14 December 2018
532330

SRK
Attention: Desmond Mossop

Dear Desmond

Anglo American Platinum Mogalakwena Mine Expansion: Specialist Terms of Reference

1. Introduction


This document serves as the Specialist Terms of Reference (ToR) that provides detail on how the specialist will need to conduct their evaluation in respect of the Mogalakwena Mine Expansion Project, including the objectives and scope of the evaluation.

2. Project Background

Based in South Africa, the Anglo-American Platinum (AAP) business is the world’s leading major producer of platinum producing around 37% of the world’s newly mined production of this precious metal. AAP mines, process and refine the entire range of platinum group metals (PGMs), which are platinum, palladium, rhodium, ruthenium, iridium and osmium. The platinum operations exploit South Africa’s Bushveld Complex, which contains around 70% of the world’s known platinum resources. MM mines 100% Platreef contained in the Bushveld Complex and utilises an open pit mining method to extract PGMs and base metals (copper, nickel, and cobalt). The ore is milled at the North and South Concentrators. The expected life of the mine is in excess of 50 years.

MM has been operational since 1992. The original Environmental Management Programme (EMPr) was undertaken by Johannesburg Consolidated Investment (JCI) Limited in 1991, mainly in terms of the Environmental Conservation Act (Act no. 73 of 1989) and the Mines and Works Act (Act no. 27 of 1956). AAP then took ownership of MM. MM, previously known as Potgietersrus Platinum Limited, changed its name in March 2008 to Mogalakwena Platinum Mine and most recently to Mogalakwena Mine. MM is owned by Rustenburg Platinum Mines Limited (RPM), a wholly owned subsidiary of AAP. MM is located approximately 30 km north-west of Mokopane in the Limpopo Province, refer to Figure 1.
Figure 1: Regional Location of the Mogalakwena Mine
3. **Mogalakwena Mine Expansion – Project Description**

It is the intention of RPM to amend the Mogalakwena Mine’s approved EMPr and associated Environmental Authorisation (EA) including updating their WUL to include the development and operation of the following additional mining related infrastructure as part of the mine’s expansion. An integrated environmental authorisation process is to be undertaken for proposed activities which entail the following:

- **The 3rd Concentrator plant;**
  - Pending on the process capacity of the 3rd Concentrator (600-900 tons or 50 M tons) a filter press and/or a paste plant will be required. The filter press will be located next to the Blinkwater Tailings Storage Facility (TSF) Compartment 2, whilst the paste plant will be located within the footprint area of the 3rd Concentrator. In addition to the Blinkwater TSF’s filter press, an additional filter press will be located in close proximity to the Vaalkop TSF.
  - Due to the extent and position of the 3rd Concentrator, the existing Pollution Control Dam (PCD) associated with the North Concentrator Plant will need to be decommissioned.

- **South Concentrator Debottlenecking Plant;**
  - The debottlenecking plant will assist with increasing the current crushing capacity of the South Concentrator, and will include a conveyor system, crushing and screening operations.

- **Expansion of the Blinkwater TSF Compartment 2 and development of additional water management infrastructure;**
  - The expansion of the Blinkwater TSF will provide additional tailings storage capacity to support the 3rd Concentrator. Any pipelines required in respect of the Blinkwater TSF Compartment 2 expansion will follow existing servitudes.

- **The Buffer Dam;**
  - An additional 1.5 Mm³ water storage dam will be located west of the Return Water Dams (RWDs) associated with the Vaalkop TSF to cater for:
    - The storage of pit water (combination of Surface water runoff and groundwater ingress collected within the open pit areas) – currently MM is authorised to store water in the pits, however the storage volume in the pits may need to be reduced once the planned super pit is fully operational and re-mining of the Sandsloot pit commences in future. The expansion of the current WRD areas will result in an increase in surface water runoff into the expanding pit areas; and
    - The storage of treated sewage effluent that is obtained from the Polokwane and Mokopane Sewage Treatment Works, via a pipeline system - currently MM utilises Dam 1160 (an existing dirty water dam) for the storage of the treated sewage effluent. The storage of treated sewage effluent will be balanced between Dam 1160 and the new buffer dam;
  - The variable regional climate also results in excessive water being generated during the wet season, which needs to be stored for utilisation in the dry season. The buffer dam will therefore assist in minimising the use of raw water and optimising water re-use on site.
  - It is anticipated that the buffer dam will be a lined facility consisting of either one or two compartments and silt traps, with a pipeline system connecting the buffer dam with the 3rd Concentrator, RWDs of the Vaalkop TSF and Dam 1160.

- **North Waste Rock Dump;**
  - An area located north of the current North Open Pit area has been earmarked for the development of an additional Waste Rock Dump (WRD) that will provide additional storage capacity for the placement of waste rock generated by the current mining operation. The new WRD will cover an area of 130 ha and will also include water management infrastructures to manage surface water runoff from the site.
  - The placement of the proposed North WRD and associated infrastructure will be located outside the 1:100 year floodline or 100 m buffer zone associated with the Witrivier River, whichever is the greatest.

- **Reinstatement of the Contractor’s’ Camp**
  - The old contractors camp located west of the current Central Open Pit area will be refurbished to provide accommodation for between 2 000 and 2 500 people. The accommodation will mainly service contractors that will be involved with the construction of the project components associated with MM’s Expansion Project.
• **Upgrade of Sewage Treatment Works**  
  o Upgrading the existing sewage treatment plants at the Contractor's Camp and North Sewage Treatment Plant, to accommodate the additional contractors and staff on site. MM is considering the installation of additional package plants in this regard.  
    ▪ **Please note that if the current approved treatment capacity increase, MM will be required to reregister the sewage treatment plants in respect of the applicable municipal bylaws.**

• **Contractor's laydown area**  
  o A new contractors' lay-down area will be required to support the construction projects associated with the Expansion Project. The area under consideration is located between the 3rd Concentrator and the proposed buffer dam.

• **Expansion of workshop area**  
  o The existing workshop area at the main office block will need to be expanded to accommodate the additional number of construction vehicles and equipment required on site.

• **Upgrade of Mine access road**  
  o Upgrading of the existing section of road that falls within the mining operation.

• **Diversion of Groot Sandsloot River**

• **An additional change house**  
  o Development of an additional change house behind or in close proximity to the main office block.

The above listed infrastructure will be located within the mining right and surface lease areas of MM. Refer to **Figure 2** for the location of the proposed infrastructure that will be associated with the MM's Expansion Project.
Figure 2: Mogalakwena Expansion Project - Infrastructure Activities
4. Legal requirements for the proposed Mogalakwena Expansion Project

The following legislation requirements are applicable in respect of the proposed Mogalakwena Expansion Project:

- For the additional mining related activities and infrastructure:
  - The National Environmental Management Act (Act No. 107 of 1998) (NEMA);
    - For any project related Listed Activities stipulated in the NEMA Environmental Impact Assessment (EIA) Regulations of 2014, as amended in 2017;
  - The National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA);
    - For any project related waste management activities stipulated in GN R 921, promulgated under NEM:WA;
  - The Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA)
    - For any amendments the proposed project will have on the Mining Work Programme and the Environmental Management Programme (EMP) in accordance with Section 102 of the MPRDA;
  - The National Water Act (Act No. 36 of 1998) (NWA);
    - For any project related water uses stipulated under Section 21 of NWA.

The identified potential NEMA and NEM:WA listed activities and the NWA Water Uses relating to the Mogalakwena Expansion project will be discussed and reviewed at the specialist kick off workshop as scheduled in section 6.2.

5. Impact Assessment Methodology

As part of the integrated environmental authorisation process, various specialist studies will need to be undertaken in support of the Environmental Impact Assessment (EIA) and the development of the Environmental Management Programme (EMP).

All specialists are required to assess each proposed activity/aspects of the Mogalakwena Expansion Project in relation to the construction, operational, closure and decommissioning phases in order to identify the potential impacts that may be associated with such activity and to develop appropriate mitigation measures that can be implemented to reduce or eliminate the potential impacts identified.

The specialist will assess the potential impact identified according to the Impact Assessment Methodology described below. This Impact Assessment Methodology has been formalised by SRK to comply the EIA Regulations of 2014 (as amended) promulgated under NEMA, which states the following:

- An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision, and must include – an assessment of each identified potentially significant impact, including –
  - (i) cumulative impacts;
  - (ii) the nature, significance and consequence of the impact and risk;
  - (iii) the extent and duration of the impact and risk;
  - (iv) the probability of the impact and risk occurring;
  - (v) the degree to which the impact and risk can be reversed;
  - (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
  - (vii) the degree to which the impact and risk can be mitigated.

Based on the above, the Impact Assessment Methodology requires that each potential impact identified is clearly described (providing the nature of the impact) and be assessed in terms of the following factors (see Table 1):

- **extent** (spatial scale) - will the impact affect the national, regional or local environment, or only that of the site?;
- **duration** (temporal scale) - how long will the impact last?;
- **magnitude** (severity) - will the impact be of high, moderate or low severity?; and
- **probability** (likelihood of occurring) - how likely is it that the impact may occur?
To enable a scientific approach for the determination of the environmental significance (importance) of each identified potential impact, a numerical value has been linked to each factor.

Table 1: Risk matrix

<table>
<thead>
<tr>
<th>Occurrence</th>
<th>Probability:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 – Permanent</td>
<td>5 – Definite/don’t know</td>
</tr>
<tr>
<td>4 - Long-term (ceases with the operational life)</td>
<td>4 – Highly probable</td>
</tr>
<tr>
<td>3 - Medium-term (5-15 years)</td>
<td>3 – Medium probability</td>
</tr>
<tr>
<td>2 - Short-term (0-5 years)</td>
<td>2 – Low probability</td>
</tr>
<tr>
<td>1 – Immediate</td>
<td>1 – Improbable</td>
</tr>
<tr>
<td>0 – None</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Severity</th>
<th>Magnitude:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 – International</td>
<td>10 - Very high/uncertain</td>
</tr>
<tr>
<td>4 – National</td>
<td>8 – High</td>
</tr>
<tr>
<td>3 – Regional</td>
<td>6 – Moderate</td>
</tr>
<tr>
<td>2 – Local</td>
<td>4 – Low</td>
</tr>
<tr>
<td>1 – Site only</td>
<td>2 – Minor</td>
</tr>
<tr>
<td>0 – None</td>
<td></td>
</tr>
</tbody>
</table>

Once the above factors had been ranked for each identified potential impact, the environmental significance of each impact can be calculated using the following formula:

- \[ \text{Significance} = (\text{duration} + \text{extend} + \text{magnitude}) \times \text{probability} \]

The maximum value that can be calculated for the environmental significance of any impact is 100.

The environmental significance of any identified potential impact is then rated as either: high, moderate or low on the following basis:

- More than 60 significance value indicates a high (H) environmental significance impact; and
- Between 30 and 60 significance value indicates a moderate (M) environmental significance impact; and
- Less than 30 significance value indicates a low (L) environmental significance impact.

In order to assess the degree to which the potential impact can be reversed and be mitigated, each identified potential impact will need to be assessed twice:

- Firstly the potential impact will be assessed and rated prior to implementing any mitigation and management measures; and
- Secondly, the potential impact will be assessed and rated after the proposed mitigation and management measures have been implemented.

The purpose of this dual rating of the impact before and after mitigation is to indicate that the significance rating of the initial impact is and should be higher in relation to the significance of the impact after mitigation measures have been implemented.

In order to assess the degree to which the potential impact can cause irreplaceable loss of resources, the following classes (%) will be used and will need to select based on the specialist informed decision and discretion:

- 5 100% - Permanent loss
- 4 75% - 99% - significant loss
- 3 50% - 74% - moderate loss
- 2 25% - 49% - minor loss
- 1 0% - 24% - limited loss
Please note that the Loss of Resources aspect will not affect the overall significance rating of the impact.

In terms of assessing the cumulative impacts, specialists are required to address this in a sentence/paragraph fashion as the spatial extent of the cumulative impacts will vary from project to project.

Cumulative impact, in relation to an activity, means the impact of an activity that in itself may not be significant, but may become significant when added to the existing or potential impacts eventuating from similar or diverse activities or undertakings in the area.

An excel spreadsheet with the above-mentioned Impact Assessment Methodology and associated formulas will be sent to you via email. SRK requests that the excel spreadsheet will be provided with the draft and final reports.

6. Specialist Report

6.1 Report Structure

All Specialist Reports will need to be compiled in such a manner that it adheres to the EIA Regulation requirements as detailed in Appendix 6 of the NEMA EIA Regulations of 2014, as amended. Please refer to Appendix A of this document for a breakdown of the NEMA specialist report requirements.

In addition to the above specialist report requirements, certain specialists’ reports will assist as supporting documentation to the Water Use Licence Application (WULA) for the Mogalakwena Expansion Project, i.e. the hydrological, geohydrological, biodiversity and rehabilitation studies.

Such specialist reports will need to be compiled, in addition to the NEMA EIA Regulation requirements, in accordance with the Regulations regarding the procedural requirements for water use licence applications (GN R 267 of March 2017).

Please refer to Appendix B of this document for a breakdown of the specific Reg 267 specialist report requirements.

6.2 Key Deliverables

The following key deliverables and dates are of importance with regards to the specialist investigations and reporting (see Table 2):

Table 2: Specialist investigation and reporting dates

<table>
<thead>
<tr>
<th>Key Deliverable</th>
<th>Key due dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialist project introductory and clarification meeting</td>
<td>3 December 2018</td>
</tr>
<tr>
<td>Specialist quotes and needs list</td>
<td>12 December 2018</td>
</tr>
<tr>
<td>Submit baseline information for scoping phase documentation purpose</td>
<td>3 February 2019</td>
</tr>
<tr>
<td>Submit draft specialist reports for SRK &amp; client review</td>
<td>6 March 2019</td>
</tr>
<tr>
<td>Specialist integration workshop</td>
<td>7-13 March 2019</td>
</tr>
<tr>
<td>Submit final specialist reports based on outcomes of workshop for SRK &amp; client review</td>
<td>5 April 2019</td>
</tr>
<tr>
<td>Attend Public Meeting as part of the EIA Phase</td>
<td>June 2019</td>
</tr>
</tbody>
</table>

Further to the deliverables mentioned above, the specialist is required to provide costing for the following:

- Specialist kick-off meeting;
- Specialist integration workshop;
- Specialist Public Meeting to be held as part of the Environmental Impact Assessment Phase currently planned during June 2019.

Specialist field specific requirements and health and safety requirements were discussed and confirmed at the planned specialist project introductory and clarification meeting.
7. **Conclusions**

We look forward to working with you on this project. Please do not hesitate to contact Kavilan Naidoo or Franciska Lake at SRK should you have any queries about the Terms of Reference.

Yours faithfully,

SRK Consulting (South Africa) (Pty) Ltd

---

**Kavilan Naidoo**
Environmental Scientist

**Franciska Lake**
Principal Environmental Scientist - Project Manager
Appendix A: Specialist Report Content Requirements in terms of NEMA
In terms of the EIA/EMP reports, specialists will be required to compile the specialist report in accordance with Appendix 6 of the NEMA EIA Regulations of 2014, as amended in 2017. Specialist report therefore must contain:

(a) details of—
   (i) the specialist who prepared the report; and
   (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;

(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;

(c) an indication of the scope of, and the purpose for which, the report was prepared, the quality and age of base data used for the specialist report and a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;

(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;

(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;

(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;

(g) an identification of any areas to be avoided, including buffers (if and where applicable);

(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers (if and where applicable);

(i) a description of any assumptions made and any uncertainties or gaps in knowledge;

(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;

(k) any mitigation measures for inclusion in the EMPr;

(l) any conditions for inclusion in the environmental authorisation;

(m) any monitoring requirements for inclusion in the EMPr or environmental authorization;

(n) a reasoned opinion—
   (i) whether the proposed activity, activities or portions thereof should be authorized regarding the acceptability of the proposed activity or activities; and
   (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;

(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;

(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and

(q) any other information requested by the competent authority.
Appendix B: Specialist Report Content Requirements in terms of NWA (Reg 267)
The following contents’ lists are included in this Appendix based on R267 unless otherwise specified:

- Integrated water and wastewater management report (Appendix Ci);
- Wetland delineation report (Appendix Cii);
- Surface water report (contents not specified in R267 but informed by IWWMP surface water requirements and requirements for Section 21(c) and (i) water uses) (Appendix Ciii);
- Geohydrology report (Appendix C iv);
- Mine closure/rehabilitation plan (Appendix Cv);
- Civil design and method statement (R267 and additional DWS requirements) (Appendix Cvi).
Appendix Ci: INTEGRATED WATER AND WASTEWATER MANAGEMENT REPORT
1. **Introduction**
   1.1 Activity Background
   1.2 Regional setting and location of activity
   1.3 Property description
   1.4 Purpose of MWMP

2. **Conceptualization of activity**
   2.1 Description of activity
   2.2 Extent of activity
   2.3 Key activity related processes and products
   2.4 Activity life description
   2.5 Activity infrastructure description
   2.6 Key water uses and waste streams
   2.7 Organisational structure of activity
   2.8 Business and corporate policies

3. **Regulatory water and waste management framework**
   3.1 Summary of all water uses
   3.2 Existing lawful water uses
   3.3 Relevant exemptions
   3.4 Generally authorised water uses
   3.5 New water uses to be licensed
   3.6 Waste management activity (NEM: WA)
   3.7 Waste related authorisations
   3.8 Other authorisation (EIAs, EMPs, RODs, Regulations)

4. **Present Environmental Situation**
   4.1 Climate
   4.2 Regional Climate Rainfall
   4.3 Evaporation
   4.4 Surface Water
   4.5 Water Management Area
   4.6 Surface Water Hydrology
   4.7 Surface Water Quality
   4.8 Mean Annual Runoff (MAR)
   4.9 Resources Class and River Health Receiving Water Quality Objectives and Reserve
   4.10 Surface Water User Survey
   4.11 Sensitive Areas Survey
   4.12 Groundwater
   4.13 Aquifer Characterization
   4.15 Hydro-census
   4.16 Potential Pollution Source Identification
   4.17 Groundwater Model
   4.18 Socio-economic environment

5. **Analysis and characterization of the water use activity**
   5.1 Site delineation for characterisation
   5.2 Water and waste management
   5.3 Process water
   5.4 Storm water
   5.5 Groundwater
   5.6 Waste
   5.7 Operational Management
   5.8 Organisational Structure
5.9 Resources and competence
5.10 Education and training
5.11 Internal and external communication
5.12 Awareness raising
5.13 Monitoring and control
5.14 Surface water monitoring
5.15 Groundwater monitoring
5.16 Bio monitoring
5.17 Waste monitoring
5.18 Risk assessment / Best Practice Assessment
5.19 Issues and responses from public consultation process
5.20 Matters requiring attention / problem statement
5.21 Assessment of level and confidence of information

6. Water and Waste Management
6.1 Water and waste management philosophy (process water, stormwater, groundwater and waste)
6.2 Strategies (process water, stormwater, groundwater and waste)
6.3 Performance objectives / goals
6.4 Measures to achieve and sustain performance objectives
6.5 Option analyses and motivation for implementation of preferred options (optional)
6.6 IWWMP action plan
6.7 Control and monitoring
6.8 Monitoring of change in baseline (environment) information (Surface water, groundwater and bio-monitoring
6.9 Audit and report on performance measures
6.10 Audit and report on relevance of IWWMP action plan

7. Conclusion
7.1 Regulatory status of activity
7.2 Statement of water uses requiring authorisation, dispensing with licensing requirement and possible exemption from regulation

8. References
9. Appendices: Specialist Studies
9.1 Geohydrology
9.2 Civil design
9.3 Wetland delineation report
Appendix Cii:  WETLAND DELINEATION REPORT
Important aspects to be addressed for the Mogalakwena Expansion study under the relevant headings below (or as Appendices to the report) include the following:

- Cumulative impacts of combined open pit and shaft mining.
- Recommended Ecological Category (REC) of the delineated wetlands/river systems.
- Rehabilitation plan for the wetland and riparian areas.
- Landscape maintenance plan to cover the riparian zones that will be affected by mining activities.
- Plant species plan map, covering the riparian zones that will be affected by mining.

1 Introduction
2 Terms of reference
3 Knowledge gaps
4 Study area
5 Expertise of the specialist
6 Aims and objectives
7 Methodology
  7.1 Wetland identification and mapping
  7.2 Wetland delineation
  7.3 Wetland functional assessment
  7.4 Determining the ecological integrity of the wetlands
  7.5 Determining the Present Ecological State of wetlands
  7.6 Determining the Ecological Importance and Sensitivity of wetlands
  7.7 Ecological classification and description
8 Results
  8.1 Wetland delineation
  8.2 Wetland unit identification
  8.3 Wetland unit setting
  8.4 Wetland soils
  8.5 Description of wetland type
  8.6 General functional description of wetland types
  8.7 Wetland ecological functional assessment
  8.8 The ecological health assessment of the opencast mining area (as specified in R267 but to be noted that in the contact of this project the heading should read “The ecological health assessment of the mining area”)
  8.9 The PES assessment of the remaining wetland areas
  8.10 The EIS assessment of the remaining wetland areas
9 Impact assessment discussions.
10 Conclusions and recommendations
11 References

The reports listed below contain the standardised and accepted methods that must be used for determining the various aspects of assessments during the WUA process related to wetlands:

1) Wetland and riparian habitat delineation document (DWS report on DWS website);
2) Wetland Buffer Guideline (SANBI WRC project and Report, on DWS website)
3) Wetland Offset (WRC report TT660/16; on DWS website)
4) High Risk Wetland Atlas (WRC Report TT659/16, on DWS website)
5) Wetland Rehabilitation in mining landscapes (WRC Report TT658/16, on DWS website)
6) Risk Assessment Protocol and associated Matrix (DWS document on DWS Website)
Appendix Ciii: SURFACE WATER STUDY REPORT
No content list is specified in R267. Important aspects to be addressed in the Mogalakwena Expansion surface water study will be discussed at the specialist introductory and clarification meeting.
Appendix Civ: GEOHYDROLOGY REPORT
Important aspects to be addressed for the Mogalakwena Expansion study under the relevant headings below include the following:

1. **Introduction**
2. **Geographical setting**
   2.1 Topography and drainage
   2.2 Climate
3. **Scope of Work**
4. **Methodology**
   4.1 Desk study
   4.2 Hydro-census
   4.3 Geophysical survey and results
   4.4 Drilling and siting of boreholes
   4.5 Aquifer testing
   4.6 Sampling and chemical analysis
   4.7 Groundwater recharge calculations
   4.8 Groundwater modelling
   4.9 Groundwater availability assessment
5. **Prevailing groundwater conditions**
   5.1 Geology
   5.1.1 Regional geology
   5.1.2 Local geology
   5.2 Acid generation capacity
   5.3 Hydrogeology
   5.3.1 Unsaturated zone
   5.3.2 Saturated zone
   5.3.3 Hydraulic conductivity
   5.4 Groundwater levels
   5.5 Groundwater potential contaminants
   5.6 Groundwater quality
6. **Aquifer Characterisation**
   6.1 Groundwater vulnerability
   6.2 Aquifer classification
   6.3 Aquifer protection classification
7. **Groundwater Modelling**
   7.1 Software model choice
   7.2 Model set-up and boundaries
   7.3 Groundwater elevation and gradient
   7.4 Geometric structure of the model
   7.5 Groundwater sources and sinks
   7.6 Conceptual model
   7.7 Numerical model
   7.8 Results of the model
   7.8.1 Pre-facility (Mining/Industry/ Wastewater treatment plant, etc)
   7.8.2 During facility (mining/ Industry/ Wastewater treatment plant) operations
   7.8.3 Post-facility (mining/ Industry/ Wastewater treatment plant) operation
8. **Geohydrological Impacts**
   8.1 Construction phase
   8.1.1 Impacts on Groundwater Quantity
   8.1.2 Impacts on Groundwater Quality
8.1.3 Groundwater Management
8.2 Operational phase
8.2.1 Impacts on Groundwater Quantity
8.2.2 Impacts on Groundwater Quality
8.2.3 Impacts on Surface Water
8.2.4 Groundwater Management
8.3 Decommissioning phase
8.4 Post-mining phase
8.4.1 Groundwater Quantity
8.4.2 Groundwater Quality
8.4.3 Cumulative Impacts
8.4.4 Groundwater Management

9. Groundwater monitoring system
9.1 Groundwater monitoring network
9.1.1 Source, plume, impact and background monitoring
9.1.2 System response monitoring network
9.1.3 Monitoring frequency
9.2 Monitoring parameters
9.3 Monitoring boreholes

10. Groundwater Environmental Management Programme
10.1 Current groundwater conditions
10.2 Predicted impacts of facility (mining)
10.3 Mitigation measures
10.3.1 Lowering of groundwater levels during facility operation (Mining/Industry/ Wastewater treatment plant, etc.
10.3.2 Rise of groundwater levels post-facility operation (Mining/Industry/ Wastewater treatment plant, etc.
10.3.3 Spread of groundwater pollution post- facility operation (Mining/Industry/ Wastewater treatment plant, etc.

11. Post Closure Management Plan
11.1 Remediation of physical activity
11.2 Remediation of storage facilities
11.3 Remediation of environmental impacts
11.4 Remediation of water resources impacts
11.5 Backfilling of the pits.

12. Conclusion and Recommendations
Appendix Cv:  MINE CLOSURE/REHABILITATION PLAN
1. Introduction
   1.1 Background
   1.2 Objectives of report
2. Project Description
   2.1 Locality
   2.2 Environment
   2.3 Community
   2.4 Mine plan and infrastructure
3. Legal obligation and comments
   3.1 Legislation
4. Closure planning
   4.1 Site-specific closure and activity
5. Rehabilitation and closure activities
   5.1 Progressive rehabilitation
   5.2 Decommission and establishment
6. Maintenance and monitoring
   6.1 Vegetation and establishment and soil nutrients
   6.2 Groundwater monitoring
   6.3 Surface water monitoring
   6.4 Record-keeping and reporting
7. Rehabilitation and Closure Annexure
8. Detailed closure costing

PUBLIC PARTICIPATION REPORT
9. Introduction
10. Objectives of the public participation
11. Identification of interested and affected parties
12. Notification of interested and affected parties
   12.1 Method of notification
   12.2 Proof of notification
13. Notification of interested and affected parties of reports and other studies
14. Interested and affected parties
   14.1 Access and opportunity to comment on all written submissions
   14.2 Response to comments received: feedback to interested and affected parties
   14.3 Disclosure of interested and affected parties interests
   14.4 Notifying interested and affected parties of the decision
15. Record of issues raised
16. Addressing the comments and concerns raised by the interested and affected parties
17. Conclusions and recommendations
Appendix Cvi:  CIVIL DESIGN AND METHOD STATEMENT
R267 REQUIREMENTS FOR CIVIL DESIGN DRAWINGS AND REPORT FROM APPLICANT:

Proto CMA / CMA:
Tel: (w) .......................(cell) .......................... E-Mail:
Project Title: .......................................................... ..................................................
District/Municipality: .................................. Property: ............................................

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Submitted</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water uses applicable in terms of Section 21 (NWA: Act 36 of 1998)</td>
<td></td>
<td>Section 21:</td>
</tr>
<tr>
<td>Design report and drawings signed by PrEng</td>
<td></td>
<td>Reg No.</td>
</tr>
<tr>
<td>ECSA registration of engineer confirmed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site geology summarized</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site geohydrology report attached</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WUL 21 f, g &amp; j uses: Waste classification type (Norms and Standards, R. 635 August 2013) applicable</td>
<td></td>
<td>Type 0/1/2/3/4</td>
</tr>
<tr>
<td>Life span for the proposed activity</td>
<td></td>
<td>Years:</td>
</tr>
</tbody>
</table>

Signature of Applicant  Date

REQUIREMENTS FOR CIVIL DESIGN DRAWINGS FOR SECTION 21(c) and (i) WATER USE

Start and end co-ordinates in decimal degrees using WGS-84 system
Dimensions: length across watercourse, breadth and height of structure or pipe diameter. Height of pipe or conveyor above ground/base flow of watercourse.
Materials and construction methods as applicable
Flood capacity e.g. 1:50 year
Floodline: 1:50 and 1:100 pre- and post-development
Energy dissipation
Erosion and sediment controls
Scour protection
Pollution controls e.g. dog housing on conveyor, collection sumps at pipeline crossings
Post construction rehabilitation

METHOD STATEMENT

Drawn up by the project engineer on how construction and post construction rehabilitation will be implemented to minimise impacts to the water resource. There is no prescribed format but aspects to be considered include the following:

- The Method Statement should talk to the identified impacts e.g. describe how a wetland is crossed.
- Construction methodology and materials used should be described.
- The stormwater management aspects should focus on the construction phase e.g. installation of trench breakers to prevent donga formation).
- The post construction rehabilitation plan should include paper trail aspects e.g. maintaining a photographic record.