

**FEASIBILITY STUDY
FOR A LONG-TERM SOLUTION
TO ADDRESS THE ACID MINE DRAINAGE
ASSOCIATED WITH THE
EAST, CENTRAL AND WEST RAND
UNDERGROUND MINING BASINS**

Terms of Reference:
REQUEST FOR PROJECT PROPOSALS

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water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

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1. INTRODUCTION

Acid Mine Drainage (AMD) has for many years been a major environmental challenge to deal with in mining, but especially mining in the Eastern, Central and West Rand Mining Basins. To deal with this problem at a very high level an Inter-Ministerial Committee (IMC) comprising of the Ministers of Mineral Resources, Water and Environmental Affairs and Science and Technology and the Minister in the Presidency: National Planning Commission was established. Subsequently a Team of Experts was instructed by a Task Team, chaired by the Directors-General of Mineral Resources and Water Affairs to advise the IMC, in respect of AMD.

The Minister in the Presidency: National Planning Commission announced on 22 February 2011 that Cabinet had accepted the recommendations of the Team of Experts, which can be summarised as follows:

- 1.1 Water must be pumped from the three priority basins to maintain water levels at least below the relevant environmental critical levels or, by agreement with stakeholders, the lowest level of underground activity within the basin.
- 1.2 Steps must be implemented to reduce the ingress of water into the underground workings, as far as is possible. This will reduce the volumes of water which need to be pumped and treated to more acceptable levels and consequently reduce the operational costs of AMD management.
- 1.3 The water which will be pumped will not be of a suitable quality for productive use or discharge to river systems and will therefore need to be treated. In the short-term it is proposed that the water be neutralised in a process which will address the low pH, high acidity and high iron and other metal content. In the medium- to long-term consideration should be given to steps which will reduce the mine water contribution to the salinity of major river systems and the necessary feasibility studies will need to be initiated immediately.
- 1.4 Improved monitoring of mine water, groundwater, surface water, seismicity, subsidence and other geotechnical impacts of mine flooding and related targeted research is required. It is recommended that a multi-institution monitoring committee be established to facilitate the implementation of the required monitoring and the necessary assessment programmes.
- 1.5 The flooded mine voids are not the only sources of AMD in the Witwatersrand. Other sources, particularly mine residue deposits, need to be monitored and appropriately remediated to reduce AMD impacts on the environment.
- 1.6 The feasibility of implementing of an environmental levy to be paid by operating mines to cover the costs of the legacies of past mining needs to be investigated.
- 1.7 The recommendations contained in this Experts' report represent the start of a process. The aim of the recommendations is to avert impending crises and stabilise the situation as well as addressing current gaps in the understanding of the AMD problems in the priority areas and their potential impacts on the environment. It is therefore recommended that the process of assessment, risk appraisal and recommendation of remedial measures continue into the future with ongoing assessments.

The problems posed by AMD will have implications far into the future, with impacts likely to continue for many years. The process of management of these impacts will therefore need to continue, with ongoing assessments and adaptation as conditions change. This Terms of Reference (ToR) is developed to address the recommendations made to the IMC,

specifically in sections 1.3 and 1.7 above. A Feasibility study will, therefore, be done to address the medium- to long-term AMD related water resources planning issues, aiming to initiate the establishment of the desired long-term solution as soon as possible.

2. ABBREVIATED PROBLEM STATEMENT

There are various environmental management challenges associated with mining, with mine water management constituting one of the major challenges to be dealt with. If un-managed and un-attended to, Acid Mine Drainage (AMD) can pose a significant risk to continued sustainable growth and development. Efforts to address AMD have to deal with a variety of complex issues; including the following:

- The apportionment of liabilities is complex in an area largely characterised by abandoned, derelict, ownerless and/or in-active mines;
- Excessive dilution-releases from Vaal Dam will be required to curb the effects of AMD associated salt-loading on the Vaal River System and to maintain fitness for use of Vaal River water below Vaal Barrage, if not addressed otherwise. This will also result in unusable surpluses developing in the lower Vaal River;
- AMD adversely impacts on the requirements of the Reserve
- The analysis of infrastructure options and long term solutions need to deal with various uncertainties in respect of seismicity, the underground mining regime, suspected improvement in water quality of the underground mine water, etc.
- The financial and institutional model to be devised, needs to be suitable to address the problems of AMD sustainably in the long-term.

It is critical that Government, and specifically DWA, provides the necessary strategic direction, guidance and support, not only in terms of source control, but also in terms of sub-regional, regional and national water resource planning. Innovative solutions are necessary to convert a water environmental threat into a water resource solution.

3. BACKGROUND

3.1 Focus on deep goldmines within the Eastern, Central and West Rand Mining Basins

The mines situated within the larger Vaal River water supply area mainly consist of deep goldmines, and shallower coalmines. The individual mines that are interlinked form underground mining basins, acting as huge underground reservoirs.

The deep gold mining basins situated within the Vaal River water supply area include the Free State Goldfields, KOSH Goldfields, Far Western, West, Central and East Rand mining basins, as well as the Evander mining basin. Of these, the Eastern, Central and West Rand Mining Basins are deemed to collectively pose the biggest immediate risk to water security. This study is to focus on the imminent water problems associated with these underground mining basins and the potential management synergies that may exist within the context of the larger Vaal River System.

3.2 Acid Mine Drainage (AMD)

AMD or Acid Rock Drainage (ARD) is produced when Sulphate bearing minerals, found in all reefs mined for gold, are exposed to oxygen. The process, termed pyrite oxidation, is enhanced when water moves through and over the surfaces of acid bearing rock having been exposed as a result of mining activities that disturbed the underlying geology. AMD is generally characterised by one or more of the following: low pH, high Total Dissolved Solids (TDS), high Sulphates (SO₄), and/ or high levels of heavy metals – particularly Iron (Fe), Manganese (Mn), Nickel (Ni) and/ or Cobalt (Co). Heavy metals (and in some instances radioactivity) being mobilised at low pH, and elevated salt levels can pose a risk to human health and to the integrity of the aquatic ecosystem while also having a significant negative economic impact.

3.3 Dewatering of underground mining basins

As mines close down and mining basins keep on filling with groundwater, an ever increasing burden, in terms of mining basin dewatering, is placed on the remaining operating mines. Since AMD can not be permitted to decant to surface uncontrolled, or to pollute valuable sources of clean groundwater, mines have no other choice but to keep underground mine water levels below an Environmental Critical Level (ECL), and hence, per implication, are faced with an open-ended liability. In order to attain a sustainable post mine closure outcome, innovative solutions are needed.

3.4 Cumulative effect

As a result of the inter-linking of many of the said underground mine workings, the cumulative effect on both the quantities of underground mine water that has to be pumped during mining basin dewatering, as well as the quality impacts resulting from AMD formation, are substantial. It is important to note that the underground mine water being pumped in the three mining basins, notably the Eastern, Central and West Rand Mining Basins, collectively contribute approximately 5% of the total Vaal River system yield, while being responsible for an estimated 20% of the total salinity load, that may also include heavy metals.

3.5 Issue of ownership

Numerous abandoned, derelict and/ or ownerless mines are situated within the larger Vaal River water supply area. This implies that the State is likely to have to assume the responsibility for many of these mines, if ownership can not be traced, or if the mines had become government responsibility in terms of the *Fanie Botha Accord* (agreement by DWA with the Chamber of Mines). Although the Department should scrupulously enforce all applicable water legislation, this fact underlines the necessity that government and the mining industry will have to work in close partnership. In addition, it must be noted that the issue of ownership potentially holds huge implications for the State in respect of contributing towards the costs associated with a regional underground mine water and AMD solution.

3.6 Integration of water resource management efforts

The strategies to be so established by DWA need to be integrated with the strategies and operation of the Vaal River System, and may provide much needed input to the Regional Mine Closure Strategy process of DMR. The Department is currently developing strategies for desalination and the re-use of water; which are also of relevance to this study.

3.7 Integrated Vaal River studies

The DWA planning studies (*viz.* the *Large Bulk Water Supply Reconciliation Strategies* and *Integrated Water Quality Management Strategy* studies for the Vaal River) confirmed that in order to manage the salinity problems in the Vaal River, while also ensuring that enough water is supplied down-stream, an increase in blending releases, as well as the direct re-use of treated underground mine water would be required. These studies *inter alia* recommended that pre-feasibility and/ or feasibility studies be undertaken to find the most appropriate option to deal with the mine water issue. More information may be accessed on <http://www.dwa.gov.za/Projects/VaalWRMS/documents.aspx>.

4. NEED FOR STRATEGIC INTERVENTION

4.1 *Status quo* scenario within the identified underground mining basins

4.1.1 East Rand Mining Basin

Until recently, the Grootvlei (Pty) Mines Ltd has discharging substantial volumes of highly saline semi-treated and/ or untreated underground mine water into the Blesbokspruit wetland; a wetland which was designated to the List of Wetlands of International Importance in terms of the Ramsar Convention in October 1986. This has contributed to the Blesbokspruit channel and associated wetland system to amongst others suffer from severe hydraulic over-loading. Due to financial difficulty, the Mine is struggling to finance the continued pumping and treatment of underground mine water in their High Density Sludge (HDS) plant prior to it being discharged, and has subsequently ceased with the dewatering of the East Rand Mining Basin.

4.1.2 Central Rand Mining Basin

Should appropriate plans to resume the dewatering of the Central Rand Mining Basin not be implemented timeously, the remaining exploitable gold reserves within the said mining basin will be sterilised, withholding potential foreign income from the country and placing a further burden on unemployment figures if mines close. In addition, AMD is to decant on surface, with AMD also likely to attack the concrete foundations of buildings, affecting the structural integrity of infrastructure in the centre of Johannesburg, and probably also causing flooding of the basement of the Standard Bank building in the city centre, as well as the underground activities of Gold Reef City to name but a few.

4.1.3 West Rand Mining Basin

Despite all the efforts and significant infrastructure investment by the mines within the West Rand Mining Basin to remove heavy metals and to do pH correction, the quality of water specified in DWA's Directive (salinity requirements) cannot be achieved due to the current technology being utilized. The situation is exacerbated when underground mine water decant quantities exceed the treatment capacities of the current HDS processes, necessitating *in situ* liming of the excess decant water. The treated and/ or untreated water currently being discharged into the Tweelopies Spruit is contaminating boreholes further down-stream and is likely to continue to contaminate a pristine karst aquifer with elevated sulphates (potentially until the entire aquifer is unfit for human and/ or animal consumption) should decisive steps not be taken timeously to rectify the situation. In addition, the

dolomitic aquifers located down-gradient of the mining area feed water to the *Cradle of Humankind World Heritage Site*, potentially providing pathways for AMD to reach the areas associated with the said World Heritage Site.

4.2 Short-term interventions

Subsequent to Cabinet approving the recommendations of the Team of Experts on AMD, funds were allocated to DWA by National Treasury with the purpose of implementing some of the said recommendations, namely to-

- firstly, investigate and implement measures to neutralise and remove metals from the AMD;
- secondly, investigate and implement measures to pump the underground mine water in order to prevent the violation of the ECLs; and
- thirdly, to initiate a feasibility study to address the medium- to long-term solution.

As the implementation of short-term interventions may potentially influence roll-out of the desired medium- to long-term solution, it is crucial that the feasibility study be initiated as soon as possible.

4.3 Need for a medium to long-term regional solution

It is highly unlikely that an individual mine-by-mine approach will yield a sustainable solution to the AMD problems associated within the Eastern, Central and West Rand Mining Basins. In the absence of a collective approach, it will be expected of individual mines to ensure that underground mine water is treated, probably until they shut down and/ or until their rehabilitation funds have been depleted, at which time the operating and maintenance costs is likely to eventually revert to the State. In addition, it may also be possible that the volumes of underground mine water from the three individual mining basins - Eastern, Central and West Rand Mining Basins - are not enough to provide a long term self sustainable solution due to the significant capital investment required, necessitating a regional solution in order to provide for the critical volumes of water required to produce a suitable quality water at a low enough unit cost. However, more information is required prior to deciding whether one or more treatment facilities are required to solve the AMD problems within the said three underground mining basins.

4.4 Water pricing

All industries (of which the mining sector constitutes a major role-player) contributing to the salt loading of the Vaal River will eventually have to contribute financially to any future treatment costs. The Waste Discharge Charge System (WDCS) will provide the mechanisms through which the internalisation of pollution costs is to be administered. However, in the absence of an operational WDCS, interim-arrangements need to be devised as a priority. This would include an investigation into the application of raw water tariffs in relation to the future implementation of the WDCS.

5. SCOPE OF WORK

5.1 Study goal

The main goal of the study contract is to-

- **investigate and recommend a feasible long-term solution to the AMD problems emerging in the study area, in order to ensure long term water supply security and continuous fitness for use of Vaal River water.**

5.2 Extent of the study area

The study area is restricted to the Eastern, Central and West Rand Mining Basins, to be looked at in the context of the Vaal River water supply area.

5.3 Study structure and priorities

Due to the nature of the study, and due to numerous uncertainties, a phased approach towards addressing the study goal is proposed. As a result of the intertwined nature of several of the study aspects, study phases may overlap, and if necessary run concurrently.

Since addressing short term priority challenges needs to fit the desired overall strategy, this study will include recommending further short term management intervention as far as is practicable and necessary.

It is foreseen that the study structure is to include the following distinct components:

Component 1 Study inception;

Component 2 Identification of sources of information;

Component 3 Legal considerations and apportionment of liabilities;

Component 4 Evaluation of management scenarios and analysis of technical options;

Component 5 Analysis for optimal infrastructure configuration

Component 6 Recommendation of suitable institutional and financial models;

Component 7 Implementation plan

Component 8 Public participation and communication; and

Component 9 Study management and administration.

Study phasing may relate, but are not necessarily limited to the above listed components. The nature of the individual study phases needs to be clearly set out within the Project Proposal to be submitted. The use of a reviewer is desirable, especially where credibility or the complexity of matters warrants it.

5.4 Time schedule

The study will be initiated during the 2011/2012 financial year and needs to be concluded within a maximum of 18 months after initiation (i.e. signing of the contracts). Proposals proposing a shorter study life span will be considered favourably.

5.5 Expected expertise

The work covers a wide range of fields, and support expertise is desired in the following areas:

- Water quality and waste management;
- Water purification technologies;
- The relevant engineering competencies;
- Water resource infrastructure project development and financing;
- Commercial and environmental law;
- Institutional models and PPP structuring;
- Hydrology, geo-hydrology and geology;
- Water resource planning and management;
- Economics, water pricing and tariffs;
- Social-economic development; and
- Stakeholder communication and participation.
- Project Finance
- Project Management

6. FOCUS AREAS

The feasibility study must *inter alia* cover the following pertinent focus areas, viz. economic, technical, financial, and legal focus areas:

6.1 Economic focus

The government requires the services of an experienced economist to undertake an economic analysis for the project. It is expected that the economic analysis will be based largely on a Cost Benefit Analysis (CBA) methodology. Where possible, other tools can be used to provide the kind of analysis that will enable government to make the right decision based on an optimal solution.

The economic analysis must provide a detailed CBA looking at different scenarios relating to the handling of the AMD problem. Such CBA must cover the different options such as (1) the do-nothing scenario; and (2) an investment scenario. Furthermore the CBA must examine the benefits and costs of allocating of responsibility for the scenarios to both the public and private sectors.

The economic analysis must provide a quantified set of cost and benefits where possible in the form of a number that can be fed into the financial model.

6.2 Technical focus

The technical adviser must, based on the available reports, examine and provide advice on technological options that can be used to deal with the problem. Amongst others the key questions to be answered is whether a centralised or dispersed technology focussing on the different areas is deployed.

The technical adviser must also provide input into the financial model by advising on the choice of technology, the availability of such technology, the use and sustainability of such technology as well as the life cycle costs implication of such technology.

The technical advisor should also be able to provide a preliminary design taking all of the above into account to guide government on possible solutions.

6.3 Lead adviser

In addition to the expertise identified above the government requires the services of a lead advisor whose role will be to provide a point of coordination for the project. This role will include project management and oversight for deliverables. More importantly the lead adviser will be responsible for producing (a) final report(s) taking into account the work done by the other experts.

The report(s) must be coherent, consistent and produce a single message advising government on all aspects of structure, cost benefit, solutions, risk and contractual issues to enable a sound decision. The technical and the lead adviser should be the same firm.

6.4 Financial focus

It is anticipated that any solution to the problem will require massive investment. The financial analysis must inform the quantum of the investment. The financial adviser must develop and design a financial model that takes into account the full life cycle costing of all the investments required.

The financial model must incorporate scenarios of public and private sector investment as well as examining the potential revenue sources, if any, that can be derived from the investment.

The financial advisor must where possible include the actual costs and benefits as identified in the CBA in the financial model. The financial advisor must assist with strategies for risk identification, quantification and mitigation that will affect the project and incorporate such in the financial model.

6.5 Legal focus

The legal issue associated with the AMD are complex and multifaceted. The legal advisor must examine the legislative issues associated with AMD. The legal expert must advise and contribute to the options selection as part of the CBA.

Working with other the advisors the legal advisor will assist with the identification of risk, quantification of such risks as well as mitigation of such risks. The legal advisor must ensure that the risks as identified are translated into a legally sound position in the agreement to be negotiated. The legal advisor must also assist to draft, negotiate and concluding any agreement that may arise from discussions between all the parties.

7. DESCRIPTION OF STUDY COMPONENTS

7.1 Component 1: Study Inception

7.1.1 Purpose

To present a final description of the scope of work, study programme and resource requirements.

7.1.2 Comments

It is critical that the subject of the feasibility study, *i.e.* the medium- to long-term solution, integrates with the efforts that form part of the short term interventions. As such, the inception phase should complement and, as far as possible and appropriate, build further on what has been implemented up to study inception. Risk factors for the state, whether financially, economically, legally or otherwise should be observed and appropriately accommodated and addressed.

7.1.3 Deliverables

The particular component should result in an Inception Report within the first 2 months. The purpose of the Study Inception Report is to agree on the methodology to be used, the project team, the study deliverables, programme and cost. The Study Inception Report should form a report on its own, while the other deliverables can be addressed via one or more additional report(s), depending on how the study unfolds. It is possible that additional study deliverables may be identified during study inception. The Inception Report will specify the agreed deliverables for the study contract.

7.2 Component 2: Identification of sources of information

7.2.1 Purpose

To identify sources of relevant information, including information that is regarded as sensitive.

7.2.2 Comments

Explicit note should be taken that various sources of information exist and that existing information and data should be utilised as far as possible. The purpose of the study is not to conduct research *per se*, but to devise suitable measures and interventions for implementation.

7.2.3 Deliverables

Inventory reference list with brief descriptions of sources of available related and relevant information.

7.3 Component 3: Legal considerations and apportionment of liabilities

7.3.1 Purpose

To provide legal assistance where necessary and to confirm and agree on the apportionment of liabilities that had been done by the Council for Geoscience.

7.3.2 Comments

Government should be cautious to not create a precedent whereby mines unduly avoid environmental responsibilities. Applicable policy principles should be applied as far as is reasonable and appropriate. Where necessary, legal council should be provided to confirm issues of current liability and/ or related matters.

The adequacy, relevance and potential utilisation of the financial provisioning made by mines for mine rehabilitation needs to be investigated.

7.3.3 Deliverables

Apportionment of liabilities and the clarification of the implications of the said apportionment;
Legal due diligence on the technical solutions recommended in the feasibility study; and
Legal opinions on any contentious issues that may be identified.

7.4 Component 4: Evaluation of management scenarios and analysis of technical options

7.4.1 Purpose

The purpose of this component is to undertake a pre-feasibility assessment of possible management scenarios and technical options in respect of the desalination of AMD within the study area. The intention is to make recommendations in respect of developmental options that should be further investigated in more detail.

7.4.2 Status assessment

A status assessment is needed to summarise all relevant information. The said status assessment should as far as possible make use of existing available sources of information.

Predictions, as accurately as possible, should be made in respect of when and where the three underground mining basins in the study area will decant and at what volumes and qualities. The decanting and Environmental Critical Levels (ECL) information to be confirmed, will dictate the timing of study roll-out and implementation. The assurances of water supply from the individual underground mining basins should be confirmed.

7.4.3 Scenarios definition

Management scenario definition and construction is based on the status assessment. Once the list of possible scenarios had been compiled, a preliminary screening (at a conceptual level) will be undertaken with the purpose of eliminating non-feasible solutions. The approach should be to have an all inclusive list of all possible scenarios, and then to reduce the list by flagging and eliminating those scenarios that have fatal flaws.

Possible management scenarios to solve the matters at hand must be identified, and further information needs should be identified and addressed where appropriate. It should amongst others, be confirmed whether the existing mines will be able to resolve the emerging underground mine water crises internally in a self-sustainable manner without any financial assistance from the State.

7.4.4 Technical options

Technologies should be identified and compared at a conceptual level, including cost comparisons and environmental implications, to inform options analysis and subsequent decision-making.

7.4.5 Evaluation criteria and screening of scenarios

Management scenarios should be screened by applying pre-defined criteria. This is done in order to ensure that the evaluation of the results is comparable and to make the ranking of scenarios in sequence of feasibility possible. Recommendation for implementation should cover the short-term, as well as the long term.

The screening of scenarios should cover the following aspects:

- Economic and financial considerations;
- Social-economic considerations;
- Environmental considerations;
- Legal considerations;
- Technical viability (physical and operational) to be evaluated for engineering feasibility; and
- Statutory and institutional responsibilities, including co-operative governance arrangements.

7.4.6 Deliverables

Status assessment report;

Conceptual comparison of appropriate and feasible treatment technologies and required infrastructure; and

Evaluation of management scenarios with recommendations on optimum option(s) for further consideration.

7.5 Component 5: Analysis for optimal infrastructure configuration

7.5.1 Purpose

To develop the most desirable management scenario and technical option up to feasibility level.

7.5.2 Comments

The desired infrastructure configuration needs to be developed up to the point where implementation can commence with minimum additional input.

All environmental authorisations, including all potential Environmental Impact Assessments (EIAs), are to be the subject of a follow-up contract to be undertaken during project implementation. However, this study will be required to consider all environmental consequences, and to initiate and maintain the appropriate requirements for authorisations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, arising for any new works proposed.

If necessary, Rand Water or any other suitable entity should be assisted with the compilation of a potential off-take agreement.

(Note the use of proprietary processes may require the use of phased or turnkey implementation contracts.)

7.5.3 Deliverables

Preliminary designs, infrastructure layout configuration, costing and environmental investigations.

7.6 Component 6: Institutional and financial models

7.6.1 Purpose

To develop and recommend the most appropriate institutional and (high-level) financial models for implementation.

7.6.2 Comments

The application of raw water tariffs for the Vaal River System, as well as the application of the Waste Discharge Charge System (WDCS) should be investigated and addressed, since it materially affects the financial feasibility of any management and/ or technical solution.

All parties involved should be identified. The desired institutional model may relate to a wholly State owned solution, a wholly private sector owned solution, or a public-private partnership solution.

This Component should be addressed in close consultation with National Treasury.

7.6.3 Deliverables

Recommendations in respect of an adapted raw water tariff structure for the Vaal River System and/ or;

Recommendations for both the interim (until the WDCS is fully developed) and the long-term application of WDCS principles ("full" WDCS implementation);

Recommendations in respect of the desired (high-level) financial model detailing the funding options and cost recovery mechanisms to be applied;

Develop and submit an application for funding, if required, to National Treasury;

Develop an economic analysis model with a positive net present value;

Analyse the optimal contract period bearing in mind the financing structure and required return on investment, risk transfer, asset life, technology changes and the Department's desire to retain in-house ability to manage the project implementation; and

Recommendations in respect of the establishment of the most appropriate institutional model to assist with the implementation, operation, maintenance and/ or management of the desired management scenario and technical option.

7.7 Component 7: Implementation

7.7.1 Purpose

To provide a systematic approach for the implementation of the desired solution. This applies to both the short-term and long-term.

7.7.2 Implementation plan

The study recommendations, resulting from the other study components (including ECL and decanting information), should be consolidated to produce an implementation plan that *inter alia* contains an implementation programme in respect of the desired management scenario and technical option. The said programme should spell-out all required activities and associated time frames, as well as responsibilities, whether government or private sector. Departmental roles and responsibilities and collaborative management positions, such as for DWA vs. DMR, should also be confirmed. In addition, a strategic level

monitoring program for implementation should also be developed as part of the implementation plan. The monitoring program should be designed to assist with the implementation and to evaluate implementation performance.

7.7.3 Other measures to assist with roll-out

This component may include the compilation of (a) Scope(s) of Work, as may be required to address further gaps, Tender Specifications, as may be required to commence with tender processes for construction, etc., as well as to recommend steps and measures, such as contracts, Memoranda of Understanding (MoUs), procurement plans, etc., to give momentum to the implementation of the desired solution;

7.7.4 Deliverables

Detailed programme for implementation; and
Other measures, as may be necessary.

7.8 Component 8: Public participation and communication

7.8.1 Purpose

To consult key stakeholders and communicate study progress to all relevant parties.

7.8.2 Comments

It is important that key stakeholders be consulted throughout the study, where relevant. Such consultation specifically applies to components 1, 2, 3, 4 and 7.

In addition, measures need to be put in place to effectively communicate study progress to all relevant parties and to promote confidence in the steps taken by DWA to address the AMD in the study area. Care should be taken to manage public perception and emotion. Public buy-in is important when communicating in respect of the desired solution.

Study communication should adhere to the DWA communication protocol.

7.8.3 Deliverables

A communication strategy, detailing the means of communication, communication schedules, the intended target audiences, methods of communication, message contents, etc. needs to be developed and implemented;

Communication media, such as newsletters, press releases, etc. necessary to communicate about AMD and the measures being put in place by DWA to address the matter in the study area;

A suitable study structure, including the structures described under Section 9, needs to be established early on during the study; and

Assist and advise the Department in conducting the negotiations with the mines to the point where legal and commercial agreements have been reached in terms of a proposed Agreement.

7.9 Component 9: Study management and administration

7.9.1 Purpose

To ensure that study execution complies with the study contract and that study management is efficient and effective.

7.9.2 Comments

It is expected of the successful Professional Service Provider (PSP) to assist the Project Manager with contract management and to provide for secretarial services, administrative support and liaison with stakeholders where necessary.

7.9.3 Deliverables

Study meetings at the required intervals, presentation material, progress reports and meeting administration in order to realise a well managed study.

8. REPORTING REQUIREMENTS

Reports shall be written in a clear and concise manner and information presented in tabular format whenever possible.

- All first draft reports shall be proof read by a person approved by the Project Management Committee (PMC) before being submitted to the Project Steering Committee (PSC) for review. First draft reports will include all introductory pages, concise executive summaries, conclusions, recommendations as appropriate and all Annexures giving comprehensive technical descriptions of the processes followed and the results achieved. First draft reports should require limited Client input and if it is submitted incomplete, it will not be considered as the first draft and will be returned to the PSP. The PSP must allow four weeks in the project programme for the review of documents;
- All documents shall comply with the *Standard for Documentation produced within the Water Resource Planning System Series*;
- All reports shall be produced free of any copyright restrictions by the authors and reports should be available for reproduction if required;
- 10 hard copies of first draft reports are to be submitted to DWA for comment as well as in electronic format (MS Word); and
- 5 bound hard copies of final reports are to be submitted to DWA as well as one unbound copy. 20 electronic copies in PDF format are also to be supplied together with one electronic copy in MS Word format.

9. PROJECT MANAGEMENT

9.1 Project Management Committee

A Project Management Committee (PMC), which is constituted as follows, will manage the project:

Beason Mwaka	(Project Manager)	Water Resource Planning Systems
Jurgo van Wyk	(Project Coordinator)	WRPS: Water Quality Planning: Central
Pieter Viljoen	(Member)	WRPS: Water Quality Planning
Rod Schwab	(Member)	WRPS: Economic & Environmental Studies
Solly Mabuda	(Member)	CD: IWRP
Seef Rademeyer	(Member)	NWRP: Central
Peter Pyke	(Member)	OA: Central
Marius Keet	(Member)	Gauteng Regional Office
Molefe Morokane	(Member)	RPW: Mines
Zacharia Maswuma	(Member)	Hydrological Services

Nancy Motebe	(Member)	RDM
Tumi Moleke	(Member)	National Treasury
Richard Holden	(Member)	TCTA
Strover Maganedis	(Member)	National Treasury

WRPS – Directorate Water Resource Planning Systems,

NWRP – Directorate National Water Resource Planning,

OA – Directorate Options Analysis;

RPW – Directorate Resource Protection and Waste.

IWRP – Chief Directorate: Integrated Water Resources Planning

It is anticipated that the PMC will meet monthly. The secretariat for the PMC will be provided by the PSP. A concise progress report will be required prior to PMC meetings. The Project Manager and/or Project Coordinator will provide feedback to the GTT.

9.2 Project Steering Committee

The Project Steering Committee (PSC) will be responsible for the strategic direction and providing technical oversight to the project. The PSC will also be involved in final sanctioning of all project deliverables. The DWA Directorate Resource Protection and Waste, Sub-Directorate Mines, the relevant DWA regional offices and the DWA Directorates National Water Resource Planning: Central and Options Analysis: Central and nominees from DMR, DEA and National Treasury are to explicitly form part of the PSC. The PSC will also include other DWA directorates and extra departmental role-players and will be chaired by the Project Director.

It is envisaged that the PSC will meet approximately 4 times during the study duration. The secretariat for the PSC will be provided by the PSP. A progress report will be required prior to PSC meetings.

10. ORGANISATIONAL MATTERS

10.1 Client and study name

DWA will act as the Client for this study through the Sub-Directorate Water Quality Planning. The formal study name shall be: ***“FEASIBILITY STUDY FOR A LONG-TERM SOLUTION TO ADDRESS THE ACID MINE DRAINAGE ASSOCIATED WITH THE EAST, CENTRAL AND WEST RAND UNDERGROUND MINING BASINS”***.

10.2 Execution, supervision and control

Supervision of the project and the management of administrative and contractual matters will be conducted by the Sub-Directorate Water Quality Planning of the Directorate Water Resource Planning Systems, Chief Directorate Integrated Water Resource Planning.

The project will be administered by the PMC, under the technical guidance of the PSC.

10.3 Programme of work

The programme of work for the study will be dependent on the schedule of activities. The time allowed for the study is as stipulated under Section 5.4.

11. INFORMATION TO BE PROVIDED IN THE PROPOSAL

11.1 Request for proposals

This Request for Proposals contains a concise background description and study layout, and intends providing sufficient information to enable the prospective PSP to compile a coherent Project Proposal based on the scope of work.

11.2 Extent of the proposal

All the discussions in the proposal should be to the point and the text should not exceed fifteen A4 pages, excluding appendices, at a font size of not less than 11 and a line spacing of not less than 1.

11.3 Summary of PSP capacity and capability

It will be necessary to have an experienced manager as lead advisor/ assignment leader/ project co-ordinator who has proven experience and expertise in water resource management.

The proposals must contain explicit information about the capacity and capability of key personnel. This information should include details of appropriate tertiary qualifications and previous involvement in water resources planning and management related studies. PSPs that do not have in-house capacity, capability or specific technical expertise in any particular aspect of the assignment are free to form associations or joint ventures with other PSPs that would provide the necessary services. The proposal documentation must provide details about the nature of such collaborations.

11.4 Summary of relevant experience

The proposal must contain brief summaries of-

- Experience in planning, feasibility studies, implementation and management of water resource development projects in Southern Africa;
- Experience of working in multi-disciplinary teams in the water resources domain;
- Experience of water resource related work in typical catchments and river systems that represents the range of catchment conditions and complexities in South Africa; and
- Experience in administrative inputs to meetings and related water resource study aspects.

In each of the above cases, please provide the names of the relevant projects, the names of the clients and the dates the projects were completed. The summary of relevant experience should demonstrate that the PSP team holds the experience listed under Section 5.5.

11.5 Curricula Vitae (CVs)

Abridged CVs of all key personnel on the study team should be attached to the proposal. The extent of each abridged CV should be no longer than 2 (two) A4 page at font-size of not less than 11 and at line spacing of not less than 1.

11.6 Charge-out rates

The applicant must together with the project proposal also supply a schedule of proposed charge-out rates of all the individual consultant team members.

Charge-out rates should comply with the applicable rule rates. The rule limit rate has an influence on the hourly rates a PSP may claim. If rates exceed the applicable rule limit rates, concise motivations are required, stipulating why such rates exceed the prescribe norms.

The rule rates refers to a maximum of either 16.5c, 17.5c or 22.0c per hour per R100 or part thereof of the total annual cost of employment of the individual defined as annual basic salary, regular bonuses and allowances, employer's contribution towards medical aid schemes, pension/provident funds and group life insurance premiums and statutory contributions, on condition that it is market related for a specific profession (see summary table immediately below).

CLASSIFICATION OF RESPONSIBILITY		
Responsibility level*	Typical positions in assignment team	Basis of determination of rates in Rand per hour
T A	Drafts Person Support Staff	16.5c rule rate. Becomes a negotiated rate if above the rule limit rate
B C	Support Staff Key Support Staff	17,5c rule rate. Becomes a negotiated rate if above the rule limit rate.
D E F	Task Leader, Key Support Staff Team Leader, Task Leader, Specialist, Reviewer Study Leader, Team Leader, Specialist, Reviewer	22.0c rule rate. Becomes a negotiated rate if above the rule limit rate.

*Responsibility level as described and classified in Annexure A.

11.7 Budget, finances and approach

It will further be required of each bidding PSP to prepare the following documents to DWA standards and to include them in their study proposals:

- Study methodology;
- A detailed study programme;
- Summary of Human Resource Utilization (Annexure B1);
- Cost Schedule per Task (Annexure B2); and
- Summary of Financial Proposal (Annexure B3).

12. EVALUATION SYSTEM

DWA will evaluate all proposals in terms of the Preferential Procurement Policy Framework Act. No. 5 of 2000 (PPPFA). A 2 phase evaluation criteria will be considered in evaluating the bid being:

Phase 1: Functional/Technical evaluation

Functionality Evaluation Criteria		
Criteria		Weighting Points Awarded
Functionality	Past Experience	30
	Methodology	25
	Team Capability	30
	HDI Participation	15
Total		100

Note to bidders: The bidder is expected to achieve a minimum threshold / required score for functionality of 70% in order to qualify for further evaluation. Further evaluation is based on Price and Preference (refer to tables immediately below) after the minimum score has been achieved by the bidder.

Phase 2: The 90/10 Principle application

CRITERIA	POINTS
People with no franchise prior to the 1993 constitution	6
Women equity	3
Disability	1

Conditions:

- Only bidders who obtain at least 70% under Functional / Technical Evaluation will be considered for further evaluation.
- Bidders are requested to provide a clear agreement regarding joint venture/consortia. The percentage involvement of each company in the joint venture agreement should be indicated.

13. CAPACITY BUILDING AND PARTICIPATION OF HDIs AND HDEs

The participation of HDIs (Historically Disadvantaged Individuals) in the study is strongly recommended. The definition of an HDI follows that of the Department's current policy.

PSPs are encouraged to put forward HDIs as key personnel, as well as to form associations or joint ventures with HDEs (Historically Disadvantaged Enterprises). The Proposal must provide clear details about the nature of such collaborations and must be explicit about the following:

- HDI ownership percentage of each participating firm in associations or joint ventures formed for this study;
- The roles of HDIs in key personnel and technical support positions; and
- The composition of HDEs that participate in associations or joint ventures formed for this study.

The ownership percentage for joint ventures or associations is calculated as a weighted average percentage based on the participation rate.

14. TAX CLEARANCE CERTIFICATE

No contract may be awarded to a PSP who has failed to submit an original Tax Clearance Certificate from the South African Revenue Service (SARS) certifying the taxes of that PSP to be in order or that suitable arrangements have been made with SARS.

15. DEADLINE AND ADDRESS FOR SUBMISSIONS

Proposals are to be submitted in accordance with *SBD1 "Invitation to Bid"*.

PROJECT MANAGER:

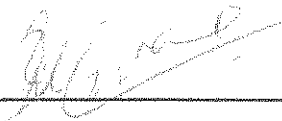
J.J. van Wyk
Scientific Manager, Water Quality Planning (Central)
Directorate Water Resource Planning Systems
Chief Directorate Integrated Water Resource Planning
Department of Water Affairs
Tel (012) 336-8407

APPROVED FOR THE DEPARTMENT OF WATER AFFAIRS:



DEPUTY DIRECTOR: WATER RESOURCE PLANNING SYSTEMS

DATE: 22/03/2011



DIRECTOR: WATER RESOURCE PLANNING SYSTEMS

DATE: 22/03/2011



CHIEF DIRECTOR: INTEGRATED WATER RESOURCE PLANNING

DATE: 25/03/2011



DEPUTY DIRECTOR-GENERAL: POLICY AND REGULATION

DATE: 05/04/2011

ANNEXURE A: CLASSIFICATION OF RESPONSIBILITY LEVELS OF PERSONNEL

Level of responsibility	01 = Level T	02 = Level A	03 = Level B	04 = Level C	05 = Level D	06 = Level E	07 = Level F
Duties	Detailing of structures, day-to-day supervision. Quantity calculations, laboratory work and surveying under experienced seniors.	Receives training in the various phases of the activities of a specific profession as classroom instruction or on-the-job assignments.	May carry out routine investigations, surveys or inspections and prepare reports. Normally regarded as a continuing portion of a junior employee's training and development. Receives assignments of limited scope and complexity usually minor phases of broader assignments. Uses a variety of standard methods and techniques in solving problems.	This is typically regarded as a fully qualified professional. Carries out responsible and varied assignments, requiring general familiarity with a broad field of a specific profession and knowledge of reciprocal effects of the work upon other fields. Problems usually solved by use of combination of standard procedure, modification of standard procedures, or method development in previous assignments. Participates in planning to achieve prescribed objectives.	This is the first level of direct and sustained supervision of other professionals OR the first level of full specialisation. Requires application of mature professional knowledge in planning and conducting projects having scope for independent accomplishment & co-ordination of the difficult and responsible assignments. Assigned problems make it necessary to modify established guides, devise new approaches apply existing criteria in new ways and draw conclusions from comparative situations.	Participates in short and long range planning: make decisions on work methods and procedures within an overall programme. May supervise large groups containing both professional and non-professional staff OR may exercise authority over a small group of highly qualified professional personnel engaged in complex applications.	Usually responsible for an professional administrative function, directing several professional and other groups engaged in interrelated professional responsibilities OR as a professional consultant achieving recognition as an authority in a specific profession field of major importance to the organisation. Independently conceived programmes and problems to be investigated. Participates in discussions determining basic operating policies.
Recommendations decisions and commitments	Decisions made under direct supervision of seniors	Few technical decisions called for and these will be of routine nature with ample precedent or clearly defined procedures as guidance.	Recommendations limited to solutions of the problem rather than end results. Decisions made are normally within established guidelines.	Makes independent studies analyses interpretations and conclusions. Difficult complex or unusual matters or decisions are usually referred to more senior authority.	Recommendations reviewed for soundness of judgement but usually accepted as technically accurate and feasible.	Make responsible decisions not usually subject to technical review on all matters assigned except those involving large sums of money or long-range objectives. Takes courses of action necessary to expedite the successful accomplishment of assigned projects.	Make responsible decisions on all matters including the establishment of policies and expenditures of large sums of money and/or implementation of major programmes, subject only to overall company policy and financial controls.

Level of responsibility	01 = Level T	02 = Level A	03 = Level B	04 = Level C	05 = Level D	06 = Level E	07 = Level F
Supervision received	With the aim of gaining experience	Works under close supervision. Work is reviewed for accuracy and in conformance with prescribed procedures.	Duties are assigned with detailed oral and occasionally written instructions as to methods and procedures to be followed. Results are usually reviewed in detail and technical guidance is usually available.	Work is not generally supervised in detail and amount of supervision varies depending upon the assignment. Usually technical guidance is available to review work programmes and advice on unusual features of an assignment.	Work is assigned in terms of objectives, relative priorities & critical areas that interfere with work of other units. Work is carried out within broad guidelines, but informed guidance is available.	Work is assigned only in terms of broad objectives to be accomplished, and is reviewed for policy, soundness of approach and general effectiveness.	Receives administrative direction based on organisational policies and objectives. Work is reviewed to ensure conformity with policy and co-ordination with other functions.
authority and/or supervision exercised	No technical staff as subordinates one to five artisans or helpers.	May assign and check the work of one to five helpers.	May give technical guidance to one or two junior personnel assigned to work on a common project.	May give technical guidance to personnel of less standing, or who are assigned to work on a common project. Supervision over other personnel not usually a regular or continuing responsibility.	Assigns and outlines work advises on technical problem reviews work for technical accuracy and adequacy. Supervision may call for recommendations concerning selection training, rating and discipline of staff.	Outlines more difficult problems and methods of approach to work programmes and directs use of equipment and material. Generally make recommendations as to the selection, training, discipline and remuneration of staff.	Reviews and evaluates technical work, selects schedules and co-ordinates to attain programme objectives and/or as an administrator makes decisions concerning selection, training, rating, discipline & remuneration of staff.

ANNEXURE B1: EXAMPLE OF THE SUMMARY OF MANPOWER, TIME AND COST SCHEDULE

Team member	Company name	Company position	Project position (Task)	Applicable experience in task	HDI / woman	Hourly rate	Time on project	% of time on project	Total cost
				Years					
D.M. Tjaka	ABC Consult	Director	Project leader	25	Y / N	520	20	10	R XX XXX
F.M. Morris	ABC Consult	Associate	Task leader, Hydrology	15	N / N	480	50	25	R XX XXX
Ven Te Chow	AquiTech Cons	Geohydrologist	Geohydrology	13	N / N	400	30	15	R XX XXX
T.Y. Matalle	ABC Consult	Director	Task leader, Geohydrology	6	Y / Y	500	40	20	R XX XXX
A. Einstein	ABC Consult	Associate	Hydrology	10	N / Y	120	15	7.5	R XX XXX
Z. Zuma	ABC Consult	Technician	Support	2	Y / Y	110	35	17.5	R XX XXX
M. Mercalli	B&T drilling	Specialist techn.	Geohydrology	20	N / N	350	10	5	R XX XXX
TOTAL							200	100	R XXX XXX

ANNEXURE B2: EXAMPLE OF A TIME AND COST SCHEDULE PER TASK

Task no.	Team member	Company name	Position in company	HDI	Project position/activity	Time schedule	Hourly rate (Excl. VAT)	Total cost (Excl. VAT)
				Yes/no		Man hours	Rand/hour	Rand
1. TASK: INCEPTION REPORT:								
1.1	Z.M. Strichnine	ABC Consult	Director	Y	Project Leader	6	R xxx.xx	R xxx.xx
1.2	J.M. Buxley	ABC Consult	Director	N	Task Leader: 2r	7	R xxx.xx	R xxx.xx
1.2	T. Greschivochi	ABC Consult	Director	N	Task Leader: 3	8	R xxx.xx	R xxx.xx
1.3	P.P. Peperoni	AquiTech Cons	Director	N	Task Leader: 4	5	R xxx.xx	R xxx.xx
	Subtotal for professional fees					26		R XX XXX, XX
Disbursements:								
	- Travel							R xxx.xx
	- Accommodation							R xxx.xx
	- Subsistence							R xxx.xx
	- Printing							R xxx.xx
	- Miscellaneous							R xxx.xx
	Subtotal for disbursements							R xxx.xx
	TOTAL COST TASK 1							R XX XXX, XX
2A. Task: 2A: XXXXXXXXXXXX								
2A.1	J.M. Buxley	ABC Consult	Director	Y	Task Leader	125	R xxx.xx	R xxxx.xx
2A.2	F.M. Morris	ABC Consult	Associate	N	Geohydrology	96	R xxx.xx	R xxxx.xx
2A.3	Ven Te Chow	ABC Consult	Specialist	N	Hydrology	72	R xxx.xx	R xxxx.xx
			Associate					
2A.4	T.Y. Vernon du Mont	ABC Consult	Engineer	N	Flood hydrology	80	R xxx.xx	R xxxx.xx
2A.5	A. Einstein	AquiTech Cons	Director	N	Programmer	120	R xxx.xx	R xxxx.xx
2A.6	Z. Bouzinesq	AquiTech Cons	Director	N	Logger equipment	48	R xxx.xx	R xxxx.xx
2A.7	M. Mercalli	ABC Consult	Associate	N	Catchment assessment	40	R xxx.xx	R xxxx.xx
2A.8	D.M. Tjaka	ABC Consult	Associate	N	Public participation	140	R xxx.xx	R xxxx.xx
2A.9	K. Rembrandt	ABC Consult	Associate	N	GIS	210	R xxx.xx	R xxxx.xx
2A.10	M.M. Dolby	ABC Consult	Associate	N	Field assistant	95	R xxx.xx	R xxxx.xx
	Subtotal for Professional Fees					1 056		R XX XXX, XX
Disbursements:								
	- Travel							R xxxx.xx

Terms of Reference:
Request for Proposals

Feasibility study to address the Acid Mine Drainage associated with the
East, Central and West Rand Underground Mining Basins

- Accommodation		R xxxx.xx
- Subsistence		R xxxx.xx
- Printing		R xxxx.xx
- Miscellaneous		R xxxx.xx
Subtotal for disbursements		R xxxx.xx
TOTAL COST TASK 2A		R XXX XXX, XX
SUBTOTAL THIS PAGE (carry forward to next page)		1 082
		366 480.00

ANNEXURE B3: EXAMPLE SUMMARY SHEET FOR FINANCIAL PROPOSAL

Task no.	Task description	Total cost of Task as per cost and time schedule (Excl. VAT)		14% VAT		Total Task cost (Incl. VAT)	
		Rand		Rand		Rand	
1	Inception	R XX XXX,XX		R XX XXX,XX		R XX XXX,XX	
2A	Task 2	R XXX XXX,XX		R XXX XXX,XX		R XXX XXX,XX	
2B	Task 3	R XXX XXX		R XXX XXX		R XXX XXX	
2C	Task 4	R XXX XXX		R XXX XXX		R XXX XXX	
3A	Task 5	R XXX XXX		R XXX XXX		R XXX XXX	
3B	Task 6	R XXX XXX		R XXX XXX		R XXX XXX	
3C	Task 7	R XXX XXX		R XXX XXX		R XXX XXX	
4A	Task 8	R XXX XXX		R XXX XXX		R XXX XXX	
4B	Task 9	R XXX XXX		R XXX XXX		R XXX XXX	
4C	Task 10	R XXX XXX		R XXX XXX		R XXX XXX	
4D	Task 11	R XXX XXX		R XXX XXX		R XXX XXX	
4E	Task 12	R XXX XXX		R XXX XXX		R XXX XXX	
TOTAL COST OF PROJECT		R X, XXX, XXX, XX		R XX XXX, XX		R X, XXX, XXX, XX	