified specialist should be consulted on the best way to proceed.							
Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	2	2	2	2	2	24	Low (-)	• Mitigation measures may be implemented to reduce dust levels from the entrainment of dust. These measures will range from watering of roads, application of a chemical dust suppressant and/or paving of roads. • A speed limit of 40 km/h or less shall apply to limit vehicle entrained dust from the unpaved roads. • All equipment used must undergo maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution.	2	2	2	2	1	18	Low (-)
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	2	2	2	2	2	24	Low (-)		2	2	2	2	1	18	Low (-)
	Improper handling and storage of formalin may result in release of formaldehyde from the formalin surface into the atmosphere.	2	2	2	2	2	24	Low (-)	• RBMR will ensure that the storage area for formalin is well ventilated •	2	2	2	2	1	18	Low (-)
Traffic	Increase in traffic volumes as a result of transportation of chemicals to the bulk storage facility, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	2	1	2	2	2	20	Low (-)	• Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads. • The number of vehicles transporting chemicals and trips shall be kept to a minimum. • Where possible the transportation of chemicals shall be undertaken outside traffic peak hours to minimise inconveniencing other road users.	1	1	2	2	1	12	Low (-)
	The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	2	1	2	2	2	20	Low (-)		1	1	2	2	1	12	Low (-)
	The increase in traffic within the RBMR precinct as a result of transportation of chemicals to the bulk chemical storage facility leading to	No impacts are anticipated.														

Activity	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
	congestion within RBMR.															
Noise	The use of vehicles and machinery during operation may generate nuisance noise in the immediate vicinity	2	2	2	2	2	24	Low (-)	• Correct Personal Protective Equipment (PPE) must be worn at all times by the personnel at the site. • All equipment should be provided with standard mufflers. Muffling units on vehicles and equipment must be kept in good working order. • Staff working on site should wear ear protection equipment where necessary. • All equipment must be kept in good working order • Regular maintenance of equipment must be undertaken.	2	1	2	2	2	20	Low (-)
Waste Management	Poor waste management during the operation of the bulk chemical storage facility could result in the contamination of surface runoff which may result in the deterioration of water quality of the watercourse.	3	3	2	2	2	32	Medium-Low (-)	• Waste management will be undertaken in line with the Anglo-American Platinum's Zero Waste to Landfill (ZW2L) goal. • For the operational phase, this will entail: o Removal of any hazardous material and re-use, recycling or disposal as a last resort at a licenced facility. o Removal of any general waste and re-use, recycling or disposal as a last resort at a registered waste disposal facility. o Excavation, removal and replacement of contaminated soil/substrate and treatment, re-use, recycling or disposal as a last resort at a registered waste disposal facility. Where re-use, recycling or disposal of waste is required, the following shall apply: *Separation of waste* • All waste shall be separated into general waste and hazardous waste. • Hazardous waste shall not be mixed with general waste • General waste can further be separated in waste that can be recycled and/or reused, if possible • No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste. • Where necessary dedicate a storage area on site for collection of waste. *Storage of waste* • General waste will be collected in an adequate number of litter bins located throughout the site. • Bins must have lids in order to keep rainwater out. • Bins shall be emptied regularly to prevent the bins from overflowing. • All waste management facilities will be maintained in good working order. • Waste shall be stored in demarcated areas according to type of waste. • Flammable substances must be kept away from sources of ignition and from oxidizing agents. • Waste shall not be buried or burned on site. *Disposal of hazardous waste* • No dumping shall be allowed in or near the site. • Hazardous containers shall be disposed of at an appropriate licensed site. • Hazardous waste will be removed and managed by an approved service provider. • A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste. • The safe disposal certificates shall be stored and provided on request. *Disposal of general waste* • No dumping shall take place in or near the project site. • All general waste shall be disposed of to a licensed landfill site.	2	2	2	2	2	24	Low (-)
	Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	3	3	2	2	2	32	Medium-Low (-)		2	2	2	2	2	24	Low (-)

Table 12-5: Summary of the potential impacts that can be expected during the operational phase for the Alternative Options

Activity	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Groundwater	Improper storage and handling of hazardous materials leading to groundwater contamination.	Same as for the Preferred Option.														
	Improper management and maintenance of oil sumps can result in groundwater contamination															
Surface Water Quality	Spillage of chemicals (acid, formalin and caustic soda) from the bulk chemical storage facility due to failure.	Same as for the Preferred Option.														
	Surface water contamination as a result of improper chemical storage/handling.															
	Contamination of runoff by poor materials/waste handling practices.															
	Contaminated dirty water runoff from the chemical storage site to surrounding areas resulting in the impact on local surface water quality.															
Biodiversity	No impacts are anticipated.															
Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	Same as for the Preferred Option.														
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.															
	Improper handling and storage of formalin may result in release of formaldehyde from															

Activity	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
	the formalin surface into the atmosphere.															
Traffic	Increase in traffic volumes as a result of transportation of chemicals to the bulk storage facility, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	Same as for the Preferred Option.														
	The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.															
	The increase in traffic within the RBMR precinct as a result of transportation of chemicals to the bulk chemical storage facility leading to congestion within RBMR.	4	2	4	4	4	80	High (-)	• The impacts on RBMR traffic management cannot be mitigated should the alternative options be implemented.	4	2	4	4	4	80	High (-)
Noise	The use of vehicles and machinery during operation may generate nuisance noise in the immediate vicinity	2	2	2	2	2	24	Low (-)	• Correct Personal Protective Equipment (PPE) must be worn at all times by the personnel at the site. • All equipment should be provided with standard mufflers. Muffling units on vehicles and equipment must be kept in good working order. • Staff working on site should wear ear protection equipment where necessary. • All equipment must be kept in good working order • Regular maintenance of equipment must be undertaken.	2	1	2	2	2	20	Low (-)
Waste Management	Poor waste management during the operation of the bulk chemical storage facility could result in the contamination of surface runoff which may result in the deterioration of water quality of the watercourse.	Same as for the Preferred Option.														
	Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water															

Activity	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
	quality of the watercourse.															

12.4 Closure and Decommissioning Phase of the New Plant

It is not expected that the bulk chemical storage facility will be decommissioned in the foreseeable future. The impacts from the decommissioning and closure are expected to be the same as for construction and have not been assessed in detail. RBMR will apply for an EA for the decommissioning and closure of the plant when the time comes, as per the requirements of Environmental Legislation at that time.

12.5 Decommissioning of Current Plant

The relocation of the bulk chemical storage plant to the new site plant will include the decommissioning and removal of the existing bulk chemical storage plant that is located inside the RBMR boundary. The impacts from the decommissioning and closure of the current bulk chemical storage plant has been assessed separately from the impacts associated with the construction and operation of the new bulk chemical storage plant.

12.5.1 Socio Economic

Anglo will appoint contractors to undertake the decommissioning and closure of the current plant. The contractors are responsible for the recruitment of labour, both casual and specialised, through the Department of Labour.

Due to the fact that during the decommissioning of the existing plant there will be limited employment opportunities, it is expected that the positive impacts (creation of employment) are also expected to be of low (+) significance.

The potential negative socio-economic impacts associated with the decommissioning and closure of the current tanks are as follows:

- Generation of dust potentially resulting in a health and nuisance impact;
- Health and safety risk as a result of the movement of vehicles increasing the risk of accidents;
- Clearing of land which may potentially impact on the sense of place; and
- Potential for squatting of job seekers.

The potential negative impacts on the socio-economic environment are expected to be of low (-) to very low (-) significance.

The cumulative impact on the socio-economic environment during the decommissioning and closure of the existing tanks will be negligible.

The mitigation measures have been included in Table 12-6 and have also been incorporated into the EMPr.

12.5.2 Groundwater

The current tanks are located within the RBMR footprint area, which is characterised by concrete covered grounds and tarred roads. This will limit the potential impact on groundwater as a result of the decommissioning and closure of the tanks and associated infrastructure.

Potential discharges to and subsequent impact on the groundwater system, could potentially occur as a result of:

- The use of earth moving machinery and demolition vehicles on site poses the risk of chemical spillages including fuel and oils;

- Poor handling of runoff from tanks rinsing areas may result in groundwater contamination; and
- Improper storage and handling of hazardous materials.

The impacts on groundwater due to the decommissioning and closure activities are expected to be of medium-low (-) and low (-) significance.

The cumulative impact on groundwater during the decommissioning and closure of the current tanks will be negligible.

12.5.3 Surface Water

As described in Section 5.1, all equipment will be cleaned per the requirements of the MSDS of the chemicals at the plant. The potential impacts on surface water during the decommissioning and closure of the tanks are as follows:

- Poor stormwater management leading to runoff from the tanks rinsing areas causing pollution of water resources;
- Accidental spillages of hazardous substances from vehicles used during decommissioning and closure, as well as from hazardous storage areas;
- Contamination of runoff by poor materials/waste handling practices;
- Debris from poor handling of materials and/or poor waste management practises; and
- Increase of surface runoff and potentially contaminated water that needs to be controlled in the areas where the demolition occurred.

It is expected that without the implementation of mitigation measures, the impacts on the surface water quality and the hydrology of the area will be of medium-low (-) significance, which can be reduced to low (-) significance with the implementation of mitigation measures.

The cumulative impact on surface water during the decommissioning and closure of the current tanks will be negligible.

12.5.4 Wetlands

There are no wetlands located where the tanks are located, as such no impacts on aquatic ecosystems are anticipated. The impacts on wetlands will be the same for both the preferred option and considered alternatives (no impacts) and there will be no cumulative impact on wetlands during the decommissioning and closure phase of the tanks.

12.5.5 Air Quality and Climate Change

The movement of decommissioning vehicles and earth moving machinery will likely result in an increase in nuisance dust, PM_{10} and $PM_{2.5}$. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and decommissioning machinery. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust.

The impacts on air quality is calculated to be of low (-) significance and can be reduced to low (-) significance when the mitigation measures have been implemented.

The movement of vehicles and earth moving machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area. The impact on climate change was calculated to be of very low (-) significance and can be mitigated to negligible (-) significance.

The cumulative impact on air quality and climate change during the decommissioning and closure of the tanks will be negligible.

12.5.6 Noise

The use of vehicles and machinery may result in an increase in ambient noise in the immediate vicinity of the project. However, due to the location of the current tanks, where significant activities are already taking place at the RBMR , the significance of the increased ambient noise levels, if at all, is expected to be of low (-) significance (before and after the implementation of mitigation measures).

The cumulative impact on noise during the decommissioning and closure of the current tanks will be negligible.

12.5.7 Visual

The following potential impacts on the visual character of the area as a result of the proposed project are envisaged during the decommissioning and closure:

- Visual intrusion as a result of the movement of machinery; and
- Indirect visual impact due to dust generation, as a result of the movement of vehicles and materials, to and from the site area.

It is also expected that due to the location of the current tanks, where significant activities are already taking place on RBMR, the significance of the visual impacts will be of low (-) significance (before and after the implementation of mitigation measures).

The cumulative visual impact during the decommissioning and closure of the tanks will be negligible.

12.5.8 Soils, Land Use and Land Capability

Prior to the establishment of the RBMR, where the current tanks are located, the land was mainly utilised for agricultural purposes by nearby farmers. With the establishment of the RBMR the land capability and land use of these areas was drastically minimised. The establishment of the RBMR included the stripping of the topsoil for construction and paving of the ground with concrete and tar resulting in the loss of soil potential.

It must however be noted that, some leakage of chemicals into soils around the plant has occurred. The area will be rehabilitated once the tanks have been removed as described in Section 5.2

The decommissioning of the current tanks will have no impact on land use and land capability but will have localised low (-) significance impacts on soils prior to implementation of rehabilitation. The significance of impacts will be reduced once rehabilitation of the area has been undertaken.

There will be negligible cumulative impact on soils due to the decommissioning of the tanks.

12.5.9 Biodiversity

The current tanks are located in an area where the clearance of vegetation has already been undertaken as part of the construction RBMR. This means that the proposed of the current tanks will not have any impacts on biodiversity in the area.

The decommissioning of the current tanks is also expected to not have any cumulative impact on biodiversity.

12.5.10 Heritage

The current tanks are located within an area that was stripped of any heritage resources that may have been located in the area for the construction of the RBMR. It is therefore expected that the decommissioning of the current tanks will have no impact on any heritage resources.

12.5.11 Traffic

Most of the traffic will be associated with the delivery of demolished infrastructure from the site to a waste site. The waste will be transported to the site via public roads, but that will only require a few trucks a day. Therefore, limited impact on public traffic is expected. The significance of the impacts on traffic was classified as low (-) significance, which can be mitigated to very low (-).

The cumulative impact on traffic during the decommissioning of the current tanks will be negligible.

12.5.12 Waste Management

The decommissioning of the current plant will result in creation of waste that will need to be managed. Improper management of waste will result in:

- Contamination of surface runoff resulting in the deterioration of water quality of the watercourse.
- Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.
- Stockpiling material from the decommissioned plant may result in secondary pollution and contamination of the watercourses.

The potential impacts from improper management of waste are expected to have a medium-low (-) impact, and these can be mitigated to low (-) significance impacts.

The cumulative impact on traffic during the decommissioning of the current tanks will be negligible.

The results of the quantitative impact assessment for the decommissioning of the current tanks are provided in Table 12-6.

Table 12-6: Quantitative Impact Assessment Results for the Decommissioning and Closure of Current Tanks

Aspect	Nature **of potential impact/risk**	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Social-economic	Possible boost in short term employment and local small business opportunities.	2	2	2	2	2	24	Low (+)	• Where possible, encourage the local employment for the following: • Reduce speed limits to 40 km/h or less. • No fires are allowed on the site, unless in areas demarked and managed for this purpose. • All workers will be made aware of fire risks. • All workers must be provided with PPE and RBMR and contractors must ensure that their personnel make use of PPE and get tested where necessary. •	1	1	2	3	5	32	Low (+)
	Potential impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly.	2	1	3	1	2	18	Low (-)		2	1	2	2	2	20	Low (-)
	Health and safety risk as a result of the movement of vehicles increasing the risk of accidents	2	1	3	1	2	18	Low (-)		1	1	3	1	2	15	Low (-)
	Health risk due to contagious diseases (such as the Corona virus) due to working in close proximity to each other	2	2	2	2	2	24	Low (-)		1	1	3	1	2	15	Low (-)
	Potential squatting of job seekers.	2	1	3	1	2	18	Low (-)		1	1	3	1	2	15	Low (-)
Groundwater	Local spillages of oils from vehicles and machinery leading to groundwater contamination.	2	2	2	2	2	24	Low (-)	• RMBR, where the current plant is located, is characterised by concrete covered grounds and tarred road which will limit the probability of infiltration to groundwater. • No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment will be clearly demarcated and will not be allowed to contaminate any surface runoff. • Sufficient areas shall be provided for the maintenance and washing of vehicles. • Refuelling of vehicles will only be allowed in designated areas. • All decommissioning equipment shall be parked in a demarcated area. Drip trays shall be used when equipment is parked for some time. • Surface bulk storage of hydrocarbons must be situated in a dedicated area, which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the substance. • Bunded areas shall follow relevant standards for hazardous chemicals (SANS 310). • Bund areas must be impermeable. • Bund areas must have a facility such as a valve/sump to drain or remove clean stormwater. • Contaminated water shall be pumped into a container for appropriate removal and disposal. • Regular inspections shall be carried out to ensure the integrity of the bund walls. • All servicing of earth moving equipment and vehicles shall be conducted in designated areas. • The handling, rinsing and management of the current tans will be conducted per the requirements of the MSDS for the tanks attached in Appendix E. • RBMR will dedicate an area to rinsing and handling of the tanks. • The area will be adequately protected by concrete and bunded to ensure no leakage of rinsing water/solution seeps and contaminates groundwater. • The run-off from the rinsing area will be directed into existing drains/channels that drain into the existing lined and licensed Pollution Control Dam (PCD).	2	1	2	2	2	20	Low (-)
	Improper storage and handling of hazardous materials leading to groundwater contamination.	2	2	2	2	2	24	Low (-)		2	1	2	2	2	20	Low (-)
	Potential groundwater contamination from poor management of runoff from rinsing water/solution which my percolate into the groundwater.	2	3	3	2	2	32	Medium-Low (-)		2	1	2	2	2	20	Low (-)

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**							**Impact Management Actions (Proposed Mitigation Measures)**	**Environmental Impact Significance After Mitigation**						
		Consequence			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**		**Consequence**			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**
		Severity	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**				**Severity**	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**		
									• RBMR shall ensure that the PCD has sufficient capacity to handle the runoff from the rinsing area.							
Surface Water Quality	Potential deterioration in water quality as a result of accidental spillages of hazardous substances such as hydrocarbons from vehicles and machinery used during the decommissioning and closure of the current plant.	2	3	3	2	2	32	Medium-Low (-)	• Ensure the clean and dirty water segregation. • Spill kits to be made available at areas of possible spillages of hazardous substances. • Remediation of spillages must be conducted on a continual basis. • Contaminated runoff will be contained and re-used where necessary. • Maintain current monitoring and management of the overall RBMR. • No direct discharge of polluted water to the environment is permitted.	2	2	2	2	2	24	Low (-)
	Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	2	3	2	3	2	35	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Deterioration of water quality as a result of improper handling/ of chemicals.	2	3	2	3	2	35	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Poor stormwater management leading to runoff from stockpiled material removed causing pollution of the water resources.	2	3	2	2	2	28	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	2	3	2	2	2	28	Medium-Low (-)		2	2	2	1	2	18	Low (-)
	Increase of surface runoff and potentially contaminated water that needs to be contained in the areas where site demolition occurred.	2	3	2	2	2	28	Medium-Low (-)		2	2	2	1	2	18	Low (-)
	Potential water contamination from poor management of runoff from rinsing water/solution	2	3	3	2	2	32	Medium-Low (-)	• The handling, rinsing and management of the current tanks will be conducted per the requirements of the (MSDS for the tanks attached in Appendix E. • RBMR will dedicate an area to rinsing and handling of the tanks. • The area will be adequately protected by concrete and bunded to ensure no leakage of rinsing water/solution seeps and contaminates groundwater. • The run-off from the rinsing area will be directed into existing drains/channels that drain into the existing lined and licensed Pollution Control Dam (PCD). • RBMR shall ensure that the PCD has sufficient capacity to handle the runoff from the rinsing area.	2	1	2	2	2	20	Low (-)
Wetlands and Aquatic Ecosystems	No impacts are anticipated.															
Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	2	2	2	2	2	24	Low (-)	• A speed limit of 40 km/h or less shall apply to limit vehicle entrained dust from the unpaved roads. • All equipment used in the decommissioning process must undergo maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution. • Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be kept on file.	2	2	2	2	1	18	Low (-)
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	2	2	2	2	2	24	Low (-)		2	2	2	2	1	18	Low (-)

Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Climate change	Emissions of Green House Gases as a result of the use of vehicles and machinery used during the decommissioning and closure activities.	2	2	2	2	2	24	Low (-)	• All the vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.	2	2	2	2	1	18	Low (-)
Heritage and Palaeontology Resources	No impacts are anticipated.															
Biodiversity	No impacts are anticipated.															
Visual	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	2	1	2	2	2	20	Low (-)	• Dust control measures shall be implemented to make sure nuisance dust is kept at a minimum.	1	1	2	2	1	12	Low (-)
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	1	2	2	2	20	Low (-)		1	1	2	2	1	12	Low (-)
Noise	The use of vehicles and machinery during the decommissioning and closure phase may generate nuisance noise in the immediate vicinity	2	2	2	2	2	24	Low (-)	• Correct personal Protective Equipment (PPE) must be worn at all times by the personnel at the site. • All equipment should be provided with standard mufflers. Muffling units on vehicles and equipment must be kept in good working order. • Staff working on site should wear ear protection equipment where necessary. • All equipment must be kept in good working order • Equipment must be operated within specifications and capacity (e.g. no overloading of machines). • Regular maintenance of equipment must be undertaken.	2	1	2	2	2	20	Low (-)
Soils, land use and land capability		3	2	2	2	2	28	Low (-)	• Geotechnical investigations must be undertaken to determine the ingress by acids encountered on the fill material and the underlying norite rock; • Contaminated soil will be excavated, removed, re-used, recycled and disposal only, as a last resort to an authorized landfill site. and • Where required, suitable material will be imported. All backfilling and compaction and testing thereof will be done in accordance with the Engineer's specifications.	2	1	2	2	2	20	Low (-)
Traffic	Increase in traffic volumes as a result of transportation of materials from the current plant site during and after decommissioning and closure, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	2	2	2	2	2	24	Low (-)	• Speed limits will be reduced to 40 km/h or less to reduce dust and noise generation. • All the vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.	1	1	2	2	1	12	Low (-)
	The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	2	2	2	2	2	24	Low (-)		1	1	2	2	1	12	Low (-)
Waste Management	Poor waste management during decommissioning and closure could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	3	3	2	2	2	32	Medium-Low (-)	• Waste management will be undertaken in line with the Anglo American Platinum's Zero Waste to Landfill (ZW2L) goal. • For the decommissioning and closure of the current plant, this will entail: o Removal of any hazardous material, including contaminates soils and re-use, recycling or disposal as a last resort at a licenced facility.	2	2	2	2	2	24	Low (-)

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**							**Impact Management Actions (Proposed Mitigation Measures)**	**Environmental Impact Significance After Mitigation**						
		Consequence			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**		**Consequence**			**Probability**		**Significance (Degree to which impact may cause irreplaceable loss of resources/damage)**	**Significance Rating**
		Severity	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**				**Severity**	**Spatial**	**Duration**	**Frequency: Activity**	**Frequency: Impact**		
									o Removal of any general waste and re-use, recycling or disposal as a last resort at a registered waste disposal facility. and o Excavation, removal and replacement of contaminated soil/substrate and treatment, re-use, recycling or disposal as a last resort at a registered waste disposal facility. Where reuse, recycling and disposal of waste is required, the following shall apply: *Separation of waste* • All waste shall be separated into general waste and hazardous waste. • Hazardous waste shall not be mixed with general waste • General waste can further be separated in waste that can be recycled and/or reused, if possible • No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste. • Where necessary dedicate a storage area on site for collection of waste. *Storage of waste* • General waste will be collected in an adequate number of litter bins located throughout the site. • Bins must have lids in order to keep rainwater out. • Bins shall be emptied regularly to prevent the bins from overflowing. • All work areas shall be kept clean and tidy at all times. • All waste management facilities will be maintained in good working order. • Waste shall be stored in demarcated areas according to type of waste. • Flammable substances must be kept away from sources of ignition and from oxidizing agents. • No builder's rubble shall be disposed of to the riparian area. • If builder's rubble is not removed immediately it shall be stockpiled outside the 1:50 year flood line and outside the sensitive riparian areas. • Demolition waste and surplus concrete shall be disposed of responsibly. • Waste shall not be buried or burned on site. *Disposal of hazardous waste* • No dumping shall be allowed in or near the site. • Hazardous containers shall be disposed of at an appropriate licensed site. • Hazardous waste will be removed and managed by an approved service provider. • A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste. • The safe disposal certificates shall be stored and provided on request. *Disposal of general waste* • No dumping shall take place in or near the project site. • All general waste shall be disposed of to a licensed landfill site. • Demolition waste and builder's rubble shall be disposed of to an appropriate licensed landfill site.							

12.6 Cumulative Impacts

Incomparable activities can result in several complex effects on the natural biophysical and social environment. These impacts are mainly identified as direct and immediate effects on the environment by a single entity affecting a variable of the environment. These direct impacts have the potential to combine and interact with other activities, depending on the surrounding environmental state and land use. These impacts may aggregate or interact with other impacts to cause additional effects, not easily quantified when assessing an individual entity.

The NEMA, 2014, specifically requires that cumulative impacts be assessed. This section provides a description and analysis of the potential cumulative effects of the proposed Bulk chemical storage facility, and past and present projects hereby considering the effects of any changes on the:

- Biophysical; and
- Socio – Economic conditions.

For the analysis of cumulative effects to be utilised as a useful tool for decision makers and stakeholders, it must be limited to the effects that can be meaningfully evaluated, rather that expanding on resources or receptors that are no longer affected by the development or are not of interest to the stakeholders. Two important aspects require consideration prior to the evaluation of cumulative effects:

- The determination of an appropriate spatial and temporal boundaries for evaluation of cumulative effects of the project; and
- The evaluation of relevant projects for consideration in the cumulative effects' analysis.

Spatial and temporal boundaries for analysis of cumulative effects are dependent on several factors, including:

- The size and nature of the project and its potential effects;
- The size, nature and location of past and (known) future projects and activities in the area,
- The aspect of the environment impacted by the cumulative effect; and
- The period of occurrence of effects.

The spatial extent of the cumulative impact analysis is generally aligned with the zone of influence of the project and other projects in the vicinity. Most impact will be localised; however, others may be experienced on a regional scale. This is taken into consideration during the assessment of cumulative impacts. It is reasonably straightforward to identify significant past and present projects and activities that may interact with the Bulk chemical storage facility project to produce cumulative impacts, and in many respects, these are taken into account in the descriptions of the biophysical and socio- economic baseline.

12.6.1 Hydrological and Surface Water Impacts

The potential groundwater and surface water quality impacts associated with the construction and operation of the bulk chemical storage facility relate to the potential contamination as a result of leakages from vehicles and machinery and from the rinsing of the current tanks. Mitigation measures have been proposed for the impacts on ground water and surface water contamination. It is expected that with the implementation of the mitigation measures, including the SWMP, these impacts will be reduced to an acceptable level. The hydrological and surface water cumulative impacts resulting from the construction and operation of the bulk chemical storage facility will be negligible.

12.6.2 Air Quality Impacts

Most of the land use in the vicinity of the RBMR where the bulk chemical storage facility is located is mostly industrial and mining in nature; it is known that pollutants also enter the environment from these sources. The potential air quality impacts associated with the construction and operation of the bulk chemical storage facility relate to the potential generation of $PM_{2.5}$, PM_{10} and fugitive dust emissions as a result of vehicular movements.

In addition to the above, formalin to be stored at the bulk chemical storage facility is also considered volatile as the formaldehyde can evaporate easily from the formalin surface. However, according to the (WRC, 2011) , formaldehyde does not raise any serious human health or environmental concerns, provided it is properly handled and stored. When released into the air, it is rapidly broken down by photolysis. When released into water, it is biodegraded within a few days. It is therefore expected that should any cumulative impacts occur from storage of formalin at the bulk chemical storage facility, the impacts will be short lived and be of low significance.

Mitigation measures have been proposed to mitigate these adverse impacts. It is expected that the implementation of these mitigation measures will reduce the impacts to an acceptable standard. It is expected that the cumulative air quality impacts from the construction and operation of the bulk chemical storage facility will be negligible.

12.6.3 Biodiversity

The study area has already been disturbed and fragmented from nearby natural habitat and is associated with high levels of anthropogenic activities that occur on mines. The proposed development will result in the clearance of vegetated areas and the displacement of faunal species within the local area due to the proposed bulk chemical storage facility and associated infrastructure. Furthermore, ineffective control and monitoring of edge effects can result in the spread of AIP species to the surrounding natural areas, which will further alter faunal habitat and subsequently faunal diversity within this area. The proposed new infrastructure should be monitored in the long term to ensure no leaks occur into the receiving environment and its atmosphere as they are extremely hazardous to fauna.

Due to the limited size of the development footprint and the peri-urban landscape of the study area, it is highly unlikely that the proposed development will impact conservation targets for sensitive faunal species.

12.6.4 Heritage Resources

According to the HIA, the establishment of the proposed bulk chemical storage facility adds to the existing infrastructure within the study area and, in so doing, decreases the area of open land on which heritage resources couldpotentially exist.

12.6.5 Noise Impacts

The potential noise nuisance associated with the construction and operation of the bulk chemical storage facility relates to the movement of vehicles and operation of machinery on site. Mitigation measures have been proposed to avoid and/or reduce the nuisance noise impacts. It is expected that with the implementation of the mitigation measures the impacts will be reduced to an acceptable level.

Most of the land use in the vicinity of the RBMR where the bulk chemical storage facility is located is mostly industrial and mining in nature, land uses associated with significant nuisance noise levels. It is anticipated that the cumulative noise impacts from the construction and operation of the bulk chemical storage facility be negligible.

13 Assumptions, Uncertainties and Gaps in Knowledge

13.1 Assumptions

Technical data and information provided by external specialists to SRK during the EIA were checked and reviewed for quality assurance by SRK. All the data and information are assumed to be accurate and still applicable. It is assumed that the applicant will comply with all legislation pertaining to the activities of this proposed project and that all permits and license that may be required will be identified and applied for prior to commencement of construction activities.

The public participation process has been sufficiently effective in identifying the critical issues needing to be addressed in the EIA / EMPr by the EAP. The public participation process has sought to involve key stakeholders, including the Competent Authority (DEDECT). Wherever possible the information requested, and comments raised by I&AP's during the scoping phase has been sufficiently addressed and incorporated into the Draft EIA / EMPr report for review and comment. These requests and any further comments will be tracked and recorded in the CRR contained in Appendix H 6.

SRK assumes that RBMR will implement the measures contained in the EMPr and will adhere to any monitoring procedures developed for the project. A monitoring and evaluation system, including auditing, will be established and operationalised to track the implementation of the EMPr, ensuring that management measures are effective to avoid, minimise and mitigate impacts and that corrective action is being undertaken to address shortcomings and/or non-conformances.

13.2 Limitations

Limitations relevant to each specialist study conducted are provided below.

13.2.1 Ecological Study

The following assumptions and limitations apply to the ecological assessment:

- The biodiversity assessment was confined to the study area and did not include the neighbouring and adjacent properties. These were considered as part of the desktop assessment;
- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. The assessment occurred late in July and thus several floral species (especially grasses) were no longer in flower, making identification of these species difficult. Furthermore, many of the underground forbs which could potentially occur within the study area had yet to re-sprout. It is, however, expected that most floral and faunal communities were accurately assessed and considered, with all relevant online sources and background information utilised to improve on the overall understanding of the study area's ecology;
- Due to the nature and habits of most faunal taxa, it is unlikely that all species would have been observed during a field assessment of limited duration. Due to the locality of the study area within a peri-urban landscape where continuous anthropogenic activities occur, the cyclical nature of many species' life stages, as well as the season of the assessment, resulted in very few faunal species being observed. As such, background data (desktop) and literature studies (previous studies undertaken in the immediate area) were used to further infer faunal species composition and sensitivities in relation to the available habitat;

- Sampling, by its nature, means that not all individuals are assessed and identified. Some species and taxa associated with the study area may have been missed during the assessment; and
- The data presented in this report are based on one site visit, undertaken on the 24th of July 2020 (winter). A more accurate assessment would require that assessments take place in all seasons of the year. However, on-site data was augmented with all available desktop data. Together with project experience in the area, the findings of this assessment are considered to be an accurate reflection of the ecological characteristics of the study area.

13.2.2 Heritage Resources

The assumptions made during the heritage resources assessment are provided in Table 13-1.

Table 13-1: Constraints and Limitations

Description	Consequence
Whilst every attempt was made to obtain the latest available information, the reviewed literature does not represent an exhaustive list of information sources for the various study areas.	The cultural heritage baseline presented in The HIA Report considered up to date and accurate.
Archaeological resources commonly occur at subsurface levels. These types of resources cannot be adequately recorded or documented by assessors without destructive and intrusive methodologies and without the correct permits issued in terms of Section 35 of the NHRA.	The reviewed literature previously completed heritage assessments and the results of the field survey are in themselves limited to surface observations. Subsurface tangible heritage may be exposed during Project activities. Should this occur, RBMR must alert the HRAs of the find and may need to enlist the services of a suitably qualified archaeologist to advise them on the way forward.
Only the preferred infrastructure layout was assessed in the HRM process. The assessment included the proposed paving of the current gravel road to the Dam 3B Desilting Dewatering Plant and installation of siding on the existing railway line. Alternative options 1 and 2 were excluded from this process.	Where the preferred option is no longer feasible, or is not implemented for any reason, the selected alternative must be subject to in-field assessment prior to the commencement of the construction phase of the Project. Any new or additional proposed infrastructure must be assessed by a suitably qualified heritage practitioner prior to implementation or construction.
Whilst every attempt was made to survey the extent of the site-specific study area, the HIA Report does not present an exhaustive list of identified heritage resources.	Every effort was made to cover the extent of the site-specific study area, however, as noted above, archaeological resources commonly occur at subsurface levels. Previously unidentified heritage resources may be encountered. Should this occur, RBMR must alert the HRAs of the find and may need to enlist the services of a suitably qualified archaeologist or palaeontologist to advise them on the way forward.
The railway line was not assessed in the field. This is an active railway line and was not deemed safe to inspect or survey.	The railway was constructed as part of the RBMR activities. No additional impacts to heritage resources are envisaged from the proposed installation of siding on the railway line.

14 Environmental Management Programme

An EMPr was compiled in accordance with Appendix 4 of GNR 326 of the NEMA. The EMPr provides effective management and mitigation measure pertaining to the proposed development relating to the identified environmental impacts. The management and mitigation measures in the EMPr are deemed adequate to minimise and/avoid the negative impacts of the proposed development and enhance the positive impacts.

The EMPr has been included in Appendix I.

16 Period for which the Environmental Authorisation should be issued

The proposed bulk chemical storage facility will be permanent and, it is requested that the Environmental Authorisation be issued for a period of 40 years.

18 Opinion and Conditions on Authorisation

The construction of the bulk chemical storage facility must be conducted under duty of care and must be in accordance with the mitigation measures that were included in the EMPr to ensure that impacts are prevented and if they do occur they are kept to the minimum. The EAP recommends that the bulk chemical storage facility be authorised for a period of 40 years and the following recommendations should be adhered to:

- Bulk storage of hydrocarbons must be undertaken in a dedicated area and must include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the substances;
- Waste management will be undertaken in line with the Anglo American Platinum's Zero Waste to Landfill (ZW2L) goal., ensuring that production of waste through all phases of the project is kept to a minimum and that recycling and re-use of waste is undertaken as much as possible, with disposal of waste being the last resort.
- The cleaning of the current tanks shall be undertaken in compliance with the recommendations of the MSDS of the chemicals.
- No dumping of waste shall be permitted. If any spills occur, they should be immediately cleaned up;
- All vehicles shall be inspected for leaks on a regular basis. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil;
- Informal fires by construction personnel within the study area shall be prohibited;
- Adequate SWMP must be incorporated into the design of the project in order to prevent pollution of water resources;
- The applicant must appoint an ECO who will oversee the implementation of the EMPr and submit annual compliance reports to the DEDECT;
- The proposed development footprint shall be kept to a minimal;
- All hazardous storage containers, storage areas and bunding areas for hazardous substances must comply with the relevant SANS standards to prevent leakage;
- The time in which soils are exposed during construction activities should remain as short as possible;
- It must be ensured that soil disturbance does not occur outside of the development footprint, as to ensure that further alien proliferation does not occur within the vicinity of the development footprint, which would further reduce the present ecological state of the surrounding area; and
- Exotic or invasive plants shall be controlled as they emerge, as such, an alien vegetation control program must be developed and implemented within all disturbed areas.
- All areas of disturbed and compacted soils need to be ripped and reprofiled;
- No dumping of waste shall be permitted. If any spills occur, they should be immediately cleaned up;
- All vehicles shall be inspected for leaks on a regular basis. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil;
- No trapping or hunting of faunal species is to take place during all phases of the proposed project;

- Upon completion of construction activities, it must be ensured that indigenous vegetation is reintroduced and used for landscaping, where possible.
- Regular inspection and maintenance of the bulk chemical storage facility and associated infrastructure shall be undertaken during the operation phase to ensure the integrity of the plant is not compromised.

19 Environmental Impact Statement

This section of the report presents the outline of:

- The key findings of the Impact Assessment; and
- A comparative assessment of the positive and negative implications of the proposed development and identified alternatives.

An EIA has been conducted in accordance with the EIA regulations which included the required PPP aimed at the key Organs of State and the identified I&APs. Where potential biophysical or social impacts have been identified mitigation and management measures have been proposed to control and monitor the magnitude of impacts associated with the various aspects of the proposed project.

The proposed project is justified through the manageable environmental impacts and positive benefits resulting from the operation of the proposed project.

19.1 Summary of the Key Findings

19.1.1 Preferred Option

The potential impacts evident from the detailed impact assessment of the proposed project are both positive and negative in nature. The identified and assessed negative impacts can be managed to acceptable levels.

Most of the negative impacts identified i.e. impacts of particulate mobilisation, increased nuisance noise, visibility due to dust plumes, potential soil and groundwater pollution due to oil and diesel will take place during all phases of the project. However, the impacts are expected to be of low and medium ;low significance and the periods of the majority of the impacts will be of short duration.

Particulate mobilisation is easily and effectively controlled by dust suppression and the potential for soil and groundwater pollution will be mitigated by taking due care to prevent spillages of oil and diesel and to clean up any spillages that might occur. In addition, the design of the facility includes oil sumps which will lined to avoid and/limit contamination of water resources during the operation of the facility. A SWMP has been compiled that the RBMR will also implement to ensure that clean and dirty water is separated and that water resources are protected.

There are no protected species or SCC located on the proposed project site and overall loss of biodiversity will be of low significance, limited to the footprint of the facility. In fact, the proposed project will also have a positive impact, albeit (of low significance) on biodiversity as it will result in removal of Alien Invasive Plant Species currently on the property.

All the identified cumulative impacts are expected to be of low significance and implementation of mitigation measures will render the potential cumulative impacts negligible.

The main positive impacts of the proposed project will be that it will allow the RBMR to avoid the potential impacts associated with the failure of the current plant. The creation of employment will be of low significance as it will be limited to the construction phase of the project and will therefore be short lived. The operation of the plant will be undertaken by RBMR.

The mitigation measures in the EMPr (Appendix I) are deemed adequate to avoid and/or minimise further degradation of the environment. In the long term, effective implementation of mitigation measures (as recommended in the EMPr) may also result in positive impacts in terms of control of alien vegetation.

The preferred option was based on:

- Reduction in vehicle - pedestrian interaction by reducing number of acid offloading trucks;

- Elimination of rail deliveries traffic within the RBMR facility; and
- Reduction of congestion at the RBMR entrance Gates and Weighbridge.

Furthermore, this option has been designed and will be engineered to mitigate many of the significant risks identified and associated with this option.

19.1.2 Alternatives Assessment

Due to the location of the alternatives, which is within the RBMR plant area where the area has been sanitized by the construction and operation of RBMR, the potential impacts during the construction phase are expected to generally be lower than the impacts from the preferred option. The construction of the alternatives will have no impacts on heritage resources and no chance findings are anticipated, biodiversity and soil, land use and land capability. Potential impacts on water resources (ground and surface) are also expected to be of lower significance compared to the preferred option.

The operation of the alternative options will mostly have the same impacts as the preferred option, with the exception of the impacts on RBMR operations. The alternatives will result in:

- Increased vehicle - pedestrian interaction by reducing number of acid offloading trucks;
- Increased rail deliveries traffic within the RBMR facility; and
- Increased congestion at RBMR entrance Gates and Weighbridge.

19.1.3 No-go alternative

The no-go option will entail leaving the situation as is and not implementing the project. With this option, all the negative environmental impacts associated with the construction of the bulk chemical plant will be avoided.

However, it must be noted that although various monitoring and preventative measures have been put in place and implemented to avoid any further spills at the current plant and repairs have been implemented around the bund to attempt to contain any further contamination or leaks, these measures are unfortunately not long-term solutions and they will not contain a catastrophic failure or major rain event. The heaving of soils is predicted to continue for the foreseeable future and will increase with the advent of the rainy season and any further leaks, which are highly likely. With the unpredictable rainfall pattern, RBMR needs to ensure 100% integrity of the structures at the plant. The behaviour of the underground soil movements is unpredictable. i.e. when and how much of the heaving is going to continue. The unforeseen and unpredictable nature of the heaving soils within the various bunds, combined with the condition of the steel and concrete structures and walls makes this project an extreme emergency.

Should the current plan fail, the implication of it are far reaching from both an environmental, socio-economic and plant safety perspective (See Section 7.1).

The no-go option is therefore not recommended.

19.2 Comparative Assessment of Impacts from the Preferred Option and Alternatives

A summary of the significance of impacts as a result of the preferred option compared to the alternative locations is provided in Table 19-1.

Table 19-1: Summary of Findings from Quantitative Impact Assessment (Preferred Option and Alternatives)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
Construction	Socio-Economic	Possible boost in short term employment and local small business opportunities.	Low (+)	Low (+)	Low (+)	Low (+)
		Potential impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		Health and safety risk as a result of the movement of vehicles increasing the risk of accidents	Low (-)	Low (-)	Low (-)	Low (-)
		Health risk due to contagious diseases (such as the Corona virus) due to working in close proximity to each other	Low (-)	Low (-)	Low (-)	Low (-)
		Potential squatting of job seekers.	Low (-)	Low (-)	Low (-)	Low (-)
	Groundwater	Local spillages of oils from vehicles and machinery leading to groundwater contamination.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
		Improper storage and handling of hazardous materials leading to groundwater contamination.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
	Surface Water Quality	Potential deterioration in water quality as a result of accidental spillages of hazardous substances such as hydrocarbons from vehicles and machinery used during the construction of the current plant.	Medium-Low (-)	Low (-)	Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
		Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
		Deterioration of water quality as a result of improper handling/ of chemicals.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
		Poor stormwater management leading to runoff from stockpiled material removed causing pollution of the water resources.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
		Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
		Increase of surface runoff and potentially contaminated water that needs to be contained in the areas where site demolition occurred.	Medium-Low (-)	Low (-)	Low (-)	Low (-)
	Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	Low (-)	Low (-)	Low (-)	Low (-)
		Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	Low (-)	Low (-)	Low (-)	Low (-)
	Climate change	Emissions of Green House Gases as a result of the use of vehicles and machinery used during the construction activities.	Low (-)	Low (-)	Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
	Heritage and Palaeontology Resources	Although no heritage resources were identified, there is potential for chance findings of heritage resources.	Low (-)	No impacts	Low (-)	N/A
	Flora	Loss of vegetation species including vegetation species of conservational concern due to indiscriminate movement of vehicles and personnel.	Low (-)	No impacts	Low (-)	N/A
		Proliferation of alien invasive species due to ineffective management and control of alien invasive plant species.	Low (-)	No impacts	Low (-)	N/A
	Fauna	Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	Low (-)	No impacts	Low (-)	N/A
	Visual	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	Low (-)	Low (-)	Low (-)	Low (-)
		Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	Low (-)	Low (-)	Low (-)	Low (-)
	Noise	The use of vehicles and machinery during the construction phase may generate nuisance noise in the immediate vicinity	Low (-)	Low (-)	Low (-)	Low (-)
	Soil, Land use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	Low (-)	No impacts	Low (-)	N/A

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
		Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	Low (-)	No impacts	Low (-)	N/A
		Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	Low (-)	No impacts	Low (-)	N/A
		Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to stripping and stockpiling footprint areas.	Low (-)	No impacts	Low (-)	N/A
	Traffic	Increase in traffic volumes as a result of transportation of materials for construction, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		The increase in traffic within the RBMR precinct as a result of transportation of construction material leading to congestion within RBMR.	No impacts anticipated.	High (-)	N/A	High (-)
	Waste Management	Poor waste management during construction could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
		contamination of surface runoff resulting in the deterioration of water quality of the watercourse.				
		Stockpiling material from the decommissioned plant may result in secondary pollution and contamination of the watercourses.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
Operational	Groundwater	Improper storage and handling of hazardous materials leading to groundwater contamination.	Low (-)	Low (-)	Low (-)	Low (-)
		Improper management and maintenance of oil sumps can result in groundwater contamination	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
	Surface Water Quality	Spillage of chemicals (acid, formalin and caustic soda) from the bulk chemical storage facility due to failure.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		Surface water contamination as a result of improper chemical storage/handling;	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)
		Contamination of runoff by poor materials/waste handling practices.	Low (-)	Low (-)	Low (-)	Low (-)
		Contaminated dirty water runoff from the chemical storage site to surrounding areas resulting in the impact on local surface water quality.	Low (-)	Low (-)	Low (-)	Low (-)
	Biodiversity	Continued loss of Loss of floral and faunal habitat, species and SCC due to ineffective rehabilitation and edge effects.	Low (-)	No impact	Low (-)	N/A

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
	Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	Low (-)	Low (-)	Low (-)	Low (-)
		Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	Low (-)	Low (-)	Low (-)	Low (-)
		Improper handling and storage of formalin may result in release of formaldehyde from the formalin surface into the atmosphere.	Low (-)	Low (-)	Low (-)	Low (-)
	Traffic	Increase in traffic volumes as a result of transportation of chemicals to the bulk storage facility, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	Low (-)	Low (-)	Low (-)	Low (-)
		The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	Low (-)	Low (-)	Low (-)	Low (-)
		The increase in traffic within the RBMR precinct as a result of transportation of chemicals to the bulk chemical storage facility leading to congestion within RBMR.	No impact	High (-)	N/A	High (-)
	Noise	The use of vehicles and machinery during operation may generate nuisance noise in the immediate vicinity	Low (-)	Low (-)	Low (-)	Low (-)
	Waste Management	Poor waste management during the operation of the bulk chemical storage facility could result in the	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)		Significance Rating (post mitigation)	
			Preferred Option	Alternatives	Preferred Option	Alternatives
		contamination of surface runoff which may result in the deterioration of water quality of the watercourse.				
		Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	Medium-Low (-)	Medium-Low (-)	Low (-)	Low (-)

19.3 Decommissioning of the Current Plant

The proposed project will require decommissioning and removal of the current tanks.

Due to the location of the current tanks, which is within the RBMR plant area where the area has been sanitized by the construction and operation RBMR, the potential impacts during the decommissioning and closure of the current tanks are expected to generally be of low (-) and medium-low (-) significance without the implementation of mitigation measures.

The cleaning and management of the current tanks will be conducted in accordance with the MSDS for the chemicals at the current plant. RBMR will dedicate an area to rinsing and handling of the tanks. The area will be adequately protected by concrete and bunded to ensure no leakage of rinsing water/solution seeps and contaminates groundwater. The run-off from the rinsing area will be directed into existing drains/channels that drain into the existing lined and licensed Pollution Control Dam (PCD) where the water is treated and reused by RBMR. RBMR shall ensure that the PCD has sufficient capacity to handle the runoff from the rinsing area.

The implementation of mitigation measures will reduce the significance of the potential impacts be of low significance.

The summary of the findings from the quantitative impact assessment is provided in Table 19-1.

Table 19-1: Summary of Findings from Quantitative Impact Assessment (Decommissioning of Current Plant)

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**	**Environmental Impact Significance After Mitigation**
Social-economic	Possible boost in short term employment and local small business opportunities.	Low (+)	Low (+)
	Potential impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly.	Medium-Low (-)	Low (-)
	Health and safety risk as a result of the movement of vehicles increasing the risk of accidents	Low (-)	Low (-)
	Health risk due to contagious diseases (such as the Corona virus) due to working in close proximity to each other	Low (-)	Low (-)
	Potential squatting of job seekers.	Low (-)	Low (-)
Groundwater	Local spillages of oils from vehicles and machinery leading to groundwater contamination.	Low (-)	Low (-)
	Improper storage and handling of hazardous materials leading to groundwater contamination.	Low (-)	Low (-)
	Potential groundwater contamination from poor management of runoff from rinsing water/solution which my percolate into the groundwater.	Medium-Low (-)	Low (-)
Surface Water Quality	Potential deterioration in water quality as a result of accidental spillages of hazardous substances such as hydrocarbons from vehicles and machinery used during the decommissioning and closure of the current plant.	Medium-Low (-)	Low (-)
	Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	Medium-Low (-)	Low (-)
	Deterioration of water quality as a result of improper handling/ of chemicals.	Medium-Low (-)	Low (-)
	Poor stormwater management leading to runoff from stockpiled material removed causing pollution of the water resources.	Medium-Low (-)	Low (-)
	Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	Medium-Low (-)	Low (-)
	Increase of surface runoff and potentially contaminated water that needs to be contained in the areas where site demolition occurred.	Medium-Low (-)	Low (-)

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**	**Environmental Impact Significance After Mitigation**
	Potential water contamination from poor management of runoff from rinsing water/solution	Medium-Low (-)	Low (-)
Wetlands and Aquatic Ecosystems	No impacts anticipated		
Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$, as a result of earthworks, operation of heavy machinery, and vehicle movement.	Low (-)	Low (-)
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	Low (-)	Low (-)
Climate change	Emissions of Green House Gases as a result of the use of vehicles and machinery used during the decommissioning and closure activities.	Low (-)	Low (-)
Heritage and Palaeontology Resources	No impacts anticipated.		
Biodiversity	No impacts anticipated.		
Visual	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	Low (-)	Low (-)
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	Low (-)	Low (-)
Noise	The use of vehicles and machinery during the decommissioning and closure phase may generate nuisance noise in the immediate vicinity.	Low (-)	Low (-)
Soils, land use and land capability	Potential for leakage of chemicals into soils prior to rehabilitation.	Low (-)	Low (-)
Traffic	Increase in traffic volumes as a result of transportation of materials from the current plant site during and after decommissioning and closure, which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	Medium-Low (-)	Low (-)
	The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	Medium-Low (-)	Low (-)

Aspect	Nature **of potential impact/risk**	**Environmental Impact Significance Before Mitigation**	**Environmental Impact Significance After Mitigation**
Waste Management	Poor waste management during decommissioning and closure could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	Medium-Low (-)	Low (-)

20 Undertaking of Oath by the EAP

Section 16 (1) (b) (iv), and Appendix 3 Section 2 (j) of the EIA Regulations, 2014 and amended in 2017 (promulgated in terms of the NEMA, require an undertaking under oath or affirmation by the EAP in relation to:

- The correctness of the information provided in the report;
- The inclusion of comments and inputs from stakeholders and I&AP's;
- Any information provided by the EAP to I&AP's and any responses by the EAP to comments or inputs made by I&AP's; and
- The level of agreement between the EAP and I&AP's on the Plan of Study for undertaking the EIA.

SRK and the EAP's managing this project hereby affirm that:

- To the best of our knowledge the information provided in the report is correct, and no attempt has been made to manipulate information to achieve a particular outcome. Some information, especially pertaining to the project description, was provided by the applicant and/or their sub-contractors. In this respect, SRK's standard disclaimer pertaining to information provided by third parties applies.
- To the best of our knowledge all comments and inputs from stakeholders and I&AP's have been captured in the report and no attempt has been made to manipulate such comment or input to achieve a particular outcome. Written submissions are appended to the report while other comments are recorded within the report. For the sake of brevity, not all comments are recorded verbatim, and in instances where many stakeholders have made similar comments, they are grouped together, with a clear listing of who submitted which comment(s).
- Information and responses provided by the EAP to I&AP's are clearly presented in the report. Where responses are provided by the applicant (not the EAP), these are clearly indicated.
- With respect to EIA Reports, SRK will take account of I&AP's comments and, insofar as comments are relevant and practicable, accommodate these during the EIA/EMPr process

21 Conclusion and Recommendations

SRK has undertaken the EIA and EMPr for the proposed bulk chemical storage facility in accordance with the requirements of the NEMA. This has included a comprehensive stakeholder engagement process which has sought to identify stakeholders, provide these parties with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the Impact Assessment Phase of this study.

To date, there are no fatal flaws or red flags that have been identified for the proposed project. Findings from specialist studies have been incorporated into this EIR and accompanying EMPr. It is the considered opinion of the EAP that the potential socio-environmental impacts associated with the bulk chemical storage facility are low and it is not anticipated that the construction and operation of the facility will result in any detrimental environmental impacts. The design and engineering of the facility is such that negative environmental impacts will be minimised. The design of the project includes provision of lined oil sumps that will minimise the contamination of water resources and the SWMP compiled for the project will also ensure that clean and dirty water is separated and managed in an environmentally acceptable manner.

An EMPr has also been developed as part of this EIA to ensure the mitigation of these impacts as far as practicable. It is anticipated that it will be possible to successfully mitigate the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented. The EMPr is considered to assist the project in striving towards the principles of the NEMA.

The project team believes that the EIA undertaken for the proposed bulk chemical storage facility fulfils the process requirements of the NEMA. It is recommended that the proposed project is allowed to proceed, given that failure to implement the project would result in far reaching negative impacts. The construction and operation of the bulk chemical storage facility should be conducted under duty of care and must be in accordance with the recommendations that were included in this EIR, the accompanying EMPr, SWMP and Material Safety Data Sheets (MSDSs) for chemicals at the current plant.

22 References

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

Appendices

Appendix A: Curriculum Vitae of the Project Team

Appendix B: Project Experience

Appendix C: DEDECT Scoping Report and PoS Acceptance Letter

Appendix D: Project Locality Map

Appendix E: MSDS for Chemicals at the Current Tanks

Appendix F: Project Layout Plan

Appendix G: Specialist Studies Reports

Appendix H: Stakeholder Engagement

Appendix H 1: Pre-application Authority Consultation Documents

Appendix H 2: Stakeholder Database

Appendix H 3: Notification Letters

Appendix H 4: Site Notices

Appendix H 5: Newspaper Advertisements

Appendix H 6: Comments and Responses Report

Appendix H 7: Stakeholder Communications

Appendix H 8: Commenting Authority Correspondence

Appendix I: Environmental Management Programme

SRK Report Distribution Record

Report No.	561608/Draft EIA Report
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Name/Title	Company	Copy	Date	Authorised by
Competent Authority				
Ms Queen Imasiku	DEDECT	1 (HC) 2 (PDF)	May 2021	HINM
Commenting Authority				
Mr P Shikwane / Ms Tsholofelo B Dikgole	Bojanala Platinum District Municipality	2 (HC)	May 2021	HINM
Lillian Sefike/ Kelebogile Mekgoe (Environmental Officer)	Rustenburg Local Municipality	3 (HC)	May 2021	HINM
Mr. Chadwick M Lobakeng	Department Water and Sanitation	4 (HC)	May 2021	HINM
SAHRA Website	North West Provincial Heritage Resources Agency	5 (PDF)	May 2021	HINM
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Public Places				
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Client				
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SRK				
SRK Library	SRK Consulting	10 (PDF)	May 2021	HINM
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