

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 Management Programme (Draft EMPr)

DEDECT Reference Number: NWP/EIA/47/2020

Report Prepared for

Anglo American Platinum's RBMR



Report Number 561608/ Draft EMPr



Report Prepared by



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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 Management Programme (EMPr)

Anglo American Platinum's RBMR

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Disclaimer

The environmental management measures provided in this Environmental Management Programme (EMPr) are based on information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by Anglo Platinum's Rustenburg Base Metals Refiners (RBMR). This report has been compiled to comply with the specific requirements of the National Environmental Management Act (No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations (2014) (as amended).

SRK has exercised all due care in reviewing the supplied information provided by RBMR during the course of the Environmental Assessment Process and has included the requirements of commenting authorities. The appropriateness and practicality of the management measures have been considered in terms of comments received and discussed with RBMR as necessary. RBMR is fully responsible for the implementation of the EMPr.

The EMPr has been provided to RBMR for review, prior to submission, to determine whether the EMPr conditions are practical, accurate and implementable. SRK cannot be held responsible for failure of RBMR to comply with the EMPr for any reason whatsoever. The EMPr by nature is a dynamic document and the NEMA provides for continual updating of the EMPr, with approval from the DEDECT.

SRK does not accept responsibility for any errors or omissions in the information supplied by RBMR and does not accept any consequential liability arising from commercial decisions, design changes or actions resulting from such decisions and/or changes. Management measures presented in this report relate to the project description and plans, as they existed at the time of SRK's investigations, and those reasonably foreseeable. These management measures do not necessarily apply to conditions and aspects 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

BA	Basic Assessment
DEA	Department of Environmental Affairs
DEDECT	Department of Economic Development, Environment, Conservation and Tourism
DEFF	Department of Environment, Forestry and Fisheries
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Plan report
GIS	Geographic Information Systems
GNR	Government Regulation Notice
MC	Motor Control
MSDS	Material Safety Data Sheets
NEM: AQA	National Environmental Management: Air Quality Act
NEM: WA	National Environmental Management: Waste Act
NEMA	National Environmental Management Act
NO ₂	Nitrogen Dioxide
NWA	National Water Act
OHSA	Occupational Health and Safety Act
PM	Particulate Matter
PPE	Personal Protective Equipment
RBMR	Rustenburg Base Metals Refiners
RLM	Rustenburg Local Municipality
RO	Reverse Osmosis

SACNASP	South African Council for Natural Scientific Professions
SANS	South African National Standard
SHE	Safety Health and Environmental
SMME	Small Medium and Micro Enterprise
SO ₂	Sulphur Dioxide
SRK	SRK Consulting (Pty) Ltd

1 Introduction

1.1 Background

Rustenburg Base Metals Refiners (RBMR) requires reagents that are critical in the processing applications 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.

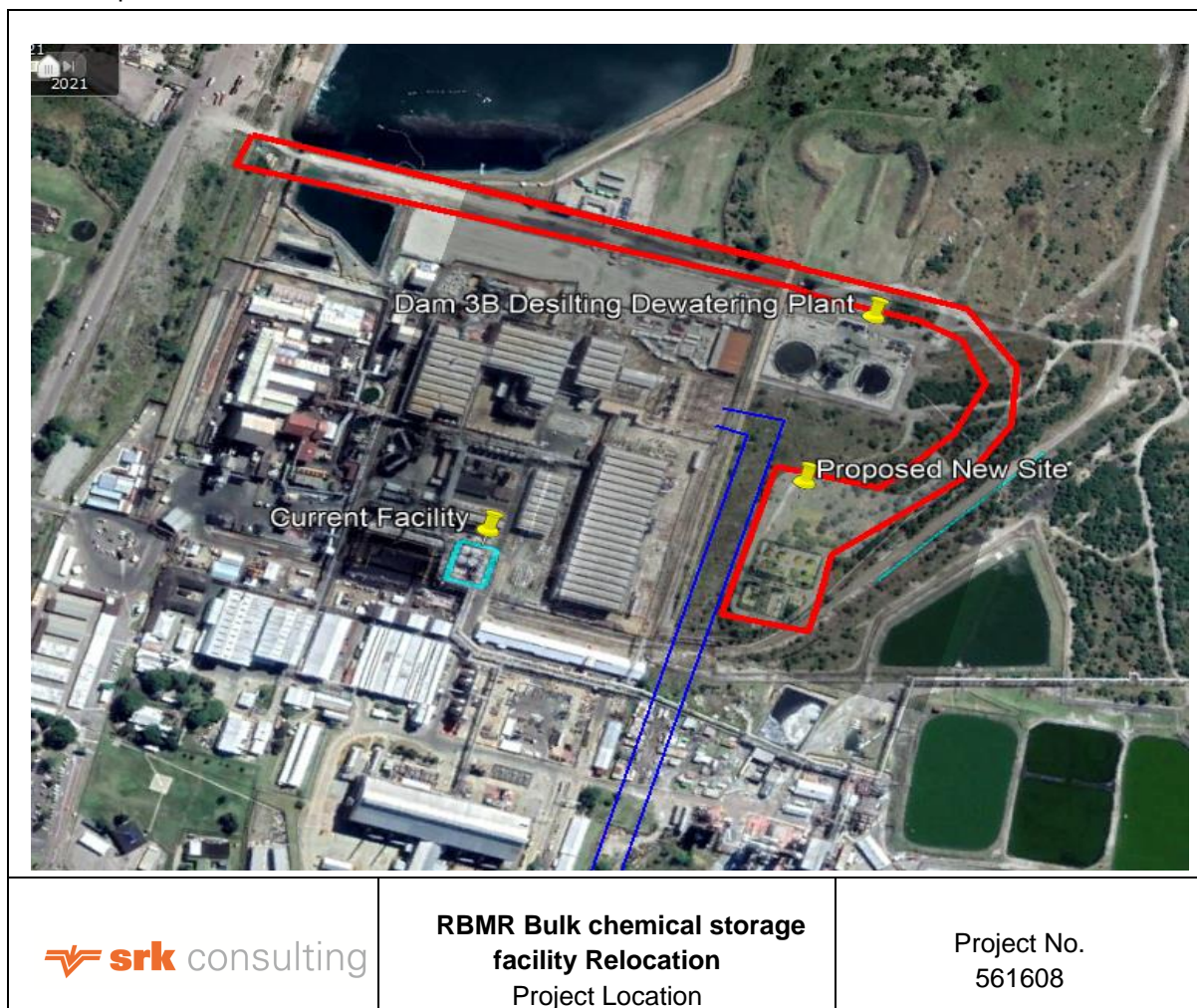


Figure 1-1: Project Location

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 the bulk chemical storage facility be relocated. It is suspected that the heaving of the foundation has been a combination of issues that 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 than 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.

Due to the status quo at the current plant, a new bulk chemical plant is required. The construction and operation of the proposed bulk chemical storage plant triggers activities listed in Government Regulation Notice (GNR) 983 (as amended by GNR327 of 7 April 2017) and 984 (as amended by GNR325 of 7 April 2017) of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and will therefore require an Environmental Authorisation (EA) from the North West Department of Economic Development, Environment, Conservation and Tourism (DEDECT). After construction of the new plant, the current bulk chemical storage plant will need to be decommissioned. The decommissioning and closure of the old plant also triggers activities in GNR 983 (as amended by GNR327 of 7 April 2017) of the NEMA and will also require authorisation from the DEDECT.

GNR 326 of the NEMA stipulates that all activities listed in GN325 require that a full Environmental Impact Assessment (EIA) (scoping and impact assessment phases) process be conducted.

SRK Consulting (SA) (Pty) Ltd (SRK) has been appointed RBMR as the independent Environmental Assessment Practitioner (EAP) to conduct the EA application process for the project, which include the compilation of an Environmental Management Programme (EMPr).

The purpose of the EMPr is to ensure that social and environmental impacts, risks and liabilities identified during the Environmental Impact Assessment (EIA) process are effectively managed during all phases of the project.

The EMPr specifies the mitigation and management measures to which RBMR is committed and shows how the project will mobilise organisational capacity and resources to implement these measures. It also shows how management measures aimed at mitigation and enhancement will be scheduled.

1.2 Objectives of the Environmental Management Programme

The key objectives of the EMPr are:

- To avoid, minimise, or remediate pollution and degradation of the environment;
- To avoid or minimise waste and to re-use or re-cycle waste where possible;
- To apply a risk averse and cautious approach to the implementation of the project;
- To anticipate and prevent negative impacts on the environment (physical, biological, social, economic, and cultural). Where these impacts cannot be prevented, such impacts must be minimised or remedied;
- That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied;
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option; and
- The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.

The National Environmental Management Act (Act No. 107 of 1998, as amended) (NEMA) stipulates that anyone who causes pollution or degradation of the environment is responsible for preventing impacts occurring, continuing or recurring and for the costs of repair of the environment. Other legislation that contain requirements, which were taken into consideration in drafting the EMPr, include but are not limited to the:

- National Water Act (Act No. 36 of 1998, as amended (NWA); and
- Occupational Health and Safety Act (Act No. 85 of 1993).

This EMPr among other things:

- Presents an action plan for the implementation of mitigation measures with the purpose of regulating the Contractor's conduct or method of working;
- Provides specific environmental guidance for all project activities;
- Incorporates measures to manage and mitigate all project activities so that negative environmental impacts are avoided or reduced;
- Identifies and allocates responsibilities for specific actions associated with the management of all project activities to mitigate negative environmental impacts; and
- Provides an outline of the activities, which require monitoring and the assessment thereof.

1.3 The Polluter-Pays Principle

This principle provides for “the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.” The Polluter Pays Principle must be rigorously applied throughout the implementation of the project.

1.4 Details and Expertise of the Environmental Assessment Practitioner (EAP)

SRK has been appointed by RBMR as the EAP. 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.

The EAPs involved in conducting the EIA and in the compilation of this EMPr and their contact details are provided in Table 1-1 below:

Table 1-1: Details of the Project Team

Details	Names	
	Manda Hinsch	Ndomupe Masawi
Designation on Project	Project Partner	Project Manager and Environmental Assessment Practitioner
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The project manager, Ndomupei Masawi is a registered Professional Natural Scientist (SACNASP Reg Number 400045/14) 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 also a Registered EAP with the EAPASA (Reg:2020/401).

Manda Hinsch is an experienced and professionally certified environmental assessment practitioner with over 34 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.

1.5 Report Index in Relation to the NEMA Regulations

Appendix 4 of GNR 982 published in terms of NEMA stipulates the minimal requirements and issues that need to be addressed in the EMPr. This report strives to address all these requirements as per regulations. Table 1-2 indicates the regulations that have been addressed and the section of the EMPr where these requirements can be found.

Table 1-2: Requirements of Appendix 4 of GNR 982

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EMPr	Section where addressed in the EMPr
Appendix 4 (a)	details of the EAP who prepared the EMPr; and the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.4
Appendix 4 (b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 2
Appendix 4 (c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers	Figure 2-3: Environmental Sensitive Areas
Appendix 4 (d)	a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- planning and design; pre-construction activities; construction activities; rehabilitation of the environment after construction and where applicable post closure; and where relevant, operation activities;	Section 10
Appendix 4 (e)	a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 10
Appendix 4 (f)	a description of proposed impact management actions, identifying the way the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to: avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; comply with any prescribed environmental management standards or practices; comply with any applicable provisions of the Act regarding closure, where applicable; and	Section 10

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EMPr	Section where addressed in the EMPr
	Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	
Appendix 4 (g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Section 10 Section 12
Appendix 4 (h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Section 10 Section 12
Appendix 4 (i)	an indication of the persons who will be responsible for the implementation of the impact management actions	Section 10
Appendix 4 (j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 10
Appendix 4 (k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 10 Section 12
Appendix 4 (l)	a program for reporting on compliance, considering the requirements as prescribed by the Regulations;	Section 10 Section 12 Section 13
Appendix 4 (m)	an environmental awareness plan describing the manner in which- the applicant intends to inform his or her employees of any environment-al risk which may result from their work; and risks must be dealt with to avoid pollution or the degradation of the Environment	Section 14
Appendix 4 (n)	Any specific information that may be required by the competent authority.	None

2 Project Overview

2.1 Project Location

The proposed project falls within the Bojanala Platinum District Municipality, under the jurisdiction of the Rustenburg Local Municipality in the North West Province. The proposed project is located on the farm portion as illustrated in Figure 2-1. Table 2-1 provides a description of the proposed activities located on the property.

Table 2-1: 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	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 with associated infrastructure outside the RBMR boundary.
T0JQ00000000030300042			

The affected property is owned by the applicant, RBMR.



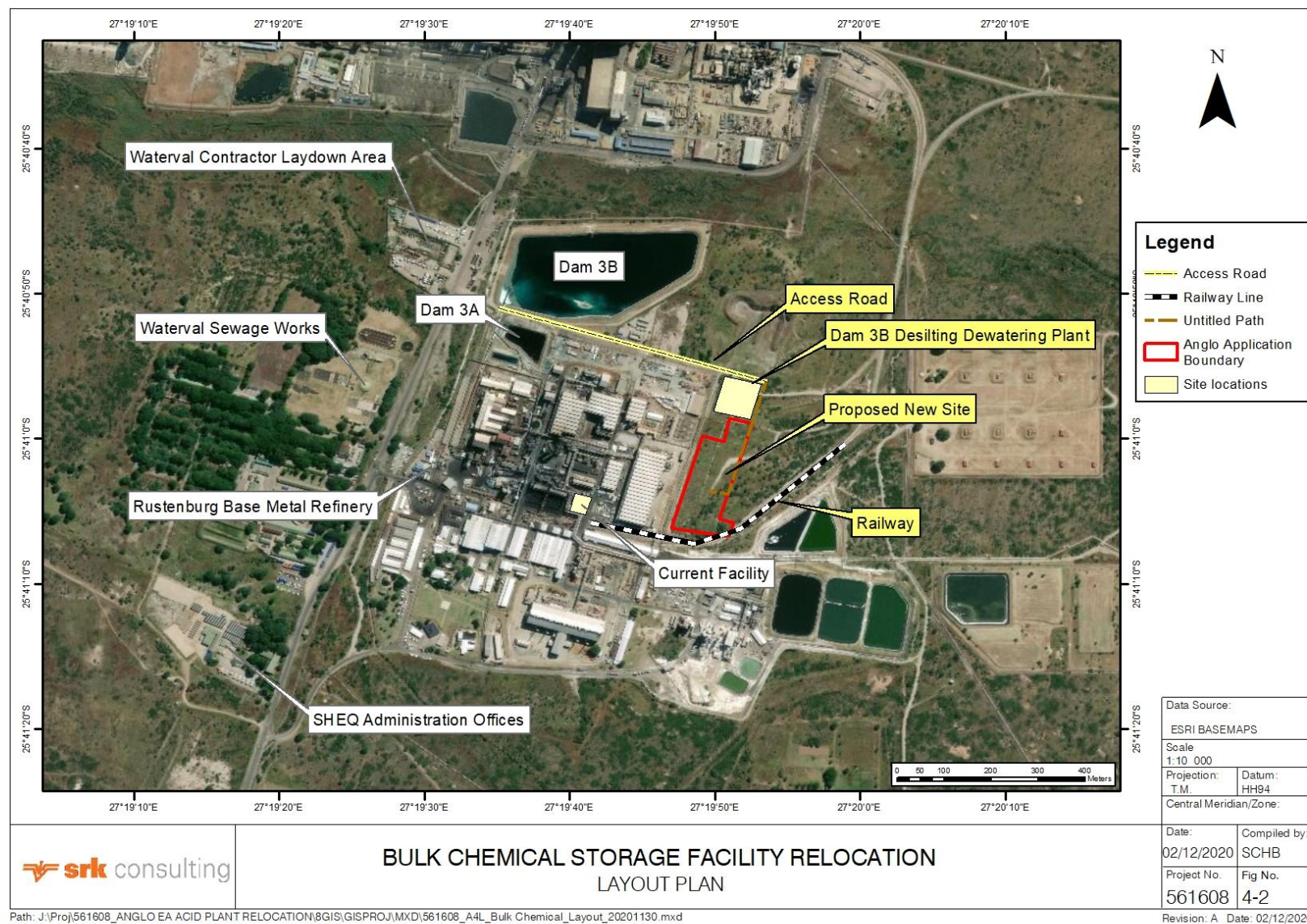


Figure 2-2: Project Layout Plan

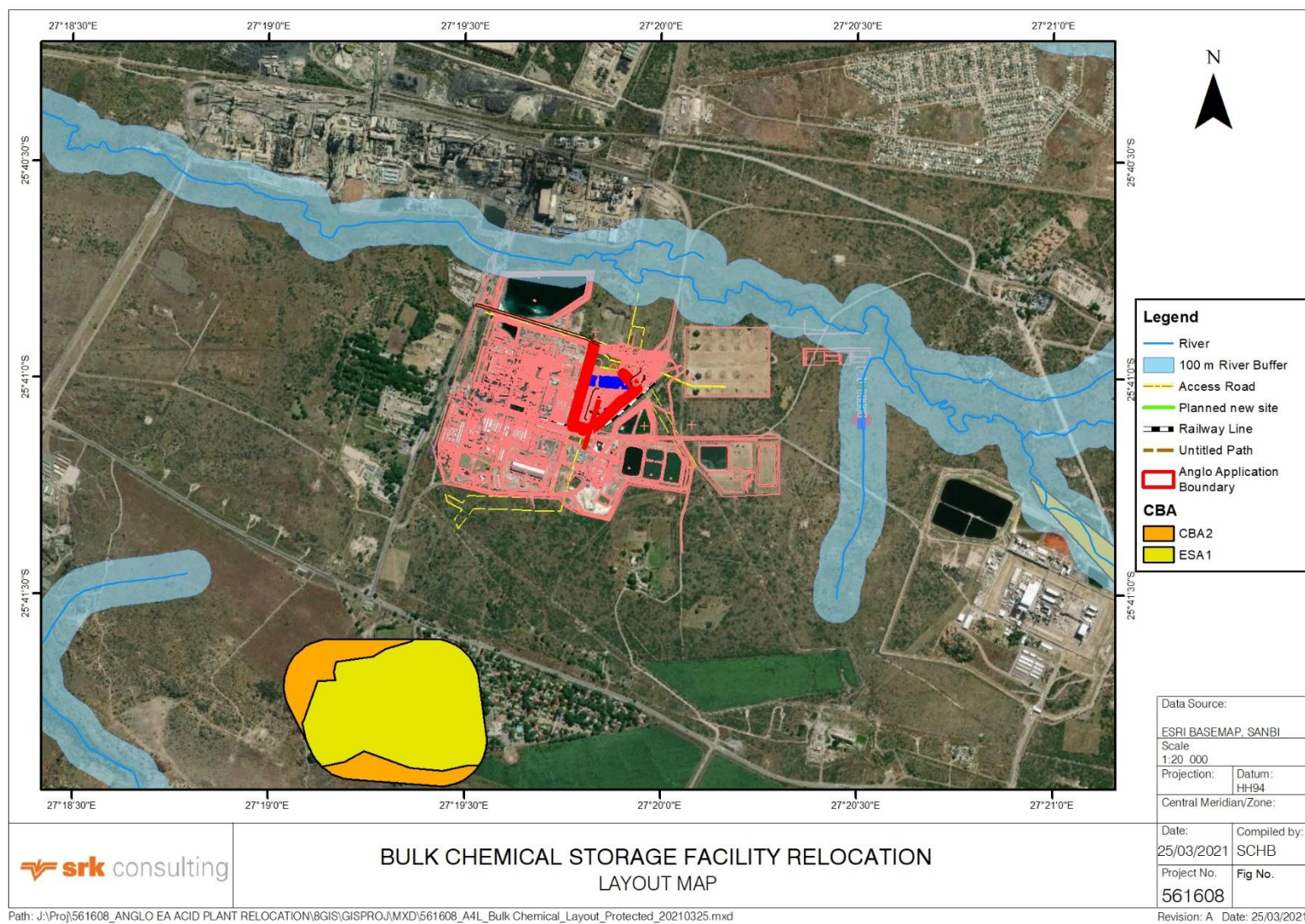


Figure 2-3: Environmental Sensitive Areas

2.2 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.

2.2.1 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 A.
- 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 tank farm 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;
- Equipment and materials will be sold and removed from the site;
- Removal of any hazardous material and re-use, recycling or disposal 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.

2.2.2 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 ground will be excavated, removed, treated, re-used, recycled 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.

2.2.3 Construction of the new plant and associated infrastructure at new location

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, 2 for Formalin and 1 effluent collection tank);
- 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 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.
- Construction of designated offloading bays per chemical and relevant effluent collection.

The layout plans of the proposed bulk chemical storage facility are provided in Figure 2-4 and Figure 2-5. These plans ensure that no structures exist within registered servitudes, save for road and pipe crossings.



Project No.
561608

Figure 2-4: Proposed Layout Plan of the bulk chemical storage facility



RBMR BULK CHEMICAL STORAGE FACILITY RELOCATION

3 D LAYOUT

Project No.

561608

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

2.2.4 Pre-construction

The area towards the west of the rail is largely inaccessible and sufficient due diligence on geotechnical work is required to finalize civil works accordingly. The pre-construction process will entail:

- Earthworks : Clearing of existing dump for geotechnical investigations of areas that could not be accessed in previous investigations.
- Detail design: Civil works amendment as prescribed by geotechnical investigations.

2.2.5 Construction

The bulk chemical storage facility and associated infrastructure will be constructed in a greenfields area located next to the RBMR facility. RBMR will appoint contractor(s) for the construction process with relevant legal appointees under the RBMR SIB reporting structures. The generic construction process will entail:

- Earthworks : Clearing and 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.

2.2.6 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 and locally acquired chemicals) and by rail (locally acquired chemicals), where the chemicals will be offloaded into the different assigned tanks as shown in Figure 2-5.

2.3 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.

2.4 Site Establishment

The construction site camps will be located outside of any sensitive environmental areas, with hazard free accessibility from the main roads for delivery and access to the construction areas. All waste products that cannot be reused and/or recycled will be removed from the construction sites to an

approved and licensed disposal site. Rehabilitation of the construction sites will be to the same level as to prior establishment. Access to the respective construction site will be possible via pre-existing access roads (D108) and the dust road adjoining D108 and the project site.

2.5 Services

2.5.1 Water for the proposed development

RBMR's process water will be used to meet any water requirements for the proposed bulk chemical storage facility.

2.5.2 Power

All machinery used during the construction will be diesel/petrol driven.

2.5.3 Sanitation

Chemical ablution facilities will be made available to the construction staff at all times during the construction period. These facilities will be serviced regularly, and the waste will be transported to a treatment facility off-site.

2.5.4 Contractors Camp and Laydown Area

The contractor's camp and laydown areas shall be located outside any sensitive environmental areas as identified by the Environmental Impact Assessment (EIA).

2.5.5 Access Roads

The existing access roads will be used throughout the construction and operational phases of the project. The access road adjoining D108 to the site will be aptly surfaced as part of the project scope.

2.6 Fuel Storage

Diesel will be required primarily for the earth moving equipment and will be below 80m³ at any given time.

2.7 Construction Materials

Suitable excavated material will be stockpiled outside sensitive environmental areas and used as backfill where specified. Material not suitable for backfilling and all excess excavated material that is not required for backfilling will be recycled or disposed of at a registered municipal landfill site.

2.8 Occupational Health and Safety

As a basic, all contractor employees and visitors will undergo induction training about health, safety and the environment. This training will be required prior to entering the site for the first time and will be required each time the conditions on-site change such that additional training is required.

Personal Protective Equipment (PPE) will be issued to all persons entering the construction site. PPE includes safety shoes, goggles, earplugs, gloves, hard hats, masks, etc. The PPE required will be dependent on the area that the person is working in, as well as the activity he/she is undertaking. The Contractor will conduct continuous rainfall projection monitoring to ensure the safety of the construction workers.

3 Alternatives Considered

Three location alternatives were considered. Two were brownfields locations which had a negative impact on the traffic management on site, and one was a Greenfield's location outside of the current RBMR fence, but inside the RBMR property.

3.1 Preferred Option

The preferred site alternative is location will be in a Greenfield area located to the East of the Copper Tank house, outside the RBMR's current boundary fence as shown in Figure 3-1.

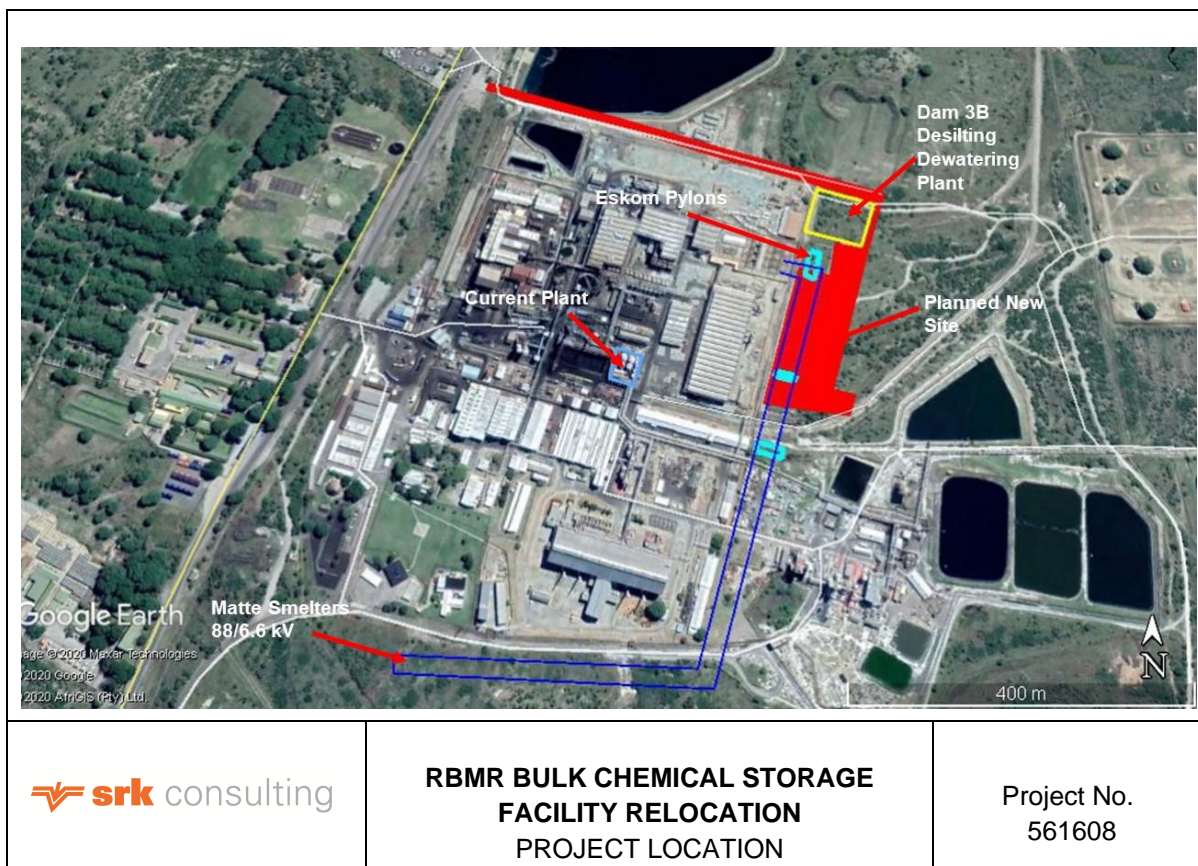


Figure 3-1: Location of the Preferred Option

3.2 Alternative 1

Alternative 1 is sited within the RBMR boundary (brownfields) to the East of the Copper Tank house as shown in Figure 3-2.

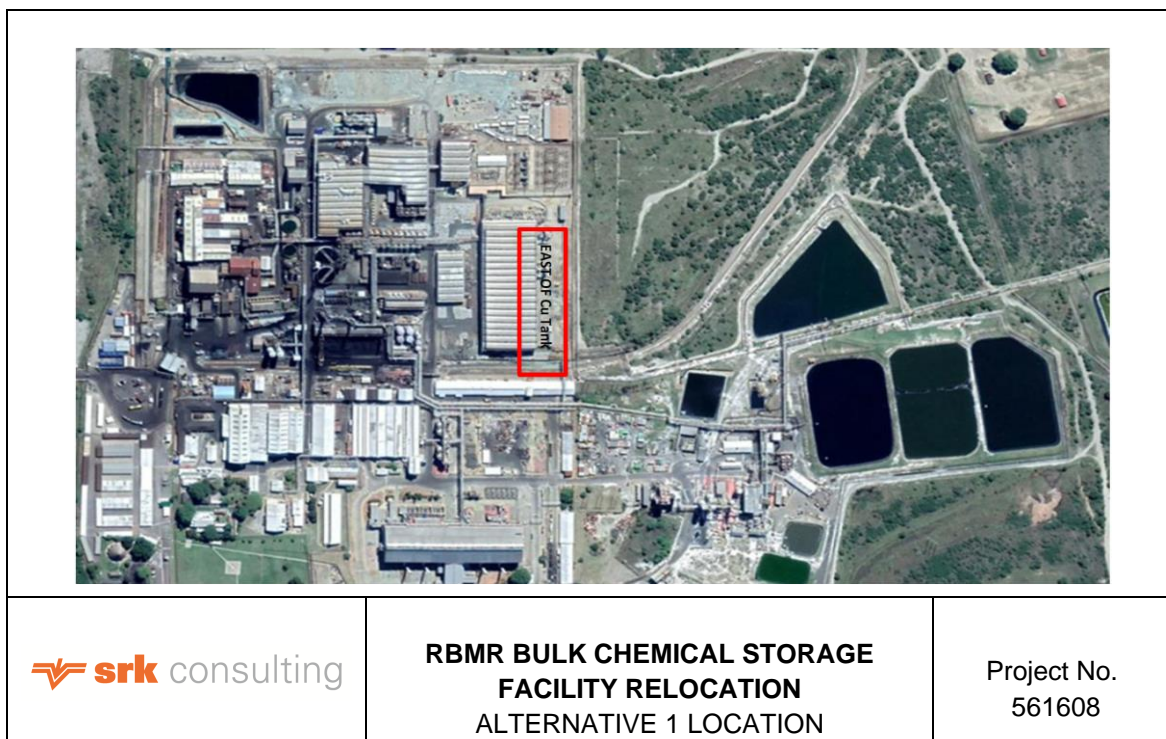


Figure 3-2: Location of Alternative 1

3.3 Alternative 2

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

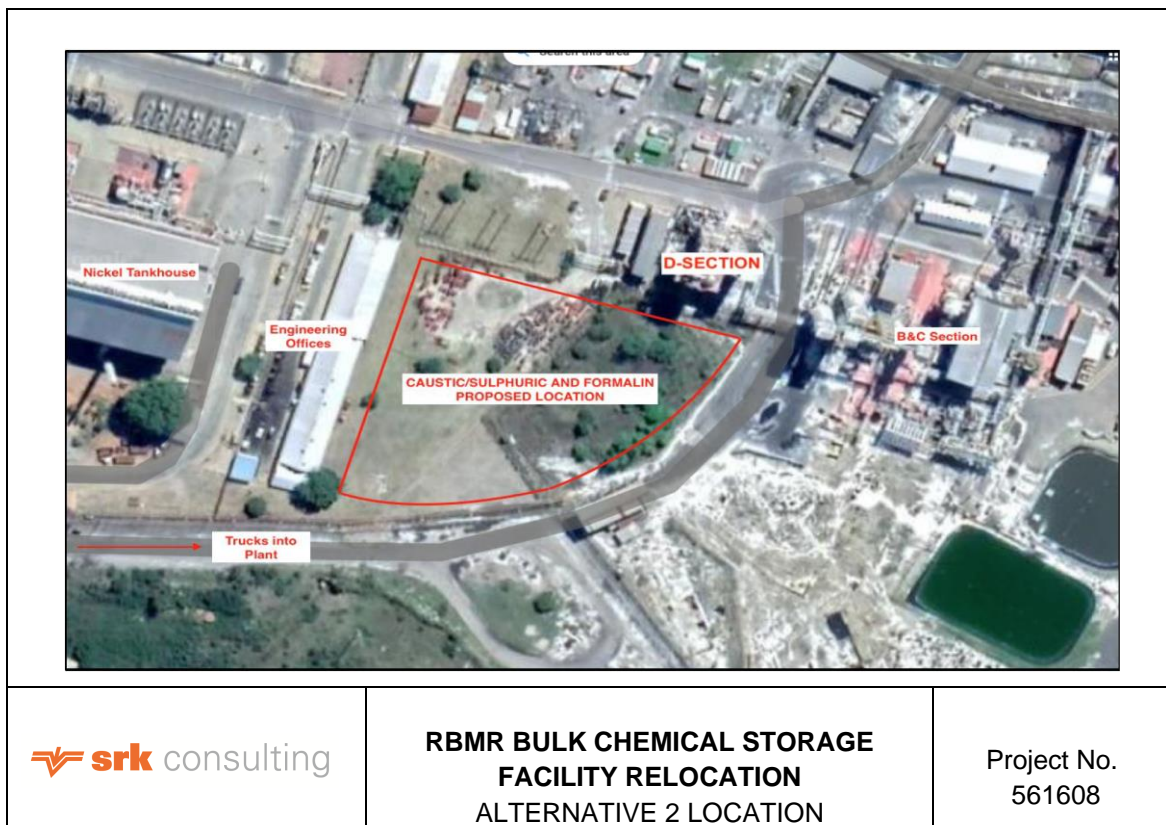


Figure 3-3: Location of Alternative 2

3.4 Location Trade-off

RBMR undertook an assessment of the desirability of the locations and technical issues as summarised in Table 3-1.

Table 3-1: 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 RBMR.	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 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.

3.5 No-Go Alternative

The assessment will include a no-go option as required by the EIA regulations. 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.

4 Legislative Requirements

4.1 Environmental Management Programme

The EIA application was submitted under the NEMA EIA Regulations (2014, as amended in 2017) and the EMPr is thus subject to the requirements of the 2014 EIA Regulations. This EMPr has been developed in fulfilment of these requirements for the all phases of the proposed bulk chemical storage facility project.

The implementation of an EMPr for the proposed activity is a requirement of the NEMA and will be a condition in the EA, issued by the DEDECT. As such, failure to comply with this EMPr will constitute an offence and RBMR and/or their Contractors may be liable for penalties and/or legal action. Therefore, it is important that all responsible parties understand their duties and undertake them with duty and care.

This EMPr should form an integral part of the contract documents, informing the Contractor of his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by the proposed activities associated with the project.

The Contractor should note that obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation. Furthermore, the EMPr is enforceable through additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

It is expected that the Contractor be conversant with all legislation pertaining to the environment, including provincial and local government ordinances which may be applicable to the contract.

All prospective contractors must sign the declaration of acceptance of the EMPr, included at the end of this document.

It should be noted that the EMPr is a living document that will be periodically reviewed and updated. As part of on-going implementation, this EMPr will be publicly disclosed during the Stakeholder Engagement Process of this project. An opportunity will be offered to participating stakeholders to provide comments for incorporation into the EMPr.

4.2 Other Applicable Legislation

RBMR is responsible for compliance with the provisions for duty of care and remediation of damage in accordance with Section 28 of NEMA and its obligations regarding the control of emergency incidents in terms of Section 30. Accordingly, the DEDECT must immediately be notified of an incident as defined in subsection 30(1) (a) of NEMA.

Table 4-1 provides an overview of the legislation and respective sections pertaining to the proposed project.

Table 4-1: Summary of Applicable legislation (not limited to)

Legislation	Section	Description
The Constitution (Act No. 108 of 1996)	Chapter 2	Bill of Rights.
	Section 24	Environmental Rights.
NEMA	Section 2	Defines the strategic environmental management goals and objectives of the government. Applies throughout the Republic to the actions of all organs of state that may significantly affect the environment.

Legislation	Section	Description
	Section 24	Provides for the prohibition, restriction and control of activities, which are likely to have a detrimental effect on the environment.
	Section 28	The developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
Environment Conservation Act (Act No. 73 of 1989)	Section 19	Prevention of littering by employees and subcontractors during decommissioning and closure of the old plant as well as the construction and operation of the Bulk chemical storage facility.
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	Section 32	Provides provision for the control of dust.
	Section 34	Provides provision for the control of noise.
	Section 35	Provides provision for the control of offensive odors.
Occupational Health and Safety Act (Act No. 85 of 1993)	Section 8	General duties of employers to their employees.
	Section 9	General duties of employers and self-employed persons to persons other than their employees.
Hazardous Substances Act (Act No. 5 of 1973)	Act	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
NEM: WA	Act	Provides for specific waste management measures (disposal and storage) and the remediation of contaminated land.

5 Quantitative Impact Assessment Outcomes

This section contains the assessment of potentially positive and negative environmental impacts that may be caused by the proposed project. The impacts are linked to the activities conducted for the proposed development, broadly relating to the decommissioning and closure activities applicable to the existing plant and construction and operational activities associated with the new bulk chemical storage facility. Specific emphasis was placed on any relevant environmental, social and economic impacts identified through comments received during the stakeholder engagement process, issues highlighted by relevant authorities; findings from the specialist studies and professional judgement of the EAP team through appraisals of 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 promote mitigation measures to avoid and/or reduce the impacts to an acceptable level where required.

The section also provides a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated.

A summary of the anticipated impacts is provided in Table 5-1 and Table 5-2

Table 5-1: Summary of potential Impacts for the construction and operation of the proposed bulk chemical storage facility

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)	Significance Rating (post mitigation)
Construction	Socio-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 or off-site, littering and driving irresponsibly.	Medium-Low (-)	Low (-)
		Potential strikes/riots by local communities seeking employment and/or business opportunities	Medium-Low (-)	Low (-)
		Health and safety risk as a result of the movement of vehicles increasing the risk of accidents and injury to persons and/or property	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.	Medium-Low (-)	Low (-)
		Improper storage and handling of hazardous materials leading to groundwater contamination.	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 construction.	Medium-Low (-)	Low (-)
		Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	Medium-Low (-)	Low (-)
		Poor stormwater management leading to runoff from stockpiled material removed causing pollution of the water resources.	Medium-Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)	Significance Rating (post mitigation)
		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 (-)
	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 construction activities.	Low (-)	Low (-)
	Heritage and Palaeontology Resources	Although no heritage resources were identified, there is potential for finding of heritage resources.	Low (-)	Low (-)
	Flora	Loss of vegetation including species of conservational concern due to indiscriminate movement of vehicles and personnel.	Low (-)	Low (-)
		Proliferation of alien invasive species due to ineffective management and control of alien invasive plant species.	Low (-)	Low (-)
	Fauna	Movement of construction vehicles and machinery may result in collision with fauna, resulting in losses.	Low (-)	Low (-)
	Visual	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)	Significance Rating (post mitigation)
		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 construction phase may generate nuisance noise in the immediate vicinity	Low (-)	Low (-)
	Soil, Land use and Land Capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	Low (-)	Low (-)
		Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	Low (-)	Low (-)
		Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	Low (-)	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.	Low (-)	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 and harm to people and/or property.	Medium-Low (-)	Low (-)
		The increase in vehicles results in an increased potential for degradation of the road network in the vicinity of the project.	Medium-Low (-)	Low (-)
		The increase in traffic within the RBMR precinct as a result of transportation of construction material leading to congestion within RBMR during current facility rehabilitation	No impacts anticipated.	N/A
	Waste Management	Poor waste management during construction could result in the contamination of surface runoff resulting in the deterioration or discolouration of water quality of the watercourse.	Medium-Low (-)	Low (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)	Significance Rating (post mitigation)
		Incorrect 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 (-)	Low (-)
		Stockpiling material from the decommissioned plant may result in secondary pollution and contamination of the watercourses.	Medium-Low (-)	Low (-)
Operational	Groundwater	Improper storage and handling of hazardous materials leading to groundwater contamination.	Low (-)	Low (-)
		Improper/inadequate management and maintenance of oil sumps can result in groundwater contamination	Medium-Low (-)	Low (-)
	Surface Water Quality	Spillage of chemicals (acid, formalin and caustic soda) from the bulk chemical storage facility due to failure.	Medium-Low (-)	Low (-)
		Surface water contamination as a result of improper chemical storage/handling;	Medium-Low (-)	Low (-)
		Contamination of runoff by poor materials/waste handling practices.	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 (-)
	Biodiversity	Potential for continued loss of floral and faunal habitat, species and SCC due to ineffective rehabilitation and edge effects.	Low (-)	Low (-)
	Air Quality	Possible increase in dust generation, PM10 and PM2.5, 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 (-)

Phase	Environmental Aspect Affected	Potential Impact	Significance Rating (Pre-mitigation)	Significance Rating (post mitigation)
		Improper handling and storage of formalin may result in release of formaldehyde from the formalin surface into the atmosphere.	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 and harm to people/property.	Low (-)	Low (-)
		The increase in vehicles results in an increased potential for degradation of the road network in the vicinity of the project.	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 during rehabilitation.	No impact	N/A
	Noise	The use of vehicles and machinery during operation may generate nuisance noise in the immediate vicinity	Low (-)	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.	Medium-Low (-)	Low (-)
		Incorrect 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 (-)	Low (-)

Table 5-2: Summary of potential Impacts for the decommissioning and closure of the existing facility

Aspect	Nature of potential impact/risk	Environmental Significance Mitigation	Impact Before	Environmental Significance Mitigation	Impact After
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 may 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 existing storage 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 (-)	

Aspect	Nature of potential impact/risk	Environmental Significance Mitigation	Impact Before	Environmental Significance Mitigation	Impact After
	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	No impacts anticipated				
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 Significance Mitigation	Impact Before	Environmental Significance Mitigation	Impact After
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 (-)	

6 Approach to Environmental Impact Management

6.1 Responsibility of the Environmental Management Programme (EMPr)

The responsibility of the EMPr implementation will ultimately reside in the RBMR's Project Management Team. There will be links with other fundamental units such as Safety Health and Environmental (SHE) representatives of RBMR.

The sections that follow outline the management cycle and responsibilities of the RBMR's Project Management Team.

Table 6-1 illustrates the range of approaches to be undertaken to manage potential project activities.

Table 6-1: Approach to Impact Management

Avoidance	Avoiding activities that could result in adverse impacts and/or resources or areas considered sensitive.
Prevention	Preventing the occurrence of negative environmental impacts and/or preventing such an occurrence having negative impacts.
Preservation	Preventing any future actions that might adversely affect an environmental resource.
Minimisation	Limiting or reducing the degree, extent, magnitude or duration of adverse impacts through scaling down, relocating, redesigning and/or realigning elements of the project.
Mitigation	Measures taken to minimise adverse impacts on the environment.
Enhancement	Magnifying and/or improving the positive effects or benefits of a project.
Rehabilitation	Repairing affected resources, such as natural habitats or water resources.
Restoration	Restoring affected resources to an earlier (possibly more stable and productive) state, typically 'background' or 'pristine' condition. These resources may include soils and biodiversity.
Compensation	Compensating for lost resources, and where possible, the creation, enhancement or protection of the same type of resource at another suitable and acceptable location.

6.2 Environmental Code of Conduct

One of the objectives of the EMPr is to ensure that all the workforce, contractors, sub-contractors and construction staff have an understanding of environmental issues and potential impacts on site activities. This environmental code of conduct provides the basic rules that should be strictly adhered to. It is the responsibility of the RBMR's Project Management Team to ensure that each contractor, sub-contractor and workforce understands and adhere to the Code of Conduct.

ENVIRONMENTAL CODE OF CONDUCT

ALL PERSONS ARE OBLIGED TO KEEP TO THE RULES OF THIS CODE OF CONDUCT

Ignorance, negligence, recklessness or a general lack of commitment resulting in environmental degradation or pollution shall not be tolerated!

ENVIRONMENTAL RULES

- Do not waste electricity, water or consumables;
- Only use authorised accesses;
- Do not litter;
- Dispose solid waste to the correct waste containers provided;
- Prevent pollution;
- Use the toilet facilities provided;
- Do not dispose contaminated wastewater to the stormwater or the environment;
- Immediately report any spillage from containers, plant or vehicles;
- Do not burn or bury any waste in the sand;
- Do not trespass onto private properties;
- Strictly leave all animals alone. Never tease, catch or set devices to trap or kill any animal.
- Never damage or remove any trees, shrubs or branches unless it forms part of working instructions and authorisation has been received where necessary;
- Do not deface, draw or cut lettering or any other markings on trees, rocks or buildings in the area;
- Know the firefighting procedure and locations of firefighting equipment; and
- Know the environmental incident procedures.

6.3 General Guidelines

According to Section 28 of the NEMA, the prevention of any site degradation due to non-compliance, administrative or financial problems, and inactivity during the construction phase, illegal activities, delays caused by archaeological finds, etc. is ultimately the responsibility of the RBMR.

The project site must be clearly defined and surveyed according to the project authorisation.

Proper site management and regular monitoring of site works must take place. Proper documentation and record keeping of all complaints and actions taken (as per the Incidents Register and Environmental Checklist) must be issued. Regular site inspections and good control over the construction process must be kept throughout the construction period.

6.4 Environmental Principles

The following environmental principles should always be considered during the pre-construction and the construction phase:

- The footprint of the construction activities must be kept as small as possible;
- As a minimum requirement, all relevant standards relating to international, national; provincial and local legislation will be adhered to; and
- Every effort will be made to implement the waste hierarchy of reduce, reuse, and/or recycle waste material generated on site.

6.5 Incidents and Non-Conformances

According to Section 30 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA): “*Incident*” means an unexpected sudden occurrence including a major emission, fire or explosion leading to serious danger to the public or potential serious pollution of or detriment to the environment, whether immediate or delayed.

In terms of the above definition:

- The Emergency response plan/method statement should be initiated in response to an incident as classified in Table 6-2. The incident must be reported to the ECO and DENC as per Section 30 (3) of NEMA. An emergency incident report required in terms of Section 30(5) of NEMA must be submitted to DEDECT’s Environmental Management Inspectorate for processing.
- A chemical spill is defined as a potential liquid hydrocarbon or chemical spill or other release, which can create a hazard to life or property or create environmental damage. Examples include liquid hydrocarbons, compressor or other equipment lube oil, evaporative cooler acid water, liquid odorant, or other substances that contain controlled or hazardous substances. Spills and other environmental incidents have been classified according to the risk to the environment and appropriate responses are indicated in Table 6-2.

Table 6-2: Classification of Environmental Incident

Level	Definition	Response Required
Level 1	A Minor Emergency, which can be controlled, entirely by the personnel and facilities located within the immediate vicinity of the accident/incident site. These include events which cause minor property or equipment damage that are non-disruptive to operations, and do not pose a safety risk to personnel or property outside of the boundaries of the development footprint.	Record in the incidents register and managed accordingly
Level 2	A Level 2 Incident is defined as a Moderate Emergency, which is disruptive, but not extensive, and forces <u>a portion</u> of the employer operation to be suspended or shut down. A Level 2 Incident is a spill or hazardous product release which has the potential to cause harm to personnel, the public, or the environment and includes a chemical spill of more than 35ℓ to land; or any chemical spill to water resources.	Record in the incidents register and managed accordingly
Level 3 to 5 Incidents	A Level 3 to 5 Incident is defined as a Serious (3), Major (4) to Catastrophic (5) alert requiring the intervention of external support services and that can have serious impacts on ecology, humans and on the overall Project.	Report the incident to the ECO immediately. The ECO will submit an emergency incident report to DEDECT. The incident must also be recorded in the incidents register

In the above cases, it will be the decision of the site management and ECO as to whether work stoppage must be implemented. In most cases, work in the area where the incident occurred will be stopped until all safety clearances have been given. Unless, there is a fatal accident, then the whole site will stop.

The holder of the authorisation, RBMR, must notify DEDECT, in writing and within 72 (seventy-two) hours, if any condition of the EA cannot be or is not adhered to. The notification must be accompanied

by reasons for the non-compliance. Non-compliance with a condition of the EA may result in criminal prosecution or other actions provided for in NEMA and the regulations.

In addition, any pollution incidents originating from the proposed project must be reported to the Regional Office of the Department of Water and Sanitation (DWS) within 72 (seventy-two) hours.

6.6 Penalties and Liabilities

Section 24F of NEMA deals with prohibitions relating to commencement or continuation of listed activities. It provides that:

- 1) *Notwithstanding any other Act, no person may-*
 - a) *Commence an activity listed or specified in terms of Section 24(2)(a) or (b) unless the competent authority or the Minister responsible for mineral resources, as the case may be, has granted an environmental authorisation for the activity; or*
 - b) *Commence and continue an activity listed in terms of Section 24(2) (d) unless it is done in terms of an applicable norm or standard.*

Section 49A of the Act deals with relevant offences. It provides that:

- (1) *A person is guilty of an offence if that person-*
 - a) *Commences with an activity in contravention of Section 24F (1)*

Section 49A of the Act deals with the penalties and provides that:

A person convicted of an offence in terms of Section 49A(1)(a) is liable to a fine not exceeding R10 million or to imprisonment for a period not exceeding 10 years, or to both such fine and such imprisonment.

7 Organisational Structure and Responsibilities

7.1 The Department of Economic Development, Environment, Conservation and Tourism (DEDECT)

The DEDECT plays a lead role in the implementation of environmental policies, legislation and regulations. Their role is to ensure that the construction and operation of the bulk chemical storage facility as well as the decommissioning and closure of the current plant is implemented in a sustainable manner, in compliance with the relevant environmental legislation. DEDECT is responsible for approving the EMPr for the project and any revisions and amendments thereto.

7.2 Applicant: RBMR Project Management Team

The Project Management Team will:

- Ensure that the Contractors are aware of the specifications, legal requirements and RBMR standards and procedures pertaining to activities taking place regarding the bulk chemical storage plant project;
- Ensure that all commitments in the EMPr are communicated and adhered to by RBMR employees and contractors involved with the bulk chemical storage plant project;
- Monitor the implementation of the EMPr throughout the project, by means of site inspections and meetings; and
- Familiarise themselves with the EMPr for this development, the conditions set out in the EA, and all relevant environmental legislation.

7.3 Contractor (including sub-contractors)

The Contractor (including sub-contractors) will be responsible for:

- Complying with the EMPr commitments and any other legislative requirements;
- Adhering to any instructions issued by the project manager on advice of the RBMR environmental specialist;
- Submitting an environmental report at each site meeting on the environmental incidents that have occurred within the period before the site meeting;
- Appoint a Safety Officer and SHE representative who will comply to the functions set out below; and
- Arrange that all employees and those of the subcontractors receive appropriate training prior to the commencement of decommissioning and closure activities, taking cognisance of this EMPr and EA.

7.4 Safety Health and Environmental Officer

The Safety Officer will:

- Fully understand the commitments in the EIA Report, EMPr and EA;
- Familiarise him/herself and ensure compliance with the relevant legislation applicable to the project and RBMR Safety Health and Environmental Policy and procedures;
- Communicate the contents of the EMPr to the contractor and sub-contractor staff members. Training will be required to ensure all staff members are aware of the requirements of this document;

- Regularly undertake site inspections to assess compliance with the EMPr and EA and take appropriate action to rectify non-conformances;
- Authorise the removal of personnel and/or equipment should they contravene the specifications of the EMPr;
- Compile progress reports on a regular basis for submission to the Project Manager;
- Establish a communication path with the Project Manager to discuss monitoring on the site;
- Ensure corrective actions are followed up and closed out; and
- Advise management on environmental issues and recommendations for the bulk chemical plant project

7.5 Environmental Control Officer

The Environmental Control Officer (ECO) will:

- Manage and report on the project's environmental performance;
- Be responsible for undertaking internal environmental audits and arrange/coordinate external environmental audits;
- Liaise with environmental statutory bodies, should this be deemed necessary;
- Conduct environmental training and awareness to employees; and
- Advise top management on environmental issues and recommendations for the project.

8 Site Documentation and Reporting

All non-conformances will be recorded and reported to the responsible personnel. These non-conformances will be rated according to a developed weighting system to determine the significance of each incident.

The following documentation will be required on site:

- Complaints Register;
- Environmental Incident Register;
- Disposal certificates of waste and sewage generated as a result of the proposed project;
- Non-conformance reports;
- Written corrective action instructions;
- EA; and
- EMPr.

The findings of all inspections and internal audits will be structured into instructive reporting providing information to all responsible personnel. Corrective actions must be clearly defined where required. Within the reporting function, a structured review component will be enforced. This review function will assist in prescribing necessary corrective actions.

8.1 Commissioning of Tenders

All contractors and sub-contractors tendering for any aspect of the proposed project will be made aware of the contents of this EMPr and the consequences and penalties resulting from non-conformances will be communicated to them.

All appointed contractors and subcontractors will be made aware of the EMPr and attend an induction focusing on the main aspects of the EMPr requirements.

8.2 Environmental Method Statements

The Contractors shall compile Environmental Method Statements, which will set out the vehicles, machinery, materials, labour and methods that the contractor proposes using to carry out the project work. The contractor must sign each Method Statement along with the ECO and the RBMR Project Manager to formalise the approved Method Statement.

All Method Statements including, those, which, may be required as *ad hoc* or emergency maintenance method statements, must be submitted to the RBMR Project Manager for approval prior to the commencement of the activity. Any changes to the method of works must be reflected by amendments to the original approved Method Statement. Any changes in this regard must be approved by the RBMR Project Manager on the understanding that such changes are environmentally acceptable and in line with the requirements of this EMPr.

The method statements for the following activities must be submitted for approval before construction activities commence:

- Solid waste management;
- Lay down areas;
- Workshop and maintenance/cleaning of plant;
- Concrete works;

- Dust control;
- Storm water management plan;
- Hydrocarbon and emergency spills procedures;
- Plant refuelling procedures;
- Sourcing, excavating, transporting and dumping of fill and spoil material; and
- Emergencies, non-compliance and communication.

8.3 Material Safety Data Sheets (MSDSs)

RBMR will ensure that all the chemicals to be stored at the facility have Material Safety Data Sheets (MSDSs) to be kept on file at the facility.

The cleaning and management of the tanks at the current plant will also be undertaken in accordance to the recommendations of the MSDS of the chemicals.

9 General Requirements

The following general requirements will apply throughout all the project phases of the project:

- The RBMR Project Management Team will ensure proper and continuous liaison between RBMR and the project contractors to make certain everyone is informed at all times;
- The Contractor must adhere to all conditions of contract, including the EMPr and EA;
- The RBMR Project Management Team will ensure documentation and record keeping of all complaints and actions taken;
- The RBMR Project Management Team will ensure regular site inspections and good control over applicable environmental procedures; and
- The Contractor shall not be released from his responsibility for the site until the SHE Representative has signed off the release documentation and is satisfied with the contractor's adherence to the EMPr and EA.

Table 9-1: General Environmental Management

Element	Management Plan
Objectives	<ul style="list-style-type: none"> • All personnel involved in the project need to be made aware of the EMPr; • All personnel involved in the project will be made aware of the environmental consequences of their individual actions, and be in a position to minimise the environmental impact of their activities, particularly with respect to potential land, wetland, surface water and groundwater contamination, air emissions, human accidents and waste management of materials removed from the site; • Roles and responsibilities need to be clearly defined to effectively implement the environmental management procedures.
Sources	<ul style="list-style-type: none"> • Materials handling, storage, and processing leading to the generation of wastes or emissions and discharges to air, land or water;
Action/Controls	<ul style="list-style-type: none"> • RBMR is ultimately responsible for environmental management and costs associated with such management and possible environmental remediation where the case of the incident is not attributed to the contractor's responsibility; • RBMR is responsible to enforce the implementation of the EMPr by its employees; • All contractors are responsible for the implementation of the EMPr as applied to their specific activities; • RBMR workforce and any contractors, are to undergo an environmental induction covering the EMPr and roles and responsibilities with respect to environmental management; • All workers that have completed the induction should sign that they have understood and will implement the measures required.
Monitoring	<ul style="list-style-type: none"> • RBMR Safety and Environmental Representative and/or Environmental Control Officer (ECO) shall be responsible for adequate monitoring of project activities to ensure compliance with the EMPr.
Corrective Actions/Reporting	<ul style="list-style-type: none"> • All incidents that occurred on site are to be recorded in an Incident Register, which will be made available to the Authorities should they request it; • RBMR shall implement preventive and corrective actions if necessary in accordance with the requirements of the EMPr, outcomes of environmental audits, and changes to legislation as they may occur from time to time, and report on environmental incidents that may occur on site in accordance with the requirements of the EMPr and environmental legislation to RBMR management responsible for the site.

Table 9-2: Environmental Monitoring

Element	Management Plan
Objective	<ul style="list-style-type: none"> To monitor compliance with the EMPr and EA; To monitor the effectiveness of management measures stipulated in the EMPr.
Sources	<ul style="list-style-type: none"> Work performed on the site that may affect the environment.
Actions/Controls	<ul style="list-style-type: none"> Appropriate frequency checks to ensure no environmental risks are present as a result of operations/activities and/or tasks; Appropriate frequency records of the site of activities/task undertaken; Records of waste removed from the site, or placed in storage for removal, during all phases of the project.
Monitoring	<ul style="list-style-type: none"> Audits are to be undertaken to monitor compliance with the EMPr during the implementation of the proposed project; Audits are to be undertaken to identify any potential risk that may be arising and to promote preventive maintenance and risk reduction as may be required.
Corrective Actions/Reporting	<ul style="list-style-type: none"> Should non-compliance with the EMPr be identified, corrective measures should be taken to ensure compliance.

10 Specific Environmental Management Requirements

This section of the EMPr deals with key impacts associated with all the project related activities associated with the bulk chemical storage facility, including the decommissioning and closure of the old plant and the construction and operation of the new bulk chemical storage facility. All activities to be managed, mitigation and management measures to be implemented, and the individuals/organisations responsible for implementing these measures, are detailed in sub-sections, which follow. This information forms the core of this EMPr and should be adhered to at all times. The sub-sections, which follow, may be updated as necessary.

Table 10-1: Environmental Management Measures for the Bulk chemical storage facility Project

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
Project Contract and Programme					
Contingencies for minimising negative impacts anticipated to occur during the construction phase	This EMPr must be included as part of the tender documentation or appointment condition of contractors thereby making it part of the required scope of work. The mitigation measures as set out in this EMPr are enforceable under the general conditions of contract.	Records in environmental file. Signed declaration forms Method Statements MSDSs	Prior to the commencement of construction activities	Project Manager, ECO and RBMR SHE Representatives	Pre-construction
	The Contractor must ensure that all the personnel on site are familiar with and understand the specifications contained in the EMPr.	Signed environmental training attendance registers in the environmental file Signed declaration forms	Prior to the commencement of construction activities	Contractor RBMR SHE Representatives	Pre-construction
Construction lay down areas	Laydown areas must be selected in consultation with the ECO. Additional areas required for the storing of equipment and parking of vehicles must first be approved in writing should this be outside of the road reserve.	No complaints from surrounding landowners or I&APs No visible signs of litter Method statements	Prior to the commencement of construction activities	Contractor ECO	Pre-construction
	Laydown areas shall be located outside the 1:100-year floodlines of watercourses the riparian zone or outside of the wetland buffer zone, or whichever is the greatest.	No signs of water or soil pollution No directives from the DWS concerning contravention of the NWA requirements	Prior to the commencement of construction activities	Contractor ECO	Pre-construction
	Where applicable, topsoil must be stripped from laydown areas. Topsoil must be stored separately for later reuse when the area is vacated.	Separate storage of topsoil for later use	Prior to the commencement of construction activities	Contractor ECO	Pre-construction
	All storage facilities must be located within the site boundaries.	No storage facilities located outside the demarcated designated areas	Prior to the commencement of construction activities	Contractor ECO	Pre-construction
	The construction team is responsible for cleaning/clearing the site of all structures, equipment, residual litter and building materials at the end of the construction period.	No litter or waste around the laydown areas after construction has been concluded	After conclusion of construction activities	Contractor ECO	Post construction

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
Socio – Economic					
Increase local employment opportunities	<p>Encourage the local employment for the following:</p> <ul style="list-style-type: none"> • Employment opportunities for local Small Medium and Micro Enterprise (SMME) contractors during site clearance, preparation and construction. • Secondary service provision of food, toilet hires, and equipment. • Appointment of contractors as drivers, cleaners and security personnel. 	Local employment of SMMEs where possible	As and when required	Contractor	<p>Construction of the new bulk chemical storage facility</p> <p>Decommissioning of the current plant</p>
Reduce potential dust impact	Reduce speed limits to 40 or 20 km/hr.	No complaints received regarding dust nuisance.	Daily	Contractor ECO RBMR SHE Officer	<p>Construction and operational phases of the new bulk chemical storage facility</p> <p>Decommissioning of the current plant</p>
Reduce potential impact on safety and security	Reduce speed limits to 40 or 20 km/hr.	<p>No complaints received regarding speeding</p> <p>No road accidents due to speeding</p>	Daily	Contractor ECO RBMR SHE Officer	<p>Construction and operational phases of the new bulk chemical storage facility</p> <p>Decommissioning of the current plant</p>
	No fires are allowed on the site, unless in areas demarcated and managed for this purpose.	No incidents of informal fires	Daily	Contractor ECO RBMR SHE Officer	<p>Construction and operational phases of the new bulk chemical storage facility</p> <p>Decommissioning of the current plant</p>
	All workers will be made aware of fire risks.	Signed environmental training attendance registers in the environmental file	As and when required as part of the induction	Contractor ECO RBMR SHE Officer	<p>Construction and operational phases of the new bulk chemical storage facility</p> <p>Decommissioning of the current plant</p>

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
Reduce potential impact on the sense of place as a result of land clearing	Limit the aerial extent of the disturbance to the exact footprint of the proposed development, including the laydown areas surrounding the primary footprint.	No construction or clearing of areas outside the demarcated footprint	Daily	Contractor ECO	Construction of the new bulk chemical storage facility
Ensure that there is enough ablution facilities available and that the ablution facilities are operated in an environmentally responsible manner	Sufficient ablution facilities shall be provided to service the site.	One toilet per 15 people as is required by OHSA	Daily	Contractor ECO	Construction of the new bulk chemical storage facility
	The maximum walking distance from a work site to a toilet shall not exceed 200 metres.	Toilets located with a 200m radius of working areas	Daily	Contractor ECO	Construction of the new bulk chemical storage facility
	Ablution facilities shall not be placed within 100-year floodline of any water course.	No toilets and sanitation facilities located within 1:100year floodline or within 100m of any water courses	Daily	Contractor ECO	Construction of the new bulk chemical storage facility
	Ablution facilities shall be serviced on a regular basis by an approved service provider to keep them in good functional working order and in an acceptable state of hygiene.	Ablution facilities are kept clean and in good working order Records of cleaning and servicing kept on file	Daily	Contractor ECO	Construction of the new bulk chemical storage facility
	Contents from the chemical toilets to be removed by an approved company and the waste to be discharged into a licenced waste water treatment works	Record of servicing signed by service provider and safe disposal certificate obtained from service provider	As and when required	Contractor ECO	Construction of the new bulk chemical storage facility
	The necessary agreement between the Service Provider and the Contractor for the removal of the sewage must be in place and shall be made available on request.	Signed agreements between contractors and sanitation service providers in place	As and when required	Contractor ECO	Construction of the new bulk chemical storage facility
Groundwater					
Reduce the potential impact on groundwater as a result of the construction and operation of the bulk chemical storage facility	No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment shall be provided with appropriate soakaways, will be clearly demarcated and will not be allowed to contaminate any surface runoff.	No vehicles washing undertaken inside designated areas	As and when required	Contractor ECO	Construction of the new bulk chemical storage facility

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	Sufficient areas shall be provided for the maintenance of vehicles, only if this will be done on-site.	No vehicle maintenance conducted outside designated areas	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Refuelling of vehicles will only be allowed in designated areas.	No vehicle refuelling conducted outside designated areas	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	All construction equipment shall be parked in a demarcated area. Drip trays shall be used when equipment is parked.	No equipment and vehicles parked and stored outside designated areas Drip trays provided for all vehicles and equipment	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	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.	Dedicated storage area must include a bund or drain	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Bunded areas shall contain 110% of the stored volume.	Bund areas have 110% of stored volume	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Bund areas must be impermeable.	Bund areas protected with impermeable surfaces	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	Bund area must have a facility such as a valve/sump to drain or remove clean stormwater.	All bund areas around the tank areas have valve or sump	As and when required	RBMR SHE Officer	Operation of bulk chemical storage facility
	Contaminated water shall be pumped into a container for appropriate removal and disposal.	Dedicated container on site for storage of contaminated water	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Regular inspections shall be carried out to ensure the integrity of the bund walls.	Records of bund wall inspection	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	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.	Schedule of preventative maintenance	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of responsibly.	No contaminated soils on site No evidence of oil, grease, hydraulic fluid and diesel spill on bare soils	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	All proposed stormwater storages/sumps should be maintained to prevent silt potentially reducing the capacities of the sumps.	No silt in the stormwater storages/sumps No overflow/leakages from storages/sumps	Bi-annually	RBMR SHE Officer	Operation of Bulk chemical storage facility
	Oil sumps must be regularly inspected to ensure the integrity of the liner systems.	Intact sump liner systems No leakage of oils from the sumps into groundwater	Annually	RBMR SHE and Officer Engineers	Operation of bulk chemical storage facility

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	The sumps shall also be emptied on a regular basis to avoid overflowing or spillage from sumps.	No overflow of sumps	Monthly	RBMR SHE Officer	Operation of bulk chemical storage facility
	Groundwater monitoring programme must be expanded to include the bulk chemical storage area	Implementation of RBMR groundwater monitoring	As per the requirements of the groundwater monitoring programme	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Vehicle parking and chemical loading areas shall be paved.	Paved parking and chemical loading areas	Once off	Contractor ECO Project Engineers RBMR SHE Officer	Preconstruction Construction and operational phases of the new bulk chemical storage facility
Surface Water/Hydrology					
Reduce the potential impact on surface water/wetlands/aquatic ecosystems as a result of the construction and operation of the Bulk chemical storage facility	Ensure the clean and dirty water segregation by implementing the stormwater management plan developed for the facility.	No contamination of clean water by dirty water	Daily	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	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) (the ENS) via the catchall tank from where it will be recycled throughout the plant.	No runoff from the rinsing area discharging to the environment	During rinsing of the tanks for use by 3rd parties.	Contractor ECO	Decommissioning of the existing facility
	RBMR shall ensure that the E&S process dam has sufficient capacity to handle the runoff from the rinsing area.	No overflowing of the E&S dam due to additional runoff from the rinsing area	Daily	Contractor ECO	Decommissioning of the old plant
	Spill kits to be made available at areas of possible spillages of hazardous substances.	Spill kits available areas where hazardous substances are stored	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
					Decommissioning of the current plant
	The handling, rinsing and management of the current tanks will be conducted per the requirements of the MSDS for the tanks attached in Appendix A.	MSDS for chemical at the plant Cleaning of tanks done per the requirements of the MSDS	As and when required	Contractor ECO	Decommissioning of the old plant
	RBMR will dedicate an area to rinsing and handling of the tanks.	Specified area designated for cleaning of tanks	Prior to cleaning of tanks	Contractor ECO	Decommissioning of the old plant
	The area will be adequately protected by concrete and bunded to ensure no leakage of rinsing water/solution seeps and contaminates water resources	Rinsing area bunded No contamination of water resources due to runoff or seepage of contaminated rinsing water/solution.	Prior to cleaning of tanks	Contractor ECO	Decommissioning of the old plant
	Drivers and operators shall be trained to use spill kits and contain spillages to the smallest possible areas and the training records shall be made available on request.	Proof of driver training Training records on file	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Remediation of spillages must be conducted on a continual basis.	No spillages around the project area	As and when required	Contractor ECO	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Adequate stormwater management must be incorporated into the design of the project in order to prevent contamination of watercourses and wetlands from dirty water.	Implementation of the stormwater management plan developed for the plant No contamination of water resources from runoff from the project site	As and when required	Contractor ECO Project Engineers RBMR SHE Officer	Preconstruction Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Clean surface runoff emanating from the area between the proposed loading bay and the desilting dewatering plant must be channelled	Monitoring results from the proposed oil trap	Monthly	RBMR SHE Officer	Operation

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	into a clean natural trench which will report at the proposed oil trap. The oil trap shall be monitored and collected oil shall be disposed of accordingly by a third party. The de-oiled storm runoff with acceptable conductivity and pH levels as per the clean water standards will be discharged to the clean natural environment.	Removal of oil spills.			
	No vegetation allowed to grow and/or silt to accumulate in the channels and along berms	No vegetation in channels and berms No reported blockages of the channels and berms	Monthly	RBMR SHE Officer	Operation
	Stormwater channels to be lined if the velocity within the channels exceeds 2 m/s to prevent erosion within the channels.	No eroded stormwater channels Lined channels where velocity exceeds 2m/s	Once off	Contractor ECO RBMR SHE Officer Project Engineer	Construction and operational phases of the new bulk chemical storage facility
	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 capacity culvert downstream of the facility where the stormwater flows towards Dam 3B will need to be upgraded to handle the additional flow from the proposed facility	Culvert openings that can handle 1:50 year storms at road crossings	Once off	Contractor ECO RBMR SHE Officer Project Engineers	Construction and operational phases of the new bulk chemical storage facility
	A 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.	Project design per the requirements of the SWMP developed for the project Sump located at the north western end of the facility footprint	Once off	Contractor ECO RBMR SHE Officer Project Engineers	Design (Pre-construction) Construction and operational phases of the new bulk chemical storage facility
	A sump must be installed at the chemical loading area to collect contaminated water due to activities occurring below the proposed loading area roof and this water will either be	Sump installed at the proposed loading area roof	Once off	Contractor ECO RBMR SHE Officer	Design (Pre-construction) Construction and operational phases of the

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	pumped directly into the CatchAll Tank or pumped into the dirty channel sump.	Runoff from loading area roof pumped to the CatchAll Tank or dirty water channel sump		Project Engineers	new bulk chemical storage facility
	Bunding walls must be constructed around the tanks to provide emergency containment in an event of tank failure, to prevent mixing of different chemicals around the tanks and to stop chemical leakage that could result in surface and groundwater contamination.	Bund walls installed at the tanks area No surface/groundwater contamination from the facility	Monthly	Contractor ECO RBMR SHE Officer Project Engineers	Design (Pre-construction) Construction and operational phases of the new bulk chemical storage facility
	A 1.5m sump to be installed in each bund to temporarily store contaminated stormwater which will be pumped to CatchAll Tank.	Each bund containing a 1.5m ² sump Stormwater from sumps pumped to the CatchAll Tank.	Once off (design)	Contractor ECO RBMR SHE Officer Project Engineers	Design (Pre-construction) Construction and operational phases of the new bulk chemical storage facility
	Contaminated stormwater collected in the CatchAll Tank will be pumped to the E&S for equalization where post equalization, the equalized stormwater will be further pumped to the Triangular Dam (E&S process dam).	Stormwater in the CatchAll pumped to the E&S for equalization prior to being pumped to the Triangular Dam.	Design (Pre-construction) Construction and operational phases of the new bulk chemical storage facility	Contractor ECO RBMR SHE Officer Project Engineers	Design (Pre-construction) Construction and operational phases of the new bulk chemical storage facility
	An efficient and effective pumping schedule to ensure that no spilling occurs from temporary storages.	Pumping schedule developed No spilling from temporary storage areas	As and when required	Contractor ECO RBMR SHE Officer Project Engineers	Construction and operational phases of the new bulk chemical storage facility
	All proposed stormwater storages/sumps should be maintained to prevent silt potentially reducing the capacities of the sumps.	No silt in the stormwater storages/sumps No overflow/leakages from storages/sumps	Bi-annually	RBMR SHE Officer	Operation of Bulk chemical storage facility
	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 floodlines.	No stormwater discharge points located within 1:100 floodlines without authorisation from the DWS	Monthly	RBMR SHE Officer	Operation of Bulk chemical storage facility

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	No direct discharge of polluted water to the environment is permitted, unless authorised by the DWS.	No discharge to water resources unless authorised by DWS	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Vehicle and personnel movement within watercourses and wetland areas shall be strictly prohibited.	No movement of vehicles within watercourses and wetland areas	Monthly	Contractor ECO RBMR Officer SHE	Construction of new bulk chemical storage facility Decommissioning of the current plant
	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.	Vehicle preventative maintenance schedule available on file Proof of preventative maintenance of vehicles	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	An inspection programme shall be implemented to ensure that all the mechanical equipment is inspected regularly to ensure the optimal functioning of the equipment.	Inspection programme on file Proof of implementation of inspection programme	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Refuelling of equipment shall occur in designated areas by trained people.	No refuelling equipment located outside designated areas	Daily	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Bunding areas shall be provided for bulk storage of diesel, fuel, and oils which shall contain 110% of the volumes stored.	Adequate bunding areas (110% of volumes stored) as per the requirements of SANS 10131:2004	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site or can be removed by a service provider that is qualified to clean the soil.	No evidence of soil contamination Where required, proof of disposal at an appropriate registered landfill site In the occurrence where soil contamination is to be treated in situ the Contractor is to provide the ECO with a method statement for approval.	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	The impacts on surface water quality will be monitored as part of the overall RBMR monitoring programme and where there are any indication of impacts from the bulk chemical storage facility, these must be immediately investigated and addressed e.g. elevated chloride levels in water resources	Implementation of water quality monitoring programme (reporting as per the approved RBMR surface water quality monitoring programme)	As per the requirements of the RBMR surface water quality monitoring programme	RBMR Officer SHE	Operation of Bulk chemical storage facility
Air Quality					
Reduce the potential for nuisance dust, the emission of carbons and other ambient air pollutants	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.	No complaints regarding dust nuisance	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	A speed limit of 40 km/h shall apply to limit vehicle entrained dust from the unpaved roads.	No complaints regarding dust nuisance	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	The impacts on air quality will be monitored as part of the overall RBMR monitoring programme.	Proof of implementation of RBMR dust fallout monitoring programme	As per the requirements of the dust fallout monitoring programme	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution.	Proof of preventative maintenance on file	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be kept on file.	Proof of regular servicing of toilets Proof of agreement with a service provider No complaints regarding odours from the toilets	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
Climate Change					
Reduce the emissions of Green House Gasses as a result of the use of construction vehicles and machinery	All the construction vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.	Vehicle maintenance plan on file Proof of regular maintenance	As and when required (as per the vehicle maintenance plan to be compiled.	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
Flora					
Reduce the potential impact on flora	<i>Development footprint:</i> <ul style="list-style-type: none"> Vegetation clearance shall be kept to a minimum and all activities must be contained within the project footprint to minimise disturbance outside these areas. Vehicles must be restricted to travelling on designated access roads to limit the ecological footprint of the proposed activity. 	No clearance of vegetation outside the RBMR precinct No vehicles travelling outside the existing access roads	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility
	<i>Weed Control and Management:</i> <ul style="list-style-type: none"> Removal of the alien and weed species encountered on the site must take place in order to comply with NEM: BA Care should be taken with the choice of herbicide to ensure that no additional impact 	Proof of an alien invasive plant species management plan developed as per the requirement of the National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) Alien and Invasive	Weekly	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	and loss of indigenous plant species occurs due to the herbicide used. <ul style="list-style-type: none"> Removal of species should take place throughout the construction and operational phases. 	Species Regulations, 2014 on file No alien invasive plant species on site			
	<i>Rehabilitation:</i> <ul style="list-style-type: none"> All disturbed habitat areas outside the project footprint area must be rehabilitated as soon as possible to ensure that floral ecology is re-instated. Reseeding with indigenous grasses should be implemented. 	Rehabilitation of all disturbed areas outside the RBMR precinct affected by the propose activities	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility
	<i>Fires:</i> <ul style="list-style-type: none"> Only controlled fires in designated areas must be allowed during all development phases. 	No informal fires on site No complaints from neighbouring properties and communities	Daily	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	<i>Flora:</i> <ul style="list-style-type: none"> Sensitive floral species, if encountered, must be rescued and relocated. The following should be ensured: If any threatened species, or nationally or provincially protected floral will be disturbed, Where required, ensure effective relocation of individuals to suitable similar habitat. All rescue and relocation plans should be overseen by a suitably qualified specialist. 	No loss of sensitive floral species Where required, proof of relocation of protected floral species Where required, proof of appointment of a suitably qualified ecologist/botanist to oversee relocation of floral species of conservation concern	As and when required	Contractor ECO RBMR SHE Officer Ecologist	Construction and operational phases of the new bulk chemical storage facility
	All sensitive open space areas will be demarcated and access into these areas shall be prohibited.	Proof of demarcation of sensitive areas marked as no-go areas No personnel accessing sensitive areas	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
Fauna					
Reduce the potential impact on Fauna	The proposed development footprint areas should remain as small as possible and be confined to already disturbed areas within the RBMR footprint.	No project related activities outside the RBMR footprint	Daily	Contractor ECO	Construction of the new bulk chemical storage facility
	No trapping or hunting of fauna is to take place.	No trapping or hunting of animals	Weekly	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed in disturbed areas.	No alien invasive plant species on site No evidence of soil erosion on site	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility
	Should any SCC be noted within the study area, these species should be relocated to similar habitat within or in the vicinity of the study area with the assistance of a suitably qualified specialist.	Where required, proof of engagement with a qualified ecologist to oversee the relocation faunal species of conservation concern No loss of faunal species concern	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility
	An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss.	Proof of an alien invasive plant species management plan developed as per the requirement of the National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) Alien and Invasive Species Regulations, 2014 on file No alien invasive plant species on site	Weekly	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Poaching of animals will be prohibited.	No poaching of wild animals	Weekly	Contractor ECO	Construction and operational phases of

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
				RBMR Officer SHE	the new bulk chemical storage facility Decommissioning of the current plant
Visual					
Reduce the potential visual impact as a result of movement of machinery, the establishment of infrastructure and dust generation	The number of construction vehicles and machinery to be used shall be kept to a minimum.	No complaints from other road users and neighbouring communities	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Site clearance shall be kept to a minimum and limited to the footprint of the plant and its associated infrastructure.	No site clearance outside the project footprint	Daily	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Where required, all lighting shall be kept to a minimum within the requirements of safety, security and efficiency.	No complaints from neighbouring communities due to light nuisance	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
Noise					
Reduce the potential generation of nuisance noise	Correct Personal Protective Equipment (PPE) must be worn at all times by the personnel on the site.	All personnel must make use of appropriate PPE on site Compliance with requirements of the OHSA.	Daily	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Establish noise abatement measures for vehicles and activities.	No noise complaints from neighbouring communities Proof of use of noise abatement measures where require	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
		Compliance with requirements of the OHSA.			Decommissioning of the current plant
	All equipment should be provided with standard mufflers. Muffling units on vehicles and equipment must be kept in good working order.	No noise complaints from neighbouring communities Compliance with requirements of the OHSA.	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fan-belts, worn bearings and other sources of noise.	No noise complaints from neighbouring communities Compliance with requirements of the OHSA.	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Equipment must be operated within specifications and capacity (e.g. no overloading of machines).	No noise complaints from neighbouring communities Compliance with requirements of the OHSA.	Daily	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Regular maintenance of equipment must be undertaken.	No noise complaints from neighbouring communities Proof of regular maintenance of equipment Compliance with requirements of the OHSA.	Daily	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Equipment shall be switched off when not in operation.	No noise complaints from neighbouring communities Proof of regular maintenance of equipment Compliance with requirements of the OHSA.	Daily	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Appropriate directional and intensity settings must be maintained on all hooters and sirens.	No noise complaints from neighbouring communities	Daily	Contractor ECO	Construction and operational phases of the new bulk chemical storage facility

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
		Proof of regular maintenance of equipment Compliance with requirements of the OHSA. Proof of implementation of directional and intensity settings were required		RBMR SHE Officer	Decommissioning of the current plant
Soils, Land Use and Land Capability					
Reduce the potential impact on soils, land use and land capability as a result of compaction, clearing of vegetation and improper storage and handling of oils, fuels and other hazardous substances Preserve soil resources	No waste or spillage of hazardous material should be allowed in bare soiled areas.	No evidence of chemical and hydrocarbon spillages	Daily	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEM: WA or can be removed by a service provider that is qualified to clean the soil.	Proof of appointment of service provider to remove and dispose of contaminated soil No evidence of chemical and hydrocarbon spillage	Daily As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	No field maintenance of equipment shall be permitted.	No maintenance of equipment in the field, outside designated areas	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Drip trays shall be used when dispensing fuel or oils from equipment outside designated areas.	Drip trays available when dispensing fuel and oils	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Drip trays shall only be emptied into a dedicated container.	Proof of availability of dedicated containers available where required	As and when required	Contractor ECO	Construction and operational phases of the new bulk chemical storage facility

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
				RBMR SHE Officer	Decommissioning of the current plant
	Dedicated containers must be emptied into containers for removal by an approved contractor.	Proof of agreement with approved contractors for removal of containers dedicated for oil and fuel	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Erosion control measures shall be implemented where deemed necessary.	Installation of erosion control measures where necessary No areas showing evidence of soil erosion	As and when required Monitor weekly	Contractor ECO	Construction of the new bulk chemical storage facility
	All erosion damage must be repaired as soon as possible.	No areas showing evidence of soil erosion	As and when required Monitor weekly	Contractor ECO	Construction of the new bulk chemical storage facility
	Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of responsibly.	No contaminated soils on site No evidence of oil, grease, hydraulic fluid and diesel spill on bare soils	Daily	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	Regular inspection and maintenance of the bulk chemical storage facility shall be conducted to ensure integrity of the plant is maintained	Proof of inspection and maintenance	As and when required	RBMR SHE Officer	Operation of bulk chemical storage facility
Traffic					
Reduce the potential impact on traffic as a result of increased vehicle numbers and the impact on road degradation	Speed limits will be reduced to 40 km/h to reduce dust and noise generation.	No complaints from adjacent landowners and other road users	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	All the construction vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.	Vehicle maintenance programme developed Proof of vehicle maintenance	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
Waste Management					
Reduce the potential environmental impact as a result of poor waste management practises	<ul style="list-style-type: none"> Waste management will be undertaken in line with the Anglo-American Platinum's Zero Waste to Landfill (ZW2L) goal throughout all phases of the project where reuse and recycling of waste will be implemented as the first choice, and disposal as a last resort. Where recycling, reuse and disposal of waste is required, the following shall apply: <i>Separation of waste:</i> <ul style="list-style-type: none"> All waste shall be separated into general waste and hazardous waste. Hazardous waste shall not be mixed with general waste increasing the quantities of hazardous waste to be managed. General waste can further be separated in waste that can be recycled and/or reused. 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 construction waste. 	Proof of separation of waste (bins clearly labelled) MSDS available on file No litter on site Comply with the requirements RBMR Waste Management Operational Procedure	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant
	<i>Storage of waste:</i> <ul style="list-style-type: none"> General waste will be collected in an adequate number of litter bins located throughout the construction site. Bins must have lids in order to keep rainwater out. 	No waste storage container located within sensitive environments No waste storage containers located outside demarcated areas	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	<ul style="list-style-type: none"> 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. Runoff from any area demarcated for waste will be contained and managed. 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 1:100-year floodline 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. 	No overflowing waste storage containers on site			
	<p><i>Disposal of hazardous waste:</i></p> <ul style="list-style-type: none"> No indiscriminate dumping shall be allowed in or near the construction 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 certificate shall be stored and provided on request. 	<p>No waste dumped on site</p> <p>Proof of agreements with service providers for the collection and disposal of hazardous waste</p> <p>MSDS available on file</p>	As and when required	Contractor ECO RBMR SHE Officer	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant

Objective	Mitigation and management measures and principles	Measurable Targets/Monitoring Outcome	Monitoring Frequency	Responsible Person	Project Stage
	<p><i>Disposal of general waste:</i></p> <ul style="list-style-type: none"> No dumping shall take place in or near the construction 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. 	No waste dumped on site MSDS available on file	As and when required	Contractor ECO RBMR Officer SHE	Construction and operational phases of the new bulk chemical storage facility Decommissioning of the current plant

11 Checking and Corrective Action

Checking and implementing corrective action, should it be required, forms an important component of the EMPr management cycle. These ensure that:

- The required EMPr management conditions are being implemented;
- The desired outcomes are being achieved;
- Ongoing inspections of operational controls and general state of operation; and
- Internal audits to assess the compliance to the EMPr or to focus on a particular performance issue.

Many potential impacts are difficult to monitor quantitatively, such as waste management. However, an ongoing, but pragmatic, inspection regime must be developed that allows potential environmental transgressions to be identified proactively so that mitigation can be quickly and effectively implemented.

The main instruments to be used to address non-compliances are the following:

- Verbal instructions – Minor transgressions from an established procedure;
- Written instructions – Normally following an audit; and
- Contract Notice – Following a breach in contract.

12 Environmental Monitoring

All programmes and plans forming part of this document will be subject to monitoring. Monitoring will have two elements, namely: routine monitoring against set standards or performance criteria, and periodic review or evaluation. This will focus on the assessment of the effectiveness of the plan or programme.

Each business unit associated with the proposed bulk chemical plant project, the generation or management of wastes, and contractors working for these business units, will ensure that all equipment is well maintained and fully operational and minimises risk of leaks or spillages.

Monitoring the performance of the project activities in respect of the EMPr will fall under the inspection role of the ECO to be appointed by RBMR.

It is important to note that the RBMR shall remain ultimately responsible for compliance to all the relevant performance criteria, procedures and legislation and should therefore also institute the appropriate monitoring to ensure adherence to the relevant requirements.

The compliance monitoring is to verify that the responsible parties are adhering to the procedures, management conditions, and specifications contained in this EMPr, and associated regulations and EA conditions.

RBMR currently has monitoring programmes (air quality, toxicity, biomonitoring, surface and ground water quality). The groundwater monitoring programme will need to be expanded to include the proposed bulk chemical storage facility.

13 Environmental Auditing

The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. In the event where discrepancies are identified, the problem must be investigated and attended to. All the results obtained during environmental monitoring must be documented for audit purposes.

An audit of the environmental management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards. Annual internal audits should be conducted during the construction and operational phase of the facility to ensure adherence to the management measures contained in the EMPr.

It is recommended that annual external EMPr audits be conducted for the project during the construction phase and biennially during the operation phase.

14 Environmental Awareness Plan

Anglo Rustenburg Process Division (which includes the RBMR) Environmental Department together with the SHE representatives will ensure that relevant employees are adequately trained on the EMPr requirements as well as the EA conditions. The induction program will include a presentation on the EMPr, and the EA. Records must be kept on all employee trained on the EMPr and those who have undergone the Environmental Awareness induction and safety filed.

Personnel involved in the bulk chemical storage facility project should be trained on the requirements of the EMPr.

The environmental awareness induction presentation must include the following:

- The importance of adhering to the EMPr and any other management plan compiled in response to this EMPr, as well as the authorised EA and their associated conditions;
- Clear understanding of the key environmental features of the plant site and surrounding environment;
- Regulatory requirements of adhering to the EMPr as well as the authorised EA and its associated conditions;
- Environmental benefits of adhering to the EMPr, the authorised EA and its associated conditions, in informing opportunities for continual improvement;
- Roles and responsibilities of individuals when carrying out their work activities;
- Consequences of deviating from set operating procedures; and
- Mitigation measures required to be implemented when carrying out their work activities when a divergence from normal operating condition occurs.

The effectiveness of the environmental awareness training will be reflected in the amount of non-conformances to the EMPr identified during internal and external audits. Should it be envisaged that re-training will be required, the SHE representative will inform RBMR managers of the training requirements and what additional actions will be undertaken.

15 Declaration of Contractor's Acceptance

I, _____, (full name) representing _____, (company name) have read, understood and accept the above environmental management plan as a framework for my company's environmental performance during the above mentioned project.

Signed: _____ Date: _____

Prepared by

SRK Consulting - Certified Electronic Signature
 **srk consulting**
561608/44341/Report
1123-7637-115; MAND-27/05/2021
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Ndomupe Masawi

Principal Environmental Scientist

Reviewed by

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Manda Hinsch

Partner

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: MSDS for Chemicals at the Current Tanks

RBMR Chemical tanks cleaning

Scope of work

- Cleaning of vessels contaminated with chemicals.

Abbreviations

CLIENT – ANGLO PLATINUM LIMITED

MAIN CONTRACTOR – INTERWASTE (PTY) LTD

SUB CONTRACTOR – ITD INDUSTECH TRANSPORT DIVISION t/a Industech

Method Statement

- **Strict adherence to this method statement is critical to the health and safety of all engaged in the work.**
- **Any deviation must first be authorised by the Site Supervisor.**
- Vessels to be vented for a minimum of +/-24 hours prior to cleaning.
- Opening of all manholes and covers of the vessel.
- Decontamination chamber with chemical showers to be erected outside of vessels.
- Bund area and wash bay area to be created prior to cleaning of vessels.
- Cleaning technicians to enter vessels on compressed air, breathing apparatus, confined space entry and chemical suits as well as PPE.
- Internally cleaning of tanks with environmentally friendly degreasers and extension lances.
- Collapsible ladder to be placed into tanks should there be a height issue with reaching top of tanks (if necessary).
- Confined space entry into vessels to make it safe for decommissioning.
- Contents of tank to be pumped out with a 180 CFM compressor and diaphragm pump.
- Effluent water and waste to be handled by **INTERWASTE** for disposal.
- High pressure hot water cleaning of bund area upon completion of vessels.
- Hydro-carbon absorbent booms to be placed near drains to prevent run-off from entering storm water lines.

Location and Access

Waterval Farm 303JQ, Old Main Road, Rustenburg, 0300, South Africa

Working Environment & Restrictions

Work is restricted to daytime operations.

Protection of others

- Exclusion/Danger zones identified and no personnel to have access to these areas during operations.
- Signage to be placed at entrances.

Emergency Procedures

Normal evacuation procedure applies. Also see fall protection plan as per file.

If any personnel are injured, the supervisor on site does know where the nearest clinic/hospital is.

Rescue Plan

Cleaning technician on standby with compressed air cylinders.

Operative/Competence

Operators to be skilled in use of equipment.

Personal Protective Equipment

- Safety Footwear
- Hard Hats
- General Protective Gloves
- Safety Goggles
- Full face respirators
- Chemical Suits, etc.

Plant and Equipment

- High pressure Cleaners, Drip trays, Fire Extinguishers
- 7.5m Extension lance
- 10m Extension pole
- Chemical Suits
- Compressed air cylinders
- Breathing apparatus
- Collapsible ladder
- 180 CFM Compressor
- Mops, rags, brooms, brushes, extension brushes
- Sign Boards
- Hydrocarbon booms & scatter
- Diaphragm pump
- Chemical shower
- Hotbox

Materials Handling/Storage & Safety Information

Flammable chemicals, High toxicity levels, acidic

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Material Safety Data Sheet - MSDS

Product:
MSDS No. : 002

CAUSTIC SODA SOLUTION AT 50%

Version: 04

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01 - IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

PRODUCT NAME CAUSTIC SODA LIQUID AT 50%
SDS No. 002

02 - COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL NAME OF THE SUBSTANCE SODIUM HYDROXIDE 50%
AQUEOUS SOLUTION

Chemical Name	Synonyms	EC-NO.	CAS-No.	Concentration	Classification Directive 67/548/EEC	Classification Regulation (EC) No 1272/2008 (GHS)
Sodium hydroxide	Caustic soda	215-185-5	1310-73-2	> 49.5 – 50.0%	C; R35	Skin Corr. 1A; H314 Eye Dam. 1; H318 Met. Corr; H290

03 - HAZARDS IDENTIFICATION

MOST IMPORTANT HAZARDS
HEALTH EFFECTS

PHYSICAL AND CHEMICAL HAZARDS
SPECIFIC HAZARDS / EC
LABEL ELEMENTS (REGULATION (EC) NO 1272/2008) IN ACCORDANCE WITH GHS
Name:

SAFETY INFORMATION : PLEASE READ THIS SHEET CAREFULLY
Skin corrosion, 1A, H314
Risk of serious damage to eyes, 1, H318
CORROSIVE to metals, 1, H290
At high temperature : forms flammable and explosive hydrogen through

Sodium hydroxide; caustic soda



Hazard pictograms:

Signal Word:
Hazard statements:

Precautionary statements:

Danger
Causes severe skin burns and eye damage.
May be corrosive to metals.
Prevention:
Do not breathe gas/mist/vapors/spray.
Wear protective gloves/protective clothing/eye protection/face protection.

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OTHER HAZARDS

Response:

IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Immediately call a POISON CENTER or doctor/ physician.

Absorb spillage to prevent material damage.

Potential health effects:

Acute exposure: Corrosive liquid

Inhalation: Severely irritating to respiratory system

Ingestion: Risk of perforation of digestive system

Physical and chemical hazards:

At high temperature: Forms flammable and explosive hydrogen through corrosion of metals.

Decomposition products: See chapter 10

Other:

Results of PBT and vPvB assessment : Not relevant

04 - FIRST AID MEASURES

GENERAL ADVICE

Under the shower:

Take off immediately all contaminated clothing, including shoes.

INHALATION

Inhalation of mists: Move to fresh air, Oxygen or artificial respiration if needed.

Keep under medical surveillance

In case of problems : Hospitalize

SKIN CONTACT

Wash immediately, abundantly and thoroughly with water If possible, rinse with Boric Acid Solution 5%

Consult a doctor.

In case of extensive burns, hospitalize

EYE CONTACT

Remove particles remaining under the eyelids

Wash well open eyes immediately and abundantly with water for at least 15 min.

Consult an ophthalmologist immediately.

INGESTION

Do not induce vomiting, rinse mouth and lips with plenty of water if the subject is conscious, then hospitalize immediately.

PROTECTION OF FIRST-AIDERS

Risk of Aerosol

For any intervention, wear appropriate breathing apparatus, Protective suit Impermeable Gloves, Safety Glasses/Goggles

05 - FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA

Suitable extinguishing media: Use extinguishing measures that are appropriate to local circumstances and the Surrounding environment.

SPECIFIC HAZARDS

At high temperature : Forms flammable and explosive hydrogen through corrosion of metals

ADVICE FOR FIREFIGHTERS

Specific Methods: In case of fire nearby, remove exposed containers. Keep containers and surroundings cool with water spray.

Special protective actions for fire-fighters:

Wear self-contained breathing apparatus and protective suit.

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06 - ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS,
PROTECTIVE EQUIPMENT AND
EMERGENCY PROCEDURES

Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Prohibit contact with skin and eyes and Inhalation of vapors.

ENVIRONMENTAL PRECAUTIONS

Should not be released into the environment
Do not let the product enter into drains
Contain by damming with sand or inert earth (Do not use combustible materials)

METHODS FOR CLEANING UP

Recovery:
Wash with water and recover it. Absorb on sand. Wash the remainder with water.
Absorb on : Sand, Loam
Neutralization:
Neutralize with an acid (diluted solutions : Hydrochloric acid)
Neutralization is exothermic
Elimination: See chapter 13

07 - HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING
Technical measures/Precautions

Storage and handling precautions applicable to products: viscous liquid
Corrosive. At high vapor/fog concentrations: Provide appropriate Exhaust ventilation at machinery. Provide showers, eye-baths. Provide water supplies near the point of use. Provide self-contained breathing apparatus nearby

Safe handling advice

Avoid splashing when handling. For personal protection see section 8.

Hygiene measures

Prohibit contact with skin and eyes and inhalation of vapors. When using, do not eat, drink or smoke.
Wash hands after handling. Remove contaminated clothing and protective equipment before entering eating areas.

CONDITION FOR SAFE STORAGE

Technical measures/Storage conditions

Provide a catch-tank and an impermeable corrosion-resistant floor with drainage to a neutralization tank within a dyke area. Store protected From moisture. Provide waterproof electrical equipment.
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Do not store below: 20 °C

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Incompatible products	Acids, Halogenated hydrocarbons
PACKAGING MATERIALS RECOMMENDED	Ordinary steel Stainless steel Vulcanite coated steel Epoxy resin lined tanks
To be avoided	Aluminum. Copper and alloys Zinc and alloys

08 - EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE PROVISIONS	Ensure sufficient air exchange and/or exhaust in work areas
CONTROL PARAMETERS	
Exposure limits	FRANCE 1993 : VME= 2 mg/m ³ USA-ACGIH 2007 : Ceiling = 2 mg/m ³ (maximum value) EH40 WEL 2007; STEL 2 mg/m ³
PERSONAL PROTECTION EQUIPMENT	Respiratory protection: In case of insufficient ventilation, wear suitable respiratory equipment. Recommended Filter type: P2 Hand protection: Splash contact, intermittent and prolonged PVC or other plastic material gloves Glove thickness: 1,2 mm Eye/face protection: Safety glasses/goggles and face-mask (during discharge) Skin and body protection: At the workplace: Safety shoes, Combination with delayed penetration Intervention at incident: Boots, overalls with hood, multi layered polyethylene

09 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE (20°C)	liquid
FORM	cloudy
COLOUR	Colorless
ODOUR	None
OLFACTORY THRESHOLD	No data available
pH	pH 14
FREEZING POINT	12°C
BOILING POINT/RANGE	142 - 144 °C
FLASH POINT	Not applicable
EVAPORATION RATE	No data available
FLAMMABILITY	Not applicable
VAPOUR PRESSURE	(20°C) : 2 hPa (mbar)
VAPOUR DENSITY	No data available
DENSITY	liquid : (20°C) : 1520 kg/m ³
SPECIFIC GRAVITY (water = 1)	(liquid) (*) : (20°C) : 1.52 (*)
WATER SOLUBILITY	20°C : Completely soluble
PARTITION COEFFICIENT: NOCTANOL/WATER:	Partition coefficient: n-octanol/water, Not relevant
MOLECULAR MASS :	40.01
AUTOIGNITION TEMPERATURE	Not applicable
VISCOSITY, DYNAMIC	Viscosity (20°C) : 78 mPa.s Viscosity (40 °C) : 23 mPa.s (cP)
OTHER DATA	
Solubility in other solvent	Water soluble solvents
Henry constant	Not applicable

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Explosive properties
Oxidizing properties

Not relevant (due to chemical structure)
Not relevant (due to chemical structure)

10 - STABILITY AND REACTIVITY

REACTIVITY & CHEMICAL STABILITY
CONDITION TO AVOID

The product is stable under normal handling and storage conditions.
(To maintain the technical properties of the product). Store protected from moisture.

INCOMPATIBLE MATERIALS TO AVOID

Water : Acids (Neutralization is exothermic)
Metals : Zinc-Aluminum-Copper (formation of : Hydrogen)
Alkaline metals : alkaline earth metals-exothermic reaction, formation of Hydrogen
Acetaldehyde - Acrolein - Acrylonitrile - Allyl alcohol (Violent polymerization)
Halogenated hydrocarbon-Maleic anhydride-Bromine-Nitro paraffin
Nitro aromatics-Oleums-Tetrahydrofuran (Violent, even explosive, reaction)
At high temperature : Forms flammable and explosive hydrogen through corrosion of metals

HAZARDOUS DECOMPOSITION
PRODUCTS

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11 - TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION

Acute toxicity

Ingestion:

Causes severe digestive tract burns., Risk of perforation of digestive system, State of shock

LOCAL EFFECTS (Corrosion /Irritation /

Serious eye damage)

Skin Contact

Causes severe burns. Very corrosive to skin

Recovery slow, Serious lesions with possible after-effects if not washed immediately. Scars may be retractile

Diluted solutions: Dermatitis possible through repeated contact

Eye Contact

Corrosive to eyes

Serious lesions with possible after-effects if not washed immediately, Affects all the tissues of the eye. Risk of loss of sight.

RESPIRATORY or SKIN SENSITIZATION

Inhalation

No data available

Skin Contact

Not a skin sensitizer

Negative epicutaneous tests reported in man

CMR EFFECTS

Mutagenicity

Results from in vitro and in vivo tests do not lead to considering the product as genotoxic.

In vitro

Ames test: negative

In vitro test for chromosomal abnormalities on CHO cells: positive

DNA repair test on rats hepatocytes: negative

In vivo

Micronucleus test in vivo mouse: negative

Tests for chromosome aberrations in vivo in germ cells: negative

Carcinogenicity

Based on the available data, the substance is not suspected of having carcinogenic potential

Reproductive toxicity

Fertility: Based on the available data, the substance is not suspected of having reprotoxic potential.

SPECIFIC TARGET ORGAN TOXICITY

Single exposure

Inhalation

Corrosive to respiratory system

Inhalation of mists , aerosol

Repeated exposure

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Local effects due to an irritant effect

ASPIRATION HAZARDS

No data available

12 - ECOLOGICAL INFORMATION

ACUTE TOXICITY

Fish

LC50, 96 h (Freshwater fish) : 35 - 139 mg/l

Aquatic invertebrates

LC50 : 30 - 1.000 mg/l product not neutralized

Aquatic plants

No relevant data for technical reasons.

Microorganisms

No data available

PERSISTENCE & DEGRADABILITY

Biodegradation (In water):

Formation of salts in solution in the environment, not applicable

Photodegradation (In air):

Overall half-life time: 13 s, Neutralization by atmospheric carbon dioxide

Material Safety Data Sheet - MSDS

CAUSTIC SODA SOLUTION AT 50%

Product:

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BIOACCUMULATION POTENTIAL

Bioaccumulation:

Not applicable

Partition coefficient: n-octanol/water, Not relevant

MOBILITY IN SOIL - Distribution among environmental compartments

Distribution among environmental compartments : not applicable

Henry constant: not applicable,

Absorption / desorption: Non absorbable

RESULTS OF PBT AND vPvB assessment:

Not relevant

13 - DISPOSAL CONSIDERATIONS

DISPOSAL OF PRODUCT

Neutralize with an acid (diluted solutions : Hydrochloric acid)

DISPOSAL OF PACKAGING

Clean container with water

Recover waste water for treatment later

14 - TRANSPORT INFORMATION

PROPER SHIPPING NAME

SODIUM HYDROXIDE SOLUTION

UN Number

1824

LABEL



ADR

Class : 8; Label 8; Packing Group II; Environmentally hazardous: no;

ADNR

Class : 8; Label 8; Packing Group II; Environmentally hazardous: no;

RID

Class : 8; Label 8; Packing Group II; Environmentally hazardous: no;

IMDG

Class : 8; Label 8; Packing Group II; Environmentally hazardous: no; EmS Number: F-A, S-B

IATA Cargo

Class : 8; Label 8; Packing Group II; Environmentally hazardous: no;

IATA Passenger

Class : 8; Label 8; Packing Group II; Environmentally hazardous: no;

15 - REGULATORY INFORMATION

SAFETY DATA SHEETS

Safety data sheets: according to Regulation (EC) No. 1907/2006

EC CLASSIFICATION / LABELLING

(EC) No 1272/2008 (GHS)

ADDITIONAL REGULATIONS (EU)

Hazardous Waste Regulations 2005 Applies

Young workers 94/33/EC Banned and/or restricted

UK REGULATION Chip3: Chemical (Hazard Information and Packaging for Supply) Regulations 2002

INVENTORIES

EINECS: Conforms to

TSCA: Conforms to

AICS: Conforms to

DSL: All components of this product are on the Canadian DSL list.

ENCS (JP): Conforms to

KECI (KR): Conforms to

PICCS (PH): Conforms to

IECSC (CN): Conforms to

16 - OTHER INFORMATION

Full text of R, H, EUH-phrases referred to under sections 2 and 3

R35 Causes severe burns.

H290 May be corrosive to metals.

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

Material Safety Data Sheet - MSDS

Product:

CAUSTIC SODA SOLUTION AT 50%

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RECOMMENDED USES

Chemical Industry
Textiles
Metallurgy
(Aluminum) Paper
making Soap industry
Detergents

BIBLIOGRAPHY REFERENCES

Fiche toxicologique INRS : N° 20 : Soude Caustique et Solutions Aqueuses

This information applies to the PRODUCT AS SUCH and conforming to specifications of QVC.

In case of formulations or mixtures, it is necessary to ascertain that a new danger will not appear.

The information contained is based on our knowledge of the product, at the date of publishing and it is given quite sincerely. However the revision of some data is in progress.

Users are advised of possible additional hazards when the product is used in applications for which it was not intended.

This sheet shall only be used and reproduced for prevention and security purposes.

The references to legislative, regulatory and codes of practice documents cannot be considered as exhaustive.

It is the responsibility of the person receiving the product to refer to the totality of the official documents concerning the use, the possession and the handling of the product.

It is also the responsibility of the handlers of the product to pass on to any subsequent persons who will come into contact with the product (usage, storage, cleaning of containers, other processes) the totality of the information contained within this safety data sheet and necessary for safety at work, the protection of health and the protection of environment.

The highlighted text indicates the changes made with respect to the previous version.

FORMALIN

Safety Data Sheet

according to Regulation (EU) 2015/830

Date of issue: 4/15/2016
Version: 1.0

Revision date: 4/15/2018

Supersedes: 4/21/2015



SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Mixture
Name : FORMALIN

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Main use category : Industrial use

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

ChemSystems (Pty) Ltd
1 Wharhurst Road, AECI Industrial Complex
4120 Umbogintwini - South Africa
T (031)9049404 031 904 9404
www.chemsystems.co.za

1.4. Emergency telephone number

Emergency number : 031 904 9400

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Acute toxicity (oral), Category 3	H301	Calculation method
Acute toxicity (dermal), Category 3	H311	Calculation method
Acute toxicity (inhalation:dust,mist), Category 3	H331	Calculation method
Skin corrosion/irritation, Category 1B	H314	Calculation method
Sensitisation — Skin, Category 1	H317	Calculation method
Germ cell mutagenicity, Category 2	H341	Calculation method
Carcinogenicity, Category 1B	H350	Calculation method
Specific target organ toxicity — Single exposure, Category 2	H371	Calculation method
Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation	H335	Calculation method

Full text of hazard classes and H-statements : see section 16

Adverse physicochemical, human health and environmental effects

May cause cancer (inhalation, ingestion, skin absorption). Suspected of causing genetic defects (inhalation, ingestion, skin absorption). May cause damage to organs (liver, kidneys, lungs) (inhalation, ingestion, skin absorption). Toxic in contact with skin. Toxic if inhaled. Toxic if swallowed. May cause respiratory irritation. Causes severe skin burns and eye damage. May cause an allergic skin reaction.

FORMALIN

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according to Regulation (EU) 2015/830

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



Signal word (CLP)

: Danger

Hazardous ingredients

: FORMALDEHYDE; METHANOL

Hazard statements (CLP)

: H301+H311+H331 - Toxic if swallowed, in contact with skin or if inhaled
H314 - Causes severe skin burns and eye damage
H317 - May cause an allergic skin reaction
H335 - May cause respiratory irritation
H341 - Suspected of causing genetic defects (inhalation, skin absorption, ingestion)
H350 - May cause cancer (inhalation)
H371 - May cause damage to organs (kidneys, liver, central nervous system, lungs) (inhalation, skin absorption, ingestion.)

Precautionary statements (CLP)

: P201 - Obtain special instructions before use
P280 - Wear goggles, gloves, clothing and respiratory protection
P301+P310 - IF SWALLOWED: Immediately call medical centre or doctor
P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P308+P313 - IF exposed or concerned: Get medical advice/attention

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
FORMALDEHYDE (Note B)(Note D)	(CAS No) 50-00-0 (EC no) 200-001-8 (EC index no) 605-001-00-5 (REACH-no) 01-2119488953-20	30 - 50	Carc. 1B, H350 Muta. 2, H341 Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Dermal), H311 Acute Tox. 3 (Inhalation), H331 Skin Corr. 1B, H314 Skin Sens. 1, H317
METHANOL	(CAS No) 67-56-1 (EC no) 200-659-6 (EC index no) 603-001-00-X (REACH-no) 01-2119433307-44	0.5 - 10	Flam. Liq. 2, H225 Acute Tox. 3 (Inhalation), H331 Acute Tox. 3 (Dermal), H311 Acute Tox. 3 (Oral), H301 STOT SE 1, H370

Specific concentration limits:

Name	Product identifier	Specific concentration limits
FORMALDEHYDE	(CAS No) 50-00-0 (EC no) 200-001-8 (EC index no) 605-001-00-5 (REACH-no) 01-2119488953-20	(C >= 0.2) Skin Sens. 1, H317 (C >= 5) STOT SE 3, H335 (5 =<C < 25) Eye Irrit. 2, H319 (5 =<C < 25) Skin Irrit. 2, H315 (C >= 25) Skin Corr. 1B, H314
METHANOL	(CAS No) 67-56-1 (EC no) 200-659-6 (EC index no) 603-001-00-X (REACH-no) 01-2119433307-44	(3 =<C < 10) STOT SE 2, H371 (C >= 10) STOT SE 1, H370

Note B : Some substances (acids, bases, etc.) are placed on the market in aqueous solutions at various concentrations and, therefore, these solutions require different classification and labelling since the hazards vary at different concentrations. In Part 3 entries with Note B have a general designation of the following type: 'nitric acid ... %'. In this case the supplier must state the percentage concentration of the solution on the label. Unless otherwise stated, it is assumed that the percentage concentration is calculated on a weight/weight basis.

Note D : Certain substances which are susceptible to spontaneous polymerisation or decomposition are generally placed on the market in a stabilised form. It is in this form that they are listed in Part 3. However, such substances are sometimes placed on the market in a non-stabilised form. In this case, the supplier must state on the label the name of the substance followed by the words 'non-stabilised'.

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Safety Data Sheet

according to Regulation (EU) 2015/830

Full text of H-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general	: Call a physician immediately.
First-aid measures after inhalation	: Remove person to fresh air and keep comfortable for breathing. Call a doctor.
First-aid measures after skin contact	: Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.
First-aid measures after eye contact	: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.
First-aid measures after ingestion	: Rinse mouth with water. Give water to drink. Do not induce vomiting. Get immediate medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation	: Irritation of the nasal mucous membranes. Respiratory difficulties. Headache. Dizziness. Nausea.
Symptoms/injuries after skin contact	: Burns. Redness, pain. ON CONTINUOUS/REPEATED EXPOSURE/CONTACT: May cause an allergic skin reaction.
Symptoms/injuries after eye contact	: Causes serious eye damage.
Symptoms/injuries after ingestion	: Burns or irritation of the linings of the mouth, throat, and gastrointestinal tract. Irritation of the gastric/intestinal mucosa. Abdominal pain. Nausea. Vomiting.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Water spray. Dry powder. Foam. Carbon dioxide.
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5.2. Special hazards arising from the substance or mixture

Fire hazard	: Combustible liquid. Under fire conditions closed containers may rupture or explode.
Hazardous decomposition products in case of fire	: Toxic fumes may be released.

5.3. Advice for firefighters

Firefighting instructions	: If exposed to fire cool the closed containers by spraying with water.
Protection during firefighting	: Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	: Limit access only to the necessary cleaning personnel. No open flames. No smoking. Remove ignition sources. Ventilate area.
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6.1.1. For non-emergency personnel

Protective equipment	: Corrosion-proof suit. Gloves. Protective apron. Protective goggles. Compressed air/oxygen apparatus.
Emergency procedures	: Only qualified personnel equipped with suitable protective equipment may intervene. Do not breathe vapour.

6.1.2. For emergency responders

Protective equipment	: Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
----------------------	---

6.2. Environmental precautions

Avoid release to the environment. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment	: Dam up the liquid spill. Collect spillage.
Methods for cleaning up	: Take up liquid spill into absorbent material. Notify authorities if product enters sewers or public waters.
Other information	: Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

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Safety Data Sheet

according to Regulation (EU) 2015/830

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for safe handling : Ensure good ventilation of the work station. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Provide local exhaust or general room ventilation. Wear personal protective equipment. Do not breathe vapour. Do not get in eyes, on skin, or on clothing.
- Hygiene measures : Separate working clothes from town clothes. Launder separately. Wash contaminated clothing before reuse. Contaminated work clothing should not be allowed out of the workplace. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Facilities: shower, eye shower. Comply with applicable regulations.
- Storage conditions : Store locked up. Store in a well-ventilated place. Keep container tightly closed. Keep cool.
- Incompatible products : Oxidizing agent. Strong acids. Strong bases. Acid chlorides. amines. alkali metals. aniline. Phenol. Isocyanates.
- Incompatible materials : Heat sources. Sources of ignition.
- Prohibitions on mixed storage : oxidizing agents. (strong) acids. (strong) bases.
- Special rules on packaging : Keep only in original container. Store in a closed container. correctly labelled.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

FORMALDEHYDE (50-00-0)		
United Kingdom	Local name	Formaldehyde
United Kingdom	WEL TWA (mg/m³)	2.5 mg/m³
United Kingdom	WEL TWA (ppm)	2 ppm
United Kingdom	WEL STEL (mg/m³)	2.5 mg/m³
United Kingdom	WEL STEL (ppm)	2 ppm
METHANOL (67-56-1)		
United Kingdom	Local name	Methanol
United Kingdom	WEL TWA (mg/m³)	266 mg/m³
United Kingdom	WEL TWA (ppm)	200 ppm
United Kingdom	WEL STEL (mg/m³)	333 mg/m³
United Kingdom	WEL STEL (ppm)	250 ppm
United Kingdom	Remark (WEL)	Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity)

8.2. Exposure controls

- Appropriate engineering controls : Ensure good ventilation of the work station. Eyewash and shower in work area.
- Personal protective equipment : Gas mask at exposure level >1mg/m3 formaldehyde. High gas/vapour concentration: gas mask. Gloves. Protective goggles. Corrosionproof clothing.
- Hand protection : Protective gloves
- Eye protection : Chemical goggles or safety glasses
- Skin and body protection : Wear suitable protective clothing
- Respiratory protection : Wear respiratory protection



- Environmental exposure controls : Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

- Physical state : Liquid

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Appearance	: Clear, colorless liquid.
Colour	: Colourless.
Odour	: Pungent.
Odour threshold	: No data available
pH	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Melting point	: Not applicable
Freezing point	: No data available
Boiling point	: $\approx 97\text{ }^{\circ}\text{C}$
Flash point	: $> 61\text{ }^{\circ}\text{C}$
Auto-ignition temperature	: $\approx 430\text{ }^{\circ}\text{C}$
Decomposition temperature	: No data available
Flammability (solid, gas)	: Not applicable
Vapour pressure	: No data available
Relative vapour density at 20 °C	: No data available
Relative density	: No data available
Density	: 1.1 - 1.3 g/cm ³
Solubility	: Miscible with water.
Log Pow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: 7 vol % 73 vol %

9.2. Other information

Formic acid content	: 50-500ppm
Silver content	: <0.01ppm

SECTION 10: Stability and reactivity

10.1. Reactivity

Unstable, polymerizes.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

Avoid extreme heat. No flames, no sparks. Eliminate all sources of ignition.

10.5. Incompatible materials

Oxidizing agent. Strong acids. Strong bases. amines. alkaline metals and acid chlorides. aniline. Phenol. Isocyanates.

10.6. Hazardous decomposition products

When heated to decomposition, emits toxic fumes.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Oral: Toxic if swallowed. Dermal: Toxic in contact with skin. Inhalation:dust,mist: Toxic if inhaled.

ATE CLP (oral)	200.000 mg/kg bodyweight
ATE CLP (dermal)	600.000 mg/kg bodyweight
ATE CLP (dust,mist)	1.000 mg/l/4h

FORMALDEHYDE (50-00-0)

LD50 oral	100 mg/kg bodyweight
LD50 dermal	270 mg/kg bodyweight
LC50 inhalation rat (Dust/Mist - mg/l/4h)	497 mg/m ³

METHANOL (67-56-1)

LD50 oral	5628 mg/kg bodyweight
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METHANOL (67-56-1)	
LD50 dermal	15800 mg/kg bodyweight
LC50 inhalation rat (Dust/Mist - mg/l/4h)	85000 mg/m³
Skin corrosion/irritation	: Causes severe skin burns and eye damage.
Serious eye damage/irritation	: Serious eye damage, category 1, implicit
Respiratory or skin sensitisation	: May cause an allergic skin reaction.
Germ cell mutagenicity	: Suspected of causing genetic defects (inhalation, skin absorption, ingestion).
Carcinogenicity	: Nasal cavity carcinomas developed at formaldehyde levels >15ppm. This level would not be tolerated by humans voluntarily. If exposure levels are below recommended levels, the health of workers will be unaffected
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: May cause damage to organs (kidneys, liver, central nervous system, lungs) (inhalation, skin absorption, ingestion.). May cause respiratory irritation.
Specific target organ toxicity (repeated exposure)	: Not classified
Aspiration hazard	: Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.

FORMALDEHYDE (50-00-0)	
LC50 fish 1	6.7 mg/l
EC50 other aquatic organisms 1	5.8 mg/l EC50 waterflea (48 h)
EC50 other aquatic organisms 2	3.48 mg/l IC50 algae (72 h) mg/l
METHANOL (67-56-1)	
LC50 fish 1	10800 mg/l
EC50 other aquatic organisms 1	10000 mg/l EC50 waterflea (48 h)
EC50 other aquatic organisms 2	12000 mg/l IC50 algae (72 h) mg/l

12.2. Persistence and degradability

FORMALIN	
Persistence and degradability	Biodegradable in water.

12.3. Bioaccumulative potential

FORMALDEHYDE (50-00-0)	
Log Pow	0.35
METHANOL (67-56-1)	
Log Pow	-0.8 - -0.6

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.
Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.

SECTION 14: Transport information

In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number

UN-No. (ADR) : 2209
UN-No. (IMDG) : 2209
UN-No. (IATA) : 2209

FORMALIN

Safety Data Sheet

according to Regulation (EU) 2015/830

14.2. UN proper shipping name

Proper Shipping Name (ADR)	: FORMALDEHYDE SOLUTION
Proper Shipping Name (IMDG)	: FORMALDEHYDE SOLUTION
Proper Shipping Name (IATA)	: Formaldehyde solution
Transport document description (ADR)	: UN 2209 FORMALDEHYDE SOLUTION, 8, III, (E)
Transport document description (IMDG)	: UN 2209 FORMALDEHYDE SOLUTION, 8, III
Transport document description (IATA)	: UN 2209 Formaldehyde solution, 8, III

14.3. Transport hazard class(es)

ADR

Transport hazard class(es) (ADR)	: 8
Danger labels (ADR)	: 8



IMDG

Transport hazard class(es) (IMDG)	: 8
Danger labels (IMDG)	: 8



IATA

Transport hazard class(es) (IATA)	: 8
Hazard labels (IATA)	: 8



14.4. Packing group

Packing group (ADR)	: III
Packing group (IMDG)	: III
Packing group (IATA)	: III

14.5. Environmental hazards

Dangerous for the environment	: No
Marine pollutant	: No
Other information	: No supplementary information available

14.6. Special precautions for user

- Overland transport

Classification code (ADR)	: C9
Special provisions (ADR)	: 533
Limited quantities (ADR)	: 5I
Excepted quantities (ADR)	: E1
Packing instructions (ADR)	: P001, IBC03, LP01, R001
Mixed packing provisions (ADR)	: MP19
Portable tank and bulk container instructions (ADR)	: T4

FORMALIN

Safety Data Sheet

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Portable tank and bulk container special provisions (ADR) : TP1
Tank code (ADR) : L4BN
Vehicle for tank carriage : AT
Transport category (ADR) : 3
Special provisions for carriage - Packages (ADR) : V12
Hazard identification number (Kemler No.) : 80
Orange plates :



Tunnel restriction code (ADR) : E
EAC code : •2X

- Transport by sea

Limited quantities (IMDG) : 5 L
Excepted quantities (IMDG) : E1
Packing instructions (IMDG) : P001, LP01
IBC packing instructions (IMDG) : IBC03
Tank instructions (IMDG) : T4
Tank special provisions (IMDG) : TP1
EmS-No. (Fire) : F-A
EmS-No. (Spillage) : S-B
Stowage category (IMDG) : A
Properties and observations (IMDG) : Colourless, clear liquid, with a suffocating pungent odour. Usually stabilized with methyl alcohol. Miscible with water. Causes burns to skin, eyes and mucous membranes.

- Air transport

PCA Excepted quantities (IATA) : E1
PCA Limited quantities (IATA) : Y841
PCA limited quantity max net quantity (IATA) : 1L
PCA packing instructions (IATA) : 852
PCA max net quantity (IATA) : 5L
CAO packing instructions (IATA) : 856
CAO max net quantity (IATA) : 60L
ERG code (IATA) : 8i

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

Contains no REACH substances with Annex XVII restrictions
Contains no substance on the REACH candidate list
Contains no REACH Annex XIV substances

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Full text of H- and EUH-statements:

Acute Tox. 3 (Dermal)	Acute toxicity (dermal), Category 3
Acute Tox. 3 (Inhalation)	Acute toxicity (inhal.), Category 3
Acute Tox. 3 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 3

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Acute Tox. 3 (Oral)	Acute toxicity (oral), Category 3
Carc. 1B	Carcinogenicity, Category 1B
Flam. Liq. 2	Flammable liquids, Category 2
Muta. 2	Germ cell mutagenicity, Category 2
Skin Corr. 1B	Skin corrosion/irritation, Category 1B
Skin Sens. 1	Sensitisation — Skin, Category 1
STOT SE 1	Specific target organ toxicity — single exposure, Category 1
STOT SE 2	Specific target organ toxicity — Single exposure, Category 2
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
H225	Highly flammable liquid and vapour
H301	Toxic if swallowed
H311	Toxic in contact with skin
H314	Causes severe skin burns and eye damage
H317	May cause an allergic skin reaction
H331	Toxic if inhaled
H335	May cause respiratory irritation
H341	Suspected of causing genetic defects
H350	May cause cancer
H370	Causes damage to organs
H371	May cause damage to organs

SDS EU AECI Chemsystems

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SAFETY DATA SHEET

According to Regulation (EC) No 1907/2006



SULPHURIC ACID, 98%

Date of issue: 2017/02/22

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SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY.

1.1 Product Identifier

Product form : Liquid
Substance Name : SULPHURIC ACID, 98%
EC Index No. : 016-020-00-8
EC No. : 231-639-5
CAS No. : 7664-93-9
REACH Registration No. : 01-2119458838-20
Type of product : Inorganic acid

1.2 Relevant identified uses of the substance or mixture and uses advised against

1.2.1 Relevant identified uses:

Materials for use in industrial applications. Refer to supplier for additional information.

1.2.2 Uses advised against:

No additional information available.

1.3 Details of the supplier of the safety data sheet.

1.4 AECI Industrial Chemicals, a division of AECI Limited

AECI Chem Park
1st Floor, Block 2
200 Bergrivier Drive
Chloorkop Ext 24
Kempton Park.

1.5 Emergency telephone number

0800 114445

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification Regulation (EC) No 1272/2008 (CLP):

Skin corrosion/irritation, Category 1A, H314
STOT (SE), Category 3, (Resp system), H335

For the full text of the H statements mentioned in this section, see Section 16.

Classification According to Directive 67/548/EEC or 1999/45/EC:

C; R35, R37

For the full text of the R phrases mentioned in this section, see Section 16.

Adverse physicochemical, human health and environmental effects:

Causes severe skin burns and eye damage. Inhalation of fumes at high concentration may be fatal and may cause lung oedema. May react with organic compounds to cause fires and explosions.

2.2 Label Elements

Labelling (Regulation (EC) No 1272/2008)

Hazard pictograms



Signal word: DANGER

Hazard Statements

H314 - Causes severe skin burns and eye damage.

H335 – May cause respiratory irritation.

Precautionary Statements

P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing.
Rinse skin with water/shower

P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes.

Remove contact lenses, if present and easy to do. Continue rinsing

P304+P340+P314 – IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if you feel unwell.

P310 - Immediately call doctor.

P220 – Keep away from combustible materials, clothing, wood, paper.

P223 - Keep away from water because of violent reaction and possible flash fire.

P321 - Specific treatment see section 4 of SDS.

2.3 Other Hazards:

Other hazards not contributing to the classification

Reacts violently on contact with water. Contact with combustible material may cause fire.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substance

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
SULPHURIC ACID	(CAS No) 7664-93-9 (EC no) 231-639-5 (EC index no) 016-020-00-8 (REACH-no) 01-2119458838-20	68 - 98	Sk. Corr 1A, H314 STOT-SE 3, H335 C, R35, R37

Full text of R- and H-statements: see section 16

3.2 Mixture

Not applicable

SECTION 4. FIRST AID MEASURES

4.1 Description of First Aid Measures

First-aid measures general:

Call for immediate medical assistance

First aid measures after inhalation:

Remove person to fresh air and keep comfortable for breathing. If breathing has stopped, perform artificial respiration. If breathing is difficult, give oxygen. Obtain immediate medical attention.

First aid measures after skin contact:

Immediately remove all contaminated clothing. Wash skin with water for at least 20 minutes. Obtain immediate medical attention.

First aid measures after eye contact:

Rinse cautiously with water for at least 20 minutes whilst holding eyes apart. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain immediate medical attention.

First aid measures after ingestion:

If the person is conscious and has no trouble breathing, wash out mouth with water and give 200-300 ml of water to drink. Do not induce vomiting. Lay person on side with head lower than waist to prevent aspiration of the swallowed product. Obtain immediate medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation:

Severe irritant to respiratory organs if mist or vapour is inhaled. May cause burns to respiratory system. Inhalation of high concentration of mist or vapour may cause pulmonary oedema.

Symptoms/injuries after skin contact:

CAUSES SEVERE SKIN BURNS

Symptoms/injuries after eye contact:

CAUSES SERIOUS EYE DAMAGE

Symptoms/injuries after ingestion:

Causes burns to the gastric/intestinal mucosa.

4.3 Indication of any immediate medical attention and special treatment needed

Symptomatic treatment and supportive therapy as indicated. Following inhalation of high concentration of mist, the patient should be kept under medical review for at least 24 hours as delayed lung oedema may develop.

SECTION 5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media:

Dry powder. Foam. Carbon dioxide.

Not suitable:

Use water spray with caution, heat release and splattering may occur.

5.2 Special hazards arising from the substance or mixture

Hazardous decomposition products in case of fire:

Toxic fumes may be released (oxides of sulphur)

5.3 Advise for firefighters

Protection during firefighting:

Do not attempt to take action without suitable protective equipment. Suitable protective equipment includes self-contained breathing apparatus with full face- piece and complete acid resistant protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel:

Emergency procedures:

Ventilate spillage area. Isolate area. Prevent access to unnecessary and unprotected personnel. Downwind evacuation may be necessary. Avoid contact with skin and eyes. Do not breathe mist or vapour.

6.1.2 For emergency responders:

Personal protective equipment:

As a minimum, use acid resistant gloves, and clothing, eye/face and breathing protection. Refer to Section 8.

6.2 Environmental precautions:

Do not flush to drain. Avoid release to the environment. Dispose of as a hazardous waste.

6.3 Methods and materials for containment and cleaning up:

Methods for cleaning up:

Dike spill with inert material and recover as much as possible. Neutralise with soda ash or lime. Cover spill with non-combustible material, e.g. sand, earth, vermiculite. Sweep and shovel into containers for disposal. Do not use combustible materials such as sawdust.

Other information:

Dispose of materials or solid residues at an authorized site.

6.4 Reference to other sections:

For further information refer to section 13.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact of substance with water. Avoid contact with skin, eyes and clothing. Avoid inhalation of vapour and mist. Ensure good ventilation of the work station. Wear recommended personal protective equipment. See section 8.

When diluting, always add acid to water, NEVER ADD WATER TO ACID.

Hygiene measures:

Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2 Conditions for safe storage, including any incompatibilities:

Storage conditions:

Store in a cool, dry, well ventilated area with acid resistant floors and good drainage. Keep away from direct sunlight, heat, water and incompatible materials.

Incompatible products:

Strong bases, reducing agents, organic compounds.

Incompatible materials:

Keep away from any possible contact with water, because of violent reaction and possible flash fire. Keep separate from combustible materials.

Suitable packaging materials:

Polypropylene

- 7.3 Specific end users:**
No additional information available

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

SULPHURIC ACID, 98% (7664-93-9)		
EU	Local name	Sulphuric acid (mist)
EU	IOELV TWA (mg/m ³)	0.05 mg/m ³
OHS (SA)	OEL-RL TWA (mg/m ³)	1.0 mg/m ³

8.2 Exposure controls

Appropriate engineering controls:

Provide eye wash and shower in work area. Ensure good ventilation of the work station.

Personal protective equipment:

Hand protection

Protective gloves

Eye protection

Safety glasses

Skin and body protection

Wear suitable protective clothing

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment.



Environmental exposure controls: Avoid release to the environment.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Product form:	Liquid
Appearance	Colorless hygroscopic viscous liquid
Odour	Odourless
Odour threshold	No data available
pH	<1 (1% solution)
Relative evaporation rate (butylacetate=1)	No data available

Molecular weight	98.08 g/mol
Melting point	10.31°C
Freezing point	-1 to -30°C
Boiling point	276°C
Flash point	No data available
Auto-ignition temperature	No data available
Flammability (solid, gas)	Not applicable
Vapour pressure	< 0 Pa at 25°C
Vapour density	3.38 (Air = 1)
Relative vapour density @20°C	No data available
Relative density	1.83 @ 20°C
Solubility	Miscible with water. Water: 1000000 mg/l
Log Pow	-2.2
Viscosity, kinematic	No data available
Viscosity, dynamic	No data available
Explosive properties	No data available
Explosive limits	No data available
Oxidising properties	No data available
Molecular mass	98.08 g/mol
Molecular formula	H ₂ SO ₄

SECTION 10. STABILITY AND REACTIVITY

10.1 Reactivity:

The product is non-reactive under recommended conditions of use, storage and transport.
Reacts violently with water. Hygroscopic.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

None under recommended processing conditions.

10.4 Conditions to avoid

Incompatible products, excess heat, exposure to moist air or water.

10.5 Incompatible materials

Water, strong bases, organic compounds, base metals, combustible materials.

10.6 Hazardous decomposition products

Oxides of sulphur (SO₂, SO₃), hydrogen

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects:

Acute toxicity :Not classified

SULPHURIC ACID, 98% (7664-93-9)	
LD50 oral	2140 mg/kg bodyweight
LC50 inhalation rat (Mist - mg/l/4h)	375 mg/m ³

Skin corrosion/irritation	Causes severe skin burns and eye damage. pH: < 1 1% solution
Serious eye damage/irritation	Causes serious eye damage (implicit) pH: < 1 1% solution
Respiratory or skin sensitisation	Not classified.
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified
Reproductive toxicity	Not classified
Specific target organ toxicity (single exposure)	May cause respiratory irritation
Specific target organ toxicity (repeated exposure)	Not classified
Aspiration hazard	Not classified

SECTION 12. ECOLOGICAL INFORMATION

- 12.1 Ecology – general:** Before neutralisation, the product may represent a danger to aquatic organisms.

SULPHURIC ACID, 98% (7664-93-9)	
LC50 fish 1	> 16 mg/l
EC50 other aquatic organisms 1	> 100 mg/l EC50 waterflea (48 h)
EC50 other aquatic organisms 2	> 100 mg/l IC50 alga (72 h) mg/l

- 12.2 Persistence and degradability**
No additional information available.

- 12.3 Bioaccumulative potential**
No additional information available.

SULPHURIC ACID, 98% (7664-93-9)	
Log Pow	-2.2

- 12.4 Mobility**
No additional information available

- 12.5 Results of PBT and vPvB assessment**
No additional information available



- 12.6 Other adverse effects**
No additional information available

SECTION 13. DISPOSAL CONSIDERATIONS

- Waste treatment methods: Dispose of waste in consultation with licensed waste disposal company in accordance with local legal requirements.

SECTION 14. TRANSPORT INFORMATION

In accordance with ADR / IMDG / IATA

	ADR	IMDG	IATA	Class Diamond
UN Number	1830	1830	1830	 
Proper Shipping Name	Sulphuric Acid	Sulphuric Acid	Sulphuric Acid	
Hazard Class	8	8	8	
Packing Group	II	II	II	
Dangerous for the environment	No	No	No	
Marine pollutant	No	No	No	

SECTION 15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

15.1.1 EU Regulations

No REACH Annex XVII restrictions

SULPHURIC ACID, 98% is not on the REACH Candidate List

SULPHURIC ACID, 98% is not on the REACH Annex XIV List

15.1.2 National Regulations:

No additional information available

15.2 Chemical Safety Assessment

No chemical safety assessment has been carried out.

SECTION 16. OTHER INFORMATION

Full text of R-, H- and EUH-statements:

Skin Corr. 1A	Skin corrosion/irritation, Category 1A
STOT (SE) Resp. System, Cat 3	Specific Target Organ Toxicity – (Single Exposure) Respiratory system, Category 3
H314	Causes severe skin burns and eye damage
H335	May cause respiratory irritation
R35	Causes severe burns
R37	Irritating to respiratory system
C	Corrosive

SDS EU Chemical Initiatives

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