DRAFT SCOPING REPORT FOR THE IMMEDIATE AND SHORT TERM INTERVENTIONS FOR THE TREATMENT OF ACID MINE DRAINAGE (AMD) IN THE WESTERN, CENTRAL AND EASTERN BASINS OF THE WITWATERSRAND GOLD FIELDS

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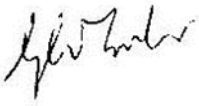
Graham Trusler	Report Reviewer		11 May 2012

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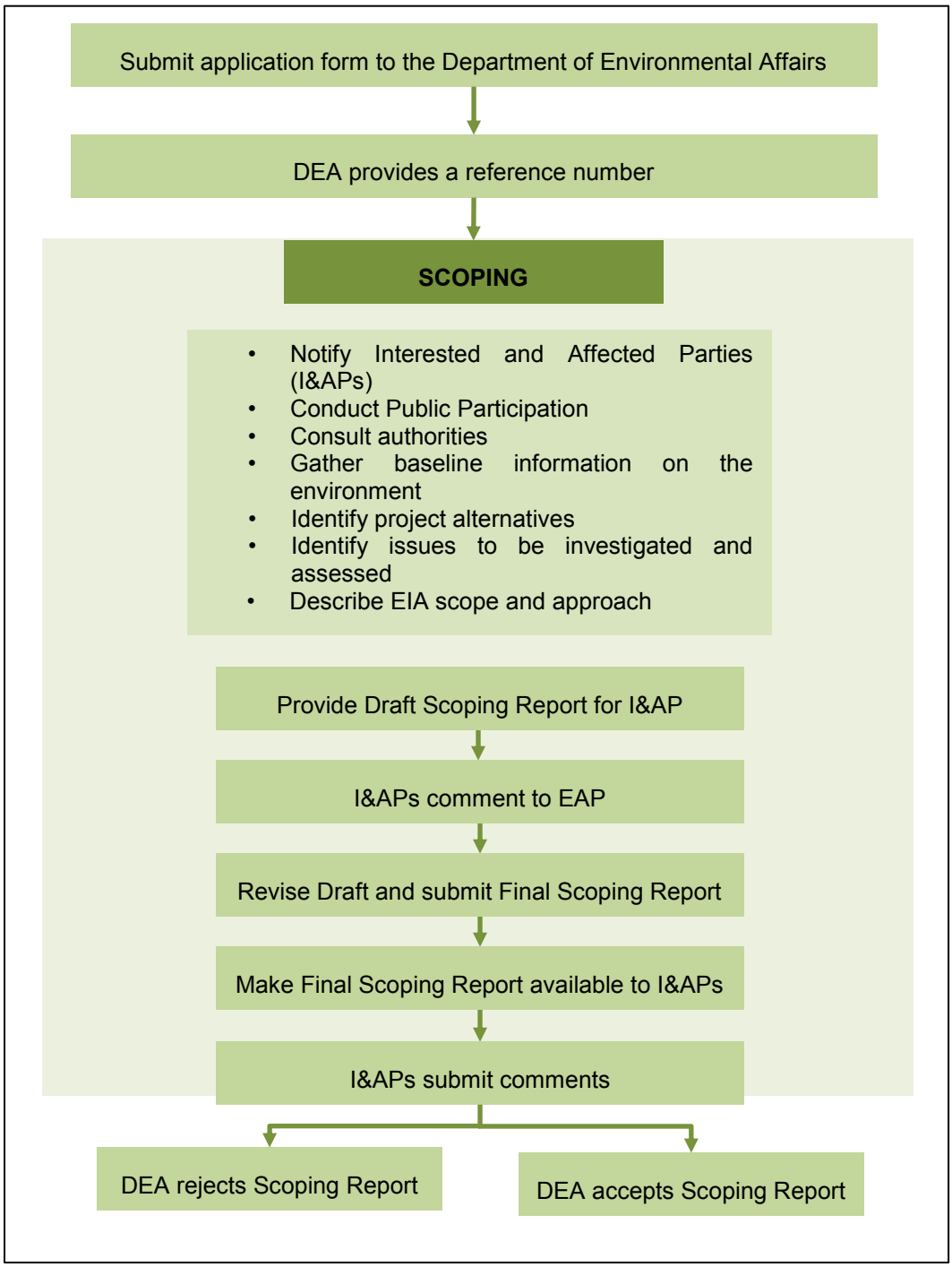
EXECUTIVE SUMMARY

Digby Wells Environmental (Digby Wells) was appointed by The Trans-Caledon Tunnel Authority (TCTA) to conduct the Environmental Impact Assessment (EIA) process for the immediate and short term interventions for the treatment of Acid Mine Drainage (AMD) in the Witwatersrand Gold Fields in Gauteng, South Africa.

The EIA is considered a tool with which to manage the environment. The completion of an EIA is a regulatory requirement in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the EIA process is regulated in terms of the GN Regulations 543 to 546 (18 June 2010) ("EIA Regulations"). The overarching purpose of the EIA process is to determine, assess and evaluate the consequences (positive and negative) of a proposed development, activity or project.

This Draft Scoping Report forms part of the EIA process and aims to identify those environmental issues and concerns that require investigation as well as determine feasible alternatives. This information is then used to determine the scope for the EIA. During the scoping phase those persons interested or affected by the project were informed of the project as well as provided the opportunity to provide their input in terms of issues and concerns they may have.



PROJECT OVERVIEW

Gold mining has occurred in the Witwatersrand for more than 120 years. During the underground mining operations, water was pumped to the surface to enable mining to take place. As mining stopped the pumping of underground water ceased and the mine voids started filling with water. The sulphide minerals in the rocks were exposed to water and

oxygen, which resulted in AMD forming. The mining voids, thus, progressively filled with acidic water that contained heavy metals and started to decant on surface in September 2002 in the Western Basin at Randfontein.

This Scoping Report deals with the two main aspects of the proposed project. The first is the immediate intervention, whereby the existing Rand Uranium water treatment plant will be refurbished and upgraded to treat the water currently decanting from the Western Basin.

The second and more detailed aspect of the project is the construction and operation of the proposed short term intervention. This entails the construction of three new High Density Sludge (HDS) treatment plants. Water will be abstracted from existing shafts in the three basins, before being treated in the HDS plants. The neutralised water will then be discharged into streams within close proximity to the plant infrastructure.

The water will be abstracted such that a level is maintained in the old workings where it is prevented from affecting any infrastructure or aquifers. This level is called the Environmental Critical Level (ECL). For the Western Basin it will mean that the water table will be lowered from where it is currently discharging on surface to the ECL and for the Central and Eastern Basins it means that the water level will be intercepted and prevented from rising above these levels.

These interventions are considered as the first phases of the long term intervention for the mitigation of AMD. The focus of this Scoping Report is on the immediate and short term interventions for the Western, Central and Eastern Basins, which is holistically referred to as the “Witwatersrand Gold Fields AMD Project” (herewith referred to as the Witwatersrand AMD Project).

Why the need for the Project?

In April 2011, the Department of Water Affairs (DWA) instructed the TCTA to act as the agent for the design and implementation of the short term measures to manage and control AMD in the Western, Central and Eastern Basins of the Witwatersrand Gold Fields.

The overall aim of the immediate and short term interventions is to treat the mine water to a level that it can be discharged to the environment, with tolerable impacts on downstream water users. This requires neutralisation of the acidic mine water and precipitation and removal of heavy metals.

What happens if we do nothing?

If nothing is done, AMD will continue to decant from the Western basin and the water will rise in the Central and Eastern Basins until there is a discharge on surface. This water will contain a high level of dissolved salts, be acidic and contain a number of heavy metals and will affect the natural environment significantly in the vicinity of the discharges and possibly over a large area downstream.

Is this all that is required?

Although the proposed project will treat the water to a level where it will no longer be acidic and where most of the dissolved salts and the heavy metals have been removed, it is still however not suitable for human consumption, but possibly for some industrial uses. The discharge of the water into public streams will affect water quality downstream and the exact effect of this will need to be investigated. During operation the mines were treating and discharging water in a similar fashion to what is being proposed. The river courses will thus be affected in a similar fashion to what was the case when the mines were in operation.

There is the possibility of treating this water further to allow for more uses but this is the subject of further investigations which have been commissioned by the DWA and is not part of this project. The current project is seen as first step of any long term treatment solution to the AMD problem on the Witwatersrand.

The Inter-Ministerial Committee Task Team of Experts recommended that the direct consumptive use of the neutralised water must be investigated as well as the desalination and sale of the water to local users. They considered the proposed solution as part of a process to get to the final solution.

PROJECT DETAILS

The proposed Witwatersrand AMD project deals with the short term interventions as proposed by the Inter-Ministerial Committee Task Team of Experts.

For the short term interventions, new water treatment plants will be constructed in three areas:

- The Randfontein Estates area (Western Basin);
- The East Rand Proprietary Mines (ERPM) South West Vertical Shaft area (Central Basin); and
- The Grootvlei Mine Shaft No.3 area (Eastern Basin).

The infrastructure associated with these areas will consist of:

- Pumps and associated infrastructure at existing shafts (for the abstraction of AMD);
- HDS treatment plants being constructed at each basin (for the neutralisation of AMD);
- Pipelines to various streams (for the discharge of water into the Tweelopiespruit, Elsburgspruit and Blesbokspruit);
- Pipeline construction to sludge disposal areas (sludge disposal); and
- Roads and areas used for transportation and access (servitudes).

The HDS treatment process is designed to neutralise the acidic mine water and allow for the precipitation and removal of heavy metals. The secondary aim is to precipitate some of the soluble salts such as sulphate as gypsum from the mine water, thereby, reducing the salt load to the catchments into which discharge will take place.

The treatment technology will be used for the short term intervention will involve the following:

- Oxidation by aeration;
- Pre-neutralisation and metals removal with limestone;
- Final neutralisation and metals removal with lime, produced by the slaking of quicklime; and
- Gypsum crystallisation and precipitation to remove excess sulphate from solution.

The water abstraction from the mine voids is planned such that the level will be drawn down below surface to a level called the ECL. This is a level whereby polluted water is not expected to influence other underground aquifers.

The treatment process produces a waste stream called sludge which contains the precipitated salts and the heavy metals which needs to be safely disposed of.

A summary of the short term intervention per basin is provided below. Visual presentations of these projects are contained in Figure 1-1, Figure 1-2 and Figure 1-3.

Western Basin

The site of the proposed Western Basin AMD water treatment plant for the short term intervention is near to the existing Rand Uranium treatment plant. Short term intervention activities planned for the Western Basin will include:

- Abstraction of AMD via pumps in Shaft No. 8 at a depth to achieve the ECL of 1550 mamsl;
- The lowering of the current water table in the old mine workings to 165 m below surface by pumping an average of 53 Ml/day (peak of 60 Ml/day) from Shaft No. 8. For the first two to three years this water will be treated concurrently by the Rand Uranium treatment plant and the short term treatment plant. Thereafter, the ECL will be maintained by treating the water at the short term plant only, where pumping will be reduced to an average of 27 Ml/day (peak of 35 Ml/day);
- Construction and operation of a new HDS treatment plant on the Randfontein Estates site;
- Construction of a treated water pipeline to a suitable discharge point on the Tweelopiespruit within the Krugersdorp Game Reserve; and
- Construction of waste sludge disposal pumps and pipeline to the West Wits Pit for the disposal of the sludge from the treatment process.

Central Basin

The proposed Central Basin AMD treatment plant is to be situated about 1,8km east of the Germiston Central Business District (CBD) on the western portion of the ERPM South West Vertical (SWV) Shaft area. Activities will include:

- Abstraction of AMD via pumps in the SWV Shaft to keep the water from rising above the ECL at 150 m below the ERPM Cinderella East Shaft collar level (1 617 m) or 1 467 mamsl;
- Pumping and treating an average of 72 Ml/day (peak of 84 Ml/day);
- Construction of a new HDS plant adjacent to the SWV shaft;
- Construction of a waste sludge pipeline to the Crown Knights Gold processing plant;
- Construction of a treated water pipeline to a suitable discharge point on the Elsburgspruit; and
- Investigation and planning for a possible future waste sludge pipeline to the ERGO Brakpan Tailings Storage Facility (TSF).

In order to meet the timing requirement in the Central Basin it may not be possible to complete the full EIA process prior to construction having to take place to install the pumping equipment to ensure the water level does not exceed the ECL. In this case a Section 24G application, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), may be submitted to the Department of Environmental Affairs (DEA).

Eastern Basin

The proposed Eastern Basin AMD water treatment plant will be situated at the Grootvlei Mine Shaft No. 3 about 4,6km east of the Springs CBD. The site is accessible via the R29 Ermelo Road and Grootvaly Road through the suburb of Casseldale. Activities will include:

- Abstraction of AMD via installed pumps in Grootvlei No. 3 shaft at a pump depth to achieve the ECL level of 1280 mamsl;
- Pumping and treating at an average of 106 Ml/day and a peak of 110 Ml/day;
- Construction of a new HDS treatment plant adjacent to the Grootvlei No. 3 shaft;
- Investigation and planning for the possible construction of a waste sludge pipeline to the Daggafontein, Brakpan and/or Grootvlei TSFs; and
- Construction of a treated water pipeline to a suitable discharge point on the Blesbokspruit.

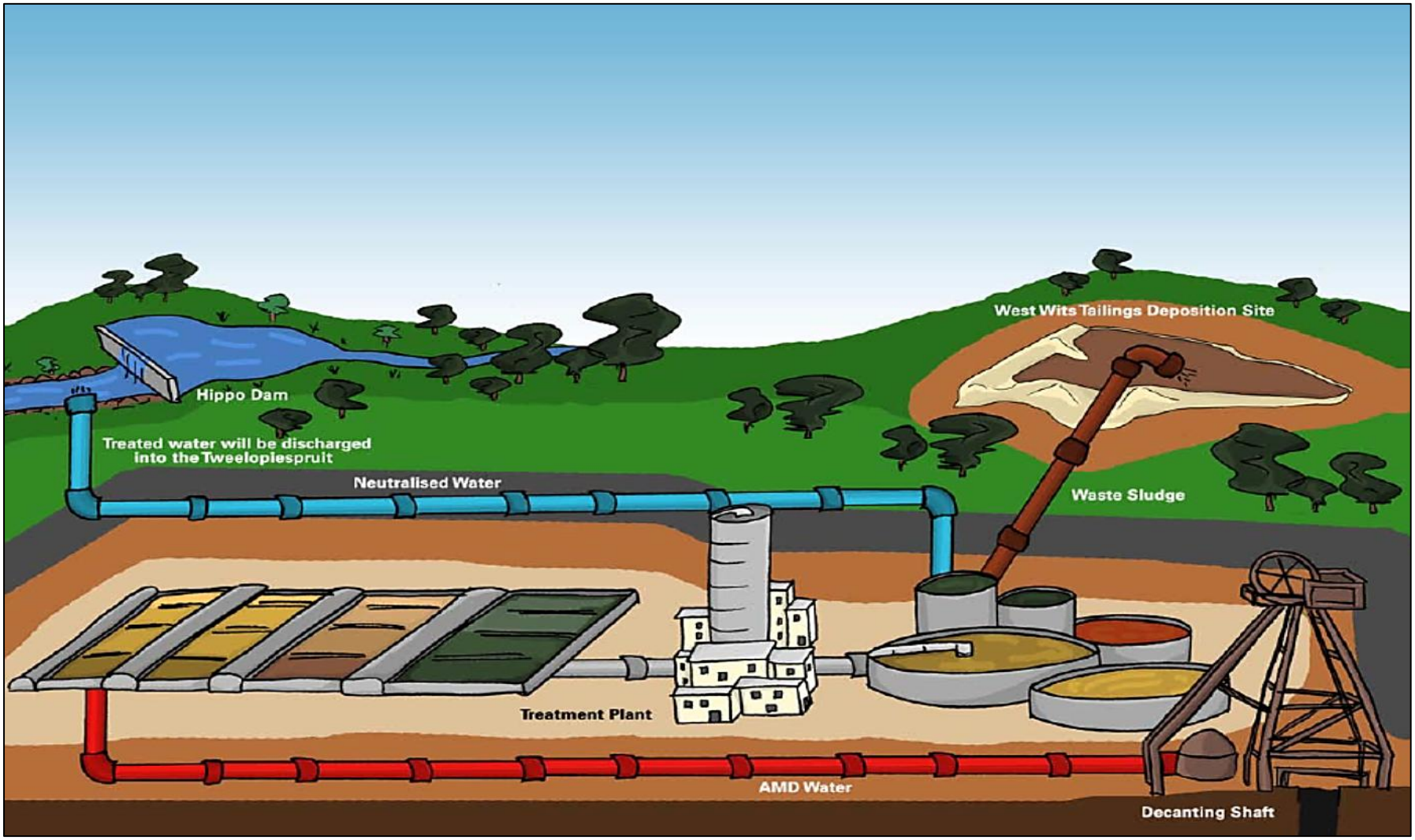


Figure 1-1: Western Basin

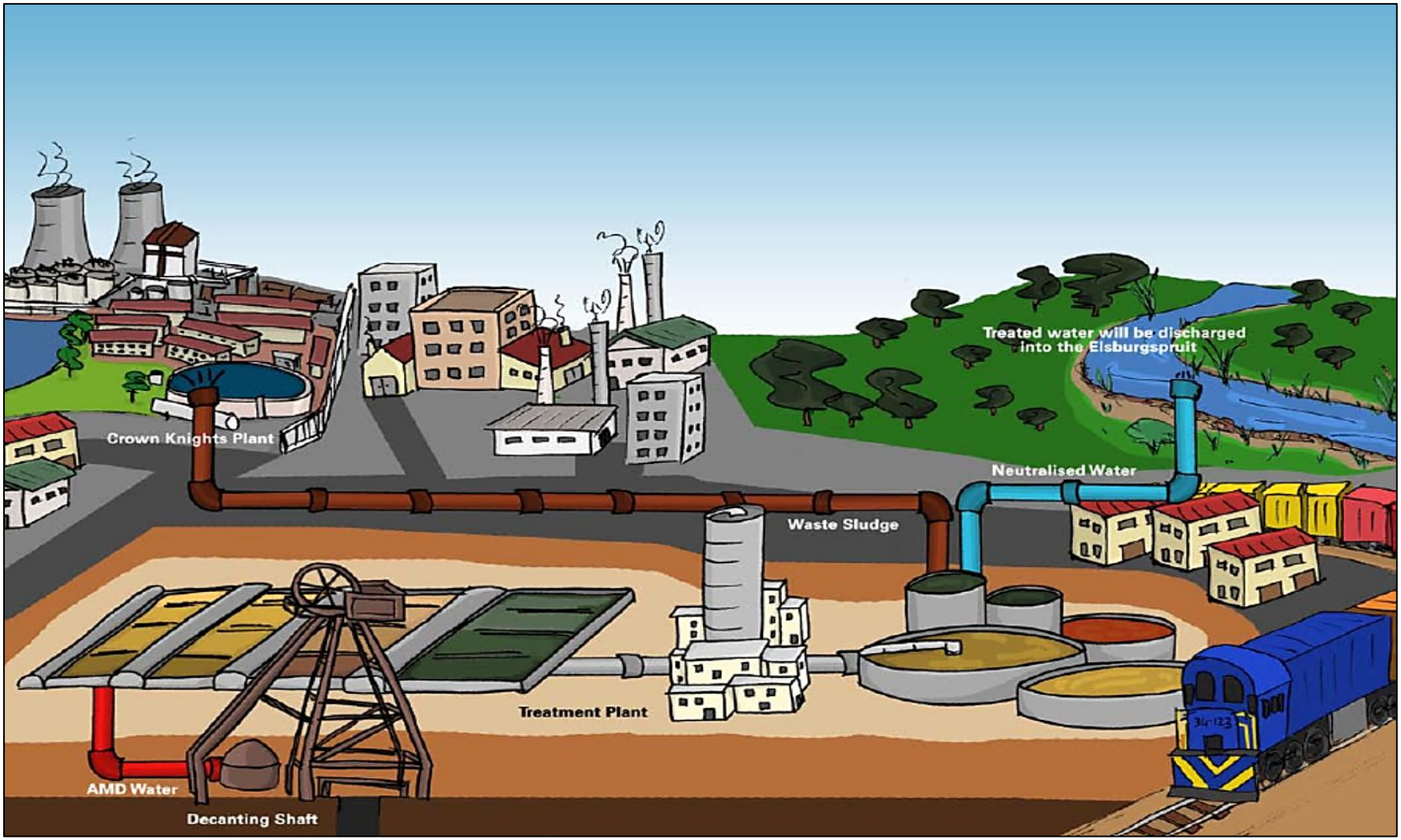


Figure 1-2: Central Basin

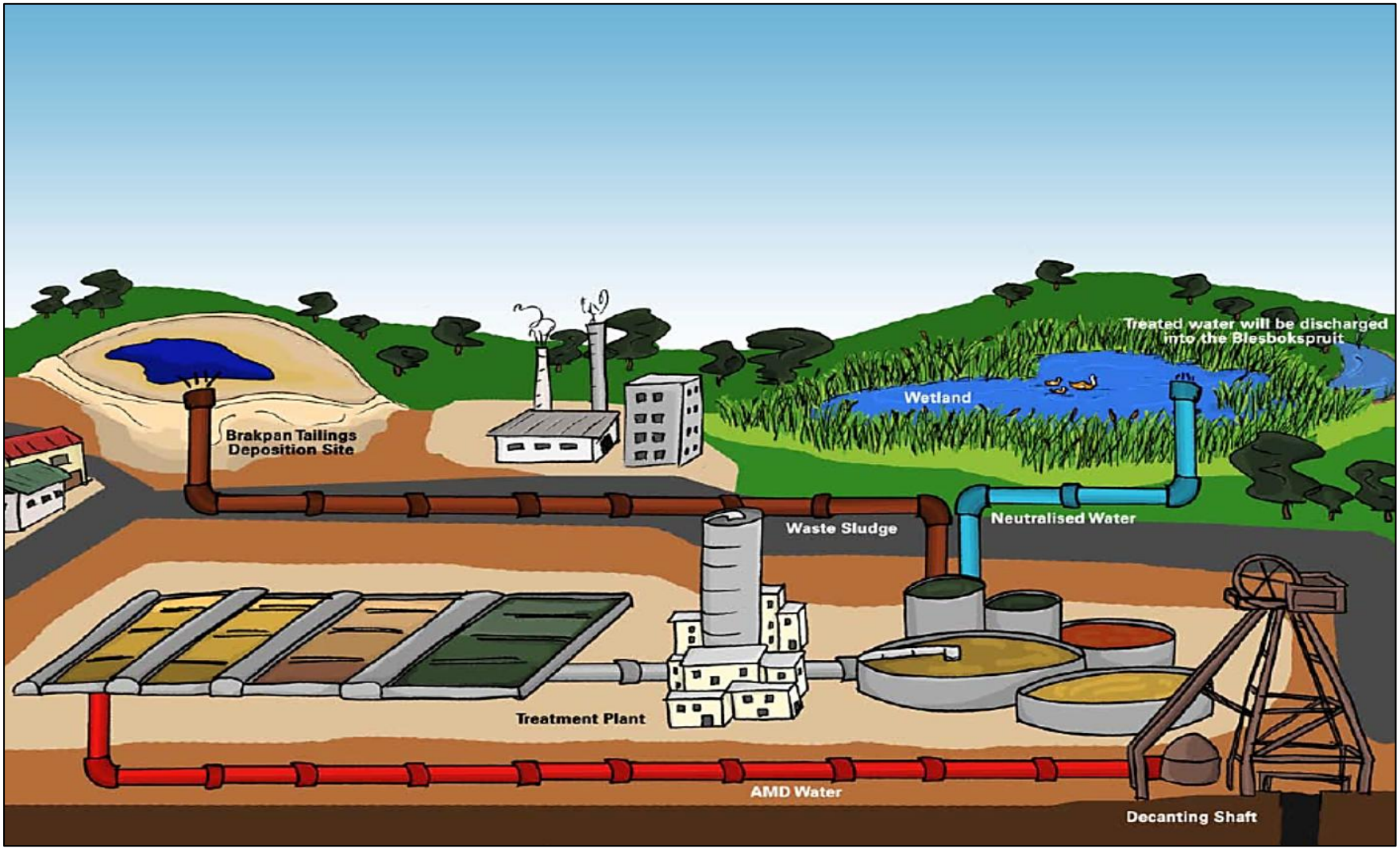


Figure 1-3: Eastern Basin

PROJECT ALTERNATIVES

As part of the scoping phase, reasonable alternatives to the proposed activities were explored. The following alternatives were considered:

Treatment technology alternatives

The treatment technology selected for the short term intervention is neutralisation through the HDS treatment route. It has been chosen due to its large scale application around the world for problems of this nature. Alternatives within the process consist of the use of different neutralising agents. Other alkalis such as only lime, sodium carbonate, or sodium hydroxide could be used, however, the cost has precluded their use on a large scale for this type of application.

The main process alternative to be considered is the full scale processing or final treatment of AMD. This process would also involve the neutralisation of the AMD, but, as a second phase would include the desalinisation of the water, improving the quality of the water. This alternative was not considered for the short term intervention due to the following reasons:

- It is expensive and a mechanism must be found as to whom is going to pay for this treatment and how it is going to be done;
- Institutional arrangements have to be put in place to manage the operation of these facilities and the water resulting from these facilities;
- The construction takes time and something needs to be done now as a matter of urgency;
- The standards to which the water should be treated have not yet been decided. It could be to potable standards, industrial standards or for discharge into a stream; and
- Different technologies need to be considered for the different areas.

Sludge disposal alternatives

In addition to the options proposed, there may be alternatives to place the sludge into specially designed and sealed disposal facilities. These will have to be designed such that they can be sustainably closed after operation.

There is also the opportunity to place the sludge on top of unused tailings facilities as this will ensure that geotechnical conditions are understood and that no additional surface area is disturbed.

Abstraction alternatives

A possible alternative in the Central Basin is to place the pumps or abstraction point nearer the outcrop area to ensure that water quality improves more quickly over time and to prevent highly saline water being drawn from the deeper workings over time. Different shafts could also be considered based on the fact that some shaft areas may have more functioning infrastructure than others

Treated water discharge alternatives

An alternative to the discharge of the treated water is to sell the water to users rather than allowing it to discharge directly into the water courses. Whilst the water could be used for reclamation of tailings materials or pumped to other catchments for use such as in the platinum mines, it is difficult to determine the needs of these mines and the volumes they would require. In Addition, the economic cycles of projects often do not correspond with the need to discharge.

An alternative to the proposed discharge point in the Western Basin, the Tweelopiespruit, would be to discharge the treated water into the Wonderfonteinspruit. The treated water would, therefore, enter the Vaal Catchment rather than the Crocodile system. A possible reason as to why this alternative is less suitable is due to the fact that even further salt loads would be introduced into the Vaal River system. An additional concern to this alternative is that some of the water from the Loopspruit may re-enter the groundwater regime over dolomitic ground. There is a pipeline which has been constructed over the dolomitic ground which may not have sufficient capacity to accommodate the neutralised water from the Western Basin.

ISSUES AND COMMENTS

During the scoping phase a number of issues and concerns were raised. The key issues and concerns and their associated responses have been summarised in the table below:

Issue	Response
The importance for the EIA to investigate alternatives particularly the no-go alternative	The EIA will investigate alternatives including the no-go option.
How and who will finance the interventions?	The immediate and short term interventions capital investment for the infrastructure will be funded by the government. The intention of government is that capital cost incurred will eventually be recovered from the water users and the mines. One of the objectives of the long term solution is to determine a model for financial recovery.
The impact of the project on downstream users.	This will be investigated in the EIA
Water quality issues particularly the release of water containing high salts.	This will be investigated in the EIA
Water quantity issues relating to the release of additional water down the streams	The impact of the additional water being released will be investigated in the EIA.

Issue	Response
The reasons why the project is not going the full treatment route including desalinisation.	The reason that desalination is not implemented within the current phase is to allow the correct selection of operation and treatment to be determined by the Long Term solution feasibility study.
The projects impact on the Vaal River and the potential of the project causing the Vaal river going into deficit.	Aurecon is looking at the long term solution which will also address the issue of the Vaal River going into deficit.
The impact of the project on groundwater.	The EIA will investigate the full extent of impact on the groundwater system.
The impact of the project on the ecology of the rivers.	The EIA will investigate the impact on the ecology and will suggest mitigation measure
The impact of the project on human and animal health.	This will be investigated in the EIA.
Public Participation ensuring that the project is made known to as many people as possible particularly the disadvantaged.	The EIA has been well advertised as per the public participation process. Meetings targeting the disadvantaged will be undertaken.
Due legal processes to be followed particularly around the use of section 24G.	TCTA has taken a decision to proceed with the EIA process and then apply for a section 24 G if required. If TCTA wait for authorisations, the ECL will be breached and decant in the Central and Eastern Basin will occur.
Treatment technologies and particularly alternative technologies.	Alternatives will be investigated as part of the EIA.
Sludge disposal sites and possible groundwater contamination.	Sludge disposal options will be investigated in the EIA.

POTENTIAL IMPACTS

The scoping phase has allowed for the identification of potential impacts associated with the proposed project. As part of the EIA these impacts will be assessed and evaluated to determine their significance. These potential impacts listed below:

- Surface water quality:
  - Deteriorating water quality in streams affecting beneficial water uses;

- Elevated sulphate levels affecting human and animal health;
- Elevated temperature, conductivity, pH, O_2 content, sulphates, heavy metals and micro-organisms in impacted streams. Many of these variables hold direct health and other water use impacts, as well as promoting damaging sludge blankets; and
- Reduction in yield of the Vaal River system due to elevated salt load entering the Vaal Barrage.

- Surface water quantity:
  - The inundation of riparian property (incl. informal areas, footpaths, access roads, etc.);
  - Impacts on low level bridges, structures, etc., affecting level of service and stability of the structures;
  - Effect on stability of farm dams, and especially spillways due to the potential of persistent spilling due to higher base flows;
  - Channel stability, especially in upper reaches of study area. Higher base flows may change the dynamics of the receiving stream and river channels; and
  - Potential movement of contaminated sediments. Especially near existing decant points and the proposed discharge points, the local sediments either have or may receive contaminants from the process. These may move further downstream under the new base flow regimes proposed.
- Geohydrology:
  - Potential reduction in groundwater quantities relied upon by water users, through the abstraction of AMD;
  - Reducing pressure through dewatering in mine voids and dolomite solution cavities – potential for collapse (geology instability);
  - Seepage of discharged water back into groundwater environment through rivers and streams. This may have a quality impact due to high salt load and waste of energy due to the recycling of water;
  - Seepage of sludge and TSF mixture into groundwater environment causing a quality impact; and
  - Deposition of sludge into Wes Wits Pit might have negative impact on water quality.
- Air quality:
  - Elevated concentration of PM10, PM2.5 particulate matter in the atmosphere due to the deposition of the sludge on tailings facilities.

- Archaeology and heritage:
  - May cause alteration, damage to or destruction of historical buildings and structures older than 60 years;
  - Potential increases in water flow due to discharge may impact on heritage resources that could occur downstream and near river banks;
  - Potential increases in water flow due to discharge may impact on intangible heritage aspects such as baptism sites located in or near river; and
  - Increased flow into the Tweelopiespruit may change aspects of the Cradle of Humankind World Heritage Site (COH WHS).
- Human health:
  - Possible health impacts associated with the exposure to surface water discharge as it may contain radionuclides, heavy metals and high salt loads.
- Socio- economic:
  - People in the surrounding communities are hired during the construction and operational phases of the project;
  - Increased expenditure on the short term solution which is funded by the government; and
  - Economic and health impacts may result on downstream water users.
- Agriculture:
  - Should the discharged water be used for irrigation or livestock watering the potential to affect agriculture exists.
- Ecology:
  - The water levels of the rivers and streams receiving discharged water will rise, possibly inundating previously seasonally wet areas and temporarily flooding areas that previously remained dry throughout the wet season;
  - The ecological flows may be affected in that the base flows will be higher year round as a result of the proposed discharge; and
  - The treated water may potentially impact the water quality of the rivers and in turn the functioning of ecological systems.

SPECIALIST STUDIES REQUIRED

In order to investigate and assess the impacts of the proposed AMD project the following specialist studies have been proposed for the EIA phase:

- Surface water assessment, including:

    - Surface water quality; and
    - Surface water quantity
- Characterisation of the social environment;
- Radiation study;
- Community Health Impact Assessment (CHIA);
- Ecological assessment, including:
    - Wetland investigation;
    - Fauna & flora assessment; and
    - Aquatic assessment.
- Geohydrological assessment;
- Archaeology and heritage assessment;
- Economic analysis;
- Agricultural assessment;
- Technology assessment;
- Air quality assessment.

INFORMATION REQUIRED TO BE INCLUDED IN A SCOPING REPORT IN TERMS OF GN REGULATION 543 OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998)

CONTENT	REFERENCE
a) Details of – (i) the EAP who prepared the report; and (ii) the expertise of the EAP to carry out scoping procedures.	Chapter 3 – Section 3.1 & 3.2
b) Description of the proposed activity	Chapter 4
c) A description of any feasible and reasonable alternatives that have been identified	Chapter 5
d) A description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is – (i) A linear activity, a description of the route of the activity; or (ii) An ocean-based activity, the coordinates where the activity is to be undertaken.	Chapter 4 – Section 4.5
e) A description of the environment that may be affected by the activity and the manner in which the activity may affect the environment.	Chapter 6
f) An identification of all legislation and guidelines that have been considered in the preparation of the scoping report.	Chapter 2
g) A description of environmental issues and potential impacts, including cumulative impacts that have been identified.	Chapter 8
h) Details of the Public Participation Process conducted in terms of regulation 27(a), including – (i) The steps that were taken to notify potentially interested and affected parties of the application (ii) Proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the application have been displayed, placed or given. (iii) A list of all persons or organisations that were identified and registered in terms of Regulation 55 as interested and affected parties in relation to the application (iv) A summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues	Chapter 7
i) A description of the need and desirability of the proposed activity.	Chapter 4 – 4.2

CONTENT	REFERENCE
j) A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity	Chapter 5
k) Copies of any representations any comments received in connection with the application or the scoping report from interested and affected parties.	Chapter 7 & Appendix L
l) Copies of the minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants.	Chapter 7 & Appendix L
m) Any responses by the EAP to those representations and comments and views.	Appendix L
n) A plan of study for the environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include – (i) A description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes and the manner in which such tasks will be undertaken (ii) An indication of the stages at which the competent authority will be consulted (iii) A description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity; and (iv) Particulars of the public participation process that will be conducted during the environmental impact assessment process.	Chapter 9
o) Any specific information required by the competent authority.	
p) Any other matters required in terms of Section 24(4)(a) and (b) of the Act.	

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ACRONYMS

ACRONYMS	DESCRIPTION
AMD	Acid Mine Drainage
ASAPA	Association of Southern African Professional Archaeologists
BID	Background Information Document
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CRR	Comments and Response Report
CSIR	Council for Scientific and Industrial Research
DEA	Department of Environmental Affairs
Digby Wells	Digby Wells Environmental
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
ECL	Environmental Critical Level
EIA	Environmental Impact Assessment
EIA Regulations	GN Regulations 543 to 546 (18 June 2010)
EMP	Environmental Management Plan
HDS	High Density Sludge
I&AP	Interested and Affected Party
IMC	Inter-Ministerial Committee
mamsl	Meters above mean sea level
MPRDA	Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)
NEMAQA	National Environmental Management: Air Quality Act (Act No.39 of 2004)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)

ACRONYMS	DESCRIPTION
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NID	Notice of Intent to Develop
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NORM	Naturally Occurring Radioactive Materials
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PPP	Public Participation Process
SAHRA	South African Heritage Resources Agency
TSF	Tailings Storage Facility
ToR	Terms of Reference
TCTA	Trans-Caledon Tunnel Authority
WMA	Water Management Area
WWP	West Wits Pits

1 INTRODUCTION

1.1 Project overview

Digby Wells Environmental (Digby Wells) was appointed by The Trans-Caledon Tunnel Authority (TCTA) to conduct the Environmental Impact Assessment (EIA) process, which includes the compilation of an EIA and Scoping Report, for the immediate and short term interventions for the treatment of Acid Mine Drainage (AMD) in the Western, Central and Eastern Basins of the Witwatersrand Gold Fields, situated in the Gauteng Province, South Africa, as shown in Plan 1(Appendix A).

TCTA was instructed by the National Government, through the Minister of Water and Environmental Affairs to implement the short term interventions to treat AMD in the Western, Central and Eastern Basins. There are two main components to the proposed project. Firstly, an immediate intervention to neutralise acid water already decanting from the Western Basin at the current Rand Uranium treatment plant, and secondly, a short term intervention which entails the pumping of water from the Western, Central and Eastern Basins to reduce and prevent surface decant and to neutralise this water in newly constructed High Density Sludge (HDS) treatment plants, before release into the environment. These interventions are considered as the first phases of the long term intervention for the mitigation of AMD. The focus of this Scoping Report is on the immediate and short term interventions for the Western, Central and Eastern Basins, which is holistically referred to as the “Witwatersrand Gold Fields AMD Project” (herewith referred to as the Witwatersrand AMD Project).

1.2 Acid Mine Drainage

AMD is acidic water (pH <5.0), containing iron, sulphate and other metals, that forms under natural conditions when geologic strata containing sulphides are exposed to the atmosphere or oxidising environments. Many metallic ores contain significant amounts of sulphide minerals, particularly pyrite (FeS2). Mining often exposes large amounts of pyrite and other sulphide minerals to the effects of water and oxygen in the old workings, and from waste rock and tailings are on surface. The mining process also exposes sulphides in the walls of opencast and underground operations, and disturbs the host rock and hydrological regime around mined out areas, allowing the ingress of water and oxygen.

In the case of gold mining on the Witwatersrand numerous large old mining areas have become connected thus allowing water to migrate from one mine to another.

Although a host of chemical processes contribute to acid mine drainage, pyrite oxidation is by far the greatest contributor. A general equation for this process is:

$$4FeS_2(s) + 14O_2(g) + 4H_2O \rightarrow 4Fe^{2+}(aq) + 8SO_4^{2-}(aq) + 8H^+(aq)$$

Oxidation of the ferrous ion to ferric ion occurs more slowly at lower pH values:

$4Fe^{2+}(aq) + O^{2}(g) + 4H+(aq) \rightarrow 4Fe^{3+}(aq) + 2H_2O\ (l)$

Ferric iron precipitates as ferric hydroxide, producing further acid:

$4Fe^{3+}(aq) + 12H_2O(l) \rightarrow 4Fe(OH)_3(s) + 12H^{+}(aq)$

(Coetzee et al., 2007, IMC)

The net effect of these reactions is to release H^+, which lowers the pH and maintains the solubility of the ferric ion.

1.3 Project background

After more than 120 years of deep level gold mining on the Witwatersrand, mining and dewatering has stopped in most areas due to the exhaustion of gold resources or due to the uneconomic nature of the remaining reserves. The cessation of dewatering has resulted in progressive flooding of the mine voids since 1997. In the Western Basin, the voids filled with water and the reaction between the rock surface and the water resulted in heavy metals dissolving and becoming suspended in the water reducing the pH and making the water acidic. Decant started from an old shaft on the Rand Uranium property in the Randfontein area of the West Rand in September 2002. The Central and Eastern Basins will decant in a similar uncontrolled fashion in the future unless there is some intervention.

In 2010, Cabinet appointed an Inter-Ministerial Committee (IMC) to address the serious environmental and social challenges posed by AMD in the Witwatersrand Gold Fields area. The IMC tasked a Technical Committee to investigate the AMD issues. The Technical Committee subsequently appointed a team of experts, who developed and presented a draft report on AMD to Cabinet on 9 February 2011. The team of experts recommended that AMD intervention measures be undertaken in the Western, Central and Eastern Basins as a matter of urgency. This involved a short term intervention, where AMD is pumped from the Western, Central and Eastern Basins to prevent surface decant and to neutralise this water before release into the environment.

The Due Diligence study conducted by BKS included an immediate intervention to neutralise acid water already decanting from the Western Basin.

The team of experts believed that there could be risks due to the flooding of the mines with regard to:

- The contamination of shallow groundwater resources required for agricultural use and human consumption;
- Geotechnical impacts such as the flooding of underground infrastructure in areas where water rises near to urban areas; and
- Increased seismic activity which could have a moderate localised effect on property and infrastructure.

They saw risks due to the uncontrolled decant of AMD to the environment as:

- Serious negative ecological impacts;
- Regional impacts on major river systems; and
- Localised flooding in low-lying areas.

They recommended a generic approach to managing the priority areas:

- Decant prevention and management (by keeping the water in the voids at or below the Environmental Critical Level (ECL) by pumping);
- Ingress control (reducing the rate of flooding and the eventual decant volume); and
- Water quality management (treating water through a number of different ways).

The ECL recommended by the Team of Experts were as follows:

- Western Basin 1530 mamsl;
- Central Basin 1503 mamsl; and
- Eastern Basin 1150 mamsl.[1]

The IMC also stated that the direct consumptive use of the neutralised water must be investigated as well as the desalination and sale of the water to local users. They did not decide on any method for fully recovering the costs associated with AMD treatment and thus recommended that the neutralisation option be applied as this would return the situation to a position where it was prior to the cessation of pumping and treatment by the mining companies.

The Minister of Water and Environmental Affairs used this advice when she tasked TCTA to implement the solutions proposed by the IMC Team of Experts. The report, however, recognised that although the short term interventions will produce conditions similar to the status quo during periods of active mining, these interventions are merely the initial phase of a long term sustainable solution to the problem of AMD. The short term project will neutralise the AMD, remove heavy metals and a large portion of the dissolved salts.

The long term intervention, which could include possible further desalinisation, must be investigated and a study to this effect has been commissioned by the Department of Water Affairs (DWA). The long term intervention, however, does not form part of the scope of the EIA. The immediate and short term interventions are to be the first phases of the long term intervention for AMD and are the subject of this Scoping Report.

As the treatment of AMD in the Western Basin and the prevention of uncontrolled AMD decant from the other mining basins is considered of national importance, DWA have subsequently issued TCTA with a directive, attached as Appendix B, to act as the Agent to

[1] These were amended during the Due Diligence conducted by BKS.

plan, design and implement the immediate and short term interventions to manage and control AMD in the Western, Central and Eastern Basins of the Witwatersrand Gold Fields.

Based on the findings of the IMC Report, the Minister of Water and Environmental Affairs, directed TCTA to implement the recommendations made. TCTA contracted BKS to complete a Due Diligence study on the proposed recommendations. This was completed in August 2011. BKS's scope of work can be divided into five tasks:

- Task 1: A due diligence review of the Inter-Ministerial Committee Report (as provided by TCTA) and the recommendation of a solution for each of the mining basins;
- Task 2: Development and production of documents supporting the Integrated Regulatory Process for all basins;
- Task 3: Development and production of engineering design and tender documents that will be used for competitive procurement of a competent contractor(s) combined with detailed engineering design of the agreed and approved solutions for each of the mining basins, complete with construction drawings;
- Task 4: Monitoring of the Contractor's activities and commissioning of the works; and
- Task 5: Monitoring of the works during the defects liability period, taking corrective actions if required, and the provision of formal operation and maintenance manuals as well as close-out reports.

The outcomes and recommendations arising from Task 1: Due Diligence, are described below.

BKS recommended that the following AMD treatment technology and chemical reagent combination be used for the treatment of the Witwatersrand Gold Fields AMD:

- Oxidation by aeration;
- Pre-neutralisation and metals removal with limestone;
- Final neutralisation and metals removal with lime, produced by the slaking of quicklime; and
- Gypsum crystallisation to remove excess sulphate from solution.

The proposed AMD treatment plants would be based on the proven and reliable HDS process with optimisation related to the use of limestone (mainly developed by the CSIR) incorporated into the final treatment process configurations.

They proposed that the following Immediate AMD mitigation measures are implemented the Western Basin:

- Upgrading and retrofitting of the existing Rand Uranium treatment plant as the best opportunity in terms of treatment capacity and ease of implementation;

- Bringing the Rand Uranium treatment plant's additional treatment trains back into operation, after appropriate mechanical and electrical equipment has been installed; and
- The potential AMD treatment capacity, including the existing single operational treatment train is estimated to be 26-32 Ml per day.

As part of the Due Diligence, BKS, in conjunction with the Council of Geoscience, calculated the ECLs For the three basins. The ECLs calculated and used for the purposes of this EIA are as follows:

- 1550 mamsl – Western Basin;
- 1467 mamsl – Central Basin; and
- 1 280 mamsl – Eastern Basin.

This means that the water level in the Western Basin will need to be lowered from its current level at surface to approximately 160 m below surface (Shaft No. 8). For the Central Basin it will mean building pumping facilities such that the water can be maintained at 150 m below surface (at the lowest lying shaft) and for the Eastern basin to keep the water table at 270 m below surface (at the lowest lying shaft).

Based on their due diligence investigation, BKS, made the following recommendations for the short term management of AMD:

- Western Basin:
  - Abstraction of AMD via installed pumps at Shaft No. 8 Shaft to achieve the ECL;
  - Construction of a new HDS treatment plant on the Randfontein Estates site;
  - Construction of a treated water pipeline to a suitable discharge point on the Tweelopiespruit within the Krugersdorp Game Reserve, flowing to the Crocodile River; and
  - Construction of waste sludge disposal pumps / a pipeline to the CPS Pit and the West Wits Pit.
- Central Basin:
  - Abstraction of AMD via installed pumps in the South West Vertical (SWV) Shaft maintain the water level below the ECL level;
  - Construction of a new HDS plant at SWV Shaft;
  - Construction of a waste sludge pipeline to the DRD Gold Crown Knights Gold Plant;
  - Construction of a treated water pipeline to a suitable discharge point on the Elsburgspruit; and
- Eastern Basin:

- Abstraction of AMD via installed pumps in Grootvlei No. 3 shaft to maintain the water level below the ECL level;
- Construction of a new HDS treatment plant adjacent to the Grootvlei No. 3 shaft;
- Construction of a waste sludge pipeline to the DRD Gold Daggafontein Gold Plant for co-disposal on the Daggafontein Tailings Storage Facility (TSF)[2];
- Construction of a treated water pipeline to a suitable discharge point on the Blesbokspruit.
- As part of the due diligence the capital and annual operating cost estimates for the AMD treatment plants for the three basins were calculated. These estimates are shown in Table 1-1 and Table 1-2.

Table 1-1: Capital costs for all three basins

Number	Description	Western Basin	Central Basin	Eastern Basin
1	AMD collection infrastructure	R 40,787,729	R 45,127,500	R 60,096,771
2	AMD treatment plant	R 73,255,525	R 90,631,838	R 108,010,007
3	Neutralised water discharge	R 1,316,400	R 1,172,400	R 1,622,400
4	Sludge handling and disposal	R 1,711,806	R 6,200,000	R 6,800,000
5	Earthworks and pipe work	R 31,008,353	R 46,196,290	R 28,480,441
6	Electrical control and instrumentation	R 25,960,790	R 23,735,832	R 30,856,582
7	Preliminaries and Generals	R 20,884,872	R 25,567,663	R 28,303,944
	Total	R 194,925,475	R 238,631,500	R 264,170,100
	Total (all basins)	R 697,727,075		

[2] This has been amended to include the Grootvlei and Brakpan TSFs.

Table 1-2: Operational costs for all three basins

Number	Description	Western Basin	Central Basin	Eastern Basin
1	O&M on CAPEX	R 3,600,100	R 4,128,600	R 4,571,500
2	Chemical costs	R 31,177,274	R 61,602,829	R 60,444,482
3	Electricity costs	R 13,527,200	R 15,146,600	R 15,520,700
	Total	R 48,304,574	R 80,878,029	R 80,536,682
	Total (all basins)	R 209,719,285		

The Due Diligence for the development and planning of short term AMD management and mitigation measures, was done within the context of accommodating the long term mine water reclamation and reuse from the respective mining basins. The selection of suitable AMD treatment plant sites, the choice of AMD neutralisation technology, the general configuration of infrastructure and pipeline routes and corridors were all undertaken to provide seamless integration with the long-term mine water management.

Based on the conclusions of the due diligence completed by BKS, Digby Wells Environmental was appointed by TCTA to undertake the EIA process for the immediate and short term interventions. Thus far, Digby Wells have announced the project to the public as well as conducted an internal risk assessment for the project, all of which form part of the Scoping Phase of the project. Digby Wells have also engaged with the authorities regarding the legal process to follow and provided Interested and Affected Parties (I&APs) the opportunity to comment on the proposed project.

It must be noted that since the drafting of the Due Diligence Report various changes in terms of project description and infrastructure have been made. This report, therefore, aims to provide the latest project details.

2 LEGISLATIVE REQUIREMENTS AND PLANNING CONTEXT

2.1 Legislative framework

The following legislation and guidelines are applicable to this project and will be considered during the EIA process for the proposed AMD treatment project.

2.1.1 Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)

Section 24 of the Constitutional Act states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that -

i. Prevents pollution and ecological degradation;

ii. Promotes conservation; and

iii. Secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

In support of the above rights, the environmental management objectives of proposed project are to protect ecologically sensitive areas and support sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development in the project areas.

2.1.2 National Environmental Management Act, 1998 (Act No. 107 of 1998)

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) provides for cooperative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state.

NEMA also provides for matters related to sustainable development, which means the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations. To achieve the above objectives, the Act makes provision for the use of the EIA process as a tool for environmentally sound decision-making. The EIA process is regulated in terms of the GN Regulations 543 to 546 (18 June 2010) (“EIA Regulations”).

As the project activities associated with the Witwatersrand AMD project require the upgrading of existing infrastructure and the construction and operation of new infrastructure, a Scoping and EIA study is required to comply with NEMA for the authorisation of listed activities contained in GNR 544 of 18 June 2010 (GNR 544) and GNR 545 of 18 June 2010 (GNR 545) published in terms of Sections 24(2) and 24D of NEMA.

2.1.3 National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA).

A waste licence is also required in terms of GNR 718 of 3 July 2009 (GNR 718) published in terms of section 19(1) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA).

The objectives of the NEMWA Act is to reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. The act also aims to provide for institutional arrangements and planning matters, to provide for the licensing and control of waste management activities and to provide for compliance and enforcement.

With reference to the Witwatersrand AMD Project, the characterisation and classification of the waste sludge streams needs to be done in accordance to the Department of Water Affairs' *"Minimum Requirements for Handling, Classification and Disposal of Hazardous Waste"* (DWAF, 1998) and a DEA memorandum dated June 2009.

The Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste (DWAF, 1998) is generally used to determine the hazard rating of waste materials relating to the National Water Act 1998 (Act 36 of 1998) and the partly repealed Environmental Conservation Act 1989 (Act 73 of 1989). The DEA is in the process of revising the waste classification system for South Africa. The final Draft Waste Classification and Management Regulations (WCMR) have been published for comment in September 2010. After finalization, these regulations will be promulgated in terms of the National Environmental Management Waste Act, 2008 (Act 59 of 2008) (NEMWA). These will be integrated during the EIA/EMP phase of this project.

2.1.4 The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) controls Indigenous Biological Resources. NEMBA provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities.

2.1.5 National Water Act, 1998 (Act No. 36 of 1998)

According to the National Water Act, 1998 (Act No. 36 of 1998) (NWA), a water resource is not only considered to be the water that can be extracted from a system and utilised but the entire water cycle. This includes evaporation, precipitation and entire aquatic ecosystem including the physical or structural aquatic habitats, the water, the aquatic biota and the physical, chemical and ecological processes that link water, habitats and biota. The entire ecosystem is acknowledged as a life support system by the NWA.

According to van Wyk et al. (2006) the "…*resource is defined to include a water course, surface water, estuary and aquifer, on the understanding that a water course includes rivers and springs, the channels in which the water flows regularly or intermittently, wetlands, lakes and dams into or from which water flows, and where relevant, the banks and bed or the system*."

In terms of the AMD project DWA have directed TCTA in terms of section 103 (2) of the NWA to undertake the emergency works. The directives issued to TCTA are attached in Appendix B.

2.1.6 Environment Conservation Act, 1989 (Act No. 73 of 1989)

The aim of the Environment Conservation Act, 1989 (Act No. 73 of 1989) is to provide for cooperative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith. The Act also includes aspects related to the protection of freshwater systems stating that appropriate environmental investigations are mandatory before approval for the "…*construction or upgrading of dams, levees or weirs affecting the flow of a river*…" will be given by the relevant authority.

2.1.7 Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)

The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) provides for control and conservation of the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of the soil, water sources and vegetation and the combating of weeds and invader plants; and for matters connected therewith. Land owners are obliged, by law, to eradicate alien vegetation on their properties.

For the purpose of the proposed AMD project, the relevant soil and agricultural assessments will be undertaken in order to minimise potential impacts on the agricultural potential or productivity of the sites affected by the project.

2.1.8 National Heritage Resources Act, 1999 (Act No. 25 of 1999)

The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) devolves responsibility for the identification of local heritage resources and the inclusion of heritage areas to all municipalities in South Africa. Developers need to incorporate the NHRA and gain approval from the relevant heritage authorities or municipalities before construction may commence.

2.1.9 National Environmental Management: Air Quality Act

The National Environmental Management: Air Quality Act, (Act No. 39 of 2004). (NEMAQA) forms part of the law regulating air quality. The law aims to provide guidance to protect the environment by providing reasonable measures for the prevention of pollution and ecological

degradation and for securing ecologically sustainable development, while promoting justifiable economic and social development. The act also aims to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.

2.1.10 The National Nuclear Regulator Act, No. 47 of 1999

The National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) aims to provide for the establishment of a National Nuclear Regulator in order to regulate nuclear activities. The act also aims to provide for safety standards and regulatory practices for the protection of persons, property and the environment against nuclear damage and to provide for matters connected therewith. The Department of Minerals and Energy is responsible to service the Minister's obligations arising from this act, which relates to the governance of the nuclear industry in South Africa and internationally in the specific areas of nuclear technology, nuclear safety and nuclear non-proliferation.

With reference to the Witwatersrand AMD Project, the water currently decanting in the Western Basin is contaminated with heavy metals. If no action is taken in the near future the same fate awaits decanted water in the Central and Eastern Basins. Amongst the heavy metals contained in the AMD contaminated water is Naturally Occurring Radioactive Materials (NORM), of which uranium and its daughter products (radium, polonium and lead) are the main radiological contaminants. Radiological risks are deduced from the radiation doses the receiving environment receives. As part of the EIA process, a Radiological Assessment will be undertaken to determine the associated risks and potential mitigations.

2.1.11 Minerals and Petroleum Resources Development Act (No 28 of 2002)

Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) primarily aims to make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources.

In addition, the MPRDA acknowledges that some mining areas have an interconnected or integrated health, safety, social or environmental impacts that need an integrated approach. Subsequently, the relevant mitigation, monitoring and managed measures in and around the mining areas need to be considered through a holistic approach for Witwatersrand AMD project. The environmental management plan for the existing mining areas must be substantial and contain all relevant section outline in Chapter 2 of the MPRDA (*Mineral and Petroleum, Social and Environmental Regulations Part 3 : Environmental Regulations for Mineral Development, Petroleum Exploration and Production 52; Environmental management plan*).

2.2 Policies, guidelines and conventions

In addition to the regulations and guidelines discussed in this chapter, the guidelines and policies of the following organisations will be taken into consideration during the EIA Phase:

- Guidelines implemented by the South African National Biodiversity Institute (SANBI), responsible for exploring, revealing, celebrating and championing biodiversity;
- Guidelines of the World Wildlife Foundation (WWF) South Africa, which aims to conserve the biodiversity assets (endangered wildlife, species, habitats and ecosystems) of South Africa and ensure natural ecosystems and their services are appropriately valued and integrated into sustainable development;
- The International Union for Conservation of Nature and Natural Resources (IUCN) Red List, which is based on information from a network of conservation organisations to rate which species are most endangered;
- Convention Concerning the Protection of the World Cultural and Natural Heritage initiated by the United Nations Educational, Scientific and Cultural Organisation (UNESCO). The Convention aims to protect and conserve the world's natural and cultural heritage. As custodian of unique cultural and natural heritage, South Africa has the responsibility to ensure the identification, protection, conservation, presentation and transmission of cultural and natural heritage sites for future generations;
- The Convention on Biological Diversity that is dedicated to promoting sustainable development. Conceived as a practical tool for translating the principles of Agenda 21 into reality, the Convention recognises that biological diversity is no only centred around plants, animals and ecosystems, but includes people and their need for food security, medical care, fresh air and water, shelter and a clean and healthy environment in which to live; and
- The Convention on International Trade in Endangered Species (CITES) which governs international trade in wild animals and plants.
- The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

2.3 Directives issued to TCTA

The Minister of Water and Environmental Affairs stated in the directive (Appendix B) to TCTA that the unmanaged AMD situation poses a severe environmental and safety threat to the environment and adjacent surface area as it may cause the following:

- The contamination of surface streams leading to catastrophic ecological disaster;
- Flood urban areas and destroy infrastructure;
- Pose a safety risk by undermining businesses and property around the mines;
- Pollute adjacent groundwater resources; and

- Pose threats to neighbouring mines due to water migration.

TCTA were tasked to implement the project which was:

- Installation of pumps to extract water from the mines to on-site treatment plants;
- Construction of an on-site water treatment plant in each basin with the option of refurbishing and upgrading existing plants owned by the mines;
- Installation of infrastructure to convey treated water to nearby water courses; and
- Operation of the pump stations and treatment works.

The directive requires TCTA to liaise with the DWA regarding the longer term AMD management objectives and to ensure compatibility of the project with future AMD management measures.

In order to enable TCTA to implement the immediate and short term steps DWA Gauteng Regional Office further directed TCTA regarding the disposal of sludge arising from the immediate solutions as follows:

- S21G To dispose of the sludge into the West Wits Pits (WWP) together with slime from Mogale City up to surrounding ground level. There are a number of conditions attached to this directive to ensure that potential impacts are understood and that monitoring takes place; and
- S21F TCTA also received a directive from the DWA to discharge the treated water to the Tweelopiespruit at a point above the Krugersdorp Game Reserve. There were a number of conditions on quality which this discharge has to meet as well as requirements for monitoring of both surface and groundwater.

2.4 Application process

Due to activities under both NEMA and NEMWA being applicable to the project an integrated application has been made to the Department of Environmental Affairs (DEA) as provided for in section 24L of the NEMA and section 44 of the NEM:WA.

Authorisation and communication with regards to the project will be by the DEA as required when an integrated application is submitted.

The listed activities which were applied for include listed activities 9, 11, 13, 18, 23, 28, 37 and 39 of GNR 545 and listed activities 3, 5 and 10 of GNR 545. Category A waste management activity 19 and Category B waste management activities 1, 6, 7 and 9 as contained in GNR 718 has been identified as waste management activities that require waste management licences.

It is in terms of these listed activities that TCTA is conducting the studies and processes as detailed in this scoping report.

The relevant departmental reference number for the application is listed in Table 2-1.

Table 2-1: DEA and NEAS reference number

DEA REF. NO.	NEAS REF. NO.
12/1220/2403	DEA/EIA/0000498/2011

The listed activities which will be triggered by the proposed project in terms of the EIA Regulations are detailed in Table 2-2 below.

Table 2-2: Listed activities applicable to the proposed project

GN. R	ACTIVITY	DESCRIPTION
544	9.	The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water – i. With an internal diameter of 0.36 metres or more; or ii. With a peak throughput of 120 litres per second or more, Excluding where: a) Such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or b) Where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.
544	11.	The construction of: i. Canals; ii. Channels; iii. Bridges; iv. Dams v. Weirs vi. Bulk storm water outlet structures; vii. Marinas; viii. Jetties exceeding 50 square metres in size; ix. Slipways exceeding 50 square metres in size; x. buildings exceeding 50 square meters in size; or xi. Infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line
544	13.	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.
544	18.	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from:

GN. R	ACTIVITY	DESCRIPTION
		i. A watercourse; ii. The sea; iii. The seashore; iv. The littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater – but excluding where such infilling, depositing, dredging, excavation, removal or moving i. Is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant authority; or ii. Occurs behind the development setback line
544	23.	The transformation of undeveloped, vacant or derelict land to – i. Residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or ii. Residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares.
544	28.	The expansion of existing facilities for any process or activity where such expansion will result in the need for a new, or amendment of, and existing permit or license in terms of national or provincial legislation governing the release of emissions or pollutions, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the Act will apply.
544	37.	The expansion of facilities or infrastructure for the bulk transportation of water, sewage or storm water where: a) The facility or infrastructure is expanded by more than 1 000 metres in length; or b) Where the throughput capacity of the facility or infrastructure will be increased by 10% or more – Excluding where such expansion: i. Relates to transportation of water, sewage or storm water within a road reserve; or ii. Where such expansion will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.
544	39.	The expansion of i. Canals; ii. Channels; iii. Bridges; iv. Weirs; v. Bulk storm water outlet structures; vi. Marinas;

GN. R	ACTIVITY	DESCRIPTION
		Within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, where such expansion will result in an increased development footprint but excluding where such expansion will occur behind the development setback line.
Listing Notice 2: List of Activities Identified in Terms of Sections 24(2) and 24D for which Scoping and an Environmental Impact Assessment is Required.		
545	3.	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.
545	5.	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.
545	10.	The construction of facilities of infrastructure for the transfer of 50 000 cubic metres or more water per day, from and to or between any combination of the following: i. water catchments, ii. water treatment works, or iii. impoundments. Excluding treatment works where water is to be treated for drinking purposes.
List of Activities Identified in Terms of GN R 718 of the National Environmental Management: Waste Act, Act 59 of 2008		
CATEGORY A A person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct a basic assessment process, as stipulated in the environmental impact assessment regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as part of a waste management Licence application.		
Construction, expansion or decommissioning of facilities and associated structures and infrastructure		
718	19	The expansion of facilities of or changes to existing facilities for any process or activity, which requires an amendment of an existing permit or license or a new permit or license in terms of legislation governing the release of pollution, effluent or waste.

GN. R	ACTIVITY	DESCRIPTION
CATEGORY B A person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct an environmental impact assessment process, as stipulated in the environmental impact assessment regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as part of a waste management licence application.		
Storage of hazardous waste		
718	1	The storage including the temporary storage of hazardous waste in lagoons.
Treatment of waste		
718	6	The treatment of hazardous waste in lagoons.
718	7	The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15 000 cubic metres or more.
Disposal of waste on land		
718	9	The disposal of any quantity of hazardous waste to land,

2.4.1 Section 24G application

Due to the rising water levels in the Central Basin and the fact that decant is already occurring in Western Basin, it is likely that the construction of the water treatment plants in these basins will commence prior to the finalisation of this EIA.

It was initially proposed that a section 28 directive be issued by the DEA, in terms of which both the immediate and short term solutions may lawfully continue as a parallel process in obtaining the necessary environmental authorisations in respect of NEMA and NEMWA. Section 28(1) provides that "*Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment*." Section 28(4) provides that: "*The Director-General or a provincial head of department may, after consultation with any other organ of state concerned and after having given adequate opportunity to affected persons to inform him or her of their relevant interests, direct any person who fails to take the measures required under subsection (1) to—*

> *(a) investigate, evaluate and assess the impact of specific activities and report thereon;*
>
> *(b) commence taking specific reasonable measures before a given date;*

(c) diligently continue with those measures; and

(d) complete them before a specified reasonable date:

Provided that the Director-General or a provincial head of department may, if urgent action is necessary for the protection of the environment, issue such directive, and consult and give such opportunity to inform as soon thereafter as is reasonable."

The directive, however, can only be issued to the offender or the entity that caused the pollution or degradation to the environment, which TCTA are not. By commencing with activities, as listed in Table 2-2, before authorisation has been received, TCTA would be initiating illegal activities which would require a rectification of these unlawful actions. This would, therefore, require the submission of a section 24G application in terms of NEMA.

Section 24G reads *"On application by a person who has committed an offence in terms of section 24F(2)(a) the Minister, Minister of Minerals and Energy or MEC concerned, as the case may be, may direct the applicant to:*

(a) compile a report containing—

(i) an assessment of the nature, extent, duration and significance of the consequences for or impacts on the environment of the activity, including the cumulative effects;

(ii) a description of mitigation measures undertaken or to be undertaken in respect of the consequences for or impacts on the environment of the activity;

(iii) a description of the public participation process followed during the course of compiling the report, including all comments received from interested and affected parties and an indication of how issues raised have been addressed;

(iv) an environmental management programme; and

(b) provide such other information or undertake such further studies as the Minister or MEC, as the case may be, may deem necessary.

(2) The Minister or MEC concerned must consider any reports or information submitted in terms of subsection (1) and thereafter may—

(a) direct the person to cease the activity, either wholly or in part, and to rehabilitate the environment within such time and subject to such conditions as the Minister or MEC may deem necessary; or

(b) issue an environmental authorisation to such person subject to such conditions as the Minister or MEC may deem necessary.

(2A) A person contemplated in subsection (1) must pay an administrative fine, which may not exceed R1 million and which must be determined by the competent authority, before the Minister or MEC concerned may act in terms of subsection (2)(a) or (b).

(3) A person who fails to comply with a directive contemplated in subsection (2)(a) or who contravenes or fails to comply with a condition contemplated in subsection (2)(b) is guilty of an offence and liable on conviction to a penalty contemplated in section 24F(4).”

The EIA process for the Eastern Basin, however, should be completed before construction commences as the water level is considerably lower than that of the Central Basin.

3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

3.1 Digby Wells Environmental

Digby Wells was appointed by TCTA as the independent Environmental Assessment Practitioner (EAP) responsible for undertaking the EIA process for the proposed immediate and short term interventions for the treatment of AMD in the Western, Central and Eastern Basins. Digby Wells is a South African company with international expertise in delivering comprehensive environmental and social solutions for clients in diverse sectors including the energy, minerals, and mining industries. A company profile has been attached to this report as Appendix C.

3.2 Project team

A team of environmental and social specialists were commissioned to conduct the relevant tasks associated with the Scoping Phase of the project. The specialists and their roles are listed in Table 3-1 below. Copies of their CVs have been attached to this report as Appendix D.

Table 3-1: Digby Wells project team

ASPECT	SPECIALIST	QUALIFICATIONS AND COMPETENCY
Project sponsor	Graham Trusler	1983-1986 BSc Chemical Engineering (UN) 1987-1988 MSc Engineering (UN) 1991 B Comm (Unisa) Professional Engineer
Project manager and Environmental Assessment Practitioner (EAP)	Grant Beringer	2004 – 2006: MSc Environmental Management –UJ 2002 – 2003: BSc (Honours) Geography and Environmental Management (*Cum Laude*) – RAU 2000 – 2002: BSc Earth Sciences – RAU
Project administrator	Marike de Klerk	2008: MSc Geography – UJ 2006: BSc (Honours) Geography and Environmental Management (*Cum Laude*) – UJ 2003 – 2005: BSc Geography and Environmental Management – UJ
Public Participation	Steve Horak	2005: BA Masters Environment and Society – University of Pretoria 1999: BA Honours Development Administration – University of South Africa 1994: BA Applied Anthropology-Development studies – University of Pretoria

4 PROJECT DESCRIPTION

4.1 Project background

In the Western Basin, the AMD started to decant from an old shaft in September 2002. AMD in the Central and Eastern Basins will decant in the next few months or years, and thus, urgent action is required to mitigate or prevent AMD decanting uncontrolled or untreated into the environment. In 2010, Cabinet appointed an IMC to address the serious challenges posed by AMD in the Witwatersrand Gold Fields area. The IMC tasked a Technical Committee, to investigate the AMD issues. The Technical Committee subsequently appointed a team of experts, who developed and presented a draft report on AMD to Cabinet on 9 February 2011. The report recommended three interventions for the management of AMD.

- Firstly, an immediate intervention, to neutralise acid water already decanting from the Western Basin;
- Secondly, a short term intervention, by pumping water from the Western, Central and Eastern Basins to prevent surface decant and to neutralise this water before release into the environment; and
- DWA is currently considering the implementation of the third intervention, a long term intervention, which includes the removal of salts from AMD water.

In addition to the above mentioned interventions the IMC recommended that water ingression into the mine workings, be investigated and reduced wherever possible.

The first two interventions, namely the immediate and short term interventions, are to be the first phases of the long term intervention for AMD. The objective of this first phase is to maintain the underground water levels below the ECL, in the Central and Eastern Basin and to stop the decant in the Western Basin by reducing the water levels below the ECL.

The ECL is governed by the geology and the mining voids in the basins. Due to the presence of dolomite formation in the Western and Eastern Basins, the ECLs in these basins have been selected in order to protect the formations which contain significant aquifers. In the Central Basin there are no sensitive aquifers, however, by maintaining the water level below the chosen ECL, groundwater users would be protected against contamination of their water. The ECLs for the three basins are shown in Table 4-1.

Table 4-1: ECLs for the three basins

Basin	ECL (mamsl)
Western	1 550
Central	1 467
Eastern	1 280

The water levels in the Central and Eastern Basins are currently below the ECL, however, water is decanting on surface in the Western Basin. The water level will, therefore, need to be drawn done below the ECL in the Western Basin.

The primary aim of the short term intervention for the treatment of AMD from the Western, Central and Eastern Basins of the Witwatersrand is, therefore, to treat the mine water to a level that it can be discharged to the environment, with tolerable impacts on downstream water users. This requires neutralisation of the acidic mine water and precipitation and removal of heavy metals.

4.2 Need and desirability for the project

Although the problem of AMD has been known for many years, little has been done to provide for a solution to its management. As stated AMD started to decant in the Western Basin in 2002 and has largely been flowing into the environment untreated. This provides an indication of what the impacts could be if nothing is done about its management and treatment. If left to its own devices, this decant will continue indefinitely, causing a host of environmental and socio-economic impacts, some of which have already been realised. The Central and Eastern Basins have yet to decant, but, it is predicted that AMD will flow to surface there in 2013 and 2015 respectively. It is this scenario which led the IMC to suggest that intervention is urgently required should we wish to mitigate and manage negative impacts on the surrounding environments of the Witwatersrand Gold Fields.

The immediate intervention on the Western Basin is required to increase the pH of the water currently flowing into the Tweelopiespruit, and to reduce the salt load and dissolved heavy metals. Rand Uranium is currently treating approximately a third of the flow from the old workings while the remainder is allowed to flow untreated into the environment. The ecological effects of this untreated effluent have been very well publicised.

4.2.1 Process and timing

Due to the rising water levels in the Central and Eastern Basins it is critical that interventions to prevent the decant of AMD, as is occurring in the Western Basin, are implemented. The relevant time constraints and processes to address the issue are described below.

4.2.1.1 Western basin

The immediate intervention will involve the upgrade and retrofitting of the existing Rand Uranium treatment plant. The upgrade will allow the plant to neutralise the current decant volumes, thereby, extracting the majority of the heavy metals, before the water is released into the environment. The upgrade of the Rand Uranium treatment plant will be funded by TCTA, however, the responsibility of its operation is that of Rand Uranium. The upgrade of the plant will, therefore, be handled with an amendment to the original Environmental Management Programme Report for Rand Uranium. In addition to the immediate intervention, it has been proposed that a short term intervention be put in place order to ensure the desired ECL is achieved.

Water is decanting at an annual average of approximately 30 Ml/day. For the short term solution it is proposed to lower the level of water in the workings and to bring it to a level where it will not affect surrounding aquifers. In order to achieve this more water will need to be pumped out until the ECL is reached. It is also proposed that this water will be treated through an HDS Plant, prior to its release into the environment. The simultaneous operation of the immediate and short term plants will provide for the treatment of sufficient volumes of AMD to ensure that the ECL, which is approximately 165 m below surface at Shaft No. 8, can be reached within 2- 3 years after commissioning of both the Immediate and Short Term solutions. Thereafter, the Rand Uranium plant will be decommissioned and only the short term plant will operate in isolation to maintain the water level below or at the ECL.

4.2.1.2 Central Basin

Water within this basin is rising and in order to prevent this water from decanting at surface similar to what is occurring in the Western Basin there are plans in place to pump the water in order to ensure that the ECL is not exceeded. It is also proposed to treat this water in a HDS plant. The ECL for the Central Basin was found to be 150 m below the East Rand Proprietary Mines (ERPM) Cinderella East Shaft collar level (1 617 m) or 1 467 mamsl (186.2m below SWV). It has been estimated that the ECL will be reached in August 2012 and that if intervention did not occur decant would occur in March 2013.

4.2.1.3 Eastern Basin

Water within this basin is rising and in order to prevent this water from decanting at surface similar to what is occurring in the Western Basin there are plans in place to pump the water in order to ensure that the ECL is not exceeded. It is also proposed to treat this water in a HDS plant. The ECL for the Eastern Basin was found to be 1 280 mamsl. It has been estimated that the ECL will be reached in April 2015 and that if intervention did not occur decant would occur in September 2015.

Due to the imminent decant in the Central and Eastern Basins and the current decant in the Western Basin it is clear that intervention is required. The IMC Report proposed that the following recommendations be implemented to prevent AMD decanting:

- Installation of pumps to extract AMD from the mines to on-site treatment plants;
- Construction of on-site water treatment plants in each basin, with the option of refurbishing and upgrading existing treatment facilities owned by the mines; and
- Installation of infrastructure to convey treated water for discharge into nearby water courses.

4.2.2 The long term solution

To achieve the recommendations from the IMC report, it was proposed to establish the immediate and short terms interventions as phase 1 of the long term sustainable solution. Any long term solution needs to be sustainable and in order to achieve this, relevant technology for the indefinite treatment of and use of the product water must be employed. The objective of the long term treatment technology is to neutralise as well as desalinate the AMD to achieve potable or other standards. There may be other uses for the treated water.

The technologies to realise this are available, however, investigation into what type of technology is used must be conducted to ensure the long term feasibility of the solution. In addition the long term solution must be financially viable and not be a burden on Government and its resources. To ensure this, institutional arrangements must be put in place where the government and private entities contribute to the sustainable operation of the long term solution. It is, therefore, crucial that the long term solution is thoroughly investigated in terms of the technology used and that the financial implications are well understood before its implementation. To bring the long term solution into operation before decant occurs is, therefore, improbable and it would be negligent of Government to do so without the necessary investigations and consultations.

The development and implementation of short term infrastructure will take the long term management of AMD into account. The proposed HDS technology will form part of the long term solution as the long term treatment of AMD will require neutralisation to occur prior to any form of desalination.

4.2.3 Water quality

With the construction and operation of the proposed short term treatment plants, the water quality will be improved considerably as opposed to letting it decant naturally without treatment. The mine water from all three basins is acidic with a high metal content and high salinity. The Western Basin's water has been measured to have a Total Dissolved Salts (TDS) concentration of above 7,000 mg/l (most of which is sulphate and calcium) and a pH of 3.4. The water in the Central Basin shows TDS concentrations of 7,700 mg/l and a pH of 2.3, whereas the Eastern basin has TDS levels of 5,500mg/l and a higher pH of 5, as shown in Table 4-2.

The proposed short term treatment will aim to neutralise free and metal acidity to neutral pH, as well as allow for the removal of metals from the AMD in the form of metal hydroxides to within DWA standards. The precipitation and removal of the uranium from the water will also

occur during the short term treatment of AMD. Although desalination will occur during the short term treatment it will be limited. It is proposed that the treated water will have a pH of 6 – 9 before release. Iron concentrations will be reduced from an average of 651.5 mg/l across the basins to < 1. Uranium levels will be decreased to < 50 µg/l and sulphates to < 2400 mg/l (currently the average across the basins is 4343.67 mg/l) reducing the TDS levels of the treated water (Table 4-3). The objectives of the short term treatment are therefore to:

- Neutralise the mine water and produce a near-neutral treated mine water with some residual buffer capacity in the form of alkalinity;
- Remove the main metals, specifically iron, aluminium and manganese to acceptable short-term discharge standards;
- Remove radionuclides, specifically uranium to acceptable short-term discharge standards; and
- Achieve a degree of desalination by removing gypsum (CaSO4) in excess of the saturation levels.

Table 4-2: Expected water quality by basin before treatment

Water quality Parameter	Units	Western Basin (95^{th} percentile)	Central Basin (95^{th} percentile)	Eastern Basin (flooded condition)
TDS	mg/ℓ	7,174	7,700	5,500
Conductivity	mS/m	548	730	450
Calcium (Ca)	mg/ℓ	461	580	550
Magnesium (Mg)	mg/ℓ	345	380	230
Sodium (Na)	mg/ℓ	139	150	325
Sulphate (SO_4)	mg/ℓ	4,556	5,200	3,275
Chloride (Cℓ)	mg/ℓ	65	260	260
pH*	-	3.4	2.3	5.0
Acidity ($CaCO_3$)*	mg/ℓ	2,560	2,425	750
Iron (Fe)	mg/ℓ	933	1,000	370
Aluminium (Aℓ)	mg/ℓ	54	50	1
Manganese (Mn)	mg/ℓ	312	60	10

Water quality Parameter	Units	Western Basin (95th percentile)	Central Basin (95th percentile)	Eastern Basin (flooded condition)
Uranium (U)	mg/ℓ	0.2	--	--

pH values are for 5th percentile

Table 4-3: Target mine water discharge standards

Water Quality Variable	Units	Concentrations
pH	-	6-9
Iron	mg/ℓ	<1
Manganese	mg/ℓ	<3
Aluminium	mg/ℓ	<1
Uranium	µg/ℓ	<50
Sulphate	mg/ℓ	<2,400

4.2.4 Water quantity

By implementing the short term intervention it is likely that the water levels will remain below the ECLs in the Central and Eastern Basins mitigating potential environmental impacts. The ECL associated with each of the mining basins is defined as “the mine water level below which, the risk of negative impacts on the shallow economically exploitable groundwater resources and the surrounding surface water resources is small.” Should the water levels in the Central and Eastern Basins be left to rise above the ECL and decant, there is the real risk that the weathered and fractured aquifers in the Central and the dolomitic formations in the Eastern Basin will be contaminated by AMD. The water level in the Western Basin needs to be lowered to prevent the spread of pollution.

4.2.5 Technology

Treatment technology and chemical reagent combinations recommended for the treatment of the Witwatersrand AMD is as follows:

- Oxidation by aeration;
- Pre-neutralisation with limestone;
- Neutralisation and metals removal with lime, produced by the slaking of quicklime; and
- Gypsum crystallisation to remove excess sulphate from solution.

The HDS Plants to be constructed for the short term intervention are based on technology that is proven to be effective (and cost effective) in the treatment of AMD at full-scale applications. Other neutralising chemicals can be used but these are generally a lot more expensive than limestone and lime.

The HDS process is seen as an active process and more suited to the treatment of AMD than passive treatment. Passive treatment systems have been tried and tested but they are mainly implemented for treating low flow systems and diffused flow systems, as stated in the International Network for Acid Prevention's (INAP) Global Acid Rock Drainage Guide. They are generally unsuitable for large flows.

The HDS plants will also be required as part of the long term treatment of AMD as neutralisation of the AMD will be required prior to desalinisation. The treatment plants for neutralisation must, therefore, have a high level of reliability in order to serve the proposed mine water reclamation plants for a long time. The HDS technology has been identified to provide this reliability in the long term.

4.2.6 Location

The locations of the short term plants were evaluated by BKS during their Due Diligence study. The locations of the plants were assessed based on the needs of the long term solution too. The site selection considered the following:

- Availability of land on an uncompromised site with favourable geotechnical conditions, off the dolomitic formations;
- Central location from the perspective of future reclaimed water distribution to Rand Water and municipal reservoirs;
- Good access and supply of bulk services, such as electrical power;
- Feasible and practical options for long-term waste sludge disposal;
- Flexibility in terms of neutralised water discharge;
- An estimate of the space requirement for the future long term scheme was made and any land procured for the short term intervention must provide sufficient land for implementation of a long term scheme;
- Sludge handling will be a long term requirement and the short term solution has thus reviewed how sludge can be handled in the long term (30+ years). The long-term requirements need to be analysed and discussed with the various mines; and
- Consideration of where the potential connection to the potable water system would be, i.e. by reviewing potential water demand and water distribution reservoirs. Detailed water distribution and master planning needs to be part of the long term solution.

4.2.7 The no-go option

Should the immediate and short term intervention for the treatment of AMD from Witwatersrand Goldfield Basins not proceed, untreated AMD will continue to decant in the Western Basin and untreated and uncontrolled AMD decant will start in the Central and Eastern Basins. The uncontrolled decant of AMD into the environment may have devastating ecological and social impacts in the respective areas, which will eventually spread to the Vaal River and Crocodile River systems. The Witwatersrand AMD Project, therefore, needs to be implemented to mitigate and prevent additional impacts of AMD. The IMC Team of Experts report indicated that underground water levels needed to be kept below an ECL and that the water needs to be treated before being released back into the environment. Maintaining water at the ECL levels will prevent future AMD decanting and prevent the flooding of lower level aquifers.

4.3 Project location

For the immediate intervention, the Rand Uranium water treatment plant will be upgraded in the West Rand. For the short term intervention, new water treatment plants will be constructed in three areas (Plan 2):

- The Randfontein Estates area - Western Basin;
- The ERPM South West Vertical Shaft area - Central Basin; and
- The Grootvlei Mine Shaft No.3 area - Eastern Basin.

It has been proposed that the disposal of the sludge takes place at the following existing TSFs:

- West Wits Pit – Western Basin;
- The Brakpan TSF – Central Basin; and
- Brakpan, Grootvlei and/or Daggafontein TSFs – Eastern Basin.

The abstraction of AMD water will take place at the following shafts:

- Rand Uranium Shaft No. 8 – Western Basin;
- ERPM South West Vertical Shaft – Central Basin; and
- Grootvlei No. 3 Shaft – Eastern Basin.

4.3.1 Land tenure

The portion numbers and owners of the land on which the infrastructure for the short term intervention for the AMD project are to be constructed is summarised in Table 4-4.

Table 4-4: Land Tenure for the treatment infrastructure

Basin	Farm Name	Portion Number	Name of Landowner
AMD Abstraction			
Western	Uitvalfontein 244 IQ	Remainder	Randfontein Estates Limited
Central	Driefontein 87 IR	Remainder of Ptn 1	Witwatersrand Gold Mining Realisation Trust
Eastern	To Be Confirmed	TBC	TBC
Treatment Plants			
Western	Randfontein 247 IQ	Ptn 1 R/E	Western Areas Limited
Central	Driefontein 87 IR	Remainder of Ptn 1	Witwatersrand Gold Mining Realisation Trust
Eastern	TBC	TBC	TBC
Discharge Points			
Western	Waterval 174 IQ	Remaining Extent	No data available
Central	Driefontein 682 IR	Remainder	Shanike Inv No 55 Pty Ltd
Eastern	TBC	TBC	TBC

Note: TCTA have yet to procure the land from DRD Gold for the construction of the treatment plant and abstraction infrastructure on the ERPM South West Vertical Shaft area. Agreements have also yet to be reached between Mogale Gold, DRD Gold and Grootvlei Gold Mine (or liquidators thereof) for the use of the West Wits Pits, Brakpan and/or Daggafontein TSF and the Grootvlei TSF for the storage of sludge respectively. In addition, agreements with Rand Uranium and Grootvlei Mine (or liquidators thereof) for the treatment plant and abstraction infrastructure have not been concluded.

The Witwatersrand Gold Fields are divided into four basins; the Far Western Basin, Western Basin, Central Basin and Eastern Basin. The immediate and short term interventions, however, focus on the Western, Central and Eastern Basins (Plan 1). Details of the locations of each basin are detailed below and illustrated in Figure 4-1.

4.3.2 Western Basin

The Western Basin is located in the Krugersdorp, Witpoortjie and Randfontein areas. The mine lease areas in the basin cover about 57 km². Mintails is active in the basin area with re-mining of old tailings dams and dumps. Rand Uranium is also re-mining selected sand dumps and is planning to reclaim slimes dams and commence possible underground mining. Past mining in the basin has created an underground mine void volume of approximately 43 Mm^3 at ECL. The cessation of mining in the basin has resulted in progressive flooding of the void since 1997, until water started to decant from an old shaft in September 2002. The decant points are all located in the north-western section of the Old Randfontein Estates Mine. A portion of the decanting mine water is intercepted at the decant point referred to as the Black Reef Incline Shaft (BRI) and pumped to a mine water treatment facility, namely the Rand Uranium treatment plant, before being released to the Tweelopiespruit. The combined treated and untreated AMD flows down the Tweelopiespruit towards the Crocodile River West. Approximately one third of the decant is currently being treated at the Rand Uranium treatment plant.

4.3.3 Central Basin

The Central Basin extends from Durban Roodepoort Deep (DRD) in the west to ERPM in the east. The mine lease areas in the basin extend cover about 251 km^2. The study area consists of 12 underground mines, with only Central Rand Gold (CRG) mining the Consolidated Main Reefs property still operational. There are numerous surface operations reclaiming sand dumps and slimes dams. Mining has created an underground mine void volume of approximately 280Mm^3 at ECL. The underground mines are interconnected, but due to the elevations of the holings between the mines, the Central Basin can be divided into four sub-compartments, DRD sub-compartment, Rand Leases sub-compartment, Central sub-compartment and ERPM sub-compartment. If allowed to fill, however, it can be expected that all the water will run to the east and will decant from one or more shafts on the ERPM property.

4.3.4 Eastern Basin

The Eastern Basin covers the East Rand area, including the towns of Boksburg, Brakpan, Springs and Nigel. The mine lease areas in the basin cover about 768 km^2. In 2010, the last operational deep-level gold mine in the Eastern basin, Grootvlei Gold Mine, ceased operation due to bankruptcy. Therefore, only Gold One, who is operating a mine close to Nigel, is still operating in the Eastern Basin. They have also recently, purchased the Grootvlei Gold Mine and may plan future mining there. Mining has created an underground mine void volume of approximately 400Mm^3 at ECL. The mining basin comprises three sub-basins: Sallies, Eastern and Brakpan. However, at the current water level and in future at the ECL, the sub-compartments operate as a single basin. It has been estimated that the ECL will be reached in August 2012 and that if intervention did not occur decant would occur in March 2013.

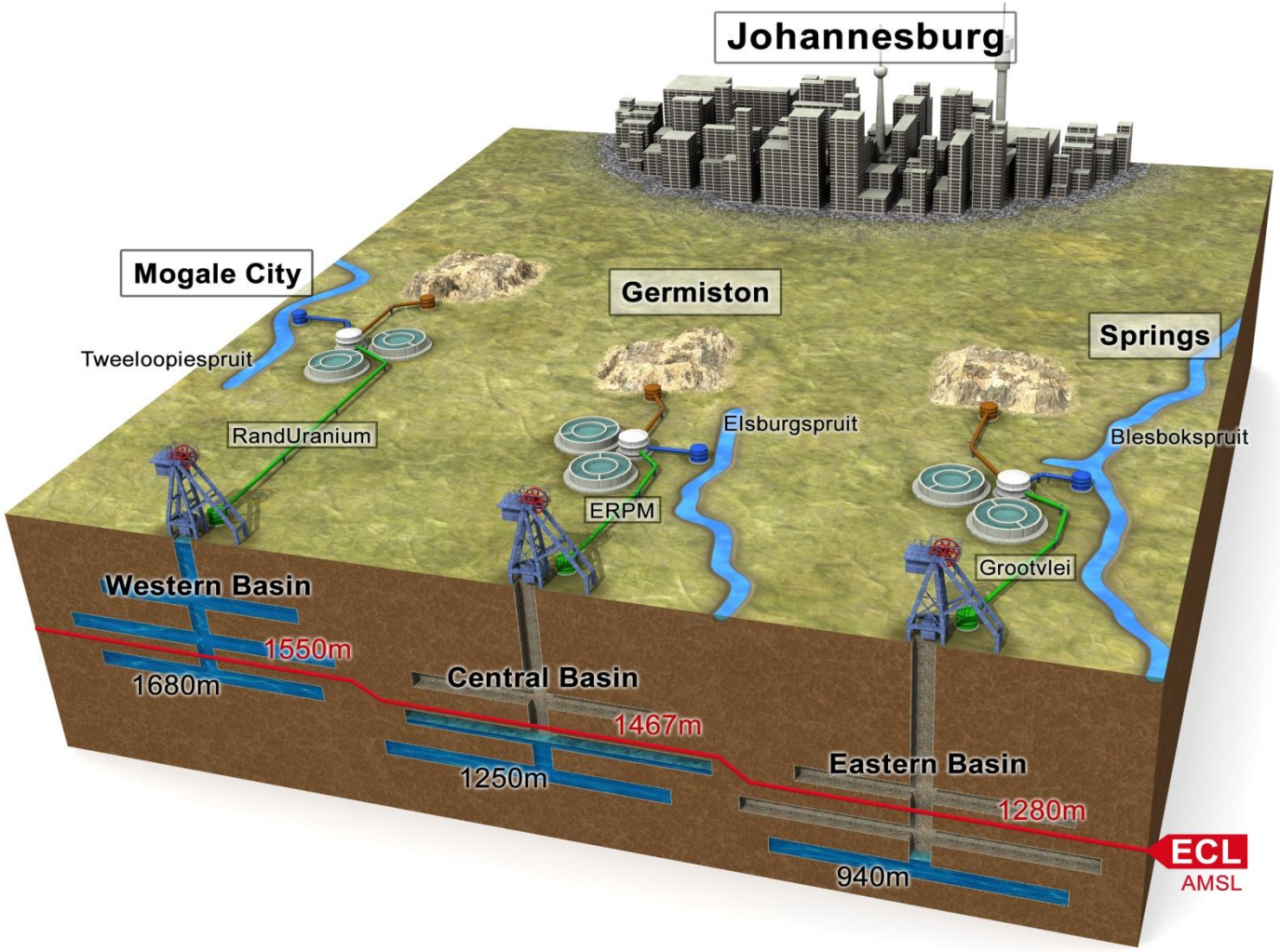

Figure 4-1: The locations of the proposed treatment plants and the water levels of the three basins.

4.4 Treatment technology

Through the due diligence process, the following treatment technology and chemical reagent combinations are recommended for the treatment of the Witwatersrand AMD:

- Oxidation by aeration;
- Pre-neutralisation with limestone;
- Neutralisation and metals removal with lime, produced by the slaking of quicklime; and
- Gypsum crystallisation to remove excess sulphate from solution.

The HDS treatment technology has been selected to treat the AMD during the immediate and short term interventions.

The HDS process generally involves the following:

- Addition of an alkali, typically lime in the slaked lime or un-slaked lime form;
- Aeration to oxidise the iron and manganese;
- Neutralisation of the free and metal-related acidity;
- Precipitation of the metals in the hydroxide or carbonate form;
- Solids separation and production of clear neutralised water; and
- Handling and disposal of waste sludge, which mainly contains metals hydroxides and gypsum.

The HDS process is recognised as the preferred method of treating mine water containing high metal concentrations. This process has been well known for a number of years and has been applied at a number of mines worldwide and in other industries with similar waste waters such as the steel producing and pickling plants.

It allows for neutralisation of acidic waters, the removal of metals and a large proportion of the dissolved salts. A number of other processes can do the same but the reason the HDS process has been implemented on a large scale is because it can produce a relatively dense sludge, thus, reducing sludge volumes and assisting with the management and disposal of this sludge.

A South African innovation which has been introduced into the proposed project is to save costs (without affecting the treatment process) by conducting the initial neutralisation with limestone and then only using slaked lime for the subsequent stages of neutralisation.

The proposed process, shown in Figure 4-2 requires the oxidation of dissolved ferrous iron (Fe^{2+}) and manganese in the AMD through aeration. The oxygen will be introduced by mechanical aeration equipment. If this stage does not occur the Fe^{2+} will not be oxidised prior to the introduction of an alkali, the lime/limestone particles may become coated with precipitation product and, therefore, be less effective.

The next stage of the process is pre-neutralisation with limestone ($CaCO_3$) to increase the pH before the neutralisation stage. During neutralisation, lime produced by the slacking of quicklime will be used. Unslaked quicklime has to be slaked ($Ca(OH)_2$) or hydrated prior to application. This requires slaking equipment that mixes water with quicklime under controlled conditions as the reaction is exothermic. Through the neutralisation of the AMD the pH is adjusted to a level which facilitates the formation of metal precipitates. Table 4-5 shows the pH condition where certain metal hydroxides have minimum solubility.

Table 4-5: Minimum metal hydroxide solubility pH

Metal	pH at minimum solubility
Ferric iron (Fe^{3+})	3.5
Antimony (Sb^{2+})	4.2
Aluminium (Al^{3+})	4.5
Lead (Pb^{2+})	6.5
Copper (Cu^{2+})	7.0
Ferrous iron (Fe^{2+})	8.0
Zinc (Zn^{2+})	8.5
Nickel (Ni^{2+})	9.3
Cadmium (Cd^{2+})	10.0
Manganese (Mn^{2+})	10.6

By elevating the pH, the process facilitates the precipitation of sulphate as gypsum ($CaSO_4$). The precipitated gypsum sludge is recycled to seed and enhance the further precipitation of gypsum on sludge seed particles and, thus, increase the removal efficiency.

After neutralisation the water will flow into a clarifier where sufficient reaction time will be allowed to provide the slow growing metal hydroxide and gypsum crystals time to form and grow, which creates a dense sludge.

The treated and neutralised water resulting from the process will then be discharged into the receiving streams.

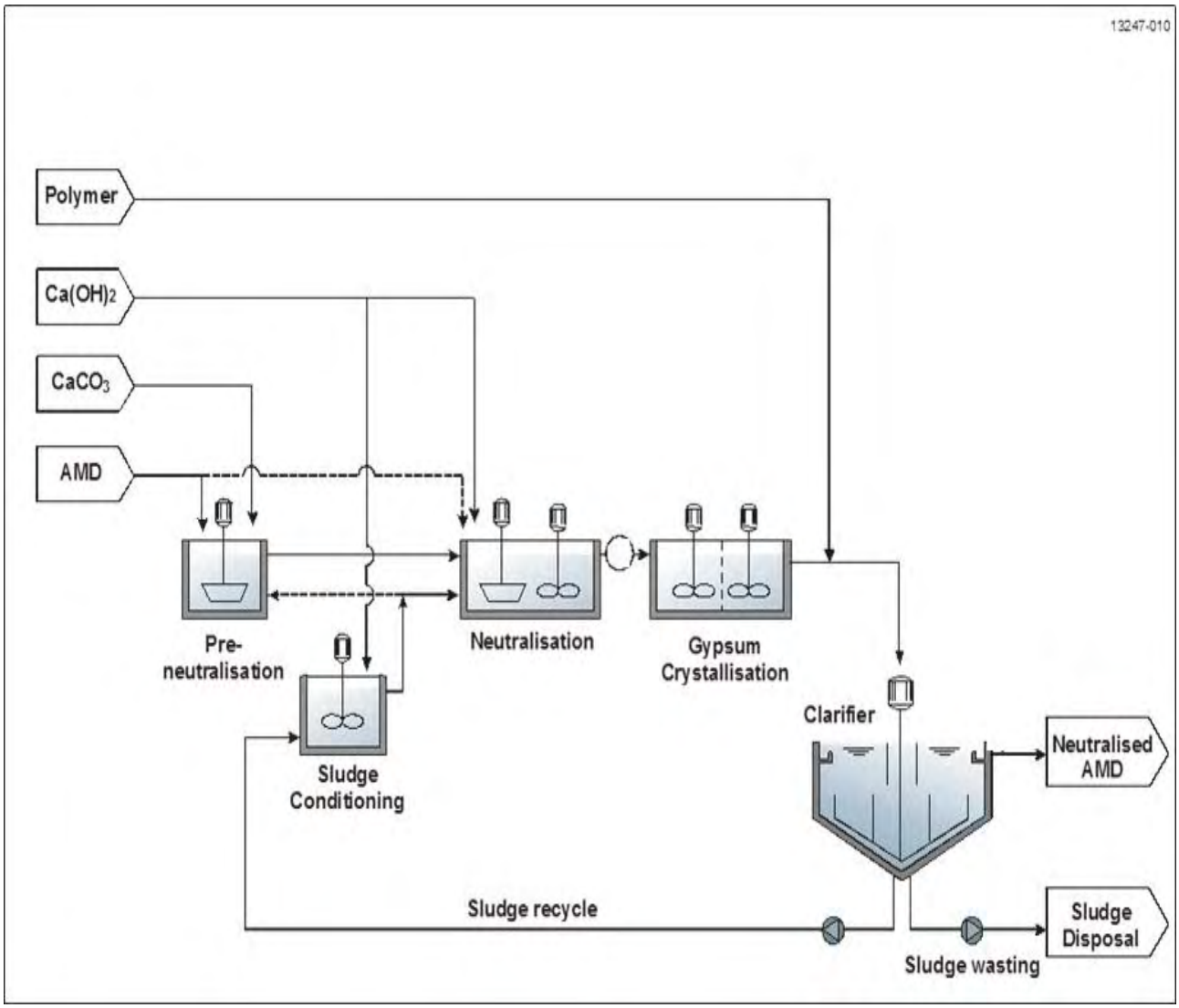

Figure 4-2: The proposed HDS process for the treatment of AMD for the immediate and short term interventions

4.5 Preliminary project layout and design

4.5.1 Conceptual site layout

The construction of infrastructure will comprise of:

- Infrastructure around the shafts (for the abstraction of AMD);
- HDS treatment plants at each basin;
- Pipeline construction to various streams (for discharge);
- Pipeline construction to treatment works from the point of abstraction;
- Pipeline construction to sludge disposal areas (sludge disposal); and

- Roads and areas used for transportation and access (servitudes).

Construction activities will be confined to the designated project areas, as defined by the Engineer (BKS). Details of each Basins conceptual layout are given below.

4.5.1.1 Western Basin

4.5.1.1.1 Immediate intervention - Plan 3

The existing Rand Uranium Water Treatment Plant is in close proximity to the abstraction point, Shaft No. 8. Close geographical location to the abstract point is essential due to the potential for oxidation, scaling and corrosion occurring within the pipelines.

- No additional development is foreseen. Existing facilities will be refurbished and upgraded; therefore, the footprint of the existing facility will not be increased;
- Access to the site will be along existing roads;
- Electrical power supply is currently being supplied to the site by existing overhead power lines;
- Potable water and reagent make up water (2 Ml/day) will be supplied from the existing Rand Water supply line; and
- Sewage on site will be disposed of in the existing conservancy tank.

4.5.1.1.2 Short term intervention - Plan 4

The treatment plant will consist of two independent trains, each comprising a sludge conditioning tank, a pre-neutralisation tank, a neutralisation tank, a gypsum crystallisation tank and a clarifier / thickener. Other than these main unit processes, other ancillary treatment infrastructure includes:

- Chemical dosing (quick lime, limestone and polyelectrolyte);
- Pumps and equipment for the sludge recycle system;
- Sludge pipeline to the disposal facility; and
- Buildings for the electrical equipment.

4.5.1.2 Central Basin

The treatment plant will consist of two independent trains, each comprising a sludge conditioning tank, a pre-neutralisation tank, a neutralisation tank, a gypsum crystallisation tank and a clarifier / thickener. Other than these main unit processes, other ancillary treatment infrastructure includes:

- Chemical dosing (quick lime, limestone and polyelectrolyte);
- Pumps and equipment for the sludge recycle system;

- Sludge retention tank (one-day storage to allow for breakdown / maintenance at Knights plant);
- Treated water retention tank (one hour storage as pump sump for potential mine use of the water);
- Sludge pipeline to the disposal facility; and
- Buildings for the electrical equipment.

The general position of the site infrastructure is shown in Plan 5.

4.5.1.3 Eastern Basin

The treatment plant will comprise three independent trains, each consisting of a sludge conditioning tank, a pre-neutralisation tank, a neutralisation tank, a gypsum crystallisation tank and a clarifier / thickener.

Other than these main unit processes, other ancillary treatment infrastructure includes:

- Chemical dosing (quick lime, limestone and polyelectrolyte);
- Pumps and equipment for a sludge recycle system;
- A sludge retention tank (one-day storage to allow for breakdown / maintenance at the receiving plant);
- A treated water retention tank (one-hour storage as pump sump for potential use of the water);
- Waste sludge pipeline to transport the sludge to the storage facility; and
- Buildings for the electrical equipment.

The location of the treatment plant and proposed discharge pipeline is shown in Plan 6.

4.5.2 Electricity supply

4.5.2.1 Western Basin

The proposed plant is adjacent to an Eskom sub-station and power will be obtained directly from Eskom. The electrical power supply voltage will be stepped down to 400V to supply electricity to the various Motor Control Centres (MCCs).

4.5.2.2 Central Basin

There is an Eskom sub-station on site and power will be obtained directly from Eskom. The electrical power supply voltage will be 6.6 kV to the pumps, but will be stepped down to 400 V to supply electricity to the treatment plant's various MCCs.

The following electrical infrastructure will be required at the plant:

- Mini-substation, rated for current use and pumps to future treatment works;

- A Low Voltage (LV) Room, including auxiliary items such as a control desk and remote control via fibre optic back to the control building; and
- Electrical controls and protection.

4.5.2.3 Eastern Basin

There are Eskom power lines close to the proposed site and power will be obtained directly from Eskom. The electrical power supply voltage will be 6.6 kV to the pumps, but will be stepped down to 400 V to supply electricity to the treatment plants various MCCs.

The following electrical infrastructure will be required at the plant:

- A mini-substation, rated for current use and pumps to future treatment works;
- A LV Room, including auxiliary items, control desk and remote control via General Packet Radio Service (GPRS) or fibre optic back to the control building; and
- Electrical controls and protection.

4.5.3 Site access

4.5.3.1 Western Basin

The existing access road to the North-East Shaft and to the electrical sub-station can be upgraded and used to access the treatment plant site.

4.5.3.2 Central Basin

An access road to the south of the SWV site will provide good access for the regular delivery of lime by larger trucks. The road is through an industrial area and the additional traffic load will be negligible.

4.5.3.3 Eastern Basin

A new access road to the east of the site is proposed as it will be a good access point for the regular delivery of lime by larger trucks. The road is through a rural / farming area and the additional traffic load will have to be considered in terms of the disturbance to local residents.

4.5.4 Water supply

4.5.4.1 Western Basin

A water connection will be installed from the municipal bulk distribution system that supplies the area.

4.5.4.2 Central Basin

A water connection will be installed from the municipal bulk distribution system that supplies the industrial area.

4.5.4.3 Eastern Basin

A municipal water supply will be preferred; but if this is not available, a borehole will be drilled into the dolomite to provide potable water to the site. A small package plant for filtration and disinfection will be provided.

4.6 Project activities

The activities to be undertaken during the phases of the proposed project and their estimated timeframes are briefly described below. The construction phase of the proposed short term intervention is not anticipated to take longer than 14 months (Western and Central Basins) and 18 months (Eastern Basin). The construction phase, however, may commence prior to the completion of the EIA and it may, therefore, be required to submit a section 24G application.

4.6.1 Western Basin

4.6.1.1 Immediate intervention

Immediate intervention measures will include the upgrading and retrofitting of the existing Rand Uranium water treatment plant by bringing the plant's additional treatment trains back into operation. The upgrade of the Rand Uranium water treatment plant requires a number of construction activities. The activities for both the construction and operational phases required for the immediate intervention are listed below. .

- Installation pipelines for the abstraction of water from Shaft No. 8;
- Abstraction of water from Shaft No. 8;
- Treatment of the AMD;
- Pumping of treated sludge to the CPS pit;
- Sludge removal from CPS pit and disposal in the West Wits Tailings Deposition site; and
- Discharge of treated water from the CPS pit into the existing outflow trench before joining the Tweelopiespruit.

With reference to the activities discussed above, Figure 4-3 presents a schematic illustration of the immediate intervention in the Western Basin.

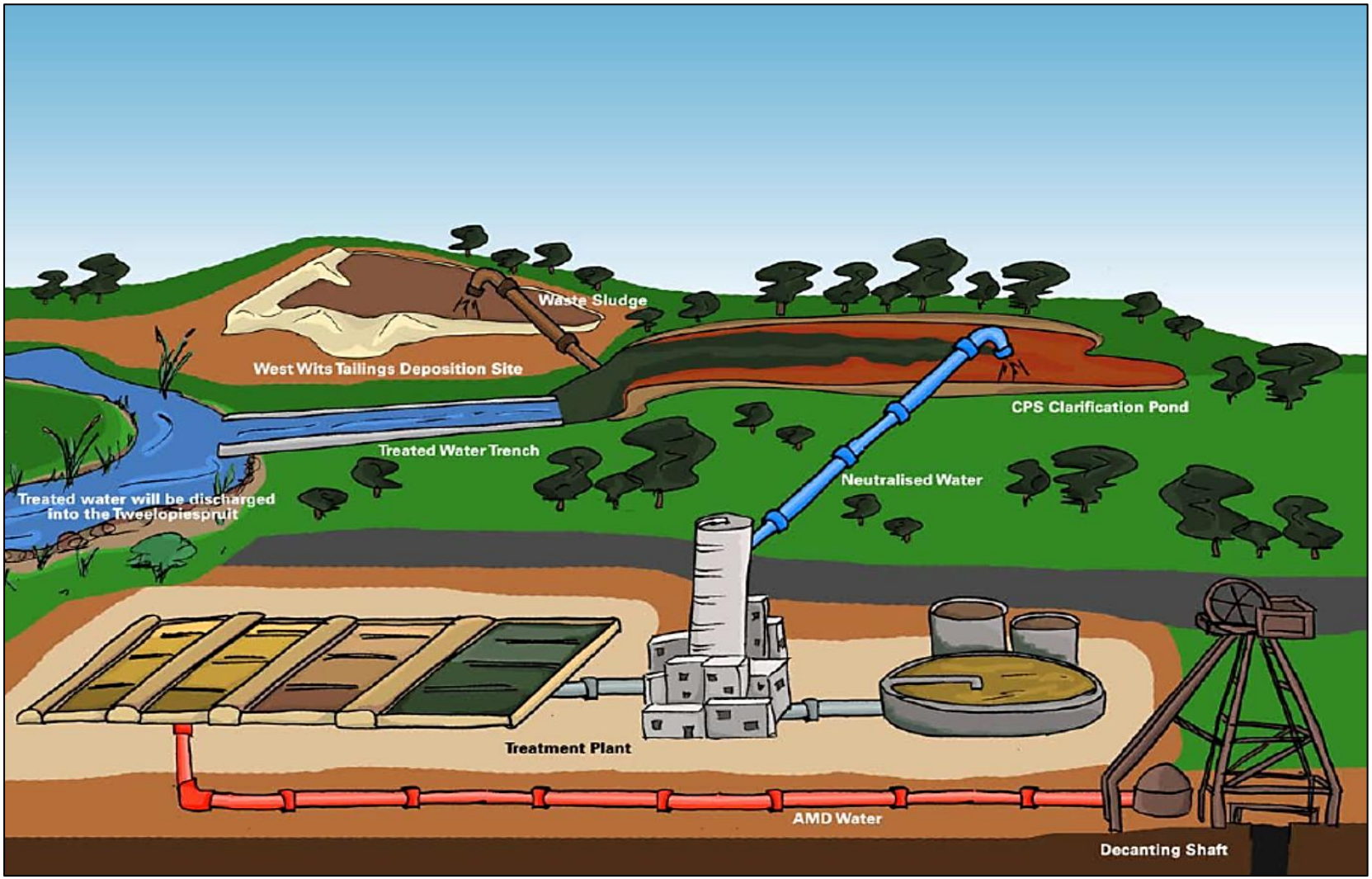

Figure 4-3: Immediate intervention – Western Basin

4.6.1.2 Short Term intervention

The short term intervention activities for the Western Basin will include:

- Abstraction of AMD via pumps installed in Shaft No. 8 to achieve the ECL;
- Construction and operation of a new HDS treatment plant on the Randfontein Estates site;
- Construction and operation of a treated water pipeline to a suitable discharge point on the Tweelopiespruit within the Krugersdorp Game Reserve; and
- Construction and operation of waste sludge disposal pumps and pipeline to the West Wits Pit.

4.6.2 Central Basin

The activities for the short term intervention will include:

- Abstraction of AMD via pumps installed in the SWV Shaft to retain the water level beneath the ECL;
- Construction and operation of a new HDS plant adjacent to the SWV Shaft;
- Construction and operation of a waste sludge pipeline to the Crown Knights Gold processing plant;
- Construction and operation of a treated water pipeline to a suitable discharge point on the Elsburgspruit; and
- The potential for the construction and operation of a waste sludge pipeline to the DRD Gold Knights (Crown) Gold Plant, with a view to deposit on the Brakpan TSF. It is not known whether existing pipelines to the facility will be used or whether a new pipeline will need to be constructed.

4.6.3 Eastern Basin

The short term intervention activities for the Eastern Basin will include:

- Abstraction of AMD via pumps installed in Grootvlei No. 3 shaft at a pump depth to retain the water level beneath the ECL;
- Construction and operation of a new HDS treatment plant adjacent to the Grootvlei No. 3 shaft;
- The possible construction and operation of a waste sludge pipeline to the Brakpan, Daggafontein and/or Grootvlei TSF; and
- Construction and operation of a treated water pipeline to a suitable discharge point on the Blesbokspruit.

The short term intervention activities can, therefore, be divided into four categories:

- The abstraction of AMD from an existing shaft;
- The construction and operation of an HDS plant which will result in the discharge of neutralised water into the environment;
- The disposal and storage of the sludge produced by the HDS process; and
- The construction and operation of pipelines for transport of:
  - AMD from the shaft to the HDS plant;
  - Neutralised water to the receiving stream; and
  - Sludge from the HDS plant to the storage facility.

These activities are described in further detail below for the three basins.

4.6.4 Abstraction of AMD

The Due Diligence completed by BKS recommended that the pumps operate using a Variable Frequency Drive (VFD) to maintain the ECL within a narrow band. This will allow the water level in the basin to remain constant, with the benefit that rock containing pyrite is not periodically exposed to oxygen. By utilising a VFD the water level will remain constant and this will achieve the most cost-effective energy utilisation.

The proposed pump depth per basin will be based on the following aspects:

- The minimum depth for installation of the pumps is the ECL;
- The pumps require a minimum depth of water above the pumps (submergence depth) to prevent vortex formation and the introduction of air into the pipe system;
- The pumps should be installed at a depth to take the potential ‘cone of depression’ into account, i.e. the water level change along the basin; and
- The pumps should be staggered both horizontally and vertically to prevent water turbulence interaction between the pumps.

Based on the due diligence findings the following shafts will be utilised to pump the AMD:

- Shaft No. 8 – Western Basin;
- ERPM South West Vertical Shaft – Central Basin; and
- Grootvlei No. 3 Shaft – Eastern Basin.

4.6.4.1 Western Basin

Shaft No. 8 has two open conveyances. Currently one conveyance is being used to abstract water for the Rand Uranium HDS plant and this will remain in use for the duration of the immediate intervention. The second conveyance will be used for the abstraction of water for the new HDS plant at Randfontein Estates.

Two submersible pumps will be used to abstract the AMD and will be suspended from the surface. The headgear, however, will not be suitable to suspend the pumps as it is in a poor condition. It is proposed that a new gantry crane within a new steel superstructure be installed for this purpose.

The pumps will deliver a peak flow of 35 Ml/d over 24 hours and an average flow of 27 Ml/d (over an 19 hour period) and a static head of 185.2m (short term intervention). The highest pump level at which the pumps will be installed will be 1 530.1 mamsl and the pumps will be designed so the pumps can be installed to 1 500.1 m amsl, with a static head of 215.2m.

4.6.4.2 Central Basin

There is no headgear, and a new steel superstructure with gantry crane will be installed over the shaft to facilitate the installation and maintenance of the pumps.

The recommended installed pump level for flexibility with regard to the water level in the Central Basin will be 1 414 mamsl, with the pipes / pumps being designed to allow installation to 1 384 mamsl. This relates to the a pump with a maximum flow of 84 Ml/d, a best efficiency at a flow of 72 Ml/d (average, for only 19 hour pump time) and a normal static head of 209 m, with the ability to be lowered to increase the static head to 239 m and 269 m.

4.6.4.3 Eastern Basin

Borehole type, thrust balanced pumps will be suspended into the mineshaft. These pumps require minimal surface infrastructure at the shaft head and no access to the mineshaft is required during installation or operation as the pumps are lowered into the mineshaft and suspended on the pipe column.

The headgear is in very poor condition and will need to be removed, and a new steel superstructure with gantry crane will be installed over the shaft to facilitate the installation and maintenance of the pumps.

From the Due Diligence it was recommended that the installed pump level for flexibility of water level within the Eastern Basin should be 1 191 mamsl, with the pipes / pumps designed to allow the pumps to be installed to 1 134 mamsl. This relates to the a pump with a maximum flow of 110 Ml/d, a best efficiency at a flow of 106 Ml/d (average, for only 19 hours pump time) and a normal static head of 313 m, with the ability to be lowered to increase the static head to 379 m and 435 m.

4.6.5 HDS plants and discharge of partially treated water

As discussed above (section 4.6.1.1) the immediate intervention will involve the upgrade and retrofitting of the existing Rand Uranium treatment plant. The short term intervention will comprise the construction of three new HDS plants at Randfontein Estates, SWV Shaft and Grootvlei No. 3 Shaft for the Western, Central and Eastern Basins respectively.

The partially treated water will be discharged into three streams associated with the basins, shown in Plan 7. The details of the discharge points and receiving streams are summarised below.

The infrastructure required for the immediate intervention is listed below:

4.6.5.1 Western Basin

4.6.5.1.1 Immediate intervention

Neutralised water will be pumped back to the existing discharge channel and ultimately discharged into the Tweelopiespruit.

4.6.5.1.2 Short term intervention

Once treated the water in the Western Basin will be released into the Tweelopiespruit (Plan 8), which flows north into the Rietspruit before joining the Bloubankspruit. The Bloubankspruit then joins the Crocodile River, which flows into the Hartbeespoort Dam.

4.6.5.2 Central Basin

In the Central Basin the treated water will be discharged into the Elsburgspruit (Plan 9) which flows to the east of the ERPM SWV Shaft area. The Elsburgspruit flows south towards the Natalspruit which joins the Kilp River. The Klip River flows into the Vaal River above the Barrage. The discharge from the Central Basin is, therefore, entering the Upper Vaal Catchment.

4.6.5.3 Eastern Basin

Like the Central Basin the treated water from the Eastern Basin will be discharged into the Upper Vaal Catchment starting at the Blesbokspruit (Plan 10). The Blesbokspruit flows south and ultimately joins the Suikerbosrant which flows into the Vaal River.

The Due Diligence conducted by BKS noted that the impact on the receiving streams hydraulics would be negligible, with the additional discharge being factors smaller than the 1:25 flood event, as shown in Table 4-6.

Table 4-6: Hydraulic Impacts of the proposed discharge

	Western Basin	Central Basin	Eastern Basin
	Tweelopiespruit	Elsburgspruit	Blesbokspruit
1 in 25 year flood volume	28 m^3/s	96 – 182 m^3/s	429 – 600 m^3/s
1 in 100 year flood volume	37 m^3/s	125 – 237 m^3/s	543 – 761 m^3/s

	Western Basin	Central Basin	Eastern Basin
	Tweelopiespruit	**Elsburgspruit**	**Blesbokspruit**
1 in 200 year flood volume	46 m^3/s	154 – 291 m^3/s	655 – 918 m^3/s
Maximum additional discharge caused by short term intervention	35Ml/d = 0.405 m^3/s	84 Ml/day = 0.972 m^3/s	110 Ml/day = 1.270 m^3/s
Calculated rise in flood water level	0 – 10mm	No change in water level	0 – 10mm

4.6.6 Sludge disposal and storage

Through the HDS process the AMD is neutralised. This decrease in the pH causes the precipitation of heavy metals in the form of a metal hydroxide; this forms the primary sludge stream, along with gypsum (CaSO4).

It has been proposed that this sludge material be co-disposed with mine tailings and stored on existing TSF close to the treatment plants. A description of the proposed storage of the sludge is described below, in Table 4-7, for each basin.

Table 4-7: Sludge volumes and qualities per basin

	Western Basin	Central Basin	Eastern Basin
Treated Volume (Avg - m^3/day)	27,000	57,000	82,000
Sludge Volumes (Normal - m^3/day)	1252	2827	1059
Sludge	15% Solids	15% Solids	15% Solids
Sulphates (mg/l)	46480	56455	67737
Iron (mg/l)	20092	20142	28565
Manganese (mg/l)	6662	1149	542
Aluminium (mg/l)	1143	988	0
Uranium (mg/l)	3	0	0

4.6.6.1 Western Basin

It has been proposed that the sludge produced by both the immediate and short term interventions on the Western Basin be co-disposed with the tailings of Mogale Gold (Plan 11) and stored in the West Wits Pit. The West Wits Pit is currently being used by Mogale Gold to deposit tailings.

It must, however, be noted that no agreement has been reached with Mogale Gold for the use of the West Wits Pit as a storage facility for the sludge produced by the Western Basin HDS plant. It does, however, remain the preferred option.

4.6.6.2 Central and Eastern Basins

The sludge produced by the HDS plants on the Central and Eastern Basins will be stored on an existing TSF.

Sludge produced in the Central Basin will first be pumped to the DRD Gold Crown Knights Gold Plant, 3 km northeast of the SWV Shaft, before being blended with their tailings and pumped to the Brakpan TSF (Plan 12).

In the case of the Eastern Basin the sludge will be pumped via pipeline to one or a combination of the Brakpan, Daggafontein and/or Grootvlei TSFs (Plan 12).

It must, however, be noted that no agreement has been reached with DRD Gold for the use of the Brakpan TSF as a storage facility for the sludge produced by the Central Basin. Furthermore no agreement has been reached with DRD Gold for the use of the Brakpan and/or Daggafontain TSFs for the co-disposal of the sludge produced on the Eastern Basin. No agreement has been reached with Grootvlei (or the liquidators thereof) for the use of the Grootvlei TSFs for the co-disposal of the sludge produced on the Eastern Basin.

4.6.7 Construction and operation of pipelines

A number of pipelines will be constructed for the immediate and short term interventions. The pipelines will be used to transport the AMD, abstracted from the shafts, to the treatment plants. Pipelines will also be constructed to discharge the treated water into the receiving streams, while, other pipelines will be used to carry the sludge produced by the treatment process to the proposed storage facilities. The pipeline routes, specifically for the sludge transport, are yet to be defined. It is, however, suggested that areas or routes suitable for the construction of the pipelines are determined during the EIA process.

Details of the pipelines to be constructed for the immediate and short term intervention, as proposed thus far, are given below and the general routes, where available, are shown on Plans 4, 5 & 6.

4.6.7.1 Immediate and Short Term Western Basin

The pipeline infrastructure already in place at the Rand Uranium treatment plant will be used. This includes a pipeline from Shaft No. 8 to the treatment plant as well as a treated slurry pipeline to the CPS pit, where clarification will take place. A pipeline from the CPS Pit to the West Wits Pit has to, however, be constructed.

A 2.7km pipeline (0.7m diameter) from Shaft No. 8 to the Western Basin HDS plant will be constructed to transport the abstracted AMD. The pipeline for the treated water discharge, 0.6m diameter, will be constructed above ground and will be approximately 6.8 km in length. It has been proposed that the pipeline crosses the R28 and go beyond the Hippo Pool in the Krugersdorp Game Reserve to prevent ingress of neutralised water into the mine void and recharge. The sludge pipeline, a 0.2m diameter, 4.2 km long above ground pipeline, will be constructed from the HDS plant to the West Wits Pit.

4.6.7.2 Central Basin

The pipeline infrastructure on the Central Basin will not be excessive due to the abstraction point and the treatment plant being on the same site. A short (100m) pipeline of a 0.55 m diameter will be constructed to take the AMD water to the treatment plant. The treated water will then be discharged into the Elsburgspruit via a 1.05m diameter, 1.5km long pipeline. This pipeline will follow an existing servitude from the treatment plant to the Elsburgspruit.

It has been proposed that two above ground sludge pipelines be constructed to the DRD Gold Crown Knights Gold Plant. The pipeline route will be approximately 3.8km to the Knights Gold Plant. In so doing the pipeline will cross a railway line twice (one single crossing and one double crossing) as well as Tide Street and the R29, where pipe jacking will take place. It is envisaged that existing pipelines will be used from the Knights Gold Plant to the Brakpan TSF, however, this has not yet been agreed upon.

4.6.7.3 Eastern Basin

The pipeline infrastructure on the Eastern Basin will not be excessive due to the abstraction point and the treatment plant being on the same site. A short (100m) pipeline of a 1.05 m diameter will be constructed to take the AMD water to the to the TSF site have yet to be decided. The use of the Brakpan, Daggafontein and/or the Grootvlei TSFs has not been decided and thus the pipeline routes cannot be defined. It is proposed that suitable routes are identified during the EIA studies for these pipelines.

5 PROJECT ALTERNATIVES

Technological and site layout alternatives for the proposed immediate and short term interventions were identified as part of the Scoping Phase. The “no-go” option (no intervention) was also investigated.

5.1 Treatment technology alternatives

The first phase of treatment technology selected by BKS, following on the recommendations of the Team of Experts, has been the neutralisation and HDS treatment route. It was chosen due to its large scale application around the world for problems of this nature. It is also the treatment technology which was being used by ERPM and Grootvlei to date. This processing route has many potential small modifications to it such as the use of different neutralising agents. It may be possible to use other alkalis such as only lime, sodium carbonate, or sodium hydroxide. The cost however has precluded their use on a large scale for this type of application.

The main process alternative to be considered is why the full scale processing or final treatment was not implemented at this stage. The reasons why it was not recommended as part of the immediate and short term treatment options are that:

- It is expensive and a mechanism must be found as to whom is going to pay for this treatment and how it is going to be performed;
- Institutional arrangements have to be put in place to manage the operation of these facilities and the water resulting from these facilities;
- The construction takes time and something needed to be done as a matter of urgency;
- The standards to which the water should be treated had not yet been decided. It could be to potable standards, industrial standards or for discharge into a stream; and
- Different technologies need to be considered for the different areas.

The list of technology alternatives considered by the Team of Experts and their applicability to the different basins is given in Appendix E.

As stated previously, the long term solution is being investigated as part of another project.

5.2 Abstraction alternatives

5.2.1 ECL

There are questions as to what the optimal ECL is in each basin. Obviously the deeper the water level is kept the more pumping costs are and possibly the more water ingresses into the system. The optimal level needs to be presented in the final EIA report.

In the Eastern and Western basins the idea is to keep the water level below the level of surrounding dolomite compartments and thus ensuring that water flow is always towards the mine workings from these dolomites. This does ensure that the dolomites are not contaminated, however, it does mean that this uncontaminated water will be drawn towards the abstraction points from the dolomites and pumped out as poor quality water.

In the Central basin the aquifers affected are very closely correlated to the reef and do not extend far from the mining areas. This has been confirmed over years as the cone of dewatering is very close to the workings. The ECL is thus more decided on the level to which the groundwater needs to be kept throughout the whole basin as the same level would be found from west to east. At present the ECL has been chosen to be below the floor level of the Gold Reef City underground tour area.

For the Western basin there are a number of important determining levels.

The Hippo Pool is at 1 636 mamsl. The entrance onto Zwartkops compartment is 1 530 mamsl. This is why it has been set it at this level. The bottom of the dolomitic outlier in this area is at 1 570-80 mamsl.

5.2.2 Central Basin - position of dewatering pumps

There have been suggestions that the position of the dewatering pumps needs to be investigated as it may be better to place the pumps or abstraction point nearer the outcrop area to ensure that water quality improves sooner and to prevent highly saline water being drawn from the deeper workings over time. The deeper shafts could act as boreholes into the deeper reaches of the basin and thus poorer quality water could be drawn in as poorer quality of water is expected in the deeper parts of the mine.

Different shafts could also be considered based on the fact that some shaft areas may have more functioning infrastructure than others.

5.2.3 Reducing inflow into the mine workings

This could be achieved in a number of ways but the two categories of prevention could be preventing direct ingression e.g. by preventing surface streams from entering underground workings and secondly by pumping water from aquifers connected to the workings, particularly where there are dolomites. This water should theoretically be cleaner and could be used or discharged. This could be achieved by installing boreholes into the dolomites of the Western and Eastern Basins.

Surface streams could be looked at in areas such as the Blesbokspruit where the water flows over dolomitic areas or areas such as the outlet to Florida Lake where remedial work has already been started.

These items need to be investigated but do not directly form part of this project.

5.3 Sludge disposal alternatives

A number of people have questioned the optimal disposal position for the sludge. In addition to the options proposed there may be alternatives to place the sludge into specially designed and sealed disposal facilities. These will have to be designed such that they can be sustainably closed after operation.

There is also the opportunity to place the sludge on top of unused tailings facilities as this will ensure that geotechnical conditions are understood and that no additional surface area is disturbed.

These items need to be investigated but do not directly form part of this project.

5.4 Treated water discharge alternatives

5.4.1 Water users

There have been a number of suggestions that various companies may be interested in purchasing the water rather than allowing it to discharge directly into the water courses. Whilst the water could be used for reclamation of tailings materials or pumped to other catchments for use such as the platinum mines, however, the amounted needed by the mines and the amounts available need to be determined. The economic cycles of projects often do not correspond with the need to discharge.

This aspect should however be investigated in a lot more detail. It may be very beneficial to link this project to a pipeline to areas or operations requiring water of this type of quality. This would also alleviate the need to treat the water to a potable condition.

It is likely that this will be investigated further by the project team investigating the long term solution.

5.4.2 Discharge point on the Western Basin

It has been suggested by some parties that an alternative to disposing of the water into the Tweelopiespruit needs to be investigated. One possibility would be to discharge the treated water into the Wonderfonteinpruit. This water will then enter the Vaal catchment instead of the Crocodile catchment.

This option needs to be investigated in more detail. There is apparently some initial resistance to the idea of introducing another load of salts into the Vaal river system by the DWA. There is also a concern that some of the water from the Loopspruit may re-enter the groundwater regime over dolomitic ground. There is a pipeline which has been constructed over the dolomitic ground which apparently is running quite full and which would not be able to deal with the additional flow. The pipeline starts at the Peter Donaldson Dam.

6 CURRENT STATUS OF THE ENVIRONMENT

This Chapter provides a description of the status of the biophysical, socio-economic and cultural environment of the three proposed project sites as well as those that are influenced by the project.

Further assessments will be undertaken during the EIA Phase to deepen the understanding of the receiving environment and ensure all impacts are managed accordingly.

6.1 Socio-Economic environment

6.1.1 Study area

6.1.1.1 Western Basin

The watercourse constituting the study area in the Western basin runs primarily from south to north. The proposed water treatment plant will decant into the Tweelopiespruit, which runs for about 5 km, mostly through the Krugersdorp Game Reserve on the western outskirts of Krugersdorp (Mogale City) before flowing into the Rietspruit soon after passing under the N14 highway. From this point the average stream flow sometimes flows underground and sometimes on surface.

The Rietspruit flows into the Bloubankspruit and continues northwards for 60 km before flowing into the Hartbeespoort Dam. At first, it runs parallel to the N14 for 3 km, then passes through a stretch of land dominated by farms, small holdings and a number of hospitality venues (Greensleeves Restaurant, the Maikiti Wedding Venue, Kanjara Lodge) and nature reserves (the Rhino and Lion Nature Reserve, Aloe Ridge Hotel and Game Reserve and Heia Safari Ranch). It then runs under the R512 highway and passes Lanseria, Blair Atholl Golf Estate and the town of Hartbeespoort before entering Hartbeespoort Dam at Port d'Afrique.

6.1.2 Central Basin

The watercourse constituting the study area in the Central basin runs primarily from north to south. The proposed treatment plant for the Central basin will decant into the Elsburgspruit, which runs for some 7 km, through Germiston South, close to Kutalo Station, past Martin du Preezville, and passes under the N17 highway before flowing into the Natalspruit.

The Natalspruit flows for about 75 km before joining with the Vaal River at Vereeniging. It flows between Elspark (to the east) and the industrial area of Wadeville (to the west), past Klippoortjie Agricultural Holdings and Roodekop before flowing under the R103 and the N3 highway. It then runs between Tshongweni township (to the west) and Spruitview (to the east), Mosekele East (on the west) and Vosloorust (on the east), past Ke-Ditselana Tourism Multicultural Village, and between Ap Khumalo and Moleleki townships (to the west and east, respectively). For a stretch of about 4 km, the river's banks are then characterised by

fairly intense subsistence farming by neighbouring communities (Palm Ridge to the west and Zonkizizwe to the east).

It then flows under the R550, passes through a stretch of land characterised by commercial agriculture with pivot irrigation, past Gardenvale Agricultural Holdings, Witkopdorp (Daleside), Henley on Klip, Meyerton and Rothdene, and runs parallel to the Sybrand van Niekerk Freeway for a short stretch before entering Vereeniging where it joins with the Vaal River.

The part of the study area constituted by the Vaal River covers about 30 km. After leaving Vereeniging, it passes Duncanville, Vanderbijlpark, the Emerald Casino Resort, Abrahamsrust and Marlbank River Estate.

6.1.3 Eastern Basin

The watercourse constituting the study area for the Eastern basin also runs predominantly north to south. Its first part, with a length of about 58 km, is the Blesbokspruit. It starts just to the south of the N17 highway and, after a short stretch flanked by agricultural land with pivot irrigation, passes Strubenvale, Daggafontein, Marievale to the west and more commercial farming to the east. It then flows under the R42 (the Nigel-Marievale road) before flowing past Vosterkroon, Nigel, Laversburg, Alra Park and Jameson Park in Heidelberg. At Heidelberg, it flows under the N3 highway, after which it passes Shalimar Ridge, Ratanda and more commercial farms before joining the Suikerbosrant.

The final part of the study area extends for some 50 km before it joins with that of the Central basin at Vereeniging. It passes a stretch of land dominated by commercial farms, passes under the R54, than passes Helderstrome Agricultural Holdings, Van der Westhuizenhoogte Agricultural Holdings and Three Rivers East before joining the Vaal River at Vereeniging.

6.2 Land use

The socio-economic impacts of the project are expected to arise mainly from potential changes in the quantity and quality of water in the watercourses constituting the study area. Consequently, accurate assessment of these impacts will rely heavily on accurate information regarding water uses and riparian land uses along these watercourses.

This section, therefore, presents a preliminary assessment of land uses along the three watercourses representing the study areas for the Western, Central and Eastern basis, respectively. These land uses were identified by means of visual inspection of available satellite imagery, concentrating on a strip of land extending 500 metres to either side of the relevant watercourse.

Land uses within this strip were classified into seven types:

- Industrial;
- Medium- to high-density residential (townships, suburbs, etc.);
- Low-density residential (golf estates, etc.);

- Smallholdings;
- Commercial agriculture;
- Subsistence agriculture; and
- Land on which there is little or no evidence of human occupation.

Examples of each of these land use types are given in Figure 6-1 below.

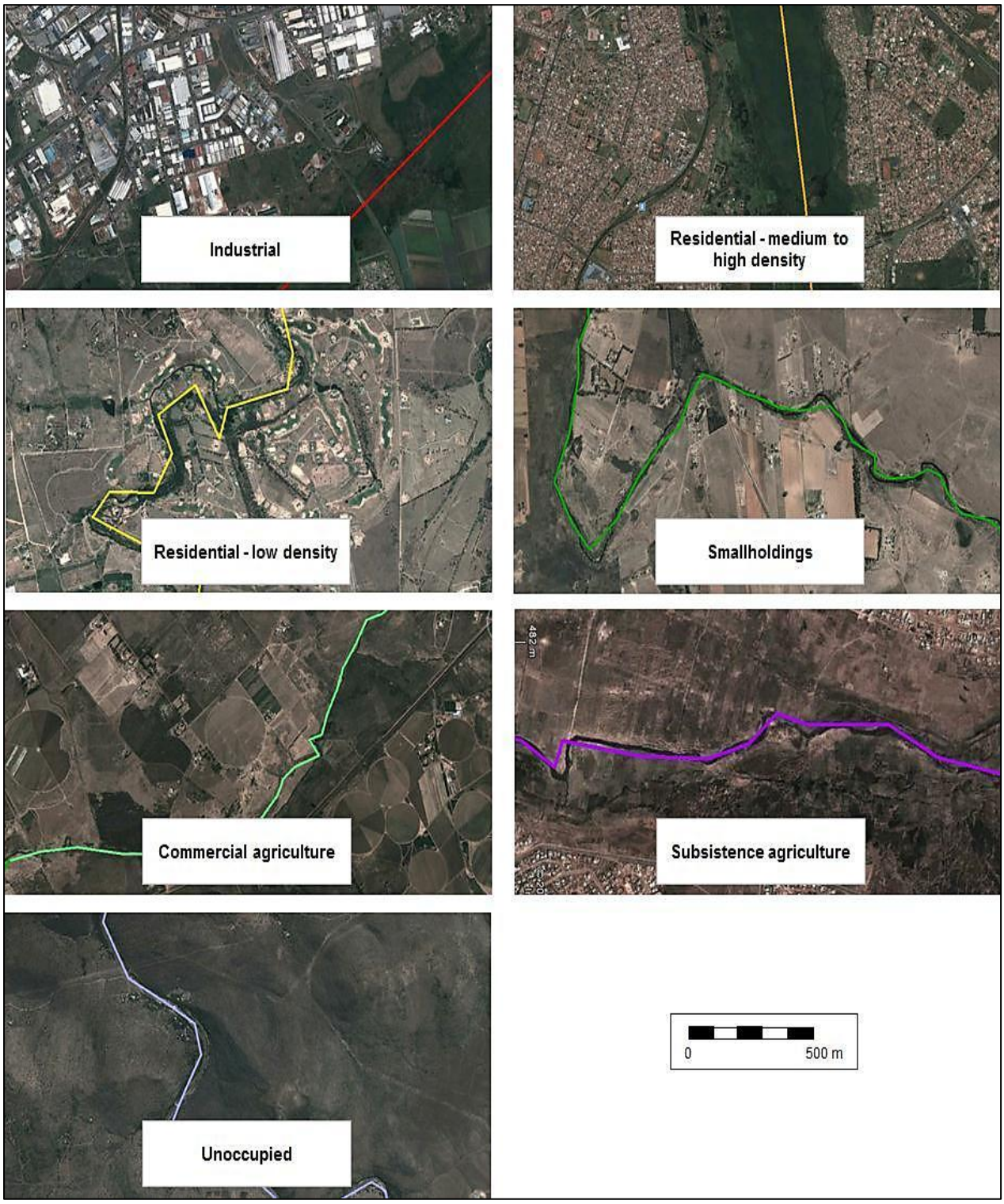

Figure 6-1: Examples of land use types

The resulting characterisation of the three watercourses constituting the study area is shown in Figure 6-2. The length and proportion of each watercourse that is adjoined by the various land use types is given in Table 6-1 and graphically depicted in Figure 6-3.

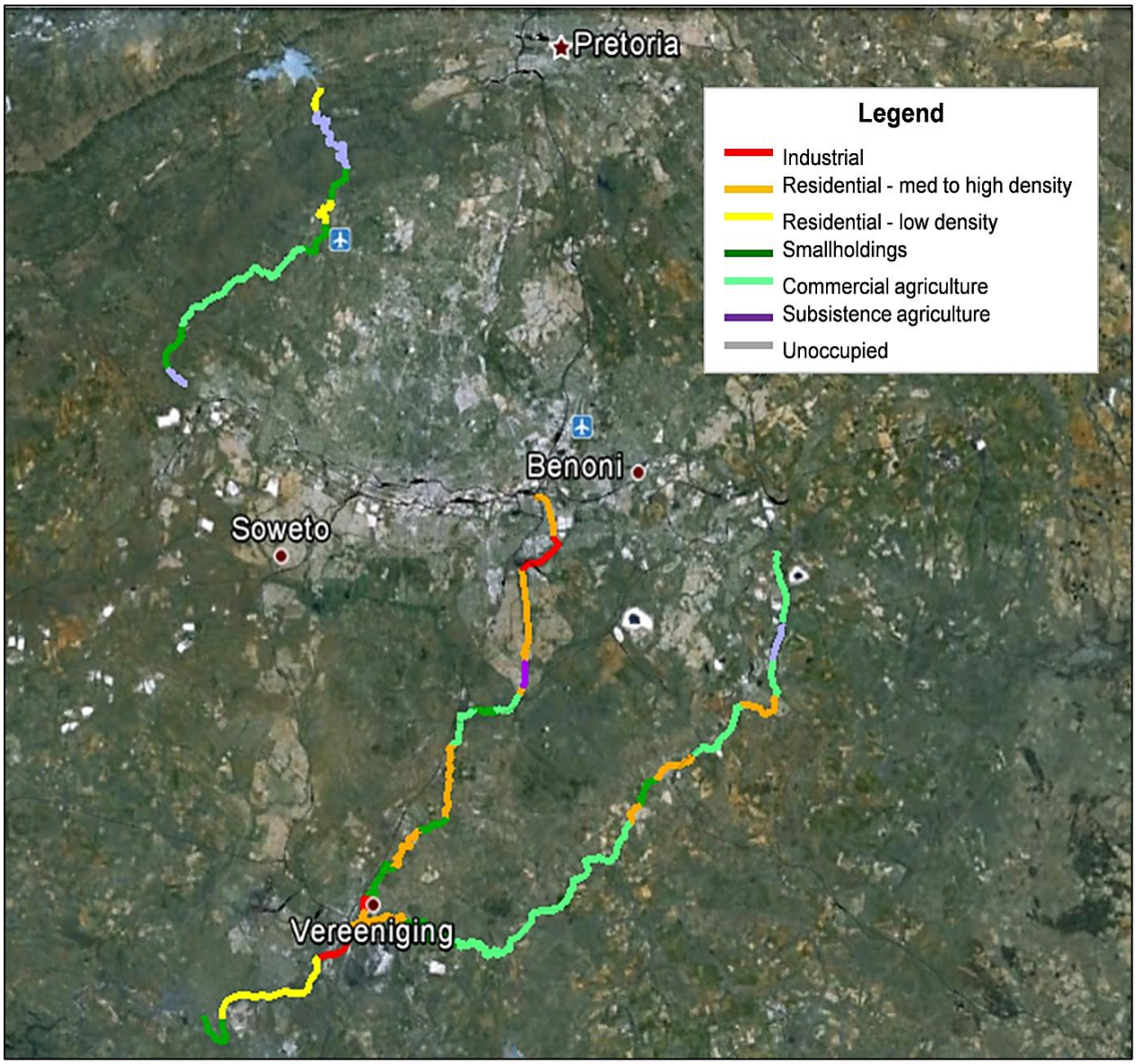

Figure 6-2: Characterisation of the study area in terms of land use

Table 6-1: Lengths of potentially-affected watercourses adjoined by each land use type

Land use type	Western Basin	Central Basin	Eastern Basin	All
Commercial agriculture	22 km *(34%)*	11 km *(10%)*	65 km *(60%)*	98 km *(34%)*
Industrial	-	16 km *(14%)*	-	16 km *(5%)*

Land use type	Western Basin	Central Basin	Eastern Basin	All
Residential - low density	9 km *(14%)*	18 km *(16%)*	-	27 km *(9%)*
Residential - med to high density	-	40 km *(36%)*	23 km *(21%)*	63 km *(22%)*
Smallholdings	18 km *(27%)*	24 km *(21%)*	15 km *(14%)*	57 km *(20%)*
Subsistence agriculture	-	4 km *(3%)*	-	4 km *(1%)*
Unoccupied	16 km *(25%)*	-	5 km *(4%)*	21 km *(7%)*
Total	**65 km *(100%)***	**112 km *(100%)***	**108 km *(100%)***	**285 km *(100%)***

As can be seen from the aforementioned table and figure, the western watercourse is the only one flowing through a significant stretch of unoccupied land, with the remainder being occupied by commercial agriculture, smallholdings and (to a lesser extent), low-density residential areas.

The central watercourse is the only one flanked by an appreciable stretch of industrial area, as well as by some subsistence agriculture, with the remainder being occupied mainly by medium- to high-density residential areas, smallholdings and low-density residential areas.

The eastern watercourse flows mostly through areas dominated by commercial farming, with the remainder of its length being flanked by medium- to high-density residential areas and smallholdings.

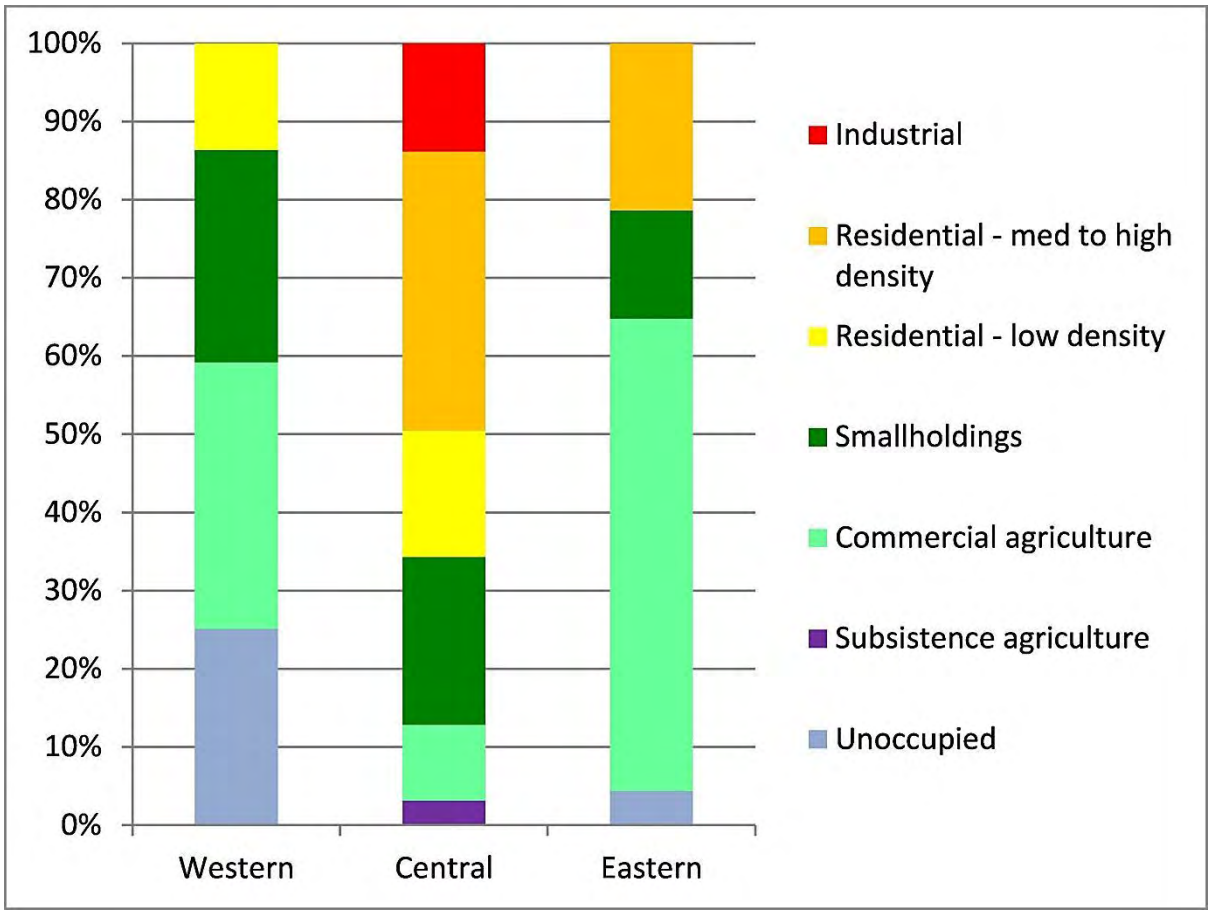

Figure 6-3: Proportion of the three watercourses adjoined by each land use type

6.3 Socio-economic characteristics of the study area

This section provides a preliminary overview of the socio-economic characteristics of the wider community within the project areas. This overview was developed on the basis of available secondary data – in particular, Census 2001 statistics. It is acknowledged that conditions may have changed in the intervening years since 2001; this information will, therefore, have to be updated during the impact assessment phase of this study, either by means of primary data collection or through the results of the 2011 census (depending on availability).

The Census 2001 statistics presented in this section have been aggregated in terms of municipal wards, using the ward delineations that were in effect in 2001. These wards, together with the local or metropolitan municipalities and the provinces to which they belong, are listed in Table 6-2 and illustrated in Plan 13, Plan 14 and Plan 15.

The remainder of this section contains a quantitative profile of these wards based on the demographic characteristics of their resident communities, the education levels of these communities, employment statistics, housing, and access to services and infrastructure.

Table 6-2: Municipal wards traversed by the potentially affected watercourses

Watercourse	Province	Municipality	Ward
Western (from south to north)	Gauteng	Randfontein	8 4 2 1
		Mogale City	18
		West Rand District Management Area	N/A
	North West	Madibeng	28
Central (from north to south)	Gauteng	Ekurhuleni	33 32 36 34 22 28 23 26 25
		Midvaal	4 3 2
		Emfuleni	1 4 6 26
	Free State	Metsimaholo	13 14 16
Eastern (from north to south)	Gauteng	Ekuruhuleni	61 60 88
		Lesedi	6 7 8
		Midvaal	1

6.3.1 Western Basin

Communities along the southernmost parts of the watercourse (Randfontein Municipality Wards 8 and 4) are mostly Afrikaans-speaking (either White or Coloured), with fairly high education and high employment levels (at least among the Afrikaans-speaking community), with most employment being in the community services and wholesale/ retail sectors. These communities are characterised by moderately high income levels. Access to water and sanitation services is relatively high, with most households having flush toilets and piped water in the dwelling.

Slightly further to the north (in Randfontein Municipality Wards 2 and 1), communities are mostly African and Setswana-speaking with lower formal education levels than their southern neighbours. Unemployment is higher than in the White and Coloured communities further south, and income levels are lower. Levels of water and sanitation services are also lower, with some communities relying on piped water in the yard (as opposed to in the dwelling) or community standpipes, and having pit latrines rather than flush toilets. Agriculture represents one of the main sources of employment in these wards

These characteristics are also reflected in the communities further north (Ward 18 of Mogale City and Ward 28 of Madibeng Municipality). However, underdevelopment is more pronounced in the northernmost of these wards, with many households living in informal dwellings, having limited access to water and sanitation services, and low income levels.

6.3.2 Central basin

Wards along the northern part of the watercourse fall into two main categories. Firstly those (Ekurhuleni Wards 22, 28, and 25) which are mostly White or Coloured, Afrikaans- or English-speaking communities with relatively high education, employment and income levels. The economy in these communities is fairly mixed, with most economic sectors contributing to employment, and access to water and sanitation services are good.

These are interspersed with the second category of communities (Ekurhuleni Wards 33, 32, 36, 34, 23 and 26) that have several contrasting characteristics: their population is mostly African, Zulu- or Sesotho-speaking, with fairly low education levels, low employment rates and low incomes. Some of these (particularly in Ekurhuleni Wards 23 and 26) live in informal settlements with limited access to water and sanitation services. Employment in these wards is mostly in the manufacturing and community services sectors.

Further to the south (in Midvaal Municipality Wards 4, 3 and 2, and Emfuleni Municipality Wards 1 and 4), communities tend to be more affluent, with higher education and employment levels (manufacturing being one of the largest sources of employment).

At the last part of the watercourse, a clear contrast is evident between communities on its northern side (Emfuleni Municipality Wards 6 and 26) and those to its south (Metsimaholo Municipality in the Free State Province, Wards 13, 14 and 16). The northern communities are mostly African, Sesotho-speaking, with low education, employment and income levels (most being employed in the wholesale/retail and agricultural sectors), while those to the south are mostly White, Afrikaans-speaking, with high education, employment and income levels (the manufacturing sector being the dominant source of employment).

6.3.3 Eastern basin

Communities along this watercourse can again be grouped into two main categories. Those (Ekurhuleni Wards 61, 60 and 88, Lesedi Ward 8 and Midvaal Ward 1) which are mostly African, Zulu-speaking, with fairly low education levels, low employment rates and low incomes. Some of these (particularly in Ekurhuleni Ward 61 and Lesedi Ward 8) live in

informal settlements, and in most of these communities, access to water and sanitation services is limited. These are interspersed (in Lesedi Wards 6 and 7) with the second type, the more affluent communities that are mostly White and Afrikaans-speaking, with relatively high education, employment and income levels. The dominant sources of employment are community services and agriculture.

6.4 Cultural and heritage characteristics

The current cultural and heritage landscape within which the AMD project will take place can in essence be divided into two categories – industrialised and rural. Primary activities will take place within the industrialised landscape; however, activities may trigger impacts on heritage resources within the more rural landscape. This industrialised landscape essentially comprises sites, places, and structures related to the industrial development and history of the Witwatersrand. The history of mining has to a considerable degree driven and shaped the character of this landscape. Tangible or physical representations of this include structures associated with early operations and other remnants of the historical built environment and sites or places related to migrant labour to consider some aspects. Intangible facets such as the socio-political history must also be considered. Fundamentally, the current heritage landscape is a historical one, except for that of the Cradle of Humankind World Heritage Site (COH WHS).

6.4.1 Western Basin

6.4.1.1 General receiving heritage landscape

Compared to the Central and Eastern Basins, the Western Basin is less industrialised, and the general landscape not shaped by mining to the same extent. Predominant industrial and urban areas are found in Krugersdorp to the east and Randfontein to the south. Large areas north and west comprise agricultural properties interspersed with several nature reserves and natural areas, most notably the COH WHS. The general heritage landscape is, therefore, much more layered and complex than compared to the above landscapes discussed, including historical, archaeological, and palaeontological heritage resources.

The area was first developed during the discovery of gold on the Witwatersrand. Before Krugersdorp was established in 1887 as a result of increased mining on the West Rand, the area was mostly farm land. Several battles and skirmishes also occurred in the area, during the First and Second Anglo-Boer Wars, and a concentration camp associated with the latter war was also formed in 1901 near Krugersdorp. Remnants of this aspect of the historical landscape may include graves, battlefields, historical homestead complexes, and other structures, as well as subsurface evidence such as middens.

Another important aspect that should be considered in characterising the historical landscape is various old limestone mines and kilns, in operation during the late 1800s. Examples of these structures are found in protected areas such as the Krugersdorp Game Reserve and elsewhere. More recently, socio-political heritage includes dispossessed

landscapes. Many black families and communities were forcibly removed from land they occupied, especially from 1960 onwards. Some intangible aspects that should also be considered can include historical initiation sites, of which at least one has been previously recorded.

The area can also be characterised by episodes related to the *Difeqane*. This was a period of massive population displacement throughout South Africa caused by the Matabele (Ndebele) raiding parties of Mzilikazi who violently migrated from present northern KwaZulu-Natal from the last decade of the 18th century. Mzilikazi conquered the BaPo (one of several original Tswana occupiers of the region) in the early 1800s and then settled in the area. When the first white *Voortrekkers* arrived during the 1830s, they in turn drove Mzilikazi out. Several of *Difeqane* refuge sites are scattered in the landscape, as well as some of the Matabele settlements. Evidence of earlier Iron Age occupation and settlement also occur, although very little is known regarding Early Iron Age sites and settlements. The most prominent and visible site type is stonewalled sites that predate the *Difeqane*. These are predominantly associated with Sotho-Tswana-speaking groups (known as Type N and Klipriviersberg sites), the relative date range for these being 1400 to 1800.

6.4.1.2 Immediate receiving heritage landscape

The proposed project area can be characterised as a relatively recent industrial landscape with archaeological and historical elements possible. The Randfontein Estates Gold Mining Company was formed in 1889. In 1952 they successfully applied as a uranium producer, and the first uranium processing plant commissioned in 1954. Compared to the Central and Eastern Basin sites due to the relative open nature of the surrounding environment, other heritage resources occur that should be considered in characterising the immediate receiving environment. These include burial grounds (informal and Boer War associated), Iron Age stonewalling sites, early Voortrekkers settlements, and Stone Age locales.

Arguably, the most important perceived heritage landscape is the COH WHS and includes the fossil hominid sites of Sterkfontein, Kromdraai, Swartkrans, and the newly discovered Sediba site. Other than representing human evolution and at least the Early and Middle Stone Ages, the COH WHS also contain historical resources such as the above mentioned lime kilns. The COH WHS will be discussed in more detail below.

6.4.2 Cradle of Humankind World Heritage Site

The fossil hominid sites of Sterkfontein, Swartkrans, Kromdraai and environs were inscribed for protection of their cultural heritage in 1999 in terms of the World Heritage Convention Act (Act No. 57 of 1999) (WHCA). These sites are collectively known as the Cradle of Humankind World Heritage Site (location shown in Plan 16). The COH WHS was inscribed by the UNESCO World Heritage Committee (WHC) in 1999 and 2005 as summarised in Table 6-3 below. At the 34th session of the WHC held in Brasilia, Brazil from 25 July to 3 August 2010, a draft decision (Document WHC-10-34.COM/8E.Add2) was presented to the committee. The WHC adopted the retrospective Statement of Outstanding Universal Value

(SoOUV) for the COH WHS. The 'brief synthesis' of the SoOUV has been replicated in the information box below.

Table 6-3: Official UNESCO description of COH WHS

Property	Fossil Hominid Sites of Sterkfontein, Swartkrans, Kromdraai, and Environs
State Party	South Africa
Id. N°	915 bis
Dates of inscription	1999 / 15th July 2005

6.4.2.1 Criteria defining Outstanding Universal Value

The SoOUV is based on UNESCO's Operational Guidelines for the Implementation of the World Heritage Convention (2005). Two criteria were specifically considered.

1) Criterion (iii)

According to the Operational Guidelines (2005) sites complying with Criterion (iii) must bear a unique or at least exceptional testimony to a cultural tradition or to a civilisation which is living or which has disappeared.

In the retrospective SoOUV the COH WHS was considered to comply with this criterion as it '*bears exceptional testimony to some of the most important Australopithecine specimens dating back more than 3.5 million years. This therefore throws light on to the origins and then the evolution of humankind, through the hominisation process*'.

2) Criterion (vi)

According to the Operational Guidelines (2005) sites complying with Criterion (vi) should be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance.

The retrospective SoOUV considered the COH WHS to comply with this criterion as '*the serially nominated sites are situated in unique natural settings that have created a suitable environment for the capture and preservation of human and animal remains that have allowed scientists a window into the past. Thus, this site constitutes a vast reserve of scientific data of universal scope and considerable potential, linked to the history of the most ancient periods of humankind*'.

Information Box 1: Summarised description of COH WHS Statement of Outstanding Universal Value

The undulating landscape containing the fossil hominid sites of South Africa comprises dolomitic limestone ridges with rocky outcrops and valley grasslands, wooded along watercourses and in areas of natural springs. Most sites are in caves or are associated with rocky outcrops or water sources. The serial listing includes the Fossil Hominid Sites of Sterkfontein, Swartkrans, Kromdraai and Environs, and the Makapan Valley and Taung Skull Fossil Site. The Taung Skull, found in a limestone quarry at Dart Pinnacle amongst numerous archaeological and palaeontological sites south-west of the Sterkfontein Valley area, is a specimen of the species Australopithecus africanus. Fossils found in the many archaeological caves of the Makapan Valley have enabled the identification of several specimens of early hominids, more particularly of Paranthropus, dating back between 4.5 million and 2.5 million years, as well as evidence of the domestication of fire 1.8 million to 1 million years ago. Collectively these sites have produced abundant scientific information on the evolution of modern humans over at least the past 3.5 million years. They constitute a vast reserve of scientific information, with enormous potential.

The sites contain within their deposits all of the key interrelated and interdependent elements in their palaeontological relationships. Alongside and predating the hominid period of occupation is a sequence of fossil mammals, micro-mammals and invertebrates which provide a window onto faunal evolution, palaeobiology and palaeoecology stretching back into the Pliocene. This record has come to play a crucial role in furthering our understanding of human evolution and the appearance of modern human behaviour.

The fossil evidence contained within these sites proves conclusively that the African continent is the undisputed Cradle of Humankind.

6.4.2.2 Integrity and authenticity of COH WHS

In addition to the criteria outlined above, the SoOUV has also taken into account the COH WHS's integrity and authenticity as defined in the 2005 Operational Guidelines.

The SoOUV concluded that the integrity of the COH WHS (as well as the Makapan Valley and Taung Skull Fossil Site) is provided due to its location in three provinces (Gauteng, Northwest, and Limpopo Provinces) and gazetted buffer zone for each component. The COH WHS, Makapan Valley, and Taung Fossil Site significantly contributed to an extensive body of scientific knowledge concerning human evolution spanning 3.5 million years. The distribution of the inscribed properties furthermore represents a great reservoir of potential scientific information.

The SoOUV determined that the sites authenticity is apparent in the fundamental interrelated and interdependent elements of natural palaeontological relationships. Accordingly the deposits represent a sequence of palaeo-ecosystems. The breccia contains fossilised remains of hominids and their lithicultural material, other faunal and botanical fossils and geochemical and sedimentological data describing relevant taphonomic conditions of each geological member or strata. The sites and deposits that have yielded material in addition to the landscape are still considered to be generally intact. However, each site and landscape is considered to be vulnerable to development pressures, communities' use of the environment and tourism.

6.5 Ecological environment

6.5.1 Provincial biodiversity planning

According to the Gauteng C-plan 3 the Gauteng province is categorized into seven biodiversity conservation categories for terrestrial ecosystems using systematic biodiversity planning methods. In Table 6-4 one can see the seven categories.

The main threat to natural areas/biodiversity is the reduction of viable habitat, which can be contributed to the following, human settlement and urban development, mining, industry and manufacturing, energy, transport, agricultural activities and tourism and recreation. All of the above with the possible exception of tourism and recreation are currently exerting pressure on the study area (area in general) by reducing the viable natural land. The 'No natural habitat remaining' is the category in which most threats can be categorized, and the transformation of the natural habitat from Protected Areas to No Natural Habitat remaining is driven by the seven threats.

Table 6-4: Gauteng C-Plan 3 categories

Category
Protected Areas
Irreplaceable
Highly Significant
Ecological Support
Important and necessary
Least concern
No Natural Habitat Remaining

Each category represents a different sensitivity rating. These ratings are specific as to which areas are to be conserved for biodiversity maintenance. The receiving rivers have been classified by the sensitivity ratings above and shown in Plan 17.

6.5.2 Regional natural environment

The study areas fall in the Grassland Biome that is found mainly on the high central plateau of South Africa, and the inland areas of KwaZulu Natal and the Eastern Cape (Figure 6-4), the study area is indicated on the map as a red dot.

Trees are absent, except in a few localised habitats and geophytes are often abundant (Low & Rebelo, 1996). Sour grassland occurs in the high rainfall eastern grassland regions (average rainfall >625 mm/annum), on relatively acidic (leached) soils (refer to soils section),

and is characterized by being short and dense in structure, having a high fibre content and a tendency to withdraw its nutrients from its leaves to its roots during the winter, rendering it largely unpalatable to stock during this time.

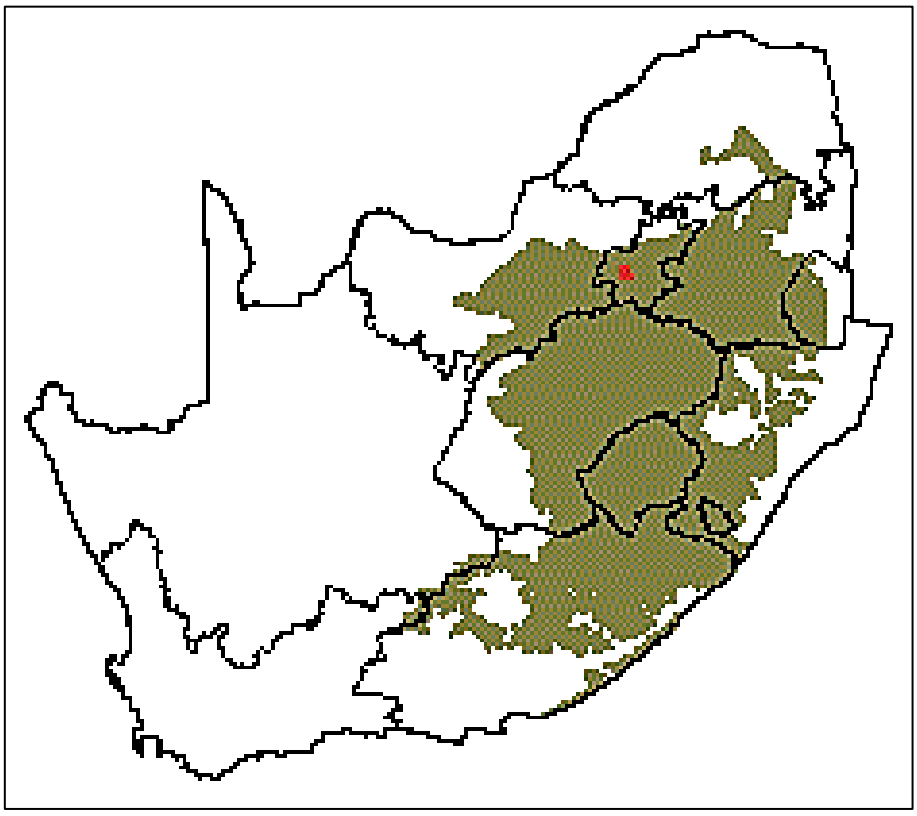

Figure 6-4: Grassland Biome of South Africa and project sites

Of the 72 vegetation types in the biome, 2 are listed as critically endangered, 18 are endangered and 27 are classed as vulnerable. 83% of river ecosystems are ranked as threatened, with 48% critically endangered.

6.5.2.1 Terrestrial flora bioregions

According to Mucina and Rutherford (2006), a Bioregion is a composite spatial terrestrial unit defined on the basis of similar biotic and physical features and processes at the regional scale.

The Dry Highveld Grassland prevails in the western regions of the Grassland Biome where annual rainfall is below 600mm/a. These grasslands are therefore sweet grasslands. This grassland type is mostly plains grassland distinguished primarily on substrate characteristics (Mucina and Rutherford 2006). The Carltonville Dolomite grassland vegetation type is found in this bioregion.

Mesic Highveld Grassland is mostly found within high rainfall areas of the Highveld, extending as far as the northern escarpment. These are sour grasslands and are dominated

mostly by Adropogonoid grasses (Mucina and Rutherford 2006). The Soweto Highveld grasslands and the Tsakane Clay grassland vegetation types are found within this bioregion.

6.5.2.2 Wetland bioregions

Azonal Fresh water wetlands form a system of small and highly fragmented patches, embedded within all mainland biomes, including the grassland biome. These are common landscape features in regions with a mean annual rainfall of 500 to 600 mm/a. These typical freshwater wetlands are vleis that form in the catchment areas of Highveld streams, where a sufficient shallow gradient permits the soil to be wet without being eroded by flow of water (Mucina and Rutherford 2006).

Eastern Temperate Freshwater Wetlands that are found in each of the three basins fall within this azonal fresh water wetland description. These areas are the areas that will be directly affected by the discharge.

It is expected that most wetlands in the study area that have the potential of being impacted, are valley bottom and floodplain wetlands. Unchannelled valley bottom wetlands may occur, but these will have to be confirmed during the surveys.

Unchanneled valley bottom wetlands are uncommon and it these do occur in the sphere of influence and discharge runs the risk of increasing erosion, head cuts and channelling this would have to form a major focus of the investigations.

Additionally, potential changes in riparian and wetland macrophytes need to be monitored and assessed. If for example, conditions are going to increase the spread of *Typha* at the cost of other obligatory hydrophytes such as *Phragmites* or *Schoenoplectus,* mitigation measures for this aspect will have to be worked into a management plan for the project but also into the management plan for the Ramsar site (Eastern Basin) and other wetland management areas.

6.5.2.2.1 Ramsar sites

The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

Negotiated through the 1960s by countries and non-governmental organizations that were concerned at the increasing loss and degradation of wetland habitat for migratory waterbirds, the treaty was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975. It is the only global environmental treaty that deals with a particular ecosystem, and the Convention's member countries cover all geographic regions of the planet.

6.5.2.3 Vegetation units

6.5.2.3.1 Carletonville Dolomite Grassland

This vegetation unit is encountered in the Central and Western Basins. Within the western basin the impact on the riparian and possibly the terrestrial vegetation will only be the increased water quantity and quality in the Tweelopiespruit down to Hartbeetpoort Dam, no additional infrastructure will be constructed here at this stage. Within the eastern basin the impact on the riparian and possibly the terrestrial vegetation will only be the increased water quantity and quality in the Elsburgspruit and Natalspruit down to Vaal Barrage, no additional infrastructure will be constructed here at this stage.

This vegetation unit mainly occurs in the North-West province but also in Gauteng and marginally into the Free State Province. It is distributed in the region of Potchefstroom, Ventersdorp and Carletonville, extending westwards to the vicinity of Ottoshoop, but also occurring as far east as Centurion and Bapsfontein in Gauteng Province. The altitude ranges from 1 360– 1 620 m.

It occurs on slightly undulating plains dissected by prominent rocky chert ridges. It forms a complex mosaic pattern dominated by many species. Grasses such as *Louditia simplex* (Common Russet Grass), *Hyparrhenia hirta* (Common Thatching Grass), *Brachiaria serrata* (Velvet Signal Grass) and *Heteropogon contortus* (Spear Grass) are prominent while shrubs such as *Euclea undulata* (Common Guarri), *Searsia magalismontana* (Berg Taaibos), *Zanthoxylon capanse* (Small Knobwood) and *Diospyros lycioides* (Bluebush) are scattered in protected places (e.g. among rocks and boulders). The geology of this vegetation unit consists of dolomites and cherts of the Malmani subgroup from the Transvaal super group.

Conservation status is currently considered vulnerable. Only a small extent conserved in statutory (Sterkfontein Caves— part of the Cradle of Humankind World Heritage Site, Oog Van Malmani, Abe Bailey, Boskop Dam, Schoonspruit, Krugersdorp, Olifantsvlei, Groenkloof) and in at least six private conservation areas. Almost a quarter of the type has already been transformed by cultivation, urban sprawl or by mining activity as well as the building of the Boskop and Klerkskraal Dams. Erosion is very low (84%) and low (15%).

6.5.2.3.2 Soweto Highveld Grassland

This vegetation unit is encountered in the Western, Central and Eastern Basins. Within the western basin this vegetation type will be affected by the following infrastructure, the treatment site, the potable water pipeline, the acid mine drainage pipeline, the proposed sludge pipeline and the treated water pipeline. Planning of infrastructure placement will reduce the threat of construction and operation on this vegetation type. The altered water quality and quantity will affect the section of the riparian vegetation of the Tweelopiespruit within this vegetation unit.

Within the eastern basin this vegetation type will be affected by the treated water pipeline and increased water quantity and quality in the Blesbokspruit.

This vegetation unit occurs in Mpumalanga, Gauteng (and to a very small extent also in neighbouring Free State and North-West) Provinces. It lies in a broad band roughly delimited by the N17 road between Ermelo and Johannesburg in the north, Perdekop in the southeast and the Vaal River (border with the Free State) in the south. It extends further westwards along the southern edge of the Johannesburg Dome (including part of Soweto) as far as the vicinity of Randfontein. In southern Gauteng it includes the surrounds of Vanderbijlpark and Vereeniging as well as Sasolburg in the northern Free State. The altitude ranges from 1 420 – 1 760 m.

It occurs on gently to moderately undulating landscape on the Highveld plateau supporting short to medium high, dense, tufted grassland dominated almost entirely by *Themeda triandra* (Rooi grass) and accompanied by a variety of other grasses such as *Elionuris muticus* (Wire grass), *Eragrostis racemosa* (Small heart grass), *Heteropogon contortus* (Spear grass) and *Tristachya leucothrix* (Trident grass).

Only small scattered wetlands, narrow streams and occasional ridges or rocky outcrops interrupt the continuous grassland cover. The geology of the Soweto Integration consists mainly of shale, sandstone or mudstone of the Madzarinwe formation (Karoo supergroup).

Conservation status

Currently considered endangered, only a handful of patches are statutorily conserved (Waldrift, Krugersdorp, Leeuwkuil, Suikerbosrant, and Rolfe's Pan Nature Reserves) or privately conserved (Johanna Jacobs, Tweefontein, Gert Jacobs, Nikolaas and Avalon Nature Reserves, Heidelberg Natural Heritage Site). Almost half of the area already transformed by cultivation, urban sprawl, mining and building of road infrastructure. Some areas have been flooded by dams (Grootdraai, Leeukuil, Trichardtsfontein, Vaal and Willem Brummer dams). Erosion is generally very low (93%).

6.5.2.3.3 Tsakane Clay Grassland

This vegetation unit is encountered in the Western and Central basins. Within the central basin the impact on the riparian and possibly the terrestrial vegetation will only be the increased water quantity and quality in the Elsburgspruit and Natalspruit down to Vaal Barrage, no additional infrastructure will be constructed here at this stage. Within the central basin the impact on the riparian and possibly the terrestrial vegetation will only be the increased water quantity and quality in the Elsburgspruit and Natalspruit down to Vaal Barrage, no additional infrastructure will be constructed here at this stage. Within the eastern basin the impact on the riparian and possibly the terrestrial vegetation will only be the increased water quantity and quality in the Blesbokspruit down to the Vaal Barrage, no additional infrastructure will be constructed here at this stage.

This vegetation unit occurs in Gauteng and Mpumalanga Provinces in patches extending in a narrow band from Soweto to Springs, broadening southwards to Nigel and from there towards to Vereeniging. It also occurs north of the Vaal Dam and between Balfour and Standerton (including Willemsdal). It is situated on an altitude ranging from 1 480 –1 680 m.

It occurs on flat to slightly undulating plains and low hills. The vegetation is short dense grassland which is dominated by common Highveld grasses such as *Themeda triandra* (Red grass), *Heteropogon contortus* (Spear grass), and *Elionuris muticus* (Wire grass) and a number of *Eragrostis* species. The most common forbs belong to the families Asteraceae, Rubiaceae, Malvaceae, Lamiaceae and Fabaceae. Disturbance leads to an increase in abundance of particularly *Hyparrhenia hirta* (Common thatching grass) and *Eragrostis chloromelas* (Curly leaf love grass). The most significant rock is basaltic rock from the Klipriviersberg group (Ventersdorp supergroup).

Conservation status

Currently considered endangered, only 1.5% is conserved in statutory reserves (Suikerbosrant, Olifantsvlei, Klipriviersberg, and Marievale) and a small portion also in private nature reserves (Avalon, Ian P. Coetser, and Andros). More than 60% transformed by cultivation, urbanisation, mining, dam-building and roads. Large portions of Alberton, Springs, Tsakane and parts of Soweto (all south and east of Johannesburg) were built in the area of this vegetation unit. Urbanisation is increasing and further expansion of especially the southern suburbs of Johannesburg and the towns of the East Rand (especially the Brakpan District) will bring further pressure on the remaining vegetation. Erosion is very low (87%) and low (11%) across the entire unit.

6.5.2.3.4 Eastern Temperate Freshwater Wetlands

This azonal vegetation type occurs in all three of the Basins. This vegetation unit occurs in the Northern Cape, Eastern Cape, Free State, North-West, Gauteng, Mpumalanga and KwaZulu-Natal Provinces as well as in neighbouring Lesotho and Swaziland. It is distributed around water bodies with stagnant water (lakes, pans, periodically flooded vleis and edges of calmly flowing rivers) and embedded within the Grassland Biome. The altitude of its distribution area ranges from 750 – 2 000 m.

It occurs on a flat landscape or shallow depressions temporary filled with water and supporting zoned systems of aquatic and hygrophilous vegetation of flooded grasslands and ephemeral herblands.

Conservation status

The type is currently considered vulnerable. About 5% is statutorily conserved in the Blesbokspruit (a Ramsar site), Hogsback, Marievale, Olifantsvlei, Seekoeivlei (a Ramsar site), Wakkerstroom Wetland, Umgeni Vlei, Umvoti Vlei and Pamula Park Nature Reserves. It is also protected in private nature reserves such as the Korsman Bird Sanctuary and Langfontein. Some 15% has been transformed to cultivated land, urban areas or plantations. In places intensive grazing, often combined with wetland drainage, occur. The use of lakes

and freshwater pans as drinking pools for cattle or sheep also cause major damage to the wetland vegetation. The Blesbokspruit Ramsar site is a significant focal point for these studies together with the CoH WHS site in the Western Basin.

The conservation status of each vegetation unit is listed in Table 6-5.

Table 6-5: The conservation status of the various vegetation units occurring within the study area (arranged top-down from most to least endangered)

Vegetation unit	Ecosystem Status	Protection level	Transformed	Protected	Target
Soweto Highveld Grassland	Endangered	Hardly protected	± 48%	0%	24%
Tsakane Clay Grassland	Endangered	Hardly protected	± 44%	1%	24%
Carletonville Dolomite Grassland	Vulnerable	Poorly protected	± 24%	2%	24%
Eastern Temperate Freshwater Wetlands	Vulnerable	Poorly protected	± 27%	4%	24%

The aquatic habitat of the Blesbokspruit consists mostly of *Phragmites australis*, bulrushes *Typha latifolia* and sedges which cover 90% of the water surface. These wetlands cover an area approximately 85% of the Marievale Bird Sanctuary. The remaining 15% is grassland which is broadly classified as Bankenveld. A wide variety of flowering plants occur. A few of the more spectacular are the Orange River lily *Crinum bulbispermum*, plough breaker *Erythrina zeyheri* and *Aloe ecklonis* (Haskins 1998).

Fauna in this site of significance for the study includes various rare and Red Data species. Among others Otters, Flamingo and African Grass Owls can be expected to occur. Bittern has not been recorded recently, but, has been known to occur. Factors specific to keystone species in the Ramsar site and specific to Ramsar criteria will be investigated. Of concern here is decrease of open water areas by reed and rush invasion.

6.5.2.4 Terrestrial Fauna

6.5.2.4.1 Animal species of concern

From the desktop work conducted for the project areas the species listed in Table 6-6 were identified as protected according to NEMBA and which may possibly be affected by the project.

Table 6-6: Animal species of concern according to NEMBA.

Common name	Scientific name	NEMBA Status
Rough-haired Golden Mole	*Chrysospalax villosus*	Critically endangered
Blue Crane*	*Anthropoides paradiseus*	Endangered
Cape Vulture	*Gyps coprotheres*	Endangered
Pinkbacked Pelican*	*Pelecanus rufescens*	Endangered
African Clawless Otter*	*Aonyx capensis*	Protected
South African Hedgehog	*Atelerix frontalis*	Protected
African Marsh Harrier*	*Circus ranivorus*	Protected
Black-footed Cat	*Felis nigripes*	Protected
Spotted-necked Otter*	*Lutra maculicollis*	Protected
Giant Bullfrog*	*Pyxicephalus adspersus*	Protected
Black Stork*	*Ciconia nigra*	Vulnerable
Lesser Kestrel	*Falco naumanni*	Vulnerable
Juliana's Golden Mole	*Neamblysomus julianae*	Vulnerable
Martial Eagle	*Polemaetus bellicosus*	Vulnerable
African Grass-Owl*	*Tyto capensis*	Vulnerable

*Depicts species often associated with wetlands and riparian zones

The Blesbokspruit supports a variety of fish, amphibians, reptiles, crustaceans and rodents. Spotted-necked otters (*Lutra maculicollis)*, Water mongoose (*Atilax palidinosus)* and many larger birds depend on these animals for their food. The Reedbuck (*Redunca arundinum)* regarded as uncommon in South Africa, has also been recorded here.

6.5.2.4.2 Reptiles and amphibians

The herpetofauna of wetlands in general tends to be poor due to a paucity of habitat diversity. In addition they are difficult to see in a dense field layer and go into hiding on being disturbed. It is therefore difficult to assess their presence. The frequency of grass fires is detrimental to the existence of reptiles and amphibians not only directly, but also indirectly as they are exposed to predation following the removal of cover, which will result in reduced abundances and possibly in local extinctions of some species.

Table 6-7: Ekhuruleni SoER amphibians.

Common Name	Species	Breeding Requirements
Common River Frog	*Afrana anglolensis*	Rivers and Permanent water, artificail habitats (dams) or pans.
Common Platanna	*Xenopus laevis*	Permanent water, seasonal pans.
Cape River Frog	*Afrana fuscigula*	Permanent water, seasonal pans.
Natal Sand Frog	*Tomopterna natalensis*	Shallow permanent streams or vleis in grassland.
Tremolo Sand Frog	*Tomopterna cryptotis*	Temporary shallow pools/pan or large roadside pools.
Bubbling Kassina	*Kassina senegalensis*	Open vleis, pans, dams in grassland.
Common Caco	*Cacosternum boettgeri*	Marsh, vleis, inundated grassland pools.
Guttural Toad	*Bufo gutturalis*	Open vleis, pans, ponds, dams, slow streams.Dominates artificial habitats. Urban Exploiter.
Raucous Toad	*Bufo rangeri*	Vegetated zones around pans or dams. Extremely rare in the Gauteng Province due topossible hybridisation with Guttural Toads, *Bufo gutturalis*
Red Toad	*Schismaderma carens*	Emerging vegetation in deeper water (.30 cm) often around reed beds (Typha).
Giant Bullfrog	*Pxyicephalus adspersus*	Sedge and grass (hygrophytic) dominated seasonal pans or shallow depressions. May utilise artificial habitats such as dams, ponds. Limited numbers in urban environments. Urban avoider.

Common Name	Species	Breeding Requirements
Striped Stream Frog	*Strongylopus fasciatus*	Vegetated dams, pans and streams. Limited numbers in urban environments. Urban avoider.
Snoring Puddle Frog	*Phrynobatrachus natalensis*	Seasonal pools, pans or around dams. Limited numbers in urban environments. Urban avoider.

In Table 6-7, the amphibians listed in the Ekhuruleni SoER is listed, these species have a high probability of occurring in the study areas, particularly the eastern basin.

1.1.1.1 Avifauna

6.5.2.4.3 Important birding areas

The IBA Programme identifies and works to conserve a network of sites critical for the long-term survival of bird species that:

- Are globally threatened;
- Have a restricted range; and
- Are restricted to specific biomes/vegetation types.

Within the eastern basin the Marievale bird sanctuary is and Important Birding Area with a wetland of Ramsar status and occurs within the eastern basin. It is a permanently inundated reed-dominated (*Typha* and *Phragmites*) wetland. Permanent flooded status is due to artificial inputs of water (e.g. from mines and sewage treatment works). Reedbeds are probably supported by eutrophic status of water.

The Blesbokspruit supports significant numbers of waterfowl, including up to 4000 yellow-billed duck, *Anas erythrorhyncha* and 1000 spur-winged goose *Plectropterus gambensis* in the dry season, when levels are maintained artificially at a high level. The high-productivity water provides food for greater flamingo *Phoenicopterus ruber*, and lesser flamingo *Phoeniconaias minor*, which are South African Red Data Book Species (Haskins 1998). Other notable birds include avocet *Recurvirostra avosetta*, purple heron *Ardea purpe* rata, spoonbill *Platalea alba*, glossy ibis *Plegadis falcinellus* and yellow-billed stork *Mycteria ibis*. African marsh harrier *Circus ranivorus*, which has been displaced from much of the veld, maintains a strong population here. There are at least three heron roosts with a total of over 3500 birds (Haskins 1998). Increasing urbanization and industrialization in the central Gauteng reduce the number of sites available to the local fauna and flora. The Blesbokspruit supports a variety of fish, amphibians, reptiles, crustaceans and rodents. Spotted-necked otters *Lutra maculicollis*, water mongoose *Atilax palidinosus* and many larger birds depend on these animals for their food (Haskins 1998). The reedbuck *Redunca arundinum* regarded as uncommon in South Africa, has also been recorded here. Avifauna count data is

available from biannual CWAC (Coordinated Waterfowl Counts) reports, while species lists are submitted by reserve visitors to BIRP (Birds In Reserves Programme) - both programmes are run by the Avian Demography Unit at the University of Cape Town (Haskins 1998). In Table 6-8 the protected bird species according to the Ekurhuleni Metropolitan Municipality's first year State of the Environment Report (2003), this coincides with the Eastern Basin.

Table 6-8: Ekhuruleni protected bird species. (Avian demography unit)

English name	Genus	Species	Status
African Marsh Harrier	*Circus*	*ranivorus*	VU
Bald Ibis	*Geronticus*	*calvus*	VU
Black Coucal	*Centropus*	*bengalensis*	NT
Black stork	*Ciconia*	*nigra*	NT
Blackwinged Plover	*Vanellus*	*melanopterus*	NT
Blue Crane	*Anthropoides*	*paradiseus*	VU
Blue Korhaan	*Eupodotis*	*caerulescens*	NT
Caspian Tern	*Hydroprogne*	*caspia*	NT
Corncrake	*Crex*	*crex*	VU
Grass Owl	*Tyto*	*capensis*	VU
Greater Flamingo	*Phoenicopterus*	*ruber*	NT
Half-collared Kingfisher	*Alcedo*	*semitorquata*	NT
Lanner Falcon	*Falco*	*biarmicus*	NT
Lesser Flamingo	*Phoeniconaias*	*minor*	NT
Lesser Kestrel	*Falco*	*naumanii*	VU
Melodious Lark	*Mirafra*	*cheniana*	NT
Openbill Stork	*Anastomus*	*lamelligerus*	NT
Painted Snipe	*Rostratula*	*benghalensis*	NT

English name	Genus	Species	Status
Secretarybird	*Sagittarius*	*serpentarius*	NT
Whitebellied Korhaan	*Eupodotis*	*cafra*	VU
Yellowbill Stork	*Mycteria*	*ibis*	NT

6.5.3 Aquatic ecology

The ecological status (integrity) of a river system refers to the overall condition or health of the system. The ecological status of a system refers to an integrated ecological category for the river. This is the totality of the features and characteristics of the river system and the associated riparian areas that rely upon the system's ability to support an appropriate natural flora and fauna and the capacity to provide a variety of goods and services. A suite of ecological indicators are specifically selected for the ability to integrate the impact of multiple disturbances on the state of rivers, these indicators include:

- Instream habitat;
- Water quality;
- Riparian zones;
- Riparian vegetation;
- Fish communities; and
- Macroinvertebrates.

According to the River Health Programme (RHP) (2005) the integrity of the instream habitat is crucial for maintaining biota and a healthy river system. Water quality issues are often a concern and require management responses. It is important to monitor water quality to ensure that the objectives are being adhered to. There are often a number of sources of pollution that are contributing to the reduced levels of water quality for a catchment (RHP, 2005). The riparian zone is considered to be an important ecological link between the river system and the terrestrial component of a catchment (RHP, 2005). Riparian zones may often function as an effective buffer area between the river systems and any potential impacts that might originate from within the catchment. In light of this, the protection of the riparian zones should be a management priority. The ecological classification of a system considers the cause-and-effect relationship for the ecological drivers and responses of a system; this relationship is presented in Figure 6-5.

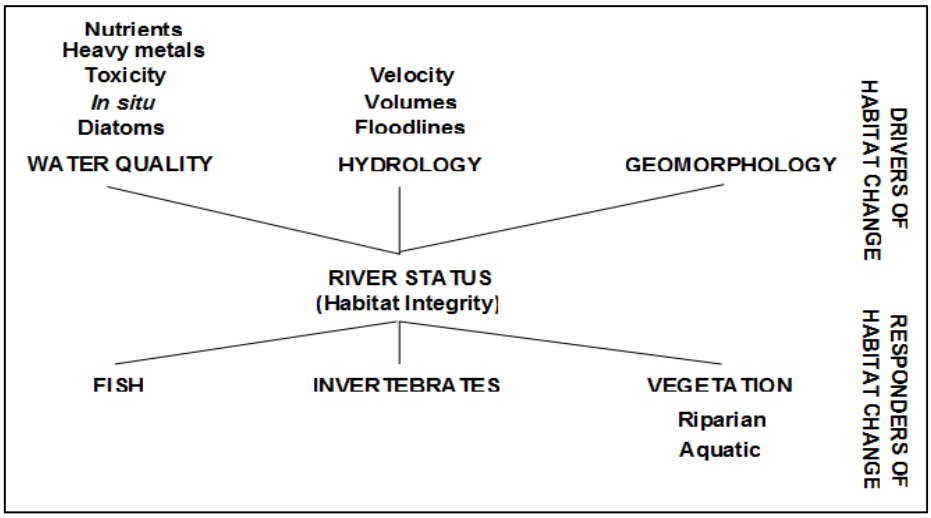

Figure 6-5: The cause-and-effect relationship between the drivers and the biological responses.

The Western Basin site is situated within the Crocodile (West) and Marico Water Management Area (WMA 3) and both the Central and Eastern Basin sites are situated within the Upper Vaal Water Management Area (WMA 8). The location of the three basin sites with respect to the Water Management Areas (WMA) and associated water resources is presented in Figure 6-6.

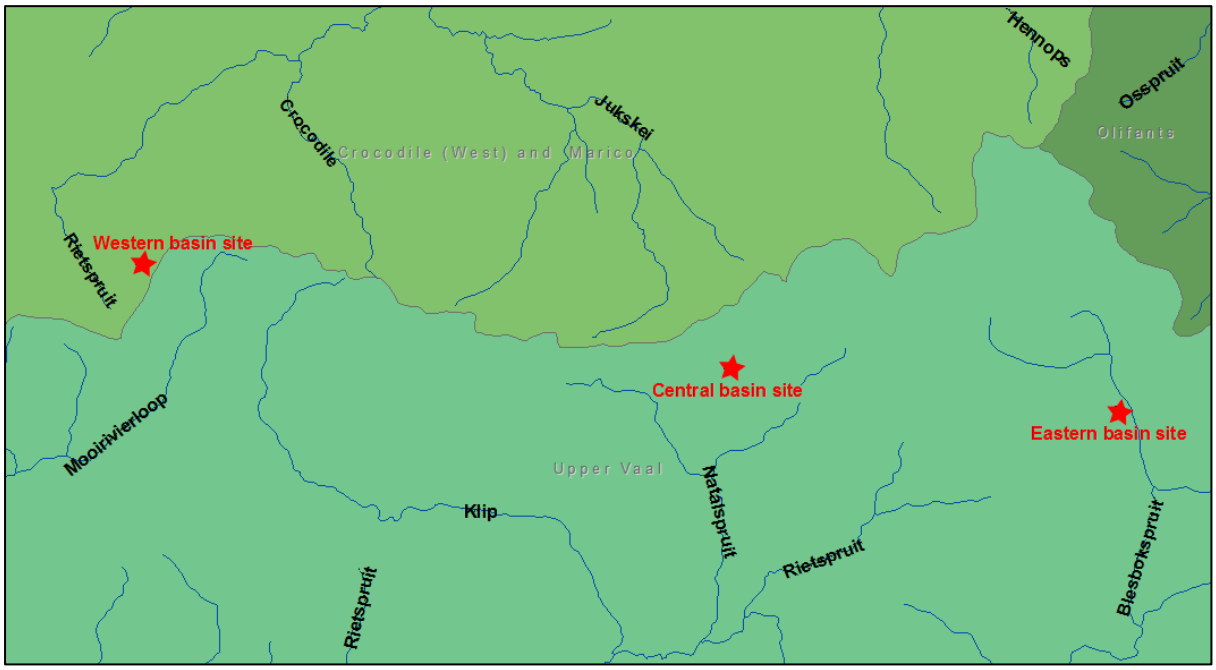

Figure 6-6: The project sites located within the respective water management areas, indicating the associated freshwater resources for each catchment.

6.5.3.1 Western Basin

The proposed project site is located within the quaternary catchment A21D. According to Kleynhans (2000) the present ecological management class for this quaternary catchment is a Class B (largely natural). In light of this, the attainable ecological management class for the quaternary catchment remains to be a Class B (Kleynhans, 2000). The water resource which will be directly impacted on as a result of the proposed discharge of treated water into the system is the Tweelopiespruit. The Tweelopiespruit runs alongside the Western Basin site and is a tributary of the Rietspruit which is considered to be a moderately modified (Class C) system. This is an indication that there has been a loss and change of natural habitat and biota, but the basic ecosystem functions are still predominantly unchanged (Kleynhans and Louw, 2007). The Rietspruit flows into the Bloubankspruit which in turn flows into the Crocodile River which is the major river which drains the catchment. The water supply of the Tweelopiesspruit comes from a number of sources, these sources vary from groundwater flow, industrial, sewage and mine works discharge, urban runoff and input from non-perennial tributaries. The location of the project site in relation to the local land cover classes for the WMA as described by the RHP (2005) is presented in Figure 6-7.

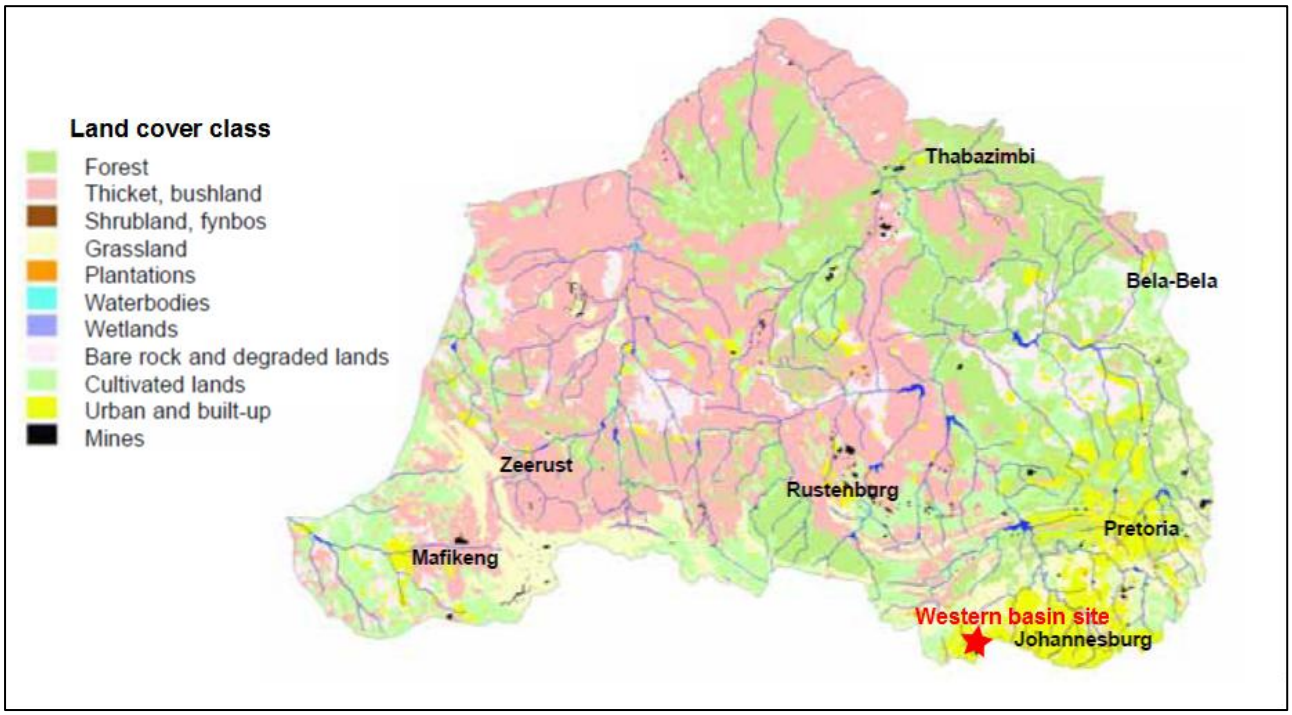

Figure 6-7: The land cover classes for the Crocodile (West) and Marico WMA indicating the location of the Western Basin site (RHP, 2005)

The Tweelopiespruit is a first order perennial river which flows in a predominantly northerly direction and this system is considered to have a Class D conservation status indicating that the natural environment is of a largely modified nature. According to Kleynhans and Louw (2007) this is an indication that a large loss of natural habitat, biota and basic ecosystem functions has occurred. Under the Gauteng conservation plan the river is considered to be irreplaceable, which indicates that no other river systems are available to meet the prescribed ecological targets for the catchment, thus, protection is crucial (Ferrar and Lotter, 2007).

The upper reaches of the Rietspruit is regarded to contain Class C (moderately modified) systems meaning that the biotic systems present are classified as pollution sensitive systems. The aquatic biodiversity of the Tweelopiespruit is considered to be endangered. According to the national FEPA programme, the proposed discharge location for the proposed project area is considered to be situated in an upstream management area (sub-catchment 1185) (WRC, 2011). Upstream management areas are sub-quaternary catchments in which human activities need to be managed to prevent degradation of downstream river FEPAs and fish support areas. The location of the project area in relation to the described FEPA is presented in Figure 6-8. A summary of the respective ecological classes for the local water resources is presented in Table 6-9.

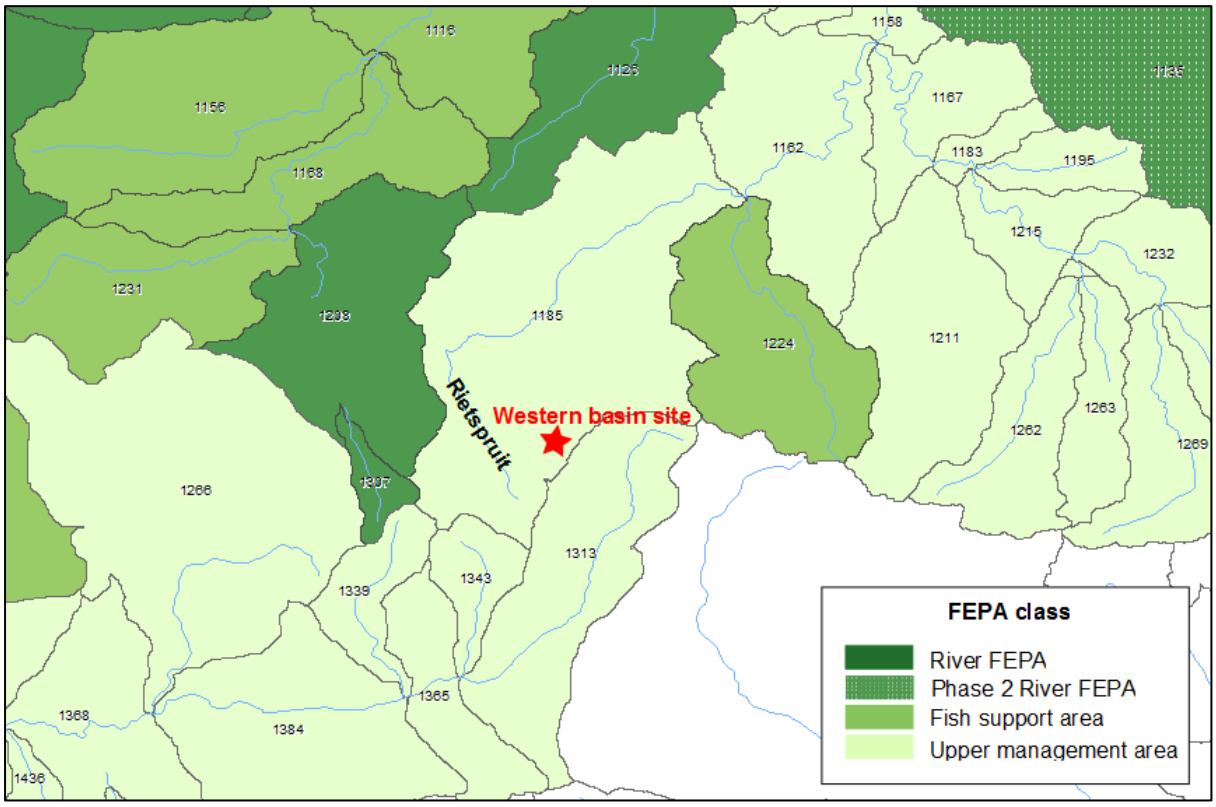

Figure 6-8: The location of the project area in relation to the described FEPA

Table 6-9: A summary of the ecological classes for the local water resources

Component	Description
PEMC (Quaternary catchment A21D)	Largely natural (Class B)
AEMC (Quaternary catchment A21D)	Largely natural (Class B)
Rietspruit	Moderately modified (Class C)
Tweelopiesspruit	Largely modified (Class D)
Tweelopiesspruit (Gauteng C-Plan)	Irreplaceable
FEPA	Upstream management area

The water quality of the Tweelopiesspruit has been determined through several studies in recent years. Some of the important water quality measurements were as follows; pH of 3.5, Conductivity of 510 mS/m, TDS of 6 580 (mg/l), Sulphate of 4 010 (mg/l), and iron of 697 (mg/l) (Inter-ministerial Committee, 2010).

6.5.3.2 Central Basin

The quaternary catchment in which the project area is situated is C22B. The present ecological management class for this quaternary catchment is a Class E or F (seriously/critically modified) which is not an acceptable state (Kleynhans, 2000). The described attainable ecological management class for the quaternary catchment is a Class D, which describes a largely modified system. The Elsburgspruit is the system which will be directly impacted on by the proposed discharge of treated water. The Elsburgspruit is a second order perennial tributary of the Natalspruit which in turn flows into the Rietspruit which ultimately flows into the Vaal River.

The Elsburgspruit and the Natalspruit are both in a seriously to critically modified state (Class E or F). This extent of modification is an indication that a critical level has been reached and the systems have been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible (Kleynhans and Louw, 2007). The water supply of the Elsburgspruit comes from a wide variety of sources namely discharges from sewage and mine works, urban runoff and a number of non-perennial tributaries.

The Gauteng conservation plan considers the Elsburgspruit to be irreplaceable, which indicates that no other river systems are available to meet the prescribed ecological targets for the catchment, thus, protection is crucial (Ferrar and Lotter, 2007). The aquatic biodiversity of the Elsburgspruit is viewed as critically endangered. The ecological integrity of the macroinvertebrate and fish populations is considered to be poor (RHP, 2003). According to the national FEPA programme, the proposed discharge location for the proposed project area is considered to be situated in a catchment not considered to be a priority area (WRC, 2011). The location of the project area in relation to the described FEPA is presented in Figure 6-9. A summary of the respective ecological classes for the local water resources is presented in Table 6-10.

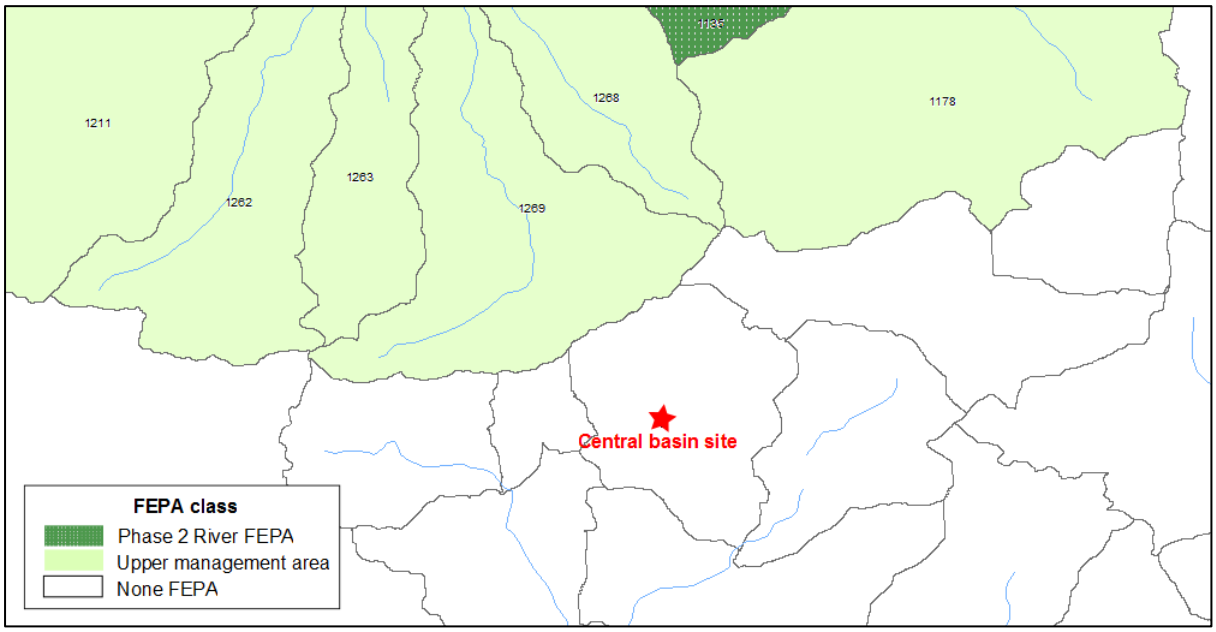

Figure 6-9: The location of the project area in relation to the described FEPA

Table 6-10: A summary of the ecological classes for the local water resources

Component	Description
PEMC (Quaternary catchment C22B)	Seriously/critically modified (Class E/F)
AEMC (Quaternary catchment C22B)	Largely modified (Class D)
Elsburgspruit	Seriously/critically modified (Class E/F)
Natalspruit	Seriously/critically modified (Class E/F)
Elsburgspruit (Gauteng C-Plan)	Irreplaceable
FEPA	None

The water quality of the Elsburgspruit has been studied extensively in recent years and has been identified by the DWA as being in a poor condition. The pH of the river has been recorded at as low as 2.8 with a conductivity of 467 mS/m. The TDS has been measured up to 4 936 mg/l with sulphate and iron concentrations recorded at 3 700 mg/l and 112 mg/l respectively (Inter-ministerial Committee, 2010).

6.5.3.3 Eastern Basin

The project area is situated within the quaternary catchment C21E. This catchment area is commonly known as the Blesbokspruit catchment. According to Kleynhans (2000) the present ecological management class for this quaternary catchment is a Class C (moderately modified) which indicates a loss and change of natural habitat and biota has

occurred, but the basic ecosystem functions are still predominantly unchanged. The described attainable ecological management class for the quaternary catchment is a Class B, which describes a largely natural system with a few modifications. This indicates that a small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged (Kleynhans and Louw, 2007). The Blesbokspruit is the largest river of this catchment and drains the Blesbokspruit catchment area. The Blesbokspruit is a perennial second order stream and is considered be in a largely modified state (Class D), this indicates that a large loss of natural habitat, biota and basic ecosystem functions has occurred. This system is a tributary of the Suikerbosrant River which finally flows into the Vaal River. A number of wetland areas are also known to occur on the Blesbokspruit. The water supply of the Blesbokspruit comes from a variety of sources, some of which include industrial, residential and mine discharge, several non-perennial streams and tributaries as well as urban runoff and shallow groundwater flow.

The Gauteng conservation plan considers the Blesbokspruit to be irreplaceable, which indicates that no other river systems are available to meet the prescribed ecological targets for the catchment, thus protection is crucial (Ferrar and Lotter, 2007). According to the RHP (2003) the ecological state of the drivers and biological responses associated with the system are in a poor state, and as a result the biodiversity of the system is considered to be critically endangered. According to the national FEPA programme, the proposed discharge location for the proposed project area is considered to be situated in a catchment not considered to be a priority area (WRC, 2011).

The project area is associated with the Blesbokspruit wetland system for which there is currently no formal protection status for this Ramsar site other than that of Marievale Nature Reserve which is a proclaimed nature reserve under the Environmental Management: Protected Area's Act. Act 57 of 2003 (Macfarlane and Muller, 2011). This wetland system, threatened by untreated mine water which is decanting into the system, was designated as a Ramsar Site in October 1986, and listed on the Montreux Record in 1994 as result of the these threats. According to Macfarlane and Muller (2011) the Ramsar requirements and guidelines to manage the Blesbokspruit have not been met. In spite of the system being on the Montreaux record since 1996, very little success has been achieved in addressing the threats and improving management of the system. The location of the project area in relation to the described FEPA wetlands is presented in Figure 6-10. A summary of the respective ecological classes for the local water resources is presented in Table 6-11.

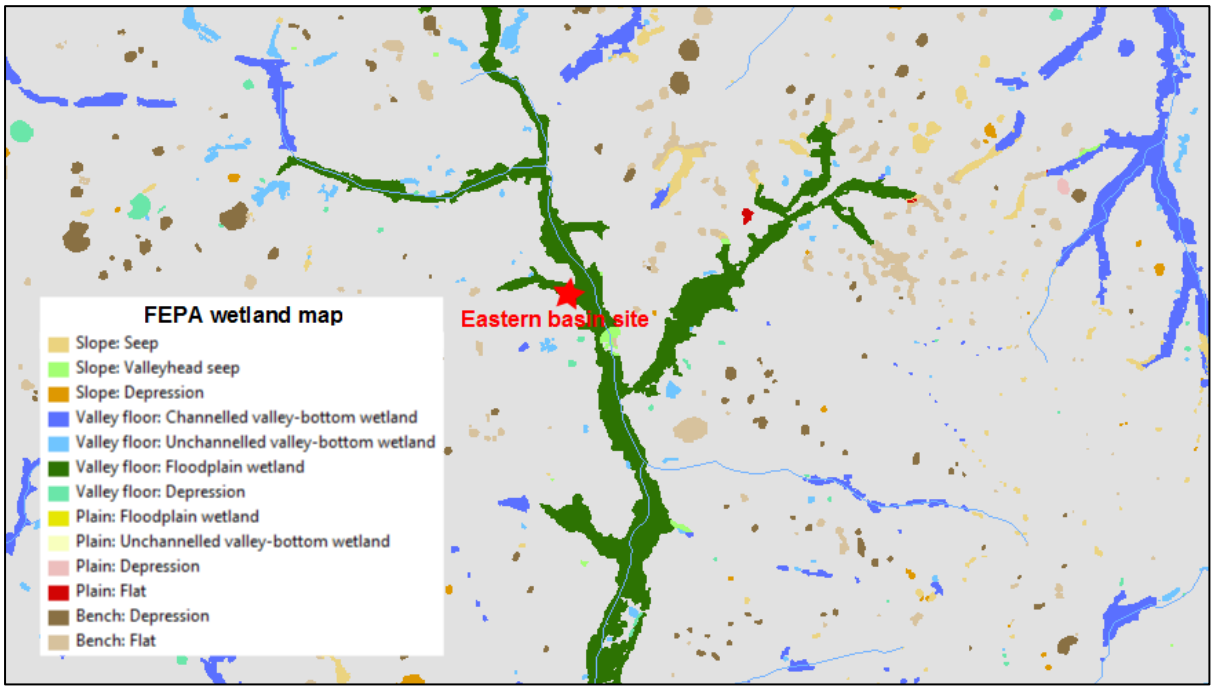

Figure 6-10: The location of the project area in relation to the described FEPA wetlands

Table 6-11: A summary of the ecological classes for the local water resources

Component	Description
PEMC (Quaternary catchment C21E)	Moderately modified (Class C)
AEMC (Quaternary catchment C21E)	Largely natural (Class B)
Blesbokspruit	Largely modified (Class D)
Blesbokspruit (Gauteng C-Plan)	Irreplaceable
Blesbokspruit wetland	Ramsar site and Montreux Record
FEPA (wetlands)	Floodplain wetland (Blesbokspruit)

The water quality of the Blesbokspruit has been described to be in a poor condition and this is due to factors such as high concentrations of iron, manganese, sulphate, calcium, magnesium, sodium and chloride. The water quality has been noted to be severely impacted by high TDS concentrations ranging from 2 700 to 3800 mg/L (Schoeman & Steyn, 2000). Uranium has also been noted to be present at concentrations of 0.013 ppm (Winde & Sandham, 2004). According to a study by Randwater in January 2011 the pH has been recorded at 7.45 (de Fontaine, 2011), however this differs from a study carried out by the DWA which recorded the pH of the river to be 6.65.

6.6 Geohydrological environment

A description of the current understanding of the geohydrological or groundwater environment within the Witwatersrand Basin and in particular the Western, Central and Eastern Basins (refer to Plan 18) has been constructed from a literature review of some of the most recent geological, hydrogeological and AMD studies. The Inter-Ministerial Committee Report (December 2010)[3] and the BKS Due Diligence Report (August 2011)[4] provides a detailed collation and assessment of all available AMD and groundwater information within the Witwatersrand area and provides possible solutions and management options to pump, treat and discharge of treated AMD water from the Western, Central and Eastern Basins respectively.

This section merely presents a summary of the geological and hydrogeological characteristics in each of the Basins, as well as proposed treatment and discharge options and associated risks.

6.6.1 The Witwatersrand Basin

The Witwatersrand Basin is a geological formation in the Witwatersrand, South Africa. It holds the world's largest known gold reserves and having produced over 1.5 billion ounces. The basin straddles the North West, Gauteng and the Orange Free State Provinces and is of the same period as the Vredefort impact of 2.023 Ga ago, and the Bushveld Igneous Complex. The name was derived from the white quartzite ridge which strikes parallel to the edge of the basin in which the sediment was deposited.

Nearly half of all the gold ever mined has come from the extensive Witwatersrand Basin that was first found near Johannesburg in 1886. The gold occurs in reefs, or thin bands, that are mined at depths of down to 4 000 m - Mponeng gold mine currently being the world's deepest. Although many of the older mines are now nearly exhausted, the Witwatersrand Basin still produces most of South Africa's gold and much of the total world output. Silver and iridium are recovered as gold-refining by-products and the basin also has coal mines, although they are small players in the basin.

The Witwatersrand Basin (Wits Basin) is a 6 km thick geological sequence of thin sedimentary layers that stretches from just east of Johannesburg in the north, to the southern Free State in the southwest, in the shape of a shallow elliptical dish. It is approximately 300 km long and 160 km wide and outcrops along its northern and north-western edges, tilting down into the earth as it extends further south.

[3] Inter-Ministerial Committee of AMD, December 2010. Mine Water Management in the Witwatersrand Gold Fields with special emphasis on Acid Mine Drainage.

[4] BKS, August 2011. Witwatersrand Gold Fields Acid Mine Drainage. Contract TCTA 08-041. Consulting Services for AMD Phase 1 Option 1. Due Diligence.

It is estimated to have formed between 2.6 and 3.0 billion years ago. Geologists believe that several braided rivers flowed into a huge inland sea that extended across this area at this time. These rivers carried eroded materials down from the surrounding highlands and deposited them in alluvial deltas around the sea, at their respective entry points.

Heavy materials, such as granules, pebbles and heavy minerals were deposited first, building up mineral-rich deltas around the shoreline, while finer sand, clay and silt would have been carried further into the sea. This was happening over millions of years, during which time, various geological changes caused movements that shifted the deposit locations, causing gravel layers to be covered by sand or clay layers, only for those to be covered in turn by later levels of gravel, and again by layers of sand or silt. These deposits piled up over time, layer upon layer, until eventually the lake became silted up.

Several volcanic and metamorphic events are also known to have occurred in the millions of years that followed this, which would have thrust the sequence up in some places, caused it to slip down in others, and also deposited various lava flows or flood basalts, across parts of its surface.

Then approximately two billion years ago, the earth was struck by a massive meteor, which hit a nearby area today known as Vredefort. The impact shattered and lifted an estimated 70 km³ of rock, and the debris thrown up by this event covered the whole Witwatersrand with a thick blanket of debris.

The Wits Basin was, therefore, preserved as mineralised reefs and hardened under these layers, which provided the heat and pressure necessary to transform the unconsolidated sediments into sedimentary rock.

The Wits Basin gold occurs almost exclusively within quartz pebble conglomerates. While the origins of the sedimentary layers of the Wits Basin are generally agreed upon, there remains much contention as to how the gold itself got there.

Dotted outside the basin are older Archaean granites of between 3 and 3.2 Ga, some of which are exposed while others are covered by the much younger Karroo System. The Witwatersrand System is a sequence of shale, quartzite and conglomerates ranging in age from 2.7 Ga for the Hospital Hill subgroup to 2.4 Ga for the Turffontein subgroup (refer to Plan 18). The Lower Witwatersrand is composed mainly of argillaceous clays and shale with occasional banded ironstone, a tillite and an intercalated lava flow, while the Upper Witwatersrand consists almost entirely of quartzite and conglomerate, with its own volcanic horizon.

There are two leading hypotheses: one called the placer model, which holds that the tiny grains of gold were carried down by the rivers from gold-bearing regions to the north and east of the Witwatersrand Basin, and deposited together with the heavier quartz pebbles in the gravel-rich deltas.

The competing theory is called the hydrothermal model, and this advocates that hot water containing dissolved gold ions, emanating from deep within the earth's crust, was pushed up

through the fractures and pores in the sedimentary rock, long after it had been deposited. These then precipitated when they came into contact with the hydrocarbons stored in the rock.

6.6.1.1 Minerals

Over 100 mineral species have been reported from the gold-bearing reefs (www.edu.uni-klu.ac.at/mmessner/sites/rsa/wits/wits.htm). Most of the minerals are esoteric and visible only under the microscope and seldom form larger collector specimens. Zircon, chromite and other heavy minerals occur throughout the Witwatersrand. The most common silicate minerals in the reefs are quartz, muscovite, pyro-phyllite, chloritoid and chlorite. The sulphide minerals are the second most abundant minerals superceded only in volume by quartz. A wide variety of nickel-cobalt-platinum sulpharsenides, as well as copper sulpho-salts and antimony-bearing minerals are present. Included in this group are species such as cobalt-rich arsenopyrite, gersdorrite and cobaltite, and the platinum group minerals geversite, sperrylite, braggite and cooperite. Pyrite is present in a variety of habits and forms. The main uranium-bearing minerals are uraninite and brannerite with minor amounts of coffinite and uanothorite. Uranium (and gold) tends to be enriched when found in combination with carbon. In some places a reef – the Carbon Leader – is developed and mined as the gold content is exceptionally high.

The strata in the gold mines have been subject to tremendous pressures and deformation resulting in the fracturing of the rocks along fault zones. Furthermore the Witwatersrand strata were introduced by younger igneous rocks which are often associated with the faults. These two features result in favourable conditions for the percolation and migration of fluids with often large quantities of dissolved silica in them. It is in these fluids that the quartz crystallised.

6.6.2 Geohydrology of the Western Basin

The Witwatersrand Gold Fields in the Western Basin comprises the following three gold reefs:

- Black Reef;
- Kimberley Reef; and
- Main Reef.

These reefs sub-outcrop on the north-western side of the Gold Fields between Randfontein and Roodepoort, but the sub-outcrop is isolated from the rest of the Gold Fields by the Witpoortjie and the Roodepoort Faults (Plan 19).

Mining in the weathered zone from surface started along the reef outcrops in the Randfontein / Krugersdorp area and, when the reefs became too deep for this type of access underground mining commenced by means of constructed shafts. When most of the reefs had been removed, underground voids were left that stretch from Randfontein and Krugersdorp to the Witpoortjie Fault. The Western Basin thus stretches from Randfontein to

Roodepoort and is separated from the Far Western Basin and the Central Basin by the Witpoortjie and Roodepoort Faults, respectively, as shown in Plan 18.

The Western Basin incorporates the old gold mining operations centred around Randfontein Estates, West Rand Consolidated, Luipaardsvlei and East Champ d'Or Mines. Mining operations ceased in around 1998 and the old mine workings progressively filled with water. Water started decanting from the Black Reef Incline (BRI) shaft in 2002. High rainfall over the past three years has caused decant from Winze 17 and 18 as well (BKS, Report No. J01599/05, August 2011).

The current mining operations on the Western Basin are exclusively associated with the re-mining and recovering of old sand and TSFs. The two largest re-mining operations are:

- Rand Uranium, which is re-mining the old Dump 20, a source of gold bearing sand. This material is railed from the Western Basin to the Cooke Gold Plant outside the Western Basin; and
- Mintails, which is re-mining several gold-bearing TSF's using its Mogale Gold Plant. The residual tailings are deposited in the Wes Wits Pit.

Rand Uranium also plans to extend its current gold mining operations, to re-commission the Millsite Tailings Dam and to use several of the opencast pits associated with the reef sub-outcrops as tailings deposition sites.

Currently AMD is decanting naturally with the majority flowing untreated down the Tweelopiespruit and into the Bloubankspruit that flows past the Sterkfontein caves and across the Zwartkrans dolomitic compartment. Most of the Tweelopiespruit water is recharging back into the groundwater environment (Zwartkrans compartment) at a point just north of the Krugersdorp Nature Reserve. This point coincides or is very close to the position where the Rietfontein fault crosses the Tweelopiespruit. The Rietfontein fault extends from the Percy Steward sewage treatment plant in a northewesterly direction towards Magaliesburg. Surface and groundwater monitoring could not confirm whether the extent of the contaminated water plume extends much further downstream along the Tweelopiespruit from this sink. The option, whether this water is recharging another dolomitic sub-compartment and whether this possible sub-compartment will eventually spill over and decant at another locality towards the northwest has to be investigated.

Large scale irrigation activities can be observed from the Steenkoppie compartment (west of Zwartkrans compartment). It is unlikely that these compartments are connected as a series of parallel dykes (Tarlton West and Tarlton East dykes) separate them. Even if they were connected, the threat of AMD contaminating the Steenkoppie compartment via the Zwartkrans compartment would be low as the natural and regional groundwater flow direction is from the west to the east – Steenkoppie to Zwartkrans compartments.

Discharged water from the Percy Steward and the Randfontein sewage treatment plants are also flowing across the Zwartkrans dolomitic compartment and down the Tweelopiespruit.

6.6.2.1 Groundwater recharge and flow

In the Western Basin, a number of distinct surface sources of recharge to the Basin contribute to the water make (BKS, Report No. J01599/05, August 2011) and includes:

- Seepage from:
  - overlying and adjacent groundwater aquifers;
  - surface mine pits which are, in some cases, connected to the underground mine workings; and
  - surface mine tailings and sand dumps;
- Ingress from surface streams and rivers crossing the old mine workings; and
- Losses from potable water, sewage and storm water reticulation systems.

The water recharge is seasonal and responds to rainfall and runoff events.

A number of studies have been completed over the last decade to gain insight into the mine water recharge and flow rates from the Western Basin. The following reports have been reviewed in selecting suitable mine flows:

- A report by RM Krantz (1996), based on anecdotal information, reported that the average flow rates from Randfontein Estates Limited was 27 Ml/day, as recorded from 1995, while the mine was still operational;
- The original groundwater balance for the Western Basin, prepared by Krantz (1996), indicated that the dry season recharge was 21 Ml/day and the wet season recharge was 27 Ml/day; and
- The Council for Geoscience (CGS), in preparing a Regional Closure Strategy for the Western Basin, proposed a recharge figure of at least 23 Ml/day. The CGS report also indicated a potential variation in mine water recharge of 18-40 Ml/day.

More recently, the mining companies have been recording the mine water decant flows from the Western Basin.

The mine water recharge and corresponding decant flows are seasonal with high recharge occurring mainly in summer. The result of the mine workings being filled is that no storage or buffer capacity is left in the old mine workings. As recharge occurs, mine water flows from the decant points.

The Western Utilities Corporation (WUC) report estimates the long-term sustainable water supply from the Western Basin to be 16 Ml/day. This is a conservative estimate and it is anticipated that the recharge to the mine workings will decrease progressively as open pits are filled in and rehabilitated.

6.6.2.2 Water quality

The water in the Western Basin represents mature AMD, which corresponds to a situation when the pyrite oxidation products accumulated in the mine workings are progressively flushed. It may take some time to observe a significant improvement in water quality. The current best estimate of AMD quality is shown in Table 6-12. *(*BKS, Report No. J01599/05, August 2011- *Annexure A. Basis of Engineering Design).*

Table 6-12: Western Basin Water Quality (BKS, August 2011)

Parameter	Unit	Black Reef Incline Concentration		IMC Report Concentrations
		Median	95th percentile	
Total Dissolved Solids (TDS)	mg/L	6,733	7,174	6,580
Electrical Conductivity (EC)	mg/L	506	548	510
Calcium (Ca)	mg/L	400	461	
Magnesium (Mg)	mg/L	218	345	
Sodium (Na)	mg/L	103	139	
Sulphate (SO_4)	mg/L	4,083	4,556	4,010
Chloride (Cl)	mg/L	46	65	
pH		3.6	3.4 – 4.0	3.5
Acidity ($CaCO_3$)*	mg/L	1,740	2,560	
Iron (Fe)	mg/L	725	933	697
Aluminium (Al)	mg/L	29	54	
Manganese (Mg)	mg/L	148	312	
Uranium (U)	mg/L	0.1	0.2	

6.6.3 Geohydrology of the Central Basin

Mining in the Central Basin of the Witwatersrand Gold Fields started 125 years ago after the discovery of gold in 1886. The Central Basin mines were dewatered to the deepest mining depths until 1974, when most of the mines in the Central Basin were no longer operational (Scott, 1995). After 1974, the water level in some of the mines was allowed to rise, while

some mine dewatering continued, but by 1995 the main dewatering took place on the extreme western and eastern edges of the basin, at DRD and ERPM respectively.

In 2008, the last mine dewatering in the Central Basin was stopped at ERPM. The water level in the basin has been rising since then. The locality and extent of the Central Basin is shown in Plan 20.

6.6.3.1 Groundwater level rise and recharge

The ECL was confirmed for the Central Basin at 150 m below the ERPM Cinderella East shaft (a probable decant shaft) with collar level of 1 617 mamsl, or ECL level of 1 467 mamsl (186.2 m below SWV).

The water level in the Central Basin (measured on 13 May 2011 by DRD Gold) was 1,199 mamsl, about 454 m below surface measured at SWV Shaft, or about 268 m below the ECL. The water level measured at Gold Reef City Shaft No.14 on the same day had an identical reading, which indicates that the water level in at least part of the Central Basin is rising at the same rate over the entire basin.

Details of the model and methods used to the Central Basin water level rise and decant can be found in Water Balance and Levels (BKS Report number J01599/06).

Based on the results from the Central Basin simulations, it is expected that the water will reach ECL in August 2012 (average rainfall) while, if allowed to happen, decant would occur around March 2013. These dates are based on annual average rainfall data. A number of rainfall / recharge scenarios were also evaluated and the predicted dates for reaching ECL are as follows:

- Above average rainfall: June 2012;
- Average rainfall: August 2012; or
- Below average rainfall: December 2012.

The interconnectivity (i.e. locations and levels of cross cuts and holings) of the Central Basin is reasonably well understood. However, the potential flow rate of water between compartments in the basin and the water level profile along the length of the basin under various dewatering pump rates is not fully understood (BKS, Report No. J01599/05, August 2011). DWA developed a water level monitoring system, which can be used to optimise the required pump level to account for any level changes along the basin.

Although the interconnectivity of the Central Basin is understood and, until recently (2008), it was possible to drain the Central Basin from the ERPM SWV shaft, the current condition of the cross-cuts and holings is unknown. Scott (1995) states that mining on the Witwatersrand created sheet-like openings that are continuous laterally and with depth, to maximum mined depths of 3,500 m. In cases where the stope is a discontinuous sheet, it is joined by access haulages and drives.

The geological structure is that of a basin, with the rim more steeply dipping than the basin bottom, which may be horizontal. In the Central Basin, dips of 60-70 degrees can be found and the average dip is about 45 degrees. Where the mine openings dip steeply, the forces are such that, even when unsupported, they remain open.

The collapse or closure of cross-cuts and holings is possible and this could impact the possibility of dewatering the basin from a single point.

Furthermore, draining the basin to allow mining will remove the water that is providing some of the support, and it is expected that there may be an initial increase in seismic activity, which could have an impact on basin connectivity.

The potential decant point has been debated and there is no consensus on the point of decant. As expected, if the connectivity between the various sub-basins in the Central Basin is good (high transmissivity), decant will occur at the lowest point connected to the Central Basin void. The lowest known direct points of connection are the mineshafts on the eastern side of the basin (ERPM shafts), with Cinderella West and East being the lowest points (collar heights of 1 614 m and 1 617 mamsl, respectively). There are possibly other points where decant can occur first, i.e. through reef outcrop, geological faults and old abandoned mine pits or shafts. By the time decant occurs, Level 5 of Gold Reef City Shaft will be flooded.

The Johannesburg CBD has many tall buildings with deep foundations, some of which have piled foundations. Various reports in the media indicated that these deep foundations might be at risk from the rising AMD. Johannesburg CBD ground levels are generally above 1,750 m to the north and west, dropping to about 1 700 m in the southeast. Therefore, there is approximately an 80 m buffer at the expected decant level (1 617 m) and a 230 m buffer at the ECL. The water level is rising at the same rate across the Central Basin (between ERPM and Crown Mines), so it is expected that decant will occur without any impact on the buildings in the CBD (BKS, Report No. J01599/05, August 2011).

6.6.3.2 Water quality

The Central Basin has not been active for the past 2 to 3 years in terms of active dewatering. Although historical mine water quality records, for when active mining was still taking place, are available from mining companies, the current geochemical conditions associated with flooding of the old mine workings would be materially different from the past situation of active mining and associated preferential flow paths. The flooding of the mine workings has probably mobilised accumulated pyrite oxidation products, which would result in the rapid deterioration of accumulated mine water. It is therefore sensible to allow for more impacted mine water in the planning and design of the mine water abstraction and treatment infrastructure. *(BKS Report No. J01599/01, included as Annexure A Basis of Engineering Design)*

Table 6-13 summarises the current best estimate of the past and anticipated mine water quality, based on the work documented in the Western Utility Corporation report and the IMC report.

Table 6-13: Central Basin Water Quality (BKS, August 2011)

Parameter	Unit	Black Reef Incline Concentration		IMC Report Concentrations
		Median	95th percentile	
Total Dissolved Solids (TDS)	mg/L	5,950	7,700	4,936
Electrical Conductivity (EC)	mg/L	560	730	467
Calcium (Ca)	mg/L	500	580	
Magnesium (Mg)	mg/L	330	380	
Sodium (Na)	mg/L	105	150	
Sulphate (SO_4)	mg/L	4,000	5,200	3,700
Chloride (Cl)	mg/L	180	270	
pH		2.6	3.5	2.8
Acidity ($CaCO_3$)*	mg/L	1,690	2,425	
Iron (Fe)	mg/L	750	1,000	112
Aluminium (Al)	mg/L	30	50	
Manganese (Mg)	mg/L	30	60	

*Calculated

6.6.4 Geohydrology of the Eastern Basin

Mining in the Eastern Basin of the Witwatersrand Gold Fields started in about 1888 at the Nigel Mines and in about 1892 at Van Ryn Estates, slightly later than the mines on the Central Rand. The Eastern Basin encloses a surface area of 768 km^2 and includes Brakpan, Springs and Nigel (Scott 1995) as shown in Plan 21.

Water ingress into the Eastern Basin has been a problem since the earliest days of mining (Scott 1995). The Eastern Rand mines were dewatered to about 220 mamsl (to accommodate deep level mining) until the early 1990s, when the basin dewatering taking

place from the Sallies No. 1 shaft was stopped. Dewatering continued at Grootvlei No. 3 shaft, maintaining a level of about 780 mamsl, until the middle of 2010, when all pumping in the basin stopped. The water level in the basin has been rising ever since.

6.6.4.1 Expected rate of rise and decant

The ECL was confirmed for the Eastern Basin as 1 280 mamsl. The reasons for selecting this level as the ECL are documented in Environmental Critical Levels (BKS, Report No. J01599/03, August 2011).

The water level in the Eastern Basin was not a concern until 2010, when pumping stopped at Grootvlei No. 3 shaft. The water level measurement at Grootvlei No. 3 shaft on 21 April 2011 was at 917 mamsl (or 653 m below surface).

Based on geo-hydrological modelling done for the Eastern Basin (Water Balance and Levels (BKS, Report No. J01599/06, August 2011) it is expected that the ECL water level will be reached in April 2015, while decant (if allowed to happen) would occur in around September 2015. These projected dates are based on annual average rainfall. If above-average rainfall occurs, the ECL will be reached earlier, possibly as early as in December 2014.

The interconnectivity of the Eastern Basin is reasonably well understood, i.e. levels of cross-cuts and holings; however, the potential flow rate of water between compartments within the basin and the water level profile across the basin under various pump rates is not fully understood. DWA developed a water level monitoring system, which can be used to optimise the required pump level to account for any level changes along the basin.

Although the interconnectivity of the Eastern Basin is understood and until 2010 it was possible to drain the Eastern Basin from the Grootvlei shaft, the current condition of the cross-cuts and holings is unknown.

Scott (1995) provides a description of the interconnectivity:

“The mines in the northern part of the area are interconnected and there is no restriction to water movement between individual mines. In the southern region Sub Nigel and Nigel Mines are continuously connected. The mines in the central part of the Eastern Basin are connected only in certain places and water flowing through this region will have to find and follow preferred pathways. There is no connection between Marivale Mine and the Nigel Mine, the connection to the lowest point at Nigel Mine is via Vogelstruisbult to Sub Nigel at 61 level.

Thus it would appear that the water from Springs Mines, East Daggafontein and Marivale would first have to flow into Vogelstruisbult where a connection exists (61 level 8 haulage) to Sub Nigel Mine. Water will rise in the Sub Nigel Mine and then into the Nigel Mine to emanate at surface. Thus the limiting factor is the connection between Vogelstruisbult and Sub Nigel Mine. If flow is restricted at this level then the water will rise at Marivale No. 4 or No. 7 shafts instead of in the Sub Nigel and Nigel Mines.”

Scott (1995) states that the rocks making up the Witwatersrand Supergroup in this area form an asymmetrical, south-west-plunging syncline. Dips on the northern limb are about 45 degrees, while those on the southern limb are about 25 degrees. As discussed for the Central Basin, where the mine openings dip steeply, the forces are such that even when unsupported, they remain open. This could make the Eastern Basin more sensitive to collapse, especially in the southern limb where the dip is only around 25 degrees.

Therefore, it can be stated that the risk of collapse or closure of cross-cuts and holings is higher in the Eastern Basin than in the Central Basin. This could impact the possibility of dewatering the basin from a single point. Filling of the cross-cuts and holings with water will, however, provide support and reduce the risk of collapse. Contingency plans have been considered to address the potential risk of connectivity problems (formation of sub-basins not connected to the Eastern Basin).

It is expected that decant from the Eastern Basin will occur at Sub-Nigel Shaft 3 (collar level 1 549 mamsl), which is the lowest known connection point to the Eastern Basin void; however, according to Scott (1995), should the flow between Vogelstruisbult and Sub-Nigel be restricted, the water will probably decant at the Marivale 4 or 7 shafts instead of in the Sub-Nigel and Nigel Mines.

Furthermore, Gold One, which owns the Sub-Nigel mines, has indicated an interest in possibly plugging some of the mines to enable the continuation of mining. This could isolate these mines from the Eastern Basin, but may also have the unexpected consequence of creating a sub-eastern basin in the Nigel Mines.

The surface elevation of the Nigel CBD are approximately at decant level to about 10 m above decant level. Therefore, at the level of decant, buildings with deep foundations may be impacted if there is connectivity to the Eastern Basin void (either direct connection or through geological faults).

6.6.4.2 Water quality

The expected water quality is defined in Basis of Engineering Design (BKS, Report No. J01599/01, August 2011).

The Eastern Basin has always had better water quality than the Western and Central Basins, which seems to be due to the lower concentration of pyrites in the rock below the water level and the recharge through the alkaline dolomites. This, however, is expected to change as the water rises into the Kimberley Reef, which typically has higher pyrite content than the Main Reef (Scott 1995). The Kimberley Reef was mined to a lesser extent than the Main Reef, so it provides a much smaller contact surface. Also, the rapid filling of the Eastern Basin does not provide contact time between water, oxygen and pyrite, which should have a positive impact on the AMD water quality.

Mine water quality in the Eastern Basin is of a relatively good quality for a number of geohydrological reasons, such as recharge of the mine workings with relatively good quality dolomitic water. However, as the basin is flooded, and due to associated mobilisation of

accumulated pyrite oxidation products, the water quality will deteriorate in time if not addressed.

The historical water quality data, measured at Grootvlei Mine and the anticipated Eastern Basin, flooded basin water quality is shown in Table 6-14, based on the work documented in the Western Utility Corporation report.

Table 6-14: Eastern Basin Water Quality (BKS, August 2011)

Parameter	Unit	Black Reef Incline Concentration		IMC Report Concentrations
		Median	95th percentile	
Total Dissolved Solids (TDS)	mg/L	2,880	4,405	5,500
Electrical Conductivity (EC)	mg/L	295	360	450
Calcium (Ca)	mg/L	395	440	550
Magnesium (Mg)	mg/L	160	185	230
Sodium (Na)	mg/L	220	260	325
Potasium (K)	mg/L	5		15
Sulphate (SO_4)	mg/L	2,400	2,620	3,275
Chloride (Cl)	mg/L	16	205	260
pH		6.5	5.9 (5th perc.)	5.0
Alkalinity ($CaCO_3$)	mg/L	230	40 (5th perc.)	0
Acidity ($CaCO_3$)*	mg/L	220	460	750
Iron (Fe)	mg/L	120	247	370
Aluminium (Al)	mg/L	0.1	0.3	1
Manganese (Mg)	mg/L	3.5	6.0	10.0
Nickel (Ni)	mg/L	0.3	0.4	1

*calculated

6.7 Surface water environment

AMD has a profound impact on the water quality of receiving streams. Close to the point of discharge untreated decant water results in unstable chemical conditions when it enters the surface water environment. The underground mining environment engenders a decant water that is characterised by extreme acidity, oxygen deficiency, high salinity and elevated temperature. The acidity mobilises metals, dominated by iron and a whole range of other metals including radionuclides. Oxygen starvation results in most of the iron being in the ferrous form, which though stable in the mining void, is unstable in the surface water environment. The high salinity often results in unacceptably high the concentrations of individual ions.

When first discharged the extreme acidity, high metal concentrations and high salinity renders the AMD highly detrimental to all categories of water use. This water is deceptively clear and sterilises life forms in the aquatic environment in the immediate vicinity of the point of discharge. Contact with surface material and the atmosphere soon neutralises the acidity while at the same time the ferrous iron fully oxidises to the characteristically red ferric form, with unsightly deposition of sediment that stifles benthic biota. Neutralisation of the acidity greatly reduces the solubility of metals, which also form part of the sediment. This also helps reduce the salinity of the stable water that finally emerges further down the stream. While highly detrimental to the local riverine environment, the water that emerges further downstream is no longer acidic, is free from excessive metals (and hence radioactivity), no longer has a propensity to deposit sediment and has a somewhat lower salinity. The warm temperature also reverts back to normal ambient conditions. There is a risk that some of the metals deposited further upstream may be remobilised and transported downstream during floods. However, solubility will remain much lower than in the original AMD and hence the metals (and any associated radionuclides) will tend to be confined to the sediment. While salinity is reduced, it remains high and acts in a conservative manner, adversely affecting the salinity throughout the downstream river system. Virtually the only mitigation of the salinity is through dilution by incremental catchment runoff and removal of water by abstraction and seepage loss.

Water treatment has a similar effect, except that the oxidation and neutralisation all takes place in a controlled environment in the treatment plant. Hence acidic and deposition damage of the upper reaches of the stream is obviated and the sediment is safely removed before the final product is discharged to stream. The product water salinity is likely to be similar to that of the decant water after natural oxidation and neutralisation has taken place, (Although some differences might result from contact with dolomitic rock downstream of the Western Basin which would favour more representation of the magnesium cation after natural decant. Moreover the solubility of naturally occurring sodium sulphate, magnesium sulphate and potassium sulphate salts also differ from that of calcium, thereby changing the deposition of the insoluble portion of each salt.)

Increased salinity holds substantial economic consequences for urban, industrial, mining and irrigation, aquaculture and (to a lesser extent) livestock users. Elevated salinity can also adversely affect the aquatic environment. Since the mine water in these Basins is predominately calcium-sulphate, it tends not to affect soil drainage even at high salinity levels. (In fact gypsum is often applied to irrigated lands to prevent the clogging of soil pores.) However, high chloride and magnesium concentrations can blemish fruit and damage leaves and high salinity as such reduces crop yields and can force switches to less valuable crop types.

It is anticipated that over time the salinity of the decant water will gradually improve. For example, since 1995 the salinity of the discharge from Grootvlei Gold Mine has improved from about 3 600 mg/l to 2 000 mg/l. This is attributable to a combination of a reduced rate at which sulphates are formed by oxidation of pyrites, gradual replacement of the saline water stored in the mine void with rainfall ingress and short-circuiting, with reduced movement of water through the deeper parts of the mining void. The reduced sulphate formation rate is caused by oxygen starvation in the inundated portion of the void, with new oxygen input limited by the amount dissolved in the rainfall ingress water, whereas before during operation the mining void was exposed to the atmosphere.

Two gold mining basins on the Witwatersrand are faced imminent decant, while in one decant has already commenced.

6.7.1 Western Basin

Plan 22 shows the Western Basin decant point and the downstream affected rivers of the Crocodile West Catchment. The decant water discharges to the Tweelopiespruit, which flows towards the Rietspruit, Bloubankspruit and the Crocodile River. Increased salt loads are anticipated in these river reaches, in Hartbeespoort Dam and beyond.

The Western basin is distinct from the other two basins in that the mining void has already filled, with uncontrolled decant to the Tweelopiespruit since 2002. As expected the upper reaches of this stream are clear but sterile, characterised by very low pH, low oxygen concentration, high salinity and elevated temperature. Contact with stream bed and the atmosphere results in neutralisation, oxygenation of iron and associated deposition of metals (including uranium), ferric iron and excess calcium sulphate, all of which suffocates benthic organisms in a blanket of sludge. Further downstream the water is again stable and clear and the temperature has reverted to normal. However, high salt concentrations persist.

However up to 2010 there was no evidence of the effect of the mining decant on water salinity at DWA weir A2H019 on the Bloubankspruit. This was surprising since for a normal river reach the low flow salinities at this point were expected to have more than trebled and the flow-weighted salt load entering Hartbeespoort Dam should have increased by 35%.

There was no evidence of the expected large increase in salinity for the first nine years because decant water enters an underlying dolomitic compartment where the groundwater level was drawn down by irrigation abstractions. As a result for the first 9 years the

groundwater did not spill from one compartment to the next with the result that no change was evident at DWA station A2H049 on the Bloubankspruit. However, since then the relevant compartments have filled and spectacular breakthrough has occurred with the salt load increasing at A2h049 by more than 3000 t per month, which implies a 27% increase in the salt load entering Hartbeespoort Dam, despite input from the biggest Waste Water Treatment Works (WWTW) is Southern Africa plus several other large WWTWs. Figure 6-11 shows the sharp change in salinity after breakthrough at station A2H049.

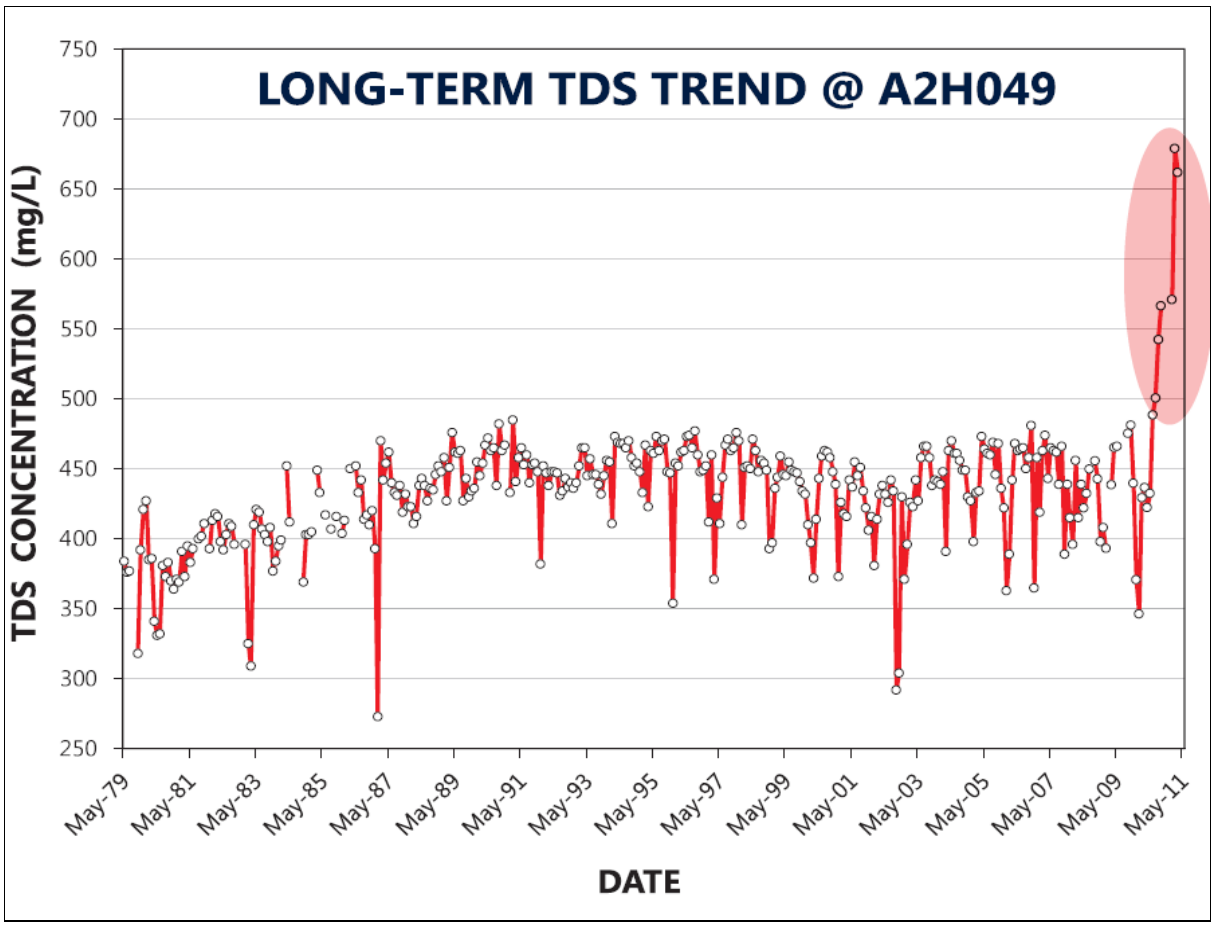

Figure 6-11: Long-term TDS trend at weir A2H049

This dramatic change highlights the need including the dolomitic storage and groundwater abstraction effect. It also points to the magnitude of the change in salinity and the resulting impact on users.

A number of impacts relate not only to the salinity as such, but to the concentrations of individual components of the TDS. Sulphate is of particular concern in this regard.

This increase in salinity would affect crop yields in the extensive irrigated areas downstream of Hartbeespoort Dam and substantially increase salinisation costs to urban and industrial consumers. This is especially important since DWA is investigating the potential development of a large regional water purification works at Hartbeespoort Dam to supply

water to the Pretoria West area. Irrigation downstream of Roodekoppies Dam would also be affected. A scheme to transfer water from the lower Crocodile River to the Moloko River catchment to supply salt-sensitive Eskom power stations is also being developed.

Hence it may be prudent to include the Crocodile River at Roodekoppies Dam (A2R015) and two points in the Lower Crocodile River to facilitate estimation of the economic effects on irrigation users and the water transfer to the strategic industries in the Waterberg area.

6.7.2 Central Basin

Plan 23 shows the proposed Central Basin treated water discharge point and the downstream affected Vaal River system. At present there is no discharge from the Central basin. After implementation of the short term intervention, treated decant water would discharge to the Elsburgspruit, which flows into the Natalspruit, Rietspruit, Klip River and Vaal River. Increased salt loads are anticipated in these river reaches, affecting salt concentrations in Bloemhof Dam and beyond to Douglas Weir.

Treated water discharge will lack most of the adverse effects currently present in the upper reaches of the Tweelopiespruit since the governing processes will take place in the HDS plant rather than the river. However, the temperature will still be elevated (although it would have cooled a bit in the plant) and the salinity will still be high.

The substantially increased salt load would enter Vaal Barrage thereby increasing the amount of water required from Vaal Dam to dilute the outflow from Vaal Barrage to protect the water quality supplied by downstream water boards and municipalities. Spillage of water from Bloemhof dam during drought sequences would also reduce system yield and trigger the need to augment raw water importation, resulting in substantial economic impact.

During drought periods when it is necessary to suspend the Vaal Barrage dilution option and revert to the less water demanding Rand Water blending option, TDS levels in the water supplied by Rand and throughout the downstream Vaal River system will increase leading to increased salinisation costs to urban and industrial consumers. The large Vaalharts irrigation scheme and riparian irrigators would also be affected, resulting in further economic impact.

The no-go option would result in uncontrolled decant, leading to contamination of the upper reaches of the Elsburgspruit in a manner similar to similar to those currently pertaining to the Tweelopiespruit. I.e. initial sterilisation, followed by a stretch of the river being discoloured and the bed blanketed with a sludge consisting of metal hydrides and gypsum, followed by clear saline water.

The effects of salinity on the downstream Vaal River system would be similar to those for the treatment option, although the salinity may differ somewhat.

6.7.3 Eastern Basin

At present there is no such discharge, following the closure of Aurora mine.

The proposed Eastern Basin treated water discharge would be to the Blesbokspruit near the head of the Blesbokspruit wetland. The downstream system that would be affected by radically increased salinity levels includes the Blesbokspruit, Suikerbosrant and Vaal River and downstream dams. This option would have similar effects on salinity levels in the downstream river system.

The no-go option for the Eastern basin would result in decant emerging far to the south at Nigel, downstream of the Blesbokspruit wetland. The water quality changes in the Blesbokspruit would be similar to those described for the Elsburgspruit for the Central basin. The larger dilution afforded by upstream sewage discharges may to some extend attenuate these negative impacts.

The economic impacts on downstream urban and industrial and irrigation users and of reduced Vaal system yield would be similar (but of different magnitude) to those described for the Central Basin.

7 PUBLIC PARTICIPATION PROCESS

Public participation is an essential and legislative requirement for environmental authorisation. The principles that demand communication with society at large are best embodied in the principles of Chapter 1 of NEMA. In addition, Section 24 (5), Regulation 54 – 57 of GNR 543 under NEMA, guides the public participation process that is required for an EIA process.

The public participation process for the Witwatersrand Gold Fields AMD project has been designed to satisfy the requirements laid down in the above legislation and its guidelines. This section of the Draft Scoping Report highlights the key elements of the public participation process to date.

It should be noted that there are a number of other channels of communication being utilised in addition to the processes occurring officially as part of this AMD EIA process by the DWA and TCTA to communicate aspects of this project. As they are not under the control of Digby Wells we cannot list them comprehensively or ensure what form or frequency they may take.

The objectives of public participation during the EIA process are to provide sufficient and accessible information to I&APs in an objective manner so as to:

During the Scoping Phase:

- Assist I&APs with identifying issues of concern, and providing suggestions for enhanced benefits and alternatives;
- Contribute their local knowledge and experience; and
- Verify that their issues have been considered and to help define the scope of the technical studies to be undertaken during the Impact Assessment.

***During Impact Assessment*:**

- Verify that their issues have been considered either by the EIA Specialist Studies; and
- Comment on the findings of the EIA, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones.

The key objective of public participation is to ensure transparency throughout the process and to promote informed decision making.

7.1 Approach

The public participation process is being undertaken to encourage active engagement from stakeholders so that suggestions and comments can be incorporated into the project design and that concerns and conflicts can be openly addressed in an on-going manner. Through the Public Participation Process (PPP) adequate and timely information is provided to all I&APs to ensure that they are given sufficient opportunity to voice their opinions, concerns and issues.

7.2 Identification of Interested and Affected Parties

The identification of stakeholders is on-going and is refined throughout the process. As the on-the-ground understanding of affected stakeholders improves through interaction with various stakeholders in the area, the database is updated. The identification of key stakeholders and community representatives for this project is important and their contributions are valued.

Identification of I&APs took place through responses to newspaper advertisements and site notices and through referrals from I&APs who have registered for the project. I&APs' details are captured on Maximiser version 12, an electronic database management software programme. According to the NEMA EIA Regulations under Section 24(5) of NEMA, a register of I&APs (Regulation 55 of GNR 543) must be kept by the public participation practitioner. Such a register has been compiled and is being kept updated with the details of involved I&APs throughout the process (See Appendix F). As of the end of the 9 May 2012 there were 458 I&APs registered on the database

7.3 EIA application form and landowner notifications

The EIA application form (Appendix G) for the proposed project was submitted to the DEA on 12 December 2011. Subsequent to the submission of the application form a letter notifying potentially directly affected land owners and occupiers were sent via registered mail. Proof of the notification letters were attached to the application form which was submitted to the DEA. A copy of the letter is attached as part of Appendix H.

7.4 Authority consultation

Authority meetings are being held every two months with the following authorities:

- Department of Environmental Affairs;
- Department of Water Affairs;
- National Nuclear Regulator;
- Ekurhuleni Metropolitan Municipality; and
- Mogale City Local Municipality.

Thus far two authorities meetings have taken place on the 14 February 2012 and the 17 April 2012 respectively. Both meetings were held at DWA's Gauteng Regional Offices in Pretoria. The purpose of these bi-monthly discussions is to inform authorities of the progress of the project, key milestones and to receive their inputs and advice on the EIA process.

7.5 Announcement of opportunity to become involved

The opportunity to participate in the AMD EIA project was announced in December 2011 and again in February 2012. The documentation that has been developed for the PPP is described below and attached as Appendix I.

7.5.1 Background Information Document

A Background Information Document (BID) and I&AP registration forms were developed and distributed to various stakeholders and I&APs from 7 December 2011 onwards. The BIDs included information regarding the following:

- Description of the project;
- Legal framework to be adhered to;
- Locality and extent of the proposed project;
- Specialist studies to be undertaken;
- Approach to the EIA;
- PPP that will be followed; and
- Invitation to public open days.

The I&AP registration form was included as part of the BID and provided I&APs with an opportunity to raise issues of concern and comments regarding the proposed project, and to register as I&APs for the EIA process.

7.5.1.1 Newspaper adverts

A number of newspaper adverts have been placed during the scoping phase of the project. The dates and newspapers advertised in are detailed in Table 7-1 and Table 7-2

Table 7-1: Newspaper adverts placed in December 2011

Newspaper	Date of Publication
Sowetan	12 December 2011
The Springs Advertiser	14 December 2011
The Springs African Reporter	16 December 2011
Randfontein/ Westonaria Herald	16 December 2011

Table 7-2: Newspaper adverts placed in February 2012

Newspaper	Date of Publication
Beeld	14 February 2012
The Star	14 February 2012
Sowetan	14 February 2012

Newspaper	Date of Publication
Randfontein Herald	21 February 2012
Springs Advertiser	22 February 2012
African Reporter	24 February 2012

In compliance with the NEMA regulations, newspaper advertisements were published in English, Afrikaans, IsiZulu and Setswana. Proof of placement of the newspaper advertisements are provided in Appendix J.

7.5.1.2 Site notices

Site notices were positioned at prominent localities within the project area during December 2011 and February 2012. These site notices were placed at conspicuous public places to invite stakeholder participation. Please refer to Appendix K for proof of site notices placed in the project area.

7.6 Consultation and written notification

7.6.1 Telephonic consultation

Throughout the scoping process, telephonic consultation with identified and registered I&APs took place to:

- Obtain and verify contact details;
- Inform I&APs of the proposed project;
- Inform I&APs of, and invite them to the public open days; and
- Gather any issues, comments and suggestions regarding the project.

7.6.2 Written notifications

Email: This method of distributing information was used mainly for the authorities and those parties who had access to email. BIDs including I&AP registration forms were emailed to stakeholders.

Hand-Delivery: BIDs were hand delivered to potentially directly affected and surrounding farmers and land occupiers and documents were also distributed during the one-on-one consultation meetings.

7.6.3 Public information sharing meetings and one-on-one sessions

Various public information sharing meetings as well as one-on-one discussions were held with I&APs to present them with information regarding the proposed project. These meetings served a purpose of providing I&APs with a platform to raise their issues and comments

regarding the proposed project. Comments raised from these meetings have been recorded and incorporated in the Comments and Response Report (CRR), attached as Appendix L. The meetings held during the scoping phase are detailed below.

7.6.3.1 EIA interest group meeting

An EIA interest group meeting was held on Wednesday, 22 February 2012 at the Turbine Hall in Newtown, Johannesburg. The aim of this meeting was to engage with the key stakeholders and to provide them with an opportunity to raise comments, questions and suggestions regarding the proposed immediate and short term interventions for the treatment of AMD. Issues raised at the meeting are included in the CRR.

7.6.3.2 Public open days

Three public open days were held in the Western, Central and Eastern Basins. The purpose of these open days was to present project information to the broader public and to allow I&APs to engage with the project team members (Figure 7-1). Issues raised at the open days are included in the CRR. Please refer to Table 7-3 for details on the Public Open Days.

Table 7-3: Details of the public open days

Location	Venue	Date	Time
Western Basin	Randfontein Golf Club	25 February 2012	09:00-16:00
Central Basin	Germiston Golf Club	03 March 2012	09:00-16:00
Eastern Basin	Springs Country Club	10 March 2012	09:00-16:00

Figure 7-1: Discussions with I&APs during a public open day

7.6.3.3 One-on-one consultations

One-on-one consultations were conducted with the relevant local authorities, directly affected and surrounding land owners in the Western, Central and Eastern basins. Refer to Table 7-4 for one-on-one meetings held to date.

Table 7-4: One-on-one consultations held to date

I&AP Name	Organisation/ Farm	Date
Rex Zorab	Rand Uranium	02 November 2011
Ms Mariette Liefferink; Dr Koos Pretorius; Ms Simone Liefferink	Federation for a Sustainable Environment	23 January 2012
Mr Jaco Schoeman Mr Henry Gouws	DRD Gold	10 March 2012
Mr Albie van Rooy	Sterkfontein 173 portion 16	15 March 2012
Mr Piet Schutte	Sterkfontein Portion 8	15 March 2012
Mr Carel Botes	Sterkfontein 173, portion 7	15 March 2012
Mr Chris Grobler	Fauna Visions, Sterkfontein 173	15 March 2012
Mr I Jardin	Sterkfontein 173	15 March 2012
Mr and Mrs Delport	Plot 88, Oak Tree	15 March 2012
Mr Jannie Rykaard	Krugersdorp Game Reserve	15 March 2012

I&AP Name	Organisation/ Farm	Date
Mr Paul Hoogendyk	Sterkfontein Country Estates	15 March 2012
Ms Elize Strydom	Sterkfontein 173, portion 6	15 March 2012
Mr Reg Tarr	Sterkfontein 173, portion 3	15 March 2012
Mr Louis Trichardt	Sterkfontein Country Estates	15 March 2012
Mr Garfield Krige	Sterkfontein Country Estates	15 March 2012
Cllr Andy Mathibe; Peter Tladi; Cllr Paul Molapo; Cllr Dikgang Sithole; Cllr. Zakhele Dlamini; and Ms Samukelisiwe Mdlalose	Mogale City Local Municipality	20 March 2012
Cllr Hillary Coke; Cllr Tania Campbell; Cllr Charlie Crawford; Cllr Mbuyiseli Xakambana; Cllr Primrose Sibidli	Ekurhuleni Metropolitan Municipality (Germiston)	30 March 2012
Mr Anthony Kesten; Ms Miemie von Maltitz; Ms Annamarie Maurizi; Ms Sonia Mothodini; Ms Elsabeth van der Merwe ; Mr Nico van den Berg; Mr Smuts Marais; Mr Callie Smit; Mr Barend Deming; Ms Ilse Kleinhans; Ms Lilian Kwakwa;	Ekurhuleni Metropolitan Municipality (Germiston)	03 April 2012

I&AP Name	Organisation/ Farm	Date
Ms Maphuthi Moabelo Ms Cecilia Rakgoale; Ms Mthokozisi Nkosi; Ms Gavin Ramaboea		
Mr Matthew Havenga ; Mr Phil De Jager; Mr Bill Ross Adams; Ms Judy Fuchs; Mr Rob Taylor; Mr Piet van der Walt; Mr Sam Khoza; Ms Ria Jacobs; Ms Sibongile Sithole; Mr John Duncan; Mr Thabo Sibuyi; Mr Gunte Jacques Kommer; Ms D Klonaris	Eastern Basin Surrounding landowners.	. 20 April 2012

7.7 Comments and response report and acknowledgements

All the issues raised up until the end of April 2012 were captured in the CRR and is appended to this Draft Scoping Report as Appendix L. The attached comments and response report has been categorised into the flowing key issues and responses are summarised in Table 7-5.

Table 7-5: Key issues and responses

Issue	Response
The importance for the EIA to investigate alternatives particularly the no-go alternative.	The EIA will investigate alternatives including the no-go option.
How and who will finance the interventions?	The immediate and short term interventions capital investment for the infrastructure will be funded by the government. The intention of government is that capital cost incurred will

Issue	Response
	eventually be recovered from the water users and the mines. One of the objectives of the long term solution is to determine a model for financial recovery.
The impact of the project on downstream users.	This will be investigated in the EIA
Water quality issues particularly the release of water containing high TDS.	This will be investigated in the EIA
Water quantity issues relating to the release of additional water down the streams.	The impact of the additional water being released will be investigated in the EIA.
The reasons why the project is not going the full treatment route including desalinisation.	The reason that desalination is not implemented within the current phase, is to allow the correct selection of operation and treatment to be determined by the Long Term solution feasibility study.
The projects impact on the Vaal River and the potential of the project causing the Vaal river going into deficit.	Aurecon is looking at the long term solution which will also address the issue of the Vaal River going into deficit.
The impact of the project on groundwater.	The EIA will investigate the full extent of impact on the groundwater system.
The impact of the project on the ecology of the rivers.	The EIA will investigate the impact on the ecology and will suggest mitigation measure
The impact of the project on human and animal health.	This will be investigated in the EIA.
Public Participation ensuring that the project is made known to as many people as possible particularly the disadvantaged.	The EIA has been well advertised as per the public participation process. Meetings targeting the disadvantaged will be undertaken.
Due legal processes to be followed particularly around the use of section 24G.	TCTA has taken a decision to proceed with the EIA process and then apply for a section 24 G if required. If TCTA wait for authorisations, the ECL will be breached and decant in the Central and Eastern Basin will occur.
Treatment technologies and particularly alternative technologies.	Alternatives will be investigated as part of the EIA.

Issue	Response
Sludge disposal and the potential impacts on groundwater.	Sludge disposal options will be investigated in the EIA.

Detailed issues and responses can be found in the CRR Appendix L.

The CRR will be updated throughout the EIA process to include additional I&AP contributions that may be received as the study proceeds, and as the findings of the EIA become available.

7.8 Draft Scoping Report

The purpose of the PPP in the Scoping phase is to enable I&APs to verify that their contributions have been captured, understood and correctly interpreted, and to raise further issues. At the end of Scoping phase, the issues identified by the I&APs and by the environmental technical specialists, will be used to define the Terms of Reference for the Specialist Studies that will be conducted during the Impact Assessment Phase of the EIA. The Draft Scoping Report, including the CRR is being distributed for comment as follows:

- Placed at public venues within the vicinity of the project area. (These are listed in Table 7-6 below);
- A second EIA interest group meeting will be held with key stakeholders;
- Open days are to be held in each of the catchments;
- Meetings with disadvantaged communities in the central basin will take place;
- Landowners and farm workers meetings in the western and eastern basins will be held;
- CDs are to be mailed to key stakeholders; and
- CDs to be mailed to I&APs who request the report.

The Draft Scoping Report will be available for review from the 28 June 2012 to 7 August 2012.

Table 7-6: Locations where the Draft Scoping Report is available for review

Location	Contact	Contact Tel	Address
Westrand District Municipality	Ms Stoffberg	011 411 5250	Cnr Sixth and Park Streets, Randfontein
Mogale City local Municipality	Ms Cindy Ramalatswa	011 951 2101	Cnr Commissioner and Market Street, Krugersdorp

Location	Contact	Contact Tel	Address
Mogale City Library	Ms Monica Fourie	011 951 2441	Cnr Von Brandis and Market streets, Krugersdorp
Randfontein Library	Ms Marjorie Sabir	(011) 411 0076)	Corner Pollock & Sutherland, Randfontein
Ekurhuleni Civic Centre Library	Ms Edith Kruger	(011) 871-7867	Corner Queen and Cross Street, Germiston
Springs Library	Ms Tebogo Kekana	(011) 999 8801	55 5th Avenue, Springs
Magaliesburg Library	N/A	N/A	Ubuntu Arts & Crafts Centre, Koster Road Magaliesburg
Haartebeespoort Library	Ms Nola van Heerdern	(012) 253 2075	Marais Street Schoemansville, Haartebeespoort
Vosloorus Library	N/A	(011)999 5937	MC Botha Avenue, Voosloorus
Thokoza Library	Ms Qoshiwe Matcheke	(011) 999 2499	7603 Moepshe Street, Alberton
Vanderbijlpark Library	Ms Elmarie Slater	(016) 950 5252	Klasie Havenga Street, Vanderbijl Park
Vereeniging Library	Ms Maria Mtimkulu	(016) 450 3164	Cnr Leslie and Market Street

The Draft Scoping Report will also be made available on the Digby Wells Environmental website; www.digbywells.com and on the AMD website; www.amdshort.co.za.

7.8.1 Notification of the availability of the Draft Scoping Report

A letter notifying stakeholders that the Draft Scoping Report is available for public review was sent to the stakeholder database on 18 June 2012. The letter invited participants to obtain a copy of the Draft Scoping Report at any of the public places or to request a CD copy of the document. The letter also invited participants to attend any of the public meetings listed in Table 7-7and Table 7-8 which will be held to review the contents of the Draft

Scoping Report. In addition to the letter which was sent to all stakeholders, the availability of the Draft Scoping Report and the planned public meetings were advertised in the newspapers listed in Table 7-9.

Table 7-7: Public meetings to review the Draft Scoping Report

Meeting	Date and time	Venue
Public meeting (and open house) Western Basin	17 July 2012 at 14:00	Randfontein Golf Club
Public meeting (and open house) Central Basin	18 July 2012 at 14:00	Germiston Golf Club
Public meeting (and open house) Eastern Basin	19 July 2012 at 14:00	Stable Inn Conference Centre

In addition to the above mentioned public meetings, the following meetings will be held with focus groups to review the Draft Scoping Report:

Table 7-8: Focus Group meetings to review the Draft Scoping Report

Meeting	Date and time	Venue
EIA Interest Group meeting	11 July 2012 at 14:00	SAB World of Beer Conference Venue
1st Central Basin community meeting (Extension 9)	21 July 2012 at 09:00	Ward 35, Ext 9 Taxi Rank
Western Basin community meeting with farmers and farm workers	24 July 2012 at 14:00	Makiti Conference Venue
Eastern Basin community meeting with landowners and workers	25 July 2012 at 14:00	Stable Inn Conference Venue
2nd Central Basin community meeting (Cyril Ramaphosa)	28 July 2012 at 09:00	Ward 42 Cyril Ramaphosa Taxi Rank

Table 7-9: Newspaper adverts for the notification of the review of the Draft Scoping Report

Newspaper	Date of Publication
Randfontein Herald	12 June 2012
Springs Advertiser	13 June 2012
The African Reporter	13 June 2012
Sowetan	14 June 2012
The Star	14 June 2012
Beeld	14 June 2012
Agri SA (Die Boer/ The Farmer)	July Edition
Farmers Weekly	27 July 2012
Heidelberg/Nigel Herald	27 June 2012
Landbou Weekblad	13 July 2012
Nufarmer & African Enterprenuer	August Edition
Sasolberg Ster	3 July 2012
Triangle Courier	24 July 2012

7.9 Final Scoping Report

The Final Scoping Report will be updated with additional issues raised by I&APs and may contain new information. The Final Scoping Report will be distributed to the DEA, key I&APs, and to those individuals who specifically request a copy. I&APs will be notified of the availability of the Final Scoping Report.

8 POTENTIAL IMPACT IDENTIFICATION

The proposed AMD Project may have potential impacts on the social and biophysical environments. These impacts may result from the construction and operational activities planned for the proposed project, with reference to the NEMA listed activities discussed in Chapter 2 (Table 2-2).

Table 8-1 was compiled to summarise the environmental aspects and potential impacts associated with the AMD Project.

Table 8-1: Potential impacts associated with the construction and operation of the proposed AMD Project

Environmental Aspect	Potential Impact
Surface Water Quality	
Discharge of treated water into the streams.	Deteriorating water quality in streams affecting beneficial water uses. Elevated sulphate levels affecting human and animal health. Elevated temperature, conductivity, pH, O_2 content, sulphates, heavy metals and micro-organisms in impacted streams. Many of these variables hold direct health and other water use impacts, as well as promoting damaging sludge blankets.
Discharge of water containing high TDS into the receiving rivers.	Reduction yield of Vaal River system due to elevated salt load entering Vaal Barrage.
Water Quantity	
Increase in water volumes in the receiving catchments due to the treated water discharge.	Flooding – inundation of riparian property (incl. informal areas, footpaths, access roads, etc.). This will support the social impact studies. Flooding – impact on low level bridges, structures, etc., affecting level of service and stability of the structures. This will support the social impact and economic impact studies. Flooding – impact on stability of farm dams, and especially spillways due to the potential of persistent spilling due to higher base flows. This will support the social impact and economic impact studies.

Environmental Aspect	Potential Impact
	Channel stability, especially in upper reaches of study area. Higher base flows may change the dynamics of the receiving stream and river channels. Potential movement of contaminated sediments. Especially near existing decant points and the proposed discharge points, the local sediments either have or may receive contaminants from the process. These may move further downstream under the new base flow regimes proposed.
Geohydrology	
Dewatering aquifers through abstraction of AMD	Potential reduction in groundwater quantities relied upon by water users. Reducing pressure through dewatering in mine voids and dolomite solution cavities – potential for collapse (geology instability)
Discharge of treated water in to the receiving environment	Seepage of discharged water back into groundwater environment – quality impact due to high salt load and waste of energy due to the recycling of water.
Storage of sludge produced by the treatment of AMD	Seepage of sludge and TSF mixture into groundwater environment – quality impact. Different quality impacts for each basin Deposition of sludge into Wes Wits Pit might have negative water quality impact
Air Quality	
Storage of sludge on existing TSFs	Elevated concentration of PM10, PM2.5 particulate matter in the atmosphere due to the deposition of the sludge on tailings facilities.
Heritage and Culture	
Construction of pump infrastructure	May cause alteration, damage to or destruction of historical buildings and structures older than 60 years

Environmental Aspect	Potential Impact
Discharge of treated water into rivers	Potential increases in water flow due to discharge may impact on heritage resources that could occur downstream and near river banks Potential increases in water flow due to discharge may impact on intangible heritage aspects such as baptism sites located in or near river Increased flow into the Tweelopiespruit may change aspects of the COH WHS
Human Health	
Treated water being discharged into the environment	Possible health impacts associated with the exposure to surface water and soil should decanting take place - sulphates, nitrates, , heavy metals, radionuclides
Radiation	
Radionuclides in the receiving streams due to the treated water discharge	Potential health impacts to humans as well as animals exposed to the water.
Socio-economic	
Potential increase in employment opportunities	People in the surrounding communities are hired during the construction and operational phases of the project
Operational costs required to maintain and run the HDS plants	Increased expenditure on the short term solution which is funded by the government
Potential change in water quality downstream of the receiving streams	Economic and health impacts may result on downstream water users
Soil	
The use of treated water for irrigation	Potential to affect the soil quality negatively. May increase the soil salinity. Potential to reduce or affect crops.
Ecology	
Discharge of water into rivers	During this phase, the water levels of the rivers

Environmental Aspect	Potential Impact
	and streams receiving discharged water will rise, permanently inundating previously seasonally wet areas and temporarily flooding areas that previously remained dry throughout the wet season. During the operational phase of this proposed project a variety of impacts will be associated with water quality. The ecological flows will be affected in that the base flows will be higher year round as a result of the proposed discharge. The impacts associated with water quality will be determined during the Environmental Impact Assessment study. The potential impact of treated water on the localised environment needs to be determined as water treatment options have not supplied effluent properties in terms of TDS, and temperature. The cumulative and chronic impacts of treated water needs to be addressed in terms of the natural fluctuations of water quality as well as the possibility for the presence of persistent elements including a variety of metals.

9 PLAN OF STUDY FOR EIA PHASE

The purpose of an EIA is to investigate the potential negative and positive impacts of a proposed project's activities on the environment. The objectives of this EIA process are:

- To ensure that the environmental impacts of developments are taken into consideration in a decision to approve or reject an application;
- To promote sustainable development;
- To ensure activities undertaken do not have a substantial detrimental impact on the environment and/or to reduce/mitigate those impacts;
- To ensure public involvement;
- To regulate the development; and
- To provide a process aimed at enabling authorities to make more informed decisions, especially in respect of their obligation to take environmental considerations into account when making those decisions.

9.1 Approach

As illustrated in Figure 9-1, the Scoping and EIA is part of an integrated approach to obtain environmental authorisation to proceed with the immediate and short term interventions for the AMD project. It is a legal requirement which the TCTA needs to adhere to.

There has been criticism of the process in stating that the project has been decided upon and that people are merely going to be commenting on an agreed project and that the findings of an EIA process are irrelevant. Digby Wells is, however, proceeding with the EIA process in gathering information on the project as proposed and trying to understand its impacts and will then be giving recommendations on aspects which it feels could and should be changed. This process will also give the authorities a chance to hear suggestions and comments from interested and affected parties. It will also give the authorities an independent view of the impacts and implications of this project.

It is likely that the construction of the water treatment plants in the Western and Central Basins will commence prior to the finalisation of the EIA. Should this be the case certain of listed activities under NEMA will be triggered and this will require the submission of a section 24G application in terms of NEMA.

The submission of the application form will constitute the initiation of the Section 24G application process. The DEA will then inform the applicant as to the process followed, however, it is anticipated that a PPP will be required.

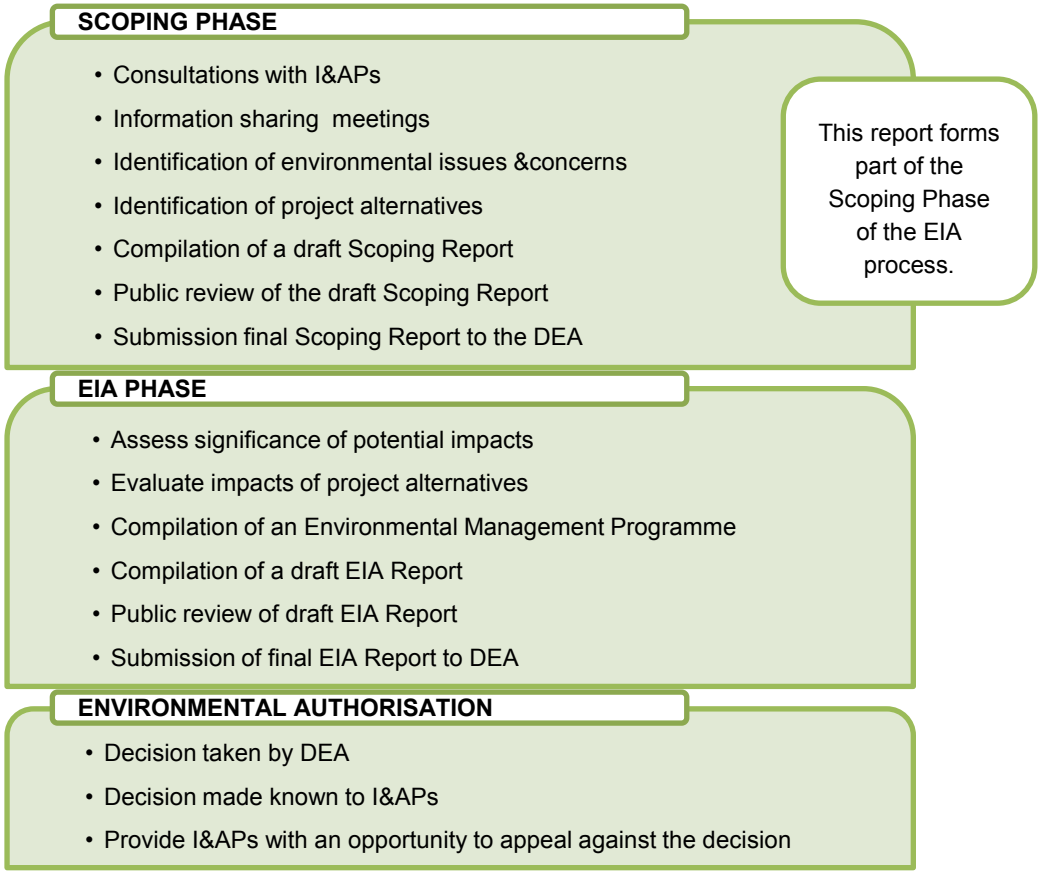

Figure 9-1: Phases of the EIA process

9.2 Public Participation during the EIA phase

Public participation will continue during the EIA phase and will allow I&APs the opportunity to provide input into the process as well as raise issues regarding the proposed project. The PPP during the EIA phase is detailed below.

9.2.1 On-going stakeholder engagement

On-going consultation will take place during the EIA phase with those I&APs identified in the scoping process. This engagement will include responding to any additional issues raised by I&APs during the EIA phase. If needed meetings with key stakeholders will take place. If required updated information documents regarding the project will be developed and sent to I&AP on the database.

9.2.2 Meetings

Public feedback meetings will be held once the draft EIA/EMP report is ready for public review. These meetings will include one meeting per basin. The aim of these meetings will be to present the findings of the EIA and to present the EMP report. Depending on the

effectiveness of the venues used during the scoping phase public meetings, the same venues will be used.

An EIA interest group meeting will be help with key stakeholders which were identified in the scoping phase. The aim of this meeting will be to present the EIA/EMP report and gather comments from these stakeholders.

The bi-monthly authorities meetings will continue to be held during the EIA phase. These meetings will be held to inform the authorities of progress made in terms of the EIA and to receive their inputs regarding the EIA process being followed.

9.2.3 Review of the Draft EIA / EMP

The draft EIA/ EMP will be placed in the public domain for public review this includes:

- Placing the document at public venues within the vicinity of the project area. The same venues will be used as during the scoping phase;
- CDs are to be mailed to key stakeholders;
- CDs to be mailed to I&APs who request the report; and
- The document will be placed on the Digby Wells website as well as the AMD short website.

The document will be made available for public review for the required 30 days. Advertisements will be placed in the relevant newspapers to inform the public of the availability of the Draft EIA/EMP report for public review.

9.2.4 Environmental authorisation decision

Once the authorities have made a decision with regards to the authorisation of the project all registered I&APs will be informed of the decision. An advertisement will also be placed in the newspapers used for the project, informing the general public of the decision.

9.3 EIA methodology

In order to clarify the purpose and limitations of the impact assessment methodology, it is necessary to address the issue of subjectivity in the assessment of the significance of environmental impacts. Even though Digby Wells and the majority of environmental impact assessment practitioners propose a numerical methodology for impact assessment, one has to accept that the process of environmental significance determination is inherently subjective. The weight assigned to the each factor of a potential impact and the design of the rating process itself, is based on the values and perception of risk of members of the assessment team, I&APs and authorities who provide input into the process. It is for this reason that it is crucial that all EIAs make reference to the environmental and socio-economic context of the proposed activity in order to reach an acceptable rating of the significance of impacts. It is not the purpose of the EIA process to provide an incontrovertible

rating of the significance of various aspects, but rather to provide a structured, traceable and defendable methodology of rating the relative significance of impacts within a specific context.

The methodology employed for the EIA is divided into two distinct phases, namely impact identification and impact assessment.

9.3.1 Impact identification

Impact identification is performed by use of an input and output model, which serves to guide the assessor in assessing all the potential instances of ecological and socio-economic change, pollution and resource consumption that may be associated with the activities required during the construction, operational, closure and post-closure phases of the project.

Outputs may generally be described as any changes to the biophysical and socio-economic environments, both positive and negative in nature, and also include the product and waste produced by the activity. During the determination of outputs, the effect of outputs on the various components of the environment (e.g. topography, water quality, etc.) is considered.

During consultation with I&APs, perceived impacts were identified. These perceived impacts will become part of the impact assessment and significance rating in order to differentiate between probable impacts and perceived impacts.

9.3.2 Impact rating

The impact rating process is designed to provide a numerical rating of the various environmental impacts identified by use of the input and output model. The significance rating process follows the established impact/risk assessment formula:

	Significance = Consequence x Probability
Where	Consequence = Severity + Spatial Scale + Duration
And	Probability = Likelihood of an impact occurring

The severity, spatial scale, duration and probability of an impact occurring are assigned a rating out of seven as indicated in Table 9-1. The matrix calculates an overall significance rating out of 147. Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in the EMP.

The significance of an impact is determined by referencing the significance rating to the probability consequence matrix shown in Table 9-2 after which it is categorised into one of four categories, as indicated in Table 9-3.

Table 9-1: Impact significance rating

Rating	Severity		Spatial scale	Duration	Probability
	Environmental	Social, cultural and heritage			
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or eco system. Persistent severe damage.	Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	International The effect will occur across international borders.	Permanent without mitigation No mitigation measures of natural process will reduce the impact after implementation.	Certain/definite The impact will occur regardless of the implementation of any preventative or corrective actions.
6	Significant impact on highly valued species, habitat or ecosystem.	Irreparable damage to highly valued items of cultural significance or breakdown of social order.	National Will affect the entire country.	Permanent with mitigation Mitigation measures of natural process will reduce the impact.	Almost certain/highly probable It is most likely that the impact will occur.
5	Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate.	Very serious widespread social impacts. Irreparable damage to highly valued items.	Provincial/regional Will affect the entire province or region.	Project life The impact will cease after the operational life span of the project.	Likely The impact may occur.
4	Serious medium term environmental effects. Environmental damage can be reversed in less	On-going serious social issues. Significant damage to structures or items of cultural	Municipal area Will affect the whole municipal area.	Long term 6 to 15 years.	Probable Has occurred here or elsewhere and could therefore occur.

Rating	Severity		Spatial scale	Duration	Probability
	Environmental	**Social, cultural and heritage**			
	than a year.	significance.			
3	Moderate, short-term effects but not affecting ecosystem functions. Rehabilitation requires intervention of external specialists and can be done in less than a month.	On-going social issues. Damage to items of cultural significance.	Local Local extending only as far as the development site area.	Medium term 1 to 5 years.	Unlikely Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur.
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with or without help of external consultants.	Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Limited Limited to the site and its immediate surroundings.	Short term Less than 1 year,	Rare or improbable Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the project but has happened elsewhere. The possibility of the impact occurring is very low as a result of design, historic experience or implementation of adequate mitigation measures.
1	Limited damage to minimal area of low significance. Will have no impact on the	Low-level repairable damage to commonplace structures.	Very limited Limited to specific isolated parts of the	Immediate Less than 1 month.	Highly unlikely Expected never to happen.

Rating	Severity		Spatial scale	Duration	Probability
	Environmental	Social, cultural and heritage			
	environment.		site.		

Table 9-2: Probability consequence matrix

Significance		Consequence (severity + scale + duration)								
		1	3	5	7	9	11	15	18	21
Probability / Likelihood	1	1	3	5	7	9	11	15	18	21
	2	2	6	10	14	18	22	30	36	42
	3	3	9	15	21	27	33	45	54	63
	4	4	12	20	28	36	44	60	72	84
	5	5	15	25	35	45	55	75	90	105
	6	6	18	30	42	54	66	90	108	126
	7	7	21	35	49	63	77	105	126	147

Table 9-3: Significance summary table

Significance		
High	**108- 147**	
Medium-High	**73 - 107**	
Medium-Low	**36 - 72**	
Low	**0 - 35**	

9.4 Risk assessment

During the scoping phase of the project a Risk Assessment was conducted to identify the potential risks to the project.

The following objectives were set for the Risk Assessment:

- To review and rank the environmental and social risks related to the treatment of polluted water from the West, Central and Eastern Witwatersrand Basins;
- To develop mitigation measures, with action plans, for the key risks; and
- Determine the detail and the scope of specialist inputs and investigations required for the permitting process of the project through the identification of these risks

Twenty-three unwanted events were identified during the Risk Assessment (Appendix M). The risk associated with each unwanted event was assessed, and a ranked list of risks has been developed. Nine risks were rated as high, and for these additional mitigatory measures have been defined.

9.5 Impact mapping

Through a series of integration meetings and workshops the specialists have been provided with the opportunity to define their study boundaries and how they relate to the other specialists. In so doing a level of integration has occurred and information dependencies have been determined.

This process also provided valuable insight into determining which activities would have environmental aspects associated with them which may lead to environmental impacts.

The proposed short term intervention for the treatment of AMD can be divided into 2 main project phases, namely; the construction phase and the operational phase. These phases were both considered during the compilation of the ToRs and require specific studies to assess the impacts associated with them. The phases and the specialist studies required for them are detailed below. The comprehensive Impact Map is attached in Appendix N.

9.5.1 Construction phase

It was confirmed that during the construction phase of the proposed project that the environmental aspect of land transformation, job creation and spending may need to be investigated further.

The table above was used to assess the various project inputs and as a team it was decided which aspects were significant or not and the significant ones formed the basis for deciding which aspect should be considered in further studies.

Land transformation was seen to have an influence on the heritage landscape of the project areas and the investigation into this was deemed necessary. This applies to all the areas of surface disturbance – pipelines, HDS plant and support infrastructure.

The creation of jobs was seen to link to the characterisation of the social environment of the study area and this would need to be studied to identify possible impacts. The capital expenditure as well as the operational costs for the project are linked to the economic analysis of the project.

9.5.2 Operational phase

It is during the operational phase that a number of activities with associated environmental aspects and impacts will take place. These can be linked to the 4 main project activities as described in chapter 2. The Main operational activities for the project can, therefore, be summarised as follows (Figure 9-2):

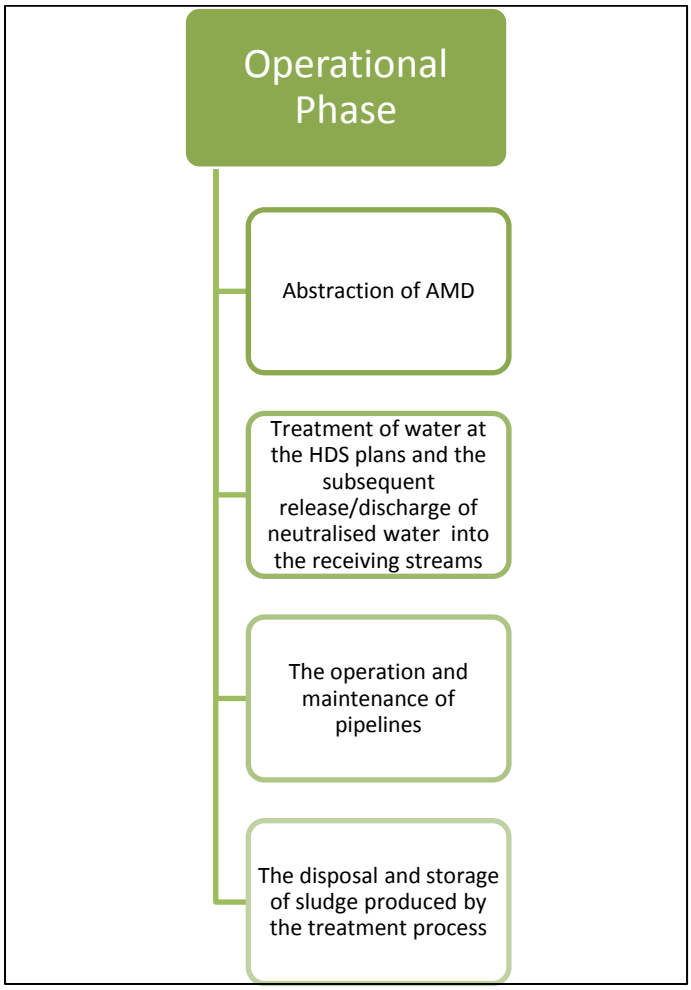

Figure 9-2: Main project activities for the operational phase

Related to these activities are a number of environmental aspects which in turn may have environmental impacts. The aspects and potential impacts for each of the operational activities were taken into consideration when the Terms of References (ToR) for the specialist studies were compiled.

9.6 Specialist Terms of References

The specialist ToRs generally describe the purpose and structure of relevant specialist studies required for a project. The specialist studies that will be undertaken as part of the EIA Phase for the proposed immediate and short term interventions for the AMD Project are discussed in detail below.

9.6.1 Study areas

The proposed short term treatment project will aim to neutralise free and metal acidity in the AMD to near-neutral pH. This neutralisation and aeration will allow for the removal of metals from the AMD in the form of metal hydroxides, including uranium. The proposed treatment will result in partial desalination of the water by removing between 40 and 60% of the dissolved salts. The neutralised water to be discharged will still be saline and an increase in TDS of the receiving rivers is likely.

The surface water quality environmental aspects will, therefore, include:

- High acidity and low pH, dissolved metals, oxygen deficiency and elevated temperatures in the upper reaches of water courses;
- Increased salinity of receiving river systems; and
- Associated changes in Vaal River system management affecting system yield and raw water importation requirements.

These changes in water quality may have direct impacts on water users and the natural environment and, thus, is viewed as the determining factor in classifying the study areas of the three basins.

The study areas for the relevant specialist studies for the three basins are described in more detail below.

9.6.1.1 Western Basin

The Western basin is distinct from the other two basins in that the mining void has already filled, and uncontrolled decant to the Tweelopiespruit has been occurring since 2002. As expected the upper reaches of this stream are clear but sterile, characterised by very low pH, low oxygen concentration, high salinity and elevated temperature.

Up until 2010 there was no evidence of the effect of the mining decant on water salinity at the Department of Water Affairs (DWA) weir A2H019 on the Bloubankspruit. This was surprising, since for a normal river reach, the low flow salinities at this point were expected to have more than trebled and the flow-weighted salt load entering Hartbeespoort Dam should have increased by 35%. It is, however, understood that for the last 9 years the water from the Rietspruit and Bloubankspruit has been recharging into the Zwartkrans groundwater compartment which was preventing the decant water from entering the Crocodile River. In 2010, however, the compartment filled up and the water is flowing on surface in the

Bloubankspruit. This has caused a 27% increase in the salt load entering the Hartbeespoort Dam.

Based on this information the study area for the Western Basin will include the Tweelopiespruit (from the decant point), the Rietspruit and the Bloubankspruit, as well as the Crocodile River all the way to the Hartbeespoort Dam.

9.6.1.2 Central and Eastern Basin

Abandonment of mine workings in the Central and Eastern basins has led to a gradual rise in water levels in the mining voids, which if left unattended would, as in the Western Basin, also eventually decant with similar adverse impacts on surface water quality. The short term intervention includes the abstraction of water to prevent the water level in the mining voids from rising above the ECL and treat the AMD at a HDS plant on surface. Hence AMD decant would be prevented from occurring in the Central and Eastern Basins.

Due to the proposed treatment of AMD it is envisaged that, In the case of the Central and Eastern basins, a substantially increased salt load would enter Vaal Barrage, thereby, increasing the amount of water required from the Vaal Dam to dilute the outflow from the Vaal Barrage to protect the water quality supplied by downstream water boards and municipalities. These management measures when implemented will have economic, social and environmental effects, which need to be investigated. The study area for the Central and Eastern Basins would include the receiving streams as well as those rivers they form tributaries to, as well as the Vaal River, from the respective confluences to the Vaal Barrage.

9.6.2 Specialist studies

Through the identification and categorisation of the potential impacts of the project, the following specialist studies were deemed necessary for the EIA phase of the AMD Project:

- Surface water assessment, including:
  - Surface water quality; and
  - Surface water quantity
- Characterisation of the social environment;
- Radiation study;
- Community Health Impact Assessment;
- Ecological assessment, including:
  - Wetland investigation;
  - Fauna & flora assessment; and
  - Aquatic assessment.
- Geohydrological assessment;

- Archaeology and Heritage assessment;
- Economic analysis;
- Agricultural assessment;
- Technology assessment; and
- Air quality assessment.

These studies and their proposed methods are discussed in detail below.

9.6.2.1 Surface water assessment

The surface water assessment will integrate the specialist investigations relating to water quality and water quantity potential changes as a result of the proposed short term treatment of AMD. It is based on this assessment that other specialist studies will be informed as to what the extent of their investigations needs to be as it is generally accepted that the potential impacts associated with the project will be the most significant on the surface water through an increase in water quantity and a decrease in quality (salinity). It is due to these potential impacts on surface water that other direct and indirect impacts in terms of the biophysical and social environment may occur.

9.6.2.1.1 Scoping issues

The following Risk Assessment issues relevant to surface water were raised during the scoping phase:

- Water shortage in the upper Vaal catchment from 2014 onwards – Risk rating of 21[5];
- The EIA shows that it is better to do nothing than to partially treat the water – Risk rating of 19;
- The EIA fails to identify the consequences of the changes in water quality and quantity – Risk rating of 14; and
- Irrigation impacts – Risk rating of 14.

A number of issues regarding surface water were raised by I&APs during the scoping phase. These issues have been reviewed and taken into consideration during the compilation of the surface water study ToR. The following key issues were identified:

- The quality of the water being released;
- The impacts of pumping neutralised water into the streams from a water quality perspective, specifically due to the high sulphate levels;

[5] Note: Risks were rated from 1 to 25 in terms of severity

- The increase in the volume of water in the receiving streams and the impacts associated with this. Issues were raised around the flooding of the streams and impacts on water front properties and infrastructure;
- Increase in base flow and the impacts on the receiving systems;
- Impacts on ecology associated with the release of neutralised water; and
- The effects on the Vaal River System with regards to water availability and dilution due to the increase in salinity.

9.6.2.1.2 Potential impacts the project may have in this specialist area

The following impacts may be associated with the project in terms of surface water (Table 9-4).

Table 9-4: Potential Impacts on surface water

Project activity	Potential impacts
1. Abstraction of water from the shafts and reaching or keeping the ECL	■ No significant impacts on the surface water environment.
2. The construction and operation of the HDS Plants and the discharge of neutralised water in the environment	■ Impact on surface water quality due to the high salt loads of the water being discharged. ■ The increase in water volumes may cause the inundation of riparian property (incl. informal areas, footpaths, access roads, etc.). ■ Flooding due to the increase in the volumes discharged may impact on low level bridges, structures, etc., affecting level of service and stability of the structures. ■ Channel stability may be impacted on due to increase flows, especially in upper reaches of study area. Higher base flows may change the dynamics of the receiving stream and river channels. This will support a study on impacts on river geomorphology. ■ Potential movement of contaminated sediments through the increase in water flow. Especially near existing decant points and the proposed discharge points, the local sediments either have or may receive contaminants from the process. These may move further downstream under the new base flow regimes proposed.

Project activity	Potential impacts
	■ Changes in duration and depth of inundation in wetlands. This will support studies on impacts on wetlands. ■ Potential changes in aquatic habitat. Changes in base flow will change velocity and depth conditions in the receiving streams, with the possibility of changes in habitat conditions. ■ General impacts on surface water resources. The magnitude of change in monthly and annual catchment yield will be assessed within the study area.
3. Construction and operation of pipelines	■ No effect on surface water other than short-term local risk of pipe rupture
4. The disposal of the sludge	■ Insignificant effect on surface water quality ■ Potential stormwater spills from the TSFs. The addition of HDS sludge to existing TSFs may change their stormwater management requirements, potentially increasing the risk of spillage from the TSFs.

9.6.2.1.3 Method and objects of the study

The objectives of the surface water assessment will be to:

- Characterise the current receiving environment with regard to:
  - The existing hydrology of the receiving streams;
  - The existing quality of the receiving streams;
  - The geomorphology of the streams;
  - Sensitive areas within these systems;
  - The current yields of the rivers and their contribution to the overall systems they exist in.
- Assess the effects of the short term intervention (I.e. pumping from the ECL followed by TDS treatment), in terms of:
  - Water quality:
    - The extent of the decrease in water quality downstream, specifically with regards to salinity and heavy metals;

    - The effects on water quality during different seasons;
    - The effect on water quality should the treatment plants not function optimally; and
    - The effect on the Vaal System and yields.
  - Water quantity:
    - The effect on hydrology of the streams taking into consideration seasonal changes;
    - the extent of this change downstream;
    - How the geomorphology of the streams will be altered with the increase in flow relating to erosion and deposition of the channels; and
    - Identify areas which could be vulnerable to flooding.
- Assess the impacts of the no-go option (i.e. the consequences of uncontrolled decant) on water quality and quantity with respect to the factors considered for the treatment option; and
- Assess the implications of discharging the water in the Western Basin into an alternative catchment.

The steps to be followed to investigate surface water quality are outlined below.

Characterisation of the receiving environment

With regard to the Tweelopiespruit, flow estimation and water quality assessments will be made to identify where the saline decant water is being lost to dolomitic compartments, complicated by irrigation abstractions.

The short-term monitoring data, together with data routinely collected by the Department of Water Affairs (DWA) at established monitoring points further downstream, will be assessed and plotted to categorise the receiving environment near to the points of discharge.

There is a considerable amount of information published for the catchments and rivers in each of the basin study areas and it is intended to utilise this data to describe the receiving environment. Data including the following will be sourced:

- Published data (e.g. WR2005) and publicly available data bases (e.g. DWA hydrological records);
- Data from utilities and local government; and
- Recent data will also be sought for the main discharges and abstractions in the receiving streams.

The data will be collated and used to characterise the water resources and stream flow in terms of statistical descriptions of monthly and daily stream flow and rainfall at a quaternary level. This will be supplemented with an assessment of urban runoff responses and

contributions to river flow. This will be largely based on anticipated responses from paved areas of the quaternary catchments.

A short-term surface water quality monitoring programme will be established for the upper reaches of the receiving water streams. Variables measured in situ will include temperature (T), dissolved oxygen (DO), pH and electrical conductivity (EC). Laboratory analyses will include key chemical constituents, metals and micro-organisms.

With respect to the hydrology of the streams, grab samples of bed sediment will be collected for testing particle size distribution and for pollutants including heavy metals and radio nuclides. This will indicate the likelihood of sediments being transported downstream which will be a concern if the proposed AMD treatment process still released these pollutants.

A component of the surface water systems that needs to be described is the flood risk along the watercourses. This will not be a detailed flood line study, but will consider potentially vulnerable areas that will be analysed on a site by site basis. These sites will be identified by both site visit and desk level (GIS) analysis, as well as input from the characterisation of the social environment.

Assessments

The monthly flow data will form the basis of the hydrology used to assess maintenance of ecological flows. The input from the surface water quantity stream will be establishing both the maintenance hydrology and the stream hydraulics at representative sites selected with the aquatic specialist. This will include depth and velocity profiling of the sites under low flow conditions, and hydraulic modelling for the high flow conditions. A flow rating curve will then be developed for each site and, with input from the aquatic specialist, the ecological flows will be estimated;

The present channel stability and susceptibility to erosion will be assessed and will include taking soil samples from the river bed and banks and testing for cohesiveness and plasticity. The rating curve will be used to estimate the shear stress and erodibility of the bed and banks.

Additionally, the same hydrology will also be used to assess potential changes to wetland water levels and area of inundation. In conjunction with the wetland specialist, the current areas of inundation will be identified for key wetland areas identified by the wetland specialist. It is intended to develop a basic water balance for the wetland(s).

The present day catchment flood responses will be calculated and compared to the hydraulic capacity of the site to determine the impacts on the identified sensitive or vulnerable sites to flooding.

Through the hydrology assessment it will be possible to determine the significance of the change in water quality due to the discharge of neutralised water. The significance will, therefore, be measured by:

- Increasing risk of channel scour and the likelihood of a noticeable change in the natural balance of the present system;
- The change in normal depth and/or velocity such that a change in habitat occurs; and
- The change in either normal flow of flood flow regimes will affect the stability, maintenance or level of service of a river structures (e.g. bridge, access road or a farm dam).

The assessment of the no-go alternative with regards to surface water quantity will involve identifying the point of discharge to the receiving streams by consulting the geohydrologist in terms of the proposed decant points. The rate of decant may be different to the planned pumping rates in the proposed treatment scheme. However, it is intended that the same sample sites are used and the same baseline hydrology will apply unless the decant points will affect different streams or are a considerable distance from the proposed HDS Plant discharge points.

With regard to surface water quality, salinity modelling will be completed for each of the basins. The following scenarios will be modelled:

- The current status i.e. before treatment;
- The short term intervention (HDS treatment) option; and
- The no-go option i.e. uncontrolled decant;

The models used will be both the WQT Hydro-salinity Model and Water Resources Planning Model (WRPM). The WQT model will be used to simulate local impacts for a few representative historical hydrological sequences while the WRPM will be used to simulate salinity and water resources in the wider systems. Salinity is extremely important in view of the large number of urban, industrial and irrigation users that will be affected and the large economic consequences associated with changes in salinity levels. Statistics and plots will be derived for each option and comparisons will be made with Resource Water Quality Objectives and the results presented.

9.6.2.1.4 Project team

The surface water assessment will be completed by Dr. Chris Herold (quality) and Stuart Dunsmore (hydrology).

9.6.2.2 Characterisation of the social environment

The characterisation of the social environment is essential for the successful completion of other relevant specialist studies. It is also dependant on the results of the surface water study as these will determine the significance of the impact on people living within the study area.

9.6.2.2.1 Scoping issues

The risk assessment identified that the release of neutralised water may have a "Social Impact" and was ranked as a moderately significant risk associated with the project.

Based on the input by I&APs and authorities during the scoping phase, the following key issues were noted:

- Job creation – The question of whether the project would create jobs, and if so, how many, was asked. I&APs see the project as potentially having a positive impact as far as job creation is concerned;
- Economic impacts - (both of the project and of the no-go option);
- Human and animal health impacts;
- Impacts on agriculture;
- Impacts on groundwater; and
- Risks associated with flooding due to increased water quantities in the affected watercourses.

As mentioned above, with the exception of job creation and economic benefits related to spending during the construction and operation of the plants, these impacts are being investigated by other specialist studies forming part of this project.

9.6.2.2.2 Potential impacts the project may have in this specialist area

The social impacts of the project are summarised in Table 9-5 below.

Table 9-5: Potential impacts on the social environment

Project activity	Potential impacts
1. Construction of the HDS Plants	■ Temporary job creation ■ Temporary economic benefits related to project spending
2. Operation of the HDS Plants	■ Relatively limited job creation ■ Relatively limited economic benefits related to project spending ■ Impacts related to the change in water quality downstream, both for people using surface and groundwater ■ Perception issues for people irrigating with mine water that could be seen as contaminated.

Project activity	Potential impacts
3. Construction and operation of pipelines	■ Relatively limited job creation ■ Relatively limited economic benefits related to project spending
4. Deposition of sludge	■ Possible impact on people living close to the TSF sites through dust emmisions and contamination of groundwater

9.6.2.2.3 Method and objectives of the study

The objectives of the characterisation of the social environment are as follows:

- To establish a baseline of land uses, communities and economic activities along the potentially impacted watercourses and around the TSFs constituting the study area;
- To determine whether abstraction from the affected watercourses for irrigation and livestock watering is occurring currently. Other water uses (e.g. recreational or cultural uses) along the potentially impacted watercourses will also be documented;
- Based on other studies and their results to quantify the impacts associated with the proposed project; and
- Provide a qualitative assessment of the social impacts that are likely to occur if the proposed intervention is not implemented – i.e. if uncontrolled decanting of untreated mine water occurs (or continues) from various shafts in the Western, Central and Eastern basins (no-go option).

Characterisation of the receiving environment

The social environment will be characterised through the completion of the following tasks:

- Database design and data collection - one of the main deliverables of the social specialist study will be a geo-referenced database of land uses, communities, economic activities, water abstraction and other water uses in the study area. The database will be developed in the appropriate electronic format to allow for geospatial referencing and will comprise the following data fields:
  - Type of feature e.g. land use, communities, infrastructure and land marks
  - The cadastral land portion on which it is located, and the title deed holder of that land portion;
  - In the case of communities that may rely on water from the affected watercourses, indicators of potential vulnerability to economic and/or health impacts that could arise from a change in water quality or quantity; and

- For points at which water is abstracted from the potentially affected watercourses or groundwater, information on the uses of abstracted water, the rate and seasonality of abstraction, etc.

- Visual inspection of available aerial imagery - each land use, community or water use in the study area that is visible on the aerial imagery will be given a unique identifier, and its characteristics as discernible from the images will be captured in the electronic database;
- Data from secondary sources - where relevant, secondary data sources will be used to further populate the database with regard to relevant attributes of land/ water uses or communities that are not readily apparent from aerial imagery;
- Field verification - a field verification or ground-truthing exercise will be undertaken by a team of suitably trained fieldworkers; and
- Interviews with communities and water users - due to the sensitivities surrounding the project, interviews with communities in the study area will be undertaken, within clearly defined boundaries and with a clear mandate.

Assessments

Once the database has been fully populated, it will be subject to quantitative analysis to generate relevant descriptive statistics (such as the numbers of potentially affected households, etc.). Informative maps will also be produced, where applicable, to reveal spatial trends and patterns in the study area.

The main aim of the social characterisation will be to provide information on social aspects of the receiving environment that would be used by most of the other specialists (namely, the economic impact assessment, health impact assessment, radiological impact assessment, heritage impact assessment and hydrological impact assessment).

The only “purely” social impacts requiring assessment as part of this specialist study are impacts related to job creation and spending during construction and operation of the HDS plants and pipelines. These impacts will be assessed based on available project information (required workforce, capital expenditure budget, etc.) and will be subject to a formal rating in terms of expected duration, geographical extent, probability, intensity and overall significance.

The social specialist study will also address the issue of cumulative social impacts that may arise from the combined effect of the project on various aspects of the biophysical and economic environment.

9.6.2.2.4 Project team

The assessment will be undertaken by Jan Perold of Digby Wells Environmental.

9.6.2.3 Radiation study

The radiation study and the prediction of impacts associated with radiation issues are highly dependent on the results of the social characterisation and the water quality assessment. The database to be compiled during the interview process will be used to identify possible pathways and, thereby, identify impacts associated with radiation exposure.

9.6.2.3.1 Scoping issues

The risk assessment identified radiation pathways and the adequate identification of these as a high risk (21) to the project. Although information is available it will be necessary, in conjunction with other studies (health and social characterisation) to determine the possible radioactivity of the discharged water and how this will impact on water users directly or indirectly.

The following issues were raised by I&AP regarding radiation:

- The uranium levels within the water discharged – Questions were asked about how much uranium would be in the discharged water;
- The impacts of uranium in the discharged water; and
- The uranium levels in the sludge and the possible migration into groundwater through seepage.

9.6.2.3.2 Potential impacts the project may have in this specialist area

Table 9-6 details the potential radiation impacts on the receiving environment.

Table 9-6: Radiation impacts

Project activity	Potential impacts
1. Abstraction of water from the shafts and reaching or keeping the ECL	■ None
2. The construction and operation of the HDS Plants and the discharge of neutralised water in the environment	■ Possible radioactive contamination of the discharged water, which in turn may have health impacts to humans.
3. Construction and operation of pipelines	■ Contamination of soil and surface water should the pipelines spill.
4. The disposal of the sludge	■ Should the sludge be radioactive and the physical properties are such that it can be distributed by wind there is a possibility of health impacts to nearby communities as well as possible groundwater contamination.

9.6.2.3.3 Method and objectives for the study

The aim of the radiation study is to determine the radiation doses that the public will receive from the resulting release of AMD water (treated or untreated).

The objectives of the assessment can be defined as follows:

- Provide a description of the relevant legal framework with reference to national legislation, conventions and guidelines;
- Ascertain and describe the existing radiological background dose conditions in the project area based on available information;
- Identify and quantify the radiological pollution sources associated with the treatment and release of the neutralised AMD effluent to the various catchment areas;
- Assess the results of the sludge characterisation and determine the impacts thereof;
- Determine the boundaries of where the release of treated or untreated AMD might contaminate the catchment area;
- Assess the cumulative environmental and public exposure radiological doses and risks for all relevant pathways to the potential receptors for both the treated and untreated effluent release cases; and
- Provide input, together with other specialists, into the future management measures required.

Characterisation of the receiving environment

A broad estimation of the radiological status of the respective catchment areas (for all three Basins) will be obtained through the collection of existing relevant radiological data (water and geological) and additional data through a sampling strategy.

Data will be collected by communication with DWA (especially the Water Research Laboratory), Council for Geosciences, the National Nuclear Regulator, licensed mines within the respective areas and relevant departments that conducted EIAs or gathered radiological data for the respective catchment areas.

To determine the current extent of radiological contamination from the Western Basin water treatment process, samples of surface water, sediment and biota will be collected from water sources (streams, rivers and other possible surface water bodies influenced by AMD effluent release) between the release point in Tweelopiespruit up to the Hartbeespoort Dam. Groundwater will also be sampled from borehole areas that rely heavily on the water for irrigation and other applications. The locations of these boreholes, however, will be determined through the social characterisation and interviews that are undertaken as part of the specialist study.

Treated and untreated AMD water just before release in the river will also be sampled in order to determine the efficacy of the treatment process and to gain information on the no-go option. Radionuclide analyses will be performed on all the gathered samples to determine

the concentrations of uranium and its daughter products. The significance of the daughter products in the samples is currently unknown. A relationship between uranium and the daughter products must, therefore, be established in order to defend any dose related assumptions made later on in the dose assessment. The sampling programme will consist of the collection of 20 water samples and 5 sediment samples.

Since water release in the Central and Eastern Basins has not yet taken place, it is expected that interested parties e.g. Department of Water Affairs, would have started with a similar sampling regime.

Assessment

The main task of this study component is to determine the public doses and resulting radiological risks, associated with the AMD treatment operations and the release of the treated or untreated water. It will make use of the data gathered during the interview process as part of the social characterisation, as well as the water quality results from the Surface Water Study. The dose assessment will cover scenarios associated with the use of the water in the catchment areas. While the main area of concern will be the catchment area of the Western Basin, the assessed results will be extrapolated to the other catchment areas as well.

The resulting radiological doses will be converted to a health risk and shared with the Health Study.

Until such time as the physical and chemical characteristics as well as the sludge disposal sites are known, the radiation assessment will not investigate the possible impacts associated with air quality and the inhalation of particles emanating from the tailings storage facility or from potential groundwater contamination.

9.6.2.3.4 Project team

The Project Team will consist of Dr. Dawid de Villiers (project leader), Dr. Gert de Beer (peer-reviewer), Gert Liebenberg, Rean Swart and Neels Boshoff.

9.6.2.4 Community Health Impact Assessment

The Community Health Impact Assessment (CHIA) will primarily identify and assess the possible human health impacts associated with the proposed treatment of AMD and the release of the neutralised water into watercourses. In order to achieve this, the CHIA is highly dependent on the information gathered and the findings of, the social characterisation and the radiation study.

9.6.2.4.1 Scoping issues

The risk assessment identified that the impact on community health is a medium risk. It was determined that this risk would be further investigated during the EIA phase of the project and that a CHIA would be required to quantify this risk.

The following issues were raised during the scoping phase of the project as were used to define the study further:

- The suitability of the water for human and animal consumption during immediate and short term;
- Impacts on human health if water is consumed or used for bathing;
- The health impacts related to radiation;
- Human health-related impacts of discharged water, especially during low-flow periods; and
- Health risks, including chronic health risks of high sulphate levels on humans and animals (mutagenicity, teratogenicity and estrogenicity).

9.6.2.4.2 Potential impacts the project may have in this specialist area

Table 9-7 details the potential impacts the project may have on human health.

Table 9-7: Potential Impacts on community health

Project activity	Potential impacts
1. Abstraction of water from the shafts and reaching or keeping the ECL	■ No impacts are expected for this project activity
2. The construction and operation of the HDS Plants and the discharge of neutralised water in the environment	■ Health impacts may occur should exposure to surface water occur. ■ Exposure to contaminated groundwater from boreholes may have potential impacts on human health; ■ The use of the discharged water for irrigation may have effect crops/produce as well as the soil. This will have an indirect impact on human health.
3. Construction and operation of pipelines	■ Should pipeline failure occur it could expose people to harmful substances with associated health impacts.
4. The disposal of the sludge	■ Run-off and seepage of wet sludge may contaminate surface and groundwater, resulting in potential exposure to sulphates, nitrates, heavy metals, radionuclides with associated health effects. ■ Exposure to dried sludge as suspended particulate matter may be inhaled and impact on human health.

9.6.2.4.3 Method and objectives of the study

The following objectives exist for the CHIA:

- To assess the health impacts associated with the proposed AMD project on people within the study area through the evaluation of health determinants identified in the various specialist studies. This will include:
  - Assessing the impact of high salt loads on humans; and
  - Assessing the impact of radionuclides on human health.
- Defining the extent of the health impacts within the study area; and
- Developing possible management measures to reduce the impacts.

Characterisation of the receiving environment

A community health and wellbeing profile will be developed using the data collected during the characterisation of the social environment. Use of national and local demographic and health information will also be made. During the characterisation of the social environment interviews will be held with people, groups or organisations during which information relating to the health of the people as well as identify practices that could compromise their health in the future e.g. drinking from the receiving rivers etc.

The information gathered during this process will include:

- Nutritional status;
- Disease profiles;
- Livelihoods;
- Potential exposure to pollutants such as particulate matter, heavy metals sulphates and nitrates, and radionuclides;
- Services;
- Social capital and culture; and
- Natural.

The health of people will be determined by the extent and distribution of the impacts relating to water quality and air quality. Receptors will, therefore, only be identified once the results of the surface water and air quality studies are known. Once received the results will allow for the identification of areas within the study are that may be affected by the proposed project. The social information relating to land use and economic activities will then be used to determine sensitive areas and within those areas possible receptors.

Assessment

The information gathered during the health baseline will be used to systemically determine the range of the potential health impacts due to the proposed project, their importance and where, when and how likely they are to occur.

A Human Health Risk Assessment will be completed once the results of the radiation assessment, water quality analysis and air quality assessment are known. The risk assessment follows a defined procedure to determine the risk potential. The procedure follows the following steps:

- Hazard identification - determines whether exposure to a particular substance may result in adverse human health effects;
- Exposure assessment - involves the determination of the emissions, pathways and rate of movement of a substance as well as its transformation and degradation in the environment. This information is used to estimate the concentration to which human populations are or may be exposed. The media (air, water, soil) that individuals may be exposed to are considered, as well as the route (inhalation, ingestion, dermal contact) of exposure;
- Toxicity assessment or dose-response assessment - is the estimation of the relationship between dose, or level of intake of a substance, and the incidence and severity of an effect, as based on previous epidemiology and toxicological studies; and
- Risk estimation or risk characterisation - all the information obtained in the previous three steps of the risk assessment to describe whether a risk to public health is predicted from exposure to the pollutant(s) of interest. This process may be qualitative or quantitative, depending on availability of benchmark levels.

9.6.2.4.4 Project team

The project team will include Ms Juanette John of the CSIR.

9.6.2.5 Geohydrological study

The geohydrological environment will be affected by certain project activities and in turn will affect other activities. The abstraction of AMD from the mining voids will cause a decrease in groundwater levels in the western basin and maintain levels at the ECL in the Central and Eastern Basin. The discharge of the neutralised water to the environment may also influence the groundwater regime through recharge. In addition the deposition of the sludge on the TSF may cause seepage into the groundwater with inherent quality impacts.

9.6.2.5.1 Scoping issues

The following summarises the key issues raised by the I&APs during the scoping phase:

- The methodology used to calculate the ECLs – questions were asked about how the ECL were calculated;
- The effect of heavy rainfall on the ECLs;
- Geological instability and formation of sinkholes in the Western Basin due to the lowering of the water levels;

- Interaction between the aquifers, particularly the dolomitic aquifers, and the impacts on these;
- The impact of the project on groundwater boreholes used in homes and for irrigation of crops – The issues raised dealt with both the change in water quality as well as the availability of water should the project commence;
- Water ingress and recharge into the mining voids;
- The impact on groundwater through the deposition of sludge on existing tailings facilities. Particular reference was made to the interconnection of the West Wits pit to underground voids; and
- The geochemistry and hazardous classification of the sludge produced.

9.6.2.5.2 Potential impacts the project may have in this specialist area

An understanding of the status of the current aquifer conditions and receiving environment is required to assess the potential impacts from each of these activities of the receiving groundwater environment and its users. The potential impacts are described in Table 9-8.

Table 9-8: Potential Impacts on groundwater

Project activity	Potential impacts
1. Abstraction of water from the shafts and reaching or keeping the ECL	■ Dewatering aquifers that were a source of water supply over the last couple of years - since Western Basin filled up and started to decant. ■ Reducing pressure (through dewatering) in mine voids and dolomite solution cavities – potential for collapse (geology instability). ■ Dewatering in the Western basin will stop current decanting AMD water – positive impact in terms of water quality in rivers. ■ Western Basin dewatering might alter the natural groundwater flow direction and direct groundwater flow away from Cradle of Humankind – positive impact. ■ The lower the ECL the more energy needs to be spent on pumping out the water and the more water there could be to pump out.
2. The construction and operation of the HDS Plants and the discharge of neutralised water in the	■ Seepage of discharged water back into groundwater environment – quality impact due to high salt load. Waste of energy due

Project activity	Potential impacts
environment	to the recycling of water. ■ Seepage / spillage of untreated water onto surface – seep into groundwater environment with water quality impacts. ■ Manage discharge in various basins to ensure minimum water level and quality impacts on for example the Sterkfontein caves and other fossil caves in the area. Assess discharge of water into other basins or water management areas.
3. Construction and operation of pipelines	■ No impact unless spills occur.
4. The disposal of the sludge	■ Seepage of sludge and TSF mixture into groundwater environment – water quality impact. Different quality impacts for each basin. ■ Deposition of sludge into Wes Wits Pit might have negative groundwater quality impact.

9.6.2.5.3 Method and objectives of the study

The groundwater regime of the study area is well understood through years of fieldwork and monitoring, both during and after mining occurred. It is, therefore, not required for the geohydrological assessment to verify or collect further data in terms of the groundwater for the three basins. Existing data and research will merely be used to assess the influence the project activities may have on the groundwater of the area as well as conceptually illustrate the interaction of the variance activities. This data will be sourced from a literature review of some of the most recent geological, hydrogeological and AMD studies and will be presented in a form which can be understood by the audience the EIA intends to address.

The geohydrological assessment aims to fulfil the following objectives:

- To characterise the aquifer systems using existing data, with particular reference to the dolomitic aquifers in each basin. The characterisation will address:
  - Extent of the basins;
  - Size and location of dolomitic aquifers;
  - Interconnection of aquifers;
  - Sources of recharge;
  - The local near surface groundwater regime over which the TSFs exist;

  - The quality of water within the mine voids with particular reference to salt loads and heavy metals; and
  - Water users in the study area.
- Develop a conceptual hydrogeological model for each basin by reviewing historical reports and numerical models. Visual aids will be developed to assist with presenting the conceptual model for each basin;
- With the use of the conceptual model evaluate the current basin water balance and evaluate the amount of discharged water that will potentially seep back to the groundwater;
- To estimate the size of the cone of dewatering that could potentially be formed due to the mine dewatering and what impact this may have on groundwater users within the impact zone;
- Assess the impacts on the groundwater of the following:
  - Disposal of sludge on existing TSF;
  - Abstraction of AMD water;
  - Geological stability impacts focusing on potential sinkhole formation;
  - Discharge of neutralised water with regard to recharge; and
  - Water users.

Characterisation of the receiving environment

A literature review will be conducted of available hydrogeological information for the three basins in order to characterise the groundwater environment in relation to the proposed project. This will involve a number of tasks, which are listed below.

- All available and relevant information on studies conducted on all the basins will be collected to understand the current status of the groundwater water quality and quantity, particularly in the vicinity of the abstraction shafts, treatment plants, sludge deposition areas and water discharge areas;
- Groundwater use data, in relation to the three basins, will be collected through the social characterisation and The WARMS data base which is managed by the Department of Water; and
- Meetings with groundwater specialists and authorities involved with the studies in the basins.
- Collection of recent monitoring data. The Department of Water Affairs (amongst others) is conducting regular groundwater and surface water monitoring activities in terms groundwater level and quality.

Assessments

The compilation of conceptual groundwater models [6] for each of the basins will be compiled using the data collected. The conceptual model will aim to describe the groundwater environment in terms of the following:

- Aquifers - these are rock units or open faults and fractures within rock units that are sufficiently permeable (effectively porous) to allow water transfer or storage. This will include:
  - Defining hydraulic parameters such as storativity and transmissivity for each aquifer unit; and
  - Interconnections between aquifers and mine voids, pits (including that of West Wits) and dolomitic compartments.
- Precipitation, evapotranspiration and subsequently recharge characteristics;
- Runoff and groundwater head data which yields groundwater flow;
- Groundwater quality characteristics;
- Potential sources of AMD and recharge to the underlying aquifer units;
- Boundaries that result in the change or interruption of groundwater flow;
- Potential sensitive areas in relation to sinkhole development; and
- Hydrostratigraphic units - these are formations, parts of formations, or a group of formations displaying similar hydrologic characteristics that allow for a grouping into aquifers and associated confining layers.

Through the compilation of the model the potential recharge and discharge areas will be defined for each basin. This information will be particularly important for other studies when assessing the no-go option of the project.

The conceptual models will also assess the interaction of the sludge disposal facilities on the local groundwater of the area by defining the geochemical characteristics of the sludge and the likely interaction with the groundwater regime and possible groundwater users and seepage zones.

Through the compilation of the conceptual model the specialists will be able to identify and quantify the impacts associated with the AMD project. The cumulative impacts of the discharge of treated AMD water will be assessed by describing the regional interaction of pits and holings and the potential contribution to recharge of the mine voids. The assessment, therefore, generally aims to identify:

- The impacts of the dewatering to ECL (Western Basin) on:

[6] Description of the geological and associated aquifer characteristics – how they interact – how water moves and what may impact water quality and level

- Geological stability; and
- Groundwater users.

- The impacts the ECLs may have on shallow and deep aquifers and groundwater users; and
- The impacts of sludge deposition on the proposed tailings storage facilities and West Wits Pit.

9.6.2.5.4 Project team

The specialist groundwater assessment will be undertaken by Lucas Smith, Dr Robel Gebrekristos, Megan Edwards and Prof Kai Witthüser (external reviewer).

9.6.2.6 Archaeology and heritage assessment

In terms the project, those heritage resources that will mostly be affected are expected to include historical structures and buildings associated with the history of mining and possibly some change to the COH WHS.

9.6.2.6.1 Scoping issues

During the risk assessment, the main risk identified was the effect that AMD may have on heritage sites, specifically the COH WHS. The risk was rated as medium (19).

The following issues were raised during the scoping phase and have been considered during the compilation of the ToR:

- The effect of the project on the COH WHS – The issue of water volume and quality on the heritage site was raised.

9.6.2.6.2 Potential impacts the project may have in this specialist area

Potential impacts associated with the project are listed in Table 9-9.

Table 9-9: Potential Impacts the project may have in this specialist area

Project activity	Potential impacts
1. Abstraction of water from the shafts and reaching or keeping the ECL	■ Construction of pump infrastructure may cause alteration, damage to or destruction of historical buildings and structures older than 60 years ■ Water abstraction may impact the COH WHS positively through the reduction of decant into the area.
2. The construction and operation of the HDS Plants and the discharge	■ Construction of HDS plant may cause alteration, damage to or destruction of

Project activity	Potential impacts
of neutralised water in the environment	historical buildings and structures older than 60 years ■ Potential increase in water flow due to discharge may impact on heritage resources that could occur downstream and near river banks ■ Potential increase in water flow due to discharge may impact on intangible heritage aspects such as baptism sites located in or near river ■ Increased flow into the Tweelopiespruit may change aspects of the COH WHS
3. Construction and operation of pipelines	■ Construction of pipelines may disturb or destroy heritage resources on route such as burial grounds
4. The disposal of the sludge	■ None

9.6.2.6.3 Method and objectives of the study

The objectives of the assessment are to:

- Describe the current environment in terms of archaeology and heritage;
- Define the historical aspects of each site prior to construction;
- Determine if archaeological sites exist within the treatment plant and pipeline footprints prior to construction;
- Describe the impacts of abstraction on the COH WHS; and
- Quantify the impacts of neutralised water discharge (quality and quantity) with regards to:
  - The COH WHS; and
  - Culturally significant sites downstream of the receiving streams.

Characterisation of the receiving environment

The current receiving environment (heritage landscape) will be characterised to include existing and potential heritage resources. This characterisation will be done for all three basins sites and will largely be performed prior to construction commencing. The COH WHS will be characterised independently.

In order to characterise the heritage landscape the following methods will be employed:

- Literature review and summary
  - Review of existing heritage impact assessment reports;
  - Review of relevant published and unpublished documents;
  - Archival and historical background research; and
  - Cartographic survey.

Characterising of the COH WHS

The current receiving environment of the COH WHS will be characterised based on existing information. In order to characterise the heritage landscape the following methods will be employed:

- Review of existing heritage impact assessment reports; and
- Review of relevant published and unpublished documents

Through the literature research sensitive areas in terms of heritage resources will be identified. Heritage resources identified will be evaluated to determine authenticity and integrity. Assessment criteria provided in Section 3 of the NHRA will guide this evaluation and a heritage value will be given.

In terms of the three proposed treatment plant sites, sensitive areas will be characterised in two manners:

1. Immediate receiving heritage landscape that will or may be affected by construction activities;
2. Peripheral receiving heritage landscape that may be affected during operations.

The first sensitive landscape will include footprints of all infrastructure proposed such as HDS plants, pipelines and water abstraction points. This may include tangible heritage resources such as historical structures, graves, protected areas, and more intangible aspects such as landscape character and sense of place. This will be assessed before construction commences.

The peripheral receiving environment may include more intangible heritage aspects such as baptism localities in rivers downstream from discharge points. In terms of the COH WHS, it will be described in terms of peripheral receiving environment and the gazetted boundaries used to characterise the affected area. Relevant information obtained during the Social Impact Assessment will contribute to define the scope of the heritage study.

Assessment

Impacts on heritage resources that may result from activities associated with the AMD project will be assessed. This will primarily be based on the research conducted during the characterisation of the environment. The Integration of information from other specialist studies, however, will also be used to quantify impacts.

Magnitude of the impacts will be considered relative to the value of the heritage resources.

The no-go option will also be assessed in terms of impacts on heritage resources. In addition, unknown resources that may be impacted by the construction of associated infrastructure such as pipelines will also not be affected or accidentally exposed.

9.6.2.6.4 Project team

The heritage impact assessment will be completed by Johan Nel of Digby Wells Environmental.

9.6.2.7 Ecological assessment

The ecological assessment will comprise of individual studies of response indicators for each affected system and/or area for the project. The findings from these studies will then be integrated in order to describe the current state of these systems.

9.6.2.7.1 Scoping issues

Risk No.16 determined that it is possible that the downstream ecology of the receiving streams will be impacted on due to the release of neutralised water into the respective systems. This risk was ranked as having a medium significance (13).

In addition, risk No. 22 determined that there is a low risk (6) that the hydrology of the respective systems will be altered due to the release of water into the systems. The two abovementioned risks will be considered for this specialist component.

During the scoping phase of the project a number of issues relating to ecology were received. The following key issues have been summarised:

- The impacts of the project on the aquatic ecology;
- The impact of salinity on ecology of the rivers;
- The impact on the ecology during low flow periods; and
- The impact on the Blesbokspruit as Ramsar site due to increased water volumes and decreased water qualities.

9.6.2.7.2 Potential impacts the project may have in this specialist area

A summary of the potential impacts are provided in Table 9-10 and the assessment of the significance of these potential impacts will be the focus of the fauna, flora and wetland assessment.

Table 9-10: Potential impacts on ecology

Project activity	Potential impacts
1. Abstraction of water from the shafts and reaching or keeping the ECL	■ None
2. The construction and operation of the HDS Plants and the discharge of neutralised water in the environment	■ Construction of HDS plant may cause alteration, damage to habitats (Western Basin) ■ Potential increase in water flow due to discharge may impact on aquatic habitats of vertebrates and invertebrates ■ Potential increase in water quantity may cause inundation of riparian zones ■ The increase in salinity of the water may impact on ecological functioning of systems
3. Construction and operation of pipelines	■ Construction of pipelines may disturb or destroy natural habitats ■ Spillages of pipelines will impact on natural vegetation and animals
4. The disposal of the sludge	■ None

9.6.2.7.3 Method and objectives of the study

The ecological assessment will fulfil the following objectives:

- Defining the ecological state of the receiving systems;
- Detect and report on spatial and temporal trends in the ecological state of the ecosystems affected;
- Identifying the wetland systems within the study area;
- Assessing the impact of the increase in salinity on:
  - Invertebrates;
  - Fish;
  - Vegetation; and
  - Waterfowl.
- Assessing the impact of the increase in water flow on:
  - Aquatic habitats;

- River geomorphology and wetlands.

- Assessing the impact of the increase in water volume on:
  - The riparian zone; and
  - Wetlands.

Characterisation of the receiving environment

The aquatic, riparian and wetland habitats are well known and researched throughout the study area and using this information the current ecological status of the systems will be determined. A desktop review will be conducted for this study which will consider the available literature sources applicable to the study area. This review will establish a description for the relevant systems.

Collection of existing data for the study area will take place through various means, these include:

- Literature – existing studies and publications for the study area will be reviewed and will assist in describing the receiving environment;
- Datasets – a number of datasets are available in-house as well as through organisations. The following dataset will be used in the characterisation of the receiving environment:
  - The ecological integrity (health) database model for the systems;
  - The RHP;
  - The Freshwater Ecological Priority Areas for the catchments; ;
  - The Gauteng Conservation Plan;
  - South African National Biodiversity Institute (SANBI) data resources:
    - BGIS
    - POSA
    - Precis list
  - Protected ecosystems (SANBI);
  - Protected areas;
  - Important Bird Areas (IBA);
  - South African National Bird Atlas Project 2 (SANBAP 2);
  - Quarter degree square grid for birds;
  - 1:50 000 topographical data (delineation of wetlands);
  - Environmental Potential Atlas (ENPAT); and
  - International Union for Conservation of Nature (IUCN).

- Consultation – consultation with institutions, authorities and professional will be done to gather information for the study area. These include:
  - SANBI;
  - RHP Gauteng; and
  - CSIR.

The data collected will then be interpreted to define aspects relating to the study area. These aspects are listed below:

- Ecological importance - the following components of the systems will be assessed to determine the ecological importance:
  - Rivers/Wetlands – The ecological importance of a water resource refers to the ability to maintain ecological diversity and functioning on local and wider scales. Information pertaining to the natural and current species composition for the respective systems will be considered in order to describe the diversity of these systems. In addition to this, the tolerance of the current species will also be considered in order to describe the sensitivity of the species to changes. The functioning of the systems will primarily consider the ability of these resources to enhance water quality, regulate streamflow as well as consider human uses;
  - Cultural/Medicinal - Certain plant species identified as being present within the study areas will be of medicinal or cultural values according to National and Provincial legislation. These species play a vital role in cultural beliefs and local medicines and are harvested for their associated value. These values are well documented with existing records and studies. These will be utilised for identification;
  - Endemic - The ecological state of being unique to a defined geographic location. Flora and Fauna species identified through previous records and studies of the study areas could be classified as endemic, this status is supported by National and Provincial legislation; and
  - Red data - The review will involve the classification of species occurring within the study area that are of conservation concern and listed by the International Union for Conservation of Nature (IUCN) or by Provincial legislation as protected and endemic. Each species will be listed and the Red Data status identified and recorded. Use will be made of existing records, findings and sightings to identify keystone and indicator species within the study area.
- Ecological status - The ecological status of each system aspect will be determined. The ecological state of the wetland systems will be determined at desktop level. This will be determined by the application of the WET-Management series which will describe the general services provided by the systems. The health of the wetland systems will be determined by the collation of the available data and information.

The ecological state of the responders of the aquatic ecosystems will be determined at desktop level compared to the natural or close to natural reference conditions. The state of these responders will be considered in order to determine the ecological state of the respective systems. The ecological state derived for each of the biological response components for a particular river will be used to derive an overall, integrated ecological state.

The data collected during the characterisation of the social environment detailing the extent and nature of anthropogenic land use, such as agricultural, residential, commercial and industrial, will be compared to empirical data sets for floral communities such as Mucina's and Rutherford Vegetation types of South Africa, to detail the current extent of these vegetation types. Through this process the current status of the floral communities will be determined.

- Sensitive Areas - based on legislated protected areas and Ramsar sites as well as the Protected Ecosystems as defined in NEMA, sensitive areas will be characterised and described for the study area.

Using the information collected and the classifications of the ecological status of the systems, impacts will be determined for the project. The impacts of the water quality and increase in flow rates would be the focus in quantifying the impacts on the ecological systems.

Depending on the findings of the phase 1 assessment, it may be required to verify the findings through fieldwork and sampling.

9.6.2.8 Air quality assessment

The air quality assessment will involve a review of the existing air quality environment. This will involve the characterisation of relevant aspects using various data sources. The study will attempt to understand existing impacts from the tailings facilities which are planned to be used for sludge disposal as well as understand the sludge characteristics and its effects on the tailings material. This data will be combined with toxicity analyses and a call made as to whether this is a significant potential change to the surrounding communities or not. This will constitute Phase 1 of the project. Depending on the characterisation of the sludge, dispersion modelling may take place as phase 2 of the assessment.

9.6.2.8.1 Scoping issues

The risk assessment identified that radiation pathways were a high risk (21). The dispersion of sludge through the air is considered to be a pathway. Risk 13 raised the fact that the project could have health risks, this is related to air quality.

9.6.2.8.2 Potential impacts the project may have in this specialist area

The potential impacts are detailed in Table 9-11.

Table 9-11: Potential impacts on air quality

Project activity	Potential impacts
1. Abstraction of water from the shafts and reaching or keeping the ECL	■ No Impact
2. The construction and operation of the HDS Plants and the discharge of neutralised water in the environment	■ Limited impact to the receiving environment during the construction phase of HDS Plants, which can be mitigated/managed by Construction EMP. ■ Impacts during the operational phase will be insignificant as projected traffic on the unpaved roads will amount to 8 (eight) trucks per day.
3. Construction and operation of pipelines	■ None
4. The disposal of the sludge	■ The possible impact to the receiving environment during the operation phase through the generation of dust from the tailings dams where the sludge will be deposited. This could lead to exposure of people to particulate matter in the form of PM10, PM2.5, dust deposition and radionuclides.

9.6.2.8.3 Method and objectives for the study

The objectives of phase one of the assessment are as follows:

- To characterise the receiving environment in terms of:
  - Climate;
  - Proximity of receptors; and
  - Spatial extent in terms of influence.
- Identify sensitive receptors;
- Assess the sludge characterisation with regard to:
  - Particle size distribution; and
  - Chemical properties.
- Identify possible impacts associated with project based on the information gathered; and
- Determine whether dispersion modelling is required for the project.

Phase 1 - Data collection and interpretation

In order to characterise the receiving environment, information on the following parameters will be acquired and assessed:

- Meteorological and climate data (rainfall, wind speed and direction, temperature, relative humidity, atmospheric stability) - South African Weather Service;
- Particle size distribution (for deposited sludge and tailings storage facilities where sludge will be deposited), as well as physical and chemical properties of deposited sludge (base metal content, water content, solids content and crusting properties);
- Sensitive receptors (communities of concern). This will be determined through the characterisation of the social environment as well as existing databases; and
- Data collection form the mines that own and operate the TSFs will also be conducted to determine what the historical impact of the facilities has been on the environment. This can only be done once agreements with the relevant mining companies have been finalised.

Phase 1 - Assessment

The assessment conducted during phase 1 will involve the identification of possible impacts based on the data gathered. The meteorological data will be used to determine predominant wind directions and speeds which will aid in identifying possible receptors. Seasonal variation will also be assessed and the associated impacts identified.

The results of the sludge characterisation will also be assessed to determine the chemical and physical nature of the sludge and whether impacts associated with the dispersion of the sludge could occur once deposited. These results will influence the need to complete phase 2 involving dispersion modelling.

Phase 2 – Dispersion modelling

Depending on the results of the sludge characterisation, dispersion modelling may be required to predict the impacts that may occur through the sludge disposal and subsequent dust generation.

Mathematical models will then be used to simulate the dispersion of air pollutants in the receiving environment. The results of the mathematical models will predict and describe the impacts on receptors through the simulation of pathways in the receiving environment. Once these impacts have been predicted and described, the significance of the impacts can be assessed. The significance of identified impacts on the receiving environment will be done by comparison of the predicted concentrations with the ambient monitoring data (if available) and NAAQS air quality standards to determine compliance with legal requirements.

9.6.2.8.4 Project Team

The project team for the study will consist of Vladimir Jovic and Mrs. Claire Wray (external review).

9.6.2.9 Agricultural assessment

Agriculture, along with its related components, may be affected by the treatment and discharge of neutralised water down the streams. It is suggested that a desktop review and interpretation of results take place to understand the possible impacts that could occur.

9.6.2.9.1 Scoping issues

The risk assessment identified a number of risks which are directly or indirectly related to agriculture. Risk 5 makes mention of radiation pathways. Build-up of uranium or radionuclides in the soil and plants (crops) may be a risk and be a pathway. Livestock may also be impacted, should they drink the water. Risk 15 saw irrigation with treated water as a potential risk. This will have an impact on agriculture.

The following issues were raised during the scoping phase:

- Impact of heavy metals on the soils;
- The costs that agriculture will bear due to the discharge of the water;
- The need for an agricultural study to be completed; and
- Impacts on agriculture due to use of the treated water.

9.6.2.9.2 Potential impacts the project may have in this specialist area

The potential impacts of the project on agriculture are listed in Table 9-12.

Table 9-12: Impacts on agriculture

Project activity	Potential impacts
1. Abstraction of water from the shafts and reaching or keeping the ECL	■ Impact on water availability for irrigation and livestock should water levels drop
2. The construction and operation of the HDS Plants and the discharge of neutralised water in the environment 3. Irrigation of soil downstream of the treated water discharge points.	■ Irrigation water quality impacts on soil quality. ■ Soil salinity will change due to the build-up of salts contained in the treated water, in irrigated soil. ■ The presence of salt influence crop growth and therefore crop production and yields. ■ It is unclear if metals and or radionuclides will be present in the treated water but if these constituents are present than they can become bio-available entering the human and animal food chains. ■ High salinity may impact livestock drinking the

Project activity	Potential impacts
	water.
4. Construction and operation of new pipelines	■ Decreasing land capability due to smaller areas available for agriculture.
5. The disposal of the sludge	■ None

9.6.2.9.3 Method and objectives of the study

It is suggested that the characterisation of agriculture be restricted to a desktop review of existing soil types and their susceptibility to different water qualities when used for irrigation and the comparison of water qualities against guideline for livestock watering. Once the characterisation of the social environment has been completed, the water uses can be classified and it will then be determined whether impacts on agriculture will occur.

The following objectives have been set for the soil assessment:

- Classification of the soil types potentially affected by the project;
- Assessment of the water use database provided by the social assessment in terms of irrigation use;
- Define the location and extent of agricultural practices using water from the rivers or underground for irrigation and livestock drinking water;
- Determine the impact on soils based on the water quality results of the surface water study, the water use information and the soil types; and
- Determine whether the water qualities exceed the standards for livestock drinking water.

Characterisation of the receiving environment

The soil types that exist along the receiving streams will be classified according to the South African soil classification system using existing data and soil classification maps for the study area. Plans will be developed for the study area delineating the various soil types.

The data collected through the characterisation of the social environment, and specifically that data pertaining to the water use, will be interpreted to define the number of persons or organisations utilising the water for irrigation and livestock watering purposes. This will be valuable in defining the extent of use within the study area.

Impact Assessment

The water quality results and modelling data (available from the surface water assessment) will be used together with the water use and soil classification information to define and quantify the impacts that may be associated with the project.

Based on the water quality results of the surface water assessment the impact on livestock will be determined. Standards for livestock drinking water will be used to identify constituent that exceed the limits as well as to establish the extent of the possible impacts.

The impacts of the no-go option will also be assessed. The effects on livestock may be significant as the water used to supply these animals may be more saline in the case of both the no-go option as well as the discharge of neutralised AMD. Input will be obtained from the social characterisation as to who is using water directly from the streams for livestock watering, what quantities they are they using and what animals they are watering. Input will then be obtained from the water quality determinations to see to what extent this water quality will be affected. A determination will then be made of the effects of the decreased, or increased, water quality on the livestock production by comparing these qualities to the DWA Guidelines for livestock watering. Where possible existing data from research sources will be used to determine the effects on productivity.

9.6.2.9.4 Project team

The assessment will be undertaken by Dr Hendrik Smith of Digby Wells Environmental.

9.6.2.10 Technology evaluation

The choice of treating the water using the HDS process was seen as an initial treatment process which would limit some of the catastrophic ecological effects which could occur if the water was allowed to be discharged in an untreated fashion.

9.6.2.10.1 Scoping issues

During the scoping phase I&APs questioned the use of HDS as the treatment technology and asked whether other technologies could be used instead.

9.6.2.10.2 Method and objectives of the study

The objective of the technological assessment will be:

- To establish whether the choice of technology for the neutralisation and preliminary treatment of acid mine drainage is logical and defendable;
- To assess what other alternatives there could be and whether these alternatives should be applied to achieve the desired objective; and
- To recommend what improvements to the process design could be implemented given the project timelines and proposed longer term treatment options to be considered.

The report will contain a summary of the findings in such a manner that it can be used for public dissemination of the information and so that this summary can be readily understood by members of the public.

9.6.2.11 Economic analysis

The proposed discharge of neutralised water will increase the salinity of the receiving streams and may impose significant costs on urban and industrial and irrigation users. Based on escalated data from earlier studies, urban and industrial users incur a cost of about 0.5 c/kl per 1 mg/l increase in supply water TDS. Although this seems small, it is very significant for polluted waters with a large number of users where the increase in TDS is much greater than 1 mg/l.

9.6.2.11.1 Scoping issues

The risk assessment recognised the potential risk in the failure to identify the consequences of changes in quality as well as the risk to downstream users in terms of cost. These were ranked as 14 and 12 respectively.

The following issues were raised during the scoping phase:

- Impact on agricultural users downstream; and
- Effect of water quality on downstream users.

9.6.2.11.2 Potential impacts the project may have in this specialist area

The potential economic impacts are listed in Table 9-13.

Table 9-13: Economic impacts

Project activity	Potential impacts
1. Abstraction of water from the shafts and reaching or keeping the ECL	■ None
2. The construction and operation of the HDS Plants and the discharge of partially treated water in the environment	■ Impact on agricultural users, through irrigation or livestock users. ■ Increase in treatment costs for municipalities. Impact on pumps and equipment for downstream users.
3. Construction and operation of pipelines	■ None
4. The disposal of the sludge	■ None

9.6.2.11.3 Method and objectives of the study

Using the data gathered and determined by the surface water assessment the salinity figures will be used to determine the likely cost increases due to the discharge of neutralised

water. Salinity cost factors for urban and industrial and irrigation use will be derived from existing models for different areas and use sectors.

9.6.2.11.4 Project team

The economic analysis will be completed by Dr. Chris Herold.

10 CONCLUSION AND RECOMMENDATIONS

10.1 The need for the project has been firmly established

AMD has been decanting from the Western Basin for a few years and will decant in an uncontrolled fashion from the Central and Eastern Basins unless a management system is put in place to prevent this from occurring. The disastrous ecological impacts of the untreated water being discharged in the West have been well documented and publicised. This and the imminent threat of rising water levels in the other basins has led to the government response of instructing TCTA to implement the Short Term interventions which involve:

- The achieving and maintaining of water in the old mine workings at a level where they should not affect surrounding aquifers, buildings or other infrastructure;
- Construction and operation of neutralisation and aeration treatment plants; and
- Discharge of the water and the safe disposal of the brine.

If this project were not implemented the status quo would be maintained in the Western Basin and decant would occur in the Central Basin somewhere near to the Elsburgspruit, probably through some of the old mine shafts and in the Eastern Basin, decant would occur somewhere near some of the old Nigel Shafts. This decant could affect some buildings in Nigel. Both the Central and Eastern Basin decants could affect large portions of the waterways below these points and large parts of the Vaal River System. In the west the Crocodile River System from the Tweelopiespruit downstream and including the Hartbeespoort Dam would be affected. This water could affect the dolomites associated with the Cradle of Humankind and a World Heritage Site.

10.2 What are the impacts of the proposed project?

The proposed interventions will assist in managing the AMD problem in a controlled fashion and return the water systems roughly to what they were during the period when the mines were operating and pumping, treating and discharging water. The water to be discharged, however, will affect the Tweelopiespruit in the west all the way to at least the Hartbeespoort Dam and the Klip River System at least to the Vaal Barrage and possibly beyond in terms of quality land flow. As large populations draw their water from these waterways and large ecosystems are dependent on these water ways it is essential that we understand the implications of the proposed actions and where necessary change them to avoid undesirable consequences. These impacts will be compared to the option of what would be the impacts if these measures were not implemented.

There are also potential impacts associated with the disposal of the sludge on existing TSFs, with air quality and groundwater being most affected.

We currently do not know enough about the potential impacts of the project but the completion of the planned Public Participation Process and the planned studies will assist all parties in better understanding the system.

10.3 Aspects to be covered in the EIA phase

Aspects which need to be studied and are planned for the EIA phase of the project are:

- Ecological impacts – including aquatic life, wetlands and flora and fauna;
- Social issues – to address impact of the project on people;
- Human health – to understand health impacts of the project;
- Radiation aspects – to understand the impacts of radiological issues resulting from the project;
- Water quality and quantity impacts – including chemical quality, water supply, groundwater impacts and implications for flow regimes;
- Heritage and archaeological impacts – including possible impact on the Cradle of Humankind World Heritage Site and buildings and equipment which may be affected;
- Air quality impacts – as a result of sludge disposal on the tailings dams; and
- Soil impacts – due to changes in water chemistry in irrigation water.

Studying these issues will assist us in advising TCTA of any changes required to the project and also provide the authorities with data to assist them in managing the resources of the country in terms of their legal obligations.

10.4 Is this project enough?

The proposed project will still have a major impact on river systems if the water is to be released and the water is not used by any large scale user in its current form. Further treatment and management of the water is subject to a separate project which does not form part of this study.

The proposed project does however provide any future water treatment option with the first and probably the cheapest first phase water preparation and treatment option.

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Appendix A: Plans

Plan 1

Acid Mine Drainage Project

Regional Setting

Legend

- AMD Treatment Sites
- City
- Major Town
- National Road
- Main Road
- Rivers
- Municipalities
- Provincial Boundary

PRETORIA
MAMELODI
ATTERIDGEVILLE
CENTURION
TEMBISA
SANDTON
KEMPTON PARK
KRUGERSDORP
RANDBURG
EDENVALE
BENONI
ROODEPOORT
RANDFONTEIN
JOHANNESBURG
GERMISTON
BOKSBURG
BRAKPAN
SPRINGS
ALBERTON
SOWETO
NIGEL
HEIDELBERG

NORTH WEST
GAUTENG
MPUMALANGA

Local Municipality of Madibeng
City of Tshwane
Kungwini Cross Boundary Local Municipality
Mogale City Local Municipality
City of Johannesburg
Ekurhuleni Municipality
Midvaal Local Municipality
Lesedi Local Municipality
Randfontein Local Municipality
Westonaria Local Municipality
Delmas Local Municipality

Western Basin Site
Central Basin Site
Eastern Basin Site

Swartspruit
Apies
Moreletta
Pienaars
Elands
Hennops
Ossspruit
Krokodil
Jukskei
Rietspruit
Mooirivierloop
Klip
Natalspruit
Blesbokspruit

DIGBY WELLS ENVIRONMENTAL
www.digbywells.com

Projection: Transverse Mercator	Ref #:amc.BKS1310.201112.038
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 07/12/2011

N
0 5 10 20
Kilometres
1:350 000

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Plan 2

Acid Mine Drainage Project

Local Setting

Legend

- Project Sites
- City
- Major Town
- National Road
- Main Road
- Rivers
- Municipalities
- Provincial Boundary

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Projection: Transverse Mercator	Ref #:amc.BKS1310.201112.038
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 08/12/2011

N

0 5 10 20

Kilometres

1:350 000

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Plan 3

Acid Mine Drainage Project

Site Layout
Immediate Intervention

27°42'30"E
27°43'0"E
27°43'30"E
27°44'0"E
26°7'0"S
26°7'30"S
26°8'0"S
26°8'30"S

West Wits Tailings Depostion Site
Treatment Plant
Abstraction Shaft
CPS Clarification Pond
Robinson Dam
R28

Legend

- Main Roads
- Powerline
- Railway Line
- Non-Perennial River
- Dam
- Vlei

Site Layout - Immediate Solution

- Neutralised Slurry
- Raw water
- Waste Sludge Pipeline
- Treated Water Trench

DIGBY WELLS ENVIRONMENTAL
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Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

Ref #: amc.BKS1310.201202.094
Revision Number: 1
Date: 20/02/2012

N
0 125 250 500 750
Metres
1:14 000

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Plan 4

Acid Mine Drainage Project

Site Layout
Western Basin
Short Term Intervention

Legend

- Main Roads
- Powerline
- Drainage Line
- Railway Line
- Non-Perennial River
- Perennial River
- Dam
- Vlei

Site Layout - Western Basin

- Proposed Treatment Site
- Raw AMD Pipeline
- Treated Water Pipeline
- Waste Sludge Pipeline

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Projection: Transverse Mercator	Ref #: amc.1310.201202.097
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 20/02/2012

N

0 0.3 0.6 1.2

Kilometers

1:25 000

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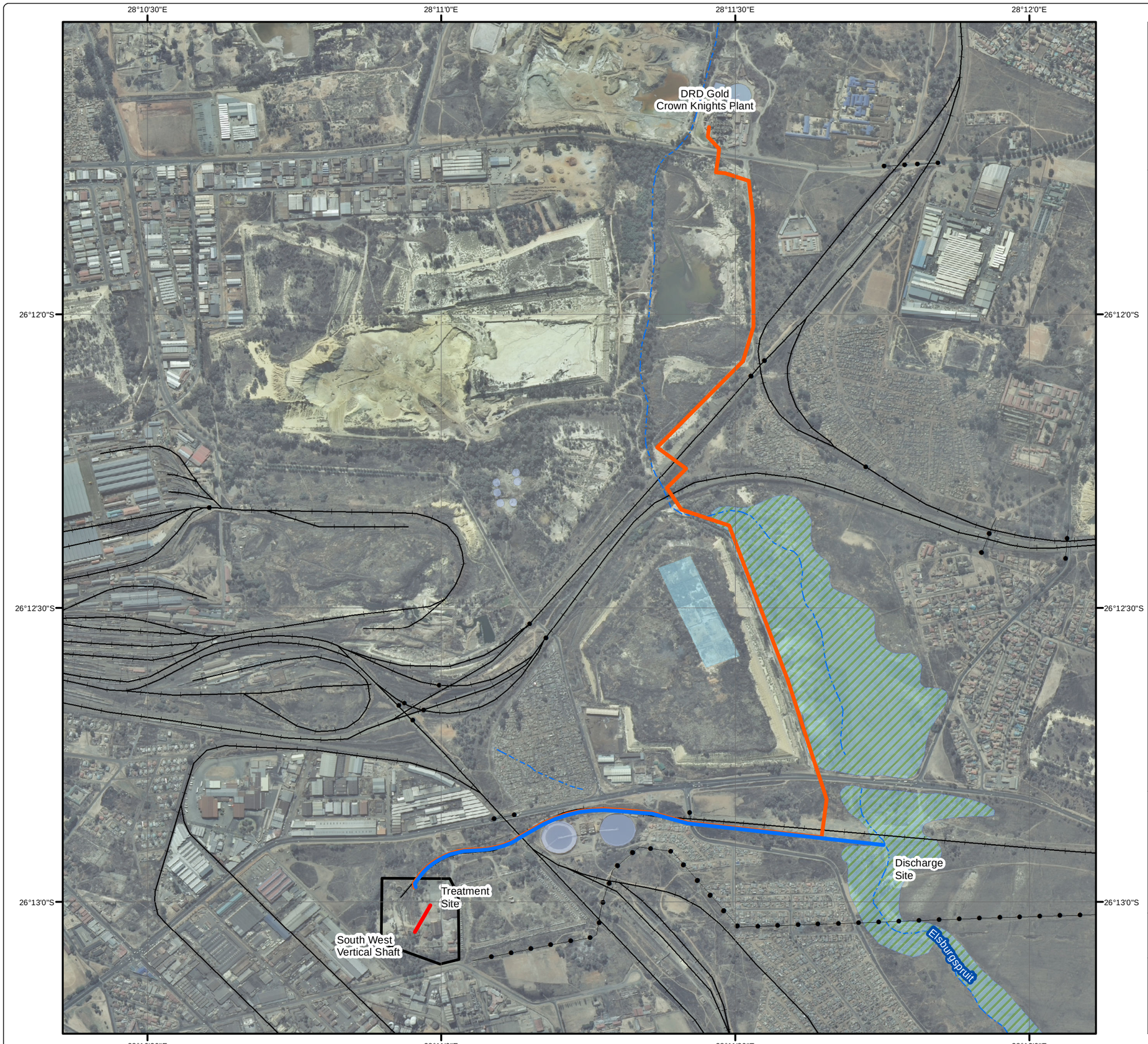
Plan 5

Acid Mine Drainage Project

Site Layout
Central Basin



Legend

- Powerline
- Non-Perennial River
- Railway Line
- Dam
- Reservoir
- Vlei

Site Layout - Central Basin

- Acid Mine Drainage Water
- Neutralised Water
- Proposed Treatment Site
- Sludge Pipeline

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #: amc.1310.201202.095
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 20/02/2012

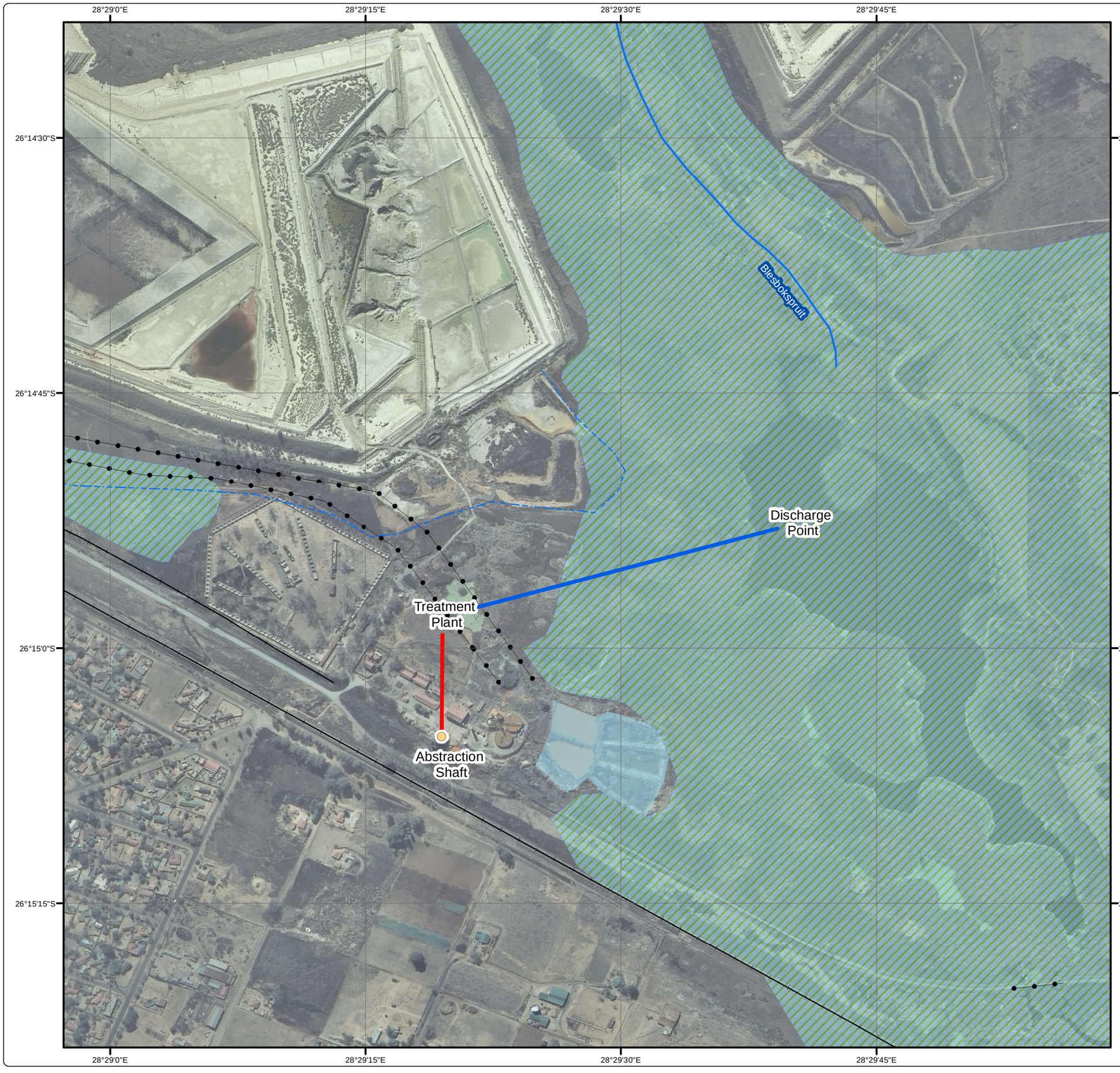
N

0 150 300 600

Metres

1:12 000

© Digby Wells Environmental



Plan 6

Acid Mine Drainage Project

Site Layout
Eastern Basin

Legend

- Grootvlei 3 Shaft
- Powerline
- Perennial River
- Non-Perennial River
- Railway
- Dam
- Vlei

Site Layout - Eastern Basin

- Acid Mine Drainage Water
- Neutralised Water

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #: amc.1310.201202.096
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 20/02/2012

N

0 100 200 400

Metres

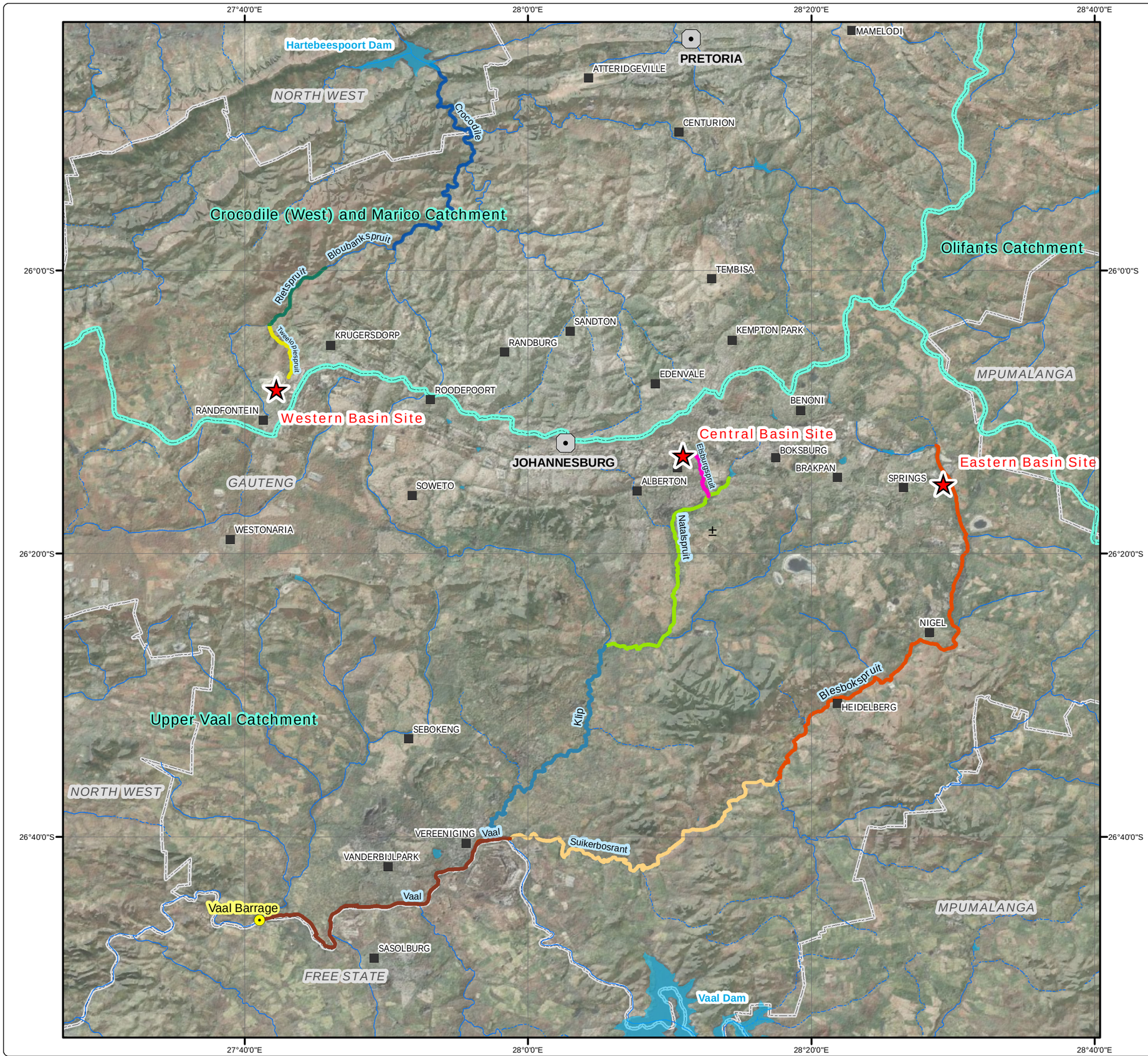
1:7 000

© Digby Wells Environmental

Plan 7

Acid Mine Drainage Project

Rivers and Catchments Potentially Impacted by the Project



Legend

- Vaal Barrage
- AMD Treatment Plants
- City
- Major Town
- Non perennial
- Perennial

Potentially Impacted Rivers and Catchments

- Elsburgspruit
- Tweelopiespruit
- Crocodile
- Rietspruit
- Klip
- Natalspruit
- Vaal
- Blesbokspruit
- Suikerbosrant
- Vaal
- Dams
- Water Management Areas
- Provinces

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #:amc.BKS1310.201201.124
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 31/01/2011

N

0 5 10 20 30

Kilometres
1:500 000

© Digby Wells Environmental

Plan 8

Acid Mine Drainage Project

Discharge Point
Western Basin
Short Term Intervention

Tweelopies - Rietspruit

Rietspruit

N14

Tweelopiespruit

R24

Robert Broom Dr

Black Reef Incline

17 Winze

Northway

Ventersdorp Rd

R28

R28

27°38'0"E
27°39'0"E
27°40'0"E
27°41'0"E
27°42'0"E
27°43'0"E
27°44'0"E

26°3'0"S
26°4'0"S
26°5'0"S
26°6'0"S
26°7'0"S
26°8'0"S
26°9'0"S

Legend

- Decant Positions
- Meeting Points Rivers
- Main Roads
- National Roads
- Non-Perennial River
- Perennial River
- Dam
- Vlei
- Krugersdorp Nature Reserve

Site Layout - Western Basin

- Proposed Treatment Site
- Raw AMD Pipeline
- Treated Water Pipeline
- Waste Sludge Pipeline

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #:amc.BKS1310.201205.030
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 09/05/2012

N

0 1 2

Kilometres

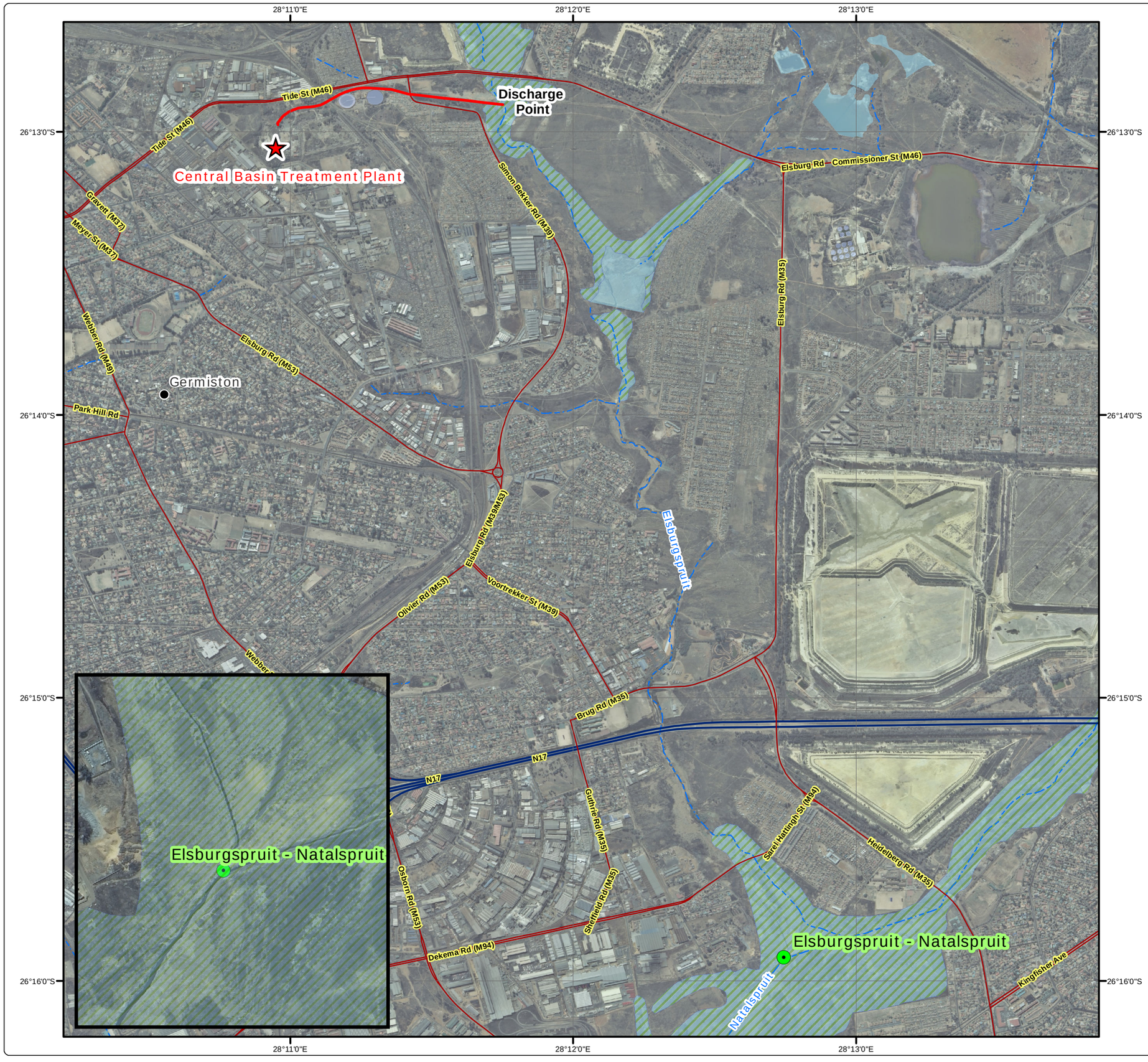
1:45 000

© Digby Wells Environmental

Plan 9

Acid Mine Drainage Project

Discharge Point
Central Basin



Legend

- AMD Treatment Site
- Meeting Points Rivers
- Major Town
- Neutralised Water Pipeline
- Main Roads
- National Roads
- Perennial River
- Non-Perennial River
- Dam
- Reservoir
- Vlei

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #:amc.BKS1310.201205.030
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 09/05/2012

N

0 0.75 1.5

Kilometres

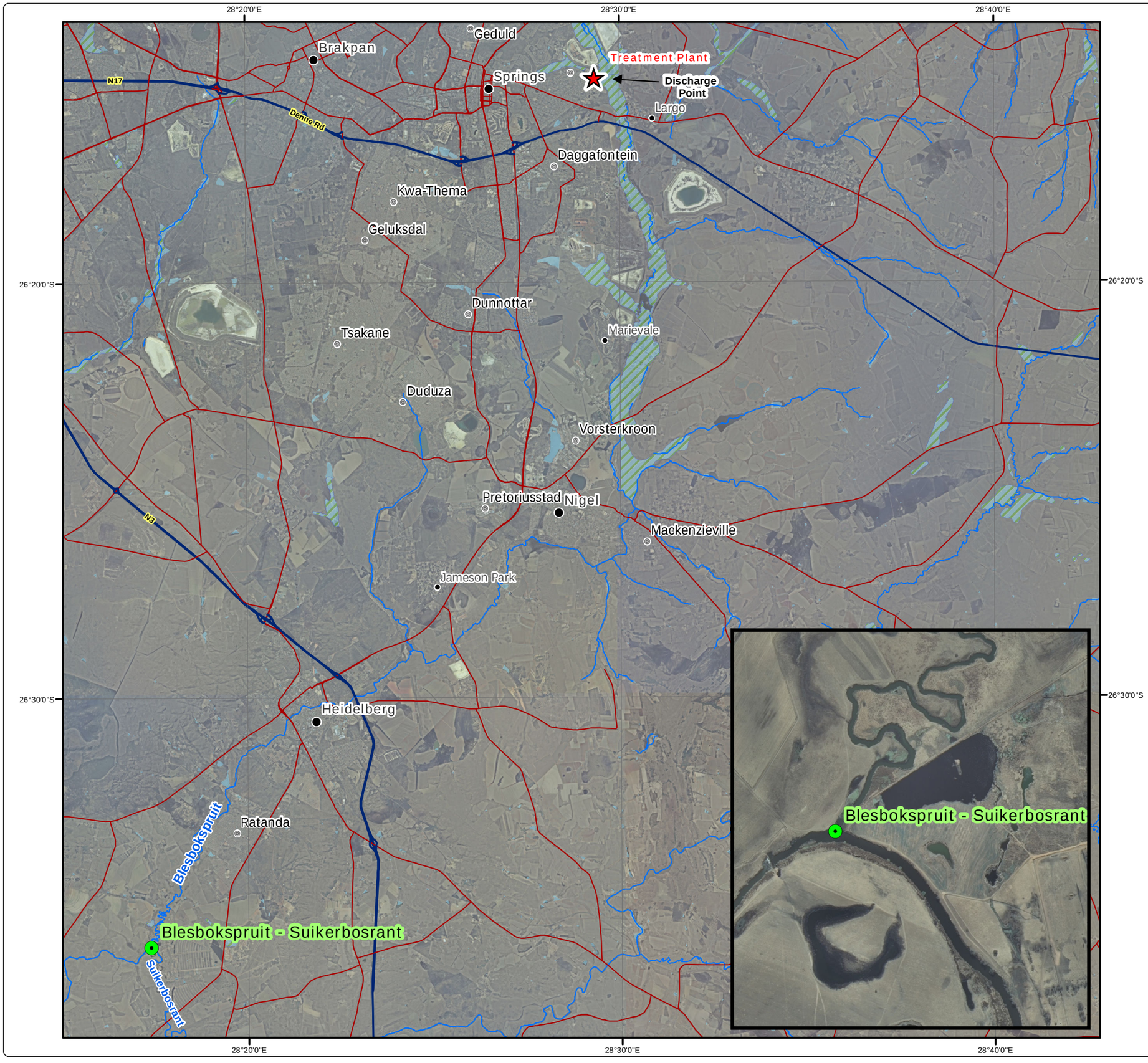
1:25 000

© Digby Wells Environmental

Plan 10

Acid Mine Drainage Project

Discharge Point Eastern Basin



Legend

- Proposed Discharge Point
- Meeting Points Rivers
- Major Town
- Secondary Town
- Other Town
- Settlement
- Main Roads
- National Roads
- Perennial River
- Dam
- Vlei

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #:amc.BKS1310.201205.034
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 09/05/2012

N

0 5 10

Kilometres

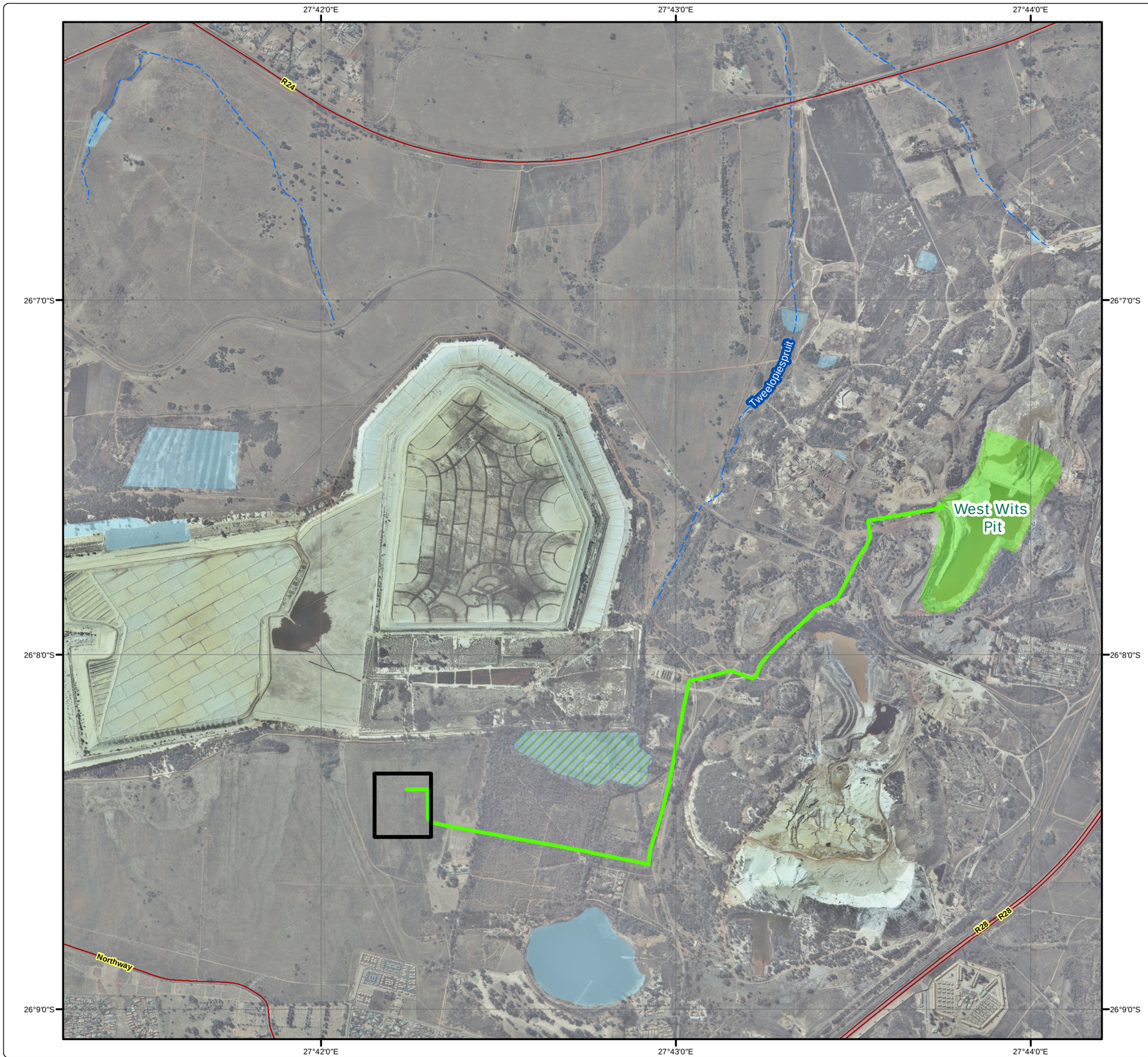
1:170 000

© Digby Wells Environmental

Plan 11

Acid Mine Drainage Project

Location of the TSF for Sludge Disposal - Western Basin



Legend

- Sludge Disposal Site - West Wits Pit
- Proposed Treatment Site
- Waste Sludge Pipeline
- Main Roads
- Non-Perennial River
- Dam
- Vlei

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #:amc.BKS1310.201205.037
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 09/05/2012

N

0 0.5 1

Kilometres

1:20 000

© Digby Wells Environmental

Plan 12

Acid Mine Drainage Project

Location of TSF for Sludge Storage Central and Eastern Basin

Legend

- Potential Sludge Disposal TSF Sites
- AMD Treatment Sites
- City
- Major Town
- Secondary Town
- Other Town
- Settlement
- Main Roads
- National Roads
- Perennial River
- Dam
- Vlei

DIGBY WELLS ENVIRONMENTAL

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Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

Ref #:amc.BKS1310.201205.036
Revision Number: 1
Date: 09/05/2012

N

0 4 8

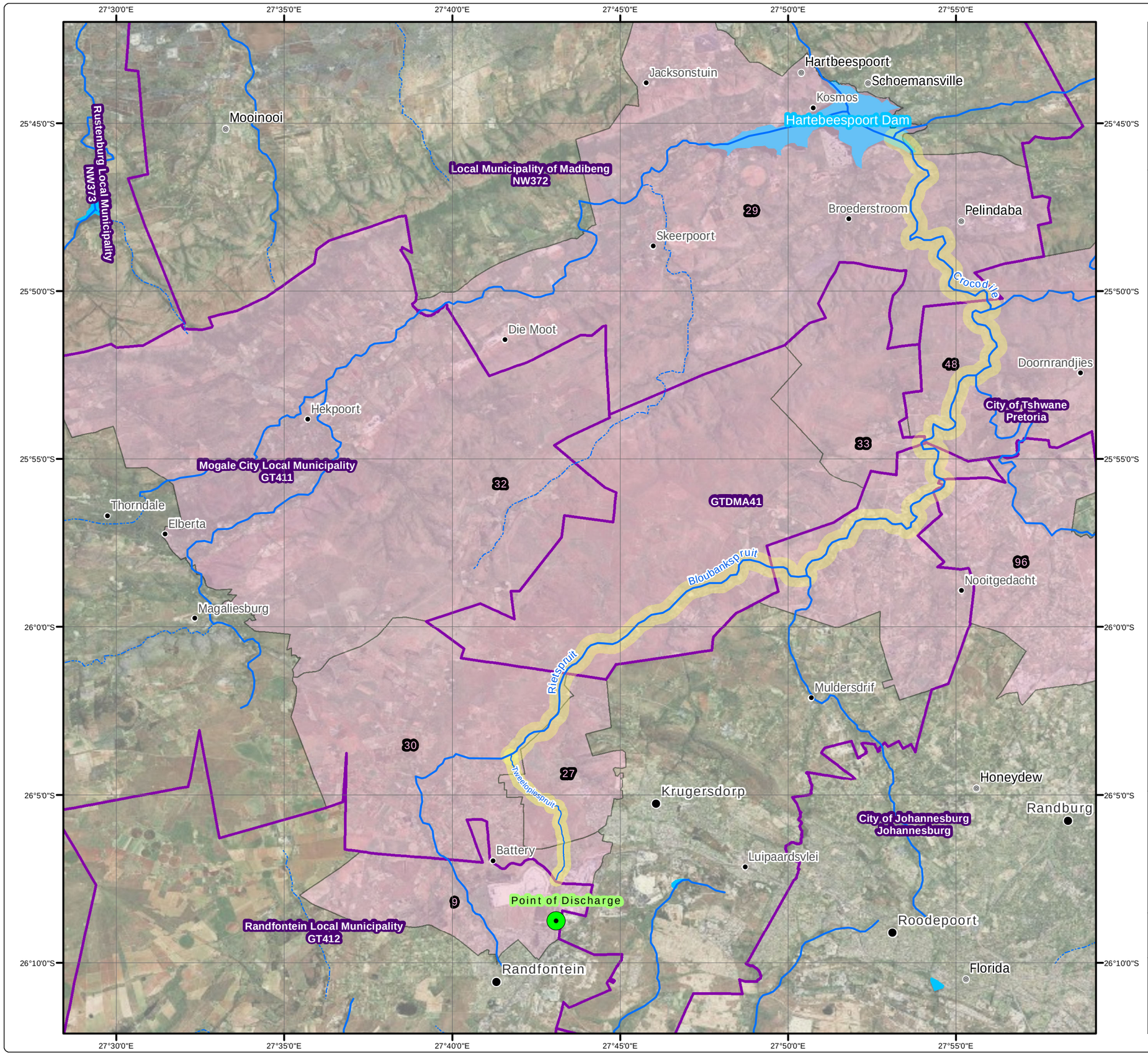
Kilometres
1:150 000

© Digby Wells Environmental

Plan 13

Acid Mine Drainage Project

Wards Affected by the Project
Western Basin



Legend

- Major Town
- Secondary Town
- Other Town
- Settlement
- Non-Perennial River
- Perennial River
- Potentially Impacted River
- Dams
- Municipalities
- Wards of Interest

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #: amc.BKS1310.201204.068
Datum: WGS84	Revision Number: 1
Central Meridian: 29°E	Date: 13/04/2012

N

0 2.5 5 10

Kilometres

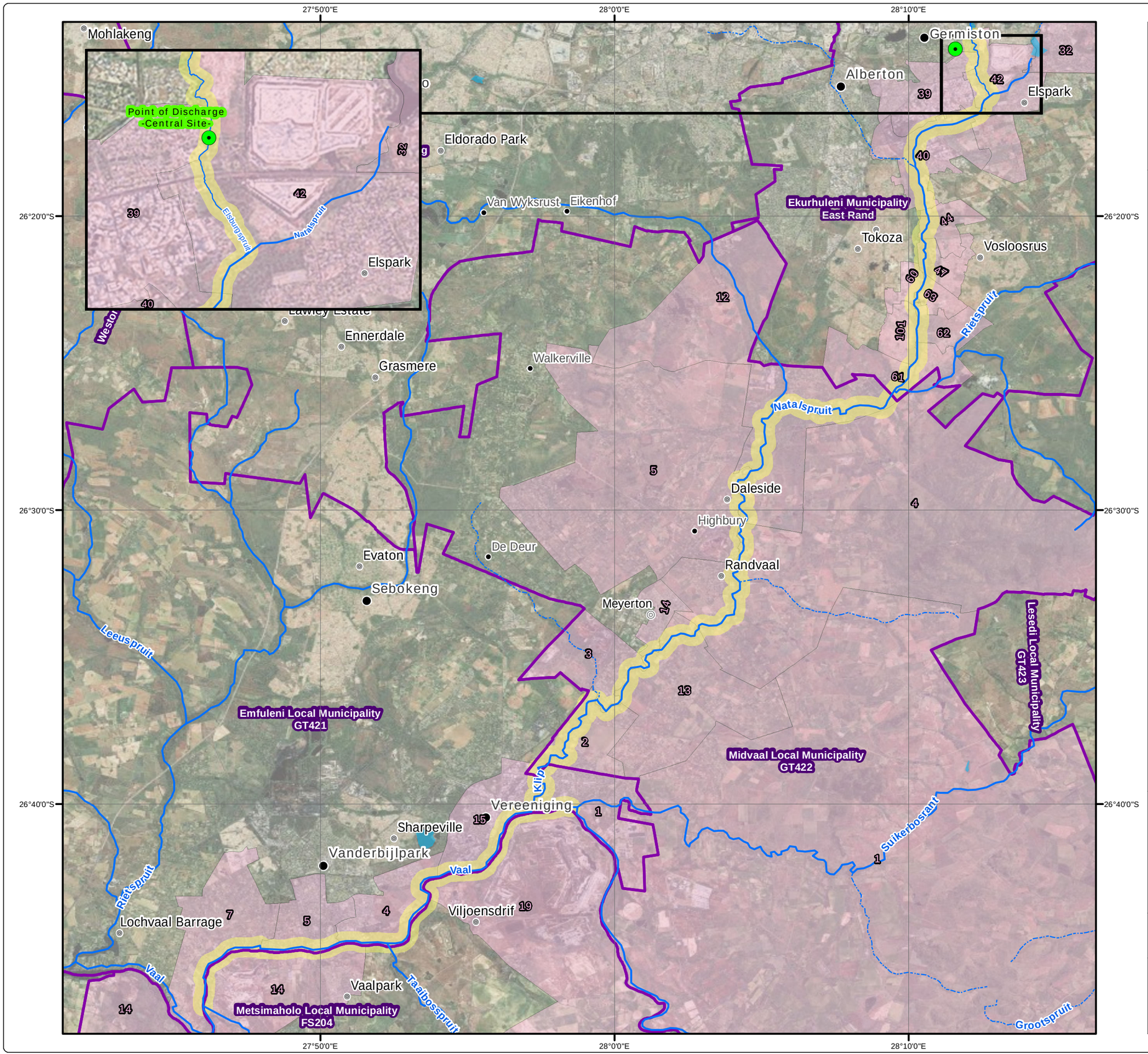
1:210 000

© Digby Wells Environmental

Plan 14

Acid Mine Drainage Project

Wards Affected by the Project Central Basin



Legend

- Major Town
- Secondary Town
- Other Town
- Settlement
- Non-Perennial River
- Perennial River
- Wards of Interest
- Dams
- Municipalities

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #: amc.BKS1310.201204.069
Datum: WGS84	Revision Number: 1
Central Meridian: 29°E	Date: 13/04/2012

N

0 3.75 7.5 15

Kilometres

1:240 000

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Plan 15

Acid Mine Drainage Project

Wards Affected by the Project
Eastern Basin

Legend

- City
- Major Town
- Secondary Town
- Non-Perennial River
- Perennial River
- Potential Wards of Interest
- Dams
- Municipalities

DIGBY WELLS ENVIRONMENTAL
www.digbywells.com

Projection: Transverse Mercator	Ref #: amc.BKS1310.201204.070
Datum: WGS84	Revision Number: 1
Central Meridian: 29°E	Date: 01/02/2012

N

0 5 10 20
Kilometres
1:375 000

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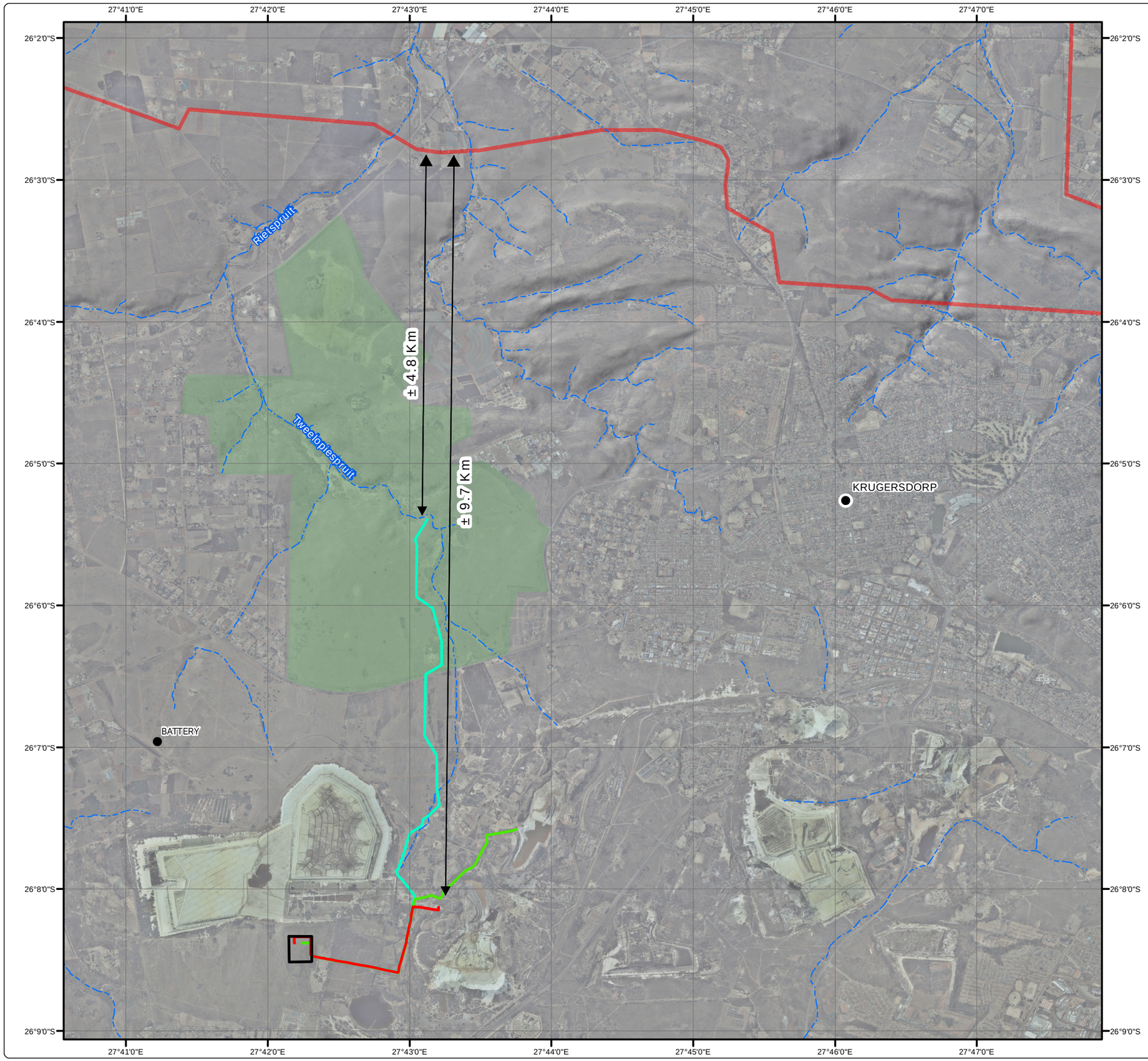
Plan 16

Acid Mine Drainage Project

Location of Cradle of Humankind



Legend

- Major Town
- Settlement
- Non-Perennial River
- Perennial River
- Proposed Treatment Site
- Raw AMD Pipeline
- Treated Water Pipeline
- Waste Sludge Pipeline

Places of Interest

- Cradle of Humankind
- Krugersdorp Nature Reserve

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #: amc.BKS1310.201205.055
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 11/05/2012

N

0 0.5 1 2 3

Kilometers

1:50 000

© Digby Wells Environmental

	Gauteng C-Plan Categories (Percentages Within 100m Buffers)			
Basin	Ecological Support Area	Important Area	Irreplaceable Area	Protected Area
Western	28.24	70.63	X	1.13
Central	56.18	40.88	2.94	X
Eastern	49.20	36.78	4.67	9.35

Plan 17

Acid Mine Drainage Project

Gauteng C-Plan and Affected Rivers

Legend

- AMD Treatment Plants
- Potentially Impacted Rivers
- Non-Perennial Rivers
- Perennial Rivers
- Dams
- Provinces

Gauteng C-Plan

- Protected Area
- Irreplaceable Area
- Important Area
- Ecological Support Area

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

Ref #: amc.BKS1310.201205.057
Revision Number: 1
Date: 11/05/2012

N

0 5 10 20

Kilometers

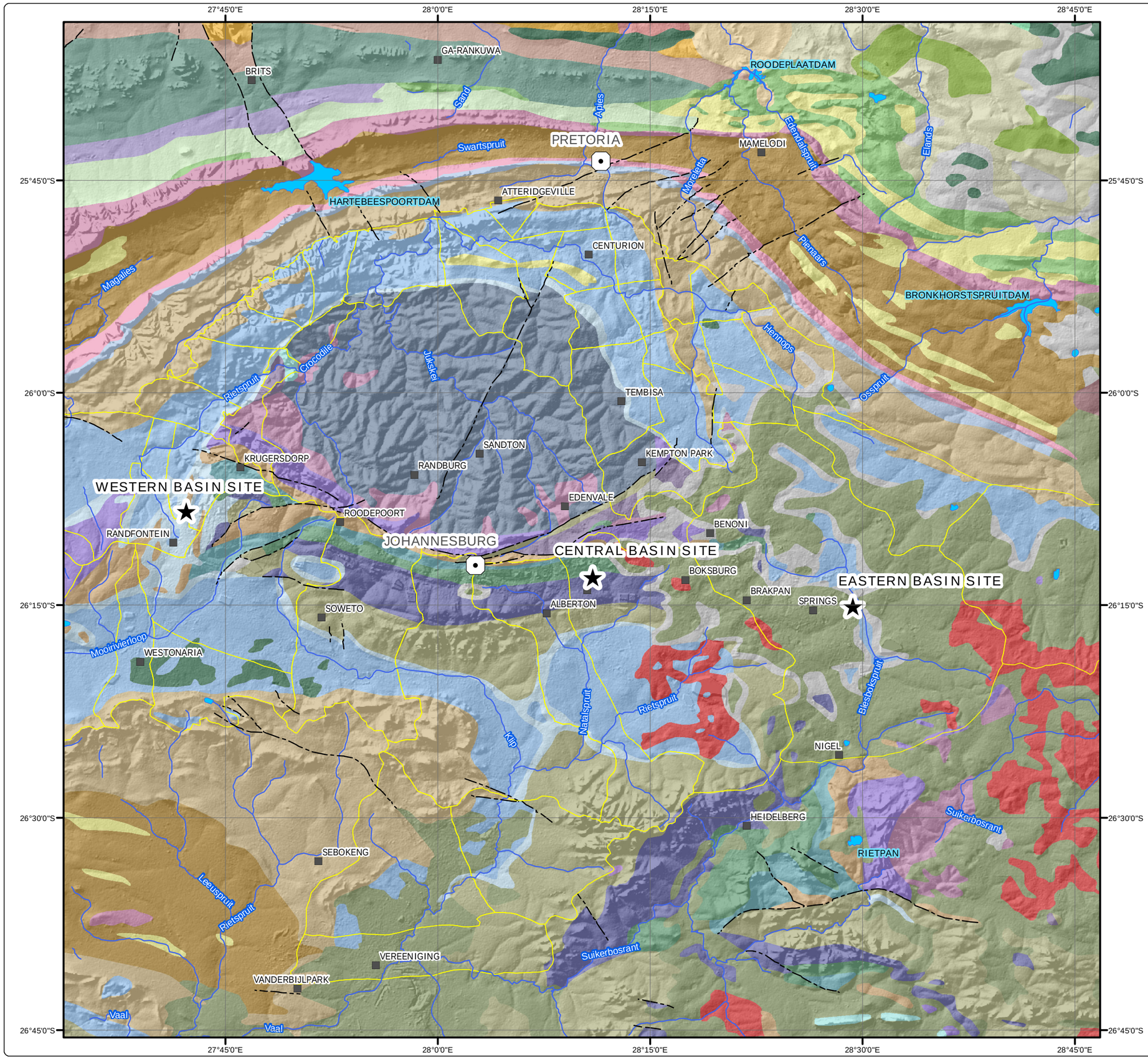
1:480 000

© Digby Wells Environmental

Plan 18

Acid Mine Drainage Project

Witwatersrand Geology



Legend

- Project Sites
- City
- Major Town
- Observed Faults
- Rivers
- Dams

Geology

- Bierkraal Magnetite Gabbro, Rustenburg Layered
- Black Reef Fm, Transvaal Spgrp
- Daspoort Fm, Pretoria Grp
- Dwarsfontein Cplx
- Dwyka Grp, Karoo Spgrp
- Ecca Grp, Karoo Spgrp
- Government Sbgrp, West Rand Grp
- Halfway House Granite
- Hospital Hill Sbgrp, West Rand Grp
- Jeppestown Sbgrp, West Rand Grp
- Johannesburg Sbgrp, Central Rand Grp
- Kaffirskraal Cplx
- Karoo Dolerite Sui
- Klipriviersberg Grp, Ventersdorp Spgrp
- Lebowa Granite Sui, Bushveld Cplx
- Loskop Fm, Transvaal Spgrp
- Madzaringwe Fm, Karoo Spgrp
- Magaliesberg Fm, Pretoria Grp
- Malmani Sbgrp, Chuniespoort Grp
- Mokolian Erathem
- Pienaars River Cplx
- Platberg Grp, Ventersdorp Spgrp
- Pretoria Grp, Transvaal Spgrp
- Pyramid Gabbro-Norite, Rustenburg Layered Sui
- Rashoop Granophyre Sui, Bushveld Cplx
- Rayton Fm, Pretoria Grp
- Rooiberg Grp, Transvaal Spgrp
- Schilpadnest Sbsui, Rustenburg Layered Sui
- Silverton Fm, Pretoria Grp
- Strubenkop Fm, Pretoria Grp
- Swazian Erathem
- Turffontein Sbgrp, Central Rand Gr
- Vaalian Erathem
- Vlakfontein Sbsuite & Kolobeng Norite, Rustb.
- Wilge River Fm, Waterberg Grp
- Witwatersrand Spgrp
- Dolomite Compartments

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

Ref #:amc.BKS1310.201204.133
Revision Number: 1
Date: 18/04/2012

N

0 5 10 20 30

Kilometres

1:500 000

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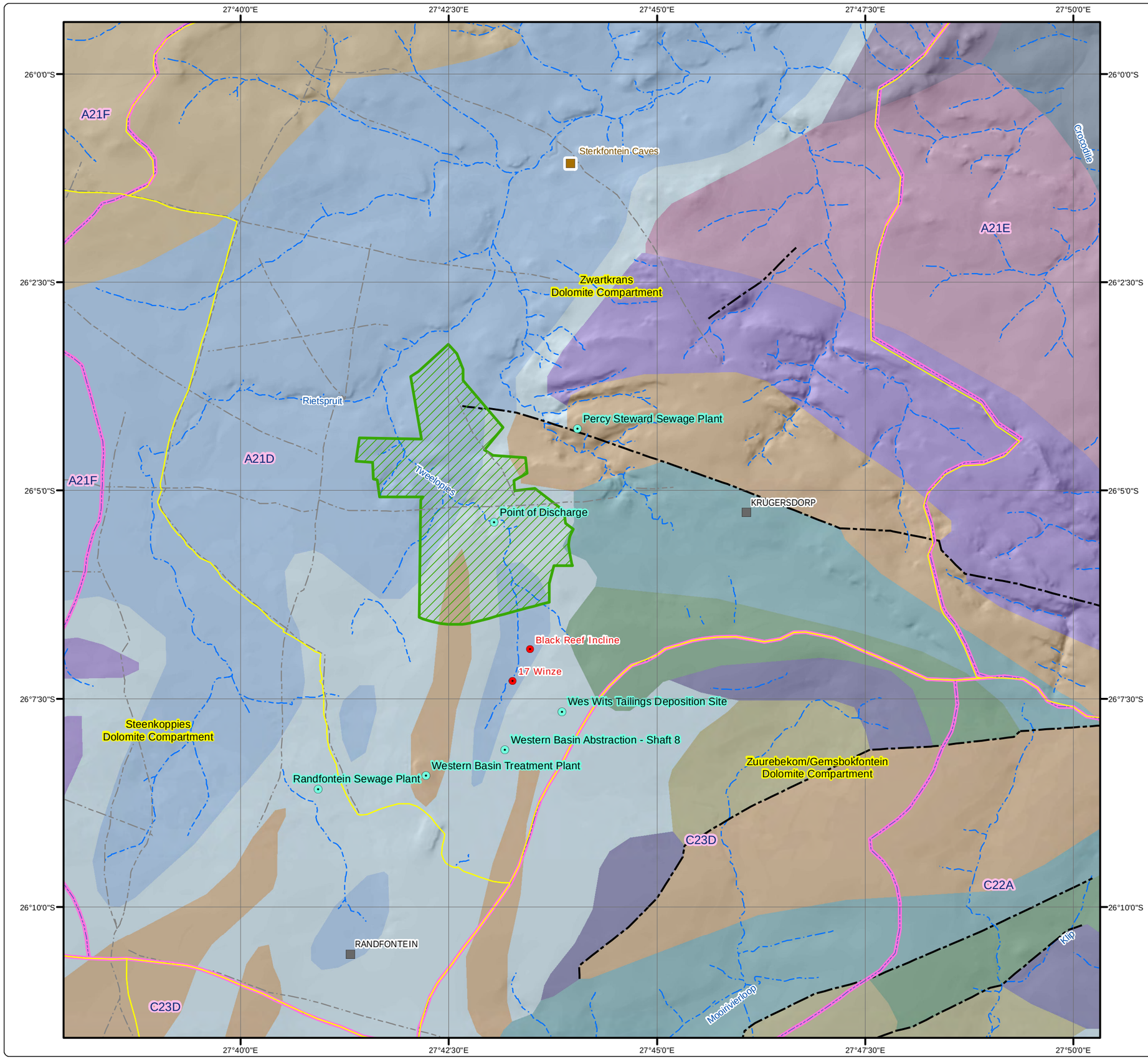
Plan 19

Acid Mine Drainage Project

Western Basin Geology



Legend

- Sterkfontein Caves
- Points of Interest
- Decant Positions
- Major Town
- Observed Faults
- Dykes
- Non-Perennial River
- Krugersdorp Nature Reserve
- Quaternary Catchments

Geology

- Black Reef Fm, Transvaal Spgrp
- Dwyka Grp, Karoo Spgrp
- Government Sbgrp, West Rand Grp
- Halfway House Granite
- Hospital Hill Sbgrp, West Rand Grp
- Jeppestown Sbgrp, West Rand Grp
- Johannesburg Sbgrp, Central Rand Grp
- Klipriviersberg Grp, Ventersdorp Spgrp
- Malmani Sbgrp, Chuniespoort Grp
- Platberg Grp, Ventersdorp Spgrp
- Pretoria Grp, Transvaal Spgrp
- Swazian Erathem
- Turffontein Sbgrp, Central Rand Gr
- Dolomite Compartments

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #:amc.BKS1310.201204.134
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 18/04/2012

N

0 1.25 2.5 5

Kilometres

1:85 000

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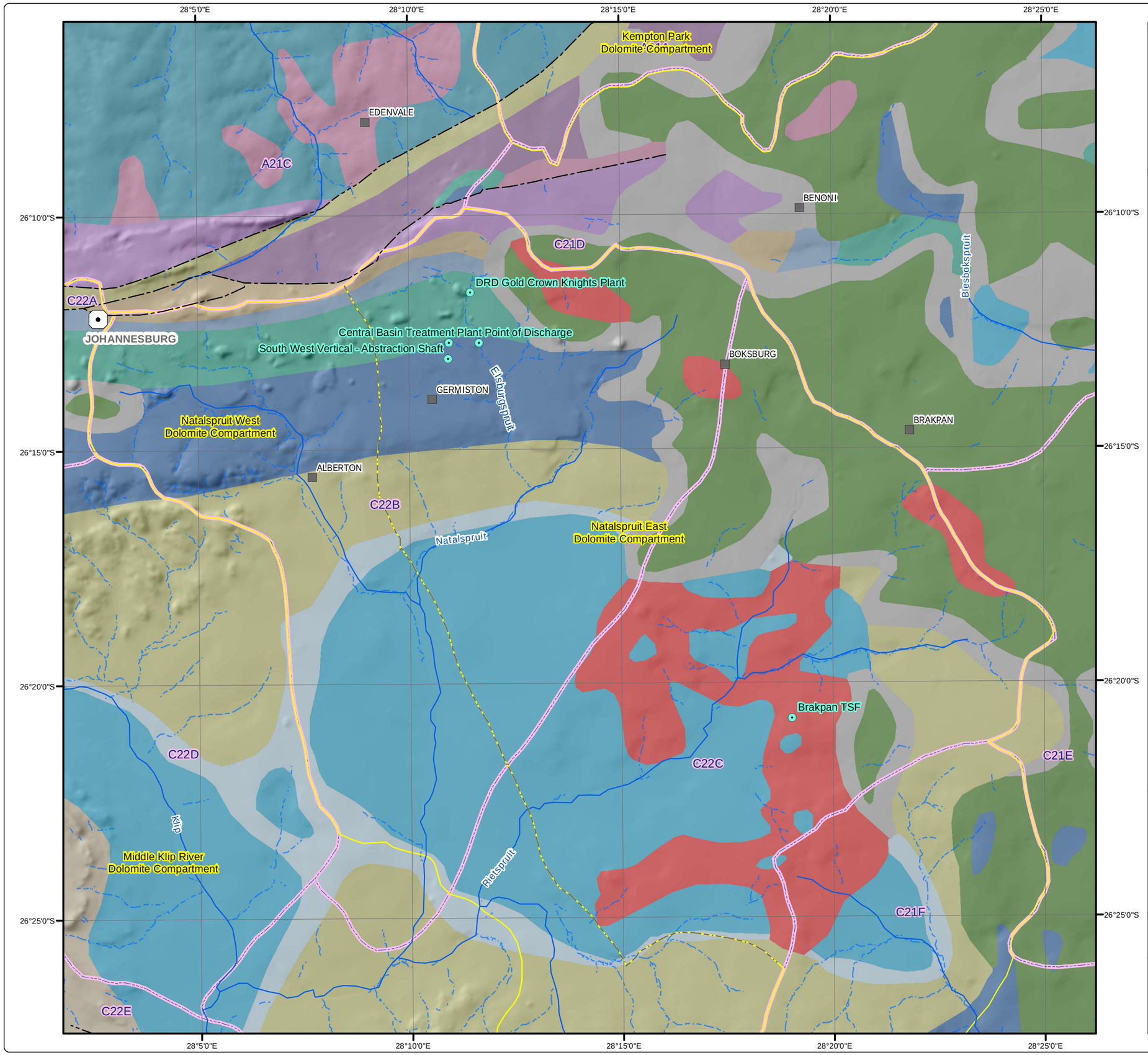
Plan 20

Acid Mine Drainage Project

Central Basin Geology



Legend

- Points of Interest
- City
- Major Town
- Observed Faults
- Dykes
- Non-Perennial River
- Quaternary Catchments

Geology

- Black Reef Fm, Transvaal Spgrp
- Dwyka Grp, Karoo Spgrp
- Government Sbgrp, West Rand Grp
- Halfway House Granite
- Hospital Hill Sbgrp, West Rand Grp
- Jeppestown Sbgrp, West Rand Grp
- Johannesburg Sbgrp, Central Rand Grp
- Karoo Dolerite Sui
- Klipriviersberg Grp, Ventersdorp Spgrp
- Madzaringwe Fm, Karoo Spgrp
- Malmani Sbgrp, Chuniespoort Grp
- Platberg Grp, Ventersdorp Spgrp
- Pretoria Grp, Transvaal Spgrp
- Swazian Erathem
- Turffontein Sbgrp, Central Rand Gr
- Dolomite Compartments

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #:amc.BKS1310.201204.135
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 18/04/2012

N

0 2 4 8

Kilometres

1:150 000

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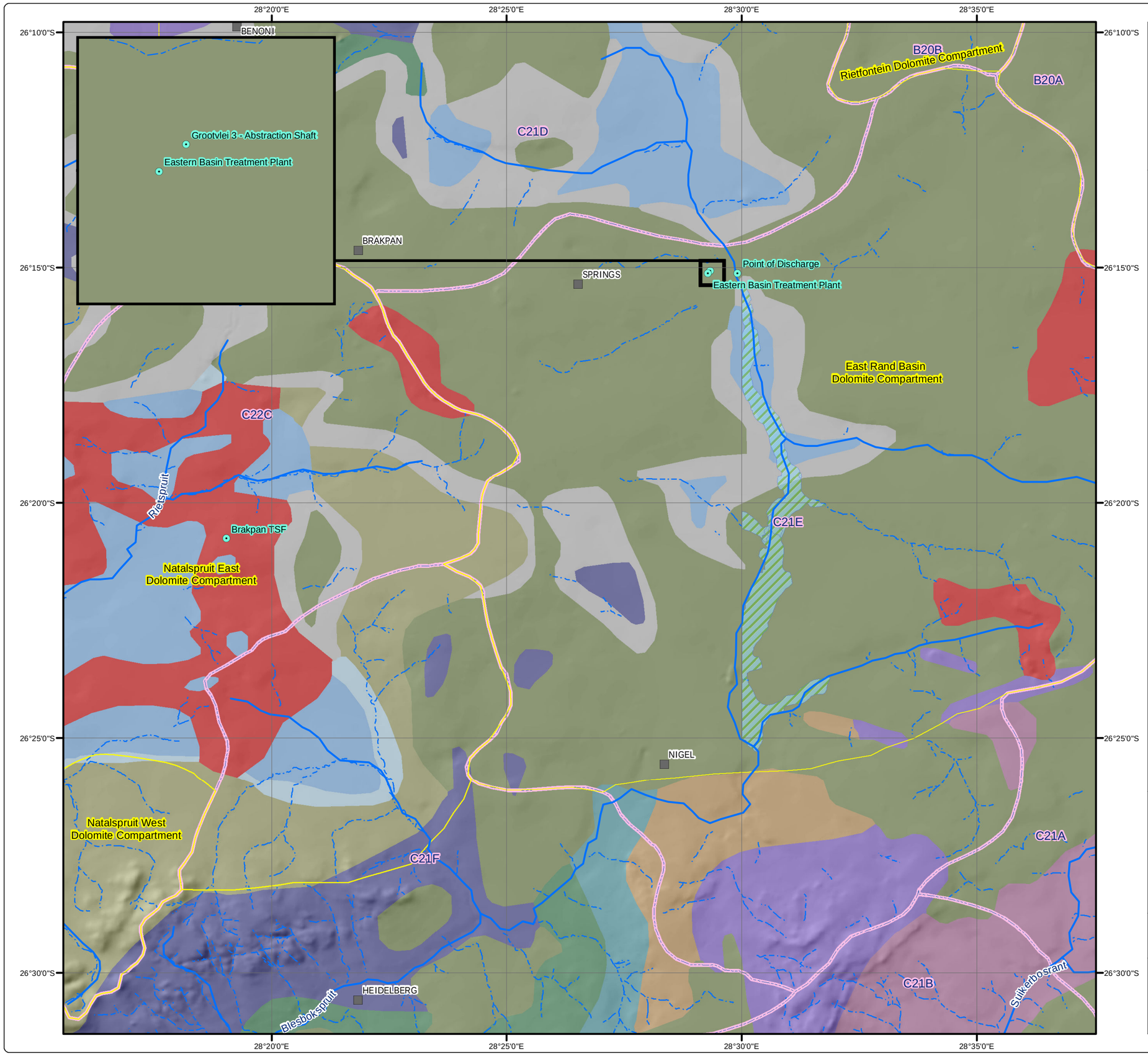
Plan 21

Acid Mine Drainage Project

Eastern Basin Geology



Legend

- Points of Interest
- Major Town
- Observed Faults
- Perennial River
- Non-Perennial River
- RAMSAR Wetland
- Quaternary Catchments

Geology

- Black Reef Fm, Transvaal Spgrp
- Dwyka Grp, Karoo Spgrp
- Government Sbgrp, West Rand Grp
- Hospital Hill Sbgrp, West Rand Grp
- Jeppestown Sbgrp, West Rand Grp
- Johannesburg Sbgrp, Central Rand Grp
- Karoo Dolerite Sui
- Klipriviersberg Grp, Ventersdorp Spgrp
- Madzaringwe Fm, Karoo Spgrp
- Malmani Sbgrp, Chuniespoort Grp
- Schilpadnest Sbsui, Rustenburg Layered Sui
- Swazian Erathem
- Turffontein Sbgrp, Central Rand Gr
- Dolomite Compartments

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #: amc.BKS1310.201204.136
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 18/04/2012

N

0 2.25 4.5 9

Kilometers

1:150 000

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Plan 22

Acid Mine Drainage Project

Crocodile West Catchment

Legend

- Project Sites
- Sterkfontein Caves
- Capital City
- Major Town
- Weir A2H049
- Perennial Stream
- Non-perennial Stream
- Dams
- Water Management Areas
- Quaternary Catchments
- Urban Areas

Places of Interest

- Cradle of Humankind
- Krugersdorp Nature Reserve

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #:bjt.BKS1310.201204.153
Datum: Hartebeesthoek 1994	Revision Number: 1
Central Meridian: 29°E	Date: 23/04/2012

N

0 2.5 5 10 15 20

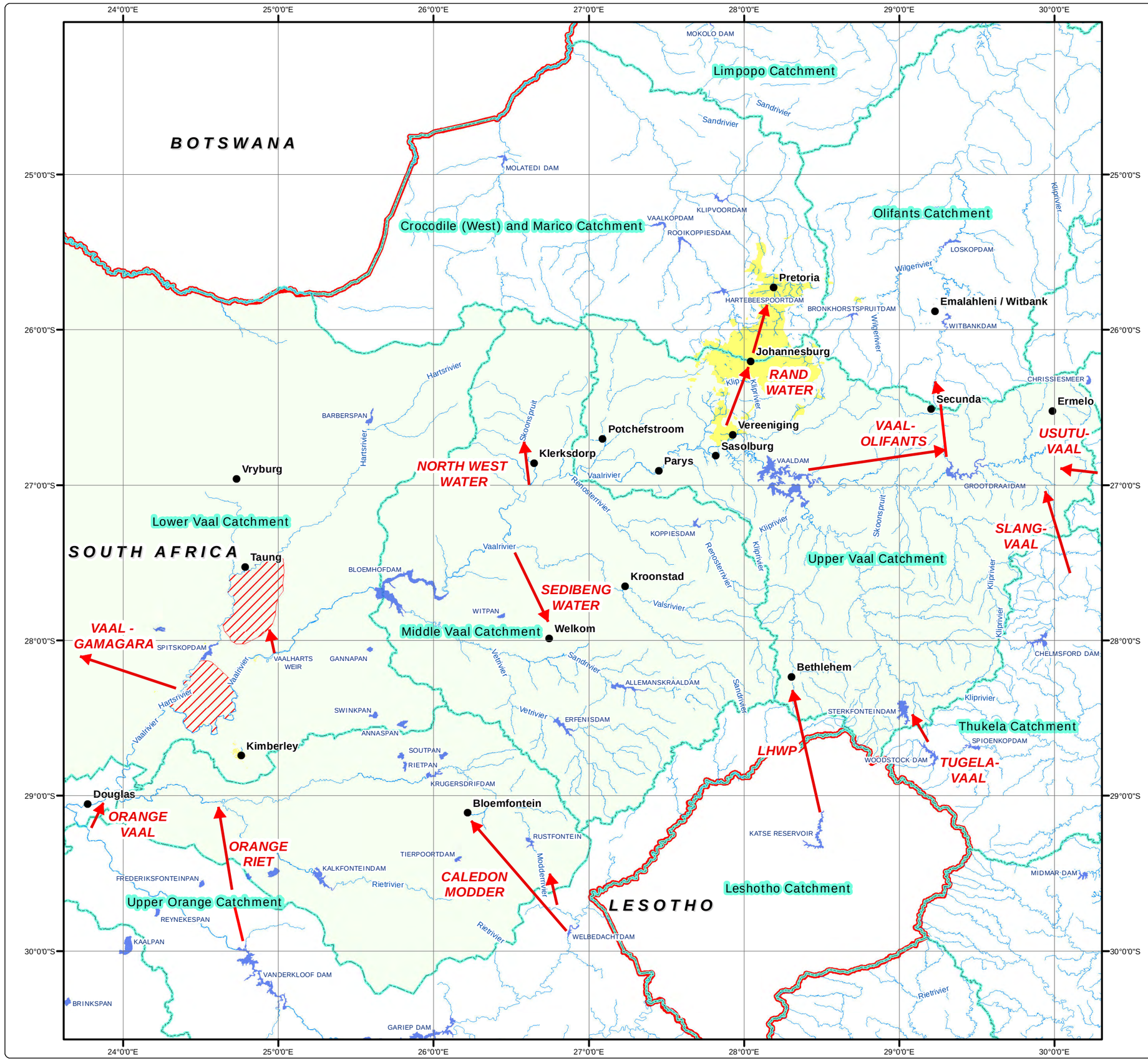
Kilometres
1:350 000

© Digby Wells Environmental

Plan 23

Acid Mine Drainage Project

Vaal Catchments



Legend

- Cities/Towns
- Rivers
- Water Transfers
- Urban Areas
- Dams
- Vaalharts Irrigation
- Water Management Areas
- Vaal Catchments
- International Boundary

DIGBY WELLS ENVIRONMENTAL

www.digbywells.com

Projection: Transverse Mercator	Ref #:bjt.BKS1310.201204.154
Datum: Hartebeesthoek 1994	Revision Number: 2
Central Meridian: 29°E	Date: 07/05/2012

N

0 37.5 75 150

Kilometres

1:2 740 000

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Appendix B: Directives issued to TCTA by DWA

MINISTER
WATER AND ENVIRONMENTAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

Private Bag X313, Pretoria, 0001, 185 Schoeman Street, Sedibeng Building, Tel: +27 12 336 8733, Fax: +27 12 336 8717
Private Bag X9052, Cape Town, 8000, 120 Plein Street, Tel: +27 21 464 1500, Fax: +27 21 465 3362

Ref.: AMD-DIR-TCTA-01.03.2011

Dr Snowy Khoza
Chairperson
Trans-Caledon Tunnel Authority
PO Box 10335
CENTURION
0046

Dear Dr Khoza

EMERGENCY WORKS WATER MANAGEMENT ON THE WITWATERSRAND GOLD FIELDS WITH SPECIAL EMPHASIS ON ACID MINE DRAINAGE: DIRECTIVE IN TERMS OF THE NATIONAL WATER ACT, 1998 (ACT 36 OF 1998)

Following concerns about acid mine drainage (AMD) impacts on the Witwatersrand gold fields, Cabinet appointed an Inter-Ministerial-Committee (IMC) to address the serious challenges posed by the AMD. A Technical Committee, tasked by the IMC and co-chaired by the Director-General of the Department of Mineral Resources and the acting Director-General of the Department of Water Affairs (DWA), subsequently appointed a Team of Experts who presented a final draft report to Cabinet on 9 February.

The following recommendations, as emergency works, in the report (attached as **Appendix A**) were approved by the IMC and Cabinet for implementation:

I. Installation of pumps to extract water from the mines to on-site treatment plants
II. Construction of an on-site water treatment plant in each Basin with the option of refurbishing and upgrading the existing ones owned by the mines
III. Installation of infrastructure to convey treated water to nearby water courses
IV. Operation of the pump stations and treatment works

I hereby direct the TCTA in terms of section 103 (2) of the National Water Act, 1998 (Act 36 of 1998) to undertake the emergency works (hereafter referred to as the Project) subject to the following conditions:

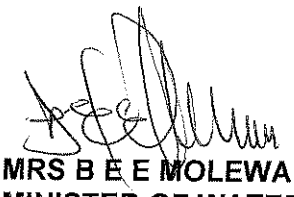
1. Funding for the Project shall be via funds allocated by the National Treasury and made available to TCTA via the DWA. Procedures to govern the disbursements of funds between the TCTA and the DWA shall be incorporated into an Implementation Agreement.
2. Relevant current best practices, and where applicable, international standards, shall be applied for the design, construction and supervision of the Project.
3. The TCTA will lead the process of obtaining the environment al authorisations of the works from the Department of Environmental Affairs (DEA); the TCTA shall ensure that all the steps are taken to ensure compliance with environmental legislation.
4. The TCTA shall liaise with the DWA regarding the longer term AMD management objectives and ensure compatibility of the Project with future application of AMD.

5. An Implementing Agreement for the Project must be concluded within three (3) months of the date of the directive between the DWA and the TCTA setting out clear lines of responsibility and accountability.
6. The Project must be implemented in the most efficient manner with due regards to cost, timing and reliability.
7. Available DWA and TCTA organisational resources shall be pooled in a manner that will build capacity for the management, development and delivery of the Project.
8. The TCTA shall establish institutional arrangements and process to ensure meaningful participation by all the relevant stakeholders of the project.
9. All Projects implementation actions shall comply with the applicable South African legislation and codes of conduct.
10. The TCTA shall include the facilitation of the best model, which shall be proposed to (the DWA) and decided upon by the DWA for the operations of the pumping stations and the treatment works.
11. The TCTA's communication strategy on the Project needs to reflect the representative roles and responsibilities of the DWA with the relevant stakeholders.
12. Land rights for the Project shall be acquired in accordance with South African statutes.
13. Progress reports on the Project shall be submitted to me every month, as well as on ad hoc issues that require my attention and intervention.
14. After completion of the project, the DWA shall assume responsibility for the operations and maintenance.
15. I may direct the TCTA to undertake further works.

In terms of section 64(1) of the said National Water Act, 1998, I hereby authorise the TCTA to expropriate property required to implement the Project.

I wish you success in executing this important assignment.

Yours sincerely



MRS B E E MOLEWA MP
MINISTER OF WATER AND ENVIRONMENTAL AFFAIRS
DATE: 06·04·2011

Cc – CEO: Trans-Caledon Tunnel Authority

water affairs
Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

Gauteng Regional Office
15th Floor, Bothongo Plaza East, 285 Schoeman Street, Pretoria

Telephone	012 392 1415	Private Bag X995	Enquiries	Mr B. Govender
e-mail	GovenderB@dwa.gov.za	Pretoria		
Facsimile	012 392 1359	0001	Reference	16/2/7/C231/G003

The Chief Executive Officer
Mr James Ndlovu
The Trans-Caledon Authority
PO Box 10335
CENTURION
0046

Dear Mr Ndlovu

DIRECTIVE IN TERMS OF SECTIONS 19 AND 20 OF THE NATIONAL WATER ACT, 1998 (ACT 36 OF 1998) [NWA] TO THE TRANS-CALEDON TUNNEL AUTHORITY (TCTA)

AUTHORISATION FOR THE DISPOSAL OF SLUDGE DERIVED DURING THE EMERGENCY WORKS (IMMEDIATE SOLUTION) TO ADDRESS ACID MINE DRAINAGE (AMD) IN THE WESTERN BASIN INTO THE WEST WITS PIT (WWP), KRUGERSDORP

1. BACKGROUND

1.1 A directive from the Minister of Water and Environmental Affairs dated 06 April 2011 directed the TCTA to undertake certain emergency works for the management of AMD in the Witwatersrand mining basins.

1.2 In accordance with the directive, the TCTA submitted a Report titled "Formulation of Western Basin AMD Immediate Mitigation Measures" (Report No. J01599/02 of July 2011). The Report identified an immediate solution to address AMD in the Western Basin.

1.3 A letter dated 02 August 2011 from the Department of Water Affairs (DWA) authorised the TCTA to implement the immediate solution.

2. REASONS FOR THE DIRECTIVE

2.1 The immediate solution, when commissioned and operated, will produce large volumes of sludge formed by the reaction between mine water (AMD) and neutralisation agents ($CaOH_2$ and / or $CaCO_3$). Chemically, the sludge will be composed of $CaSO_4$-heavy metal co-precipitate and will require disposal into a suitable facility. The TCTA's Report in (1.2) has identified the WWP as a possible site for disposal of the sludge. In terms of the NWA, the DWA must ensure certain regulatory specifications are in place to authorise the disposal of the sludge.

3. DIRECTIVE

I, Hendrik Albertus Smit, in my capacity as Regional Head: Gauteng, in the Department of Water Affairs and acting under authority of the power delegated to me by the Minister of Water and Environmental Affairs in terms of Section 63 of the NWA, after taking into account the representations made by the TCTA and the Report referred to in (1.2), hereby direct the TCTA in terms of Sections 19 and 20 of the NWA, subject to the terms and conditions set out below, to perform the following:

3.1 Conduct sludge deposition into the WWP in accordance with the following conditions:

i. Sludge must be co-disposed with processed tailings generated by the Mogale Gold Pty Ltd operation. The TCTA must inform the DWA in writing of the existing preventative and mitigation measures for hydrological, chemical, microbiological or radioactive processes that result in the contamination of the groundwater and surface water resources.

ii. A sludge-tailings co-disposal method must be developed by an accredited engineer and submitted to the DWA for approval within ninety (90) days from date of issuance of this Directive.

iii. Waste classification tests must be conducted on the sludge including appropriate studies to establish the physico-chemical properties of the sludge and its suitability for co-disposal with tailings into the WWP. These studies include, but are not limited to chemical and physical composition, potential to generate acid and / or leach heavy metals, stability, behaviour under varying conditions of hydration, resistance to natural elements and panning (crusting) tendency of the sludge-tailings compound. The chemical tests should be performed to the same standards as those performed in the licensing of the disposal of tailings to the WWP and should include, as a minimum, paste pH, acid-base accounting, synthetic acid rain leaching and toxicity characteristic leach procedure (TCLP), with all tests to be performed on the tailings, sludge and the likely tailings-sludge mixture.

iv. An agreement for co-disposal of sludge and tailings into the WWP must be reached with Mogale Gold Pty Ltd and the Mogale City Local Municipality within ninety (90) days from date of issuance of this Directive.

v. The Fraser Alexander Report titled "West Wits Pit: South Pit Filling *Modus Operandi*", dated September 2009, under reference Addendum to FA/BR/021/2009 which stipulates environmentally-optimal tailings deposition methods to be employed to manage tailings deposition and the pool in the WWP.

3.2 Notwithstanding the above, specific attention is drawn to the following:

i. Only sludge derived from the emergency works and tailings processed through the Mogale Gold Pty Ltd operation may be co-disposed into the WWP.

ii. The co-deposition of tailings and sludge may only continue until the surrounding natural ground level is attained and is subject to proof that disposal has not caused deleterious environmental consequences.

iii. In conjunction with (3.1 iv), the TCTA must finalise an agreement with Mogale Gold Pty Ltd on the apportionment of obligations and liabilities with regard to closure of the WWP and rehabilitation thereof.

iv. The TCTA must inform the DWA of current measures applied to prevent ingress of the sludge-tailings deposit into the underground mine void including the management/remediation of sinkholes and subsidences that may be incurred during sludge-tailings co-deposition.

v. The TCTA must inform the DWA of contingency measures that will be put in place should sludge-tailing co-deposits decant or if there is any evidence of groundwater pollution.

3.3 Sludge-tailings co-disposal methods must ensure that any water present in the mixture is adequately de-watered and that return water volumes collecting in the WWP are kept to a minimum. Return water must be pooled to a suitable region of the WWP and pumping infrastructure must be commissioned to ensure pooled water can be extracted for use in the emergency works and / or the Mogale Gold Pty Ltd processes.

3.4 The TCTA must reach an agreement with Mogale Gold Pty Ltd to utilise existing boreholes on the perimeter of the WWP and / or establish suitable boreholes for the implementation of a groundwater monitoring programme that will analyse for the following:

i. pH;
ii. electrical conductivity;
iii. SO_4^{2-};
iv. suspended solids;
v. total dissolved solids and;
vi. Fe, U, Na, Mg, Cl, Ca, Al and Mn.

For two (2) years from commencement of sludge disposal, analyses must be conducted on a quarterly basis. Thereafter, groundwater monitoring shall be conducted bi-annually;

3.5 Any water pooled in the WWP, together with water samples extracted from the 8 Shaft, must be analysed as per variables and frequency outlined in (3.4);

3.6 Record the date, time and monitoring point in respect of each sample taken together with the results of the analyses;

3.7 Monitoring points shall not be changed prior to notification and written approval from the Regional Head;

3.8 Complete all analysis of samples in accordance with methods prescribed by and obtainable from the South African Bureau of Standards (SABS), in terms of the Standards Act, 2008 (Act 8 of 2008);

3.9 Ensure that methods of analysis are not changed without prior notification of and written approval from the Regional Head;

3.10 Submit an updated water balance and calculated loads of waste emanating from the activities within ninety (90) days from date of issuance of this Directive;

3.11 Report in writing, on a quarterly basis, all sampling results to the Regional Head;

3.12 The TCTA must inform the DWA of the measures taken by Mogale Gold Pty Ltd to prevent water containing waste or any substance which causes or is likely to cause pollution of water resources from entering any water resource either by natural flow or by seepage, and retain or collect such substance or water for use, re-use, evaporation or for purification and disposal;

3.13 The TCTA must inform the DWA of the measures taken by Mogale Gold Pty Ltd for the appropriate management of storm water in the vicinity of the WWP;

3.14 Install flow measuring systems on the emergency works plant to account for sludge and water volumes;

3.15 Check and maintain all pipelines on a daily basis;

3.16 Ensure that the operator of the treatment plant maintains accurate and up-to-date records of all system malfunctions resulting in non-compliance with the requirements of this Directive. These records must be made available for inspection by the Regional Head upon request. Such malfunctions must be tabulated under the following headings with a full explanation of all the contributory circumstances:

i. operating errors;
ii. mechanical and structural failures (including design, installation or maintenance);
iii. environmental factors (e.g. flood);
iv. loss of supply services (e.g. power failure) and;
v. other causes.

3.17 Ensure that the operator of the treatment plant notifies the Regional Head within 24 hours of the occurrence or potential occurrence of any incident which has the potential to cause, or has caused water pollution, pollution of the environment, health risks or which is a contravention of the conditions of the Directive;

3.18 The TCTA must reach an agreement with Mogale Gold Pty Ltd to introduce radiation control monitoring and any radiation control measures that may be required in accordance with the specifications of the National Nuclear Regulator (NNR);

3.19 The TCTA must reach an agreement with Mogale Gold Pty Ltd to assess the radiological risk to affected water bodies (including both surface and groundwater) via a programme of analysis for radionuclides in accordance with a radiological risk assessment procedure to be submitted to the NNR for approval within sixty (60) days and approved by the NNR.

4. Non-compliance to the conditions of this Directive should immediately be reported to the Regional Head in writing. Such a report should include measures to be instituted towards correcting non-compliance.

5. Should the TCTA fail to comply, or comply inadequately with any term of this Directive, the DWA may take measures it considers necessary to remedy the situation, including but not limited to:

i. Criminal proceedings against any of the parties in terms of Section 151 of the Act, and;
ii. Taking the measures itself and recovering the costs thereof from any of the parties, in terms of Section 19(4) of the Act.

6. In terms of Section 124 of the NWA, the DWA has the power to inspect the land on which any activity in terms of this Directive is carried out.

7. This Directive will remain in force and becomes effective from date of signature until it is superseded by a Section 21 water use licence issued by the DWA in terms of Section 41 of the NWA.

8. This Directive is subject to the special terms and conditions that should any of the material terms and conditions of the Directive not be implemented or is breached by the TCTA, the DWA reserves its right to withdraw this Directive.

9. Your attention is drawn to the fact that you may lodge an appeal against this Directive to the Water Tribunal in terms of Section 148(1)(a) of the NWA. Contact details of the Water Tribunal are:

Postal Address:
The Registrar
Water Tribunal
Private Bag x316
Pretoria, 0001

Physical Address:
Room 344
Waterbron Building
191 Schoeman Street
Pretoria, 0001

Telephone 012 336 8297
Facsimile 012 336 8666

10. Please note that even though a party may appeal against this Directive to the Water Tribunal, such an appeal in terms of Section 148(2) of the NWA does not suspend the Directive, pending the outcome of the Directive.

SIGNED AT PRETORIA ON THE 07 **DAY OF** November **2011.**

REGIONAL HEAD: GAUTENG

water affairs
Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

Gauteng Regional Office
15th Floor, Bothongo Plaza East, 285 Schoeman Street, Pretoria

Telephone	012 392 1415	Private Bag X995	Enquiries	Mr B. Govender
e-mail	GovenderB@dwa.gov.za	Pretoria		
Facsimile	012 392 1359	0001	Reference	16/2/7/C231/G003

The Chief Executive Officer
Mr James Ndlovu
The Trans-Caledon Authority
PO Box 10335
CENTURION
0046

Dear Mr Ndlovu

DIRECTIVE IN TERMS OF SECTIONS 19 AND 20 OF THE NATIONAL WATER ACT, 1998 (ACT 36 OF 1998) [NWA] TO THE TRANS-CALEDON TUNNEL AUTHORITY (TCTA)

AUTHORISATION FOR THE DISPOSAL OF TREATED MINE WATER DERIVED DURING THE EMERGENCY WORKS (IMMEDIATE SOLUTION) TO ADDRESS ACID MINE DRAINAGE (AMD) IN THE WESTERN BASIN INTO THE TWEELOPIES (EAST) SPRUIT, KRUGERSDORP

1. BACKGROUND

1.1 A directive from the Minister of Water and Environmental Affairs dated 06 April 2011 directed the TCTA to undertake certain emergency works for the management of AMD in the Witwatersrand mining basins.

1.2 In accordance with the directive, the TCTA submitted a Report titled "Formulation of Western Basin AMD Immediate Mitigation Measures" (Report No. J01599/02 of July 2011). The Report identified an immediate solution to address AMD in the Western Basin.

1.3 A letter dated 02 August 2011 from the Department of Water Affairs (DWA) authorised the TCTA to implement the immediate solution.

2. REASONS FOR THE DIRECTIVE

2.1 The immediate solution, when commissioned and operated, will produce approximately 27 – 32 ML / day of treated mine water. The Report in (1.2) has identified the Tweelopies (East) Spruit as a possible site for discharge of the treated mine water. In terms of the NWA, the DWA must ensure certain regulatory specifications are in place to authorise the discharge.

3. DIRECTIVE

I, Hendrik Albertus Smit, in my capacity as Regional Head: Gauteng, in the Department of Water Affairs and acting under authority of the power delegated to me by the Minister of Water and Environmental Affairs in terms of Section 63 of the NWA, after taking into account the representations made by the TCTA and the Report referred to in (1.2), hereby direct the TCTA in terms of Sections 19 and 20 of the NWA, subject to the terms and conditions set out below, to perform the following:

3.1 The TCTA must reach an agreement with Rand Uranium Pty Ltd to pump and treat the Western Basin mine void water to the conditions stipulated in (3.2) prior to discharging the treated water into the Tweelopies (East) Spruit at a point above the Krugersdorp Game Reserve;

3.2 The discharge of treated mine water to the Tweelopies (East) Spruit shall at all times not exceed the values stipulated in Table 1;

Table 1

Variable (Symbol) (Unit)	Value
pH	6.5 – 9.5
Conductivity (EC) (mS/m)	350
Sulphate (SO_4^{2-}) (mg/L)*	2500
Aluminium (Al) (mg/L)*	<1
Manganese (Mn) (mg/L)*	<10
Iron (Fe) (mg/L)*	<1
Uranium (U) (µg/L)*	<50

*dissolved

3.3 The TCTA must reach an agreement with Rand Uranium Pty Ltd to implement a surface water and groundwater monitoring programme as detailed in (3.4) and (3.5) to determine the extent of the impact from the point of discharge into the Tweelopies (East) Spruit;

3.4 Sample and analyse surface water at the points stipulated in Table 2;

Table 2

Sampling point	Frequency	Variables
Extraction from the mine shaft	Daily (mine laboratory)	Flow, pH, EC, TDS
	Weekly (accredited independent laboratory)	Flow, pH, EC, TDS SO_4^{2-}, Fe, U, Al, Mn, Pb,
Discharge of treated water into the Tweelopies (East) Spruit (point of continuous monitoring)	Daily (mine laboratory)	Flow, pH, EC, TDS
	Weekly (accredited independent laboratory)	Flow, pH, EC, TDS SO_4^{2-}, Fe, U, Al, Mn, Pb,
Upstream of the Krugersdorp Game Reserve (R24 road culvert)	Weekly (accredited independent laboratory)	Flow, pH, EC, TDS SO_4^{2-}, Fe, U, Al, Mn, Pb
Downstream of the Krugersdorp Game Reserve (Aviary Dam)	Weekly (accredited independent laboratory)	Flow, pH, EC, TDS SO_4^{2-}, Fe, U, Al, Mn, Pb
Tweelopies (East) Spruit: Upstream of the confluence of the Tweelopies (East) and Tweelopies (West) Spruits (Brick Dam)	Weekly (accredited independent laboratory)	Flow, pH, EC, TDS SO_4^{2-}, Fe, U, Al, Mn, Pb

Table 2 continued

Sampling point	Frequency	Variables
Riet Spruit: Downstream of the confluence of the Tweelopies (East) and Tweelopies (West) Spruits (Morester Camp)	Weekly (accredited independent laboratory)	Flow, pH, EC, TDS SO_4^{2-}, Fe, U, Al, Mn, Pb

3.5 Conduct groundwater monitoring at sites representative of the surface water sampling points stipulated in (3.4). The variables analysed for in groundwater must be the same as for surface water with the exception of flow.
For two (2) years from commencement of the discharge, analyses must be conducted on a quarterly basis. Thereafter, groundwater monitoring shall be conducted bi-annually;

3.6 Submit the groundwater monitoring programme to the Regional Head within three (3) months from date of receipt of this Directive for approval;

3.7 Record the date, time and monitoring point in respect of each sample taken together with the results of the analyses;

3.8 Complete all analysis of samples in accordance with methods prescribed by and obtainable from the South African Bureau of Standards (SABS), in terms of the Standards Act, 2008 (Act 8 of 2008).

3.9 Ensure that methods of analysis referred to in (3.8) are not changed without prior notification of and written approval from the Regional Head;

3.10 Report in writing, on a monthly basis, all sampling results to the Regional Head.

3.11 Submit an updated water balance and calculated loads of waste emanating from this activity within three (3) months from date of receipt of this Directive;

3.12 Maintain accurate and up-to-date records of all system malfunctions resulting in non-compliance with the requirements of this Directive. These records must be made available for inspection by the Regional Head upon request. Such malfunctions must be tabulated under the following headings with a full explanation of all the contributory circumstances:

i. operating errors;
ii. mechanical failures (including design, installation or maintenance);
iii. environmental factors (e.g. flood);
iv. loss of supply services (e.g. power failure); and
v. other causes.

3.13 Notify the Regional Head of the occurrence or potential occurrence of any incident which has the potential to cause, or has caused water pollution, pollution of the environment, health risks or which is a contravention of the conditions of this Directive;

3.14 The TCTA must reach an agreement with Rand Uranium Pty Ltd to introduce radiation control monitoring and any radiation control measures that may be required in accordance with the specifications of the National Nuclear Regulator (NNR);

3.15 Report any non-compliance to the conditions of this Directive immediately to the Regional Head in writing. Such a report must include measures to be instituted towards correcting non-compliance;

3.16 Apply for a water use licence in terms of Section 21 of the NWA for all water uses contemplated in this Directive within 90 (ninety) days from date of receipt of this Directive.

4. Non-compliance to the conditions of this Directive should immediately be reported to the Regional Head in writing. Such a report should include measures to be instituted towards correcting non-compliance.

5. Should the TCTA fail to comply, or comply inadequately with any term of this Directive, the DWA may take measures it considers necessary to remedy the situation, including but not limited to:

i. Criminal proceedings against any of the parties in terms of Section 151 of the NWA and;

ii. Taking the measures itself and recovering the costs thereof from any of the parties, in terms of Section 19(4) of the NWA.

6. In terms of Section 124 of the NWA, the DWA has the power to inspect the land on which any activity in terms of this Directive is carried out.

7. This Directive will remain in force and becomes effective from date of signature until it is superseded by a Section 21 water use licence issued by the DWA in terms of Section 41 of the NWA.

8. This Directive is subject to the special terms and conditions that should any of the material terms and conditions of the Directive not be implemented or is breached by the TCTA, the DWA reserves the right to withdraw this Directive.

9. Your attention is drawn to the fact that you may lodge an appeal against this Directive to the Water Tribunal in terms of Section 148(1)(a) of the NWA. Contact details of the Water Tribunal are:

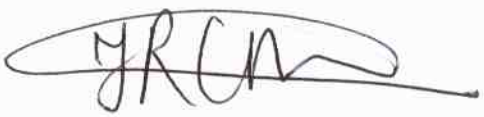
Postal Address:
The Registrar
Water Tribunal
Private Bag X316
PRETORIA, 0001

Physical Address:
Room 344
Waterbron Building
191 Schoeman Street
PRETORIA, 0001

Telephone 012 336 8297
Facsimile 012 336 8666

10. Please note that even though a party may appeal against this Directive to the Water Tribunal, such an appeal in terms of Section 148(2) of the NWA does not suspend the Directive, pending the outcome of the Directive.

SIGNED AT PRETORIA ON THE 07 **DAY OF** November **2011.**



REGIONAL HEAD: GAUTENG

Appendix C: Company Profile - Digby Wells Environmental

DIGBY WELLS
ENVIRONMENTAL

COMPANY PROFILE

April 2012

"DIGBY WELLS WILL ENABLE US TO MOVE FROM THE WORLD WE LIVE IN, TO THE WORLD WE SEEK"

COMPANY VISION

Reg. No. 1999/005985/07

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Fax: (+27 11) 789-9498

Email: info@digbywells.com

Web site: www.digbywells.com

Directors: AR Wilke, LF Koeslag, PD Tanner (British)*, AJ Reynolds (Chairman) (British)*, J Leaver*, GE Trusler (C.E.O)
*Non-Executive

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1 COMPANY BACKGROUND

Digby Wells Environmental (Digby Wells) is the brand under which the services of the group of companies are marketed. Digby Wells and Associates (Pty) Ltd was formed in January 1995 by three partners – Digby Wells, Ken van Rooyen and Graham Trusler – all three previously from the Environmental Management Department of Rand Mines. The company is named after the late Mr Digby Wells, who made a significant and lasting contribution to the environmental management field in South Africa. Digby passed away in 1996. Graham Trusler is the current Chief Executive Officer of Digby Wells & Associates.

The company enjoys a staff complement of committed, highly trained, specialised and skilled employees, most of whom are shareholders – a structure that enables the business to remain truly employee-owned, as well as ensuring the staff take an active interest in delivering quality services.

The company is busy establishing a presence in various countries on the African continent through various subsidiaries and joint ventures.

The company's activities are driven by the vision of being the premier environmental and social services provider to the mining industry in Africa.

2 SERVICES

Digby Wells specialises exclusively in providing environmental and social services; there are thus no conflict of interest in providing project solutions, and clients are assured of a focussed and dedicated team.

Digby Wells employs a large team of professional consultants and administrative staff to provide a comprehensive Environmental and Social service – a 'one-stop shop' – to its clients to satisfy all their specified needs with respect to the biophysical and human environment.

Digby Wells has extensive experience in providing services to South African and international clients, with the focus predominantly on the Mineral Resources and Energy sectors in Africa. This international experience, extending to the Americas, Europe, the CIS countries and Asia, means a wide range of projects have been undertaken to both in-country legal requirements and international standards such as the Equator Principles, International Finance Corporation (IFC) Performance Standards and World Bank Group Guidelines.

The company services can be grouped into five areas, namely:

- Biophysical Environment;
- Social Environment (including stakeholder engagement);
- Environmental Management Services;

- Geographical Information Systems (GIS); and
- Environmental Legal Services.

Services are provided over the entire life cycle of an operation from early engagement prior to exploration, securing of exploration rights in the specific jurisdiction, services during the exploration phase, pre-feasibility study, definitive feasibility study, construction, operational phase, closure planning and implementation, as well as post closure monitoring.

Services are continuously developed and new services added as the client and industry requirements dictate.

2.1 Biophysical Environment

The biophysical environment is defined as the physical environment (water, soil, etc.), as well as the biological activity within it (plants, animals etc.).

Services offered include baseline assessments, specialist studies, impact assessments; contamination assessments, as well as the compiling of management measures, either as part of standard authorisation requirements or as independent specialist studies. The following services are offered:

2.1.1 Fauna and Flora Assessments

These assessments determine the overall terrestrial ecology of an area and include the flora community and the associated fauna such as invertebrates, avifauna, mammals, reptiles and amphibians. The baseline ecological conditions are determined and potential negative impacts of development on the ecology are projected and mitigation measures are developed. Assessments are also made as to whether any rare or endangered species or habitat could be affected by a proposed project. The implementation of management measures (e.g. relocation of red data species) is also undertaken.

2.1.2 Aquatic Assessments

In order to determine the ecological integrity of the aquatic environment, individual biophysical components of rivers, streams and dams are assessed.

These components are studied within rivers and streams through aquatic biomonitoring, monitoring of invertebrates, river integrity (health) assessments and toxicity testing. Accepted standard methodologies (e.g. SASS5 in South Africa) are used where required.

Aquatic assessments of dams, pans and other such systems are undertaken and utilise the fish population dynamics as an indicator, biomarker analysis, fish health assessments and telemetry to collect relevant data.

2.1.3 Wetland Assessments

Wetland assessments are conducted to determine the extent of the wetland area, to document its current ecological state as well as the ecological services the wetland provides. Wetland areas are delineated and buffer zones or offset areas are assigned depending on

the ecological status, importance and sensitivity of the wetland. Management programmes to upgrade degraded areas are devised.

2.1.4 Biodiversity Assessments

Biodiversity assessments are conducted to determine the health and functioning of the environment through the study of terrestrial and aquatic ecosystems. The findings from the assessments are then used to develop Biodiversity Action Plans which provide management strategies for the biophysical environment. Biodiversity monitoring is also undertaken. The Biodiversity Action Plans are management plans integrated with GIS into an interactive management tool.

2.1.5 Soil Surveys, Land Capability and Land Use

Prior to land disturbance the agricultural potential, depth and extent of the soil resources are determined to provide soil management advice during development and rehabilitation of a site. Digby Wells is pioneering Predictive Soil Mapping techniques in conjunction with the University of the Free State, which enable significant cost savings when compared to traditional grid surveys for large areas.

The soil mapping forms the basis for assessing the land capability. Current land use is also assessed in conjunction with the social studies and GIS in a project.

2.1.6 Rehabilitation

The rehabilitation of areas disturbed by mining is required to ensure the sustainability and an acceptable post closure land capability and land use. The rehabilitation planning should start prior to breaking ground as this ensures optimal movement of material for both opencast and underground operations.

The design of the various mine waste deposits that will remain after closure also needs to be done with final rehabilitation in mind.

2.1.7 Air Quality Assessments

Fallout dust is monitored using dust bucket samplers and then analysed to establish baseline conditions before the development of a site. The results are interpreted and management plans are developed for a project. On-going monitoring is also offered by Digby Wells during construction, operation and decommissioning phases.

The impact prediction is conducted at the hand of air quality dispersion models constructed for each site taking into account the relevant topography, climate as well as sources and receptors.

2.1.8 Hydrological Assessments

Surface hydrology is assessed in terms of quality and quantity of the current hydrological environment, the likely impacts and the resultant management plans. This includes water quality assessments, flood hydrology and flood lines, storm water management plans.

Specialist skills in relation to the selection of mine water treatment options during the operational and post closure phase is delivered.

Comprehensive monitoring services as well as regular data interpretation and reporting on data collected by the company, or the client, are offered.

2.1.9 Hydrogeological Assessments

The groundwater team at Digby Wells has experience in water provisioning studies, aquifer characterisation, geophysical investigations, mine dewatering, groundwater pollution studies and numerical modelling.

The hydrogeological services offered include groundwater baseline assessments, water provisioning, mine water ingress, quality and quantity monitoring and numerical modelling of quantity and quality impacts. Field programmes are designed and implemented.

Staff are also seconded to clients for larger projects at favourable rates.

The company has its own geophysical instrumentation for electromagnetic and magnetic surveys and access to reliable suppliers for resistivity, gravity, down-the-hole and airborne geophysical techniques.

2.1.10 Geochemical Assessments

Geochemical investigations are integral to understanding the risks posed to the environment from mining operations and their associated waste facilities. Digby Wells undertakes a range of investigations varying from initial Acid Base Accounting, mineralogical analyses to full geochemical modelling through its own staff or associates.

2.2 Social Environment

Although the social environment is part and parcel of the biophysical environment, services in this regard are specialised and require a separate approach to the other aspects in the biophysical environment. The social science service offering includes the following:

2.2.1 Stakeholder Engagement Processes (SEPs)

Conducting a transparent and independent stakeholder engagement process has become a key component of any development project and is required by law and international financiers.

The stakeholder engagement team has extensive experience in complying with the Equator Principles, World Bank Guidelines and the IFC performance standards. Consultation always takes into account the in-country legal requirements as well.

Public consultation is undertaken in South Africa by Digby Wells as part of the authorisation processes for listed activities under NEMA, NWA, NEMWA and MPRDA.

2.2.2 Grievance Mechanisms

Digby Wells has developed and managed grievance mechanisms for clients. These mechanisms are essential to ensure that effective lines of communication between the

2.2.7 Social and Labour Plans (South Africa)

Social and Labour Plans (SLPs) are required for mining right applications in terms of the South African MPRDA. SLPs aim to build capacity among employees and promote regional and diversified socio-economic development. SLPs also address downscaling and mine closure. Digby Wells has compiled numerous SLPs for its mining clients and has experience in auditing the implementation of SLPs.

A tracking mechanism has been developed to ensure client compliance and to ensure the security of tenure of the mineral rights.

Although a South African requirement the principles are being adopted as international best practice and applied in other jurisdictions as well.

2.2.8 Local Economic Development Action Plans

These plans encourage local people to achieve sustainable economic growth, and Digby Wells has local and international experience in developing and implementing such plans. The focus of such plans are to use mining as catalyst for sustainable socio-economic development and to prevent dependency on the mine by the local community(ies).

2.2.9 Archaeological and Heritage Assessments

In compliance with the South African National Heritage Resources Act (no 25 of 1999) and IFC Performance Standards and World Bank Guidelines, Digby Wells has acquired the necessary skills to undertake Archaeological and Heritage Assessments. These assessments involve resource identification, site documentation and impact assessment, as well as the compilation of management and monitoring plans. Digby Wells can also facilitate the mitigation of archaeological artefacts, heritage buildings and grave relocations.

2.2.10 Social Auditing

Digby Wells' staff has experience in undertaking a range of social audits for clients. These include compliance auditing, reviews and auditing for donor funding and audits to international and local standards.

2.2.11 Sustainability Assessments

Digby Wells integrates elements of environmental integrity, social justice and economic efficiency in all projects to promote sustainable development. Sustainable development study activities include identifying sensitive areas, suggesting cleaner production strategies, supporting areas of high agriculture potential and promoting ways of improving the sustainable use of natural and social resources in a project area.

2.2.12 Noise Assessments

Baseline noise measurements are taken both during the day and at night at potential noise receptors before construction to establish a noise baseline. A noise report is compiled and impacts and mitigation measures are highlighted. Noise monitoring can also be undertaken for the construction and operational phases of a project.

communities and the mining operation are maintained, and to address any issues before they become an impediment to project progress.

2.2.3 Socio-Economic Impact Assessments

Social Impact Assessments (SIAs) are required for both the World Bank and the IFC and are becoming more prominent in the South African context. SIA findings are used to guide and inform project design and planning. The SIAs developed by Digby Wells will provide clients with a baseline description of the social environment. An assessment of potential socio-economic impacts will be made. Measures to mitigate negative social impacts and enhance the positive socio-economic benefits of a project are developed.

2.2.4 Socio-Economic Baseline Surveys

Household and workforce skills surveys are conducted to give an understanding of how a development may affect communities in the area in which a development may occur, or to clearly plan for economic development activities. Skills of potential job applicants can be documented and used for recruitment planning. These surveys also provide baseline information for Social Impact Assessments and Resettlement Action Plans. Surveys can be used to monitor the social impacts a development might have on an affected community. Digby Wells can undertake baseline surveys either as part of Social Impact Assessments and Resettlement Action Plans, or as an independent specialist study.

2.2.5 Resettlement Action Plans (RAPs)

Development projects often require the physical resettlement of project-affected people and/or economic displacement, i.e. where people's livelihoods are affected. Digby Wells has both international and South African experience in developing and implementing resettlement action plans in compliance with country-specific legislation and international financing requirements. Resettlements undertaken have varied from 3 households to 17 000 individuals.

2.2.6 Health Impact Assessments

International Finance Corporation (IFC), Performance Standard 4 (PS4): Community Health, Safety and Security, recognises that project activities result in both positive and negative impacts on communities. The International Association of Impact Assessment (IAIA) defines a Health Impact Assessment (HIA) as "a combination of procedures, methods and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, program or project on the health of a population and the distribution of those effects within the population. Digby Wells undertakes community HIAs for clients where mining activities occur in close proximity to these communities. The cHIA aims to provide a baseline of current health of the community, as well as anticipate future impacts (negative and positive) as a result of the project.

2.2.13 Visual Assessments and Mapping

Visual impact assessments are undertaken by the GIS unit as well as all mapping and data base requirements for Digby Wells' specialists and clients. A visual assessment includes the assessment of the topography to develop a view shed, the nature of the visual intrusion as well as distance and other mitigating factors to assess the likely intrusion of a proposed project.

2.3 Environmental Management Services

Environmental Management Services focuses on the management of environmental authorisation processes, co-ordination of multidisciplinary projects, project management, legal compliance and international standards. Available services include:

2.3.1 Environmental Impact Assessments (EIAs) and Environmental Management Plans (EMPs) (South Africa)

Digby Wells has extensive experience in compiling EIAs and EMPs (including the Social and Health aspects for ESHIAs) for authorisation and funding requirements. All aspects of the required professional studies are managed and integrated. A wide range of specialists are employed to compile the detailed sections of EIAs and EMPs. These are mostly in-house specialists or sourced from a group of specialist associates where in-house skills lack the specificity required for the project. The reports are compiled after consultation with relevant government departments as well as Interested and Affected Parties (I&APs). Both qualitative and quantitative data is used in the assessment processes to provide a description of the baseline environment and potential impacts as a result of development. The EMPs developed describe how impacts will be mitigated and managed over the life of the project.

2.3.2 Environmental and Social Impact Assessments (ESIA) (International)

The Equator Principles require that a project be assessed in terms of the potential impacts on the environment. An ESIA is compiled in line with the IFC performance standards and the World Bank sectoral guidelines to assess all environmental and social impacts, as well as management plans. The process includes the stakeholder engagement process. The compilation of the ESIA is incorporated into the pre-feasibility and bankable feasibility assessments for clients.

2.3.3 Authorisation and Compliance Services

In the various jurisdictions that Digby Wells' clients operate, various in-country requirements are complied with.

In the South African context, Digby Wells undertakes environmental authorisations according to the South African National Environmental Management Act, Act 107 of 1998 (NEMA), and associated regulations as well as the Minerals and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA).

Digby Wells compiles mining right applications for clients and develops mine works programmes and Social and Labour Plans (SLPs) as part of mining right applications.

Compliance services include record of decision compliance auditing, assessment of compliance to EMPs, legal compliance audits and assessment of compliance with conditions of an environmental authorisation.

2.3.4 Prospecting Applications, Fatal Flaw Analyses, Due Diligence Studies, Pre-Feasibility and Bankable (Definitive) Feasibility Studies

Digby Wells aims to engage with prospective clients as early as possible in the mining or project development cycle. Compiling Prospecting Environmental Management Programmes is essential to ensure that trust is built with stakeholders and prospecting impacts are understood and mitigated. Adherence to these programmes is also audited.

Fatal flaw assessments during the early stages of the prospecting/exploration phase are conducted to ensure that issues with long lead times, or potential fatal flaws from an environmental and social perspective, are identified as early as possible.

Digby Wells has vast experience in the compilation of the environmental aspects of pre-feasibility studies and bankable feasibility studies for clients to International Standards and Guidelines. The signing of the Equator Principles by all the major financial institutions means that most large pre-feasibility and feasibility studies must be undertaken in line with these international benchmarks.

2.3.5 Environmental Management System (EMS) Development

An EMS ensures that all required management actions identified as part of the project are accounted for, assigned to a responsible person, monitored and reported on. Assistance to clients include the development of EMS systems, in line with International Standards (ISO14001) where applicable, as well as preparation for ISO14001 accreditation.

2.3.6 Environmental Due Diligence Assessments

Due diligence assessments are usually completed by multi-disciplinary teams during the purchase of assets by the buyer or financier. Digby Wells regularly supplies senior personnel to form part of such teams in the environmental or legal roles. The objectives would be related to the security of tenure, compliance with legal requirements and commitments, identification of risks, compliance with the buyers own policies and procedures as well as the operational and capital costs to ensure compliance with the above.

The closure liability assessments is central to the due diligence and in many cases one of the largest capital or operational items.

2.3.7 Closure & Liability Assessments

Digby Wells has conducted numerous closure liability assessments to determine the costs associated with closure of mines around the world. The assessments involve detailed site inspections where infrastructure is physically measured and data gathered to ensure accurate closure costs are calculated. Digby Wells has formulated an electronic database closure cost model which allows companies to calculate their liabilities as well as to manage them. The model is server based and can be tailored to suit specific needs and functions.

In South Africa annual assessments for submission to the DMR are done annually for a range of clients.

2.3.8 Strategic Environmental Assessments

The development of projects within an area could also have impacts on a regional scale, in such cases a strategic environmental assessment is done on a regional or industry basis to fully understand the risks, impacts and the optimal development path. The various aspects are integrated through GIS and a regional development plan established.

2.3.9 Health & Safety and Risk Assessments

Mine Health and Safety audits and reviews are conducted and Risk Management processes can be conducted to the required level of detail, dependant on the project.

2.4 Geographical Information Systems (GIS)

Digby Wells has a fully functional GIS capability. GIS is a digital cartographic tool capable of creating, integrating, storing, editing, analysing, sharing and displaying geographically referenced information. It allows users to create queries, analyse spatial information and edit and manage data, with the final function being the creation of maps to aid in visual interpretation.

The use of GIS and maps as interpretation aids is valuable in the sense that they visually display data, providing far more meaningful results. It is these visual products that the GIS specialists strive to enhance.

2.4.1 Topographical Mapping

A topographical map is a scaled diagram of reality and is characterised by local detail, including an array of natural and man-made environmental features. The map supplies a generalised description of the earth's surface, which includes roads, railways, rivers, towns, political boundaries, buildings and other relevant information. Topographical maps have a wide range of uses especially relevant to planning.

2.4.2 Digital Terrain Modelling (DTM)

A Digital Terrain Model (DTM) is used to depict the relief of the topography of an area; it is an invaluable tool for visualising slopes, drainage patterns and relative elevations. The model is drafted on elevation data such as contour lines. Shuttle Radar Topography Mission (SRTM) data, Light Detection and Ranging (LIDAR) data and survey data is used.

2.4.3 Aerial Photography

The interpretation of aerial photography is an extremely useful practice for investigations in both the natural and human environments. Spatial and temporal relationships such as land uses, vegetation types and environmental disturbances are assessed using this technique.

Digby Wells undertakes on behalf of clients the management of specialist subcontractors to determine specifications and quality control.

2.4.4 Statistical Mapping

Statistical information is modelled to evaluate spatial differentiation of data sets; this is used to understand the various populations residing in the area of interest, to determine project impacts and to guide development decisions. These techniques are applied to a wide range of disciplines including population data, hydrochemistry, biological communities etc.

2.4.5 Data Modelling

Data Modelling is performed when data is displayed to emphasise a specific theme. This method is used for visualising specific aspects of data that would not otherwise have been identified. Data modelling is very useful to the analyst as it highlights variations and relationships as well as concentrations in data.

2.4.6 Map Projections

Our GIS specialists are familiar with the commonly-used projections and co-ordinate systems and are able to use and translate data into the appropriate formats and projections in order to create spatially and statistically accurate results.

2.4.7 3 Dimensional and Spatial Analysis

The GIS unit has also acquired both the 3D and Spatial Analyst extensions for ArcGis 9.3.1.

The extensions to the software package enable us to perform complicated analyses of data, which include volumetric calculations of tailings facilities and mining pits; as well as cut-and-fill of slopes. Currently these new software extensions are being utilised to perform an array of analyses for extensive hydrological mapping (stream accumulation predictions, flood hydrology etc.).

2.4.8 Design Assistance

Digby Wells has undertaken design and supervision in the construction and operation of waste-management and tailings facilities. Inspections of dam safety, tailings-management practices and review of large designs are still undertaken.

We assist clients to ensure that the conceptual designs incorporate the best possible measures to limit long-term liabilities and aid closure, as well as to ensure that the placement and management of waste facilities take into account environmental considerations.

2.5 Environmental Legal Services

Ecolaw (the Environmental Legal Services department of Digby Wells Environmental) represents a synergy between the earth sciences and the legal profession.

Environmental law operates to regulate the interaction of humanity and the natural environment, with the purpose of ensuring a sustainable existence for all.

Ecolaw operated to pro-actively ensure that all projects take legal considerations into account during project planning by:

- Determining project design criteria;
- Detailing permitting requirements; and
- Guiding professional teams.

2.5.1 Environmental Legal Advice and Assistance

Ecolaw is able to offer advice to clients on sustainable development and authorisation requirements, which are relevant throughout the project's life cycle. This ensures that the project proceeds as planned within the applicable laws.

2.5.2 Legal Compliance Audits

Environmental legal compliance audits which entail an assessment of a company's environmental legal compliance status against preselected legal audit criteria.

2.5.3 Authorisation Compliance Services (South Africa)

The following audits are undertaken:

- Waste Licensing in terms of the National Environmental Management Waste Act (NEMWA);
- Prospecting Right Applications;
- Integrated water use licence applications (IWULA);
- Mining Right Applications in South Africa which includes a Mine Works Programme and Social and Labour Plan; and
- EIAs and EMPs.

2.5.4 Environmental Compliance Services

Clients require a range of compliance audits to be done for submission to regulatory authorities, or in order to align with internal controls. The audits undertaken are:

- Annual Environmental Assessments for Equator Principle Compliance for Equator Principle Funding Institutions as well as lenders;
- EMP Performance Assessments;
- Environmental Authorisation compliance reports; and
- Environmental and waste management audits.

2.5.5 Environmental Legal Registers

Ecolaw compiles detailed Legal Registers (environmental and/or health and safety) for all clients. Our Legal Registers assist in compliance with ISO 14001:2004 and/or OHSAS 18001 standards and are and are regularly examined and approved by external auditors. Ecolaw's Legal Registers are customised for each client with regard to a company's activities and aspects.

The Legal Register identifies all national, provincial and local legislation and full text of all governing legislation, including by-laws, as well as any company policies, standards, codes

of practice and other environmental legal authorisations / permits, and accordingly sets a benchmark of legal compliance against which your company will be audited and monitored.

Most importantly the Legal Register will, in addition to legal compliance audits, facilitate the identification of a company's environmental legal liabilities which, once identified would place your company in the position to institute corrective measures through its non-conformance and corrective action system. Such continual improvement leads to increased environmental performance, thereby avoiding unnecessary legal liability claims.

2.5.6 Legal Updates

In accordance with and as part of both the ISO4001 and OHSA1800 compliance, Ecolaw is able to offer clients comprehensive legal updates on a monthly and annual basis.

Legal updates in terms of mining operations and the application thereof can be conducted by Ecolaw team.

2.5.7 Risk Assessments

Assist clients with the identification of environmental legal risks and liabilities during the planning and pre-feasibility, feasibility, operational and closure stages of projects.

2.5.8 Appeal Submissions

Advise clients on appeal submissions and responses to various appeals.

3 OUR EXPERIENCE

The following section provides an overview of the experience of the company, if more specific details are required do not hesitate to contact us on info@digbywells.com.

3.1 Geographical Coverage

Since establishment in 1995 Digby Wells has completed projects on no less than 5 continents. Although we focus on the resource and energy industry in Africa, projects have been completed in Asia, Europe, North America and South America.

In Africa the company has completed projects in 23 countries, these are:

- Botswana
- Burkina Faso
- Cameroon
- Democratic Republic of Congo
- Ghana
- Guinea
- Ivory Coast
- Kenya
- Lesotho
- Liberia
- Madagascar
- Malawi
- Mali
- Morocco
- Mozambique
- Namibia
- Nigeria
- Senegal
- Sierra Leone
- South Africa
- Tanzania
- Zambia
- Zimbabwe

Digby Wells operates from offices in Johannesburg and Pretoria. The company has established offices in Mali, Ghana and the United Kingdom. In Senegal it operates in a joint venture partnership with Tropica Environmental Consultants and it has a liaison in Perth to assist in communication and project management for Western Australian clients.

The Malian and Senegalse offices gives Digby Wells access to francophone staff to complement its francophone staff based in Johannesburg.

3.2 Commodity

The company has got experience in diverse range of commodities, these include:

- Aluminium
- Ash
- Bentonite
- Brontonite
- Chrome
- Coal Metalurgical
- Coal Thermal
- Copper/ Cobalt
- Diamonds Alluvial
- Diamonds Kimberlitic
- Dolomite
- Ferrochrome
- Industrial Clay
- Gold
- Industrial Aggregate
- Industrial Sand
- Industrial Steel
- Iron
- Limestone
- Manganese
- Platinum
- Mineral Sands
- Phosphate
- Pyrophelite
- Rare earths
- Tantalum
- Thorium
- Uranium
- Zinc
- Nickel
- Copper

3.3 Non Mining Sectors

The company has completed projects within the following non-mining sectors as standalone projects or as projects associated with mining projects:

- Cleaner Production
- Downstream Beneficiation
- Electricity Distribution
- Electricity Generation
- Energy Efficiency
- Governmental Assistance
- Hydropower
- Industrial Property
- Municipal Sector
- Photovoltaic
- Recreational
- Residential Property
- Tourism
- Waste Management
- Water Provision
- Water Treatment

3.4 Selected Projects

The following is a selection from the database of more than 1000 projects completed by Digby Wells till date. The selection includes some of our Tier 1 clients, as well as small junior miners consisting of a single operation or purely exploration at present.

COMPANY	MINE & COUNTRY	PROJECT
Anglo Coal	Goedehoop Colliery, RSA	Biodiversity Baseline Assessment
Anglo American	ZCCM, Zambia	Due Diligence Assessment Competent Persons Report Resettlement Action Plans
Anglo Gold Ashanti	Sadiola Hill Gold Mine, Mali, West Africa	ESIA for the Deep Sulphide Project
Anglo Platinum	Head Office	Audit for Prospecting (EMP Assessment & Reports)
	Rustenburg Process Division	EIA amendments for the Base Metal Refinery, Smelter and Precious Metal Refinery Expansions Closure cost assessment Geohydrological studies Audits Staff secondment

	Polokwane smelter	Assistance with EIA and Project Management
	Rustenburg, RSA	Environmental studies
Aquila Steel South Africa	Semaka, Thabazimbi, RSA	Prospecting
	Northern Cape, RSA	Prospecting
Armgold/Harmony JV Company	All mine sites	Closure Cost Assessment Geohydrological assessments Closure Plans
Behre Dolbear	Namibia, Congo	Copper – Due Diligence
	London	Jordan Uranium – Due Diligence
	Hong Kong	Stock Exchange listing requirements
BHP Billiton Energy Coal SA	Khutala Colliery Southern Access and Optimisation Project, RSA	EIA EMP WUL
Burkina Mining Company SA	Youga, Burkina Faso	Supervision of Tailings Dam Construction Geohydrological studies
BSGR Resources	Guinea, iron ore	Monitoring of drilling impacts Baseline studies
Canon Engineering Pty	Transalloys Middleburg, RSA	EIA and EMP for slag reclamation process and hazardous waste disposal site Hazardous waste site application and design

CIC Energy Corporation	Mmamabula Botswana	Social Impact Assessment. Resettlement Audit Plan PowerStation and Mine EIA + EMP Power line route options and EIA. Public Participation Process MEP Strip Mining Operation EIA MEP Railway EIA. MEP Railway Siding EIA. Border crossing upgrade EIA
Coal of Africa Ltd. (GVM Metals Limited)	Holfontein, Mpumalanga, RSA	Water Provision Study Aquatic Assessment. EIA + EMP
Coffey (RSG Global)	Crocodile River Mine RSA	Mine Review
Comdek	Zoetfontein, RSA	EMPR Resettlement Action Plan
Crown Gold Recoveries (Pty) Ltd	ERGO Benoni RSA	Dump Reclamation
	Top Star RSA	EIA & EMP
	Numerous dump reclamation operations	Social & Labour Plans EIAs EMPs Audits. Mineral right conversion
DRD Gold SA	West Rand Properties, RSA	SLPs
	Ergo, RSA	Mineral Rights Conversion Water Use Licence Application EIA and EMP
Deloitte	Subaru, Johannesburg, RSA	Environmental Legal Assessment

Dynamic Crane Systems	Johannesburg, RSA	Environmental Audit
ERM South Africa	Mmamabula, Botswana	MEP Railway AIA
Eastplats	Crocodile River, RSA	Smelter EIA &EMP
Exxaro (Pty) Ltd	Grootgeluk, RSA	Water Treatment Works
	Belfast, RSA	Prospecting Closure
	Arnot (coal), RSA	EIA EMP
Foskor	ZIRCONIA RSA Phalaborwa, RSA	EMPR IWWMP Water management strategy
	Sasol Nitro	Investigation of environmental synergies in case of an acquisition
Gauteng Provincial Government (GDACE)	Gauteng Shared Service Centre, RSA	Updating Of Mining Manual for EIA inspectors
GW Base and Industrial Minerals	Koppies Bentonite Mine, RSA	Liability Assessment EIA and EMP
	Masala Pyrophyllite Mine, Piet Retief, RSA	Environmental Liability Assessment
Hereaus Refinery SA (Pty) Ltd	Precious Metals Refinery Port Elizabeth, RSA	Environmental Investigations Phase 2
IMC Group Consulting	Botswana Copper Limited, Botswana	Technical Assistance to BCL
	Twangiza, DRC	Competent Persons report
	Chemaf/ Etoile Copper Mine	EIA EMP RAP
	Donugal Coal, Russia	Competent Person report
	Ferronickeli, Kosova	Due diligence assessment

	Aneka Tambang, Indonesia	Due diligence assessment
	Kazakhmys, Kazakhstan	Competent Person report
Iprop Limited	Baragwanath Ext 5 property development, RSA	Basic Environmental Assessment
Platreef Resources (Ivanplats)	Platreef Platinum Project, RSA	EMP Performance Assessment SLP and skills survey Environmental Baseline Assessment Bulk Sample Application
Kevin Ridge Development cc	Johannesburg, RSA	Development
Koidu Kimberlite	Diamonds, Sierra Leone	ESIA and EMP RAP
Lanseria Nursery	Nooitgedacht, RSA	EIA
Lanxess Mining (Pty) Ltd	Bayers Rustenburg Chrome Mine, RSA	MG4 Water Provision Phase 1Conversion EIA and EMP
Lumba Projects 37 (Pty) Ltd	Thabazimbi RSA	Diamond Prospecting
Margaret Water Company	Klerksdorp, RSA	Groundwater exploration. Geophysics, drilling & aquifer testing of Margaret shaft exploration
Mashala Resources	Delta Penumbra, RSA	Closure Costs. EIA + EMP ESIA
Mineral Corporation	Bankfontein, RSA	MRA SLP Public Participation Process

	Schoongezicht, RSA	MRA Public Participation Process
Northern Coal	Mimosa Colliery, RSA	EMPR amendment Water Licence EIA + EMP Geohydrology
	Jaglust RSA	Mining Right Application (Full) Water Use Licence Application NEMA Application
	Weltevreden RSA	Mining Right Application (Full) Water Use Licence Application NEMA Application
NuCoal Mining (Pty) Ltd	Heuvelfontein RSA Op goeden hoop, RSA	EIA + EMP Mining Right Application (Full)
Orange Farm Scrap Metals	Orange Farm Ext. 7, RSA	Fauna & Flora Assessment. EIA + EMP
Pamodzi Gold Limited	Free State, RSA	EIA + EMP Public Participation Process
Mashala Coal Mining	Penumbra Coal Mine, RSA	Water and Dust Monitoring
Phumelela Africa (Pty) Ltd	ThabaNchu, RSA	Filling Station
Piet van Niekerk Stene	Steelpoort, RSA	EMP Conversion
Platinum Australia	Kalplats, RSA	Tailings & Geohydrology

Randgold Resources	Tongon, Ivory Coast	Full Bankable Environmental Feasibility Study Full ESIA + EMP Resettlement Action Plan Development and Implementation Resettlement Audit Plan
	Kibali, DRC (in progress)	Full Bankable Environmental Feasibility Study Full ESIA + EMP Resettlement Action Plan
Randgold Resources	Masawa, Senegal (in Progress)	Full Bankable Environmental Feasibility Study Full ESIA + EMP Resettlement Action Plan
	Gounkoto, Mali (in Progress)	Full Bankable Environmental Feasibility Study Full ESIA + EMP Resettlement Action Plan
Randgold Resources	Morila, Mali	Full Bankable Environmental Feasibility Study. ESIA + EMP.
	Loulo, Mali	Bi Annual Audit Full Bankable Environmental Feasibility Study. Full ESIA + EMP.
Richards Bay Coal Terminal Co LTD (RBCT)	Berth 306 Port, RSA	Liability Assessment
Riversdale Holdings	Riversdale, RSA	Surface and Groundwater Monitoring. Water Provision.

Shell Marketing	Fuel stations, RSA	30 Sites, basic assessments & EIAs.
Taurus Gold	Afema Gold Project, Cote d'Ivoire	Fatal flaw assessment, ESIA and EMP
Tect Geological Consulting	Bakgaga Mining, RSA	Prospecting
Tegeta Exploration & Resources (Pty) Ltd	Cherry Moss1 (Hartebeeslaagte), RSA	EMPs
Total Coal SA	Boschmanskop, RSA	EMPR/WUL
	Dorstfontein Coal Mine, RSA	SLP
Total Coal Holdings	All Sites RSA	TCH Monitoring. SW & GW 2007, 2008, 2009
	Forzando South	EIA and EMP
Tsumeb Exploration Company Ltd	ValenciaUranium, Namibia	EIA, EMP, Monitoring
Two Pedestrians Mining	ATCOM Colliery, Contractor	Atcom Slurry Lagoon WMP
Umbono	Ellisras, RSA	EIA
Umthombo Resources (Pty) Ltd	Old Largo Colliery	Fatal flaw analysis
Universal Coal	Kangala Roodekop Brakfontein	EIA + EMP + IWULA EIA + EMP + IWULA EIA + EMP + IWULA
Vaal Sand (Pty) Ltd	Bankfontein 9, RSA	Social and Labour Plan
Vitol Group	Woestalleen, RSA	Due Diligence
Xstrata Coal S.A.	Butterfly pit River, RSA	Diversion Basic Assessment

	Tavistock (coal), RSA	EMPR Update. ATC Venture drilling.
	All Coal Mines RSA	Closure Cost Assessment 2007 - 2010.
	All Mpumalanga Complexes	Community Baseline Survey 2009
	Impunzi (coal), RSA	Biodiversity Assessments. Butterfly Pit EMP ROD Requirements. Beath Dump Geochem.
	Tselentis (coal), RSA	EMPR Upgrade. EIA EMP for New Areas. Dump Safety and Stability Audit. Dam Upgrade Detail Design. Pan Geohydrology.
	Waterpan Slurry Dam (coal), RSA	Concept Design. Remedial Construction Site Supervision. Waterpan slurry dam detail design.
	Spitzkop (coal), RSA	Duiker I4 SIA Studies EIA EMP for New Areas. Greenfields Project Additional Studies. Discard dump extension re-design.
	Voorslag, RSA	Cattle Farming Assessment. Social development project

In addition to the above projects, numerous smaller projects have been undertaken to solve environmental problems and pollution issues or to furnish professional advice.

Appendix D: CVs - Protect Team

GRAHAM TRUSLER

Mr. Graham Trusler

Director and CEO

Corporate Department

Digby Wells Environmental

1 EDUCATION

- B.Sc (Chem.Eng.), University of Natal, 1986.
- M.Sc. (Eng.), University of Natal, 1988.
- Integrated Environmental Management course (I.E.M.), University of Cape Town 1993.
- B.Comm., Economics and Business Economics majors, UNISA, 1994.

2 EMPLOYMENT

Jan 1995 - present. Digby Wells & Associates. Founding Partner

Sep 1992 - Dec 1994. Randcoal / Randgold Head Office (Rand Mines)

Jun 1992 - Aug 1992. Middelburg Mine Services (Rand Mines) (coal mine).

May 1992 - Jun 1992. Rand Mines, Milling & Mining (gold dump re-treatment).

May 1991 - May 1992. Durban Roodepoort Deep (Rand Mines) (gold mine).

Dec 1990 - May 1991. Barplats Refinery (Rand Mines) (platinum refinery).

Aug 1990 - Dec 1990. Vansa Vanadium Mine (Rand Mines) (vanadium mine).

Dec 1989 - Jul 1990. Pollution Research Group, University of Natal (water research).

Nov 1988 - Jan 1989. Transvaal Gold Mining Estates (Rand Mines) (gold mine).

Dec 1986 - Jan 1987. Metallurgical Research Department, Harmony Gold Mine (Rand Mines) (gold mine).

3 EXPERIENCE

I have spent three years in the metallurgical department at a number of different mines in the Rand Mines group managing various production units. These included coal washing plants, carbon elution and regeneration plants, conventional gold plants, a platinum refinery and a vanadium

extraction plant. I have also spent over 2 years researching water pollution and treatment options for a number of effluents ranging from acid mine drainage to dyehouse effluents. This interest in water effluent treatment led me to join the Environmental Management Department of Rand Mines where I spent over 2 years handling water pollution and water management issues for the group's gold, coal and property divisions. This involved doing cost comparisons for different water treatment options. I also conducted a number of general environmental impact assessments and compiled environmental management programme reports. I served on the steering committee of three Water Research Commission projects dealing with water treatment options for mining effluent and participated in the compilation of a number of catchment management plans.

Special areas of interest include cleaner production and consumption, process modification to reduce pollution, mine water management, effluent treatment, and environmental project management.

After leaving the corporate world I was one of the founding directors of Digby Wells & Associates, an environmental consultancy focused on the mining industry.

Whilst at Digby Wells and Associates I have completed numerous specialist investigations as well as managed the environmental aspects of brownfields and greenfields projects and get environmental approvals for them. Countries in which these have been completed include South Africa, Mali, Zambia, Tanzania, Mozambique, Sierra Leone, Zimbabwe, Botswana, China, Russia, Kosova, Peru and Indonesia. These projects have been in the industrial, mining, metallurgical and water sectors.

4 PROFESSIONAL AFFILIATIONS

- Engineering Council of SA, Professional Engineer Reg.No. 920088
- SA Institute of Chemical Engineers
- Water Institute of SA
- American Society for Mining and Reclamation

5 PUBLICATIONS

"Sulphate removal from industrial processes" presented at Environment Week, Durban.

"The chemical removal of sulphates", Trusler G.E., Edwards R.I., Brouckaert C.J. and Buckley C.A. Proceedings of the 5th National Institute of Chemical Engineers. Pretoria W3-0 to W3-11, 1988.

"Sulphate removal using anionic exchange membranes", Presented at the Water Institute of SA open Day, Rustenberg, 1990.

"The Barium Carbonate process", Presented at the Water Institute of SA Open Day, Rustenberg, 1990.

"Sulphate, calcium and heavy metal removal from industrial effluents using barium carbonate". Trusler G.E., Edwards R.I. and Buckley C.A., Water SA Vol. 17 No. 2 April 1991.

"Industrial water usage: what industry needs and what it gets", Water 98 conference by AIC.

"Environmental implications for mining in Africa", SAIMM 1998 conference, Mining in Africa.

"Environmental management through all stages of the mining process", Enviro-mining 2000 Conference, 2000 by ICM.

Introducing Cleaner Production to the South African mining industry: Points of accord and of discord, Priyal Dama[1], Graham Trusler[1], Claire Jänisch, Chris Buckley[2] and Harro von Blottnitz[3]

GRANT BERINGER

Mr. Grant Beringer

Principal Environmental Consultant and Project Management Coordinator

Corporate Department

Digby Wells Environmental

1 EDUCATION

2004 - 2006:	MSc in Environmental Management – University of Johannesburg (UJ)
2002 – 2003:	BSc Hons. Geography and Environmental Management – Rand Afrikaans University (RAU)
2000 – 2002:	BSc Earth Sciences, Majoring in Geography & Environmental Management and Geology (RAU)

2 EMPLOYMENT

Nov 2010 – Present:	Digby Wells Environmental, as a Principal Environmental Consultant and Project Co-ordinator
Nov 2008 – Nov 2010:	Digby Wells and Associates, as Manager of the Biophysical Department.
March 2007 – Nov 2008:	Digby Wells and Associates, as Unit Manager.
Oct 2003 – March 2007:	Digby Wells and Associates, as an Environmental Scientist.

3 EXPERIENCE

Whilst at Digby Wells I have been extensively involved in the management of the Environmental Impact Assessment (EIA) process as well as with the compilation of Environmental Management Plans (EMP). I have also compiled numerous Prospecting Right Applications, Liability Assessments and Water Use Licenses. In addition I have experience in conducting due diligence investigations throughout Africa; closure costs assessments and EMP compliance auditing. This has included work in Botswana, Namibia, Zambia, The Democratic Republic of Congo (DRC), Zimbabwe, Guinea and South Africa. The projects I have worked on have covered various minerals, including gold, silver, copper, cobalt, nickel, and coal.

Special areas of interest include Project Management, Closure Liability Assessments and Closure Cost Estimations.

4 PROJECT EXPERIENCE

Harmony Gold Closure Cost Assessment (Project Manager): Completed the closure cost assessment for all Harmony Gold's Operations (for the last 4 years).

Harmony Gold Closure Cost Rate updates (Project Manager): Harmony Gold's rates were updated through investigation into the various industries related to mine closure and rehabilitation.

Sasol Mining Rate update (Project Manager): Sasol's rates for mine closure were reviewed and updated to ensure they were accurate.

Sasol Mining Closure Model review and Update (Project Manager): Sasol's closure cost estimation model was updated to provide ease of use and to make certain that all liabilities were accounted for. The model was also updated to provide summary sheets and allow for cross referencing.

National Manganese Mines (Project Manager): A liability assessment for National Manganese's Morokwa Mine in the Northern Cape was completed. The assessment was conducted to evaluate the current closure methods, provide recommendations for closure and update methodologies adopted by the mine.

Richards Bay Coal Terminal: Completed the liability and closure cost assessment for Richards Bay Coal Terminal.

Closure and Rehabilitation Assessments for prospecting: Numerous prospecting closure and rehabilitation costs have been calculated for operations throughout Southern Africa. The relevant guidelines and standards were used to calculate these costs accurately.

Foskor Zirconia EIA/EMP authorisation (Project Manager): Completion of the EIA and EMP for Foskor Zirconia under the NEMA regulations.

ERGO Mining (Pty) Ltd – Benoni and Elsburg Dump Reclamation Projects (Project Manager): The completion of the EIA/EMPs for the two areas under the MPRDA regulations. The project involved managing the Public Participation Process, Project Meetings and resource allocation and management.

DRD Gold – The overall project management of all DRD Golds reclamation projects. This includes the closure liability assessments.

Xstrata Alloys – Completion of the rehabilitation plan for the proposed Lesedi Power Plant in Mpumalanga.

Randgold Resources – Kibali Gold Project in the DRC. Managed the Environmental studies for the project and currently overseeing the general management of the project which includes the resettlement of people.

A number of due diligences have been completed locally and in Africa, Zambia (2) and Namibia.

STEVE HORAK

Mr Steve Horak

Department Manager: Social Sciences

Social Sciences Department

Digby Wells Environmental

1 EDUCATION

2005: BA Masters Environment and Society – University of Pretoria

1999: BA Honours Development Administration – University of South Africa

1994: BA Applied Anthropology-Development studies – University of Pretoria

2 EMPLOYMENT

Dec 2008 to present:	Digby Wells and Associates, Manger Social Sciences Department
1998 to 2008:	Self-employed, Perisseuo Consulting CC, CK98/68973/23 Founding member
1996 to 1998:	Junior Lecturer, University of South Africa (Unisa) Department of Development Administration, Co-ordinator, Centre for Development administration

3 EXPERIENCE

Before working at Digby Wells Steve has been involved in numerous projects and has managed a number of theses projects. These include Public Participation Processes, Social Assessments, Capacity Building and Facilitation. He has also worked on contract to the Department of Water Affairs and Forestry firstly as the Strategic Environmental Assessment project co-ordinator for the Usutu – Mhaltuze Water Management area 1999 – 2002 and then more recently 2005 – 2008 as a Member of the Business Intelligence Team in the Water Services Directorate: Planning and Information. Now as part of Digby Wells and Associates he manages the social sciences department.

4 PROJECT EXPERIENCE

- **Consultation Process:** Prospecting Right Application Vista Resources (Makhado Local Municipality, Limpopo Province) 2008
- **Public Participation Process** IFC and World Bank standards Proposed ConRoast Platinum Smelter TWP (Rustenburg, North West) 2008

- **Social Impact Assessment:** IFC and World Bank standards proposed Wesizwe Platinum Mine TWP (Ledig, North West) 2007-2008
- **Public Participation Process:** Closure Plan Black Mountain Mine Umsizi (Aggeneys, Northern Cape) 2007-2008
- **Social Impact Assessment**: Closure Plan Black Mountain Mine Umsizi (Aggeneys, Northern Cape) 2007
- **Public Participation:** Super Dump (EIA) Mintails Umsizi (Randforntein Gauteng Province) 2008
- **Special Intervention Programme:** Data Management Specialist Free Basic Water Implementation Department of Public Works, Bigin Africa (National) 2008
- **Consumer Survey:** Water Services: Regulation Department of Water Affairs and Forestry WRP (National) 2008
- **Business Intelligence Team:** Water Services: Planning and Information Department of Water Affairs and Forestry (National) 2009-2005
- **Preliminary Environmental, Social and Transition Management Assessments:** for possible sites for National Government Head Offices the Department of Public Works BKS (Pretoria, Guateng) 2007-2008
- **Monitoring and Evaluation Framework:** Department of Provincial and Local Government Focus BI (National) 2006
- **Public Participation:** for the conversion of the old order mining rights: extension of existing opencast mining operations, construction of a river diversion and application for an integrated water use licence on the farm Halfgewonnen 190 is, CT Environmental (Mpumalanga) 2006
- **Environmental Impact Assessment:** (EIA): and Environmental Management Programme (EMP) for Boschmanskop Coal Mine CT Environmental (Mpumalanga) 2006
- **Socio-Economic Profiling:** of Kromme, Seekoei Catchments, Reserve Determination Department of Water Affairs and Forestry, Coastal & Environmental Services (Eastern Cape) 2006
- **Public Participation:** Taba Romana Granite CT Environmental (Britz, North West) 2006
- **Social Plan Development:** BHP Billiton, Digby Wells and Associates (Revilo North West) 2005
- **Public Participation:** Environmental Management Program Report (EMPR) new coal mine development Boschmanskop CT Environmental (Hendrina, Mpumalanga) 2005
- **Public Participation:** Spitzkop Colliery (EMPR amendment), Digby Wells and Associates, (Ermelo, Mpumalanga) 2005
- **Resettlement Action Plan:** Tselentis Colliery, Digby Wells and Associates (Mpumalanga) 2004
- **Feasibility Study:** Mankwe Campus University of the North West Price Waterhouse Coopers (Mogwassie, North West) 2004

- **Social Plan Development:** BHP Billiton, Digby Wells and Associates (Revilo North West) 2004
- **Preliminary Public Participation:** Environmental Management Program Report (EMPR) new coal mine development Boschmanskop (Hendrina) 2004
- **Social and Labour Plan Development:** Chemwes Recovery Operation, Digby Wells and Associates (Stillfontien) 2004
- **Resettlement Action Plan:** Digby Wells and Associates Koidu (Serraleone) 2004
- **Social Plan:** Closure of Pering mine Digby Wells and Associates (Revilo North West) 2004
- **Public Participation:** Spitzkop Colliery (EMPR amendment), Digby Wells and Associates, (Ermelo) 2003
- **Public Participation:** (EMPR) & Water License Application new diamond mining development, Etruscan, Digby Wells and Associates (Ventersdorp) 2003
- **Public Participation:** (EMPR) Diamond Mining Development, Digby Wells and Associates (Vaal River) 2003
- **Project Coordinator Strategic Environmental Assessment:** Usutu – Mhaltuze Water Management Area Department of Water Affairs and Forestry (Kwa-Zulu Natal) 1999-2003
- **Socio-Economic Impact Assessment:** Winning Business Systems, Woman's Development Bank (Boipatong, Daveyton, Katlehong) 1999
- **Social Impact Assessment:** (EMPR) Tavistock Collieries, Digby Wells and Associates (Ogies) 1999
- **Social Impact Assessment:** (Expansions to Tselentis colliery), Digby Wells and Associates (Breyten) 1999
- **Social Impact Assessment:** (Sand dump reclamation 3/A/1), Digby Wells and Associates (Mariasberg) 1998
- **Khylami Community Health Education Programme:** BKS Consultburo: Consulting Engineers for the Khylami Metropolitan Council (Gauteng Province) 1998
- **Anthropological Research:** Chizumulu Island, Lake Malawi (Malawi) 1996

5 PROFESSIONAL AFFILIATIONS

International Association for Impact Assessment: South Africa

MARIKE DE KLERK

Ms Marike de Klerk

Environmental Consultant

Environmental Management Services Department

Digby Wells Environmental

1 EDUCATION

Florida High school (1994 – 1999)

Matric Exception (Grade 12) Distinctions in Biology, Mathematics, Tourism Management and History of Art, Scottish Exams (supplementary) 1999 Distinctions in Biology and Afrikaans

University of Pretoria (UP) (2000 – 2002)

BhcS. Degree (Baccalaureas Hereditans Culturaeque Scientea) Specializing in Heritage Tourism Management. Prestige bursary holder for 3 consecutive years; this degree is based on intensive research on heritage resource management and emphasizes sustainable development. It focuses on the practical application of interdisciplinary academic theories. Subjects include: Tourism management, Geography, Computer Information Literacy (CIL), Archaeology, Anthropology, History and Heritage management.

University of Pretoria (UP) (2003 – 2004)

Bhcs. (Honours) Degree Cum Laude, focussed on Environmental Impact Assessment (EIA), sustainable development, African archaeology, Geography and Community development. Research report/Mini-thesis entitled: “Ethno-botanical assessment of the Blouberg region: Its significance for tourism”, conducted under leadership of Prof. C.C. Boonzaaier. The report focused on the potential of ethno-botanical tourism development at Blouberg, which is part of the ‘African Ivory Route’ Tourism Project in the Limpopo Province. (South Africa). Marike conceded her Bhcs (Hon.) degree with distinction.

University of Johannesburg (UJ) (2005 – 2006)

M.A (Magister Artium) Degree, specializing in Sustainable Development and tourism management, focusing primarily on development in the northern regions of the Limpopo Province; Activities include intensive research, implementation of sustainable principles, problem-solving, management evaluation, mission & goal definition, impact assessment, monitoring, strategic management and continuous feedback. Case study: Hananwa region (Blouberg) in the Limpopo Province.

Wildlife Campus (Ecolife) (2007 – 2008)

Wildlife Management, Certificate course focusing on the science of wildlife management, habitat management, game management, nutritional physiology of herbivores, nutritional chemistry for herbivores, wildlife nutrition, wildlife diseases, wildlife parasites, toxic plants, soil assessment, carrying capacity, assessing vegetation and integrated game reserve management. The wildlife

management course is presented by Ecolife, owned and operated by Professor Wouter Von Hoven at the University of Pretoria's Centre for Wildlife Management (Wildlife campus)

University of Johannesburg (UJ) (2008 – current)

Doctoral Degree in Environmental Management in the Science Faculty, Department Geography, Environmental Management and Energy studies, focussing on the systematic analysis of impacts on archaeological and palaeontological resources in the Sterkfontein Caves of the Cradle of Humankind World Heritage Site, as result of groundwater pollution from mining on the West Rand

Lifetime Membership: Goldenkey International Honorary Society: Membership attained through academic achievement (Honorary Colours) in the BhcS. Degree at University of Pretoria (UP).

2 EMPLOYMENT

2006 – Current:	Environmental Consultant at Digby Wells Environmental, Randburg;
2005:	Lecturer in Sustainable Tourism Development at the University of Johannesburg;
2005:	Lecturer in Geography at Abbott's College, Northcliff;
2004:	Researcher for South African Veterinary Association (SAVA): Development of Veterinary Museum at Onderstepoort, Pretoria;
2004:	Administrative Assistant at Financial Services Compensation Scheme (FHCS), London;
2002 – 2003:	Research Assistant at University of Pretoria (UP), Archive Assistant & Part-time Travel Writer for Campus Newspaper

3 EXPERIENCE

Whilst completing a BhcS. (Hon) and Masters Degree, Marike has done intensive research, fieldwork and impact assessments in the Blouberg area, Limpopo Province. The Hananwa community formed an integral part of the Masters Degree in Sustainable Development as well as an Ethno-botanical assessment of the region. As lecturer in Sustainable Development, Tourism development and Geography at University of Johannesburg (UJ) and Abbott's College, she was responsible for the preparation of formal lectures, presentations, practical guidance (excursions) and student evaluation. Other work experiences such as Research assistant for South African Veterinary Association (SAVA) and University of Pretoria (UP) were primarily focussed on resource analysis, literature reviews, compilation of development proposals, data input and constructive recommendations. Current area of expertise at Digby Wells lies in the formulation and implementation of sustainable development initiatives, archaeological impacts assessments and assisting with Environmental Impact Assessments (EIA/ESIA's), Environmental Management Plans (EMP), Scoping Reports, Closure Reports and Environmental Audits (EMP review and ISO 14001).

4 PROJECT EXPERIENCE

- Sadiola Deep Sulphides Project (EIA/EMP, Project Manager), AngloGold Ashanti (AGA), Mali, West Africa;
- Valencia Uranium Project (EIA/EMP, Assistant Project Manager), Forsys Metals, Namibia, Southern Africa;

- Loulo Mine Project (EMP Review and ISO 14001 Compatibility Audit), Rand Gold Resources, Mali, West Africa;
- Boikarabelo Project (Sustainability Assessment), Resource Generation, Waterberg, Limpopo Province;
- HCI Nokuhle Coal Project, (Archaeological Assessment and Sustainability Assessment), Ogies, Mpumalanga Province;
- Resources Generation, Coal Mine Project in the Waterberg area (EIA/EMP, Archaeological Assessment and Tourism Assessment), Limpopo Province;
- Universal Coal, Kangala Coal Mine Project in the Delmas area (EIA/EMP, Archaeological Assessment and Tourism Assessment), Mpumalanga;
- Lesedi Power Generation Project (EIA/EMP, heritage assessment, sustainability assessment) in Tweefontein Division, Mpumalanga Province;
- Crown Ergo Mining Operation and related reclamation activities (EIAs/EMPS, Air Quality and Archaeological Management), Gauteng;
- Northern Coal, Weltevreden (EIA/EMP, Archaeological Management), Mpumalanga;
- Etoile (Preliminary Archaeological Investigations), IMC, Democratic Republic of Congo (DRC);
- Khutala Mineral Optimisation Project, EIA/EMPR, Ingwe Colliery, Mpumalanga, South Africa ;
- Cleaner Production (CP) Campaign, Water Research Commission (WRC), South Africa;
- Mmamabula Energy Projects, CIC, Botswana, archaeological and heritage section for the:
  - Mine & Power station EIA/EMPR,
  - Transmission Lines EIA/EMPR,
  - Railway Link and Service Corridor,
  - Kudumatse Groundwater exploration boreholes and
  - Calcrete Mine.
- ATC Mini Opencast Pits EMPR Addendums, Xstrata Coal, Mpumalanga.
- Mareesburg Platinum Joint Venture, Eastern Platinum, Mpumalanga.
- Bankfontein EIA/EMPR, Vaalsands (Pty) Ltd, Free State
- 3L2 Dump EIA/EMPR, Crown Gold Recoveries, Gauteng
- Lime-Chem EIA/EMPR, Lime-Chem (Pty) Ltd, Limpopo Province

Appendix E: Technology Alternatives Considered by the Team of Experts

Options for water management in the Witwatersrand mining basins and their applicability to the different basins (W-Western Basin, C-Central Basin, E-Eastern Basin)

Objective	Option	Advantages	Disadvantages	Relative cost		Applicability		
				Capex	Opex	W	C	E
Management of flooding and/or decant	Pump water from ECL	• Environmental protection	• Pumping may prove costly	Moderate	High	Y	Y	Y
	Pump water from level shallower than ECL	• Lower cost than pumping from ECL	• Is likely to place the environment at risk	Moderate	Moderate	Y	Y	Y
	Allow to decant	• No pumping costs • May be possible in areas where younger surficial cover rocks act as a seal above the mine void	• Seepage and secondary decant points could develop • Water rising into dolomitic layers could lead to groundwater contamination and sinkhole formation • Does not allow seasonal balancing of volume i.r.o. water treatment	Low	Low	N	N	N

Objective	Option	Advantages	Disadvantages	Relative cost		Applicability		
				Capex	Opex	W	C	E
	Tunnel[1] to create an artificial decant	• No pumping costs • Will ensure that decant occurs in a controlled fashion	• High capital costs • Does not fully protect the environment unless the tunnel can be constructed at the ECL • Does not allow seasonal balancing of volumes i.r.o. water treatment • Long-term maintenance costs of tunnel • Risk of tunnel failure	Very high	Low	N	Y	N
	Tunnel to a remote pumping station to reduce pumping costs	• Allows the location of the abstraction point for water according to the optimal location for a treatment plant	• Limited access to the underground workings will complicate construction • Does not remove the requirement to pump water	High	Moderate	Needs further investigation		

[1] The idea of tunnelling to create a preferred pathway for mine water to flow out of the void was proposed by the Council for Geoscience several years ago and detailed design studies have been undertaken. This will allow the mine void to drain by gravity feeding water through a tunnel to a low-lying point.

Objective	Option	Advantages	Disadvantages	Relative cost		Applicability		
				Capex	Opex	W	C	E
Ingress management	Seal areas of surface ingress (riverbeds, old mine workings, etc.)	• Long-term reduction in water management costs • Lower water volumes may result in more options for management • Some projects may be implemented by mines (W Basin)	• Some projects involve high capital costs	High	Low	Y	Y	Y
	Abstract clean water from overlying aquifers before it enters the mine void	• 'Keeps clean water clean' • Reduces ingress • Provides a source of clean water to local users	• Will need to be properly managed in dolomitic areas to prevent subsidence	Moderate	Moderate	N	N	Y
Water treatment	Neutralisation and iron removal	• Lowest cost option • Removes most heavy metals • Can be implemented in a relatively short time • Pre-treatment stage necessary for most more-advanced treatment methods • Returns conditions to those that existed during active mining	• Does not fully address salinity problems • Water produced has limited uses • Requires facilities for sludge disposal	Moderate	Moderate	Y	Y	Y

Objective	Option	Advantages	Disadvantages	Relative cost		Applicability		
				Capex	Opex	W	C	E
	Desalination (may be one of a range of several treatment methods based on chemical precipitation, membrane treatment, ion exchange or biological sulphate removal)	• Proven, with a limited number of commercial biological sulphate removal, membrane treatment and chemical precipitation plants • Produces clean water that can be used for any purpose, including drinking • Can remove salts from river systems completely • May produce saleable by-products that could offset some or all costs	• High capital and operating costs • Not all technologies have been tested at full scale • Membrane processes at very high cost • Need for management of wastes	Very high	Very high	Y	Y	Y
	Discharge water without treatment	• No costs	• Will seriously affect downstream environments • Will increase salinity of downstream river systems	Low	Low	N	N	N

Objective	Option	Advantages	Disadvantages	Relative cost		Applicability		
				Capex	Opex	W	C	E
	In-situ treatment	• No fixed plant required • Creates options as relatively clean water can be abstracted from the mine void • Active and on-going operational personnel required, but permanent presence on site not required • Requires chemicals, operations staff, intermittent field maintenance, electrical power and low frequency monitoring	• Requires a system with good mixing characteristics and sufficient points of access to the void water, which is not the case in the Witwatersrand mines • Relatively inefficient mixing requires large inputs of reagents	Low	High	N	N	N

Objective	Option	Advantages	Disadvantages	Relative cost		Applicability		
				Capex	Opex	W	C	E
	Passive treatment	• Perceived to be low cost option: moderate capital investment with periodic reinvestment to replace depleted wetlands media • Self-sustaining processes, periodic maintenance, intermittent monitoring. May require replacement or supplement of materials at low frequency • Natural energy sources of gravity flow, solar energy and bio-chemical energy • Requires little intervention	• Creates contaminated areas in treatment systems • Generally regarded to be unsuitable for the large volumes and poor qualities expected from the Witwatersrand • Requires extensive monitoring to evaluate success • Requires an additional energy (carbon) source for bacterial processes • Treated water quality poorer and more variable than other options	Moderate	Moderate	N	N	N

Appendix F: I&AP Database

BKS 1310 AMD I&AP DATABASE

First Name	Last Name	Company
Kobus	van der Westhuizen	Yeast Pro
Gert	Steenkamp	Yeast Pro
Willem	Wegelin	WRP Consulting Enginners (Pty) Ltd
Pieter	van Rooyen	WRP Consulting Enginners (Pty) Ltd
Christine	Colvin	World Wildlife Fund
Neels	Hoek	witwatersrand Gold Mining Realization Trust
Jan	Reeneen	witwatersrand Gold Mining Realization Trust
Elana	Coreejes	Witfontein Belange Group
John	Wesson	Wild life and Environment Society of South Africa
Lemson	Betha	Wild life and Environment Society of South Africa
Karen	Marx	Wild life and Environment Society of South Africa
Garth	Barnes	Wild life and Environment Society of South Africa
Mike	Severin	Wild life and Environment Society of South Africa
Gary	Marnerwick	Wetland Consulting Services
Jaco	Schoeman	Western Utilities Corporation
Bertie	Steyler	Western Utilities Corporation
Louis	Roos	West Witwatersrand Gold Mines
Wiekus	Myburgh	West Rand District Municipality
Susan	Stoffberg	West Rand District Municipality
Olivia	Caldeira	West Rand District Municipality
Zakhele	Nhlapho	West Rand District Municipality
Zakhele	Dlamini	West Rand District Municipality
Herina	Hamer	West Rand District Municipality
Eiman	Karar	Water Research Commission
Stanley	Liphadzi	Water Research Commission
Schafic	Adams	Water Research Commission
Jo	Burgess	Water Research Commission
Bonani	Madikizela	Water Research Commission
Wandile	Nomquphu	Water Research Commission
Lindy	Strever	Waste Services
Linda	Hall	Waste Services

Hennie	Schoeman	Waste Services
Gordon	Donaldson	Waste Services
Lehlohonolo	Moloi	Ward C32- Environmental Forum
Sam	Mokoena	Vaal Environmental Justice Alliance
Phineas	Malapela	Vaal Environmental Justice Alliance
David	Roche-Kellly	University of the Witwatersrand
Terence	McCarthy	University of the Witwatersrand
Tony	Jamison	University of the Witwatersrand
Tracy	Humby	University of the Witwatersrand
Stephan	Ekulo	University of the Witwatersrand
May	Hermanus	University of the Witwatersrand
Elke	Bay	University of the Witwatersrand
Jan	Myburgh	University of Pretoria
Francois	Durand	University of Johannesburg
Gerrit	van Tonder	University of Freestate
Gideon	Steyl	University of Free State
Craig	Sheridan	University of Free State
Andre	Venter	UASA
Caliphs	Zvinowanda	Tshwane University of Technology
Jannie	Maree	Tshwane University of Technology
Derek	Hazelton	TSE Water Services cc
Jan	Viljoen	Transvaalse Landbou Unie
Gert	Cruywagen	Transvaal Agricultural Union
Chris	van Zyl	Transvaal Agricultural Union
Bennie	van Zyl	Transvaal Agricultural Union
Francis	Rahlapane	Transnet
Hesmarie	Pearson	Tox Solutions (Klipriver Forum)
Jacques	Myburg	Tosa (Pty) Ltd (Klipriver Forum)
Jafta	Namo	Tongaat Hullet Starch-Klipriver
Andreas	Machinini	Tongaat Hullet Starch-Klipriver
Joseph	Gruber	Tiger Chemicals (Klipriver Forum)
Katharine	Child	The Time Newspaper
Jessica	Bezuindenhout	The Sunday Times

Jilian	Green	The Star
Solomon	Saohatse	The Daily Sun
Martin	Williams	The Citizen
Nicki	Gules	The Citizen
Louis	Meintjes	TAUSA
Abrie	Lottering	Tarlton Water Use Forum
V	Rungani	Tarlton Water Use Forum
Makhudu	Sefara	Sunday Independent
Michael	van Harmelen	Sterkfonteinm Estates Homeowners association
Kobie	Smith	Sterkfontein Estates Home owners Association
Nadia	Coetzee	Sterkfontein Estates Home owners Association
Johan	Scheepers	Sterkfontein Estates Home owners Association
Ilani	Pretorius	Sterkfontein Estates Home owners Association
J	Janse van Rensburg	Sterkfontein Estates Home owners Association
S	Mancer	Sterkfontein Estates Home owners Association
Elise	Mitchell	Sterkfontein Estates Home owners Association
Maryna	van Harmelen	Sterkfontein Estates Home owners Association
Emelia	Villiano	Sterkfontein Estates Home owners Association
Earl	Saunders	Sterkfontein Estates Home owners Association
Nini	Jeffery	Sterkfontein Estates Home owners Association
Paul	Le Roux	Sterkfontein Estates Home owners Association
John	Mitchell	Sterkfontein Estates Home owners Association
Tinus	Maritz	Sterkfontein Estates Home owners Association
Dejan	Liebenberg	Sterkfontein Estates Home owners Association
Eben	Venter	Sterkfontein Estates Home owners Association
Jacqueline	Hoogendyk	Sterkfontein Estates Home owners Association
Adriaan	Coetzee	Sterkfontein Estates Home owners Association
Maritsa	Viljoen	Sterkfontein Estates Home owners Association
Lee Ann	Saunders	Sterkfontein Estates Home owners Association
Gerrit	Van Der Merwe	Sterkfontein Estates Home owners Association
Pieter	de Lange	Sterkfontein Estates Home owners Association
A	Grove	Sterkfontein Estates Home owners Association
WM	de Wet	Sterkfontein Estates Home owners Association

Sonja	Trichardt	Sterkfontein Estates Home owners Association
Louis	Trichardt	Sterkfontein Estates Home owners Association
Hans	Scheepers	Sterkfontein Estates Home owners Association
Shawn	Bontekoning	Sterkfontein Estates Home owners Association
Ann	Klemptner	Sterkfontein Estates Home owners Association
Celeste	Le Roux	Sterkfontein Estates Home owners Association
Vicky	de Beer	Sterkfontein Estates Home owners Association
Lee	Hunter	Sterkfontein Estates Home owners Association
Adam	Mac Donald	Sterkfontein Estates Home owners Association
Yolanda	Steyn	Sterkfontein Estates Home owners Association
Danie	du Plessis	Sterkfontein Estates Home owners Association
Henri	Smith	Sterkfontein Estates Home owners Association
Pierre	Dispan	Sterkfontein Estates Home owners Association
Maurice	Williams	Sterkfontein Estates Home owners Association
Cassie	Wessels	Sterkfontein Estates Home owners Association
Raymond	Hunter	Sterkfontein Estates Home owners Association
Liz	Kruger	Sterkfontein Estates Home owners Association
Tanya	Aucamp	Sterkfontein Estates Home owners Association
Peter	Botha	Sterkfontein Estates Home owners Association
Danie	Steyn	Sterkfontein Estates Home owners Association
Ansie	Botha	Sterkfontein Estates Home owners Association
Valerie	Bontekoning	Sterkfontein Estates Home owners Association
Jenny	Johnson	Sterkfontein Estates Home owners Association
Andre	de Beer	Sterkfontein Estates Home owners Association
John	Whillier	Sterkfontein Estates Home owners Association
Anne-Lize	Wessels	Sterkfontein Estates Home owners Association
Hennie	Kruger	Sterkfontein Estates Home owners Association
I	Ramarumo	Sterkfontein Estates Home owners Association
Wouter	van Wyk	Sterkfontein Estates Home owners Association
Lynn	Venter	Sterkfontein Estates Home owners Association
B	Senyolo	Sterkfontein Estates Home owners Association
Paul	Williams	Sterkfontein Estates Home owners Association
Uwe	Engelmann	Sterkfontein Estates Home owners Association

Michelle	Engelmann	Sterkfontein Estates Home owners Association
Ann	de Villiers	Sterkfontein Estates Home owners Association
Christo	Pretorius	Sterkfontein Estates Home owners Association
Daleen	de Lange	Sterkfontein Estates Home owners Association
Tersia	Wilken	Sterkfontein Estates Home owners Association
Karin	Dispan	Sterkfontein Estates Home owners Association
Sonia	van Rooyen	Sterkfontein Estates Home owners Association
Kenny	Kelbrick	Sterkfontein Estates Home owners Association
Andy	Hall	Sterkfontein Estates Home owners Association
Ryan	Jeffery	Sterkfontein Estates Home owners Association
Wickus	Labuschagne	Sterkfontein Estates Home owners Association
Tania	Hunter	Sterkfontein Estates Home owners Association
Hanlie	Williams	Sterkfontein Estates Home owners Association
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Bertus	van Rooyen	Sterkfontein Estates Home owners Association
Marnus	Steyn	Sterkfontein Estates Home owners Association
Simone	Rosenberg	Sterkfontein Estates Home owners Association
Nic	Rosenberg	Sterkfontein Estates Home owners Association
Christia	Maritz	Sterkfontein Estates Home owners Association
Lizeth	van der Merwe	Sterkfontein Estates Home owners Association
Chanel	Whillier	Sterkfontein Estates Home owners Association
Johan	Viljoen	Sterkfontein Estates Home owners Association
Lily	Viljoen	Sterkfontein Estates Home owners Association
Tersia	Labschagne	Sterkfontein Estates Home owners Association
Engella	Hall	Sterkfontein Estates Home owners Association
Leon	Bylsma	Sterkfontein Estates Home owners Association
Alfie	Klemptner	Sterkfontein Estates Home owners Association
Elmarie	Krige	Sterkfontein Estates Home owners Association
Riaan	Aucamp	Sterkfontein Estates Home owners Association
Pieter	de Villiers	Sterkfontein Estates Home owners Association
Elrine	Kelbrick	Sterkfontein Estates Home owners Association

Zelda	Schonfield	Sterkfontein Estates Home owners Association
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Jonathan	Shaw	Sterkfontein Estates Home owners Association
Gunte	Kommer	Stable Inn
Vassie	Maharaj	SRK Consulting
Elna	de Beer	SRK Consulting
Jacky	Burke	SRK (Klipriver Forum)
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Cathy	Grosvenor	Springs Advertiser
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Johan	Bruwer	South African National Roads Agency
Lerotholi	Sekhonyana	South African Local Government Association
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Cobus	Nienaber	South African Irrigation Institute (SABI)
Angela	Kariuki	South African Human Rights Commission
Yuri	Ramkissoon	South African Human Rights Commission
Pandelis	Greogriou	South African Human Rights Commission
Motshabi	Moemise	South African Human Rights Commission
Janet	Love	South African Human Rights Commission
Marlise	Scheepers	Sondag
	Andre	Solidarity
Anna	Alcaro	Socio Economic Rights Institute of South Africa (SERI)
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Nezar	Eldidy	Sobek Engineering
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Hans	Mey	Sedibeng Water
Noeline	Basson	Sedibeng Water
Deon	Dippenaar	Sedibeng Water
Ester	Peta	Scaw Metals
Thomas	du Toit	Save the Vaal Environment
Kashiefa	Ajam	Saturday Star
Chris	Nkosi	SATAWU
Hans	Kruger	Sasol Tecthnology

Andries	Meyer	Sasol Synfuels
Andries	Meyer	Sasol Synfuels
Johan	Duvenhage	Sasol Solvents(Klipriver Forum)
Bob	Kleynjan	Sasol Chemical Industries
Martin	Ginster	Sasol
Farai	Chamisa	Sasol
Dave	Smith	Sappi Forests (Pty) Ltd
Frans	Matfield	Sappi Fine Papers (Pty) Ltd
S	Molefsoane	SANCO
Mandy	Driver	SANBI
John	Dini	SANBI
Umesh	Bahadur	SANBI
Namhua	Mbona	SANBI
Jaco	Van Wyk	Samancor (Klipriver Forum)
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Peter	Mackenzie	S&W Consulting Engineers
Sandra	Botes	Royal Engineering
Elana	Coreejes	Rodora Agri Forum
Altus	Feenstra	Robor Galvanizers
Diana	Tshivhase	Robor
Francois	van Wyk	Road Water
Andrian	van Bart	Rison Groundwater Consulting
Candice	Landie	ReSource
Anthony	Richard	Realsearch Environmental & Legal Services
Shan	Holmes	Realsearch Environmental & Legal Services
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Liesel	De Lange	Rapport
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Heidi	Pretorius	Randwater
John	Critchely	Randwater
Tendai	Chitaka	Randwater
Reveck	Hariram	Randwater
Kobie	Mare	Randwater

Tawanda	Nyandoro	Randwater
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Peter	Dick	Randfontein Local Municipality
Maliba	Ramathlabe	Randfontein Local Municipality
Nthabiseng	Mogale	Randfontein Local Municipality
Johan	Meyer	Randfontein Herald
Marc	de Fontainne	Rand Water, Blesbokspruit Forum and Gauteng Wetland Forum
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Rex	Zorab	Rand Uranium
Sarel	Keller	Rand Uranium
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Dandet	Seke	Q Habitat
Lekau	Hlabolwa	Q Habitat
Elsabe	Brink	Provincial Heitage Resource Authority
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Eric	Stoch	Potchesftroom Disaster Management
Rene	Potgieter	Potch Petitioners
PJ	Mostert	People for Wildllife
Johan	Kruger	Pecanwood Estate Homeowners Association
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John	Duncan	Patcon
Johnny	De Lange	Parliamentary Portfolio Committee on Water and Environment
Rita	Brummer	Orthopaedic Technologies
Johan	Berg	Obaro
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Johann	Tempelhoff	North West University
Leslie	Stoch	North West University
Leon	van Rensburg	North West University
Frans	Waanders	North West University
Frank	Winde	North West University
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Hermien	Roux	North West Nature Conservation
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Fikile	Mashinini	Ncamiso Trading GG
Mzwakhe	Nhlapho	National Union of Mine Workers
Frans	Beleni	National Union of Mine Workers
Patle	Mohajane	National Nuclear Regulator
Boyce	Mkhize	National Nuclear Regulator
Victor	Munnik	Mvula Trust
Dean	Muruven	MSA Group
Margo	Saner	MS&A
Mabutho	Sithole	Mpumalanga Province Office of the Speaker
Nicky	van Hille	Moss Group
Pieter	Kruger	Mogale Gold
Stephan	du Toit	Mogale City Local Municipality
Samukelisiwe	Mdlalose	Mogale City Local Municipality
Andy	Mathibe	Mogale City Local Municipality
Peter	Tladi	Mogale City Local Municipality
Cindy	Ramalatswa	Mogale City Local Municipality
Dan	Mashitisho	Mogale City Local Municipality
Paul	Molapo	Mogale City Local Municipality
Zigi	Nxumalo	Mogale City Local Municipality
Morakane	Mokoena	Mogale City Local Municipality
Karabo	Raphasha	Mogale City Local Municipality
Dikgang	Sithole	Mogale City Local Municipality
Faith	Chademana	Mintails
Robert	Freeman	Mintails
Martin	Zhuwakinya	Mining Weekly
Marina	Kruger	Midvaal Water Company
Johan	Venter	Midvaal Local Municipality (Klipriver Forum)
Jako	Verster	Midvaal Local Municipality (Klipriver Forum)
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Ariel	Mafejane	Johannesburg Water
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Vincent	Muberuka	Johannesburg Road Agency
Neil	Fraser	Johannesburg Heritage Trust
Sharon	Lewis	Johannesburg Development Agency
Heleen	Bredenhann	Johan Fourie & Associates
Chitra	Bodasing	Joburg East Express
Jerry	Mashinini	JHB Water -Cydna Lab (Klipriver Forum)
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Piet	de Vries	IProp (Pty) Ltd
Irene	Lea	ILEH
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Ben	Hefer	Hernic Ferrochrome (Pty) Ltd
Jim	Dickens	Henley Conservancy (Klipriver forum)
Meera	Shah	Harvard Law School
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Keith	Warrener	Haggie SWR
Gustav	Schumann	Haggie SWR
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Johan	Engelbrecht	Grootvlei Gold Mine, Aurora
Jan	Rigale	Grootvlei Development Organisation
Peter	Kompie	Grootvlei Development Organisation
James	Mqanyane	Grootvlei Development Organisation
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Mike	Hood	Grootvaly Blesbokspruit Conservation Trust
Ewald	Meyer	Grootvaly Blesbokspruit Conservation Trust
Harry	Klemp	Greens Greens
Graham	Twaddle	Greater Heriotdale Business Forum
John	Fell	Greater Heriotdale Business Forum
Hugh	Lee	Greater Heriotdale Business Forum
Joan	Gooysen	Gold Reef City
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Adele	Hepburn	Metalloys
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Wilem	Hazewindus	Marico Catchement Conservation Association
Sarel	Pretorius	Marico Bosveld Water Association
Roelf	le Roux	Magalies Water Board
Mias	van der Walt	Magalies Water
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Gopolang	Betha	Madibeng Local Municipality
Manie	du Toit	Macsteel Fluidcontrol
Peter	Lawrence	Lime Chem (Pty) Ltd
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Hannes	van der Walt	Lafarge Gypsum Division
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Jannie	Rykaart	Krugersdorp Game Reserve
	Editor	Kormorant Newspaper
Alwyn	Laas	Kloof Gold Mine, Gold Fields
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Feizal	Gathoo	KERF Region 11
Bertus	Bierman	Joint Water Forum & Anglo American Platinum
Jones	Mnisi	Johannesburg Water (Pty) Ltd
Jones	Mnisi	Johannesburg Water (Klipriver Forum)
Boetie	Mashigo	Johannesburg Water
Amanda	Nkomo	Johannesburg Water
Eitenne	Hugo	Johannesburg Water
Alastair	Galt	Johannesburg Water

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Johan	Mouton	Gold One International Ltd
Delareze	Joubert	Gold fields
Melissa	Hart	Germiston City News
Mpfareleni	Mashau	GDARD (Marievale Bird Sanctuary)
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Lulu	Ngomane	Gauteng Water Sector Forum
Piet	Muller	Gauteng River Health Programme
Thomas	Walters	Gauteng Provincial Legislature
Nomvula	Mokonyane	Gauteng Provincial Government
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Mafu	Nkosi	Gauteng Department of Agriculture and Rural Development
Puthi	Matlamela	Gauteng Department of Agriculture and Rural Development
Fhatuwani	Munyai	Gauteng Department of Agriculture and Rural Development
Matimba	Baloyi	Gauteng Department of Agriculture and Rural Development
Rina	Taviv	Gauteng Department of Agriculture and Rural Development
Quintoin	Joshua	Gauteng Department of Agriculture and Rural Development
Pirate	Ncube	Gauteng Department of Agriculture and Rural Development
Peter	Mills	Gauteng Department of Agriculture and Rural Development
Mpho	Muvhenga	Gauteng Department of Agriculture and Rural Development
Keneuoe	Segele	Gauteng Department of Agriculture and Rural Development
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Gideon	Viljoen	Fry's Metals
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Mariette	Liefferink	Federation for Sustainable Development

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Anesh	Surendra	Eskom-Mega Watt Park
Nandha	Govender	Eskom-Mega Watt Park
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Dean	Lindecke	ERGO
Carol	Knoll	Environmental Management
Martin	Zhuwakinya	Engineering news
Yolanda	Friedmann	Endangered Wildlife Trust
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Thembi	Mkhize	Emfuleni Local Municipality
Sydney	Chauke	Emfuleni Local Municipality
Mark	Scheepers	Eldorado Urban News
Edith	Kruger	Ekurhuleni Metropolitan Municipality Library
Pilusa	Mashamaite	Ekurhuleni Metropolitan Municipality Library
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Ilse	Kleinhans	Ekurhuleni Metropolitan Municipality
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Dumisane	Tembe	Ekurhuleni Metropolitan Municipality
Jeffrey	Senoelo	Ekurhuleni Metropolitan Municipality
Slindokuhle	Hadebe	Ekurhuleni Metropolitan Municipality
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Sonia	Mathodini	Ekurhuleni Metropolitan Municipality
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Annamarie	Maurizi	Ekurhuleni Metropolitan Municipality
Bernard	Williamson	Ekurhuleni Metropolitan Municipality
Aubrey	Mokgosi	Ekurhuleni Metropolitan Municipality
Themba	Moganseli	Ekurhuleni Metropolitan Municipality
Lusanda	Mtolo	Ekurhuleni Metropolitan Municipality

Queen	Duba	Ekurhuleni Metropolitan Municipality
Molwantwa	Nkoana	Ekurhuleni Metropolitan Municipality
Khaya	Ngema	Ekurhuleni Metropolitan Municipality
Bennett	Nikani	Ekurhuleni Metropolitan Municipality
Paulina	Morake	Ekurhuleni Metropolitan Municipality
Tania	Campbell	Ekurhuleni Metropolitan Municipality
Connie	Ras	Ekurhuleni Metropolitan Municipality
Stone Dean	Desmond	Ekurhuleni Metropolitan Municipality
Johan	Hendricks	Ekurhuleni Metropolitan Municipality
M	Xakambana	Ekurhuleni Metropolitan Municipality
Ivan	Kadungure	Ekurhuleni Metropolitan Municipality
Ivan	Kadungure	Ekurhuleni Metropolitan Municipality
Smuts	Marais	Ekurhuleni Metropolitan Municipality
Sekhonyana	Lerotholi	Ekurhuleni Metropolitan Municipality
Qaphile	Gcwensa	Ekurhuleni Metropolitan Municipality
Pieter	Gobler	Ekurhuleni Metropolitan Municipality
Mthokozisi	Nkosi	Ekurhuleni Metropolitan Municipality
Moses	Maliba	Ekurhuleni Metropolitan Municipality
Gavin	Ramaboea	Ekurhuleni Metropolitan Municipality
Lillian	Kwakwa	Ekurhuleni Metropolitan Municipality
Judith	Ndebele	Ekurhuleni Metropolitan Municipality
Jerry	Chaka	Ekurhuleni Metropolitan Municipality
Francois	Meyer	Ekurhuleni Metropolitan Municipality
Cecilia	Rakgoale	Ekurhuleni Metropolitan Municipality
Bheki	Sibeko	Ekurhuleni Metropolitan Municipality
Barend	Deminey	Ekurhuleni Metropolitan Municipality
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Jacobus	Wilken	East Rand Water Care Company (ERWAT)
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Johan	Hendriksz	East Rand Water Care Company (ERWAT)
Giepie	Hefer	East Rand Water Care Company (ERWAT)
Piet	De Vries	East Rand Proprietary Mines
Jetro	Ngwenya	Earth Life
Fiona	Maskell	Earth Life
Isreal	Mosala	Earth Life
Rachel	Adatia	Earth Life
Makoma	Lekalaka	Earth Life
Judith	Taylor	Earth Life
Neville	Lane	Durban Roodepoort Deep Gold Mine
Simphiwe	Makaka	Dukathole Environmental Community Forum
David	Zilwa	Dukathole Environmental Community Forum
Hary	Traub	DRY- TECH
Henry	Gouws	DRD Gold
Jaco	Schoeman	DRD Gold
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Marie	Brisley	Department of Water Affairs North West
Neo	Thulo	Department of Water Affairs North West
Chadwick	Lobakeng	Department of Water Affairs North West
Masego	Khambule	Department of Water Affairs
Sebastiaan	Jooste	Department of Water Affairs
Dragana	Ristic	Department of Water Affairs
Barbara	Ngoasheng	Department of Water Affairs
Bashan	Govender	Department of Water Affairs
Celiwe	Ntuli	Department of Water Affairs
Peter	Pyke	Department of Water Affairs
Cronje	Rachalet	Department of Water Affairs
Pieter	Viljoen	Department of Water Affairs
Beason	Mwaka	Department of Water Affairs
Petrus	Venter	Department of Water Affairs
Kennedy	Mandaza	Department of Water Affairs
Nadene	Slabbert	Department of Water Affairs

Rens	Botha	Department of Water Affairs
Fred	van Zyl	Department of Water Affairs
Seef	Rademeyer	Department of Water Affairs
Francois	van der Merwe	Department of Water Affairs
Mike	Warren	Department of Water Affairs
Paul	Herbst	Department of Water Affairs
Shane	Naidoo	Department of Water Affairs
Moleseng	Tlaila	Department of Water Affairs
Harry	Pienaar	Department of Water Affairs
Hennie	Smit	Department of Water Affairs
Jurgo	van Wyk	Department of Water Affairs
Ephraim	Matseba	Department of Water Affairs
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Marius	Keet	Department of Water Affairs
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Ethel	Sinthumule	Department of Mineral Resources
Kgauta	Mokoena	Department of Mineral and Resources
Rudzani	Mabogo	Department of Mineral and Resources
Mashudu	Maduka	Department of Mineral and Resources
Mmadikeledi	Malebe	Department of Mineral and Resources
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Fortress	Netili	Council for Geo Science
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Lunelle	Serobatse	City of Johannesburg
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Dumisane	Sibeko	City of Johannesburg
Daniel	Masemola	City of Johannesburg
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Lebo	Molefe	City of Johannesburg
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Johan	duToit	Central Rand Gold
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Peet	Kruger	Beeld
Pieter	du Toit	Beeld
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Harry	Pretorius	Basic Bedrock-Strata (PTY) LTD
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Malcom	Sutton	Anglo Gold Ashanti- Ergo
Charl	Human	Anglo Gold Ashanti
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Dirk	Hanekom	Agri-SA
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Ashley	Rutheford	
R	Lavers	
Charl	van der Merwe	
Paul	Hoogendyk	
Eugene	Viljoen	
Eugene	Viljoen	
Tony	Jamison	
Anthony	Turton	
I	Jardin	
Albie	van Rooy	
Elisabeth	Olivier	
Jan	Ratsoma	
Rob	Taylor	
D	Klonaris	
Sipho	Zondo	
Peter	Wood	
Philip	de Jager	
Lynn	Steenkanmp	

P	van der Walt	
Sam	Khoza	
Robert	Gassmann	
Brian	Johnson	
Tracy	Havinga	
Michael	Harris	
Andre	du Plessis	
Ronny	Newby	
Helene	Gassmann	
Ricky	Reynolds	
Mary	Reynolds	
Bill	Adams	
Ann	de Jager	
Sebastiaan	Buiseman	
Michelle	Nel	
Pieter	Delport	
Louis	Trichardt	
Ramesh	Sheodin	
Jacqui	Mcknight	
Jonathan	Shaw	
M	Schemker	
Judy	Fuchs	
Margaret	Maome	
Mark	Biggars	
GS	Barkhuizen	
G	Barkhuizen	
Colin	Coreejes	
Ria	Jacobs	
Mariana	Delport	
Steyn	Liebenberg	
Mark	Helfrich	
Carel	Botes	
Lynne	Skead	

Lindsey	Smith	
D	Madumo	
Simon	Makola	
Sipho	Myeni	
Sibongile	Sithole	
Vanessa	Vermaak	
Matthew	Havinga	
Thabo	Sibuyi	
Elizbi	van der Westhuizen	
Elize	Strydom	
Nico	Strydom	
Elmar	Pittendugh	
	Klempter	
Jana	van de Linde	
Cindy	Fourie	
P	van der Merwe	
P	Schutte	
Louwtjie	van de Linde	
Emily	Chidi	
Shadrack	Funde	
Vassie	Maharaj	
Thapelo	Motlogela	
Romeo	Appies	
Polla	Wolvaardt	
Palesa	Diale	
Louis	Du Preez	
Kate	Tissington	
Julius	Kleynhans	
Johan	Fourie	
Hilda	Fourie	
Henry	Badenhorst	
Grant	Cawthorn	
Fumani	Mthembi	

Chris	Sutton	
Elaine	Appies	
Corne	van der Westhuizen	
Chazanne	Allison	
C	Grobler	
Campbell	Mac Eachern	
Brain	Meadows	
Basie	van der Walt	

Appendix G: EIA Application Form

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEAT/
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010; and
(2) National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 718 of 2009.

PROJECT TITLE

Immediate and Short term intervention for Acid Mine Drainage (AMD) in the Witwatersrand Goldfield of South Africa

PART A: INFORMATION AND APPLICATION PROCESS

1. DEFINITIONS

Definitions in this form are as per the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the Environmental Impact Assessment ("EIA") Regulations, 2010, the National Environmental Management: Waste Act, 1998 (Act No. 59 of 2008) ("NEMWA") and the Schedule contained in Government Notice 718, published on 3 July 2009 in terms of section 19 of NEMWA.

2. APPLICABILITY OF INTEGRATED ENVIRONMENTAL AUTHORISATION PROCESS

The integrated environmental authorisation process only apply in instances where the **Minister** is both the-

(a) competent authority for the environmental authorisation applied for in terms of NEMA and the EIA Regulations, 2010; and
(b) the licencing authority for the waste management licence in terms of NEMWA.

Kindly refer to paragraph 3.2 of this part of the application to determine in which instances the Minister would be the competent authority in terms of NEMA and the licencing authority in terms of NEMWA.

3. APPLICATION PROCESS EXPLAINED:

3.1 Integrated environmental authorisation process:

3.1.1 The environmental authorisation process prescribed for listed activities under Listing Notices 1, 2 and 3 published in Government *Gazette* Numbers R544, R545 and R546 respectively and the waste licensing process for listed activities contained in the Schedule in Government Notice 718, 2009 published in terms of section 19 of NEMWA are as defined in the Environmental Impact Assessment (EIA) Regulations made under section 24(5) of the National Environmental Management Act, 2008 (Act No. 107 of 1998) ("NEMA").

3.1.2 This integrated application form is the official form in terms of regulation 12(2)(a) of the EIA Regulations, 2010 and must accompany every integrated environmental authorization application pertaining to-

- listed activities in terms of NEMA; and
- waste activities in terms of NEMWA.

3.2 Competent Authority (Where to submit applications)

3.2.1 The Minister of Water and Environmental Affairs is the-

- competent authority in respect of the activities listed in Listing Notices 1, 2 and 3, published in Government *Gazette* numbers R544, R545, and R546 respectively, in terms of NEMA if the activity-
  - (a) has implications for international environmental commitments or relations;
  - (b) will take place within an area protected by means of an international environmental instrument, other than-
    - (i) any area falling within the sea-shore or within 150 meters seawards from the high-water mark, whichever is the greater;
    - (ii) a conservancy;
    - (iii) a protected natural environment;
    - (iv) a proclaimed private nature reserve;
    - (v) a natural heritage site; and
    - (vi) the buffer zone or transitional area of a world heritage site;
  - (c) has a development footprint that falls within the boundaries of more than one province or traverses international boundaries;
  - (d) Is undertaken, or is to be undertaken by-
    - (i) A national department;
    - (ii) A provincial department responsible for environmental affairs or any other organ of state performing a regulatory function and reporting to the MEC; or
    - (iii) A statutory body, excluding any municipality, performing an exclusive competence of the national sphere of government; or
  - (e) Will take place within a national proclaimed protected area or other conservation area under control of a national authority.
- licencing authority in respect of all activities listed in both categories of the Schedule contained in Government Notice 718, 2009 published in terms of section 19 of NEMWA where –
  - (a) Unless otherwise indicated by the Minister by notice in the *Gazette,* the waste management activity involves the establishment, operation, cessation or

decommissioning of a facility at which hazardous waste has been or is to be stored, treated or disposed of;

(b) The waste management activity involves obligations in terms of an international obligation, including the importation or exportation of hazardous waste;
(c) The waste management activity is to be undertaken by-
    (i) A national department;
    (ii) A provincial department responsible for environmental affairs; or
    (iii) A statutory body, excluding any municipality, performing an exclusive competence of the national sphere of government;
(d) The waste management activity will affect more than one province or traverse international boundaries; or
(e) Two or more waste management activities are to be undertaken at the same facility and the Minister is the licencing authority for any of those activities.

However, despite the above-mentioned legislative provisions, the Minister and an MEC may agree that an application for a waste management activity or an environmental authorisation in respect of the above-mentioned activities, where the Minister is the competent/licencing authority, may be dealt with by the relevant MEC within whose province the activity(ies) will take place. Similarly the Minister and the MEC may agree that an application for an environmental authorisation or a waste management activity where the MEC has been identified as the competent/licencing authority, may be dealt with by the Minister. [Section 24C(3) of NEMA and section 43(3) of NEMWA)]

The integrated application for environmental authorisation must be submitted by lodging an application with the National Department of Environmental Affairs. The application must be marked for the attention of:

The Director: Environmental Impact Evaluation
Private Bag X447
Pretoria 0001
Tel: 012 310 3230

3.3 Making an Application

3.3.1 This application form is current as of 1 September 2010. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority. It is the applicant's responsibility to download the current version of the application form from the website of the Department at **http://www.deat.gov.za**.

3.3.2 The application must be typed within the spaces provided in the form. The sizes of the spaces provided are not necessarily indicative of the amount of information to be provided. Spaces are provided in tabular format and will extend automatically when each space is filled with typing.

3.3.3 The applicant must clearly mark confidential sections of the information submitted in the application form and supporting documents. Unless protected by law, all information filled in on this application will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this application on request, during any stage of the application process.

3.3.4 The applicant must fill in all relevant sections of this form. Incomplete applications will not be processed. The applicant will be notified of the missing information in the acknowledgement letter that will be sent within 14 days of receipt of the application.

3.3.5 Incomplete applications may be returned to the applicant for revision.

3.3.6 Sections in the form that do not apply to the applicant must be marked "not applicable". However, the use of the phrase "not applicable" in the form must be done with circumspection. Should it be done in respect of material information required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the Regulations.

3.3.7 Where applicable **black out** the boxes that are not applicable in the form.

3.3.8 This application form (together with four hard copies of this application form), must be handed in at the offices of the relevant competent authority as determined by the relevant Acts and Regulations and as indicated in this application form. All application forms must be signed as stipulated in the form. Applications that are not signed or completed accordingly will not be considered.

3.3.9 No faxed or e-mailed applications will be accepted.

3.3.10 There is currently no prescribed fee.

3.4 Appointment of an EAP

- The applicant must appoint an EAP in terms of EIA Regulations, 2010;
- The EAP must comply with general requirements as given in EIA regulations, 2010; and
- The EAP may be disqualified in terms of EIA Regulations, 2010.

3.5 Criteria for determining whether basic assessment or scoping is to be applied to applications

3.5.1 NEMA activities

(a) Basic assessment must be applied to an application if the authorisation applied for is in respect of an activity listed in Listing Notices 1 and/or 3 published in Government *Gazette* Numbers R544 and R546, 2010 respectively and which must follows the process described in sections 21-25 of the EIA Regulations, 2010; and

(b) Scoping and Environmental Impact Reporting Process ("S&EIR") must be applied to an application if the authorisation applied for is in respect of an activity listed in Listing Notice 2 published in Government Gazette Number R545, 2010 and which must follows the process described in sections 26-35 of the EIA Regulations, 2010.

3.5.2 NEMWA activities

(a) Basic assessment, in terms of sections 21-25 of the EIA Regulations, 2010, must be applied to an application if the authorisation applied for is in respect of an activity listed in Category A of the Schedule contained in Government Notice 718, published on 3 July 2009, in terms of section 19 of NEMWA; and

(b) S&EIR, in terms of sections 26-35 of the EIA Regulations, 2010, must be applied to an application if the authorisation applied for is in respect of an activity Category B of the Schedule contained in Government Notice 718, published on 3 July 2009, in terms of section 19 of NEMWA.

3.5.3 Combination of NEMA and NEMWA activities

Should any of the NEMA or NEMWA activities applied for require the application of the S&EIR process, the S&EIR process will be applied to this application for integrated environmental authorisation.

Queries must be addressed to the contact hereunder:

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Director: Environmental Impact Evaluation
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Fedsure Forum Building (corner of Pretorius and Van der Walt Streets)
2nd Floor North Tower
315 Pretorius Street
Pretoria
0002

Queries should be directed to the Directorate: Environmental Impact Evaluation at:
Tel: 012-310-3290
Fax: 012-320-7539

PART B: GENERAL

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1. DESCRIPTION OF PROJECT

Cabinet appointed an Inter-Ministerial Committee (IMC) in 2010 to address the serious challenges posed by Acid Mine Drainage (AMD) in the Witwatersrand Goldfields area. The IMC tasked a Technical Committee, co-chaired by the Director Generals of the Department of Mineral Resources (DMR) and the Department of Water Affairs (DWA), to investigate the AMD issue. The IMC Report indicated that the treatment of AMD in the Western-, Central- and Eastern Gold Mining Basins of South Africa is urgently required to prevent and mitigate the AMD decant from the mining basins. The entire project will entail the following:

- Installation of pumps to extract AMD from mines to onsite treatment plans;
- Construction of onsite water treatment plants in the Western-, Central- and Eastern Basin, with the option of upgrading and refurbishing the existing treatment facilities owned by the mines;
- Installation of infrastructure to convey treated water to discharge into nearby water course; and
- Disposal of sludge into existing tailings facilities.

This project is considered to be of national importance and the AMD situation was classified as an emergency situation. The Minister of Water and Environmental Affairs Directed the Trans-Caledon Tunnel Authority (TCTA) on 4 April 2011 to implement this emergency intervention.

Purpose of application:

To acquire all the necessary authorisations required to construct, implement and operate the required equipment to abstract, treat, discharge and dispose of acid mine water in in the Western-, Central- and Eastern Gold Mining Basins of South Africa.

Please note: An initial application for the integrated environmental authorisation and waste management licence in terms of NEMA and NEMWA for the "Short term solution for Acid Mine Drainage (AMD) in the Witwatersrand Goldfield of South Africa" was submitted in August 2011. This application serves to amend the initial EIA application, due to the fact that the original application excluded the immediate intervention in the Western Basin. This application, therefore, includes all listed activities and waste aspects for the Immediate and Short term interventions for Acid Mine Drainage (AMD) in the Witwatersrand Goldfield of South Africa. After consultation with DEA head office (Fatima Rawjee), it was confirmed that the existing reference numbers (DEA/EIA/0000498/2011 & 12/12/20/2403) are still applicable and will be used for this project.

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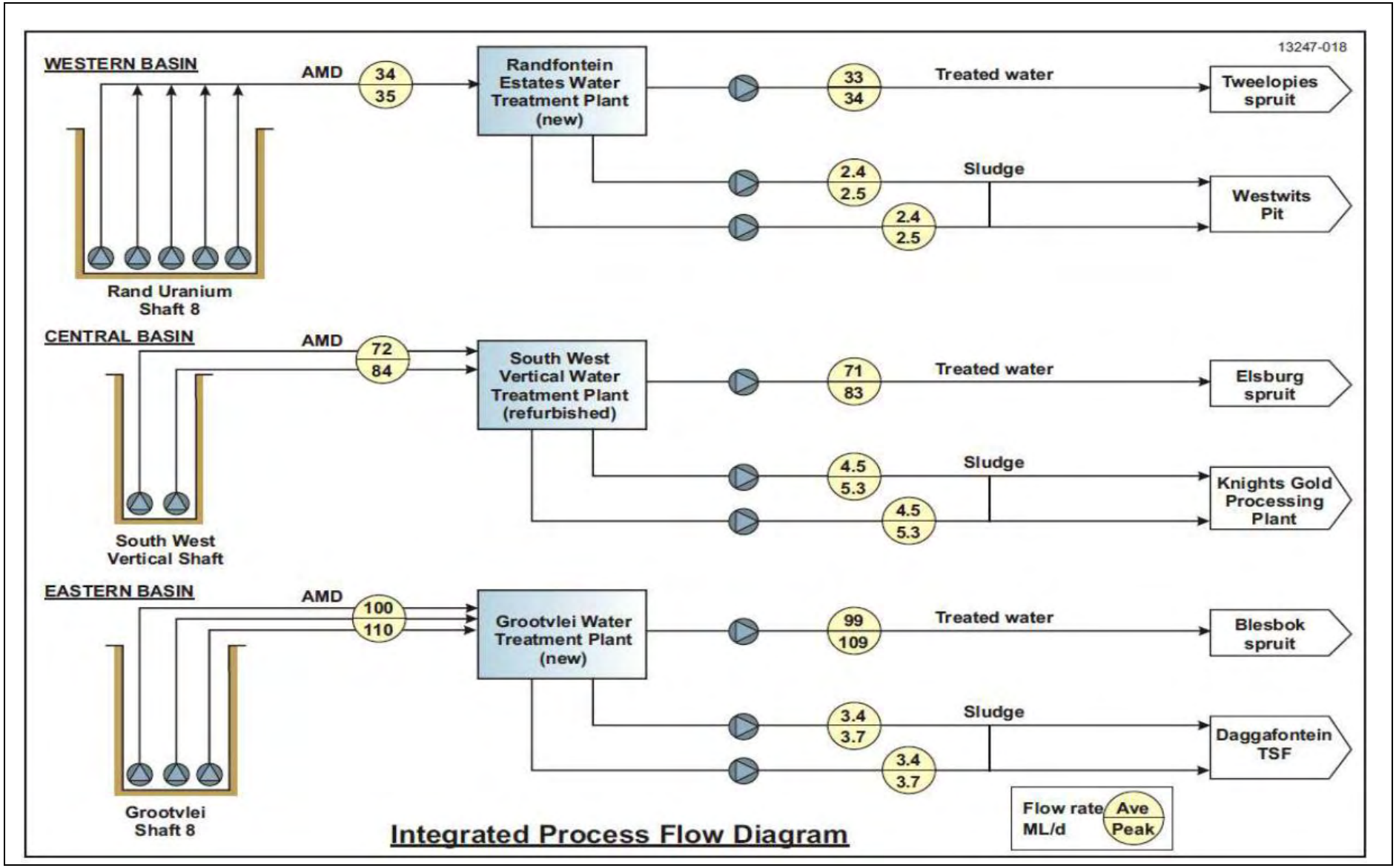
2. FLOW CHART OF OPERATIONS

Please provide a brief description of the activities and operations at the site. Provide a flow chart of the operation showing all inputs and outputs of the process. Give particulars of the source, location, nature, composition and quantity of emission to the atmosphere, surface water, sewer, and ground-water including noise emissions. Solid waste must be in tons and specify units for liquids and gases.

A generic process design, based on the High Density Sludge (HDS) process, was completed for the Western, Central and Eastern Basins. Although the water treatment plant is the essence of the process design, the integrated process includes (1) AMD abstraction, (2) conveyance to the treatment plant, (3) sludge or waste discharge and (4) the discharge of treated water. This integrated scheme for each basin is schematically illustrated in the Integrated Process Flow Diagram in the following figure. More information on the designs, operations, activities and processes at the proposed project sites will be provided in the Scoping Report.


13247-018
WESTERN BASIN
AMD
34
35
Randfontein Estates Water Treatment Plant (new)
33
34
Treated water
Tweelopies spruit
2.4
2.5
Sludge
Westwits Pit
2.4
2.5
Rand Uranium Shaft 8
CENTRAL BASIN
AMD
72
84
South West Vertical Water Treatment Plant (refurbished)
71
83
Treated water
Elsburg spruit
4.5
5.3
Sludge
Knights Gold Processing Plant
4.5
5.3
South West Vertical Shaft
EASTERN BASIN
AMD
100
110
Grootvlei Water Treatment Plant (new)
99
109
Treated water
Blesbok spruit
3.4
3.7
Sludge
Daggafontein TSF
3.4
3.7
Grootvlei Shaft 8
Flow rate ML/d
Ave
Peak
Integrated Process Flow Diagram

3. BACKGROUND INFORMATION

Project applicant:	TCTA
Trading name:	Trans-Caledon Tunnel Authority
Contact person:	Nigel Rossouw
Physical address:	265 West Rd Centurion
Postal address:	PO Box 10335, Centurion
Postal code:	0046
Telephone:	(012) 683 1239
E-mail:	nrossouw@tcta.co.za

The following local and district municipalities are applicable to this application:

1.Ekurhuleni Metropolitan Municipality
2.City of Johannesburg Metropolitan Municipality
3.West Rand District Municipality
4.Mogale City Local Municipality
5.Randfontein Local Municipality

The details for the ownership and authority applicable to the Central, Western and Eastern Basins are listed in the following tables.

CENTRAL BASIN (GERMISTON)					
Landowner:	DRD Gold				
Contact person:	Mr Henry Gouws				
Postal address:	PO Box 390 Maraisburg South Africa				
Postal code:	1700	Cell:			
Telephone:	011 470 2600	Fax:	011 470 2618		
E-mail:	henry.gouws@za.drdgold.com				
	In instances where there is more than one landowner, please attach a list of landowners with their contact details to this application. Ownership of the property (mark only one with an X)				
	Property owned by applicant (100% Share value)		**Property leased by applicant**		
	Property owned by applicant (Share value less than 100%)	**X**	**The property is communal land**		
Local authority in whose jurisdiction the proposed activity will fall:	Ekurhuleni Metropolitan Municipality				
Nearest town or districts:	Germiston and Alberton				
Contact person:	Mr Khaya Ngema				
Postal address:	Private Bag X1069, GERMISTON,				
Postal code:	1400	Cell:			
Telephone:	011 999 0863				
E-mail:	khaya.ngema@ekurhuleni.gov.za				
	In instances where there is more than one local authority involved, please attach a list of local authorities with their contact details to this application.				

<table>
<tr><th colspan="5">WESTERN BASIN (RANDFONTEIN)</th></tr>
<tr><td>Landowner:</td><td colspan="4">Rand Uranium</td></tr>
<tr><td>Contact person:</td><td colspan="4">Mr Sarel Keller</td></tr>
<tr><td>Postal address:</td><td colspan="4">Private Bag X9, Randfontein</td></tr>
<tr><td>Postal code:</td><td>1760</td><td>Cell:</td><td colspan="2">083 516 5356</td></tr>
<tr><td>Telephone:</td><td>011 278 0007</td><td>Fax:</td><td colspan="2">011 278 0031</td></tr>
<tr><td>E-mail:</td><td>Sarel.Keller@Randuranium.co.za</td><td></td><td colspan="2"></td></tr>
<tr><td></td><td colspan="4">In instances where there is more than one landowner, please attach a list of landowners with their contact details to this application. Ownership of the property
<table>
<tr><td>Property owned by applicant (100% Share value)</td><td></td><td>Property leased by applicant</td><td></td></tr>
<tr><td>Property owned by applicant (Share value less than 100%)</td><td>X</td><td>The property is communal land</td><td></td></tr>
</table></td></tr>
<tr><td>Local authority in whose jurisdiction the proposed activity will fall:</td><td colspan="4">Randfontein Local Municipality</td></tr>
<tr><td>Nearest town or districts:</td><td colspan="4">Mogale City</td></tr>
<tr><td>Contact person:</td><td colspan="4">Advocate Nthabiseng Mogale</td></tr>
<tr><td>Postal address:</td><td colspan="4">PO Box 218</td></tr>
<tr><td>Postal code:</td><td>1760</td><td>Cell:</td><td colspan="2"></td></tr>
<tr><td>Telephone:</td><td>011 411 0051/2</td><td>Fax:</td><td colspan="2">011 693 3865</td></tr>
<tr><td>E-mail:</td><td colspan="4">lana.olivier@randfontein.gov.za</td></tr>
</table>

EASTERN BASIN (SPRINGS)					
Landowner:	Icon Insolvency (Liquidators for Aurora-Grootvlei Mine)				
Contact person:	Johan Engelbrecht				
Postal address	P.O. Box 92333 Mooikloof				
Postal code:	0059	Cell:	082 377 5016		
Telephone:	011 278 0007	Fax:			
E-mail:	johan@iconinsolvency.co.za				
	In instances where there is more than one landowner, please attach a list of landowners with their contact details to this application. Ownership of the property (mark only one with an X)				
	Property owned by applicant (100% Share value)		**Property leased by applicant**		
	Property owned by applicant (Share value less than 100%)	**X**	**The property is communal land**		
Local authority in whose jurisdiction the proposed activity will fall:	Ekurhuleni Metropolitan Municipality				
Nearest town or districts:	Nigel				
Contact person:	Khaya Ngema				
Postal address:	Private Bag X1069, GERMISTON,				
Postal code:	1400	Cell:			
Telephone:	011 999 0863	Fax:	011 693 3865		
E-mail:	khaya.ngema@ekurhuleni.gov.za				

Property description/physical address:	There are four Basins in the Witwatersrand Goldfield namely the Eastern Basin, Central Basin, Western Basin and Far Western Basin stretching from Springs (Eastern Basin), Germiston, Johannesburg, Roodepoort, (Central Basin), Krugersdorp and Randfontein (Western Basin) and Westonaria and Carletonville (Far Western Basin). This project will be focussed on three of the four basins, namely Western, Central and Eastern Basins. These properties cover vast geographical areas. More details on the project locations will be provided in the Scoping Report.

(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.

In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.

1. Ekurhuleni Metropolitan Municipality
2. City of Johannesburg Metropolitan Municipality
3. West Rand District Municipality
4. Mogale City Local Municipality
5. Randfontein Local Municipality

Current land-use where the site is situated**:**

Industrial		Recreation	
Agriculture		Commercial	
Residential		Mining & quarrying	x
Forestry		Wilderness areas	
Wetlands		Nature area	
Open spaces			

Current land-use zoning:	Industrial Mining

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to , to this application.

Is a change of land-use or a consent use application required?	**YES**	
Must a building plan be submitted to the local authority?		**NO**

Locality map: An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

4. SITE IDENTIFICATION AND LINKAGE, LOCATION AND LANDUSE

4.1 Please indicate all the Surveyor-general 21 digit site (erf/farm/portion) reference numbers for all sites (including portions of sites) that are part of the application. – These will be supplied in the scoping report

1	**2**				**3**				**4**							**5**			

LEGEND:

1. Refers to the Surveyor's-General Office
2. Major Code (Registration Division)
3. Minor code
4. Property No (i.e. Farm No./Erf No./Holding Area No./Sheme No.)
5. Portion Number

(if there are more that 6, please attach a list with the rest of the numbers)
(These numbers will be used to link various different applications, authorisations, permits etc. that may be connected to a specific site)

4.2 If the property type is not surveyed, complete the following:

Full name of leader of village, community or tribal authority	
Local Authority	1. Ekurhuleni Metropolitan Municipality 2. City of Johannesburg Metropolitan Municipality 3. West Rand District Municipality 4. Mogale City Local Municipality 5. Randfontein Local Municipality
Magisterial District	
Tribal Authority/Council	

PART C: LISTED ACTIVITIES APPLIED FOR IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE ENVIRONMENTAL IMPACT REGULATIONS, 2010

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1. ACTIVITIES APPLIED FOR TO BE AUTHORISED

For an application for authorisation that involves more than one listed or specified activity that, together, make up one development proposal, all the listed activities pertaining to this application must be indicated.

INDICATE THE NUMBER AND DATE OF THE RELEVANT NOTICE:	ACTIVITY NO (S) (IN TERMS OF THE RELEVANT OR NOTICE) :	DESCRIBE EACH LISTED ACTIVITY AS PER THE DETAILED PROJECT DESCRIPTION (AND NOT AS PER WORDING OF THE RELEVANT GOVERNMENT NOTICE):
Listed Activity Checklist in terms of the National Environmental Management Act, Environmental Impact Assessment Regulations, GN R543 ("NEMA EIA Regulations")		
Listing Notice 1: List of Activities Identified in Terms of Sections 24(2) and 24D for which a Basic Assessment Process is required.	9	Pipelines will be constructed for abstraction and discharge
	11	The discharge points will require construction within a watercourse or within 32 metres of a watercourse.
	13	Quick Lime will be stored on site
	18	Excavation of pipeline crossings and culverts for pipeline associated with sludge disposal
	23	Area for Western Basin will be transformed and will be 5 hectares or more, but less than 20 hectares
	28	Expansion of the Rand Uranium Treatment Works for the immediate invention
	37	Pipelines for the Rand Uranium Treatment plant (Immediate Intervention) will be upgraded, and will exceed 1 000 metres in length.
	39	Upgrade of the canal for the Western Basin will be done.
Listing Notice 2: List of Activities Identified in Terms of Sections 24(2) and 24D for which Scoping and an Environmental Impact Assessment is Required.	3	Quick lime to be stored on site, which will occur in containers with a combined capacity of more than 500 cubic metres.
	5	The construction of water treatment works as well as the disposal of sludge and discharge of treated water will require licensing.
	10	The construction of facilities of infrastructure will be required for the transfer of 50 000 cubic metres or more water per day

Please note that any authorisation that may result from this application will only cover activities specifically applied for.

2. TYPE OF APPLICATION REQUIRED FOR ABOVE-MENTIONED ACTIVITIES

2.1 Application for Basic Assessment

Is this an application for conducting a basic assessment (as defined in the Regulations)?		**NO**

Please indicate when the basic assessment report will be submitted:

N/A

2.2 Application for Scoping and Environmental Impact Reporting (S&EIR) assessment

Is this an application for S&EIR (as defined in the Regulations)?	**YES**	

Please indicate when the S&EIR Report (including the Plan of Study for EIA) will be submitted:

The schedule and plan of study for the EIA will be detailed in the Scoping Report.

The S&EIR report will be submitted after consultation with the competent authority:	**YES**	

PART D: ACTIVITIES APPLIED FOR IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 AND THE ENVIRONMENTAL IMPACT REGULATIONS, 2010

SECTION 1: TYPE OF APPLICATION AND FACILITY:

1.1 Indicate the type of facility/operation and fill in the required sections only

TYPE OF ACTIVITY	MARK	SECTIONS OF THE FORM TO BE FILLED IN
Storage and or transfer Facility	X	All except Section 5
Treatment facility	X	All except Section 5

1.2 Activities applied for:

An application may be made for more than one listed or specified activity that, together, make up one development proposal. All the listed activities that make up this application must be listed.

INDICATE THE NO. & DATE OF THE RELEVANT NOTICE:	ACTIVITY NUMBERS (AS LISTED IN WASTE MANAGEMENT ACTIVITY LIST) :	DESCRIBE EACH LISTED ACTIVITY (and not as per the wording of the relevant Government Notice):
Listed Activity Checklist in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 718 of 2009.		
Category A - Construction, expansion or decommissioning of facilities and associated structures and infrastructure	19	Expansion of the Rand Uranium Treatment Works for the immediate invention
Category B - Storage of hazardous waste	1	The storage of the sludge in the CPS pit (Western Basin)
	6	The sludge generated from the treatment plants will be temporarily stored in lagoons (Eastern, Central and Western Basins)
	7	The treatment of AMD by treatment plants at all three basins will exceed 15 000 cubic metres or more.
	9	The disposal of sludge on existing tailings facilities (Eastern, Central and Western Basins)

NB: Authorisation issued will only cover activities applied for and listed above. Activities added in the middle or after the processing of this authorisation may mean a totally new application.

1.3 TYPE OF APPLICATION REQUIRED FOR ABOVE-MENTIONED ACTIVITIES

1.3.1 Application for Basic Assessment

Is this an application for conducting a basic assessment (as defined in the Regulations)?		**NO**

Please indicate when the basic assessment report will be submitted:

N/A

1.3.2 Application for Scoping and Environmental Impact Reporting (S&EIR) assessment

Is this an application for S&EIR (as defined in the EIA Regulations, 2010) reporting?	**YES**	

Please indicate when the S&EIR Report (including the Plan of Study for EIA) will be submitted:

The schedule and plan of study for the EIA will be detailed in the Scoping Report.

The scoping report will be submitted after consultation with the competent authority:	**YES**	

1.4 Size of Site and Classification

Size of facility for a waste management activity	To be confirmed in Scoping Report
Area where the waste management activity takes place	Existing tailings facility in proximity to the water treatment plants will be considered during the EIA stage.
Classification of facility in terms of climatic water balance	N/A
Classification of Facility in terms of the type and the quantity of waste received	N/A

1.5 Operational times

PERIOD	FROM	UNTIL
Weekdays	**00h00**	**24h00**
Saturdays	**00h00**	**24h00**
Sunday	**00h00**	**24h00**
Public holidays	**00h00**	**24h00**

SECTION 2: WASTE QUANTITIES

2.1 Indicate or specify types of waste and list the estimated quantities expected to be managed daily (should you need more columns, you are advised to add more)

Hazardous waste	Non hazardous waste	Total waste handled (tonnes per day)
To be confirmed in Assessment	To be confirmed in Assessment	1 Megalitres (Ml)/day sludge solids per 30Ml of AMD abstracted to existing tailings facilities
To be confirmed in Assessment	To be confirmed in Assessment	30 Ml/day liquid per 30Ml of AMD water abstracted and discharged into river

Source of information supplied in the table above Mark with an "X"

Determined from volumes	
Determined with weighbridge/scale	
Estimated	X

2.2 Recovery, Reuse, Recycling, treatment and disposal quantities:

Indicate the applicable waste types and quantities expected to be disposed of and salvaged annually:

TYPES OF WASTE	MAIN SOURCE (NAME OF COMPANY)	QUANTITIES		ON-SITE RECOVERY REUSE RECYCLING TREATMENT OR DISPOSAL	OFFSITE RECOVERY REUSE RECYCLING TREATMENT OR DISPOSAL	OFFSITE DISPOSAL
		TONS/MONTH	M^3/MONTH	method & location	method location and contractor details	
AMD	Underground Mine Water		6,870,000	Lime Neutralisation Method; Mine Water Treatment Plant	Sludge to existing mine tailings And Treated effluent into river	None

SECTION 3: GENERAL

3.1 Prevailing wind direction (e.g. NWW)

The predominant wind direction for the sites is: North – North North West

November – April	N/A
May - October	N/A

3.2 The size of population to be served by the facility

	Mark with "X"	Comment
0-499		
500-9,999		
10,000-199,999		
200,000 upwards	**X**	**All water users in the basins (across Provinces)**

3.3 The geological formations underlying the site:

Granite		Quartzite	X
Shale	X	Dolomite	X
Sandstone		Dolerite	

A brief description of the regional geology of the Western, Central and Eastern Basins are provided below. More details of the geological composition of the underlying formations of each site will be provided in the Scoping Report.

Western Basin:

The lithology and stratigraphy of the surface and near-surface geology comprise the Transvaal and Karoo supergroups. These rocks overlie the older Ventersdorp Lava (Klipriviersberg Group) and the gold-bearing conglomerates of the Witwatersrand Supergroup. According to Parsons (1985), the Chuniespoort dolomite attains a thickness of up to a 1,000 m. Large portions of the surface are covered by the Rooihoogte Formation, comprising the Bevets Conglomerate, shale and quartzite. Pebble and boulder beds belonging to the Dwyka Formation, Karoo Supergroup, overlie parts of the Transvaal rocks.

Central Basin:

Mining at ERPM focused on conglomeratic reefs (South Reef, Main Reef Leader and Main Reef) in the Upper Areas and on the Composite Reef in the Far East Vertical Shaft area. The principal auriferous conglomerates of the central rand are well developed in the west, where they are characterised by partings of about 1 m between the Main Reef and Main Reef Leader, and 30 m between the Main Reef Leader and the South Reef. Towards the east, the reefs merge progressively and at ERPM, the lower two reefs are completely cut out by the South Reef.

Eastern Basin:

Geologically, the eastern basin is an extension of the central basin and contains all the same units. The conglomerate reefs mined in the eastern basin include the Kimberley, Black, C, MK and Main Reefs, all of which were mined for their gold content, although the Kimberley Reefs also contain uranium. The geology of the area is simple with flat-lying sedimentary rocks of Karoo and Transvaal age, overlying older formations of gold-bearing Witwatersrand

SECTION 4: COMPETENCE TO OPERATE SITE

It is imperative that the holder of the waste management licence is a fit person in terms of section 59 of the NEMWA (59 of 2008). To assess the holder's competence to operate the site, please disclose the following:

4.1 Legal compliance

	YES/NO	DETAILS
Has the applicant ever been found guilty or issued with a non compliance notice in terms of any national environmental management legislation?	No	
Has the applicant's licence in terms of the Waste Act 2008 ever been revoked?	No	
Has the applicant ever been issued with a non compliance notice or letter in terms of any South African Law?	No	

***NB**: Details required above include any information that the applicant wants the Department to take into consideration in determining whether they are a "fit person" and this includes reasons why the offence happened and measures in place to prevent recurrence*

4.2 Technical competence

What technical skills are required to operate the site?	1. **Site Manager;** 2. **Resident Engineer;** 3. **Environmental Control Officer;** 4. **Administrator;** 5. **Equipment and Machinery operators;** 6. **General workers;** 7. **Security;** 8. **Cleaners; and** 9. **Drivers.**
How will the applicant ensure and maintain technical competency in the operation of the site?	**By employing a qualified site manager and auxiliary staff with the relevant skills and experience in:** 1. **The operation of a limestone neutralisation plant;** 2. **The effective implementation of an Environmental Monitoring Plan; and** 3. **The effective implementation a Rehabilitation Plan.**

4.3 Details of applicant's experience and qualification along with that of relevant employees must be summarised as shown in the table below:

NAME	POSITION	DUTIES AND RESPONSIBILITIES	QUALIFICATIONS AND EXPERIENCE
TCTA	To be confirmed	To be confirmed	To be confirmed

4.4 Financial Provisions

Provide a plan of estimated expenditure for the following:

	ATTACHED/NOT ATTACHED	SECTION OF THE REPORT WHERE IT IS ATTACHED
Environmental Monitoring	**Not attached**	To be included in the assessment report
Provision and replacement of infrastructure	**Not attached**	To be included in the assessment report
Restoration and aftercare	**Not attached**	To be included in the assessment report

SECTION 5: LANDFILL PARAMETERS

Please note: This section is not applicable to this application.

5.1 The method of disposal of waste:

Land-building ☐ Land-filling ☐ Both ☐

The dimensions of the disposal site in metres

	At commencement	After rehabilitation
Height/Depth		
Length		
Breadth		

5.2 The total volume available for the disposal of waste on the site:

Volume Available	Mark with "X"	Source of information (Determined by surveyor/ Estimated)
Up to 99		
100-34 999		
35 000- 3,5 million		
>3,5 million		

5.3 The total volume already used for waste disposal:

(a) Will the waste body be covered daily

(b) Is sufficient cover material available

(c) Will waste be compacted daily

If the answers (a) and/or (b) are No, what measures will be employed to prevent the problems of burning or smouldering of waste and the generation of nuisance?

N/A

5.4 The Salvage method

Mark with an "X" the method to be used.

At source

Recycling installation

Formal salvaging

Contractor

No salvaging planned

5.5 Fatal Flaws for the site:

Indicate which of the following apply to the facility for a waste management activity:

Within a 3000m radius of the end of an airport landing strip		
Within the 1 in 50 year flood line of any watercourse		
Within an unstable area(fault zone, seismic zone, dolomitic area, sinkholes)		
Within the drainage area or within 5 km of water source		
Within an area with shallow and/or visible water table		
Within an area adjacent to or above an aquifer		
Within an area with shallow bedrock and limited available cover material		
Within 100 m of the source of surface water		
Within 1km from the wetland		
Indicate the distance to the boundary of the nearest residential area		
Indicate the distance to the boundary of the industrial area		

5.6 Wettest six months of the year

November- April	
May -October	

5.7 For the wettest six month period indicated above, indicate the following for the preceding 30 years

	Total rainfall for 6 months	**Total A-pan evaporation for 6 months**	**Climatic water balance**
For the 1st wettest year			
For the 2nd wettest year			
For the 3rd wettest year			
For the 4th wettest year			
For the 5th wettest year			
For the 6th wettest year			
For the 7th wettest year			
For the 8th wettest year			
For the 9th wettest year			
For the 10th wettest year			

5.8 Location and depth of ground water monitoring boreholes:

Codes of boreholes	Borehole locality	Depth (m)	Latitude	Longitude
.....	.....		° ' "	° ' "
.....	.....		° ' "	° ' "
.....	.....		° ' "	° ' "
.....	.....		° ' "	° ' "
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.....	.....		° ' "	° ' "
.....	.....		° ' "	° ' "

5.9 Location and depth of landfill gas monitoring test pit:

Codes of boreholes	Borehole locality	Latitude	Longitude
.....	.....	° ' "	° ' "
.....	.....	° ' "	° ' "
.....	.....	° ' "	° ' "
.....	.....	° ' "	° ' "
.....	.....	° ' "	° ' "
.....	.....	° ' "	° ' "
.....	.....	° ' "	° ' "

PART E: DECLARATION BY THE APPLICANT

1. The Applicant

I, **Nigel Rossouw** , declare that I -

- am, or represent[1], the applicant in this application;
- have appointed / will appoint (delete that which is not applicable) an environmental assessment practitioner to act as the independent environmental assessment practitioner for this application / will obtain exemption from the requirement to obtain an environmental assessment practitioner[2];
- will provide the environmental assessment practitioner and the competent authority with access to all information at my disposal that is relevant to the application;
- will be responsible for the costs incurred in complying with the Environmental Impact Assessment Regulations, 2010, including but not limited to –
  - costs incurred in connection with the appointment of the environmental assessment practitioner or any person contracted by the environmental assessment practitioner;
  - costs incurred in respect of the undertaking of any process required in terms of the Regulations;
  - costs in respect of any fee prescribed by the Minister or MEC in respect of the Regulations;
  - costs in respect of specialist reviews, if the competent authority decides to recover costs; and
  - the provision of security to ensure compliance with conditions attached to an environmental authorisation, should it be required by the competent authority;
- will ensure that the environmental assessment practitioner is competent to comply with the requirements of these Regulations and will take reasonable steps to verify whether the EAP complies with the Regulations;
- will inform all registered interested and affected parties of any suspension of the application as well as of any decisions taken by the competent authority in this regard;
- am responsible for complying with the conditions of any environmental authorisation issued by the competent authority;
- hereby indemnify the Government of the Republic, the competent authority and all its officers, agents and employees, from any liability arising out of the content of any report, any procedure or any action which the applicant or environmental assessment practitioner is responsible for in terms of these Regulations;
- will not hold the competent authority responsible for any costs that may be incurred by the applicant in proceeding with an activity prior to obtaining an environmental authorisation or prior to an appeal being decided in terms of these Regulations;
- will perform all other obligations as expected from an applicant in terms of the Regulations;
- all the particulars furnished by me in this form are true and correct; and

[1] If this is signed on behalf of the applicant, proof of such authority from the applicant must be attached.

[2] If exemption is obtained from appointing an EAP, the responsibilities of an EAP will automatically apply to the person conducting the environmental impact assessment in terms of the Regulations.

- I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the applicant[3]/ Signature on behalf of the applicant:

TCTA

Name of company (if applicable):

9 December 2011

Date:

[3] If the applicant is a juristic person, a signature on behalf of the applicant is required as well as proof of such authority.

Appendix H: Letter Informing Directly Affected Land Owners

DIGBY WELLS
ENVIRONMENTAL

TO:	Mr Johan Engelbrecht	**FROM:**	Steve Horak
COMPANY:	Icon Insolvency	**DATE:**	12 December 2011
FAX #:	086 613 7780	**TOTAL PAGES:**	4
RE:	**Landowner Notification Letter-Acid Mine Drainage Project**		

Dear Mr Engelbrecht

This letter serves to inform you of Trans Caledon Tunnel Authority's (TCTA) application for Environmental Authorisation for listed activities on the Aurora Mine property. For further information please refer to the attached document. Should you have any queries, please do not hesitate to contact us

Kind Regards

Steve Horak

Public Participation Practitioner

DIGBY WELLS
ENVIRONMENTAL

Date: 12 December 2011

PO Box 92332
Mooikloof
0059

Landowner: Aurora Mine /Icon Insolvency

DEA Reference Number: *12/12/20/2403*

NEAS Reference Number: *DEA/EIA/0000498/2011*

Dear Mr Engelbrecht

Landowner Notification Letter

This letter serves to notify you of Trans-Caledon Tunnel Authority's ("TCTA") intention to apply for environmental authorisation for the refurbishment and development of water treatment plants for the treatment of Acid Mine Drainage ("AMD") in the Witwatersrand Gold Fields, Gauteng Province.

This notice is hereby given in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) ("NEMA") for the authorisation of listed activities contained in GNR 544 of 18 June 2010 ("GNR 544") and GNR 545 of 18 June 2010 ("GNR 545") published in terms of Sections 24(2) and 24D the NEMA,

A waste licence is also required in terms of GNR 718 of 3 July 2009 ("GNR 718") published in terms of section 19(1) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) ("NEM:WA"). An integrated application will, therefore, be made to the Department of Environmental Affairs ("DEA") as provided for in section 24L of the NEMA and section 44 of the NEM:WA.

Project motivation

The underground mining operations within the Witwatersrand Gold Fields have ceased, and with this the dewatering of the mine workings has stopped. This has resulted in the accumulation of water within the voids resulting in the formation of AMD. With time this water will rise to natural pre-mining levels and eventually decant on to the surface at defined low points. In response to concerns about the AMD the TCTA has received a ministerial directive to upgrade and construct water treatment plants which will neutralise AMD within the Western, Central and Eastern Basins. The upgrade (immediate intervention) and construction of the proposed water treatment plants will entail undertaking the following activities; abstraction of water from affected mine shafts; treatment of the water; sludge removal and disposal; and discharge of neutralised water into the receiving environment.

The long term solution to AMD in all the basins is currently under investigation by the Department of Water Affairs. The long-term solution does not form part of this EIA application and process.

Western Basin

The site of the proposed Western Basin AMD water treatment plant is situated on the Rand Uranium Property about 5km south-west of Krugersdorp and is accessible from the R28 Main Reef Road. This is an existing water treatment plant which will be upgraded as part of the immediate intervention to treat the AMD which is already decanting in the western basin. The short term intervention will be to develop a new water treatment plant on the Randfontein Estates property adjacent to the Rand Uranium property.

Central Basin

The proposed Central Basin AMD treatment plant is to be constructed about 1,8km east of the Germiston CBD on the western portion of the ERPM South West Vertical Shaft. The site is bounded on the north by Lower Boksburg Road, on the west and south by Brammer Street and Power Street, and on the east by a Transnet railway line. The construction forms part of the short term intervention to treat AMD.

Eastern Basin

The proposed Eastern Basin AMD water treatment plant will be constructed at the Grootvlei Mine Shaft No. 3 about 4,6km due east of the Springs CBD. The site is accessible via the R29 Ermelo Road and Grootvaly Road through the suburb of Casseldale. The construction forms part of the short term intervention to treat AMD.

Listed activities

Authorisation for the following listed activities will be applied for: Listed activities 9, 11, 13, 18, 23, 28, 37 and 39 of GNR 545 and listed activities 3, 5 and 10 of GNR 545 have been identified as activities that require environmental authorisations and that will be subject to scoping and environmental impact reporting.

Category A waste management activity 19 and Category B waste management activities 1, 6, 7 and 9 as contained in GNR 718 has been identified as waste management activities that require waste management licences.

Independent Environmental Impact Assessment Practitioner

Digby Wells Environmental (Pty) Ltd ("Digby Wells") has been appointed by TCTA as the independent Environmental Assessment Practitioner ("EAP") responsible for undertaking the required environmental studies for the refurbishment and development of the water treatment plants.

An integrated application to conduct the EIA process will be submitted to the National Department of Environmental Affairs ("DEA"). Upon approval of the EIA application by DEA, you will be provided with detailed project information and invited to participate in the public consultation process during the EIA process.

Should you have any queries please contact:

Digby Wells Environmental
Steve Horak
Public Participation Practitioner

Tel: 011 789 9495
Fax: 011 789 9498
Email: steve@digbywells.com

****
*** FAX TX REPORT ***
****

TRANSMISSION OK

JOB NO.	3924
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SUBADDRESS	
DESTINATION ID	
ST. TIME	12/12 12:42
TX/RX TIME	03'12
PGS.	4
RESULT	OK

DIGBY WELLS
ENVIRONMENTAL

TO:	Mr Johan Engelbrecht	**FROM:**	Steve Horak
COMPANY:	Icon Insolvency	**DATE:**	12 December 2011
FAX #:	086 613 7780	**TOTAL PAGES:**	4
RE:	**Landowner Notification Letter-Acid Mine Drainage Project**		

Dear Mr Engelbrecht

This letter serves to inform you of Trans Caledon Tunnel Authority's (TCTA) application for Environmental Authorisation for listed activities on the Aurora Mine property. For further information please refer to the attached document. Should you have any queries, please do not hesitate to contact us

Kind Regards

Steve Horak

Public Participation Practitioner

Digby Wells & Associates (Pty) Ltd. Co. Reg. No. 1999/05985/07. Fern Isle, Section 10, 359 Pretoria Ave Randburg Private Bag X10046, Randburg, 2125, South Africa
Tel: +27 11 789 9495, Fax: +27 11 789 9498, info@digbywells.com, www.digbywells.com
Directors: AR Wilke, CD Wells, LF Koesleg, PD Tanner (British)*, AJ Reynolds (Chairman) (British)*, GE Trusler (C.E.O)
*Non-Executive

Trace Report

Your trace:	Landowner Notification Letter - Acid Mine Drainage Project
addressed to:	<johan@iconinsolvency.co.za>
has reached:	196.2.16.216
at:	2011/12/12 11:12:03 AM

Trace Information

ZAJHB01/SRV/DigbyWells	11:11:50 AM Today - 11:12:03 AM Today
ZAJHB01/SRV/DigbyWells	11:12:03 AM Today - 11:12:03 AM Today

DIGBY WELLS
ENVIRONMENTAL

TO:	Mr Henry Gouws	**FROM:**	Steve Horak
COMPANY:	DRD Gold	**DATE:**	12 December 2011
FAX #:	011 470 2618	**TOTAL PAGES:**	4
RE:	**Landowner Notification Letter-Acid Mine Drainage Project**		

Dear Mr Gouws

This letter serves to inform you of Trans Caledon Tunnel Authority's (TCTA) application for Environmental Authorisation for listed activities on the ERPM South West Vertical Shaft property. For further information please refer to the attached document. Should you have any queries, please do not hesitate to contact us

Kind Regards

Steve Horak

Public Participation Practitioner

Digby Wells & Associates (Pty) Ltd. Co. Reg. No. 1999/05985/07. Fern Isle, Section 10, 359 Pretoria Ave Randburg Private Bag X10046, Randburg, 2125, South Africa
Tel: +27 11 789 9495, Fax: +27 11 789 9498, info@digbywells.com, www.digbywells.com

Directors: AR Wilke, CD Wells, LF Koeslag, PD Tanner (British)*, AJ Reynolds (Chairman) (British)*, GE Trusler (C.E.O)
*Non-Executive

DIGBY WELLS
ENVIRONMENTAL

Date: 12 December 2011

PO Box 390
Maraisburg
South Africa
1700

Landowner: DRD Gold (Pty) Ltd

DEA Reference Number: *12/12/20/2403*

NEAS Reference Number: *DEA/EIA/0000498/2011*

Dear Mr Gouws

Landowner Notification Letter

This letter serves to notify you of Trans-Caledon Tunnel Authority's ("TCTA") intention to apply for environmental authorisation for the refurbishment and development of water treatment plants for the treatment of Acid Mine Drainage ("AMD") in the Witwatersrand Gold Fields, Gauteng Province.

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Category A waste management activity 19 and Category B waste management activities 1, 6, 7 and 9 as contained in GNR 718 has been identified as waste management activities that require waste management licences.

Independent Environmental Impact Assessment Practitioner

Digby Wells Environmental (Pty) Ltd ("Digby Wells") has been appointed by TCTA as the independent Environmental Assessment Practitioner ("EAP") responsible for undertaking the required environmental studies for the refurbishment and development of the water treatment plants.

An integrated application to conduct the EIA process will be submitted to the National Department of Environmental Affairs ("DEA"). Upon approval of the EIA application by DEA, you will be provided with detailed project information and invited to participate in the public consultation process during the EIA process.

Should you have any queries please contact:

Digby Wells Environmental
Steve Horak
Public Participation Practitioner

Tel: 011 789 9495
Fax: 011 789 9498
Email: steve@digbywells.com

****
*** FAX TX REPORT ***
****

TRANSMISSION OK

JOB NO.	3925
DESTINATION ADDRESS	0114702618
SUBADDRESS	
DESTINATION ID	
ST. TIME	12/12 12:45
TX/RX TIME	00' 39
PGS.	4
RESULT	OK

DIGBY WELLS
ENVIRONMENTAL

TO:	Mr Henry Gouws	**FROM:**	Steve Horak
COMPANY:	DRD Gold	**DATE:**	12 December 2011
FAX #:	011 470 2618	**TOTAL PAGES:**	4
RE:	**Landowner Notification Letter-Acid Mine Drainage Project**		

Dear Mr Gouws

This letter serves to inform you of Trans Caledon Tunnel Authority's (TCTA) application for Environmental Authorisation for listed activities on the ERPM South West Vertical Shaft property. For further information please refer to the attached document. Should you have any queries, please do not hesitate to contact us

Kind Regards

Steve Horak

Public Participation Practitioner

Digby Wells & Associates (Pty) Ltd. Co. Reg. No. 1999/05985/07. Fern Isle. Section 10, 359 Pretoria Ave Randburg Private Bag X10046. Randburg, 2125. South Africa
Tel: +27 11 789 9495, Fax: +27 11 789 9498. info@digbywells.com. www.digbywells.com
Directors: AR Wilke, CD Wells, LF Koeslag, PD Tanner (British)*, AJ Reynolds (Chairman) (British)*, GE Trusler (C.E.O)
*Non-Executive

document1

Trace Report

Your trace:	Landowner Notification Letter - Acid Mine Drainage Project
addressed to:	<henry.gouws@za.drdgold.com>
has reached:	196.2.16.216
at:	2011/12/12 11:07:34 AM

Trace Information

ZAJHB01/SRV/DigbyWells	11:05:50 AM Today - 11:07:34 AM Today
ZAJHB01/SRV/DigbyWells	11:07:34 AM Today - 11:07:35 AM Today

DIGBY WELLS
ENVIRONMENTAL

TO:	Mr Sarel Keller	**FROM:**	Steve Horak
COMPANY:	Rand Uranium	**DATE:**	12 December 2011
FAX #:	011 278 0031	**TOTAL PAGES:**	4
RE:	**Landowner Notification Letter-Acid Mine Drainage Project**		

Dear Mr Keller

This letter serves to inform you of Trans Caledon Tunnel Authority's (TCTA) application for Environmental Authorisation for listed activities on the Rand Uranium property. For further information please refer to the attached document. Should you have any queries, please do not hesitate to contact us

Kind Regards

Steve Horak

Public Participation Practitioner

DIGBY WELLS
ENVIRONMENTAL

Date: 12 December 2011

Private Bag X9,
Randfontein,
1760

Landowner: Rand Uranium

DEA Reference Number: *12/12/20/2403*

NEAS Reference Number: *DEA/EIA/0000498/2011*

Dear: Mr Sarel Keller

Landowner Notification Letter

This letter serves to notify you of Trans-Caledon Tunnel Authority's ("TCTA") intention to apply for environmental authorisation for the refurbishment and development of water treatment plants for the treatment of Acid Mine Drainage ("AMD") in the Witwatersrand Gold Fields, Gauteng Province.

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A waste licence is also required in terms of GNR 718 of 3 July 2009 ("GNR 718") published in terms of section 19(1) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) ("NEM:WA"). An integrated application will, therefore, be made to the Department of Environmental Affairs ("DEA") as provided for in section 24L of the NEMA and section 44 of the NEM:WA.

Project motivation

The underground mining operations within the Witwatersrand Gold Fields have ceased, and with this the dewatering of the mine workings has stopped. This has resulted in the accumulation of water within the voids resulting in the formation of AMD. With time this water will rise to natural pre-mining levels and eventually decant on to the surface at defined low points. In response to concerns about the AMD the TCTA has received a ministerial directive to upgrade and construct water treatment plants which will neutralise AMD within the Western, Central and Eastern Basins. The upgrade (immediate intervention) and construction of the proposed water treatment plants will entail undertaking the following activities; abstraction of water from affected mine shafts; treatment of the water; sludge removal and disposal; and discharge of neutralised water into the receiving environment.

The long term solution to AMD in all the basins is currently under investigation by the Department of Water Affairs. The long-term solution does not form part of this EIA application and process.

Western Basin

The site of the proposed Western Basin AMD water treatment plant is situated on the Rand Uranium Property about 5km south-west of Krugersdorp and is accessible from the R28 Main Reef Road. This is an existing water treatment plant which will be upgraded as part of the immediate intervention to treat the AMD which is already decanting in the western basin. The short term intervention will be to develop a new water treatment plant on the Randfontein Estates property adjacent to the Rand Uranium property.

Central Basin

The proposed Central Basin AMD treatment plant is to be constructed about 1,8km east of the Germiston CBD on the western portion of the ERPM South West Vertical Shaft. The site is bounded on the north by Lower Boksburg Road, on the west and south by Brammer Street and Power Street, and on the east by a Transnet railway line. The construction forms part of the short term intervention to treat AMD.

Eastern Basin

The proposed Eastern Basin AMD water treatment plant will be constructed at the Grootvlei Mine Shaft No. 3 about 4,6km due east of the Springs CBD. The site is accessible via the R29 Ermelo Road and Grootvaly Road through the suburb of Casseldale. The construction forms part of the short term intervention to treat AMD.

Listed activities

Authorisation for the following listed activities will be applied for: Listed activities 9, 11, 13, 18, 23, 28, 37 and 39 of GNR 545 and listed activities 3, 5 and 10 of GNR 545 have been identified as activities that require environmental authorisations and that will be subject to scoping and environmental impact reporting.

Category A waste management activity 19 and Category B waste management activities 1, 6, 7 and 9 as contained in GNR 718 has been identified as waste management activities that require waste management licences.

Independent Environmental Impact Assessment Practitioner

Digby Wells Environmental (Pty) Ltd ("Digby Wells") has been appointed by TCTA as the independent Environmental Assessment Practitioner ("EAP") responsible for undertaking the required environmental studies for the refurbishment and development of the water treatment plants.

An integrated application to conduct the EIA process will be submitted to the National Department of Environmental Affairs ("DEA"). Upon approval of the EIA application by DEA, you will be provided with detailed project information and invited to participate in the public consultation process during the EIA process.

Should you have any queries please contact:

Digby Wells Environmental
Steve Horak
Public Participation Practitioner

Tel: 011 789 9495
Fax: 011 789 9498
Email: steve@digbywells.com

****
*** FAX TX REPORT ***
****

TRANSMISSION OK

JOB NO.	3926
DESTINATION ADDRESS	0112780031
SUBADDRESS	
DESTINATION ID	
ST. TIME	12/12 12:51
TX/RX TIME	00'53
PGS.	3
RESULT	OK

DIGBY WELLS
ENVIRONMENTAL

TO:	Mr Sarel Keller	**FROM:**	Steve Horak
COMPANY:	Rand Uranium	**DATE:**	12 December 2011
FAX #:	011 278 0031	**TOTAL PAGES:**	4
RE:	**Landowner Notification Letter-Acid Mine Drainage Project**		

Dear Mr Keller

This letter serves to inform you of Trans Caledon Tunnel Authority's (TCTA) application for Environmental Authorisation for listed activities on the Rand Uranium property. For further information please refer to the attached document. Should you have any queries, please do not hesitate to contact us

Kind Regards

Steve Horak

Public Participation Practitioner

Digby Wells & Associates (Pty) Ltd. Co. Reg. No. 1999/05985/07. Fern Isle, Section 10, 359 Pretoria Ave Randburg Private Bag X10046, Randburg, 2125, South Africa
Tel: +27 11 789 9495. Fax: +27 11 789 9498. info@digbywells.com, www.digbywells.com
Directors: AR Wilke, CD Wells, LF Koeslag, PD Tanner (British)*, AJ Reynolds (Chairman) (British)*, GE Trusler (C.E.O)
*Non-Executive

Trace Report

Your trace:	Landowner Notification Letter - Acid Mine Drainage Project
addressed to:	<Sarel.Keller@Randuranium.co.za>
has reached:	196.2.16.216
at:	2011/12/12 11:09:16 AM

Trace Information

ZAJHB01/SRV/DigbyWells	11:08:58 AM Today - 11:09:16 AM Today
ZAJHB01/SRV/DigbyWells	11:09:16 AM Today - 11:09:16 AM Today

REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

Mr Johan Engelbrecht
PO Box 92332
Mooikloof

0075 Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie brief is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100.00. Geen vergoeding is sonder dokumentere bewys betaalbaar nie. Opsionele versekering tot R2 000.00 is beskikbaar en is slegs op binnelandse geregisteerde briewe van toepassing.

Postage paid R ____ c
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Insurance / Versekering R ____ c
Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

Date Stamp / Datumstempel

RANDBURG
12 DEC 2011
FOLIO 5
2125

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(with a domestic insurance option)
ShareCall 0860 111 502 www.sapo.co.za
RD 506 184 836 ZA

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Plak Volg-en-Spoor klientafskrif

Paraaf van aanneem-beampte

REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

Mr Henry Gouws
DRD GoCD
PO Box 390
Maraisburg

1709 Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie brief is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100.00. Geen vergoeding is sonder dokumentere bewys betaalbaar nie. Opsionele versekering tot R2 000.00 is beskikbaar en is slegs op binnelandse geregisteerde briewe van toepassing.

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Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

Date Stamp / Datumstempel

RANDBURG
12 DEC 2011
FOLIO 5
2125

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klientafskrif

Paraaf van aanneem-beampte

REGISTERED LETTER
GEREGISTREERDE BRIEF

Post Office

(with an insurance option/met 'n versekeringsopsie)

Full tracking and tracing/Volledige volg en spoor

Addressed to/Geadresseer aan

Mr. Sarel Kelly
Rand Uranium
Private Bag X9
Randfontein

1760 Postcode / Poskode

The value of the contents of this letter is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance up to R2 000.00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie brief is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100.00. Geen vergoeding is sonder dokumentere bewys betaalbaar nie. Opsionele versekering tot R2 000.00 is beskikbaar en is slegs op binnelandse geregisteerde briewe van toepassing.

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Insurance / Versekering R ____ c
Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

Date Stamp / Datumstempel

RANDBURG
12 DEC 2011
FOLIO 5
2125

REGISTERED LETTER
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ShareCall 0860 111 502 www.sapo.co.za
RD 506 184 853 ZA

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klientafskrif

Paraaf van aanneem-beampte

REGISTERED LETTER
GEREGISTREERDE BRIEF

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Service fee / Diensgeld R ____ c
Insurance / Versekering R ____ c
Total / Totaal R ____ c

Insured value of contents
Versekerde waarde van inhoud R ____ c

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

Initial of accepting officer

Date Stamp / Datumstempel

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Paraaf van aanneem-beampte

Appendix I: PPP Information Documentation

BACKGROUND INFORMATION DOCUMENT FOR THE ACTIVITIES ASSOCIATED WITH THE IMMEDIATE AND SHORT TERM INTERVENTIONS REGARDING ACID MINE DRAINAGE IN THE WESTERN, CENTRAL AND EASTERN WITWATERSRAND BASINS

DEA REFERENCE NUMBERS: DEA/EIA/0000498/2011 & DEA12/12/20/2403

HIERDIE DOCUMENT IS BESKIKBAAR IN AFRIKAANS OP AANVRAAG ·

LENCWADI IYATHOLAKALA NGOLWIMI LWESIZULUTOKOMANE ·

YENA IYAFUMANEGA KASETSWANA

PURPOSE OF THIS DOCUMENT

This Background Information Document (BID) is available to Interested and Affected Parties (I&APs) in order to provide information regarding Trans-Caledon Tunnel Authority (TCTA)'s intention to upgrade and construct Water Treatment Plants for the immediate and short term treatment of Acid Mine Drainage (AMD) in the Western, Central and Eastern Witwatersrand Basins in Gauteng, South Africa. I&APs are invited to provide comments regarding the proposed project. Digby Wells Environmental (Digby Wells) has been appointed by TCTA to undertake the Environmental Impact Assessment (EIA) for the proposed project.

All comments regarding the EIA must be directed to:

DIGBY WELLS ENVIRONMENTAL

Steve Horak

Tel: 011 789 9495•Fax: 011 789 9498

Email: steve@digbywells.com

Postal: Private Bag X10046, Randburg, 2125

Physical: 359 Fern Isle Building, Pretoria Avenue, Randburg, 2125

Please ensure that you complete the attached registration and comment form.

PROJECT BACKGROUND

After more than 120 years of deep level gold mining on the Witwatersrand, mining and dewatering has stopped due to the exhaustion of gold resources. The cessation of dewatering has resulted in progressive flooding of the mine voids since 1997. In the Western Basin, the voids filled with acidic water containing heavy metals and started to decant from a number of boreholes and an old shaft in September 2002. It is likely that the Central and Eastern Basins will decant in the future. Acid Mine Drainage (AMD) occurs when ore and waste material, containing sulphides, (e.g. pyrite) are exposed to water and oxygen.

In 2010, Cabinet appointed an Inter-Ministerial Committee (IMC) to address the serious challenges posed by AMD in the Witwatersrand Goldfields area. The IMC tasked a Technical Committee, to investigate the AMD issues. The Technical Committee subsequently appointed a team of experts, who developed and presented a draft report on AMD to Cabinet on 9 February 2011.

The report identified three interventions for the treatment of AMD. An immediate intervention to neutralise acid water already decanting from the Western Basin, a short term intervention, pumping water from the Western, Central and Eastern Basins to prevent surface decant and to neutralise this water before release into the environment and a long term intervention which includes the neutralisation of acid and removal of salts from AMD water this intervention is currently being investigated by the Department of Water Affairs (DWA) and does not form part of the scope of this project. The immediate and short term interventions are to be the first phases of the long term intervention for AMD. The immediate and short term interventions are the subject of this BID and the required EIA for the proposed project.

The IMC experts report indicated that interventions are urgently required as prevention of AMD decant from the mining basins is considered of national importance. As part of a national mitigation strategy, DWA subsequently issued TCTA with a directive to act as the agent to plan, design and implement immediate and short term measures to manage and control AMD in the Western, Central and Eastern Basins of the Witwatersrand Goldfields.

DESCRIPTION OF THE BASINS

The Western Basin covers the Krugersdorp, Witpoortjie and Randfontein areas. The mine lease areas in this basin extend over about 57km². The Central Basin extends from Durban Roodepoort Deep (DRD) in the west to the East Rand Proprietary Mines (ERPM) in the east. The mine lease areas in this basin extend over about 251km^2. The Eastern Basin covers the East Rand area, including the towns of Boksburg, Brakpan, Springs and Nigel. The mine lease areas in

this basin extend over about 768km^2. Refer to the attached map for the areas discussed.

At present the Western Basin is decanting at an old shaft and partially treated and untreated AMD is being released into the Tweelopiesspruit.

The Central and Eastern Basins are not decanting but future decant is expected in 2013 for the Central Basin and 2015 for the Eastern Basin.

In order to prevent decant from these basins and stop the decant at the Western Basin the IMC team of experts report indicated that underground water levels needed to be kept below an Environmental Critical Level (ECL). These levels are:

- Western Basin: 1,550 m amsl;
- Central Basin 1,467 m amsl; and
- Eastern Basin: 1,280 m amsl.

Refer to the attached schematic representation of the AMD and ECL levels.

These levels will prevent future AMD decanting and prevent the flooding of lower level voids such as Gold Reef City tourist mine. Should the proposed project not proceed, untreated AMD will continue to decant in the Western Basin and untreated decant will start in the Central and Eastern Basins.

PROJECT DESCRIPTION

The TCTA undertook a Due Diligence based on the recommendations of the IMC team of experts report. The due diligence report recommended that the following AMD treatment technology and chemical reagent combination be used for the treatment of AMD:

- Oxidation by aeration;
- Pre-neutralisation and metals removal with limestone;
- Final neutralisation and metals removal with lime, produced by the slaking of quicklime; and
- Gypsum crystallisation to remove excess sulphate from the solution.

The proposed AMD treatment plants will be based on the proven and reliable High Density Sludge (HDS) process developed by the CSIR.

The site of the proposed Western Basin AMD water treatment plant for the immediate intervention is situated on the Rand Uranium Property about 5km south-west of Krugersdorp and is accessible from the R28 Main Reef Road.

For the Western Basin, immediate intervention measures include the following:

- Upgrading and retrofitting of the existing Rand Uranium Water Treatment Plant; and

- Bringing the Rand Uranium Water Treatment Plant's additional treatment trains back into operation.

For the short term interventions the following activities need to be undertaken in each of the basins.

Western Basin

The new HDS treatment plant for the short term intervention will be situated on the Randfontein Estates property adjacent to the Rand Uranium property. The activities will include:

- Abstraction of AMD via installed pumps in Rand Uranium's No. 8 Shaft at a depth to achieve the ECL;
- Construction of new HDS treatment plant on the Randfontein Estates site;
- Construction of a treated water pipeline to a suitable discharge point on the Tweelopiespruit; and
- Construction of waste sludge disposal pumps and pipeline to the old opencast pits for the disposal of the sludge from the treatment process.

Central Basin

The proposed Central Basin AMD treatment plant is to be situated about 1,8km east of the Germiston CBD on the western portion of the ERPM South West Vertical Shaft area. The site is bounded on the north by Lower Boksburg Road, on the west and south by Brammer Street and Power Street respectively, and on the east by a Transnet railway line. The activities will include:

- Abstraction of AMD via installed pumps in the South West Vertical (SWV) Shaft to pump to the ECL;
- Construction of a new HDS plant at SWV Shaft;
- Construction of a waste sludge pipeline to the Crown Knights Gold processing plant;
- Construction of a treated water pipeline to a suitable discharge point on the Elsburgspruit; and
- Investigation and planning for a possible future waste sludge pipeline to the ERGO Brakpan Tailings Storage Facility (TSF) and, alternatively, to ERPM's old underground workings.

Eastern Basin

The proposed Eastern Basin AMD water treatment plant will be situated at the Grootvlei Mine Shaft No. 3 about 4,6km due east of the Springs CBD. The site is accessible via the R29 Ermelo Road and Grootvaly Road through the suburb of Casseldale. The activities will include:

- Abstraction of AMD via installed pumps in Grootvlei No. 3 shaft at a pump depth to achieve the ECL level or the level;
- Construction of a new HDS treatment plant adjacent to the Grootvlei No. 3 shaft;
- Investigation and planning for the possible construction of a waste sludge

pipeline to the Daggafontein or Brakpan TSF; and

- Construction of a treated water pipeline to a suitable discharge point on the Blesbokspruit.

The project as a whole is referred to as the "Witwatersrand Goldfields AMD Project". It is to be implemented over the next three to four years.

LEGISLATIVE REQUIREMENTS

As the project activities require the upgrade of existing infrastructure and the development of new infrastructure, an EIA will be required in compliance with the National Environmental Management Act, National Environmental Management Act, 1998 (Act No.107 of 1998) (NEMA) for the authorisation of listed activities contained in GNR 544 of 18 June 2010 (GNR 544) and GNR 545 of 18 June 2010 (GNR 545) published in terms of Sections 24(2) and 24D the NEMA. A waste licence is also required in terms of GNR 718 of 3 July 2009 (GNR 718) published in terms of section 19(1) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA). An integrated application has, therefore, been made to the Department of Environmental Affairs (DEA) as provided for in section 24L of the NEMA and section 44 of the NEM:WA.

The listed activities which have been applied for include Listed activities 9, 11, 13, 18, 23, 28, 37 and 39 of GNR 545 and listed activities 3, 5 and 10 of GNR 545.

Category A waste management activity 19 and Category B waste management activities 1, 6, 7 and 9 as contained in GNR 718 has been identified as waste management activities that require waste management licences.

PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) is an essential component for any EIA process to ensure I&APs are provided with an opportunity to provide comments regarding the proposed project. Digby Wells will facilitate the PPP and any comments received from I&APs will be recorded and will contribute to the decision making process. All I&APs are requested to register with Digby Wells at the contact details provided.

REGISTRATION AS AN I&AP

To ensure that you are registered as an I&AP and to receive updated project information please complete the attached registration form.

Comments and registration forms can be sent to:

DIGBY WELLS ENVIRONMENTAL

Steve Horak

Tel: 011 789 9495

Fax: 011 789 9498

E-mail: steve@digbywells.com

Postal:

Private Bag X10046,

Randburg,

2125

Physical:

359 Fern Isle Building,

Pretoria Avenue,

Randburg, 2125

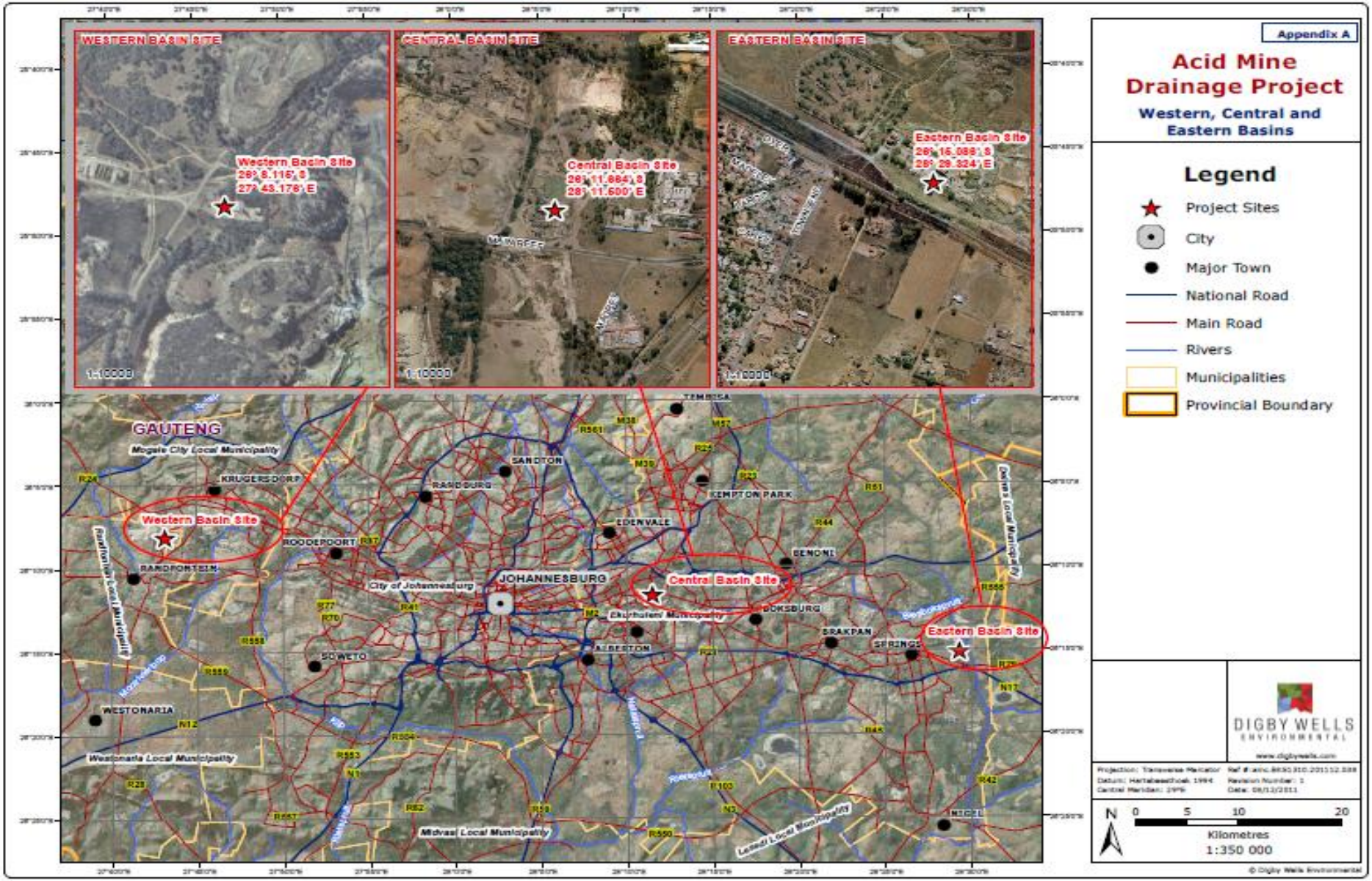
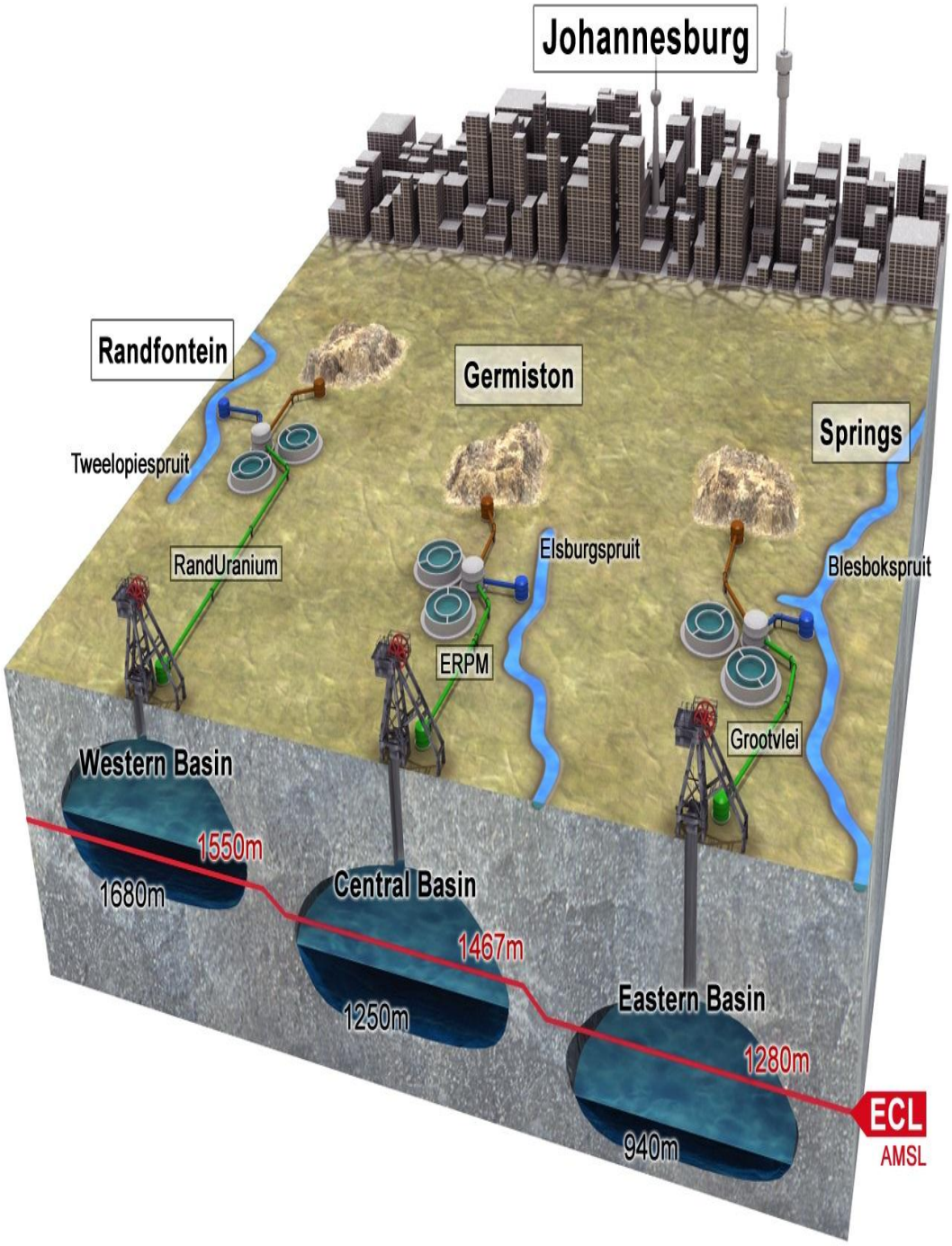

WESTERN BASIN SITE
Western Basin Site
26° 8.115' S
27° 43.178' E
1:10000
CENTRAL BASIN SITE
Central Basin Site
26° 11.684' S
28° 11.600' E
1:10000
EASTERN BASIN SITE
Eastern Basin Site
26° 16.088' S
28° 29.324' E
1:10000
GAUTENG
Mogale City Local Municipality
KRUGERSDORP
RANDBURG
SANDTON
KEMPTON PARK
EDENVALE
BENONI
RANDFONTEIN
ROODEPOORT
Western Basin Site
City of Johannesburg
JOHANNESBURG
Central Basin Site
Ekurhuleni Metropolitan
BOKSBURG
BRAKPAN
SPRINGS
Eastern Basin Site
ALBERTON
SOWETO
WESTONARIA
Westonaria Local Municipality
Merafong City Local Municipality
Midvaal Local Municipality
Lesedi Local Municipality
Emfuleni Local Municipality
Appendix A
Acid Mine Drainage Project
Western, Central and Eastern Basins
Legend
Project Sites
City
Major Town
National Road
Main Road
Rivers
Municipalities
Provincial Boundary
DIGBY WELLS ENVIRONMENTAL
www.digbywells.com
N
0 5 10 20
Kilometres
1:350 000
© Digby Wells Environmental

Figure 1: Schematic representation of the AMD and ECL levels



DIGBY WELLS
ENVIRONMENTAL

REGISTRATION AND COMMENT FORM FOR THE WITWATERSRAND GOLDFIELDS AMD PROJECT

Please complete this form and return it to Digby Wells Environmental to ensure that you are registered as an Interested and Affected Party.

By answering the questions below you will help us to develop a better understanding of your information requirements. The form also gives you the opportunity to make comments regarding the project. Additional pages may be attached should this be required.

PERSONAL INFORMATION			
Title (Mr/Mrs/Dr/Prof):			
First Name:			
Surname:			
Please indicate whether you are registering as a Community / Organisation / Farm/ or Business and provide the name:			
Physical address:			
Postal Address:		Telephone:	
		Cell:	
		E-mail:	
		Fax:	

GENERAL INTEREST IN THE PROJECT
Do you have any specific comments regarding the upgrade of the of the Rand Uranium Water Treatment Works in the Western Basin and the construction of new Water Treatment Works in the Western, Central and Eastern Basins ?

If you know of anyone who should be informed about the project please provide their contact details below:			
First Name:			
Surname:			
Community / Organisation / Farm:			
Physical address:			
Postal Address:		Telephone:	
		Cell:	
		E-mail:	

METHOD OF COMMUNICATION		
What is your preferred method of correspondence? Please tick the appropriate box:	Fax:	E-mail:
	Post:	SMS:

DIGBY WELLS ENVIRONMENTAL

Steve Horak

Tel: 011789 9495

Fax: 011 789 9498

E-mail: steve@digbywells.com

Postal: Private Bag X10046, Randburg, 2125

Physical: 359 Fern Isle Building, Pretoria Avenue, Randburg, 2125

AGTERGRONDINLIGTINGSDOKUMENT VIR DIE AKTIWITEITE VERWANT AAN DIE ONMIDDELLIKE EN KORTTERMYN-INGRYPING RAKENDE DIE DREINEREDE SUURMYNWATER IN DIE WESTELIKE, SENTRALE EN OOSTELIKE WITWATERSRAND-KOMME

DEPARTEMENT OMGEWINGSAKE (DEA) VERWYSINGSNOMMERS:

DEA/EIA/0000498/2011 & DEA12/12/20/2403

THIS DOCUMENT IS AVAILABLE IN ENGLISH ON REQUEST ·

LENCWADI IYATHOLAKALA NGOLWIMI LWESIZULU

TOKOMANE · YENA IYAFUMANEGA KASETSWANA

DOEL VAN HIERDIE DOKUMENT

Hierdie agtergrondinligtingsdokument (BID) is beskikbaar aan Belangstellende en Geaffekteerde Partye (I&APs) ten einde inligting te voorsien oor Trans-Caledon Tunnel Authority (TCTA) se voorneme om watersuiweringsaanlegte te opgradeer en bou vir die onmiddellike en korttermyn behandeling van Gedreineerde Suur Mynwater (AMD) in die Westelike, Sentrale en Oostelike Witwatersrand-komme in Gauteng, Suid-Afrika. I&APs word genooi om kommentaar oor die voorgenome projek te lewer. Digby Wells Environmental (Digby Wells) is deur TCTA aangestel om die Omgewingsimpakassessering (EIA) vir die voorgenome projek te onderneem.

Alle kommentaar rakende die EIA moet gerig word aan:

DIGBY WELLS ENVIRONMENTAL

Steve Horak

Tel: 011 789 9495 • Faks: 011 789 9498

E-pos: steve@digbywells.com

Posadres: Privaatsak X10046, Randburg, 2125

Straatadres: 359 Fern Isle-gebou, Pretorialaan, Randburg, 2125

PROJEKAGTERGROND

Na meer as 120 jaar van diep ondergrondse mynbou op die Witwatersrand, het mynbou en ontwatering weens die uitputting van goud-hulpbronne tot 'n einde gekom. Die beëindiging van ontwatering het sedert 1997 tot die progressiewe oorstroming van die mynholtes gelei. In die Westelike Kom het die holtes opgevul met suurwater wat swaar-metale bevat het, en het in September 2002 begin om vanaf 'n aantal boorgate en 'n ou skag uit te loop. Dit is waarskynlik dat die Sentrale en Oostelike Komme in die toekoms sal begin oorloop. Dreinering van Suurmynwater (AMD) vind plaas wanneer erts en afvalmateriaal, wat sulfiede (bv. piriet) bevat, aan water en suurstof blootgestel word.

Die Kabinet het in 2010 'n Inter-Ministeriële Komitee (IMC) aangestel om die ernstige uit-dagings wat deur AMD in die Witwatersrand Goldfields-gebied veroorsaak word, aan te spreek. Die IMC het 'n Tegniese Komitee gelas om die AMD-kwessies te ondersoek. Die Tegniese Komitee het gevolglik 'n span deskundiges aangestel, wat op 9 Februarie 2011 'n konsepverslag oor AMD opgestel en voorgelê het.

Die verslag het drie ingrypings vir die behandeling van AMD geïdentifiseer. 'n Onmiddellike ingryping om suurwater te neutraliseer wat reeds by die Westelike Kom oorloop, 'n korttermyn ingryping om water uit die Westelike, Sentrale en Oostelike Komme te pomp om oorloop na die opper-vlak te voorkom en om hierdie water te neutraliseer voordat dit in die omgewing vry-gestel word, en 'n langtermyn ingryping wat die neutralisasie van suur en ver-wydering van soute uit die AMD-water insluit. Hierdie ingryping word tans deur die Departement van Watersake (DWA) onder-soek en vorm nie deel van die omvang van hierdie projek nie. Die onmiddellike en kort-termyn ingryping is die onderwerp van hierdie BID en die vereiste EIA vir die voorgenome projek.

Die IMC deskundiges se verslag het aange-dui dat ingrypings dringend nodig is, aan-gesien die voorkoming van AMD-oorloop vanuit die mynkomme beskou word as van nasionale belang. As deel van 'n nasionale mitigasie-strategie, het DWA gevolglik 'n aanwysing aan TCTA uitgereik om as die agent op te tree om onmiddellike en kort-termyn maatreëls te beplan, ontwerp en implementeer om AMD in die Westelike, Sentrale en Oostelike Komme van die Witwatersrand Goldfields te bestuur en beheer.

BESKRYWING VAN DIE KOMME

Die Westelike Kom dek die gebiede van Krugersdorp, Witpoortjie en Randfontein areas. Die mynhuurkontrak-gebiede in hier-die kom strek oor ongeveer 57km². Die Sentrale Kom loop vanaf Durban Roodepoort Deep (DRD) in die weste na die East Rand Proprietary Mines (ERPM) in die

ooste. Die mynhuurkontrak-gebiede in hierdie kom strek oor ongeveer 251km^2. Die Oostelike Kom dek die Oosrand-gebied, insluitend die dorpe van Boksburg, Brakpan, Springs en Nigel. Die mynhuurkontrak-gebiede in hierdie kom strek oor ongeveer 768km^2. Verwys na aangehegte kaart vir die gebiede onder bespreking.

Die Westelike Kom loop tans by ’n ou skag oor en gedeeltelik-behandelde en onbehandelde AMD word in die Tweelopiespruit vrygestel.

Die Sentrale en Oostelike Komme loop nie oor nie, maar toekomstige oorloop word in 2013 vir die Sentrale Kom en 2015 vir die Oostelike Kom verwag.

Ten einde oorloop van hierdie komme te verhoed en die oorloop by die Westelike Kom stop te sit, dui die IMC se span deskundiges se verslag aan dat onder-grondse watervlakke onder ’n Omgewings-kritieke Vlak (ECL) gehou moet word. Hierdie vlakke is:

- Westelike Kom: 1,550 m amsl;
- Sentrale Kom 1,467 m amsl; en
- Oostelike Kom: 1,280 m amsl.

Verwys na die aangehegte skematiese voorstelling van die AMD- en ECL-vlakke.

Hierdie vlakke sal toekomstige AMD-oorloop voorkom, en sal die oorstroming van laer-vlak holtes soos Gold Reef City toeristemyn verhoed. Sou die voorgestelde projek nie plaasvind nie, sal onbehandelde AMD-oorloop in die Westelike Kom voortduur en onbehandelde oorloop sal in die Sentrale en Oostelike Komme begin.

PROJEKBESKRYWING

Die TCTA het ’n Noulettendheidsondersoek onderneem, gegrond op die aanbevelings van die IMC span deskundiges se verslag. Die noulettendheidsondersoekverslag het aanbeveel dat die volgende AMD-behandelingstegnologie en chemiese reagens kombinasie gebruik word vir die behandeling van AMD:

- Oksidasie deur belugting;
- Pre-neutralisasie en verwydering van metale met kalksteen;
- Finale neutralisasie en verwydering van metale met kalk, geproduseer deur die blussing van ongebluste kalk; en
- Kristallisasie van gips om oortollige sulfaat uit die oplossing te verwyder.

Die voorgestelde AMD-suiweringsaanlegte sal gegrond wees op die bewese en betroubare Hoë-digtheid Slyk (HDS) proses wat deur die WNNR ontwikkel is.

Die ligging van die voorgenome Westelike Kom AMD-watersuiweringsaanleg vir die onmiddellike ingryping is geleë op die Rand Uranium eiendom, ongeveer 5 km suidwes van Krugersdorp, en is toeganklik vanaf die R28 Main Reef-pad.

Onmiddellike ingrypings-maatreëls vir die Westelike Kom sluit die volgende in:

- Opgradering en herbouing van die bestaande Rand Uranium Water-suiweringsaanleg; en
- Om die Rand Uranium Water-suiweringsaanleg se addisionele suiweringstreine weer in bedryf te stel.

Die volgende aktiwiteite moet in elkeen van die komme onderneem word vir die korttermyn ingrypings:

Westelike Kom

Die nuwe HDS-suiweringsaanleg vir die korttermyn ingryping sal op die Randfontein Estates-eiendom aanliggend tot die Rand Uranium-eiendom geleë wees. Die aktiwiteite sal die volgende insluit:

- Onttrekking van AMD deur geïnstalleerde pompe in Rand Uranium se Nr. 8 Skag teen ’n diepte om die ECL te bereik;
- Konstruksie van nuwe HDS suiweringsaanleg op die Randfontein Estates-terrein;
- Konstruksie van ’n behandelde water-pyplyn na ’n geskikte uitlaat-punt op die Tweelopiespruit; en
- Konstruksie van afvalslyk-verwyderingspompe en pyplyn na die ou oop putte vir die verwydering van die slyk uit die suiweringsproses.

Sentrale Kom

Die voorgenome Sentrale Kom AMD-suiweringsaanleg sal ongeveer 1,8 km oos van die Germiston SBD op die westelike gedeelte van die ERPM Suidwestelike Vertikale Skag-gebied geleë wees. Die terrein word in die noorde deur Lower Boksburg-pad omgrens, in die weste en suide deur Brammerstraat en Powerstraat onderskeidelik, en in die ooste deur ’n Transnet-spoorweglyn. Die aktiwiteite sal die volgende insluit:

- Onttrekking van AMD deur geïnstalleerde pompe in die Suid-westelike Vertikale (SWV) Skag om na die ECL te pomp;
- Konstruksie van nuwe HDS suiwerings-aanleg by SWV Skag;
- Konstruksie van afvalslykpyplyn na die Crown Knights Gold verwerkings-aanleg;
- Konstruksie van ’n behandelde water-pyplyn na ’n geskikte uitlaat-punt op die Elsburgspruit; en
- Ondersoek en beplanning van ’n moontlike toekomstige afvalslyk-pyplyn na die ERGO Brakpan Afvalbergingsfasiliteit (TSF) en, alternatiewelik, na ERPM se ou ondergrondse werke.

Oostelike Kom

Die voorgenome Oostelike Kom AMD-watersuiweringsaanleg sal by die Grootvlei Mynskag Nr. 3 geleë wees, ongeveer 4,6 km oos van die Springs SBD. Die terrein is toeganklik vanaf die R29 Ermelo-pad en Grootvaly-pad deur die voorstad van Casseldale. Die aktiwiteit sal die volgende insluit:

- Onttrekking van AMD deur geïnstalleerde pompe in Grootvlei Nr. 3 Skag teen ’n diepte om die ECL te bereik;
- Konstruksie van nuwe HDS suiweringsaanleg aanliggend tot die Grootvlei Nr. 3 skag;
- Ondersoek en beplanning van ’n moontlike konstruksie van ’n afvalslykpyplyn na die Daggafontein of Brakpan TSF; and
- Konstruksie van ’n behandelde water-pyplyn na ’n geskikte uitlaatpunt op die Blesbokspruit.

Die projek as ’n geheel word na verwys as die “Witwatersrand Goldfields AMD-projek”. Dit sal oor die volgende drie tot vier jaar geïmplementeer word.

WETGEWENDE VEREISTES

Aangesien die projek se aktiwiteite die opgradering van bestaande infrastruktuur en die ontwikkeling van nuwe infrastruktuur behels, sal ’n EIA nodig wees ter nakoming van die Wet op Nasionale Omgewingsbestuur, 1998 (Wet Nr. 107 van 1998) (NEMA) vir die magtiging van gelyste aktiwiteite vervat in GNR 544 van 18 Junie 2010 (GNR 544) en GNR 545 van 18 Junie 2010 (GNR 545) gepubliseer kragtens artikel 24(2) en 24D van die NEMA. ’n Afvallisensie word ook vereis kragtens GNR 718 van 3 Julie 2009 (GNR 718) gepubliseer kragtens artikel 19(1) van die Wet op Nasionale Omgewingsbestuur: Afval, 2008 (Wet Nr. 59 van 2008) (NEM:WA). ’n Geïntegreerde aansoek is dus by die Departement van Omgewingsake (DEA) ingedien, soos bepaal in artikel 24L van die NEMA en artikel 44 van die NEM:WA.

Die gelyste aktiwiteite waarvoor aansoek gedoen is, sluit in: Gelyste Aktiwiteit 9, 11, 13, 18, 23, 28, 37 en 39 van GNR 545 en Gelyste Aktiwiteit 3, 5 en 10 van GNR 545.

Kategorie A afvalbestuursaktiwiteit 19 en Kategorie B afvalbestuursaktiwiteit 1, 6, 7 en 9 soos vervat in GNR 718 is geïdentifiseer as afvalbestuursaktiwiteite wat afvalbestuurslisensies vereis.

OPENBARE DEELNAMEPROSES

Die Openbare Deelnameproses (PPP) is ’n noodsaaklike komponent vir enige EIA proses om te verseker dat I&APs voorsien word van ’n geleentheid om kommentaar op die voorgenome projek te lewer. Digby Wells sal die PPP fasiliteer en enige kommentaar wat van I&APs ontvang word, sal aangeteken word en tot die besluitnemingsproses bydra. Alle I&APs word versoek om by Digby Wells te registreer by die kontakbesonderhede wat voorsien is.

REGISTRASIE AS ’N I&AP

Om te verseker dat u as ’n I&AP geregistreer is en om opgedateerde projekinligting te bekom, voltooi asseblief aangehegte registrasievorm.

Kommentaar en registrasievorms kan gestuur word aan:

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Pretorialaan,

Randburg, 2125

Appendix A

Acid Mine Drainage Project

Western, Central and Eastern Basins

WESTERN BASIN SITE

Western Basin Site
26° 8' 6.923" S
27° 43' 10.531" E

1:10000

CENTRAL BASIN SITE

MILLER
ABKIN
RINKHALS
TIDE
BRAMMER
POWER
ARKINS
JACK PIENAAR
LABASSEE
STRACHAN
BRAMMER

Central Basin Site
26° 13' 3.277" S
28° 10' 56.877" E

1:10000

EASTERN BASIN SITE

DYER
MADELEY
LARGO
CAREY
TOWNSEND

Eastern Basin Site
26° 15' 5.173" S
28° 29' 19.461" E

1:10000

TEMBISA
M38
M57
R561
R25
M39
R23
R51
SANDTON
RANDBURG
KEMPTON PARK
EDENVALE
BENONI
Delmas Local Municipality
Mogale City Local Municipality
R24
KRUGERSDORP
GAUTENG
Western Basin Site
R47
Randfontein Local Municipality
RANDFONTEIN
ROODEPOORT
JOHANNESBURG
City of Johannesburg
Ekurhuleni Municipality
R555
R77
R70
R41
M2
Central Basin Site
BOKSBURG
BRAKPAN
Eastern Basin Site
SPRINGS
R558
SOWETO
ALBERTON
R21
R29
R559
N17
Mooirivierloop
WESTONARIA
N12
Klip
R554
Natalspruit
R45
Westonaria Local Municipality
R553
N1
R28
R42
Rietspruit
R103
R82
R59
N3
NIGEL
R557
Midvaal Local Municipality
R550
Lesedi Local Municipality

25°40'0"S
25°45'0"S
25°50'0"S
25°55'0"S
26°0'0"S
26°5'0"S
26°10'0"S
26°15'0"S
26°20'0"S
26°25'0"S

27°40'0"E
27°45'0"E
27°50'0"E
27°55'0"E
28°0'0"E
28°5'0"E
28°10'0"E
28°15'0"E
28°20'0"E
28°25'0"E
28°30'0"E

Legend

- Project Sites
- City
- Major Town
- National Road
- Main Road
- Rivers
- Municipalities
- Provincial Boundary

DIGBY WELLS ENVIRONMENTAL
www.digbywells.com

Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

Ref #:amc.BKS1310.201112.038
Revision Number: 1
Date: 08/12/2011

N

0 5 10 20
Kilometres
1:350 000

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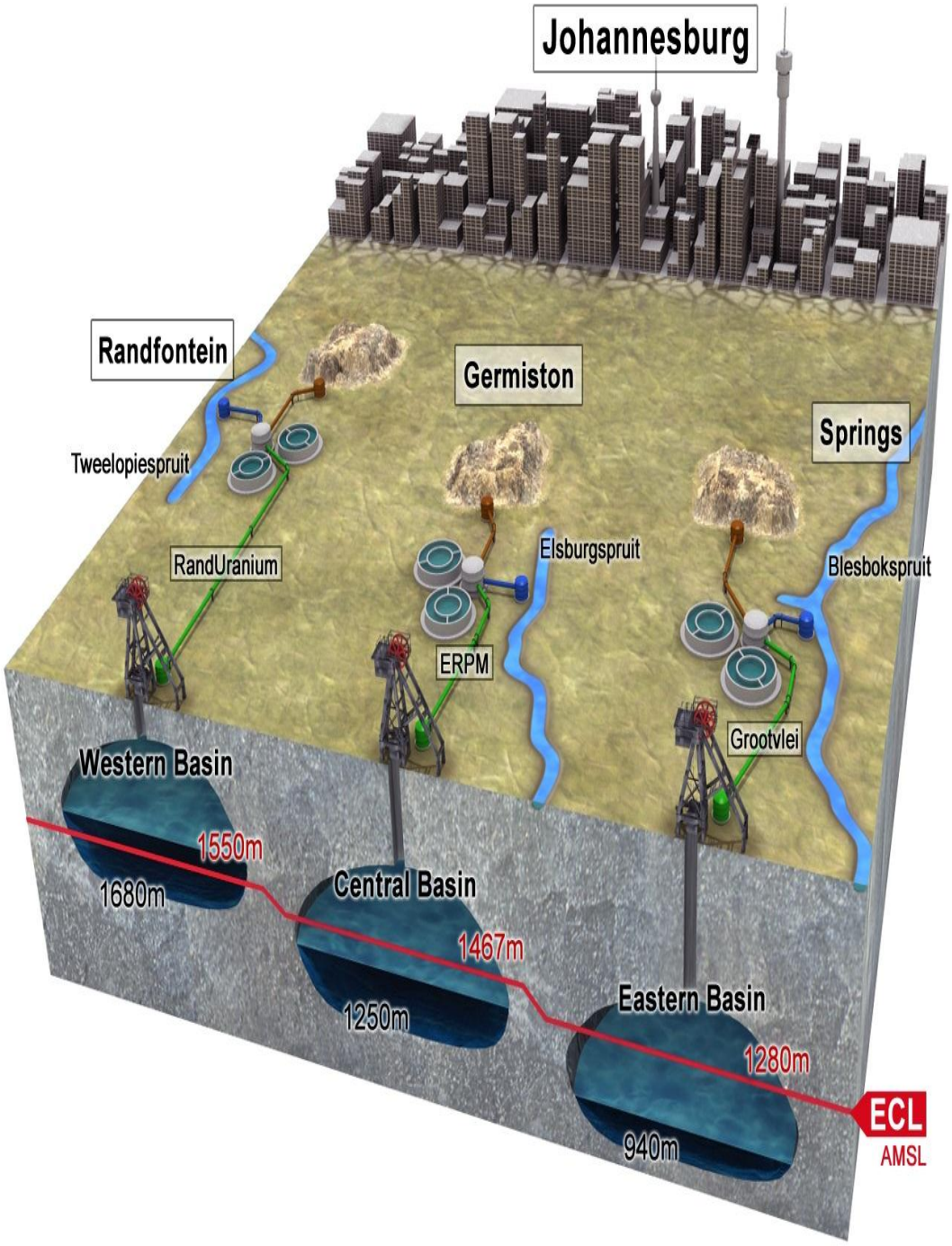
Figuur 1: Skematiese voorstelling van die AMD- en ECL-vlakke



REGISTRASIE- EN KOMMENTAARVORM VIR DIE WITWATERSRAND GOLDFIELDS

AMD-PROJEK

DEPARTEMENT OMGEWINGSAKE (DEA) VERWYSINGSNOMMERS: DEA/EIA/0000498/2011 & DEA12/12/20/2403

Voltooi asseblief hierdie vorm en terug aan Digby Wells Environmental om te verseker dat u as 'n Belangstellende en Geaffekteerde Party geregistreer is. Deur onderstaande vrae te beantwoord, sal u ons help om 'n beter begrip van u inligtings-vereistes te kry. Die vorm verleen ook aan u die geleentheid om kommentaar oor die projek te lewer. Bykomende bladsye mag by die aansoekvorm geheg word, indien nodig.

PERSOONLIKE INLIGTING			
Titel (Mnr./Mev./Dr./Prof.):			
Voornaam:			
Van:			
Dui asseblief aan of u as 'n Gemeenskap/ Organisasie/ Plaas of Besigheid registreer, en verskaf die naam:			
Straatadres:			
Posadres:		Telefoon:	
		Sel:	
		E-pos:	
		Faks:	
ALGEMENE BELANG IN DIE PROJEK			
Het u enige spesifieke kommentaar oor die opgradering van die Rand Uranium Watersuiweringsaanlegte in die Westelike Kom en die konstruksie van nuwe Watersuiweringsaanlegte in die Westelike, Sentrale en Oostelike Komme?			

Indien u van enigiemand weet wat oor die projek ingelig moet word, verskaf asseblief hulle kontak-besonderhede hier onder:			
Voornaam:			
Van:			
Gemeenskap/ Organisasie/ Plaas			
Straatadres:			
Posadres:		Telefoon:	
		Sel:	
		E-pos:	
METODE VAN KOMMUNIKASIE			
Wat is u verkose metode van kommunikasie? Merk asseblief die toepaslike blokkie:		Faks:	E-pos:
		Pos:	SMS:

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TOKOMANE YA TSHEDIMOSETSO KA POROJEKE YA DITIRO TSE DI AMANANG LE DITHARABOLOLO TSA KA BONAKO LE TSA LOBAKA LO LO KHUTSHWANE LWA GO NTSHA ASITI YA MOEPO KA DIPHAEPHE KWA DIBEISENENG TSA BOPHIRIMA, TSA BOGARE LE TSA BOTLHABA TSA WITWATERSRAND

DINOMORE TSA TSHUPISO TSA DEA: DEA/EIA/0000498/2011 & DEA12/12/20/2403

HIERDIE DOCUMENT IS BESKIKBAAR IN AFRIKAANS OP AANVRAAG ·

LENCWADI IYATHOLAKALA NGOLWIMI LWESIZULU

TOKOMANE ENO E TENG LE KA SETSWANA

BOIKAELELO JWA TOKOMANE ENO

Tokomane eno ya Tshedimosetso ka Porojeke (BID ka Seesemane) e ka bonwa ke Makoko a a Nang le Kgatlhego E bile a Angwa ke Porojeke eno (di-I&AP ka Seemane) gore a tle a kgone go ntsha tshedimosetso ka maikaelelo a Trans-Caledon Tunnel Authority (TCTA) a go tlhabolola le go aga Madirelo a go Itshekisa Metsi le a lobaka lo lo khutshwane lwa go Ntsha Asiti ya Moepo ka Diphaephe / Acid Mine Drainage (AMD) kwa Dibeiseneng tsa Bophirima, Bogare le Botlhaba tsa Witwatersrand mo Gauteng, mo Aforika Borwa. Maloko a I&AP a kopiwa go ntsha ditshwaelo tsa one ka porojeke eno e go tshitshintsweng gore e dirwe. Digby Wells Environmental (Digby Wells) e tlhomilwe ke TCTA gore e dire Tshekatsheko ya Diphelelo Tsa mo Tikologong (EIA ka Seesemane) ya porojeke e go tshitshintsweng gore e dirwe.

Ditshwaelo tsotlhe ka ga EIA di thwanetse go romelwa go:

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Steve Horak

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Imeile: steve@digbywells.com

DINTLHA KA POROJEKE

Morago ga dingwaga di le 120 tsa go epolola gauta mo moepong o o kwa teng wa Witwatersrand, go dira mo moepong le go ntsha metsi mo go one go ne ga emsiwa ka ntlha go bo ditsompelo tsa gauta di ntshitswe tsotlhe. Go emisa go ntsha metsi mo go one go ne ga feleletsa ka gore dikhuti tsa mafika a moepo di rwalelelwe ke metsi fa e sa le ka 1997. Mo Beiseneng ya Bophirima, dikhuti tsa mafika di ne tsa tlala ka metsi a a nang le asiti a a nang le dimmetale tse di thata mme metsi ao a ne a tswela mo didibeng tse di borilweng le mo tšhafong ya bogologolo ka kgwedi ya Lwetse 2002. Ga go na pelaelo gore metsi ao a tla tswela mo Dibeiseneng tsa Bogare le Tsa Botlhaba mo isagweng. Go Ntsha Asiti ya Moepo ka Diphaephe (AMD ka Seesemane) go direga fa manya le matlakala a a nang le motswako wa sebabole (sekai, diminerale tse di nang le sebabole le mmetale) a kopana le metsi le okosejene.

Ka 2010, Khabinete e ile ya tlhoma Komiti ya Balaodi ba ba Sikarisitsweng Maikarabelo (IMC ka Seesemane) go rarabolola bothata jo bo masisi jono jo bo bakwang ke AMD mo Mafelong a Witwatersrand a go Bonwang Gauta mo go One. IMC e ile ya naya Komiti ya Setegeniki maikarabelo a go batlisisa ka mathata AMD. Komiti ya Setegeniki le yone e ne ya tlhoma setlhopha sa bomankge, ba ba neng ba kwala pego e go neng go ise go dirwe tshwetso ya bofelo ka yone ka AMD le go e naya Khabinete ka di 9 tsa Tlhakole 2011.

Pego eno e ne e umaka ditsela-tharabololo di le tharo tsa go itshekisa AMD. Tharabololo ya ka bonako ya go fedisa metsi a a nang le asiti a a setseng a tswa mo Beiseneng ya Bophirima, tharabololo ya lobaka lo lo khutshwane, go pompa metsi go tswa mo Dibeiseneng tsa Bophirima, Bogare le Botlhaba gore bogodimo bo se ka jwa rwalelelwa ke metsi le go fedisa metsi ano pele a tswela mo tikologong le tharabololo ya lobaka lo lo leele e e akaretsang go tlosa asiti le matswai mo metsing a AMD. Lefapha la Merero ya Metsi (DWA ka Seesemane) le sa ntse le dira patlisiso ka tharabololo eno mme ga le bope karolo ya porojeke eno. Ditharabololo tsa ka bonako le tsa lobaka lo lo khutshwane di tshwanetse go nna dikgato tsa ntlha tsa tharabololo eno e e tla tsayang lobaka lo lo leele ya AMD. Ditharabololo tsa ka bonako le tsa lobaka lo lo khutshwane ke tsone setlhogo sa BID eno mmogo le EIA e e batlegang ya porojeke e go tshitshintsweng gore e dirwe.

Pego ya bomankge ba IMC e bontshitse gore ditharabololo di tlhokega ka lepotlapotla e re ka thibelo ya go tswa ga metsi ya AMD mo dibeiseneng tsa moepo go lejwa e le selo se se botlhokwa mo setšhabeng sotlhe. Jaaka nngwe ya dikgato-tharabololo tsa bosetšhaba, DWA e ne morago ga moo ya naya TCTA taelo ya gore e dire jaaka moemedi wa go rulaganya, go tlhama le go tsenya tirisong ka bonako dikgato tsa lobaka lo lo khutshwane tsa go laola AMD kwa Dibeiseneng Tsa Bophirima, Bogare le Tsa Botlhaba tsa Mafelo a go Bonwang Gauta mo go One a Witwatersrand .

TLHALOSO YA DIBEISENE

Beisene ya Bophirima e akaretsa mafelo a Krugersdorp, Witpoortjie le Randfontein. Mafelo a a hirilweng ke moepo mo beiseng eno a akaretsa sekgala se se ka fetang 57km². Beisene ya Bogare e simolola kwa Durban Roodepoort Deep (DRD) kwa bophirima go ya kwa East Rand Proprietary Mines (ERPM) kwa botlhaba. Mafelo a a hirilweng ke moepo mo beiseng eno a akaretsa sekgala se se ka fetang 251km². Beisene ya Botlhaba e akaretsa lefelo la Ranta Botlhaba, go akaretsa le ditoropo tsa Boksburg, Brakpan, Springs le Nigel. Mafelo a a hirilweng ke moepo mo beiseng eno a akaretsa sekgala se se ka fetang 768km².

Leba mmepe o o mametleletsweng fano go bona mafelo a go tlotlwang ka one.

Ga jaanong jaana Beisene ya Bophirima e tswa metsi kwa tšhafong ya bogologolo mme AMD e e itshekisitsweng go se kae le e e sa itshekisiwang gotlhelele e tswela mo Tweelopiesspruit.

Dibeisene tsa Bogare le tsa Botlhaba ga di tswe metsi mme go lebeletswe gore Beisene ya Bogare e tswe metsi ka 2013 le gore Beisene ya Botlhaba e tswe metsi ka 2015.

Go thibela go tswa ga metsi mo dibeiseneng tseno le go emisa go tswa ga metsi kwa Beiseneng ya Bophirima, pego ya setlhopha sa IMC sa bomankge se supile gore metsi a a ka fa tlase ga lefatshe a ne a tshwanetse go bolokwa a le ka fa tlase ga Boalo jo bo Botlhokwa mo Tikologong kgotsa Environmental Critical Level (ECL). Boalo jono bo akaretsa:

- Beisene ya Bophirima: 1,550 m amsl;
- Beinsele ya Bogare 1,467 m amsl; le
- Beisene ya Botlhaba: 1,280 m amsl.

Leba ditshwantsho tse di mametleletsweng fano tsa boalo jwa AMD le ECL.

Boalo jono bo tla thibela go tswa ga metsi a AMD mo isagweng le go thibela go rwalelelwa ke metsi ga boalo jwa dikhuti tse di leng mo mafikeng jaaka moepo wa bojanala wa Gold Reef City. Fa porojeke e go tshitshintsweng gore e dirwe e ka se ka ya tswelela, AMD e e iseng e itshekisiwe e tla tswelela e tswa metsi mo Beiseneng ya Bophirima mme metsi a a iseng a itshekisiwe a tla simolola go tswa kwa Beiseneng ya Bogare le ya Botlhaba.

TLHALOSO YA POROJEKE

TCTA e ile ya dira Tshekatsheko ya Kgonego ya go Dirwa ga Tiro Eno e e ikaegileng ka pego ya ditshitshinyo tsa setlhopha sa bo mankge ba IMC. Pego ya tshekatsheko ya kgonego ya go dirwa ga tiro eno e ne ya tshitshinya gore thekenoloji e e latelang ya go itshekisiwa ga AMD le sere se se dirisediwang go baka phetogo ya dikhemikale se dirisediwe go itshekisiwa ga AMD:

- Go fetolwa ga dikhemikale ka go di kopanya le mowa wa okosejene;
- Go fokotsa dikhemikale go sa le gale le go tlosa dimmetale ka kalaka;
- Go fokotsa dikhemikale la bofelo le go tlosa dimmetale ka kalaka, go go dirwang ka go koafatsa khalesiamo-okosaete kgotsa *quicklime*; le
- Go fetola gepise gore e nne dikeresetale go tlosa salefeiti e e setseng mo motswakong.

Madirelo a go tshitshintsweng gore a dirwe a go itshekisa AMD a tla bo e le a a theilweng mo thulaganyong e go ntshitsweng bosupi jwa gore e ka ikanngwa ya Seretse se se Loileng Thata kgotsa High Density Sludge (HDS) e e tlhamilweng ke CSIR.

Setsha sa bodirelo jo go tshitshintsweng gore bo dirwe jwa go itshekisa metsi jwa Beisene ya Bophirima ya AMD jwa tharabololo ya ka bonako se kwa Setsheng sa Rand Uranium mo e ka nnang 5km borwa-bophirima jwa Krugersdorp mme go iwa kwa go sone ka go dirisa tsela ya R28 ya Main Reef.

Malebana le Beisene ya Bophirima, dikgato tsa tharabololo ya ka bonako di akaretsa dilo tse di latelang:

- Go tlhabololwa ga Bodirelo jo bo ntseng bo le gone Jwa go Itshekisa Metsi Jwa Rand Uranium le go bo tsenya ditshipi tse dintšha; le
- Go busetsa mo tirong ditshipi tse di dikologang tsa Bodirelo

Jwa go Itshekisa Metsi Jwa Rand Uranium.

Malebana le ditharabololo tsa lobaka lo lo khutshwane, go tshwanetse ga dirwa ditironyana tse di latelang mo beiseneng nngwe le nngwe .

Beisene ya Bophirima

Bodirelo jo boša jwa go itshekisa metsi jwa tharabololo ya lobaka lo lo khutshwane bo tlile go tlhomiwa kwa setsheng sa Randfontein Estates go lebagana le setsha sa Rand Uranium. Ditiro tsa teng di tla akaretsa:

Go aroganngwa ga AMD ka dipompo tse di tsentsweng kwa Tšhafong No. 8 ya Rand Uranium tsa boteng jo bo fitlhang go ECL;

Go agiwa bodirelo jwa go itshekisa metsi jwa HDS kwa setsheng sa Randfontein Estates;

- Go tsenngwa ga diphaephe tse di tsamaisang seretse go ya kwa bokgwelong jwa Tweelopiespruit; le
- Go agiwa ga dipompo le diphaephe tse di tshololelang seretse se se latlhiwang kwa moepong wa bogologolo o o bulegileng fa godimo se se tswang ka nako ya go itshekisiwa ga diedi
- Go agiwa ga bodirelo jo boša jwa HDS kwa Tšhafong ya SWV;

Beinsene ya Bogare

Bodirelo jwa go itshekisa diedi tsa AMD tsa Beisene ya Bogare jo go tshitshintsweng gore bo dirwe bo tlile go nna mo e ka nnang 1,8km go ela kwa botlhaba jwa Bogare Jwa Toropo ya Germiston ka fa bophirima jwa karolo ya ERPM ya Tšhafo e e yang kwa tlase ya Borwa Bophirima. Ka fa bokone jwa setsha seno go feta Tsela-Tlase ya Boksburg, mme ka fa bophirima le ka fa borwa go feta Brammer Street le Power Street, mme ka fa botlhaba go feta seporo sa Transnet. Ditiro tsa teng di tla akaretsa:

- Go aroganngwa ga AMD ka dipompo tse di tsentsweng kwa Tšhafong e e Yang Kwa Tlase e e ka fa Borwa Bophirima (SWV

ka Seesemane) tse di pompelang go fitlha kwa ECL;

- Go tsenngwa ga diphaephe tse di tsamaisang seretse go ya kwa bodirelong jwa Crown Knights Gold;
- Go tsenngwa ga diphaephe tse di itshekisang metsi tse di yang kwa bokgwelong jo bo tshwanetseng jwa Elsburgspruit; le
- Go dira tshekatsheko ya go bona gore a go ka kgonega gore go nne le phaephe mo isagweng e e tsamaisang seretse se se latlhiwang go ya kwa Bobolokelong Jwa Matlakala a Manya (TSF ka Seesemane) jwa ERGO kwa Brakpan le go rulaganyetsa gore phaephe eo e nne teng, kgotsa, go ya kwa madirelong a a ka fa tlase ga lefatshe a bogologolo a ERPM.

Beisene ya Botlhaba

Bodirelo jo go tshitshintsweng gore bo dirwe jo bo itshekisang metsi jwa AMD ya Beisene ya Botlhaba bo tla bo bo le kwa Tšhafong ya No. 3 ya Moepo wa Grootvlei bokgakala jwa mo e ka nnang 4,6km go ela kwa botlhaba jwa Bogare Jwa Toropo ya Springs. Go iwa kwa setsheng seno ka Tsela ya R29 ya Ermelo le Tsela ya Grootvaly go

kgabaganya motsesetoropo wa Casseldale. Ditiro tsa teng di tla akaretsa:

- Go aroganngwa ga AMD ka dipompo tse di tsentsweng kwa Tšhafong No. 3 ya Grootvlei ka boteng jo bo fitlhang kwa boalong jwa ECL kgotsa boteng;
- Go agiwa ga bodirelo jo boša jo bo itshekisang diedi jwa HDS go lebagana le tšhafo ya No. 3 ya Grootvlei;
- Go dira tshekatsheko ya go bona gore a go ka kgonega gore go tsenngwe phaephe e e tsamaisang seretse se se latlhiwang go ya kwa Daggafontein kgotsa kwa TSF ya Brakpan; le
- Go tsenngwa ga diphaephe tse di itshekisang metsi tse di yang kwa bokgwelong jo bo tshwanetseng jwa Blesbokspruit.

Porojeke eno yotlhe e bidiwa "Porojeke ya Witwatersrand ya Mafelo a go Bonwang Gauta mo go One a AMD". E tlile go dirwa mo lobakeng lwa dingwaga di le tharo go ya go di le nne tse di tlang.

DIPATLALAFALO TSA KGOTLATHEOMOLAO

E re ka ditiro tsa porojeke eno di batla gore go tlhabololwe dikago tse di leng teng gone jaanong le go agiwa ga dikago tse dintšha, go tla tshwanelwa ke gore go dirwe EIA tumalanong le Molao wa Bosetšshaba wa go Laola Tikologo, Molao wa Bosetšshaba wa go Laola Tikologo, 1998 (Molao wa bo 107 wa ka 1998) (NEMA ka Seesemane) gore go ntshiwe taolo ya gore go dirwe ditiro tse di leng mo lenaaneng la GNR 544 la di 18 Seetebosigo 2010 (GNR 544) le GNR 545 ya di 18 Seetebosigo 2010 (GNR 545) le le gatisitsweng go ya ka Dikarolo 24(2) le 24D tsa NEMA. Gape go batliwa le laesense ya go tlosa matlakala go ya ka GNR 718 ya di 3 Phukwi 2009 (GNR 718) e e gatisitsweng go ya ka karolo 19(1) ya Molao wa Bosetšshaba wa go Laola Tikologo ya: Molao wa Matlakala, 2008 (Molao wa bo 59 wa ka 2008) (NEM:WA) Ka jalo, go rometswe kopo e e kopantsweng kwa Lefapheng la Merero ya Tikologo (DEA ka Seesemane) jaaka go tlhalosiwa mo karolong 24L ya NEMA le mo karolong 44 ya NEM;WA.

Ditiro tse di kwadilweng mo lenaaneng tse go dirilweng kopo ya gore di dirwe di akaretsa ditiro tse go kwadilweng Lenaane la tsone tsa 9, 11, 13, 18, 23, 28, 37 le 39 tsa GNR 545 le ditiro tse go kwadilweng lenaane la tsone tsa 3, 5 le 10 tsa GNR 545.

Setlhopha A sa tiro 19 ya go tlosa matlakala le Setlhopha B sa ditiro 1, 6, 7 le 9 tsa go tlosa matlakala jaaka go kwadilwe go GNR 718 di ile tsa tlhaolwa jaaka ditiro tsa go tlosa matlakala tse di batlang laesense ya go tlosa matlakala.

THULAGANYO YA GO NNA LE SEABE GA BAAGI

Thulaganyo ya go Nna le Seabe ga Baagi (PPP ka Seesemane) ke karolo e e botlhokwa ya go dirwa ga thulaganyo ya EIA go tlhomamisa gore maloko a I&AP a newa tshono ya go ntshsa ditshwaelo malebana le porojeke eno e go tshitshintsweng gore e dirwe. Digby Wells e tla etelela pele PPP mme ditshwaelo dipe tse di amogetsweng go tswa go maloko a I&AP di tla kwalwa mme di tla thusa mo thulaganyong ya go dirwa ga ditshwetso. Maloko otlhe a I&AP a kopiwa go ikwadisa mo go Digby Wells ka go dirisa dintlha tsa kgokagano tse di kwadilweng fa tlase.

GO IKWADISA JAAKA LELOKO LA I&AP

Go tlhomamisa gore o ikwadisitse jaaka leloko la I&AP le go amogela tshedimosetso e e tlhabolotsweng ya porojeke, tsweetswee tlatsa foromo e e mametleletsweng fano ya go ikwadisa.

Diforomo tsa ditshwaelo le tsa go ikwadisa di ka romelwa go:

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Appendix A

Acid Mine Drainage Project

Western, Central and Eastern Basins

WESTERN BASIN SITE

Western Basin Site
26° 8' 6.923" S
27° 43' 10.531" E

1:10000

CENTRAL BASIN SITE

MILLER
ABKIN
RINKHALS
TIDE
BRAMMER
POWER
ARKINS
JACK PIENAAR
LABASSEE
STRACHAN
BRAMMER

Central Basin Site
26° 13' 3.277" S
28° 10' 56.877" E

1:10000

EASTERN BASIN SITE

DYER
MADELEY
LARGO
CAREY
TOWNSEND

Eastern Basin Site
26° 15' 5.173" S
28° 29' 19.461" E

1:10000

TEMBISA
M38
M57
R561
R25
M39
R23
R51
SANDTON
RANDBURG
KEMPTON PARK
EDENVALE
BENONI
Delmas Local Municipality
Mogale City Local Municipality
R24
KRUGERSDORP
GAUTENG
Western Basin Site
R47
Randfontein Local Municipality
RANDFONTEIN
ROODEPOORT
JOHANNESBURG
City of Johannesburg
Ekurhuleni Municipality
R555
R77
R70
R41
M2
Central Basin Site
BOKSBURG
BRAKPAN
Eastern Basin Site
SPRINGS
R558
SOWETO
ALBERTON
R21
R29
R559
N17
Mooirivierloop
WESTONARIA
N12
Klip
R554
Natalspruit
R45
Westonaria Local Municipality
R553
N1
R28
R42
Rietspruit
R103
R82
R59
N3
NIGEL
R557
Midvaal Local Municipality
R550
Lesedi Local Municipality

25°40'0"S
25°45'0"S
25°50'0"S
25°55'0"S
26°0'0"S
26°5'0"S
26°10'0"S
26°15'0"S
26°20'0"S
26°25'0"S

27°40'0"E
27°45'0"E
27°50'0"E
27°55'0"E
28°0'0"E
28°5'0"E
28°10'0"E
28°15'0"E
28°20'0"E
28°25'0"E
28°30'0"E

Legend

- Project Sites
- City
- Major Town
- National Road
- Main Road
- Rivers
- Municipalities
- Provincial Boundary

DIGBY WELLS ENVIRONMENTAL
www.digbywells.com

Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

Ref #:amc.BKS1310.201112.038
Revision Number: 1
Date: 08/12/2011

N

0 5 10 20
Kilometres
1:350 000

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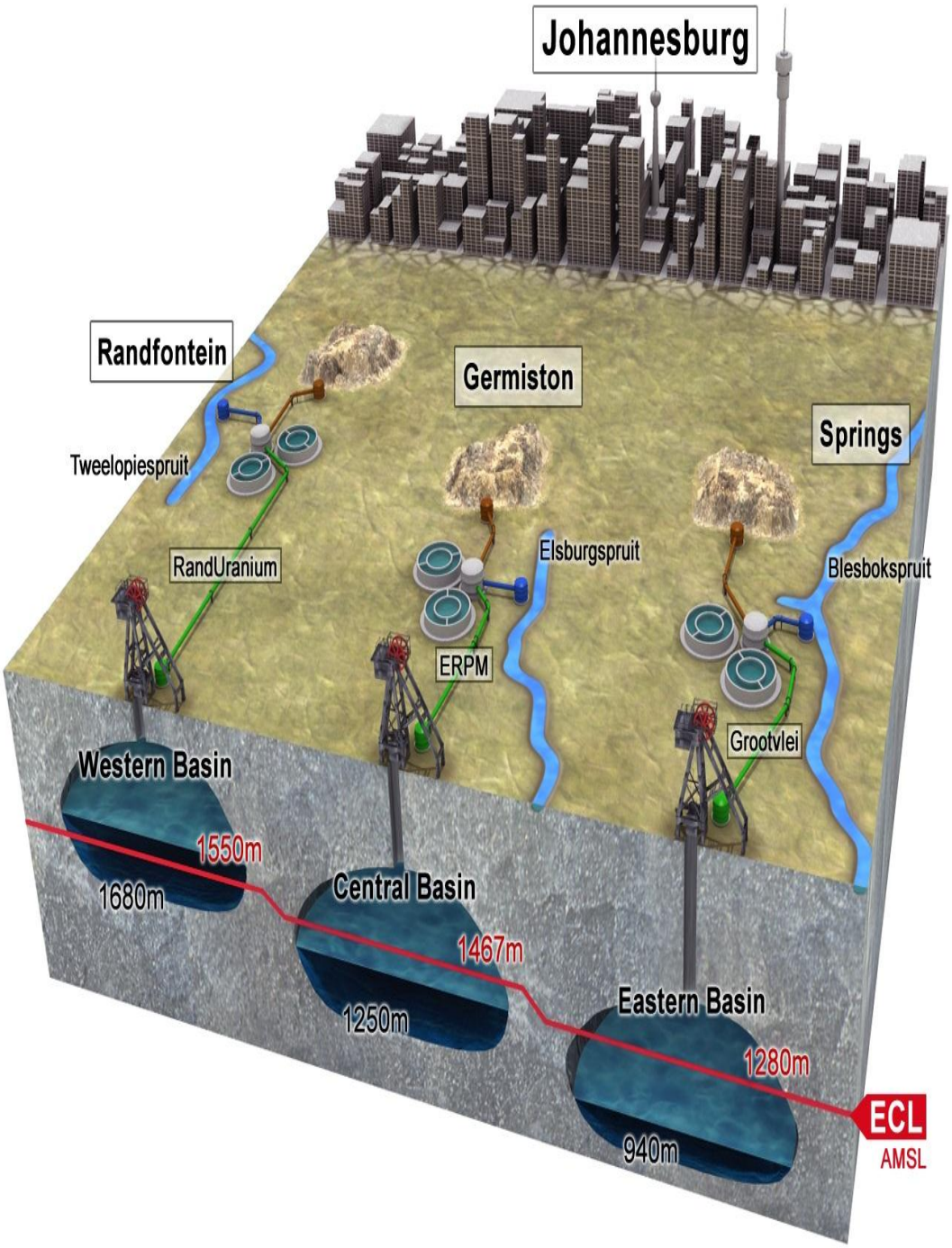
Setshwantsho sa 1: Setshwantsho sa boalo jwa AMD le ECL



FOROMO YA GO IKWADISA LE YA GO NTSHA DITSHWAELO YA POROJEKE YA MAFELO A GO KA BONWANG GAUTA MO GO ONE A WITWATERSRAND

DINOMORE TSA TSHUPISO TSA DEA: DEA/EIA/0000498/2011 & DEA12/12/20/2403

Tsweetswee tlatsa foromo eno mme o e busetse go Digby Wells Environmental go tlhomamisa gore o kwadisitswe jaaka Leloko le le Nang le Kgatlhego mo go Seno le le le Angwang ke Porojeke eno.

Ka go araba potso e e fa tlase o tla re thusa go tlhaloganya botoka tshedimosetso e e bontshang dipatlafalo tsa gago. Gape foromo eno e go naya tshono ya go dira ditshwaelo ka porojeke eno. O ka nna wa tshwaraganya ditsebe tse di oketsegileng fa go ka tlhokega jalo.

TSHEDOMOSETSO YA GA GO			
Sereto (Rre/Mme/Ngaka/Mop):			
Leina			
Sefane:			
Tsweetswee supa gore a o ikwadisa jaaka Baagi / Setlamo / Polasi/ kgotsa Kgwebo mme o re neye leina:			
Aterese ya tiro:			
Aterese ya Poso:		Mogala:	
		Sele:	
		Imeili:	
		Fekese:	
KGATLHEGO KA KAKARETSO MO POROJEKENG ENO			
A o na le ditshwaelo dipe tse di kgethegileng ka go tlhabololwa ga Madirelo a go Itshekisa Metsi a Rand Uranium a Beisene ya Bophirima le go agiwa ga Madirelo a maša a go Itshekisa Metsi a Beisene ya Bophirima, ya Bogare le ya Botlhaba?			

Fa o itse motho ope fela yo o tshwanelwang ke go bolelelwa ka porojeke eno tsweetswee kwala dintlha tsa go ikgolaganya le ene fa tlase fano:			
Leina			
Sefane:			
Baagi / Setlamo / Polasi:			
Aterese ya tiro:			
Aterese ya Poso:		Mogala:	
		Sele:	
		Imeili:	
MOKGWA WA PUISANO			
O eletsa gore go buisanwe le wena ka mokgwa ofe? Tsweetswee tshwaya bokoso e e maleba:		Fekese:	Imeili:
		Poso:	SMS:

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UMBHALO ONIKEZA ISENDLALELO NGEZINTO EZIHAMBISANA NOKUNGENELELA NGOKUSHESHA KWESIKHASHANA MAYELANA NE-ACID MINE DRAINAGE EMIGODINI ESENTSHONALANGA, MAPHAKATHI KANYE NASEMPUMALANGA NE-WITWATERSRAND

DEA REFERENCE NUMBERS: DEA/EIA/0000498/2011 & DEA12/12/20/2403

HIERDIE DOCUMENT IS BESKIKBAAR IN AFRIKAANS OP AANVRAAG ·

LENCWADI IYATHOLAKALA NGOLIMI LWESIZULU ·

TOKOMANE ENO E TENG LE KA SETSWANA.

INHLOSO YALE NCWADI

Le ncwadi eyisendlalelo (BID) iyatholakala kwabayingxenye nabathintekayo (I&APs) ukuze inikeze imininingwane mayelana nenhloso ye-Trans-Caledon Tunnel Authority (TCTA) yokuphucula nokwakha izihlanzi zamanzi ukuze kuhlanzwe ngokushesha nangokwesikhashana imigodi ye-Acid Mine Drainage (AMD) eNtshonalanga, maphakathi naseMpumalanga ne-Witwatersrand e-Gauteng, eNingizimu Afrika. Abayingxenye nabathintekayo bayamenywa ukuba balethe eyabo imibono mayelana nephrojekthi ephakanyisiwe. Abakwa-Digby Wells Environmental (Digby Wells) baqokiwe yi-TCTA ukuthi babheke ukuHlolwa koMthelela eNdaweni (EIA) kule phrojekthi ehlongoziwe.

Yonke imibono kufanele ibhekiswe kwabakwa:

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Uyacelwa uqinisekise ukuthi uyaligcwalisa ifomu lokubhalisa nelokuphawula.

ISENDLALELO NGEPHROJEKTHI

Emva kweminyaka engaphezu kweyi-120 yokumbiwa kwegolide ezingeni elijulile e-Witwatersrand, ukumbiwa kwegolide nokumonywa kwamanzi sekumisiwe ngenxa yokuphela kwegolide. Ukumiswa kokumonywa kwamanzi sekuholele ekchithekeni okungapheli kwemigodi yezimayini kusukela ngonyaka we-1997 e-mgodini oseNtshonalanga, imigodi egcwele amanzi ane-esidi aqukethe imethali enzima bese kuvuzela emapitsini amaningi nasemgodini omdala ngoMandulo wez-2002. Kungenzeka imigodi emaphakathi neseMpumalanga iqhume ngokuhamba kwesikhathi. I-Acid Mine Drainage (AMD) yenzeka uma insimbi embiwayo kanye nendle, ehlangene nama-sulphide, (pyrite) kuhlangana namanzi ne-oksijini.

Ngonyaka wezi-2010, iKhabhinethi yakhetha iKomidi loNgqongqoshe (IMC) elizobhekana nezinselele ezinzima ezidalwa yi-AMD endaweni yase-Witwatersrand Goldfields. Leli komidi elaliqokelwe lokhu, ukuba liphenye ngezindaba ze-AMD. Ikomiti labe nalo seliqoka ithimba lezazi, ezahlela zase zethula umbiko owuhlaka mayelana ne-AMD phambi kweKhabhinethi ngomhlaka 9 kuNhlolanja 2011.

Umbiko waveza izindlela ezintathu zokungenelela ukusombulula udaba lwe-AMD. Indlela esheshayo yokungenelela wukuthena amandla amanzi ene-esidi vele ephumaemgodini oseNtshonalanga, ukungenelela okuzosiza okwesikhashana, ukuphampa amanzi emgodini oseNtshonalanga, Maphakathi naseMpumalanga ukugwema ukugubheka komhlaba kanye nokuthena amandla kula manzi ngaphambi kokuthi aphumele emphakathini kanti isixazululo senkathi ende sibandakanya ukuthenwa amandla kwamanzi ane-esidi nokukhishwa kosawoti emanzini e--AMD lesi sixazululo sisaphenywa nguMnyango wezaManzi (DWA) futhi asiyona ingxenye yale phrojekthi. Isixazululo esisheshayo senkathi emfushane sizokwenziwa njengengxenye yokungenelela kwenkathi ende ku-AMD. Isixazululo esisheshayo nesenkathi ende kuncike ku-BID kanye ne-EIA edingekayo yephrojekthi ehlongozwayo.

Umbiko wezazi ze-IMC waveza ukuthi izingenelelo zidingeka ngokushesha ukuze zivikele i-AMD ukuba ingene emigodini yezimayini futhi lokhu kubaluleke kakhulu. Njengengxenye yokunciphisa lokhu, uMnyango wezaManzi usukhiphe i-TCTA nomyalelo wokusebenza njengomenzeleli wokuhlela, ukusungula kanye nokwenziwa kohlelo oluphuthumayo kanye nolwesikhashana ukuze kulawulwe i-AMD emigodini eseNtshonalanga, maPhakathi kanye neseMpumalanga ye-Witwatersrand Goldfields.

INCAZELO YEMIGODI

Imigodi yaseNtshonalanga ibandakanya i-Krugersdorp, Witpoortjie kanye nezindawo ezise-Randfontein. Ilisi yemayini kulo mgodi ingaphezu kwama-57km². Umgodi omaphakathi uze ufike e-Durban Roodepoort Deep (DRD) entshonalanga ne-East Rand Proprietary Mines (ERPM) empumalanga. Ilisi yemayini ezindaweni zalo mgodi ilinganiselwa kuma-251km^2. Umgodi oseMpumalanga ubandakanya ne-East Rand, kanye namadolobha ase-Boksburg, Brakpan, Springs nase-Nigel. Ilisi yemayini kule ndawo ize ifinyelele cishe ngaphezu kwama-768km^2. Buka ibalazwe elingemuva ukuze ubone indawo okukhulunywa ngayo.

Njengamanje umgodi waseNtshonalanga uchithela emgodini omdala i-ADM ehlanzwe kancane nengahlanzwanga ichithelwa e-Tweelopiesspruit.

Umgodi omaphakathi noseMpumalanga ayichithi kodwa kulindeleke ukuba ichithe ngonyaka wezi-2013 omaphakathi nowezi-2015 oseMpumalanga.

Ukuze kuvikelwe ukuchitheka kule migodi kumiswe nasemgodini oseNtshonalanga, umbiko wethimba lezazi ze-IMC waveza ukuthi amazinga amanzi angaphansi komhlaba kudingeka agcinwe engaphansi kwe-Environmental Critical Level (ECL). Lawa mazinga athi:

- Umgodi oseNtshonalanga: 1,550 m amsl;
- Umgodi oMaphakathi 1,467 m amsl; kanye
- Nomgodi oseMpumalanga: 1,280 m amsl.

Buka umfanekiso wamazinga osekugcineni ukuze ubone amazing e-AMD nawe-ECL.

Lawa mazinga azogwema ukuchitheka kwe-AMD esikhathini esizayo emigodini enamazinga aphansi njengemayini yezivakashi i-Gold Reef City. Uma iphrojekthi ehlongozwayo ingaqhubeki, i-AMD engahlanziwe izoqhubeka nokuchitheka emgodini oseNtshonalanga kuphinde kuqale nasemgodini oseMaphakathi noseMpumalanga.

UKUCHAZWA KWEPHROJEKTHI

I-TCTA yenza iphepha lesivumelwano yalisekele ezincomweni ezazenziwe yithimba lezazi ze-IMC. Umbiko wesivumelwano wawuphakamisa ukuthi ubuchwepheshe obulandelayo bokuhlanzwa kwe-AMD namakhemikhayili kusetshenziswe uma kuhlanzwa i- AMD:

- Ukulumbanisa nge-oksijini ngokubhubhudla ngogesi;
- Ukuthenwa amandla kuqala nokususwa kwensimbi nge-limestone;
- Ukuthenwa amandla kokugcina nokukhishwa kwensimbi ngomcako, ekhiqizwe wukuxutshwa kwamanzi nomcako, kanye
- Ukuphendulwa kwe-Gypsum ibe ngamakhristali ukuze kususwe i-sulphate esele engxubeni.

Izihlanzi ze-ADM eziphakanyisiwe zizosekelwa phezu kohlelo oluthembekile nolusebenzayo lwe-High Density Sludge (HDS) olwenziwa ngabe-CSIR.

Isayithi yesihlanzi se-AMD esihlongozwayo somgodi oseNtshonalanga sokungenelela okuphuthumayo sitholakala e-Rand Uranium Property okungenani ama-5km eningizimu-ntshonalanga yase-Krugersdorp futhi itholakala uma uhamba ngo-R28 Main Reef Road.

Emgodini oseNtshonalanga, ukungenelela okuphuthumayo kubandakanya lokhu okulandelayo:

- Ukuphuculwa nokufitha kabusha kwesihlanzi samanzi sase-Rand Uranium Water Treatment Plant; kanye
- Ukubuyiselwa kwezitimela ezengeziwe zesihlanzi sase-Rand Uranium Water Treatment ukuze kuphinde kuqaliswe umsebenzi.

Ukwenziwa kokungenelela kwesikhathi esifushane kudingeka kwenziwe lokhu okulndelayo emgodini ngamunye.

Umgodi waseNtshonalanga

Isihlanzi esisha se-HDS esiyisixazululo esiphuthumayo sizoba se-Randfontein Estates indawo encikene ne-Rand Uranium. Okwenziwayo kuyobandakanya:

- Ukuqedwa kwe-AMD kusetshenziswa amaphampu afakwe emgodini ose-No. 8 e-Rand Uranium ekujuleni okuzofeza i-ECL;
- Ukwakhiwa kwesihlanzi esisha se-HDS kusayithi yase-Randfontein Estates;
- Ukwakhiwa kwepayipi lamanzi ahlanziwe eliya endaweni yokulahla efanele e-Tweelopiespruit; kanye
- Nokwakhiwa kwamaphampu namapayipi okulahla indle abheke emigodini emidala ukuze kulahlwe udoti ngesikhathi sokuhlanza.

Umgodi omaphakathi

Umgodi omaphakathi ohlongozwayo wesihlanzi se-AMD uyokwakhiwa endaweni elinganiselwa kuma-1,8km empumalanga ne-Germiston CBD ngasentshonalanga nengxenye ye-ERPM South West Vertical Shaft. Le sayithi itholakala enyakatho yase-Lower Boksburg Road, entshonalanga naseningizimu ya-Brammer Street kanye no-Power Street ngokulandelana kwakhona, kanye nasempumalanga kojantshi wakwa-Transnet. Okuzokwenziwa kuyobandakanya:

- Ukuqedwa kwe-AMD kusetshenziswa amaphampu afakwe emgodini ose- South West Vertical (SWV) Shaft ukuphampela e-ECL;
- Ukwakhiwa kwesihlanzi esisha se-HDS e-SWV Shaft;
- Ukwakhiwa kwepayipi lendle endaweni yesihlanzi i-Crown Knights Gold;
- Ukwakhiwa kwepayipi lamanzi ahlanziwe eliya endaweni yokulahla efanele e-Elsburgspruit; kanye
- Ukuphenya nokuhlelela ukwakhiwa kwepayipi lokulahla udoti e-ERGO Brakpan Tailings Storage Facility (TSF) kanye, noma-ke, endaweni yakudala engaphansi komhlaba yase-ERPM.

Umgodi oseMpumalanga

Umgodi we-ADM wesihlanzi samanzi ohlongozwa eMpumalanga uyoba se-Grootvlei Mine Shaft No. 3 endaweni elinganiselwa kuma-4,6km ukuya empumalanga ne-Springs CBD. Le sayithi itholakala uma uhamba ngo-R29 Ermelo Road kanye no-Grootvaly Road kunqamula e-Casseldale. Okwenziwayo kuyobandakanya:

- Ukuqedwa kwe-AMD kusetshenziswa amaphampu afakwe emgodini ose Grootvlei No. 3 shaft ekujuleni kwephampu ezofinyelela ezingeni le-ECLl noma ezingeni;
- Ukwakhiwa kwesihlanzi esisha se-HDS esincikene ne-Grootvlei No. 3 shaft;
- Ukuphenya nokuhlelela ukwakhiwa kwepayipi lokulahla udoti e-Daggafontein noma e-Brakpan TSF; kanye
- Nokwakhiwa kwepayipi lamanzi ahlanziwe ukuya endaweni yokulahla efanele e- Blesbokspruit.

Le phrojekthi yonkana ibizwa ngokuthi yi-“Witwatersrand Goldfields AMD Project”. Izoqaliswa esikhathini esiyiminyaka emithathu kuya kwemine.

IZIDINGO ZEZOMTHETHO

Njengoba ukuqhutshwa kwephrojekthi kudinga ukuphuculwa kwengqalasizinda ekhona kanye nokwenziwa kwentsha, i-EIA iyodingeka ukuze kulandelwe i-National Environmental Management Act, i-National Environmental Management Act, 1998 (UMthetho onguNombolo.107 we-1998) (NEMA) ukugunyazwa kwezinto ezisohleni oluqukethwe ku-GNR 544 yango-18 June 2010 (GNR 544) kanye ne-GNR 545 yango-18 June 2010 (GNR 545) eshicilelwe ngokuka-Sections 24(2) kanye no-24D i-NEMA. Ilayisensi yendle nayo iyadingeka ngokwe-GNR 718 yango-3 July 2009 (GNR 718) eshicilelwe ngokuka-section 19(1) we-National Environmental Management: Waste Act, 2008 (UMthetho ongu No. 59 wangowezi-2008) (NEM:WA). Isicelo esididiyelwe sesenziwe kuMnyango wezeMvelo (DEA) njengoba kusho ku-section 24L we-NEMA kanye no-section 44 we-NEM:WA.

Izenzo ezilandelayo esezifakelwe isicelo zibandakanya 9, 11, 13, 18, 23, 28, 37 kanye no-39 we-GNR 545 kanye nokusohlwini okwenziwayo okungu-3, 5 kanye no-10 we-GNR 545.

Ingxenye A wokwenziwayo kokulawula ukuphathwa kwendle okungu-19 kanye neNgxenye B wokwenziwayo ukulawula ukuphathwa kwendle okungu-1, 6, 7 kanye no-9 njengoba kuqukethwe ku-GNR 718 sekubalulwe njengemisebenzi yokuphathwa kwendle okudinga imvume yokuphathwa kwendle.

UHLELO LOKUBANDAKANYWA KOMPHAKATHI

Uhlelo lokuBandakanywa koMphakathi (PPP) lungolubalulekile kuzo zonke izinhlelo ze-EIA ukuze kuqinisekiswe ukuthi ama-I&APs anikeziwe ithuba lokuphawula ngephrojekthi ehlongozwayo. Abakwa-Digby Wells bazoqhuba i-PPP kanti yonke imibono etholakele kuma-I&APs izoqoshwa futhi ibe nomthelela lapho kuthathwa isinqumo. Wonke ama-I&APs ayacelwa ukuba

babhalise kwabakwa-Digby kule mininingwane enikeziwe.

UKUBHALISA NJENGE-I&AP

Ukuqinisekisa ukuthi ubhalisile njenge- I&AP nokuthola imininingwane emisha ngephrojekthi, uyacelwa ukuba ugcwalise leli fomu lokubhalisa elinyathelisiwe.

Amafomu okuphawula nokubhalisa angathunyelwa lapha:

DIGBY WELLS ENVIRONMENTAL

Steve Horak

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Randburg,

2125

Ikheli lendawo:

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Pretoria Avenue,

Randburg, 2125

Appendix A

Acid Mine Drainage Project

Western, Central and Eastern Basins

WESTERN BASIN SITE

Western Basin Site
26° 8' 6.923" S
27° 43' 10.531" E

1:10000

CENTRAL BASIN SITE

MILLER
ABKIN
RINKHALS
TIDE
BRAMMER
POWER
ARKINS
JACK PIENAAR
LABASSEE
STRACHAN
BRAMMER

Central Basin Site
26° 13' 3.277" S
28° 10' 56.877" E

1:10000

EASTERN BASIN SITE

DYER
MADELEY
LARGO
CAREY
TOWNSEND

Eastern Basin Site
26° 15' 5.173" S
28° 29' 19.461" E

1:10000

TEMBISA
M38
M57
R561
R25
M39
R23
R51
SANDTON
RANDBURG
KEMPTON PARK
EDENVALE
BENONI
Delmas Local Municipality
Mogale City Local Municipality
R24
KRUGERSDORP
GAUTENG
Western Basin Site
R47
Randfontein Local Municipality
RANDFONTEIN
ROODEPOORT
JOHANNESBURG
City of Johannesburg
Ekurhuleni Municipality
R555
R77
R70
R41
M2
Central Basin Site
BOKSBURG
BRAKPAN
Eastern Basin Site
SPRINGS
R558
SOWETO
ALBERTON
R21
R29
R559
N17
Mooirivierloop
WESTONARIA
N12
Klip
R554
Natalspruit
R45
Westonaria Local Municipality
R553
N1
R28
R42
Rietspruit
R103
R82
R59
N3
NIGEL
R557
Midvaal Local Municipality
R550
Lesedi Local Municipality

25°40'0"S
25°45'0"S
25°50'0"S
25°55'0"S
26°0'0"S
26°5'0"S
26°10'0"S
26°15'0"S
26°20'0"S
26°25'0"S

27°40'0"E
27°45'0"E
27°50'0"E
27°55'0"E
28°0'0"E
28°5'0"E
28°10'0"E
28°15'0"E
28°20'0"E
28°25'0"E
28°30'0"E

Legend

- Project Sites
- City
- Major Town
- National Road
- Main Road
- Rivers
- Municipalities
- Provincial Boundary

DIGBY WELLS ENVIRONMENTAL
www.digbywells.com

Projection: Transverse Mercator
Datum: Hartebeesthoek 1994
Central Meridian: 29°E

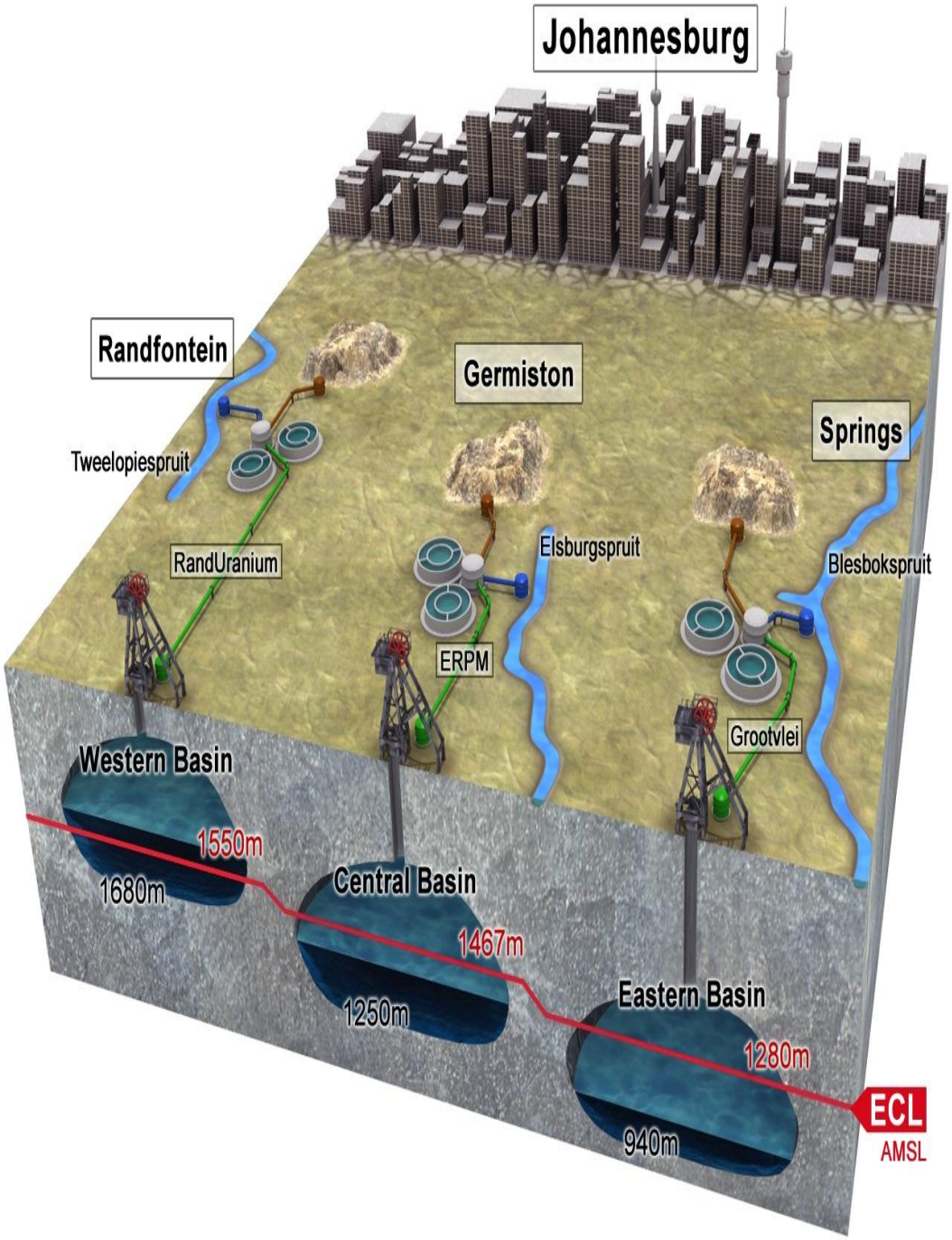
Ref #:amc.BKS1310.201112.038
Revision Number: 1
Date: 08/12/2011

N

0 5 10 20
Kilometres
1:350 000

© Digby Wells Environmental

Umfanekiso 1: Umfanekiso obonisa amazinga e-AMD kanye ne-ECL



IFOMU LOKUBHALISA LOKUPHAWULA NGE-WITWATERSRAND GOLDFIELDS AMD PROJECT

DEA REFERENCE NUMBERS: DEA/EIA/0000498/2011 & DEA12/12/20/2403

Uyacelwa ukuba ugcwalise leli fomu bese ulibuyisela kwa-Digby Wells Environmental ukuqinisekisa ukuthi ubhalisiwe njengoyiNgxenye yabaneNtshisekelo naba Chaphazelekayo

Ngokuphendula imibuzo engezansi uzoselekelela ukuba siqonde kangcono ngemininingwane. Ifomu liphinde linikeze ithuba lokubeka eyakho imibon ngephrojekthi. Amakhasi engeziwe anganezelelwa uma kunesidingo.

IMININGWANE YOMUNTU			
Isikhundla (Mnu/Nkk/Dkt/Slz):			
Igama:			
Isibongo:			
Uyacelwa ukuba ubalule ukuthi ubhalisa njengoMphakathi / INhlangano / iFamu noma iBhizinisi bese unikeza igama:			
Ikheli lendawo:			
Ikheli leposi:		Ucingo:	
		Iselula:	
		I-imeyli:	
		Ifeksi	
INTSHISEKELO ETHILE KULE PHROJEKTHI			
Unako ukuphawula okuthile mayelana nokulungiswa kwe-Rand Uranium Water Treatment Works e-Western Basin kanye nokwakhiwa kwentsha i-Water Treatment Works e-Western, Central kanye nase-Eastern Basins?			

Uma kukhona omaziyo okufanele aziswe ngale-phrojekthi, uyacelwa ukuba unikeze imininingwane yokuxhumana naye lapha ngezansi:			
Igama:			
Isibongo:			
Umphakathi / Inhlangano/ Ifamu:			
Ikheli lendawo			
Ikheli leposi:		Uthelefoni:	
		Iselula:	
		I-meyli:	
UHLOBO LOKUXHUMANA			
Yiluphi uhlobo lokuxhumana ongathanda ukuthintwa ngalo? Uyacelwa ukuba ufakwe uqhwi ebhokisi elifanele:		Ifeksi:	I-imeyli:
		Iposi:	I-SMS:

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NOTICE FOR THE AUTHORISATION OF LISTED ACTIVITIES ASSOCIATED WITH THE IMMEDIATE, AND SHORT TERM INTERVENTIONS FOR THE MANAGEMENT MEASURES OF ACID MINE DRAINANGE IN THE WESTERN, CENTRAL AND EASTERN BASINS OF THE WITWATERSRAND GOLDFIELDS

DEA REFERENCE NUMBERS: DEA/EIA/0000498/2011 & DEA12/12/20/2403

This notice is hereby given in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) ("NEMA") for the authorisation of listed activities contained in GNR 544 of 18 June 2010 ("GNR 544") and GNR 545 of 18 June 2010 ("GNR 545") published in terms of Sections 24(2) and 24D the NEMA, for the refurbishment and development of water treatment plants for the treatment of Acid Mine Drainage ("AMD") in the Eastern, Central and Western Basins of the Witwatersrand Gold Fields, Gauteng Province. A waste licence is also required in terms of GNR 718 of 3 July 2009 ("GNR 718") published in terms of section 19(1) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) ("NEM:WA"). An integrated application has, therefore, been made to the Department of Environmental Affairs ("DEA") as provided for in section 24L of the NEMA and section 44 of the NEM: WA.

Project motivation
The underground mining operations within the Eastern, Central and Western Basins have ceased, and with this the dewatering of the mine workings has stopped. This has resulted in the formation of acidified and saline water within the voids (i.e. AMD). With time this water will rise to natural pre-mining levels and eventually decant on to the surface at defined low points and adjacent streams. In response to concerns about AMD the Trans-Caledon Tunnel Authority ("TCTA") has, received a ministerial directive to upgrade existing plants and construct water treatment plants which will neutralise AMD within the Western, Central and Eastern Basins. The upgrade (immediate intervention) and construction of the proposed water treatment plants will entail undertaking the following activities; abstraction of water from affected mine shafts; treatment of the water; sludge removal and disposal; and discharge of neutralised water into the receiving environment.

The long term solution to AMD in all the basins is currently under investigation by the Department of Water Affairs. The long-term solution does not form part of this EIA application and process.

Western Basin
The site of the proposed Western Basin AMD water treatment plant is situated on the Rand Uranium Property about 5km south-west of Krugersdorp and is accessible from the R28 Main Reef Road. This is an existing water treatment plant which will be upgraded as part of the immediate intervention to treat the AMD which is already decanting in the western basin. The short term intervention will be to develop a new water treatment plant on the Randfontein Estates property adjacent to the Rand Uranium property.

Central Basin
The proposed Central Basin AMD treatment plant is to be constructed about 1,8km east of the Germiston CBD adjacent to the ERPM South West Vertical Shaft. The site is bounded on the north by Lower Boksburg Road, on the west and south by Brammer Street and Power Street, and on the east by a Transnet railway line. The construction forms part of the short term intervention to treat AMD.

Eastern Basin
The proposed Eastern Basin AMD water treatment plant will be constructed at the Grootvlei Mine Shaft No. 3 about 4,6km due east of the Springs CBD. The site is accessible via the R29 Ermelo Road and Grootvaly Road through the suburb of Casseldale. The construction forms part of the short term intervention to treat AMD.

Listed activities
Listed activities 9, 11, 13, 18, 23, 28, 37 and 39 of GNR 545 and listed activities 3, 5 and 10 of GNR 545 have been identified as activities that require environmental authorisations and that will be subject to scoping and environmental impact reporting.

Category A waste management activity 19 and Category B waste management activities 1,6,7 and 9 as contained in GNR 718 have been identified as waste management activities that require waste management licences.

Applicant
Trans-Caledon Tunnel Authority

Independent Environmental Impact Assessment Practitioner
Digby Wells Environmental (Pty) Ltd has been appointed as an independent environmental consultant to undertake the required Environmental Impact Assessment and to facilitate the Public Participation Process for the immediate and short term interventions.

Register an interested and affected party (I&AP)
Should you wish to be registered as an interested or affected party and receive further information, please contact the person below.

Invitation to Open Days
You are hereby invited to attend any of the public open days for the proposed Witwatersrand Gold Fields AMD Project. The open days will provide I&APs with an opportunity to meet with the project team and raise issues of concern, comments and/ suggestions regarding the proposed project. Please refer to Table 1 for details of the open days.

Table 1: Details of the Public Open Days

Area	Venue	Date	Time
Western Basin	Randfontein Golf and Country Club Homestead Avenue, Robinson, Randfontein	Saturday 25 February 2012	09H00 – 16H00
Central Basin	Germiston Golf Club Airport Road (Off Power Street) Germiston	Saturday 03 March 2012	09H00 – 16H00
Eastern Basin	Springs Country Club Cnr Parkes and Nigel Rd, Selection Park, Springs	Saturday 10 March 2012,	09H00 – 16:00

Environmental Consultant: Digby Wells Environmental (Pty) Ltd
Contact Person: Steve Horak
Telephone: 011 789 9495
Fax: 011 789 9498
E-mail: steve@digbywells.com

KENNISGEWING VIR DIE MAGTIGING VAN GELYSTE AKTIWITEITE WAT VERBAND HOU MET DIE ONMIDDELLIKE EN KORTTERMYN-INGRYPING VIR DIE BESTUURSMAATREËLS VAN SUURMYNWATER DIE WESTELIKE, SENTRALE EN OOSTELIKE KOMME VAN DIE WITWATERSRAND GOUDVELDE

DEPARTEMENT OMGEWINGSAKE (DEA) -VERWYSINGSNOMMERS: DEA/EIA/0000498/2011 EN DEA12/12/20/2403

Hierdie kennisgewing is kragtens die Wet op Nasionale Omgewingsbestuur, 1998 (wet no 107 van 1998) ("NEMA") vir die magtiging van gelyste aktiwiteite vervat in GNR 544 van 18 Junie 2010 ("GNR 544") en GNR 545 van 18 Junie 2010 ("GNR 545"), gepubliseer kragtens artikel 24(2) en 24D van die NEMA, vir die opgradeering en ontwikkeling van watersuiweringsaanlegte vir die behandeling van suurmynwater ("AMD") in die Oostelike, Sentrale en Westelike Bekkens van die Witwatersrand se Goudvelde in Gauteng. 'n Uitskotlisensie word ook vereis kragtens GNR 718 van 3 Julie 2009 ("GNR 718"), gepubliseer kragtens artikel 19(1) van die Wet op Nasionale Omgewingsbestuur: Uitskotwet, 2008 (wet no 59 van 2008) ("NEM:WA"). 'n Geïntegreerde aansoek is by die Departement Omgewingsake ("DEA") ingedien, soos voorsien in artikel 24L van die NEMA en artikel 44 van die NEM: WA.

Projekmotivering
Die ondergrondse mynbedrywighede binne die Oostelike, Sentrale en Westelike Bekkens, asook die ontwatering van die myndelfplekke is gestaak. Dit het tot die vorming van aangesuurde en soutwater binne die holtes (dws AMD) gelei. Mettertyd sal hierdie water tot natuurlike voormynvlakke styg en uiteindelik na die oppervlak by gedefinieerde laepunte en aanliggende strome afgiet. Na aanleiding van kommer oor AMD, het die Trans-Caledon Tonnelgesag ("TCTA") 'n opdrag van die minister ontvang om bestaande aanlegte op te gradeer en watersuiweringsaanlegte te bou, wat AMD binne die Westelike, Sentrale en Oostelike Bekkens sal neutraliseer. Die opgradering (onmiddellike ingryping) en konstruksie van die voorgenome watersuiweringsaanlegte sal die volgende aktiwiteite behels: onttrekking van water uit geaffekteerde mynskagte, suiwering van die water, modderverwydering en -wegruiming, en afvoer van geneutraliseerde water binne die opvangsomgewing.

Die langtermynoplossing vir AMD in al die bekkens word tans deur die Departement van Waterwese ondersoek. Die langtermynoplossing vorm nie deel van hierdie EIA-aansoek en -proses nie.

Westelike Bekken
Die perseel van die beplande Westelike Bekken AMD-watersuiweringsaanleg is op die Rand Uranium-eiendom ongeveer 5 km suidwes van Krugersdorp geleë en kan vanuit die R28 Main Reef-weg bereik word. Dit is 'n bestaande watersuiweringsaanleg wat as deel van die onmiddellike ingryping opgegradeer sal word om die AMD te suiwer wat reeds in die Westelike Bekken afgiet. Die korttermyn-ingryping is die ontwikkeling van 'n nuwe watersuiweringsaanleg op die Randfontein Estates-eiendom langs die Rand Uranium-eiendom.

Sentrale Bekken
Die beplande Sentrale Bekken AMD-suiweringsaanleg sal bykans 1,8 km oos van die Germiston SSG langs die ERPM Suidwes Vertikale Skag gebou word. Die perseel word aan die noordekant deur Lower Boksburgweg, aan die weste- en suidekant deur Brammer- en Powerstraat en aan die oostekant deur 'n Transnet-spoorlyn begrens. Die konstruksie vorm deel van die korttermyningryping om AMD te suiwer.

Oostelike Bekken
Die beplande Oostelike Bekken AMD-watersuiweringsaanleg sal bykans 4,6 km reg oos van die Springs SSG by die Grootvlei-mynskag nommer 3 gebou word. Die perseel kan van die R29 Ermeloweg en Grootvalleiweg deur die Casseldale-voorstad bereik word. Die konstruksie vorm deel van die korttermyningryping om AMD te suiwer.

Gelyste aktiwiteite
Gelyste aktiwiteite 9, 11, 13, 18, 23, 28, 37 en 39 van GNR 545 en gelyste aktiwiteite 3, 5 en 10 van GNR 545 is geïdentifiseer as aktiwiteite wat omgewingsmagtiging vereis en aan ondersoeke en omgewingsimpakverslae onderhewig sal wees.

Kategorie A-afvalbestuursaktiwiteit 19 en Kategorie B-afvalbestuursaktiwiteite 1, 6, 7 en 9 soos vervat in GNR 718 is as afvalbestuursaktiwiteite geïdentifiseer wat afvalbestuurslisensies vereis.

Aansoeker
Trans-Caledon Tonnelgesag

Onafhanklike Omgewingsimpakondersoek-praktisyn
Digby Wells Environmental (Edms) Bpk is aangestel as 'n onafhanklike omgewingskonsultant om die voorgeskrewe Omgewingsimpakondersoek te onderneem en die Openbare Deelnameproses vir die onmiddellike en korttermyn-ingrypings te fasiliteer.

Registrasie as 'n Belanghebbende en Geaffekteerde Party ("I & AP")
Indien u as 'n belanghebbende of geaffekteerde party wil registreer en meer inligting benodig, kontak die ondergenoemde person.

Uitnodiging na 'n Openbare Opedag
U word uitgenooi om 'n openbare opedag vir die beplande Witwatersrandse Goudvelde-projek by te woon. Die openbare opedag sal aan belanghebbende en geaffekteerde partye die geleentheid bied om die projekspan te ontmoet en om bekommernisse, opmerkings en/of voorstelle ter sprake te bring. Verwys na Tabel 1 vir besonderhede oor die openbare opedagvergaderings.

Tabel 2: Besonderhede van die openbare vergaderings

Area	Plek	Datum	Tyd
Westelike Bekken	Randfontein Gholf- en Buiteklub Homesteadlaan, Robinson, Randfontein	Saterdag 25 Februarie 2012	09:00 – 16:00
Sentrale Bekken	Germiston Gholfklub Airportweg (uit Powerstraat) Germiston	Saterdag 03 Maart 2012	09:00 – 16:00
Oostelike Bekken	Springs Buiteklub, hv Parkes- en Nigelweg, Selection Park, Springs	Saterdag 10 Maart 2012	09:00 – 16:00

Omgewingskonsultant: Digby Wells Environmental (Edms) Bpk
Kontakpersoon: Steve Horak
Telefoon: 011 789 9495
Faks: 011 789 9498
E-pos: steve@digbywells.com

ISAZISO SOKUGUNYAZA IMISEBENZI ESOHLWINI EMAYELANA NOKUNGENELELA OKUPHUTHUMAYO, NOKWESIKHASHANA KOKULAWULWA KWAMAZINGA OKUMONYWA KWE-ESIDI EMIGODINI ESENTSHONALANGA, MAPHAKATHI KANYE NASEMPUMALANGA YASE-WITWATERSRAND GOLDFIELDS

IZINOMBOLO ZEREFERENSI YE-DEA: DEA/EIA/0000498/2011 & DEA12/12/20/2403

Lesi saziso sinikezwa ngokuhambisana ne-National Environmental Management Act, 1998 (UMthetho ongunombolo107 we-1998) ("NEMA") ukuze kugunyazwe uhla lokuzokwenziwa oluqukethwe ku-GNR 544 yangoNhlangulana wezi-2010 ("GNR 544") kanye ne-GNR 545 yangomhlaka-18 kuNhlangulana wezi-2010 ("GNR 545") eshicilelwe ngokuka-Section 24(2) kanye no-24D we-NEMA, yokuthuthukiswa kwesihlanzi samanzi nokwe-Acid Mine Drainage ("AMD") emigodini eseMpumalanga, Maphakathi kanye naseNtshonalanga e-Witwatersrand Gold Fields, esiFundazweni sase-Gauteng. Ilayisensi yokuthuthwa kwendle iyadingeka ngokuka-GNR 718 wangomhlaka 3 kuNtulikazi wezi-2009 ("GNR 718") eshicilelwe ngokuka-section 19(1) we-National Environmental Management: Waste Act, 2008 (UMthetho ongunombolo 59 wezi-2008) ("NEM:WA"). Isicelo esididiyelwe sesenziwe kuMnyango wezeMvelo ("DEA") njengokusho kuka-section 24L we-NEMA kanye no-section 44 we-NEM:WA.

Ukwesekwa kwephrojekthi
Imisebenzi yasemayini eyenziwa ngaphansi komhlaba emigodini eseMpumalanga, Maphakathi kanye naseNtshonalanga isimisiwe. Lokhu kungenxa yokwakhekha kwamanzi ane-esidi nosawoti ngaphakathi emigodini (okusho i-AMD). Ngokuhamba kwesikhathi la manzi azokhuphuka aye agcine esechithekela ngaphandle ezindaweni ezaziwa njengeziphansi ezincikene nemithombo yamanzi.. Ukuphendula izikhalo mayelana ne-AMD i-Trans-Caledon Tunnel Authority ("TCTA") isithole umyalelo ovela kongqonggoshe ukuba iphucule izihlanzi ezikhona iphinde yakhe izihlanzi zamanzi ezizothena amandla e-AMD emigodini esezindaweni zaseNtshonalanga, Maphakathi naseMpumalanga. Ukuphuculwa (ukungenelela okuphuthumayo) nokwakhiwa kwezihlanzi zamanzi ezihlongozwayo kuzoholela ekutheni kwenziwe lokhu okulandelayo; ukuqedwa kwamanzi emigodini yezimayini ethikamezwe yilokhu, ukuhlanzwa kwamanzi; ukukhishwa kwemfucuza nokulahlwa kwayo; nokukhishwa kwamanzi athenwe amandla ekhishelwa lapho ethululelwa khona.

Isixazululo senkathi ende kule nkinga ye-AMD kuyo yonke imigodi sisaphenywa nguMnyango wezaManzi. Isixazululo senkathi ende asiyona ingxenye yalesi sicelo nohlelo lwe-EIA.

Umgodi oseNtshonalanga
Isayithi yomgodi wokuhlanzwa kwamanzi e-AMD ohlongozwa eNtshonalanga utholakala e-Rand Uranium Property okungenani kuma-5km eningizimu-nentshoanalanga ye-Krugersdorp futhi uyatholakala ngokuhamba ngo-R28 Main Reef Road. Lesi yisihlanzi samanzi esikhona 3sizophuculwa njengengxenye yesixazululo esiphuthumayo sokuhlanzwa kwe-AMD sivele ichithekela emgodini osentshonalanga. Ukungenelela kwesikhashana kuzoba wukwakhiwa kwesihlanzi samanzi esisha e-Randfontein Estates encikene ne-Rand Uranium.

Umgodi oMaphakathi
Umgodi we-AMD wokuhlanzwa kwamanzi ohlongozwa endaweni eMaphakathi uzokwakhiwa okungenani kuma-1,8km empumalanga ne-Germiston CBD okuncikene ne-ERPM South West Vertical Shaft. Le sayithi itholakala enyakatho ne-Lower Boksburg Road, entshonalanga naseningizimu ne-Brammer Street no-Power Street, futhi empumalanga nojantshi wesitimela sakwa-Transnet. Lokhu kuyingxenye yesixazululo sesikhashana sokuhlanzwa kwe-AMD.

Umgodi oseMpumalanga
Umgodi we-AMD ohlongozwayo wokuhlanzwa kwamanzi eMpumalanga uyokwakhiwa e-Grootvlei Mine Shaft No. 3 okulinganiselwa kuma-4,6km ukuya empumalanga ye-Springs CBD. Isayithi itholakala ngokuhamba ngo-R29 Ermelo Road kanye no-Grootvaly Road kunqamula e-Casseldale. Lokhu kuyingxenye yesixazululo sesikhashana sokuhlanzwa kwe-AMD.

Okubalulwe ohlwini
Imisebenzi esohlwini eyi-9, 11, 13, 18, 23, 28, 37 kanye nama- 39 e-GNR 545 kanye nokunye okusohlwini oku-3, 5 kanye ne-10 kwe-GNR 545 sekubalulwe njengezinto ezidinga ukugunyazwa endaweni futhi kuzofanele zinikezwe igunya lokwenziwa kunikezwe nombiko womthelela kwakho endaweni.

Ingxenye A okungukunganyelwa kokuphathwa kwendle 19 neNgxenye B yokunganyelwa kwendle 1,6,7 kanye ne-9 njengoba kuqukethwe ku-GNR 718 sekubalulwe njengemisebenzi edinga izimvume zokunganyelwa kwendle.

Ofaka Isicelo
I-Trans-Caledon Tunnel Authority

Umenzi woMsebenzi wokukuHlola uMthelela eNdaweni ozimele
Abakwa-Digby Wells Environmental (Pty) Ltd sebeqoke umeluli ngendawo ozimele ukuba abhekane nokuHlolwa koMthelela eNdaweni nokuba abhekane noHlelo lokuziBandakanya koMphakathi ezixazululweni eziphuthumayo nezesikhashana.

Ukubhalisa kwabantu abayingxenye nabathintekayo (I&AP)
Uma kwenzeka unesifiso sokubhalisa njengoyingxenye nothintekayo bese uthola imininingwane ethe xaxa, uyacelwa ukuba uthintane ne Digby Wells Environmental.

Isimemo somhlangano woSuku oluVulelekile

Nasi isimemo sakho sokuba wethamele umhlangano ovulelekile womphakathi we-Witwatersrand Gold Fields AMD Project ehlongozwayo. Inhloso yalolu suku wukunikeza abayingxenye nabathintekayo ithuba lokuhlangana nethimba lephrojekthi babeke lokho abakhala ngako, ukuphawula, kanye/ imibono mayelana nale phrojekthi ehlongozwayo. Uyacelwa ukuba ubheke iThebula 1 mayelana nemininingwane yalezi zinsuku zemihlangano.

Ithebhula 1: Imininingwane yemiHlangano yoMphakathi eVulelekile

Isizinda	Indawo	Usuku	Isikhathi
Umgodi oseNtshonalanga	Randfontein Golf and Country Club Homestead Avenue, Robinson, Randfontein	UmGqibelo 25 kuNhlolanja (February) 2012	09H00 – 16H00
Umgodi oMaphakathi	Germiston Golf Club Airport Road (Off Power Street), Germiston	UMgqibelo 03 kuNdasa (March) 2012	09H00 – 16H00
Umgodi oseMpumalnga	Springs Country Club Cnr Parkes no-Nigel Rd, Selection Park, Springs	UMgqibelo 10 kuNdasa (March) 2012	09H00 – 16:00

Umeluleki ngokwezendawo: Digby Wells Environmental (Pty) Ltd
Okungaxhunywana naye: Steve Horak
Ucingo: 011 789 9495
Ifeksi: 011 789 9498
I-imeyli: steve@digbywells.com

KITSISO YA GO NTSHIWA GA TETLA YA DITIRO TSE DI LENG MO LENAANENG TSE DI AMANANG LE DITHARABOLLO TSE TSWANG KA BONAKO LE KA LOBAKA LO LO KHUTSHWANE LWA DIKGATO TSA GO LAOLA GO NTSHIWA GA ASITI YA MOEPO KA DIPHAEPHE MO DIBEISENENG TSA BOPHIRIMA, TSA BOGARE LE TSA BOTLHABA TSA MAFELO A GO KA BONWANG GAUTA MO GO ONE A WITWATERSRAND

DINOMORE TSA TSHUPISO TSA DEA: DEA/EIA/0000498/2011 & DEA12/12/20/2403

Go ntshiwa kitsiso fano go ya ka Molao wa Bosetššhaba wa go Laola Tikologo, wa 1998 (Molao No.: 107 wa 1998) ("NEMA" ka Seesemane) wa gore go ntshiwe taolo ya go dirwa ga ditiro tse di leng mo lenaaneng la GNR 544 ya 18- Seetebosigo 2010 ("GNR 544") le la GNR 545 ya-18 Seetebosigo 2010 ("GNR 545") le le gatisitsweng go ya ka Dikarolo 24(2) le 24D, NEMA, la go tlhabololwa le go tlhamiwa ga madirelo a go itshekisa metsi a go Ntshiwa ga Asiti ya Moepo ka Diphaephe kgotsa Mine Drainage ("AMD" ka Seesemane) mo Dibeiseneng Tsa Botlhaba, Tsa Bogare le Tsa Bophirima tsa Mafelo a go ka Bonwang Gauta mo go One a Witwatersrand, mo Porofenseng ya Gauteng. Gape go batliwa le Laesense ya Matlakala go ya ka GNR 718 ya-3 Phukwi 2009 (GNR 718) e e gatisitsweng go ya ka karolo 19(1) ya Molao wa Bosetššhaba wa go Laola Tikologo ya: Molao wa Matlakala, 2008 (Molao No.: 59 wa 2008) ("NEM:WA" Ka Seesemane). Ka jalo, go rometswe kopo e e kopantsweng kwa Lefapheng la Merero ya Tikologo ("DEA" ka Seesemane) jaaka go tlhaloswa mo karolong 24L ya NEMA le mo karolong 44 ya NEM:WA.

Mabaka a go dirwa ga porojeke eno
Ditiro tsa mo moepong tsa ka fa tlase ga lefatshe mo Dibeiseneng tsa Botlhaba, Tsa Bogare le Tsa Bophrima di emisitswe, mme ka ntlha ya seno, ditiro tsa mo moepong tsa go ntsha metsi le tsone di emisitswe. Seno se bakile gore go nne le metsi a a tletseng asiti le letswai mo dikhuting tsa mafika a a mo teng ga moepo (ke gore, AMD). Fa nako e ntse e tsamaya, metsi ano a tla tlhatloga go fitlha fa boalong jwa pele ga fa go dirwa tiro ya mo moepong mme kwa bofelong a tla tswela mo bogodimong mo boalong jo bo kwa tlase le mo melatswaneng e e mabapi. Fa go tsibogelwa matshwenyego ka ga AMD, Trans-Caledon Tunnel Authority ("TCTA") e amogetse kaelo ya bodiredi ya go tlhabolola madirelo a a leng teng le go aga madirelo a go itshekisa metsi a a tla fedisang bothata jwa AMD mo Dibeiseneng tsa Bophirima, Tsa Bogare le Tsa Bothaba. Go tlhabololwa (tharabololo ya ka bonako) le go agiwa ga madirelo a go itshekisa metsi a go tshitshintsweng gore a agiwe go tla akaretsa ditiro tse di latelang; go arogannggwa ga metsi go tswa mo ditšhafong tsa moepo tse di amegang; go itshekisiwa ga metsi; go ntshiwa ga seretse le go latlhiwa ga sone; le go ntshiwa ga metsi a a ntshitsweng asiti a a tswelang mo lefelong le a tlileng go dirisiwa mo go lone.

Lefapha la Merero ya Metsi le sa ntse le dira patlisiso ka tharabololo ya lobaka lo lo leele ya AMD mo dibeiseneng tsotlhe. Tharabololo ya lobaka lo lo leele ga se karolo ya go dirwa ga kopo eno ya EIA le thulaganyo ya teng.

Beisene ya Bophirima
Setsha sa bodirelo jo go tshitshintsweng gore bo dirwe jwa go itshekisa metsi jwa Beisene ya Bophirima ya AMD se kwa Setsheng sa Rand Uranium mo e ka nnang 5km borwa-bophirima jwa Krugersdorp mme go iwa kwa go sone ka go dirisa tsela ya R28 ya Main Reef. Jono ke bodirelo jo bo ntseng bo le teng jwa go itshekisa metsi jo bo tlileng go tlhabololwa jaaka karolo ya tharabololo ya ka bonako ya go itshekisa AMD e e setseng e ntshetsa metsi mo beiseneng ya bophirima. Tharabololo ya lobaka lo lo khutshwane e tla nna ya go tlhama bodirelo jo boša jwa go itshekisa metsi mo setsheng sa Randfontein Estates se se bapileng le setsha sa Rand Uranium.

Beinsene ya Bogare
Bodirelo jwa go itshekisa diedi tsa AMD tsa Beisene ya Bogare jo go tshitshintsweng gore bo dirwe bo tlile go nna mo e ka nnang 1,8km go ela kwa botlhaba jwa Bogare Jwa Toropo ya Germiston go bapa le Tšhafo e e yang kwa tlase e e ka fa Borwa Bophirima ya ERPM. Ka fa bokone jwa setsha seno go feta Tsela-Tlase ya Boksburg, mme ka fa bophirima le ka fa borwa go feta Brammer Street le Power Street, mme ka fa botlhaba go feta seporo sa Transnet. Tiro ya go di aga e bopa karolo ya tharabololo ya lobaka lo lo khutshwane ya go itshekisa AMD.

Beisene ya Botlhaba
Bodirelo jo go tshitshintsweng gore bo dirwe jo bo itshekisang metsi jwa AMD ya Beisene ya Botlhaba bo tla bo bo agilwe kwa Tšhafong ya No. 3 ya Moepo wa Grootvlei bokgakala jwa mo e ka nnang 4,6km go ela kwa botlhaba jwa Bogare Jwa Toropo ya Springs. Go iwa kwa setsheng seno ka Tsela ya R29 ya Ermelo le Tsela ya Grootvaly go kgabaganya motsesetoropo wa Casseldale. Tiro ya go di aga e bopa karolo ya tharabololo ya lobaka lo lo khutshwane ya go itshekisa AMD.

Ditiro tse di mo lenaaneng
Ditiro tse di leng mo lenaaneng la 9, 11, 13, 18, 23, 28, 37 le 39 la GNR 545 le ditiro tse di leng mo lenaaneng la 3, 5 le 10 la GNR 545 di tlhaotswe jaaka ditiro tse go tshwanetseng gore go ntshiwe tetla ya gore di dirwe mo tikologong le tse go tshwanetseng ga dirwa patlisiso ka tsone pele mo tikologong le go ntsha pego ya diphelelo tsa tsone mo tikologong.

Setlhopha A sa tiro 19 ya go tlosa matlakala le Setlhopha B sa ditiro 1, 6, 7 le 9 tsa go tlosa matlakala jaaka go kwadilwe go GNR 718 di ile tsa tlhaolwa jaaka ditiro tsa go tlosa matlakala tse di batlang laesense ya go tlosa matlakala.

Modirakopo
Trans-Caledon Tunnel Authority

Mogakolodi yo o Ikemetseng ka Nosi wa Tshekatsheko ya Diphelelo Tsa mo Tikologong
Digby Wells Environmental (Pty) Ltd e tlhomilwe go nna mogakolodi yo o ikemetseng ka nosi wa tsa tikologo gore e dire Tshekatsheko ya Diphelelo Tsa mo Tikologong e e tlhokang go dirwa le go etelela pele Thulaganyo ya go Nna le Seabe ga Baagi ya ditharabololo tsa ka bonako le tsa lobaka lo lo khutshwane.

Go ikwadisa jaaka leloko le le nang le kgatlhego le le le angwang ke porojeke eno (I&AP)
Fa o eletsa go ikwadisa jaaka leloko le le nang le kgatlhego mo go seno le le angwang ke porojeke eno le go amogela tshedimosetso go ya pele, tsweetswee ikgolaganye le motho yo leina la gagwe le kwadilweng fa tlase.

Taletso ya Letsatsi la go Lalediwa ga Botlhe
O lalediwa fano gore o nne teng mo letsatsing la go lalediwa ga botlhe go tla kopanong ya baagi botlhe ya Porojeke e go tshitshintsweng gore e dirwe ya Mafelo a go ka Bonwang Gauta mo go One a Witwatersrand. Boikaelelo jwa kopano ya letsatsi la go lalediwa ga botlhe bo tla naya maloko a l&AP tshono ya go kopana le setlhopha sa porojeke le go tlhagisa matshwenyego a bone, ditshwaelo le/ ditshitshinyo malebana le porojeke eno e go tshitshintsweng gore e dirwe. Tsweetswee leba dintlha tsa Lenaanethalo 1 la dikopano tsa letsatsi la go lalediwa ga botlhe.

Lenaanethalo 2: Dintlha tsa Dikopano Tsa Letsatsi la go Lalediwa ga Botlhe

Boalo	Lefelo	Letlha	Nako
Beisene ya Bophirima	Randfontein Golf le Country Club Homestead Avenue, Robinson, Randfontein	Matlhatso 25 Tlhakole (February) 2012	09H00 – 16H00
Beinsele ya Bogare	Germiston Golf Club Airport Road (Off Power Street), Germiston	Matlhatso 03 Mopitlwe (March) 2012	09H00 – 16H00
Beisene ya Botlhaba	Springs Country Club Cnr Parkes and Nigel Rd, Selection Park, Springs	Matlhatso 10 Mopitlwe (March) 2012	09H00 – 16:00

Mogakolodi wa Tsa Tikologo: Digby Wells Environmental (Pty) Ltd
Motho Yo go Ka Ikgolaganngwang Nae: Steve Horak
Mogala: 011 789 9495
Fekese: 011 789 9498
Imeile: steve@digbywells.com

Appendix J: Proof of Newspaper Adverts

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R380 000
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083 507 9784 or
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NOTICE FOR THE AUTHORISATION OF LISTED ACTIVITIES ASSOCIATED WITH THE IMMEDIATE, AND SHORT TERM INTERVENTIONS FOR THE MANAGEMENT MEASURES OF ACID MINE DRAINANGE IN THE WESTERN, CENTRAL AND EASTERN BASINS OF THE WITWATERSRAND GOLDFIELDS

DEA REFERENCE NUMBERS: DEA/EIA/0000498/2011 & DEA12/12/20/2403

This notice is hereby given in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) ("NEMA") for the authorisation of listed activities contained in GNR 544 of 18 June 2010 ("GNR 544") and GNR 545 of 18 June 2010 ("GNR 545") published in terms of Sections 24(2) and 24D the NEMA, for the refurbishment and development of water treatment plants for the treatment of Acid Mine Drainage ("AMD") in the Eastern, Central and Western Basins of the Witwatersrand Gold Fields, Gauteng Province. A waste licence is also required in terms of GNR 718 of 3 July 2009 ("GNR 718") published in terms of section 19(1) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) ("NEM:WA"). An integrated application has, therefore, been made to the Department of Environmental Affairs ("DEA") as provided for in section 24L of the NEMA and section 44 of the NEM: WA.

Project motivation

The underground mining operations within the Eastern, Central and Western Basins have ceased, and with this the dewatering of the mine workings has stopped. This has resulted in the formation of acidified and saline water within the voids (i.e. AMD). With time this water will rise to natural pre-mining levels and eventually decant on to the surface at defined low points and adjacent streams. In response to concerns about AMD the Trans-Caledon Tunnel Authority ("TCTA") has, received a ministerial directive to upgrade existing plants and construct water treatment plants which will neutralise AMD within the Western, Central and Eastern Basins. The upgrade (immediate intervention) and construction of the proposed water treatment plants will entail undertaking the following activities; abstraction of water from affected mine shafts; treatment of the water; sludge removal and disposal; and discharge of neutralised water into the receiving environment.

The long term solution to AMD in all the basins is currently under investigation by the Department of Water Affairs. The long-term solution does not form part of this EIA application and process.

Western Basin

The site of the proposed Western Basin AMD water treatment plant is situated on the Rand Uranium Property about 5km south-west of Krugersdorp and is accessible from the R28 Main Reef Road. This is an existing water treatment plant which will be upgraded as part of the immediate intervention to treat the AMD which is already decanting in the western basin. The short term intervention will be to develop a new water treatment plant on the Randfontein Estates property adjacent to the Rand Uranium property.

Central Basin

The proposed Central Basin AMD treatment plant is to be constructed about 1,9km east of the Germiston CBD adjacent to the ERPM South West Vertical Shaft. The site is bounded on the north by Lower Boksburg Road, on the west and south by Brammer Street and Power Street, and on the east by a Transnet railway line. The construction forms part of the short term intervention to treat AMD.

Eastern Basin

The proposed Eastern Basin AMD water treatment plant will be constructed at the Grootvlei Mine Shaft No. 3 about 4,6km due east of the Springs CBD. The site is accessible via the R29 Ermelo Road and Grootvaly Road through the suburb of Casseldale. The construction forms part of the short term intervention to treat AMD.

Listed activities

Listed activities 9, 11, 13, 18, 23, 29, 37 and 39 of GNR 545 and listed activities 3, 5 and 10 of GNR 545 have been identified as activities that require environmental authorisations and that will be subject to scoping and environmental impact reporting.

Category A waste management activity 19 and Category B waste management activities 1,6,7 and 9 as contained in GNR 718 have been identified as waste management activities that require waste management licences.

Applicant

Trans-Caledon Tunnel Authority

Independent Environmental Impact Assessment Practitioner

Digby Wells Environmental (Pty) Ltd has been appointed as an independent environmental consultant to undertake the required Environmental Impact Assessment and to facilitate the Public Participation Process for the immediate and short term interventions.

Register an Interested and affected party (I&AP)

Should you wish to be registered as an interested or affected party and receive further information, please contact the person below.

Invitation to Open Days

You are hereby invited to attend any of the public open days for the proposed Witwatersrand Gold Fields AMD Project. The open days will provide I&APs with an opportunity to meet with the project team and raise issues of concern, comments and suggestions regarding the proposed project. Please refer to Table 1 for details of the open days.

Table 1: Details of the Public Open Days

Area	Venue	Date	Time
Western Basin	Randfontein Golf and Country Club Homestead Avenue, Robinson,Randfontein	Saturday, 25 February 2012	09h00 - 16h00
Central Basin	Germiston Golf Club Airport Road (Off Power Street) Germiston	Saturday, 03 March 2012	09h00 - 16h00
Eastern Basin	Springs Country Club Cnr Parkes and Nigel Rd, Selection Park, Springs	Saturday, 10 March 2012,	09h00 - 16h00

Lifa Gova is a new addition to the national soccer team for people living wi disabilities.

Soccer player Lifa Gova aims to be a player of choice in the national disabled soccer squad, since his selection last year.

The member of the KwaThema Disability Sports Club passed the trials and is now part of the disabled soccer team, set to play in the national tournament at Durban in June.

Since he will be playing for the national squad for the first time, his objective is to stay in the team as long as age allows. This is a dream come true for the KwaThema resident, who has been training hard under wheelchair-bound coach Aubrey Mathibela.

Lifa says when his coach broke the news to him that he had made the selection into the squad, he was ecstatic because this is an opportunity which can afford him a spot in the team going to the Paralympics some day.

"I have been longing for this opportunity ever since I knew there is a soccer squad for people with disabilities. I'm going to make sure that my relationship with the team lasts long because I'm going to work hard," says Lifa.

He adds that people wi disabilities should come out their shells and engage in spo because if they believe that th can, they will succeed.

Lifa is grateful to his fami that has always stood by hi especially his mother, wi reminds him all the time th he can achieve what he sets l eyes on. He is also thankful his coach and the communit

Lifa invites people wi disabilities to come KwaThema Stadium to tra in order to live a healt lifestyle.

Teens' attackers are arrested

Two suspected rapists have been arrested.

On Monday, two 16-year-old suspects were arrested at Geluksdal High School and charged with raping a fellow schoolmate. The 14-year old girl was attacked in a storeroom.

The suspects appeared in the Brakpan Magistrate's Court on Tuesday.

Another arrest effected this week was that of a 34-year-old man who was on the run for the murder of his 16-year-old girlfriend. He was arrested on February 5 in Germiston. It alleged that on December 3 the man murdered and bu the teenager. He appeared the KwaThema Magistrat Court on February 6, and w appear again on February for a bail application.

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• Boksburg Advertiser 011 916-5300
• Brakpan Herald 011 740-1625
• Germiston City News 011 622-1792
• Get It East Rand 011 916-5300
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KONTAK ESTIE 073 156 1890
juriestie@lantic.net

SO065301

TRUCK DRIVERS REQUIRED

Randfontein area.
Short haul.
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FAX SHORT CV TO 086-610-9470

SO065285

RANDFONTEIN
Plaaslike Munisipaliteit
Local Municipality

- **SPORT AND RECREATION FACILITY AND PROGRAMMES COORDINATOR**
- **ARTISAN/HANDYMAN - WELDING (TRADE CERTIFICATE IN WELDING OR EQUIVALENT N3 TECHNICAL QUALIFICATION)**
- **MANAGER: HOUSING AND PROPERTY ADMINISTRATION**
- **INTERNAL AUDITOR**

Enquiries: Mr N Nkosi, tel (011) 411-6132

A detailed application including a covering letter, CV and certified copies of qualifications to be posted to the Randfontein Local Municipality, cnr Pollock and Sutherland, PO Box 218, Randfontein 1760 OR e-mail: hr@randfontein.gov.za

For more information, visit www.randfontein.gov.za
(Click Administration/Vacancies)

Closing date: 27 February 2012

Westonaria
Local Municipality

Draft Annual Report: 2010/2011

The Council of Westonaria Local Municipality has, in terms of Section 127 of the Municipal Finance Management Act, No 56 of 2003, approved the Draft Annual Report 2010/2011 during its Extraordinary Council meeting held on 31 January 2012. Copies of the Report are available at the following venues and offices for comments and representations until 29 February 2012:

- Office of the Executive Mayor
- Office of the Municipal Manager
- eMandela Library
- Mihhoven Library
- Office of the Speaker
- Westonaria Library
- Glenharvie Library
- Zuurbekom Library

For more information, please contact Mr EM Meiring at tel. (011) 278-3021 during office hours.
Mr T Ndlovu- Municipal Manager

AN 8/2012

Westonaria
Local Municipality

The Westonaria Local Municipality invites suitably qualified candidates to apply for the following position:

Directorate: Corporate Services

Manager: Human Resources

Basic salary: R276 660 - R324 684 per annum (Level 2)

The successful candidate will manage the provision of Human Resource functions/services to the Local Municipality in compliance with legislation, Council policy and the South African Local Government Association (SALGA); the Local Government Sector Education Training Authority (LGSETA); and the South African Local Government Bargaining Council (SALGBC) directives.

Key performance areas: • Interpret, promote and monitor the implementation of the WLM's HR Strategy • Initiate and coordinate operational HR issues by formulating Standard Operating Procedures, as well as implementing HR policies, procedures, processes and practices • Research and develop strategic and short-term plans for the HR functionality • Ensure an effective, integrated HR information system/tool and administrative support • Establish, promote and maintain effective stakeholder management • Formulate, develop and implement appropriate processes to enhance staff morale • Ensure the effective implementation of talent management and performance management systems • Remain abreast of developments in HR legislation and Local Government-related issues • Direct and control the KPIs and outcomes of staff within the Section • Manage, lead and control subordinates and ensure effective discipline • Manage the HR Section's budget • Oversee the management of the Labour Relations, Training and Development, Employee Wellness, Organisational Development, as well as the Staffing and Benefits Units within HR • Provide advisory services on HR issues to Executive and Line Management.

Requirements: • An appropriate B-degree or equivalent qualification in Human Resource Management/Development or Social Science • A Code EB driver's licence • Computer literacy • 5 to 7 years' exposure to the full spectrum of Human Resource Management, 3 of which should have been in a management role (Local Government experience would be an added advantage) • The ability to communicate at different levels • Good report-writing and presentation skills.

Please note the following: • Applications will not be acknowledged and only short-listed candidates will be invited for interviews • Fraudulent qualifications, information or documentation will immediately disqualify any applicant • If you have not received a response within 3 months, please accept that your application was unsuccessful.

Applications for the above post, accompanied by a comprehensive CV and certified copies of qualifications, must be forwarded to the Manager: Human Resources, Westonaria Local Municipality, cnr Neptune and Saturn Street, PO Box 19, Westonaria 1780. For further enquiries, contact Ms Nomsa Shilubane at (011) 278-3005 or Lesibe Pepe at (011) 278-3028.

Westonaria Local Municipality is an equal opportunity employer and reserves the right not to make an appointment.

Appointments will be made in accordance with the Westonaria Local Municipality's Recruitment and Selection Policy.

Closing date: 2 March 2012 @ 12:00pm

TC Ndlovu
Municipal Manager

NOTICE FOR THE AUTHORISATION OF LISTED ACTIVITIES ASSOCIATED WITH THE IMMEDIATE, AND SHORT TERM INTERVENTIONS FOR THE MANAGEMENT MEASURES OF ACID MINE DRAINANGE IN THE WESTERN, CENTRAL AND EASTERN BASINS OF THE WITWATERSRAND GOLDFIELDS

DEA REFERENCE NUMBERS: DEA/EIA/0000498/2011 & DEA12/12/20/2403

This notice is hereby given in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) ("NEMA") for the authorisation of listed activities contained in GNR 544 of 18 June 2010 ("GNR 544") and GNR 545 of 18 June 2010 ("GNR 545") published in terms of Sections 24(2) and 24D the NEMA, for the refurbishment and development of water treatment plants for the treatment of Acid Mine Drainage ("AMD") in the Eastern, Central and Western Basins of the Witwatersrand Gold Fields, Gauteng Province. A waste licence is also required in terms of GNR 718 of 3 July 2009 ("GNR 718") published in terms of section 19(1) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) ("NEM:WA"). An integrated application has, therefore, been made to the Department of Environmental Affairs ("DEA") as provided for in section 24L of the NEMA and section 44 of the NEM: WA.

Project motivation

The underground mining operations within the Eastern, Central and Western Basins have ceased, and with this the dewatering of the mine workings has stopped. This has resulted in the formation of acidified and saline water within the voids (i.e. AMD). With time this water will rise to natural pre-mining levels and eventually decant on to the surface at defined low points and adjacent streams. In response to concerns about AMD the Trans-Caledon Tunnel Authority ("TCTA") has, received a ministerial directive to upgrade existing plants and construct water treatment plants which will neutralise AMD within the Western, Central and Eastern Basins. The upgrade (immediate intervention) and construction of the proposed water treatment plants will entail undertaking the following activities: abstraction of water from affected mine shafts, treatment of the water; sludge removal and disposal and discharge of neutralised water into the receiving environment.

The long term solution to AMD in all the basins is currently under investigation by the Department of Water Affairs. The long-term solution does not form part of this EIA application and process.

Western Basin

The site of the proposed Western Basin AMD water treatment plant is situated on the Rand Uranium Property about 5km south-west of Krugersdorp and is accessible from the R28 Main Reef Road. This is an existing water treatment plant which will be upgraded as part of the immediate intervention to treat the AMD which is already decanting in the western basin. The short term intervention will be to develop a new water treatment plant on the Randfontein Estates property adjacent to the Rand Uranium property.

Central Basin

The proposed Central Basin AMD treatment plant is to be constructed about 1.8km east of the Germiston CBD adjacent to the ERPM South West Vertical Shaft. The site is bounded on the north by Lower Boksburg Road, on the west and south by Bramner Street and Power Street, and on the east by a Transnet railway line. The construction forms part of the short term intervention to treat AMD.

Eastern Basin

The proposed Eastern Basin AMD water treatment plant will be constructed at the Grootvlei Mine Shaft No. 3 about 4.5km due east of the Springs CBD. The site is accessible via the R29 Ermelo Road and Grootvlei Road through the suburb of Casseldale. The construction forms part of the short term intervention to treat AMD.

Listed activities

Listed activities 9, 11, 13, 19, 23, 28, 37 and 39 of GNR 545 and listed activities 3, 5 and 10 of GNR 545 have been identified as activities that require environmental authorisations and that will be subject to scoping and environmental impact reporting.

Category A waste management activity 18 and Category B waste management activities 1,6,7 and 9 as contained in GNR 718 have been identified as waste management activities that require waste management licences.

Applicant

Trans-Caledon Tunnel Authority

Independent Environmental Impact Assessment Practitioner

Digby Wells Environmental (Pty) Ltd has been appointed as an independent environmental consultant to undertake the required Environmental Impact Assessment and to facilitate the Public Participation Process for the immediate and short term interventions.

Register an interested and affected party (I&AP)

Should you wish to be registered as an interested or affected party and receive further information, please contact the person below.

Invitation to Open Days

You are hereby invited to attend any of the public open days for the proposed Witwatersrand Gold Fields AMD Project. The open days will provide I&APs with an opportunity to meet with the project team and raise issues of concern, comments and suggestions regarding the proposed project. Please refer to Table 1 for details of the open days.

Table 1: Details of the Public Open Days

Area	Venue	Date	Time
Western Basin	Randfontein Golf and Country Club Homestead Avenue, Robinson Randfontein	Saturday, 25 February 2012	09h00 - 10h00
Central Basin	Germiston Golf Club Airport Road (Off Power Street) Germiston	Saturday, 03 March 2012	09h00 - 10h00
Eastern Basin	Springs Country Club Cnr Parkes and Nigel Rd, Selection Park, Springs	Saturday, 10 March 2012	09h00 - 10h00

Environmental Consultant: Digby Wells Environmental (Pty) Ltd
Contact Person: Steve Horak
Telephone: 011 789 9495
Fax: 011 789 0499
E-mail: steveh@digbywells.com

DIGBY WELLS ENVIRONMENTAL

Junior Reporter

BOKSBURG ADVERTISER

is looking for a journalist.

The successful applicant must have:

- An excellent command of the English language
- A working command of the Afrikaans language
- Own car and driver's licence
- Be able to work weekends and nights when required
- Be proficient in social media platforms
- Knowledge of CMS an advantage
- Preference will be given to Boksburg residents
- A journalism degree or diploma from a reputable institution

Journalism experience will be advantageous.

Please send your CVs to riaane@caxton.co.za

Deadline: Thursday, March 8

LAB TECHNICIAN

We require services of a
LAB TECHNICIAN
for our Goldplant situated in Benoni.
Salary negotiated. Applicants must be qualified and have AA experience.

Please forward your abbreviated CV to: Info@goldplat.com and on subject line put on the position you are applying for

---

AS PART OF OUR BBBEE SOCIAL ENTERPRISE DEVELOPMENT INITIATIVE

We offer a discount for domestic workers wanting to advertise in our domestic employment wanted column.

CAXTON

Normal price: R 80.00
We charge them R 34.00

CAXTON

DANISILE seeks full time work. Mon-Fri. Sleep in, cooks, child care, refs. 071 571 2160 — DR038396

DAPHNEY seeks full time domestic work, Mon-Fri. Sleep in, cooking, child care. 072 357 3331 — LA035808

ELIZABETH seeks full time work. Mon - Sun. Sleep in, child care 079 090 8073 — ZC029624

ELSIE seeks full time work. Mon - Sat. Refs 083 354 2108 — ZC029623

ENTE req f/t sleep out work Mon - Thurs. Child care. Refs. 083 690 4352 — LR055408

ESTHER req part time work, sleep out, cooking, child care. 073 418 7981 — ZH046574

FLORAH seeks full time work. Mon-Thurs. Sleep out, cooks, c /care, refs. 082 0568 405 — DR039397

GETRUDE seeks full part time work. Mon-Fri. Sleep out, refs avail. 084 708 7158 — DR039395

LORRAINE req full time work, sleep out. 078 816 6332 — ZH046599

MARIA req f/p time work, sleep out, child care. Refs avail. 082 061 6547 — ZH046585

MARIA seeks full time domestic work, Mon - fooks, good with kids, Tel: 078-324-8895. — LM070914

MARIA seeks full time work. Mon - Fri. Sleep out, cooking, child care. Refs 071 236 5900 — ZC029636

MARTHA seeks part time domestic work, Mon, Wed, Fri, sleep out, child care 082 545 1979. — RN079779

MEYA req full time sleep in/out work. Mon-Fri. Child care 073 942 9611 — LA035740

MILLICENT seeks part-time domestic work Mon, Wed, Fri, sleep out, has refs. Tel: 071-260-0083. — LM070904

PAULINAH req p/t sleep out work Mon, Wed, Fri. Cooking. Child care. 074 566 1939. — LR055436

RACHEL seeks full time sleep in / out domestic work, Mon - Fri, good with kids. 074-710-5841. — LM070821

SAFILA seeks full time domestic work, Mon - Sat, sleep out, cooking, child care. 073 896 0310. — RN079788

SHEILA seeks domestic work. 084 564 0012. — RN079678

IAN seeks full time work, Mon - Sat, painting, gardening, sleep out, refs avail 078 977 3258 — MA025706

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Experience in car parts would be advantageous.

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or phone Dave of Flippie 011 740 0868
Or Fax CV to: 086 651 9080

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basic + commission, medical and pension.

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R12000 to start/comm/inc Med/ petrol allowance.
011 609 2119
or SMS name/area/age to 078 806 4140
VAS Rates Apply — LR055405

CAREER OPPORTUNITY IN EAST RAND
A motivated person for portfolio analysis and financial advice in a specific market segment.
- Good interpersonal relations
- Computer literate
- Own Vehicle & Valid Licence
- Minimum Grade 12/Matric
- South African Citizens only

We offer:
R7 850 pm + comm. on targets being met
Fax CV to 086 581 4537 or email cdefortier @oldmutual.com — RN079747

SALES PERSON REQUIRED
For upmarket adult shop in Springs.
Salary R3000 neg.
Fax CV to 086 655 2078 — DR039349

0870 Technical

APPLIANCE REPAIRS TECHNICIAN REQUIRED SPRINGS

Email CV
iec@mweb.co.za
Andrew
083-302-7199. — CA000016

ELECTRICAL AND MECHANICAL N6 QUALIFIED STUDENTS

Required by Pharmaceutical company.

FAX CV TO 086 587 4003 — CA001899

SENIOR SERVICE TECHNICIAN
Must have experience in the following fields:-
- Electrical and Electronic background.
- Mechanical background.
- Instrumentation Maintenance/ Technician
- Advanced Computer Literacy.

Please email CV's to Service@eltra-africa.co.za with reference number A469.
Deadline date for CV's to be submitted is 29.02.2012 — RN079677

0875 Trade

TRAINEE DRAUGHTSMAN REQUIRED

Must have Technical drawing, Maths, English and Afrikaans.

PLEASE FAX CV TO 086 272 1953 — ZH046507

ENGINEERING COMPANY HAS THE FOLLOWING VACANCIES:

BOILERMAKER
Stainless steel and Mild Steel fabrication
Read drawing and design

FITTER AND TURNER
All aspects

Please fax CV to 086 607 3887

ELECTRICIAN

Qualified Electrician required for large East Rand printing company.

e-mail CV TO sacvben10 @gmail.com

FINISHING CARPENTER REQUIRED
With exp.
Fax Cv to: 086 766 7601
No Chancers — CA003008

QUALIFIED WELDER

With trade papers wanted for work in Wadeville area. Needs to have gas cutting exp.

PLEASE SEND CV TO lindhwem@ omegahr.co.za — LR055400

0800 General Employment Wanted

I am a qualified electrician (Sec 13) looking for a jnr position.
Phone 079 074 3943. — RN079791

MY name is John. I have a Code 10 PDP licence. I am looking for work
082 734 1214 — ZC029635

ELDERLY LADY
Of sober habits seeks morning only position.
076 331 7490 — ZH046462

0806 Domestic Employment Wanted

ACENCIA req full time sleep out, child care. Refs avail. 072 595 3428 — ZH046584

ALICE seeks full time work. Mon - Fri. Sleep out, cooking, child care 071 978 9130 — ZC029637

ANAH seeks full/part time work. Mon-Fri. Sleep in/out, refs avail 083 6862 539 — DR039394

ANNAH seeks part-time work sleep out, cooks, good with kids. Mon, Tues, Wed, Thur. 073-599-0624. — LM070820

CONSTANCE req sleep out work Mon - Fri. Cooking. Child care. Refs. 078 610 6097. — LR055409

CYNTHIA seeks full time domestic work, Mon - Fri, sleep out, cooking, child care. 073 962 2213. — RN079781

0807 Gardener Employment Wanted

IAN seeks full time work, Mon - Sat, painting, gardening, sleep out, refs avail 078 977 3258 — MA025706

0861 Adult Entertainment

NOTICE FOR THE AUTHORISATION OF LISTED ACTIVITIES ASSOCIATED WITH THE IMMEDIATE, AND SHORT TERM INTERVENTIONS FOR THE MANAGEMENT MEASURES OF ACID MINE DRAINANGE IN THE WESTERN, CENTRAL AND EASTERN BASINS OF THE WITWATERSRAND GOLDFIELDS

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Applicant
Trans-Caledon Tunnel Authority

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Eastern Basin	Springs Country Club Cnr Parkes and Nigel Rd, Selection Park, Springs	Saturday, 10 March 2012	09h00 - 16h00

Environmental Consultant: Digby Wells Environmental (Pty) Ltd
Contact Person: Steve Horak
Telephone: 011 789 9495
Fax: 011 789 9498
E-mail: steve@digbywells.com

DIGBY WELLS ENVIRONMENTAL

ACCOUNTING TRAINEE REQUIRED

A small firm of professional accountants situated centrally in Springs requires a person with the following attributes:

- A conscientious and hardworking (male or female) with a few years related working experience.
- At least a matric with accounting as subject and whom has made some progress with post matric studies in the accounting field.
- Bilingualism and good people skills essential.

This is an excellent ground floor opportunity for a person wanting to make a career in accounting.

Tremendous scope to gain experience and knowledge.

Good salary. Flexible starting date.

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Qualification papers of utmost importance.
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Mandy Breedt: (011) 869 3406
mandybreedt@vodamail.co.za

KITSISO YA GO NTSHIWA GA TETLA YA DITIRO TSE DI LENG MO LENAANENG TSE DI AMANANG LE DITHARABOLLO TSE TSWANG KA BONAKO LE KA LOBAKA LO LO KHUTSHWANE LWA DIKGATO TSA GO LAOLA GO NTSHIWA GA ASITI YA MOEPO KA DIPHAEPHE MO DIBEISENENG TSA BOPHIRIMA, TSA BOGARE LE TSA BOTLHABA TSA MAFELO A GO KA BONWANG GAUTA MO GO ONE A WITWATERSRAND

DINOMORE TSA TSHUPISO TSA DEA: DEA/EIA/0000498/2011 & DEA12/12/20/2403

Go ntshiwa katsiso fano go ya ka Molao wa Boseitšhaba wa go Laola Tikologo wa 1998 (Molao No.: 107 wa 1998) ("NEMA" ka Seesemane) wa gore go ntshiwe taolo ya go dirwa ga ditiro tse di leng mo lenaaneng la GNR 544 ya 18-Seetebosigo 2010 ("GNR 544") le la GNR 545 ya 18 Seetebosigo 2010 ("GNR 545") le le gatisitsweng go ya ka Ditaelo 24(2) le 24D, NEMA, la go tlhabolowa le go tlhamiwa ga maemo a go itshekisa metsi a go Ntshiwa ga Asiti ya Moepo ka Diphaephe kgotsa Mine Drainage ("AMD" ka Seesemane) mo Dibeiseneng Tsa Botlhaba, Tsa Bogare le Tsa Bophirima tsa Mafelo e go ka Bonwang Gauta mo go One a Witwatersrand, mo Porolonseng ya Gauteng. Gape go baiwa le Lesense ya Matlakala go ya ka GNR 718 ya-3 Phatwe 2009 (GNR 718) e e gatsitsweng go ya ka karolo 19(1) ya Molao wa Boseitšhaba wa go Laola Tikologo ya: Molao wa Matlakala, 2008 (Molao No.: 59 wa 2008) ("NEM:WA" Ka Seesemane). Ka jaro, go rometswe kopo e e kopantsweng bara Letsapeng la Merero ya Tikologo ("DEA" ka Seesemane) jaaka go thalositswe mo karolong 24L ya NEMA le mo karolong 44 ya NEM:WA.

Mafelo e go dirwa ga porojeke ene

Ditiro tse mo moepong tsa ka fa tlase ga lefatshe mo Dibeiseneng tsa Botlhaba, Tsa Bogare le Tsa Bophirima di emisitswe, mme ka ntlha ya seno, ditiro tse mo moepong tsa go ntsha metsi le tsone di emisitswe. Seno se bakile gore go nne le metsi a a tletseng asiti le letswai mo dikhuting tsa mafika a a mo teng ga moepo (tse gore, AMD). Fa nako e ntse e tsamaya, metsi ano a ta thatloga go fitha fa boelong jwa pula ga fa go dirwa bro ya mo moepong mme kwa boletsong a fa tswela mo bogodimong mo boelong jo bo kwa tlase le mo molatswaneng e e mabapi. Fa go tsibogetswe matshwenyego ka ga AMD, Trans-Caledon Tunnel Authority ("TCTA") e amogetsa kaelo ya bodiredi ya go thabolola madiredi a a leng teng le go aga madiredi a go itshekisa metsi a e ta bofosang bothata jwa AMD mo Dibeiseneng tsa Bophirima, Tsa Bogare le Tsa Botlhaba. Go thabololwa (tlamolokoo ya ka bonako) le go agiwa ga madiredi a go itshekisa metsi a go tshibhintshweng gore a agiwe go tla akaretsa ditiro tse di latelang; go aroganingwa ga metsi go bewa mo dikhetlhong tsa moepo tse di amegang; go itshekiswa ga metsi, go ntshiwa ga seretse le go latlhiwa ga sone; le go ntshiwa ga metsi a a ntshitsweng a fitlang a bereka mo lefelong le a fitlang go dirisiwa mo go tone.

Letapha la Merero ya Metsi le sa ntse le dira patlisiso ka itheraboloto ya lobaka lo lo leele ya AMD mo dibeiseneng tsotlhe. Tharaboloto ya lobaka lo lo leele ga se karolo ya go dirwa ga kopo eno ya EIA le thulaganyo ya yona.

Beiseng ya Bophirima

Setsha sa bodirelo jo go tshibhintshweng gore bo dirwe jwa go itshekisa metsi jwa Beiseng ya Bophirima ya AMD se fowa Setsheng sa Rand Uranium mo e ka nnang 5km borwa-bophirima jwa Krugersdorp mme go iwa kwa go sone ka go dirisa tsela ya R28 ya Main Reef. Jono ke bodirelo jo bo ntseng bo le teng jwa go itshekisa metsi jo bo tlileng go tlhabolwa jaaka karolo ya tharaboloto ya lefatshe ya bonako ya go itshekisa AMD e e setseng e ntshetse metsi mo beiseneng ya bophirima. Tharaboloto ya lobaka lo lo khutshwane e ta nna ya go thama bodirelo jo bosa jwa go itshekisa metsi mo setsheng sa Randfontein Estates se se bapileng le setsha sa Rand Uranium.

Beiseng ya Bogare

Bodirelo jwa go itshekisa diedi tsa AMD tsa Beiseng ya Bogare jo go tshibhintshweng gore bo dirwe bo tlile go nna mo e ka nnang 1.8km go ela kwa botlhaba jwa Bogare Jwa Toropo ya Germiston go bapa le Tlhatlo e e yang kwa tlase e e ka fa Borwa Bophirima ya ERPM. Ka fa bolkone jwa setsha seno go lata Tsala-Tlase ya Boksburg, mme ka fa bophirima le ka fa borwa go feta Brammer Street le Power Street, mme ka fa bofhaba go lata sepopi sa Transvaal. Tiro ya go di aga e bopa karolo ye tharaboloto ya lobaka lo lo khutshwane ya go itshekisa AMD

Beiseng ye Botlhaba

Bodirelo jo go tshibhintshweng gore bo dirwe jo bo itshekisang metsi jwa AMD ya Beiseng ye Botlhaba bo tla bo bo agilwe kwa Tlhatlong ya No. 3 ya Moepo wa Grootvlei botgatlaka jwa mo e ka nnang 4.6km go ela kwa botlhaba jwa Bogare Jwa Toropo ya Springs. Go kwa kwa setsheng seno ka Tsele ya R29 ya Ermelo le Tsele ye Grootvlei go kgabaganya motsesetsropo wa Casseldale. Tiro ya go di aga e bopa karolo ye itharaboloto ya lobaka lo lo khutshwane ya go itshekisa AMD.

Ditiro tse di mo lenaaneng

Ditiro tse di leng mo lenaaneng la 9, 11, 13, 18, 23, 28, 37 le 39 la GNR 545 le ditiro tse di leng mo lenaaneng la 3, 5 le 10 la GNR 545 di tlhagisiwe jaaka ditiro tse go tshwanetseng gore go ntshiwe tetla ya gore di dirwe mo tikologong le tse go tshwanetseng ga dirwa patlisiso ka tsone pele mo tikologong le go ntsha pego ye dipheleto tsa tsone mo tikologong.

Setlhopha A sa tiro 19 ya go tlosa matlakala le Setlhopha B sa ditiro 1, 6, 7 le 9 tsa go tlosa matlakala jaaka go kwadilwe go GNR 718 di ile tsa tlhagisiwa jaaka ditiro tsa go tlosa matlakala tse di batlang latesense ya go tlosa matlakala.

Modirallopo
Trans-Caledon Tunnel Authority

Mogaetadodi yo o Ikemetseng ka Nosi wa Tshekatsheko ya Diphetelo Tse mo Tikologong
Digby Wells Environmental (Pty) Ltd e thomilwe go nna mogaetadodi yo o ikemetseng ka nosi we tsa tikologo gore e dire Tshekatsheko ya Diphetelo Tsa mo Tikologong e e thokang go dirwa le go ateelela pele Thulaganyo ya go Nna le Seabe ga Baagi ya diTharabololo tsa ka bonako le tsa kobaka lo lo khutshwane.

Go ikwadisa jaaka lekuka le le nang le kgatlhego le le le angwang ka porojeke eno (I&AP)
Fa o ntse go itemdisa jaaka lekuka le le nang le kgatlhego mo go seno le le angwang ka porojeke eno le go amogela tshedimosetso go ya pele, tsweetswee ikgolagonye le matho yo leina la gagwe le kwadilweng fa tlase.

Tatelano yea Letsatsi le go Laolwa ga Botlhe
O latelwa fano gore o nne lang mo letsatsing la go laolwa ga botlhe go ita kopanong ya baagi botlhe ya Porojeke e go tshibhintshweng gore e dirwe ya Mafelo a go ka Bonweng Gauta mo go One a Witwatersrand. Bolokelelo jwe kopano ya letsatsi la go laolwa ga botlhe bo tla naya mafelo a I&AP tshono ya go kopana le setlhopha sa porojeke le go thagisa matshwenyego a bone, dikhwaelo le/ dikhitshinyo melebana le porojeke eno e go tshibhintshweng gore e dirwe. Tsweetswee lebe ditlhe tsa Lansanetlselo 1 la dikopano tsa letsatsi la go laolwa ga botlhe.

Lansanetlselo 1: Ditlha tsa Dikopano Tsa Letsatsi la go Laolwa ga Botlhe

Bosio	Lefelo	Letlha	Nako
Beisene ya Bophirima	Randfontein Golf le Country Club Homestead Avenue, Robinson, Randfontein	Matlhatso, 25 Tlhakole (February) 2012	09h00 - 16h00
Beinsole ya Bogare	Germiston Golf Club Airport Road (Off Power Street), Germiston	Matlhatso, 03 Mopitlwe (March) 2012	09h00 - 16h00
Beisene ya Botlhaba	Springs Country Club Cnr Parkes and Nigel Rd, Selection Park, Springs	Matlhatso, 10 Mopitlwe 2012,	09h00 - 16h00

ISAZISO SOKUGUNYAZA IMISEBENZI ESOHLWINI EMAYELANA NOKUNGENELELA OKUPHUTHUMAYO, NOKWESIKHASHANA KOKULAWULWA KWAMAZINGA OKUMONYWA KWE-ESIDI EMIGODINI ESENTSHONALANGA, MAPHAKATHI KANYE NASEMPUMALANGA YASE-WITWATERSRAND GOLDFIELDS

IZINOMBOLO ZEREFERENSI YE-DEA: DEA/EIA/0000498/2011 & DEA12/12/20/2403

Lesi saziso sinikezwa ngokuhambisana ne-National Environmental Management Act, 1998 (UMthetho ongunombolo107 wa-1998) ("NEMA") ukuze lugunyazwe ukuqaliswa kwezitshudeko ezilandelayo ku-GNR 544 yangoMfumfu wezi-2010 ("GNR 544") kanye ne-GNR 545 yangomhlaka-18 kuMfumfulwana wezi-2010 ("GNR 545") esihlokwe ngokuka-Section 24(2) kanye no-24D we-NEMA, yokuthuthukiswa kweisihlenzi samanzi ndawo-Acid Mine Drainage ("AMD") emigodini eseMpumalanga, Maphakathi kanye naseNtshonalanga e-Witwatersrand Gold Fields, esiFundazweni sase-Gauteng. Ilayisensi yokuhlushwa kwendle lyadingeka ngokuka-GNR 718 wangomhlaka 3 kuMalboozi wezi-2009 ("GNR 718") esihlokwe ngokuka-section 19(1) we-National Environmental Management: Waste Act, 2008 (UMthetho ongunombolo 59 wezi-2008) ("NEM:WA"). Isicelo esidityelwe sesenzeiwe kuMnyango wezeMvelo ("DEA") ngengokusho kuka-section 24L wa-NEMA kanye no-section 44 we-NEM:WA.

Ukwesekwa kwephrojekthi

Imisebenzi yasemayini eyenziwa ngaphansi komhlaba emigodini eseMpumalanga, Maphakathi kanye naseNtshonalanga isimishiwe. Lokhu kungenxa yokwakhekha kwamanzi ane-esidi nosawoti ngaphakathi emigodini (okuvelo i-AMD). Ngokuhamba kwesikhathi le manzi azokhuphuka aye agcine esezikhetheni ngaphansi ezindaweni ezazihe ziyengezitshaniswa nezimbombo yamanzi. Ukuphendula lokhalo mayelana ne-AMD i-Trans-Caledon Tunnel Authority ("TCTA") isithole umyalelo ovela kongqongqoshe ukuba lybuzule izihlanzi ezikhona iphinde yakhe izihlanzi zamanzi ezizophiwa amandla e-AMD emigodini ekuntshonalanga, Maphakathi naseMpumalanga. Umqhubuzwa (ukungenelela okuphuthumayo) nokwakhiwa kwezihlenzi zamanzi ezihongozwayo kuzohoneka ukutheni kwenziwe lokhu okulandelayo; ukuqedwa kwamanzi emigodini yezimayini ethiliziwezwe yikothu, ukuhlanzwa kwamanzi; ukukhishwa kwamanzi okungcolile kwezimayini ezikhethekile

Spreker Spreker Spreker Lofprysing

Stuur epos na: info@mmclimpopo.co.za
www.mmclimpopo.co.za
0837261180 / 0824602540

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KENNISGEWING VIR DIE MAGTIGING VAN GELYSTE AKTIWITEITE WAT VERBAND HOU MET DIE ONMIDDELLIKE EN KORTTERMYN-INGRYPING VIR DIE BESTUURSMAATREELS VAN SUURMYNWATERDREINERING (SMD) IN DIE WESTELIKE, SENTRALE EN OOSTELIKE KOMME VAN DIE WITWATERSRANDSE GOUDVELDE

DEPARTEMENT OMGEWINGSAKE (DEA) -VERWYSINGSNOMMERS: DEA/EIA/0000498/2011 EN DEA12/12/20/2403

Hierdie kennisgewing is kragtens die Wet op Nasionale Omgewingsbestuur, 1998 (wet no 107 van 1998) ("NEMA") vir die magtiging van gelyste aktiwiteite vervat in GNR 544 van 18 Junie 2010 ("GNR 544") en GNR 545 van 18 Junie 2010 ("GNR 545"), gepubliseer kragtens artikel 24(2) en 24D van die NEMA, vir die opgradering en ontwikkeling van watersuiweringsaanlegte vir die behandeling van suurmynwaterdreinering ("SMD") in die Oostelike, Sentrale en Westelike Komme van die Witwatersrand se Goudvelde in Gauteng. 'n Afvalfisensie word ook vereis kragtens GNR 718 van 3 Julie 2009 ("GNR 718"), gepubliseer kragtens artikel 19(1) van die Wet op Nasionale Omgewingsbestuur: Afvalwet, 2008 (wet no 59 van 2008) ("NEM:WA") 'n Geïntegreerde aansoek is by die Departement Omgewingsake ("DEA") ingedien, soos voorsien in artikel 24L van die NEMA en artikel 44 van die NEM: WA.

Projekmotivering
Die ondergrondse mynbedrywighede binne die Oostelike, Sentrale en Westelike Komme, asook die ontwatering van die myndelfplekke is gestaak. Dit het tot die vorming van suur- en soutwater binne die holtes gelei. Mettertyd sal hierdie water tot natuurlike voormynvlakke styg en uiteindelik na die oppervlak by gedefinieerde laepunte en aanliggende strome uitloop. Na aanleiding van kommer oor SMD, het die Trans-Caledon Tonnelgesag ("TCTA") 'n opdrag van die minister ontvang om bestaande aanlegte op te gradeer en watersuiweringsaanlegte te bou, wat SMD binne die Westelike, Sentrale en Oostelike Komme sal neutraliseer. Die opgradering (onmiddellike ingryping) en konstruksie van die beoogde watersuiweringsaanlegte sal die volgende aktiwiteite behels: onttrekking van water uit geaffekteerde mynskagte, suiwering van die water, modderverwydering en -wegruiming, en afvoer van geneutraliseerde water binne die opvangsomgewing.

Die langtermynoplossing vir SMD in al die komme word tans deur die Departement van Waterwese ondersoek. Die langtermynoplossing vorm nie deel van hierdie EIA-aansoek en -proses nie.

Westelike Kom
Die perseel van die beplande Westelike Kom SMD-watersuiweringsaanleg is op die Rand Uranium-eiendom ongeveer 5 km suidwes van Krugersdorp gelee en kan vanaf die R28 Main Reef-weg bereik word. Dit is 'n bestaande watersuiweringsaanleg wat as deel van die onmiddellike ingryping opgegradeer sal word om die SMD te suiwer wat reeds in die Westelike Kom uitloop. Die korttermyn-ingryping is die ontwikkeling van 'n nuwe watersuiweringsaanleg op die Randfontein Estates-eiendom langs die Rand Uranium-eiendom.

Sentrale Kom
Die beplande Sentrale Kom SMD-suiweringsaanleg sal bykans 1,8 km oos van die Germiston SSG langs die ERPM Suidwes Vertikale Skag gebou word. Die perseel word aan die noordekant deur Laer Boksburgweg, aan die weste- en suidekant deur Brammer- en Powerstraat en aan die oostekant deur 'n Transnet-spoorlyn begrens. Die konstruksie vorm deel van die korttermyningryping om SMD te suiwer.

Oostelike Kom
Die beplande Oostelike Kom SMD-watersuiweringsaanleg sal bykans 4,6 km reg oos van die Springs SSG by die Grootvlei-mynskag nommer 3 gebou word. Die perseel kan van die R29 Ermelo-weg en Grootvleiweg deur die Casseldale-voorstad bereik word. Die konstruksie vorm deel van die korttermyningryping om SMD te suiwer.

Geïdentifiseerde aktiwiteite
Geïdentifiseerde aktiwiteite 9, 11, 13, 18, 23, 28, 37 en 39 van GNR 545 en geïdentifiseerde aktiwiteite 3, 5 en 10 van GNR 545 is geïdentifiseer as aktiwiteite wat omgewingsmagtiging vereis en aan ondersoeke en omgewingsimpakverslae onderhewig sal wees.

Kategorie A-afvalbestuursaktiwiteit 19 en Kategorie B-afvalbestuursaktiwiteite 1, 6, 7 en 9 soos vervat in GNR 718 is as afvalbestuursaktiwiteite geïdentifiseer wat afvalbestuursfisensies vereis.

Aansoeker
Trans-Caledon Tonnelgesag

Onafhanklike Omgewingsimpakondersoek-praktisyn
Digby Wells Environmental (Edms) Bpk is aangestel as 'n onafhanklike omgewingskonsultant om die voorgestelde Omgewingsimpakondersoek te onderneem en die Openbare Deelnameproses vir die onmiddellike en korttermyn-ingrypings te fasiliteer.

Registrasie as 'n Belanghebbende en Geaffekteerde Party ("I & AP")
Indien u as 'n belanghebbende of geaffekteerde party wil registreer en meer inligting benodig, kontak die ondergenoemde persoon.

Uitnodiging na 'n Openbare Opedag
U word uitgenooi om 'n openbare opedag vir die beplande Witwatersrandse Goudvelde-projek by te woon. Die openbare opedag sal aan belanghebbende en geaffekteerde partye die geleentheid bied om die projekspan te ontmoet en om bekommernisse, opmerkings en/of voorstelle ter sprake te bring. Verwys na Tabel 1 vir besonderhede oor die openbare opedagvergaderings.

Tabel 1: Besonderhede van die openbare vergaderings

Area	Plek	Datum	Tyd
Westelike Kom	Randfontein Gholf- en Buiteklub Homesteadlaan, Robinson, Randfontein	Saterdag 25 Februarie 2012	09:00 – 16:00
Sentrale Kom	Germiston Gholfklub Airportweg (uit Powerstraat) Germiston	Saterdag 3 Maart 2012	09:00 – 16:00
Oostelike Kom	Springs Buiteklub, hv Parkes- en Nigelweg, Selection Park, Springs	Saterdag 10 Maart 2012	09:00 - 16:00

Omgewingskonsultant: Digby Wells Environmental (Edms) Bpk
Kontakpersoon: Steve Horak
Telefoon: 011 789 9495
Faks: 011 789 9498
E-pos: steve@digbywells.com

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& KLERKSDORP. ONS BE

your CV to:
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ion: Annemarie

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LIQUOR ACT, 2003
NOTICE OF APPLICATION
IN TERMS OF SECTION 24

Notice is hereby given that it is the intention of the person whose details are set out below to lodge an application for Liquor License to the secretary of the local committee of The Gauteng Liquor Board, (Johannesburg)
1. Full names the applicant: Winston Oscar Melinga
2. Intended trading name: Café Mojo
3. Identity number or Registration number of the applicant: 7403206231085
4. Full address and location of the premises: 31 Totius Street, Crystal Park, Benoni
5. Type of licence applied for: Restaurent Liquor License
6. Names and nature of educational institutions within a radius of 1 kilometer from the premises in paragraph 4: None
7. Names and distances to similar licensed premises within a radius of 1 kilometer from the premises in paragraph 4: 1. Crystal Park Bottle Store, 2. Spar Supermarket (Use annexure where necessary)
8. Places of worship within a radius of 1 kilometer from the premises in paragraph 4: None

Signed at Crystal Park on this 09th day of February 2012
(Sta: 8627264)

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HIEF EXECUTIVE OFFICER FOR THEBE ENERGY

FICATIONS & EXPERIENCE NEEDED:
cutive management experience (Director or Chairman level)
tiel
least 20 years experience in the oil industry - Internationally &

st have experience in various disciplines of the oil industry -
ring & Network development preferred.
levant Commerce degree. Training in System Analysis would
added advantage
ONSIBILITIES:
grow the company to become profitable, sustainable and cash
itive by 2013
develop a number of diverse income streams for the company
the petroleum sector nationally and internationally" Manage
takeholders within the petroleum industry including petroleum
ieties, industry associations and the public sector
d and manage relations between Thebe Energy and Shell
sure adequate systems of internal control, risk management
orporate governance
velop the internal operational capacity within the company
velop & manage a high performance team within the company

Send CV to HR: Wisane Maluleke:
wisane.maluleke@thebe.co.za
Closing date: 17 February 2012

Ekurhuleni
METROPOLITAN MUNICIPALITY

ERRATUM

The Ekurhuleni Metropolitan
unicipality (EMM) wish to advise that
e following bid previously advertised
on Friday, 13 January 2012,
l be WITHDRAWN and re-advertised
as soon as possible.

NTRACT NUMBER:
S(RW) 07/2012
e supply, installation and maintenance
raffic signal equipment on an as and
en required basis with effect from date
award until 30 June 2014.

e EMM would like to apologise for any
onvenience caused.

. K. NGEMA
TY MANAGER
M

The National Health Laboratory Service invites tenders

A non refundable charge of R500-00 is payable prior to obtaining a tender document. The monies should be deposited into the account of the NHLS, First National Bank, Parktown, account number 58811152924, branch code 250455. Proof of payment should be sent via fax (011 386-6302) or e-mail to irene.strydom@nhls.ac.za or nondyebo.maganedisa@nhls.ac.za upon which the tender document will be e-mailed. Tenders may also be collected after payment from: Ms I Strydom/Ms N Maganedisa, 1 Modderfontein Rd, Sandringham, Johannesburg, Tel: (011) 386 6165 (011) 885 5352.

Sealed tenders, endorsed with the tender number, name of tenderer and closing date and addressed to the Procurement Manager: NHLS, must be deposited in the Tender Box situated at the Reception, NHLS, 1 Modderfontein Rd, Sandringham, Johannesburg on or before the closing time and date. Documents received after 11:00 on the closing date will be regarded as late and will not be accepted under any circumstances.

TENDER NUMBER	DESCRIPTION OF TENDER	CLOSING DATE	CONTACT
048/11-12	Disposal of hazardous chemical waste substances, nationally	12 March 2012	Mr R McFarlane (011) 489-9215

NOTICE FOR THE AUTHORISATION OF LISTED ACTIVITIES ASSOCIATED WITH THE IMMEDIATE, AND SHORT TERM INTERVENTIONS FOR THE MANAGEMENT MEASURES OF ACID MINE DRAINANGE IN THE WESTERN, CENTRAL AND EASTERN BASINS OF THE WITWATERSRAND GOLDFIELDS

DEA REFERENCE NUMBERS: DEA/EIA/0000498/2011 & DEA12/12/20/2403

This notice is hereby given in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) ("NEMA") for the authorisation of listed activities contained in GNR 544 of 18 June 2010 ("GNR 544") and GNR 545 of 18 June 2010 ("GNR 545") published in terms of Sections 24(2) and 24D the NEMA, for the refurbishment and development of water treatment plants for the treatment of Acid Mine Drainage ("AMD") in the Eastern, Central and Western Basins of the Witwatersrand Gold Fields, Gauteng Province. A waste licence is also required in terms of GNR 718 of 3 July 2009 ("GNR 718") published in terms of section 19(1) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) ("NEM:WA"). An integrated application has, therefore, been made to the Department of Environmental Affairs ("DEA") as provided for in section 24L of the NEMA and section 44 of the NEM: WA.

Project motivation
The underground mining operations within the Eastern, Central and Western Basins have ceased, and with this the dewatering of the mine workings has stopped. This has resulted in the formation of acidified and saline water within the voids (i.e. AMD). With time this water will rise to natural pre-mining levels and eventually decant on to the surface at defined low points and adjacent streams. In response to concerns about AMD the Trans-Caledon Tunnel Authority ("TCTA") has, received a ministerial directive to upgrade existing plants and construct water treatment plants which will neutralise AMD within the Western, Central and Eastern Basins. The upgrade (immediate intervention) and construction of the proposed water treatment plants will entail undertaking the following activities; abstraction of water from affected mine shafts; treatment of the water; sludge removal and disposal; and discharge of neutralised water into the receiving environment.

The long term solution to AMD in all the basins is currently under investigation by the Department of Water Affairs. The long-term solution does not form part of this EIA application and process.

Western Basin
The site of the proposed Western Basin AMD water treatment plant is situated on the Rand Uranium Property about 5km south-west of Krugersdorp and is accessible from the R28 Main Reef Road. This is an existing water treatment plant which will be upgraded as part of the immediate intervention to treat the AMD which is already decanting in the western basin. The short term intervention will be to develop a new water treatment plant on the Randfontein Estates property adjacent to the Rand Uranium property.

Central Basin
The proposed Central Basin AMD treatment plant is to be constructed about 1,8km east of the Germiston CBD adjacent to the ERPM South West Vertical Shaft. The site is bounded on the north by Lower Boksburg Road, on the west and south by Brammer Street and Power Street, and on the east by a Transnet railway line. The construction forms part of the short term intervention to treat AMD.

Eastern Basin
The proposed Eastern Basin AMD water treatment plant will be constructed at the Grootvlei Mine Shaft No. 3 about 4,6km due east of the Springs CBD. The site is accessible via the R29 Ermelo Road and Grootvlei Road through the suburb of Casseldale. The construction forms part of the short term intervention to treat AMD.

Listed activities
Listed activities 9, 11, 13, 18, 23, 28, 37 and 39 of GNR 545 and listed activities 3, 5 and 10 of GNR 545 have been identified as activities that require environmental authorisations and that will be subject to scoping and environmental impact reporting.

Category A waste management activity 19 and Category B waste management activities 1,6,7 and 9 as contained in GNR 718 have been identified as waste management activities that require waste management licences.

Applicant
Trans-Caledon Tunnel Authority

Independent Environmental Impact Assessment Practitioner
Digby Wells Environmental (Pty) Ltd has been appointed as an independent environmental consultant to undertake the required Environmental Impact Assessment and to facilitate the Public Participation Process for the immediate and short term interventions.

Register an interested and affected party (I&AP)
Should you wish to be registered as an interested or affected party and receive further information, please contact the person below.

Invitation to Open Days
You are hereby invited to attend any of the public open days for the proposed Witwatersrand Gold Fields AMD Project. The open days will provide I&APs with an opportunity to meet with the project team and raise issues of concern, comments and/ suggestions regarding the proposed project. Please refer to Table 1 for details of the open days.

Table 1: Details of the Public Open Days

Area	Venue	Date	Time
Western Basin	Randfontein Golf and Country Club Homestead Avenue, Robinson,Randfontein	Saturday, 25 February 2012	09h00 - 16h00
Central Basin	Germiston Golf Club Airport Road (Off Power Street) Germiston	Saturday, 03 March 2012	09h00 - 16h00
Eastern Basin	Springs Country Club Cnr Parkes and Nigel Rd, Selection Park, Springs	Saturday, 10 March 2012,	09h00 - 16h00

Environmental Consultant: Digby Wells Environmental (Pty) Ltd
Contact Person: Steve Horak
Telephone: 011 789 9495
Fax: 011 789 9498
E-mail: steve@digbywells.com

DIGBY WELLS ENVIRONMENTAL

NOTICE FOR THE AUTHORISATION OF LISTED ACTIVITIES ASSOCIATED WITH THE IMMEDIATE, AND SHORT TERM INTERVENTIONS FOR THE MANAGEMENT MEASURES OF ACID MINE DRAINAGE IN THE WESTERN, CENTRAL AND EASTERN BASINS OF THE WITWATERSRAND GOLDFIELDS

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Applicant
Trans-Caledon Tunnel Authority

Independent Environmental Impact Assessment Practitioner
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DEA REFERENCE NUMBERS: DEA/EIA/0000498/2011 & DEA12/12/20/2403

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The long term solution to AMD in all the basins is currently under investigation by the Department of Water Affairs. The long-term solution does not form part of this EIA application and process.

Western Basin

The site of the proposed Western Basin AMD water treatment plant is situated on the Rand Uranium Property about 5km south-west of Krugersdorp and is accessible from the R26 Main Reef Road. This is an existing water treatment plant which will be upgraded as part of the immediate intervention to treat the AMD which is already decanting in the western basin. The short term intervention will be to develop a new water treatment plant on the Randfontein Estates property adjacent to the Rand Uranium property.

Central Basin

The proposed Central Basin AMD treatment plant is to be constructed about 1.8km east of the Germiston CBD adjacent to the ERPM South West Vertical Shaft. The site is bounded on the north by Lower Boksburg Road, on the west and south by Brammer Street and Power Street, and on the east by a Transnet railway line. The construction forms part of the short term intervention to treat AMD.

Eastern Basin

The proposed Eastern Basin AMD water treatment plant will be constructed at the Grootvlei Mine Shaft No. 3 about 4.6km due east of the Springs CBD. The site is accessible via the R29 Ermelo Road and Grootvaly Road through the suburb of Casseldale. The construction forms part of the short term intervention to treat AMD.

Listed activities

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Central Basin
The proposed Central Basin AMD treatment plant is to be constructed about 1.8km east of the Germiston CBD adjacent to the Simmer & Jack West Vertical Shaft. The site is bounded on the north by Lower Boksburg Road, on the west and south by Kramer Street and Power Street, and on the east by a Transnet railway line. The construction forms part of the short term intervention to treat AMD.

Eastern Basin
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Nigeria honours Zuma's efforts

PRESIDENT Jacob Zuma accepted an honorary doctorate in philosophy from the American University of Nigeria, in Yola, Adamawa, at the weekend, the presidency said.

Zuma received the award for his contribution to education and human development during a working tour to Nigeria. In his speech Zuma said he regarded the award as an honour and recognition of South Africa and the country's role in the continent and the world.

"I am aware that the honour I am receiving today is the highest that a university can bestow on an individual and I heartily thank you for that," Zuma said.

Education in Africa was important because quality education was essential to building the human resources required for the continent's development, he said.

"Not a single nation will prosper without education. We should ensure that education is used as a tool for development," he said.

Among the top 100 universities in the world it was "hard to find a single one from Africa", the president said.

The colonial legacy, political repression and budget cuts had hampered African universities, but African academics were needed to offset the negative perceptions of the continent perpetuated by foreign academics, he said.

Zuma also called for indigenous languages to be used in academia as this was prerequisite to "the decolonisation of the African mind" - *Sapa*

RESOLUTE: Sasco president Ngoako Selamolela, general secretary Themba Masondo and treasurer Liyanda Maphanga. PHOTO: ANTONIO MUCHAVE

SASCO UPS ANTE ON FREE EDUCATION

Students want education tax to cover costs

Penwell Dlamini

THE South African Students Congress will embark on a national campaign demanding free education at institutions of higher learning next year.

Last week, Sasco held its 17th national congress at the University of Free State, and yesterday it unveiled its resolutions at ANC headquarters Luthuli House in Johannesburg.

Sasco announced that it would dedicate the entire 2012 in campaigning for free education, saying free education had "remained a pipe dream".

Sasco president Ngoako Selamolela said the organisation would mobilise all sections of society.

"This campaign will not just be a campaign to government but it will also be a campaign to exclusion rules in this university (of Free State). We are pained by that poor students are not given admission because they do not have sufficient funds to register at these institutions," said Selamolela.

He said the best way to fund free education was the introduction of an education tax on high-income earners. "Our government does have the necessary financial capacity to provide free education. We also want to see a better relationship between Sasco and the Department of Higher Education."

Sasco said it was very concerned about the lack of transformation in the higher education and training sector and called for the disbandment of the council of the University of Free State.

But the UFS said the allegations were baseless. "Cosas is clearly out of touch with transformation in the university. The university can only respond to facts and not false and misleading allegations," said UFS spokeswoman Lacea Loader.

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DIGBY WELLS ENVIRONMENTAL

Anger over cabinet takeover

Kingdom Mabuza

THE cabinet decision to put several Limpopo provincial government departments under administration has left the ANC in the province in shock.

ANC chairperson and Premier Cassel Mathale said the cabinet had no "basis" for the decision last week to place under administration the department of treasury led by MEC David Masondo, education under MEC Dickson Masemola, health and social development led by MEC Dikeledi Magadzi, MEC Pinky Kekana's roads and transport and MEC Thabitha Mohlala's public works department.

The departments will be taken over by the national government because of, among other things, a financial crisis and alleged mismanagement.

"We were shocked when the cabinet announced that five departments would be under administration, but we have accepted that decision," Mathale said.

Mathale, who is fighting for political survival, has also questioned Cosatu's planned march on the eve of the ANC's provincial conference on Saturday.

A fierce political battle is unfolding between Mathale supporters and a faction behind Deputy Arts Minister Joe Phaahla.

Phaahla had been nominated to contest for the ANC chairmanship against Mathale.

All set for battle for the ANC leadership in Limpopo

IT'S ALL systems go for the ANC Limpopo provincial elective conference scheduled to take place at the University of Limpopo's Turfloop campus this weekend.

The conference will decide on who leads the party in the province for the coming five years. The conference will also test the popularity of the two candidates vying for the the position of chairperson.

Incumbent Cassel Mathale, who is also premier of the province, will fight to retain the position, while Deputy Minister for Arts and Culture Joe Phaahla will challenge him.

ANC Limpopo spokesman David Masondo said: "Preparations for the conference have gone well and we look forward to a successful event this coming weekend." - *Frank Maponya*

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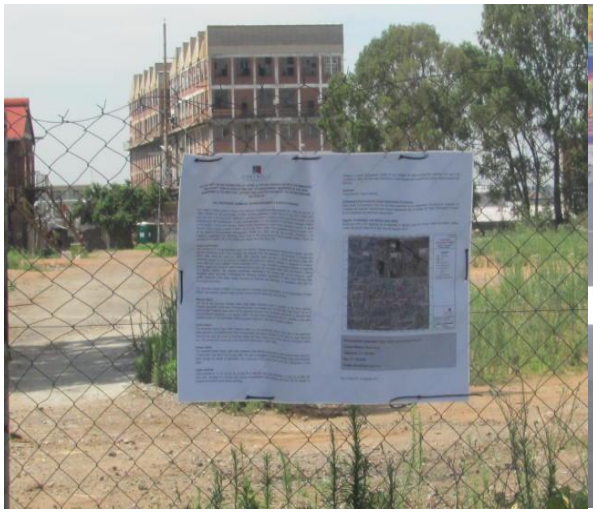

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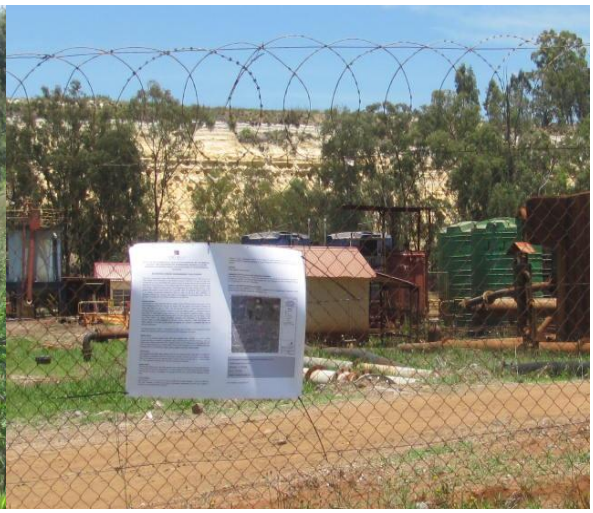

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Appendix L: Comments and Response Report

AMD EIA - COMMENTS AND RESPONSE REPORT

TRANS-CALEDON TUNNEL AUTHORITY

JUNE 2012

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Tel: +27 11 789 9495, Fax: +27 11 789 9498, info@digbywells.com, www.digbywells.com

Directors: AR Wilke, LF Koeslag, PD Tanner (British)*, AJ Reynolds (Chairman) (British)*, J Leaver*, GE Trusler (C.E.O)
*Non-Executive

This document has been prepared by **Digby Wells Environmental**.

Report Title: **AMD EIA - Comments and Response Report**

Project Number: **BKS1310**

Name	Responsibility	Signature	Date
Steve Horak	Report Writer		01 June 2012
Grant Beringer	Reviewer		22 June 2012

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Annexure B: EIA Interest Group Meeting Minutes

Annexure C: Public Open Day Comments Sheets

Annexure D: Attendance Registers – One-on-one Consultations

Annexure E: Summary of Technology Costs

Annexure F: Summary of the Sludge Discharge into the West Wits Pit

1 INTRODUCTION

The Comments and Response Report (CRR) (Version 1) provides a summary of the comments, questions and issues raised by stakeholders since December 2011- April 2012. These comments have been extracted from written submissions of Interested and Affected Party (I&APs) registration forms, issues raised during the EIA interest group meeting, public open days and one-on-one consultations with various stakeholders. Please note, this version records comments received until 20 April 2012, comments received thereafter will be included in Version 2 of this report which will accompany the Final Scoping Report.

Please take note of the following:

- Version 1 of the CRR will be appended to the Draft Scoping Report which is available for public review from 28 June -7 August 2012;
- Version 2 of the CRR will include comments and issues raised by stakeholders during the review of the Draft Scoping Report. Version 2 will be appended to the Final Scoping Report which will be submitted to the Department of Environmental Affairs (DEA);
- Version 3 of the CRR will be appended to the Draft EIA Report. Version 3 will include all comments from stakeholders during the EIA phase. The date for the review of the Draft EIA Report will be made available for public review.
- Version 4 of the CRR will be appended to the Final EIA Report. Version 4 will include comments from stakeholders on the Draft EIA Report.
- Version 1 of the CRR will be updated to become the subsequent, therefore issues and comments recorded in this document will be carried over to all the next versions of the CRR.

The minutes of the meeting held with the Federation for Sustainable Environment (FSE) as well as the minutes of the EIA Interest Group Meeting are attached as Annexure A and Annexure B respectively.

The comment sheets from the public open days are attached in Annexure C and the attendance registers form the one-on-one consultations as Annexure D.

The summary of the technology costs is attached as Annexure E and the summary of the sludge discharge into the West Wits Pit as Annexure F.

2 ISSUES AND RESPONSE TABLE

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			2.1 Project Description		
1	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	What does the immediate and short term interventions entail?	The immediate intervention is for the western basin where the AMD is already decanting and involves the upgrade of the existing Rand Uranium water treatment plant. The short term refers to pumping of water in the Western and the Central and Eastern basins to ensure that the Environmental Critical Level (ECL) is not reached The immediate and short term interventions entails the removal of heavy metals and the raising of the PH of the water through the High Density Sludge (HDS) process, it does not involve the removal of salts. The long term intervention will involve the full treatment of water including desalinisation and it is hoped that this will be implemented in the next four	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				years.	
2.2 Project Timing					
2	Matthew Havinga Eastern Basin Land Owner	20/04/2012 One-on–one consultations	When will the short term intervention be implemented?	The planned implementation schedule is directly related to the ECL. The immediate intervention in the Western Basin is in process. The central basin will be implemented by early 2013 and eastern will be operational by 2015 based on current rate of rise.	
3	Matthew Havinga Eastern Basin Land Owner	20/04/2012 One-on–one consultations	The short term intervention might not be implemented in the next four years considering the funds required to complete the AMD project	The planned implementation schedule is directly related to the ECL.	
4	Nezau Elididy	10/03/2012Eastern Basin Open Day	Why do you call it short-term intervention? and how short is "short"?	The short term interventions needs to be completed within the next two years, based on water rise within the basins. The short term intervention will be integrated into the long term solution, which is currently in feasibility stage.	
5	Anna Marie	03/04/2012	When will the immediate and short term	In the western basin the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Water Quality & Water Sanitation	Meeting with Ekurhuleni Municipal Officials	interventions to treat AMD be implemented?	implementation of the immediate intervention has already started. It is expected that the intervention in the central basin will start in 2013 and the eastern basin in 2014.	
6	Garfield Krige Sterkfontein Country Estates	15/03/2012One-on-one consultations	There was ample time to treat AMD why are interventions to treat AMD only sought now?	The point is taken, however AMD is a legacy issue, which has been in the making for the past 120 years due to mining. The reason the state could not act was that they did not own or control the land on which mining activities were taking place. Form a legal perspective land owners and those in control of land need to control and mitigate their pollution in terms of the NWA (clause 19 and 20) and the puller pays principle in NEMA. Due to mining having ceased and the companies who were responsible for the pollution no longer exist the government has now decided to step in to address the AMD issue.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
7	Charl van der Merwe,	10/03/2012Eastern Basin Open Day	Revisit time scales?	The timelines are set for now every effort is being made to implement the project as quickly as possible to treat the existing decant and prevent decant in the other catchment.	
8	Lea, Irene	10/03/2012 Eastern Basin Open Day	Construction of infrastructure and treatment plant must not be delayed to ensure that all is managed effectively (not retro-actively).	Comment noted. The construction will be programmed to ensure that the plant is operational prior to the water level reaching the ECL.	
9	Severin, Michael	10/03/2012Eastern Basin Open Day	Needs to happen a.s.a.p	Noted	
10	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	It is stated in the BID page one under the highlighted heading that decanting in the Western basin started in 2002 as a result WESSA would like to find out why did DWA wait for 10 years to realise that AMD decanting was an emergency and a serious issue?	AMD is a legacy issue, which has been in the making for the past 120 years due to mining. The reason the state could not act was that they did not own or control the land on which mining activities were taking place. Form a legal perspective land owners and those in control of land need to control and mitigate their pollution in	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				terms of the NWA (clause 19 and 20) and the puller pays principle in NEMA. Due to mining having ceased and the companies who were responsible for the pollution no longer exist the government has now decided to step in to address the AMD issue.	
11	Mr Philip	25/02/2012Western Basin Open Day	When will construction start?	For the immediate intervention construction activities have started for the short term intervention construction should start in April / May 2012. For the Short Term tenders have been requested and closed. The tenders are currently being evaluated.	
12	Elize Strydom Member of the public	10/02/2012Email	When do you plan to start as dates given have come and gone with no explanation, time and time again and what should make us believe, that this is not just another decoy of sorts?	For the immediate intervention the activities include the upgrading of the Rand Uranium plant to its full capacity to be able to treat the full volume of AMD. The award and construction is dependent on the amount of finance available form national treasury. The	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				original plan was to start construction in March 2012.	
13	Dr Koos Pretorius FSE	20/01/2012Email The issues raised are in response to an article By: Terence Creamer 19th January 2012	TCTA expects construction to begin in February. – Based on what plan and what authorisations by whom since we are only going to see an issues and response table in March 2012, never mind an EMP or water use license application?	In order to stop the existing decant on the Western Basin and to prevent decant in the other basins immediate action is required. TCTA is exploring together with DWA and DEA the process that can be used to ensure that there is lawful commencement of the activities. This will be communicated in due course.	
14	Terence McCarthy	19/01/2012Email	I would like to find out more about the timelines that are envisaged for commencement of pumping at ERPM by the TCTA. Why I ask is because I am concerned about the situation at Gold Reef City.	The timeline has been selected based on starting pumping prior to the water reaching the selected ECL. The ECL level is below the level of the Gold Reef City Shaft 14 - 5 Level and therefore, based on the expected time frames there should be no risk of flooding the underground mine at Gold Reef City.	
15	Terence McCarthy	19/01/2012Email	Gold Reef City has developed 5 Level for the tour visits, which is located at a	The pumps will be installed at a position at least 30m lower than the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			depth of 212 m below surface. The elevation of the shaft collar is 1712 m amsl, so Level 5 is located at an elevation of 1500 m amsl. The water level in the shaft is currently at a depth of 430 m below surface, or 1282 m amsl, and is rising at a rate of 10 m per month. At this rate, 5 Level will flood in about 22 months from now. The rate of rise will probably slow down slightly, but I suspect not by much. They will also need some free-board at 14 Shaft, so to save the underground facility, pumping will have to commence in not more than 20 months from now.	ECL, which will enable the water level to be drawn down to at least 30m below Shaft 14 – 5 Level. Up to date information received from Department of Water Affairs placed the collar level at 1699m amsl, with the Mine Museum at -215m (GRC information). Therefore the level is at 1484m amsl. The ECL level is defined as 1467m amsl (or 17m below GRC). The pump design allows for the pumps to be placed significantly lower than the ECL level, to allow for keeping the water level, say 30m below GRC (1454m) and also to allow for some level differences along the length of the basin (cone of depression). The Due Diligence model predicted ECL level to be reached in September 2012 (average rainfall). However, the model is conservative in predictive	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				rate of rise and has taken the worst case scenario for rate of raise. Using data recorded by GRC, the level rise over the last year has been on average 11m per month. The level is currently 425m below GRC (1278m amsl). This indicates that (using a simple straight line calculation) there are 16months available to implement the project. The tender for construction has been issued and evaluation of tenders is complete with award happening soon. A construction period of 9 months (completion January 2013) is programmed. This is less than the 16 months available (May 2013).	
16	Terence McCarthy	19/01/2012Email	The collar elevation of the shaft that is likely to be selected for the pumping facility at ERPM is about 1650 m amsl, so to protect Gold Reef City the pumping level at ERPM will have to be	SWV Collar Level = 1646 m amsl. Refer to discussion above.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			located at a depth of 200 m below surface (this will allow some free-board and also for a small cone of depression).		
17	Terence McCarthy	19/01/2012Email	From your experience and knowledge of the project, do you think that there is sufficient time to establish a pumping facility at ERPM to prevent flooding of 5 Level at 14 Shaft (i.e. in less than 20 months)?	Only if sufficient funds are made available and the requisite Government approvals are timeously given.	
18	Jan H. van den Berg Private individual	06/01/2012 Email	Project timing: It appears that this project is behind schedule – EIA 2012, Budget approval, Tender approval, Feasibility studies, Project initiation and construction. What is the target date for the ROD (if positive).	We cannot give a target date as this is dependent on the authorities' approval process. However the upgrade of the water treatment plant in the western basin has already commenced due to the urgency of addressing the problem and the directive issued to the Trans Caledon Tunnel Authority (TCTA) to commence with project implementation. A section 24 G application in terms of National	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				Environmental Management Act (NEMA) will be made for the listed activities which will be triggered by the upgrade and construction activities.	
2.3 Project Financing					
19	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Will the set R900 million be used for all three basins?	Yes at this stage that is correct.	
20	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Will the government fund the whole project?	The government will fund the immediate and short term interventions capital expenditure for building the infrastructure. How the operation of the treatment plants and long term solution is to be funded is still to be determined.	
21	Cllr Samukeliswe Mdlalose, Mogale City	20/03/2012 Meeting with affected Mogale city ward	Who will be funding and maintaining the whole project (short, medium and long term)?	The immediate and short term interventions capital investment for the infrastructure will be funded by the government. The intention of	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		councillor		government is that capital cost incurred will eventually be recovered from the water users. One of the objectives of the long term solution is to determine a model for financial recovery.	
22	Garfield Krige Sterkfontein Country Estates	15/03/2012One-on-one consultations	Why should the tax payers' money be used to treat AMD?	At this the interventions for the immediate and short term will be funded by government as funding from other sources has not been secured.	
23	Anonymous (The I&AP did not indicate their name	10/03/2012Eastern Basin Open Day	How much will this cost and who pays?	It is estimated that for all three basins the amount needed is approximately 900 million rand. As of now the confirmed Government contribution is approximately 400 million rand. Government intends to recover costs for treating AMD form the water users. Government will also be investigating whether an environmental levy from mining companies can be levied.	
24	Dave Smith	06/03/2012	Would like to find out how the Project is	The project will be funded by the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Environmental Manager Enstra Mill Sappi Paper and Paper Packaging	Email Registration form	to be funded and who will apply for the water licence.	government for the immediate and short term interventions other funding structures are being investigated for the long term solution. The TCTA will apply for the water licence.	
25	Victor Mazibuko,	03/03/2012Central Basin Open Day	Thanks for the opportunity afforded by the department and would like to get more clarity on why the companies are not being allowed to fund the project themselves.	The state is in the process of investigating how the cost of AMD treatment can be funded by the water users and the mines.	
26	Mashinini, Fikile	03/03/2012Central Basin Open Day	This could be self-sustainable project if it is done correctly.	Noted	
27	Mariette Lifferink FSE	29/02/2012Email & Attachment	The funds which were made available by the National Treasury for the short term and immediate term treatment of AMD amount to R433m. The funds the TCTA requires for the installation of the treatment plants and infrastructure (the capital expenditure) are R924m. There is a significant shortfall between	This is correct and treasury has been approached to augment the funding already allocated.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			the funds allocated by the National Treasury and the funds required by the TCTA.		
28	Mariette Lifferink FSE	29/02/2012Email & Attachment	The TCTA was directed to undertake the emergency works subject to the funds allocated by the National Treasury and made available to the TCTA via the DWA. The funds allocated by the National Treasury are R433m. The TCTA was not directed to propose and implement the infrastructure, treatment plants and pumps at a cost of R924m. The proposed infrastructure, treatment plants and pumps must therefore be modified in order not to incur capital expenditure costs more than the allocated R433m.	TCTA was not directed to implement the project within a defined budget. The engineering design criteria and the cost for the engineering design and construction works is based on the need to maintain the ECLs, treat the pumped mine water and in so doing prevent decant. If the state is unable to provide the full allocation of funding for the works defined by TCTA, then TCTA will prioritise which infrastructure components will be implemented.	
29	Mark Biggers	27/02/2012Email and Registration form and comments	Where will the remaining funding come from for implementation? Will Past Mining Legacy as good corporate citizen that had previously benefited	At this stage government is funding the project and is investigating finical mechanisms to recover the cost from both the mining houses and water	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			from the mining of minerals be seen to play a pro-active and constructive role in finding a solution for the legacy issues of mining this footprint and in respect of AMD; can DRDGold and Ferreira Estates & Investments Company state what their subsidiaries' % contribution to the problem of AMD is?	users.	
30	Dr. van Eeden Eco monitor	22/02/2012 EIA Interest Group Meeting	Is there a guarantee that the government will support this project in the long run?	TCTA is a parastatal therefore cannot comment on whether the government will support the project in the long run. The implementation of AMD is part of DWA planning for providing water in the Vaal system. In years to come treated AMD will be an option for clean water or phase 2 of the Lesotho Highlands project might also be an option. The unit costs for treating AMD are cheaper than other sources such as phase 2 of the Lesotho Highlands project.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
31	Dr Koos Pretorius FSE	22/02/2012 EIA Interest Group Meeting	Enquired as to what will be the costs after the sulphates have been desalinated.	A cost analysis has been completed and is appended as Annexure G.	9.6.2.11 Economic analysis
32	Rachael Adatia Earth life	22/02/2012 EIA Interest Group Meeting	Enquired as to when the rest of the funding will be secured, as only half the capital has been secured currently.	Project funding requirements for the short term solution have not yet been finalised and are currently under review between DWA and TCTA. Stakeholders will be kept informed of developments in this regard.	
33	Joshua Ellis Anglo Ashanti	22/02/2012 EIA Interest Group Meeting	Enquired on how an EIA can be undertaken without having secured all the funding needed for the project. The current funding will not execute the scope of work required for the project. Suggested that for those basins in which funding has not be allocated for, should be taken out of the scope of work.	Noted. It is not pre-requisite for an EIA to have the funding in place since it is the intention of the EIA to refine the design which could have financial implications.	
34	Pakso Chitaka Rand Water	EIA Interest Group Meeting	Enquired why the tax payer's money is being used when some of the mines are still in operation.	The rapid rate of rise to ECL had necessitated urgent government intervention. DWA and other	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				government departments are reviewing the legal processes required to obtain funding from the mines through a separate process as well as various business models.	
35	Dr Koos Pretorius FSE	23/01/2012 Meeting with FSE at the CSIR	Where are the financials to prove that this is the cheapest cost and apex?	TCTA has undertaken a financial and engineering due diligence and is confident that the proposed interventions are cost effective. There is no other proposal at a comparative level of information with which to undertake a cost benefit analysis.	
36	Dr Koos Pretorius FSE	20/01/2012Email The issues raised are in response to an article By: Terence Creamer 19th January 2012	'status update' ….. funding by the government to meet AMD costs as "not feasible or desirable". – Why can we not be given one and especially since we requested more info regarding the financials of the project?	The financials are as quoted in the article "capital costs associated with Phase 1, inclusive of a 15% contingency and escalation, would be R924-million. DWA was initially allocated R225-million, which National Treasury increased by a further R208-million after the Department of Water Affairs (DWA) made representations. In other words, the funding shortfall is	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				currently estimated at R492-million for the project. TCTA's mandate is as per the directive issued to them. The long term solution and funding arrangements falls outside the scope of this EIA. As stated DWA is in the process of investigating the long term solution including funding options this information can be sourced from DWA when it becomes available.	
37	Dr Koos Pretorius FSE	20/01/2012Email The issues raised are in response to an article By: Terence Creamer 19th January 2012	But Morgan is also sceptical of the suggestion of the imposition of an environmental levy on the mines to pay for the AMD. – Where does this come from? Did we not ask for this exact information about the funding? It is well known that the historical mines which have caused the AMD are unable to pay for the treatment of AMD and the responsibility now falls to government to address the problem.	The current legislation does not allow for the costs to be retrospectively recovered from the still existing mining houses that operated the mines. Amendments to the legislation to allow this are part of the long-term feasibility study. The current mines are only responsible for the portion of the AMD attributable to their current mining lease.	
38	Mariette Liefferink	17/01/2012	■ Short term solution financial	Both the capital and operating costs	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	FSE	Email and attached report	implications ■ We need clarity on the financial implications of the short term options. ■ On what basis was the tender granted to the Trans Caledon Tunnel Authority (TCTA)? What is the R value of the tender? ■ What amount of money has been made available by Treasury for this project – both long and short term? Please indicate what the capital and the operational expenditure is. ■ What are the conditions under which the money will be released?	of then short-term intervention are funded by the taxpayer as there is no saleable commodity TCTA is a statutory body established through legislation and answerable to the Minister of Water & Environmental Affairs (as the shareholder representative). The legislation enables the Minister to issue a directive to carry out works under her control to where it falls outside the organisations legislative mandate. This is clearly set out in the Water Act and TCTA's Notice of Establishment The directive did not have a Rand value as DWA anticipated costs would need to be revised as no feasibility study had been undertaken. National Treasury has allocated R433 million for the implementation of the short-term intervention. However	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				based on the outcome of the due diligence review the projected capital cost, inclusive of a 15% contingency and escalation, amounts to R924 million for implementing short-term intervention. Operating costs inclusive of water treatment are expected to amount to approximately R210 million per annum.	
39	Mariette Liefferink Federation for a Sustainable Environment	08/01/2012 Emailed Documents The Impact of Acid Mine Drainage in the Witwatersrand on the Mining Industry in Mpumalanga, Free State, Limpopo, North West and	Money would be needed to fund both the capital and operating costs and the treated AMD.	At this stage the DWA directive to TCTA only covers the upgrade and construction of the water treatment works. The operating costs still need to be determined and who will operate these plants also needs to be decided.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Northern Cape Provinces			
40	Mariette Liefferink FSE	07/01/2012 Email	Most importantly, there is not sufficient money for the immediate and short term treatment and pumping of AMD. What is required, according to the TCTA, is R385 million per annum for the operational costs and R924 million per annum for the capital expenditure. We were credibly informed by the TCTA that only R433 has been made available for the short term treatment of AMD. The preferred option of neutralization was based on direct costs only (a very flawed process and unsustainable, and in contravention of the basic principles of NEMA and the NWA) in the task team's report. The costs are grossly under-estimated according to the TCTA's presentation. TCTA would need a substantially increased budget in order to achieve the minimum objectives assigned to it.	The financials are capital costs associated with Phase 1, inclusive of a 15% contingency and escalation, would be R924-million. DWA was initially allocated R225-million, which National Treasury increased by a further R208-million after Department of Water Affairs (DWA) made representations. In other words, the funding shortfall is currently estimated at R492-million for the project. TCTA's mandate is as per the directive issued to them for the short term intervention. The long term solution and funding arrangements falls outside for the short term intervention scope of this EIA. As stated DWA is in the process of investigating the long term solution including funding options this	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			It begs the question why neutralization continues to be pursued as the preferred option and why desalination is not investigated as a viable alternative. Portable reverse osmosis plants can be erected within 3 - 4 months.	information can be sourced from DWA when it becomes available. Refer to appendix for detailed analysis on portable desalinisation costs.	
41	Leslie Stoch	06/01/2012 Email	My interest is founded in the growing cost (R4+-b) to the tax paying public of a project that is based on a document that was not, I believe, reviewed and which appears to be seriously flawed.	It is assumed that reference is being made to the IMC report. The IMC report was drafted and contributed to by some of the country's leading experts in water resources management and in the treatment of mine water. TCTA is confident that the basis of the IMC report are scientifically valid.	
2.4 Environmental Critical Levels					
42	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal	How were the environmental critical levels determined?	The ECLs were determined as part of the due diligence process undertaken by TCTA. Further work during the TCTA project, by the project team, Department of Water Affairs and	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Officials		Council for Geoscience confirmed and expanded the IMC recommendations.	
43	Anthony Kesten DEMS: Disaster Management	03/04/2012 Meeting with Ekurhuleni Municipal Officials	How will heavy rain impact on the ECL and the current water levels?	Rain water contributes to ingress into the mine voids and was taken into account for the operating rules for the short term intervention to maintain the ECLs	
44	Lea, Irene	10/03/2012 Eastern Basin Open Day	Check elevation of Eastern Basin relative to central basin. I understand it's a higher elevation than central basin.	There are various elevations that can be discussed, e.g. the abstraction point Central Basin is at 1646m, compared to Eastern Basin at 1593m. However the water level in the basin is currently far lower in the Eastern Basin at 600m below surface, while in the Central it is only 400m below surface. If the basins were allowed to decant, the Eastern Basin would decant more than a year after the Central Basin.	
45	Koos Pretorius FSE	23/01/2012 Meeting with	TCTA is spending money to lower the ECL whilst another company (Rand	Noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		FSE at the CSIR	Uranium) is increasing the ECL.		
46	Campbell MacEachern	11/01/2012 Email	Firstly, in Figure 1: Schematic representation of AMD and ECL, the ECL in the Central Basin is set at 1467m AMSL. Assuming AMSL is above mean sea level, what depth does this equate to below surface level? Secondly, if the 29th of Feb is the closing date for public consultation, when can we expect work to commence?	The water level in the Central Basin is currently 454m below surface level as measured at South West Vertical Shaft and 268m below the Environmental Critical Level (ECL) Due to the urgency of addressing the issue of AMD and TCTA having been given the directive to commence upgrading, construction of the western basin water treatment works has already started and a section 24G application will be made for the activities which trigger the NEMA listed activities. The ECL level in the eastern basin will be reached at a later date and it is likely the EIA will be complete before this time and a section 24G application will not be needed for this basin.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			2.5 Long Term Solution		
47	Mariette Lifferink FSE	29/02/2012Email & Attachment	We have been credibly informed by the TCTA and the DWA that the emergency works water management (neutralisation by means of a High Density Sludge process) is a temporary treatment process which will be augmented within 3 (three) years with the long term treatment process of AMD, that is, desalination. The infrastructure, water treatment plants and pump stations which will be erected for the emergency management of AMD, it is logically inferred from the above-mentioned directive, will be used for the long term treatment of AMD.	The Short Term is not a temporary solution, but rather the first phase of the Long Term solution. Therefore the majority of the infrastructure that will be installed in the Short Term phase will be required for the Long Term solution.	
48	Mariette Lifferink FSE	29/02/2012Email & Attachment	The Directive (AMD-DR-TCTA-01.03.2011) directs that the TCTA must ensure the compatibility of the emergency project with the future application of AMD (Condition 4). The	This is correct the immediate and short term interventions will be phase one of the long term solution	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			emergency works water management on the Witwatersrand Goldfields with the associated infrastructure, plants and pump stations must therefore be integrated with or linked to the long term treatment of AMD.		
49	Mariette Lifferink FSE	29/02/2012Email & Attachment	However, the feasibility study for the long term treatment of AMD is anticipated to be completed only by February, 2013. The feasibility study for the long term treatment of AMD may or may not support the current building or upgrading of water treatment plants and pump stations in the areas determined by the TCTA for the emergency treatment of AMD. It implies therefore that the long term treatment must adjust to the emergency works water management of AMD within the Witwatersrand Goldfields with associated infrastructure, water treatment plants and pump stations, regardless of the	As stated it is accepted that neutralisation will be the first step in the long term solution treatment process.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			findings of the feasibility study for the long term treatment of AMD. It is trite, however, that the emergency works water management should integrate with or link to the long term treatment of AMD.		
50	Mariette Lifferink FSE	29/02/2012Email & Attachment	Decisions have already been taken for the emergency works water management of AMD and associated infrastructure hence will influence and advise the decisions for the long term treatment of AMD, instead of the findings of the feasibility study for the long term treatment of AMD advising the emergency works water management of AMD. To exemplify: The feasibility study for the long term treatment of AMD, may recommend and advise the installation of a number of pumps within the Central, Eastern and Western Basins for the abstraction of acidic mine water from a number of ingress points and not only from Rand	The short term intervention has been designed as phase one of the long term solution. One of the engineering design criteria is that the short term is integrated into the long term solution. All the works proposed for the short term will not restrict future treatment options. TCTA is of the view that irrespective of the treatment technology proposed for the long term that the current designed infrastructure for the short term is inevitably required. The immediate and short term interventions are actions coming from the IMC team of expert's report which	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Uranium's No 8 Shaft, South West Vertical Shaft (ERPM) and Grootvlei's Number 3 Shaft. However, the decision has already been taken by the TCTA that water treatment plants and pumps will be installed at the aforesaid Shafts. The long term treatment options for AMD are therefore curtailed and defined by the decisions already taken by the TCTA regarding the emergency works water management of AMD within the Witwatersrand Goldfields.	includes the neutralisation and later full treatment of AMD.	
51	Mariette Lifferink FSE	29/02/2012Email & Attachment	The decisions for the short term and immediate treatment of AMD with the associated infrastructure, pump stations and treatment plants therefore potentially restricts the options of the long term treatment of AMD.	It is widely accepted by the team of experts that neutralisation will be the first stage of the treatment process and will therefore not prejudice other treatment options for the long term solution.	
52	Lemson Betha Environmental Co-	29/02/2012Email	The BID puts the short term intervention and long term intervention as similar processes and having	The Department of Water Affairs have recently appointed Aurecon to investigate the long term solution and	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	ordinator: Northern Areas Region		mentioned this, WESSA strongly feel that a long term intervention should be spelt out clearer at this stage of the process since it will be taking over from the short term intervention.	therefore this detail cannot be provided yet.	
53	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	WESSA would like to find out when will the long term intervention be expected to finalised?	The Long Term feasibility study will be completed early in 2013. The process to implement an operational solution is expected to take a further 3 years, i.e. about 4 years.	
54	Tracey Humby,	25/02/2012Western Basin Open Day	The economic and institutional arrangements for the long-term treatment of AMD need to be Transparent.	The long term solution has a stakeholder engagement component where stakeholders will be informed of the feasibility findings analysis of the financial models and institutional arrangements are part of the scope for the feasibility study for the long term.	
55	Diana Tshivhase,	25/02/2012Western Basin Open	Long-term solution: Appreciate the fact that the short-term solution will link into	Comment noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Day	long-term solution. Constant communication and information flow from TCTA to interested and affected parties should please be effective.		
56	Ms Palesa Diale	23/02/2012Email and registration form	I am a postgraduate student at wits University, Chemical and Metallurgical Department, My current project is aimed at using immobilized microalgae for the abatement of heavy metal pollution. Bioremoval has a potential to achieve greater performance at lower costs, therefore considering to develop an algal based bioremoval process can be beneficial as a long term intervention.	This could be investigated as part of the long term solution.	
57	James Department of Housing	22/02/2012 EIA Interest Group Meeting	The short term measures needs to be considered in perspective. It should be taken into consideration that the short term solution will feed into the long term solution.	Noted	
58	Dr Koos Pretorious	30/01/2012Email In response to	The contact details at Aurecon dealing with the long term solution.	The PPP person at SRK, who have been appointed by Aurecon is Elna de	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	FSE	directives sent to FSE		Beer email address edebeer@srk.co.za	
59	Mariette Liefferink FSE	17/01/2012 Email and attached report	These, as well as other processes, need to be evaluated for use in the short term and comparisons must be done on an equal basis. The advantages and disadvantages of each have to be comparatively assessed.	The Directive is for neutralisation only whereas the processes described are for 2nd stage treatment (long term solution).	
60	Mariette Liefferink FSE	17/01/2012 Email and attached report	Long term solution – ■ Has any entity been appointed to investigate this option? ■ What is their Terms of Reference (TOR)? ■ Will public participation be conducted early in the process and before decisions are made and minds are fixed?	Aurecon have been appointed by DWA to undertake the long-term feasibility study. This process cannot answer for this study.	
61	Mariette Liefferink FSE	17/01/2012 Email and attached report	Who will be paying for the long and short term costs? ■ Polluter	Currently only funds from National Treasury have been made available for the short-term intervention.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			■ Public ■ All mines- environmental levy	No comment can be made on the long-term as this is subject to a separate study. The application of the polluter pays principles which are enshrined in NEMA is being investigated as part of the long term feasibility. Whatever financial model is selected for the long term solution the end result will be that water users will pay.	
62	Dr Koos Pretorius FSE	Email 09/01/2012	Please refer to the directive you refer to in your BID about the relationship between the short and long term solutions. I understand the basic principles of the solution cannot be separated.	The immediate and short term interventions are the first phases of addressing the problem of AMD. The long term solution is currently being investigated by DWA. The directive issued to TCTA is only for the immediate and short term interventions.	
63	Mariette Liefferink Federation for a Sustainable	08/01/2012 Emailed Documents	Failure to establish a sustainable long-term solution to AMD would lead to the prolonged reliance upon funding from the general fiscus.	It is acknowledged that a long term solution is required, how this solution is to be funded is still to be established and does not form part of	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Environment	The Impact of Acid Mine Drainage in the Witwatersrand on the Mining Industry in Mpumalanga, Free State, Limpopo, North West and Northern Cape Provinces		the scope of this EIA. DWA are investigating a solution to the long term treatment of AMD.	
2.6 Far Western Basin					
64	Charl Human Environmental Manager - Water, Air & Information Systems Environmental	28/02/2012Email and registration form	Our operations in the Far Western Basin and KOSH area, should be included in process and as possible options for interventions.	Comment noted at this stage the far western basin does not form part of the project, because the basin is currently still being mined and dewatered by the mines. It is therefore not an immediate priority.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Management Department AngloGold Ashanti				
65	Mariette Liefferink FSE	07/01/2012 Email	There has been no consideration given to the flooding and probable decant from the Far Western Basin, the KOSH Basin and the Free State goldfields and there are no proactive plans in place.	The project only deals with the Western, Central and Eastern Basins. The far Western Basin does not form part of the scope of work for this process.	
2.7	**Environmental Impact Assessment / Environmental Management Plan**				
66	Elsabeth van der Merwe Environmental Policy and Planning	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Requested that a maintenance plan be included in the Environmental Management Plan (EMP).	For all DWA projects an engineering operations and maintenance (O&M) manual is prepared for each installation and this includes environmental management.	
67	Elsabeth van der Merwe Environmental Policy and Planning	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Requested that the Draft Scoping Report should be submitted to Ekurhuleni Metropolitan Municipality.	The Draft Scoping Report will be made available to the municipality.	
68	Mr Smuts Marais	03/04/2012	Will the Elsburgspruit be rehabilitated?	The protection of water resources is a	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Water Quality (South West Area)	Meeting with Ekurhuleni Municipal Officials		water affairs responsibility. Where there is a quantifiable impact by the project on the Elsburgspruit, rehabilitation will be included as part of the mitigation measures.	
69	Anthony Kesten DEMS: Disaster Management	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Will awareness projects be conducted to inform people living near the streams?	Part of the PPP process is to inform affected parties of the project. The EIA will define the parties which will be affected and their geographical location.	
70	Dr. van Eeden Eco Monitor	22/02/2012 EIA Interest Group Meeting	Indicated that what constitutes an “emergency” is not exactly what is happening in the basins. Concerned that the approach undertaken by TCTA will set wrong precedence, as some projects will be categorised as an “emergency” and EIAs will be undertaken without adequate procedures being followed.	Emphasised that the scope of the EIA is to look at the short term intervention which is neutralisation. Referred to on Page 99 of the IMC report which sets out the aspects on how to deal with and treat AMD.	
71	Joshua Ellis Anglo Gold Ashanti	22/02/2012 EIA Interest	Recommends that TCTA to go back to government to reconsider the	The TCTA cannot go back on the approach as a directive has been issued by Minister of Water Affairs	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Group Meeting	approach. Considers this process of making a mockery of the regulatory process and what it entails	which TCTA now needs to act upon. TCTA is in constant contact with the regulators.	
72	Lemson Betha WESSA	22/02/2012 EIA Interest Group Meeting	What is the point of doing an EIA as the project will be implemented without environmental authorisation? The outcome of the EIA must inform implementation of the project.	TCTA was directed to ensure that the ECL in the Central and Eastern basins is not exceeded. In consultation with DEA, TCTA were advised to undertake an EIA. If TCTA waits for an environmental authorisation, the western basin will continue to decant, and the central and eastern basin may surpass ECL. However the TCTA is committed to following due environmental processes and is in constant contact with the regulators to ensure that the best authorisation process is followed	
73	Dr. van Eeden Eco Monitor	22/02/2012 EIA Interest Group Meeting	It should be noted that, as environmental consultancy, Digby Wells is required to remain	Digby Wells is well aware of its responsibilities and requirements in terms of the EIA.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			independent.		
74	Cllr Samukeliswe Mdlalose, Mogale City	20/03/2012 Meeting with affected Mogale city ward councillor	The EIA report for this EIA (immediate and short term) must include recommendations for the long term solution. As participants we would like to be involved in the long term solution while discussing the short and immediate solutions.	Aurecon have been appointed to investigate the feasibility of the long term solution depending on the progress of this work the EIA will make reference to this work. A consultation process is underway for the long term solution feasibility study and the EIA I&AP database has been made available to the consultants SRK who are undertaking the consultation process. Elna de Beer email address edebeer@srk.co.za.	
75	Dr Shan Holms	01/03/2012Email	I will not detail and spell out the implications of my comments below concerning the above referenced projects, where on the Western Basin some of the proposed projects have commenced.	Noted	
76	Dr Shan Holms	01/03/2012Email	It is noted that the commencement of works on the Western Basin has already been initiated in the absence of	As explained the project has commenced in the western basin and a section 24g application will be made	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			any Environmental Authorisations for a host of Listed Activities (many of which require Licences) spanning several statutes and their accompanying regulations. The project proponents and their appointed implementing agents and contractors are fully aware of the fact that the law makes no provisions for conducting such unlawful and irregular activities without the requisite licences	for the authorisation of listed activities which may be triggered by the construction activities. TCTA is committed to acting within the ambit of the environmental legislation.	
77	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	WESSA would also want to see as part of this EIA process all environmental impacts and damages caused by the Western Basin decant outlined.	The impact of decant in the eastern and central basins will be investigated as the “do nothing” option. On the western basin the do nothing option is the existing decant environment. This will be reported in the EIA as the receiving environment.	
78	Prof Terence McCarthy WITS Member of the IMC	22/02/2012 EIA Interest Group	Indicated that the EIA/EMP is a waste of time, as it was not required when ERPM was discharging water into the Natalspruit. Enquired as to why	Conducting an EIA is a regulatory process and forms part of the directive. The overriding directive from the minister was to ensure that the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			permission should be sought to return to a condition that existed during mining.	ECL are not exceeded in the Central and Eastern basins. TCTA has been in a difficult position to achieve the objective of the ministerial directive. Some processes must run in parallel and construction may happen before environmental authorisation has been granted and a section 24G application will be required, legislation does not make provision for emergency interventions.	
79	Mariette Liefferink FSE	17/01/2012 Email and attached report	I&APs must have access to any Environmental Authorisation's conditions.	As per the requirements I&APs will be informed of all ROD and their conditions.	
80	Leslie Stoch	06/01/2012 Email	If I read correctly, the EIA process is confined to the Short and Medium term solutions which the liberal use of the term "will" translates, as I see it, into decisions that have already been taken.	The EIA is confined to the immediate and short term interventions as the DWA directive only deals with these interventions. TCTA is acting on directives to resolve the immediate and short term problem. This directive came from DWA who made the decision as to	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				how the interventions would take place based on the IMC report. The EIA process for the immediate and short term interventions will allow the public to raise issues and concerns around the intervention as well as provide the EAP opportunities to assess potential impacts associated with the interventions as well as assess alternative interventions.	
2.8 Alternatives					
81	Cecilia Rakgoale	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Is there an alternative for water not being discharged into the streams?	Alternatives will be investigated during the EIA specialist studies and these will be included as recommendations in the EIA report. But at this stage it is proposed that the water be disposed of in the streams.	
82	Miemie von Malitz Human Settlement	03/04/2012 Meeting with Ekurhuleni Municipal	Have alternative sites been investigated for the treatment plants. Was the site selected by default as it belongs to ERPM (DRD Gold)?	Alternative sites were considered. The site was selected based on the suitability of the shafts condition for AMD abstraction access and availability of land for the construction	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Officials		of infrastructure for the short and long term solutions. Ownership of the sites was not important in selecting the site.	
83	Cllr Samukeliswe Mdlalose, Mogale City	20/03/2012 Meeting with affected Mogale city ward councillor	What are the alternatives to pumping being investigated in the EIA – surely different alternatives are being investigated?	Different alternatives will be investigated as part of the EIA.	
84	Cllr Samukeliswe Mdlalose, Mogale City	20/03/2012 Meeting with affected Mogale city ward councillor	Suggested that the tailings from the mine dumps should be used to fill and conceal the shafts. This will address the issue of dust and decanting shafts from the mines. This is an example of the alternatives that should be investigated	This alternative forms part of the investigations which will be undertaken.	
85	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	The BID states that the proposed AMD treatment plants will be based on the proven and reliable High Density Sludge process developed by the CSIR. WESSA would then want to find out if this will be an opted option or it is the only option which was explored.	At this scale (total volume of water), the High Density Sludge (HDS) is the only neutralisation technology that meets two key criteria: ■ Developed and demonstrated to be reliable at full industrial	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			What other alternatives does TCTA have to address this problem?	scale. ■ Proven track record in treating AMD at several reference plant sites. Although the term HDS is used as a blanket term, a number of variations of the HDS process were reviewed. Neutralisation and metals removal is required as the first phase of the full treatment solution.	
86	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	WESSA strongly feels that the consultant has already rubber stamped the one option of which it is not in line with the EIA regulations and because of this WESSA would like to see other alternatives explored as well including the no go option.	The no go option will be one of the options explored there will also be a treatment technology assessment undertaken as part of the EIA. Refer to above comment.	
87	Dr. van Eeden Eco Monitor	22/02/2012 EIA Interest Group	If TCTA instructs the environmental consultant to conduct a study, Digby Wells is legally responsible to consider the alternatives.	Alternatives will be considered in the EIA.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
88	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	Why are alternative treatments not being investigated? Especially treatments that can treat the water to a standard that can be used for either industrial use or even for potable use.	DWA directive to TCTA only deals with the neutralisation of AMD before discharge to the rivers. TCTA were not tasked with, nor do they have a legislative mandate, to enter into agreements with end consumers on use of the treated AMD. They also have no authority to construct the required distribution systems. The long term intervention will investigate other alternatives to treat and distribute the treated AMD.	
89	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	It seems as if the whole project is severely lacking in alternatives, which is a legal requirement in both the NEMA and its regulations.	At this stage the project is to implement the directives issued to the TCTA alternatives will be considered in line with these directives such as the no go option.	
90	Leslie Stoch	06/01/2012 Email	Please correct me if I err: Should an EIA not include a range of alternatives from which the best option is selected by the relevant Authority? If so, then these are surely to be made	EIA's do need to consider alternatives. The alternatives have been considered in the IMC report and will again be assessed during the EIA.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			available before we are asked for any comment/contributions?		
			2.9 Specialist studies		
91	Dr.van Eeden	22/02/2012 EIA Interest Group Meeting	If there are 2500 Milligrams per litre of sulphates disposed into the upper part of the Vaal catchment, it will have astronomical impacts on the agricultural industry an agricultural study must be undertaken. Recommended that a separate agricultural study must be undertaken.	One of the studies to be undertaken will be an Economic Impact Assessment which will investigate the agricultural impacts. The results of an economic impact assessment will indicate whether a separate agriculture study is required.	9.6.2.9 Agricultural assessment
92	Dr.van Eeden	22/02/2012 EIA Interest Group Meeting	The rehabilitation also needs to be considered.	The protection of water resources is a water affairs responsibility. Where there is a quantifiable impact by the project on the rivers, rehabilitation will be included as part of the mitigation measures.	
93	Dumisane Sibeko	20/03/2012	As part of the specialist studies to be	A risk assessment was under taken to	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Environmental Impact Management City of Johannesburg Metropolitan Municipality	Email and registration form	undertaken the city wants to submit that a high level risks assessment be undertaken to establish any potential impacts on the above mentioned infrastructure.	inform the EIA process. The evidence form the existing information and monitoring data shows that there will be no impacts on the infrastructure of the city of Johannesburg.	
94	Dumisane Sibeko Environmental Impact Management City of Johannesburg	20/03/2012 Email and registration form	Geotechnical studies including implication of the project	Geotechnical studies will form part of the engineering feasibility at construction sites locations. Geotechnical studies are not required across the total area of the city of Johannesburg because the manner in which water is rising and if it does decant there will still be no impact on the infrastructure of the city due to the nature of the geology of the city.	
95	Dumisane Sibeko Environmental Impact Management City of Johannesburg Metropolitan	20/03/2012 Email and registration form	Model the pollution plume and propose mitigation measures	The extent and severity of pollution on downstream water resources (surface and ground water) will be determined.	9.6.2.1 Surface water assessment 9.6.2.5 Geohydrolo-

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Municipality				gical study
96	Tracey Humby	25/02/2012Western Basin Open Day	The impacts of this on agricultural users downstream must be thoroughly investigated.	This will be considered in the EIA.	9.6.2.9 Agricultural assessment
97	Mr Peter Mills Cradle of Humankind	22/02/2012 EIA Interest Group Meeting	It must be taken into consideration that there will be increased river flows which will have a huge impact on the ecology, therefore, ecological specialist studies needs to be undertaken as part of the EIA.	Hydrological, Fauna and Flora, Aquatic studies will be undertaken to address the ecological impacts.	9.6.2.1 Surface water assessment 9.6.2.7 Ecological assessment
98	Mr Peter Mills Cradle of Humankind	22/02/2012 EIA Interest Group Meeting	Indicated that about 60Ml of sulphates are transmitted through the Cradle which is a world heritage site. Recommended that a Heritage Impact Assessment should be undertaken	A heritage Impact Assessment will form part of the specialist studies that will be undertaken for the EIA.	9.6.2.6 Archaeology and heritage assessment
99	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	What volumes of treated water will be released? How will this volume of water affect the ecological flows in the Blesbokspruit, Elsburgspruit and Tweelopiesspruit?	Western: 35Ml/d Central: 84Ml/d Eastern: 110Ml/d The base flows will be increased and	9.6.2.1 Surface water assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				remain constant throughout the period of the operation of the short term intervention.	9.6.2.7 Ecological assessment
2.10 Ecology					
100	Matthew Havinga Eastern Basin Land Owner	20/04/2012 One-on –one consultations	What impacts will the short term interventions have on the aquatic life?	This will be investigated in the EIA.	9.6.2.7 Ecological assessment
101	Ron Adams Eastern Basin Land Owner	20/04/2012 One-on-one consultations	Releasing high content of salts into the river is not acceptable as it will have huge impacts on the ecology.	The EIA will investigate the impact on the ecology and will suggest mitigation measures.	9.6.2.7 Ecological assessment
102	Mr Peter Mills Cradle of Humankind	22/02/2012 EIA Interest Group Meeting	It should be -noted that nothing is living in the Tweelopiespruit.	Ecological studies will form part of the EIA.	9.6.2.7 Ecological assessment
103	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	What will be the ecological related impacts of the discharged water be, especially during the winter low-flow, dry months?	This will be investigated as part of the EIA.	9.6.2.7 Ecological assessment
2.11 Soil					
104	Cllr Tania Campbell	30/03/2012	In 2007, the Department of Mineral and	Specialist studies which will only be	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Ekurhuleni Metropolitan Municipality: Ward 31	Meeting with affected Germiston ward councillors	Resources conducted soil tests in the area. Their findings indicated that the soil contains cyanide.	commissioned to investigate the impact of the project process (construction and operation) on the receiving environment. Where necessary ambient conditions will be determined but only in so far as these relate to the risks associated with the project. At this stage it is not envisaged that a soil study will be required as part of the EIA.	
105	Cllr Tania Campbell Ekurhuleni Metropolitan Municipality: Ward 31	30/03/2012 Meeting with affected Germiston ward councillors	The quality of soil has been affected by mining operations. People do garden projects in containers as the soil is contaminated.	At this stage it is not envisaged by TCTA that a soil study will be required as part of the EIA as stated above.	
106	Mr Carel Botes Sterfontein 173 Portion 7	15/03/2012One-on-one consultations	Concerned that the soil is filled with heavy metals.	At this stage it is not envisaged that a soil study will be required as part of the EIA as stated above.	
107	Nezau Elididy	10/03/2012Eastern Basin Open Day	Impact of high rate draw off on soil stability?	There are two aspects to soil stability related to the drawing down of the water level:	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				■ Sinkhole formation; and ■ Seismicity It is expected that the mine water level in the Eastern Basin will be stopped before it reaches ECL and that there will be no de-watering required. Therefore there will be no impact from water abstraction on the Eastern Basin. The Central Basin could be subject to low level seismicity due to possible dewatering from ECL down to a potential mining level. The Western Basin is the most complex of the basins, because the water is already decanting and therefore dropping the water level to ECL will require dewatering. The dewatering could be problematic in dolomite areas, and result in sinkholes. The mine area would need to be superimposed onto the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				geological mapping, to determine potential problem areas.	
			2.12 Health		
108	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	There is water seeping from the South Extension pipes. The water is brownish-orange in colour. Three children between the ages 3-6 years were affected by this water. They had blisters on their feet as a result of the water. ERPM and DWA were informed about this incident.	Noted	
109	Paul Brits Director: Health Care Waste and Occupational Hygiene Risk Management Gauteng Health Department	19/03/2012 Email and registration form	The Directorate I manage is responsible for statutory compliance for e.g. the Occ. Health and Safety Act, Water Act, etc. Furthermore my team and I are specialists in Environmental and Environmental Health matters and could make Significant contributions to the process.	Contributions are welcomed and all documentation will be made available to the department.	
110	Albie Van Rooy.	15/03/2012One-	Enquired if the treated water will be	Water treated during the immediate	9.6.2.4

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Danielsrust portion: 16,17, 18 and 21	on-one consultations	suitable for human and animal consumption	and short term will not be suitable for humans and animal as it will contain a high salts.	Community Health Impact Assessment
111	Chris Grobler Plot 173 Sterkfontein	15/03/2012One-on-one consultations	Indicated that their organisation (Fauna Visions) organises youth camps. Water is an attraction for children who visit the camp. Enquired as to what will be the health implications if children fell into the acidic water.	The impacts of untreated and treated water on downstream water users will be evaluated.	9.6.2.4 Community Health Impact Assessment
112	Elize Strydom Sterkfontein 173 Portion 6	15/03/2012One-on-one consultations	What are the effects of sulphides and Uranium?	The flow path of sulphates and uranium in the sludge will be investigated in terms of exposure and dose in the receiving environment.	9.6.2.4 Community Health Impact Assessment 9.6.2.3 Radiation study
113	Dr. Pieter van Eeden Eco Monitor cc	02/02/2012Email	What will be human-health related impacts of the discharged water be, especially during the winter low-flow,	This will be investigated as part of the EIA.	9.6.2.4 Community Health Impact

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Director		dry months?		Assessment
114	Mariette Liefferink FSE	07/01/2012 Email	Have the health risks, including the chronic effects such as mutagenicity, teratogenicity and estrogenicity of sulphate levels of 2 000 mg/l upon humans and animals been assessed?	The health risks associated with the discharge of the treated AMD will be investigated as part of the EIA.	9.6.2.4 Community Health Impact Assessment 9.6.2.3 Radiation study
2.13 Air Pollution					
115	Cllr Sibidli	30/03/2012 Meeting with affected Germiston ward councillors	Concerned that during pumping dust will be generated and this will affect the health of people living in close proximity to the project site.	The pumping process should not generate dust, there may be dust during the construction phase but this will be managed by the construction EMP.	
2.14 Cost Benefit Analysis					
116	Cllr Samukeliswe Mdlalose, Mogale	20/03/2012 Meeting with affected Mogale	Was a cost benefit analysis undertaken for the proposed implementation of the short, medium and long term solutions?	No, however TCTA undertook a due diligence analysis to determine the best possible options to respond to	9.6.2.11 Economic analysis

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	City	city ward councillo		the directive issued by the minster. The long term solution will also evaluate the best technological option.	
2.15 Impact on downstream users					
117	Gunte Kommer Eastern Basin Land Owner	20/04/2012 One-on-one consultations	How will they be affected by the water released into the Blesbokspruit	Impacts will be investigated as part of the EIA.	9.6.2.2 Characteris-ation of the social environment 9.6.2.4 Community Health Impact Assessment 9.6.2.3 Radiation study
118	Sibu, Sibusiso	10/03/2012Easte rn Basin Open Day	Impact on downstream water users such as Karan Beef, the Marievale Bird Sanctuary.	These will be investigated in the EIA.	9.6.2.2 Characteris-ation of the

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
					social environment 9.6.2.4 Community Health Impact Assessment 9.6.2.3 Radiation study
2.16 Employment					
119	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	How will the affected communities benefit from the AMD project?	The communities will benefit in the long run as the project will prevent untreated AMD decanting on the surface.	9.6.2.2 Characterisation of the social environment
120	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	Will the project provide job opportunities to the surrounding communities?	At this stage there may be limited temporary job opportunities during the construction of the treatment plants. Once the plants become operational there may be more permanent jobs	9.6.2.2 Characterisation of the social environment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				but this does not form part of the immediate and short term interventions as operators for the treatment plants have not been appointed yet. Although the final number of labour is unknown at this stage, it can be expected on a project of this size that 150+ local labourers will be required during the course of the construction.	
121	Cllr Paul Molapo, Mogale City	20/03/2012 Meeting with affected Mogale city ward councillor	Will the project generate employment opportunities?	The project will generate limited employment opportunities both during construction and operation Although the final number of labour is unknown at this stage, it can be expected on a project of this size that 150+ local labourers will be required during the course of the construction.	9.6.2.2 Characteris-ation of the social environment
122	Makola, Solomon	10/03/2012Eastern Basin Open Day	How long is it going to take to build the treatment plant, for employment purposes?	The current plan for the Western and Central Basin is for construction to occur over a period of 9 months (practical completion) + 3 months	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				(finishing). Due to the fast track programme and small site footprint, the majority of the activities will be highly mechanised. Although the final number of labour is unknown at this stage, it can be expected on a project of this size that 150+ local labourers will be required during the course of the construction. The skills levels for this labour will vary.	
123	Makola, Solomon	10/03/2012Eastern Basin Open Day	Is there something in place for local people who are qualified in water treatment?	Not at this stage, this will be an issue once an operator for the Treatment Plant has been appointed.	9.6.2.2 Characterisation of the social environment
2.17 Conservation Areas					
124	Phil de Jager Eastern Basin Land Owner	20/04/2012 One-on-one consultations	The Blesbokspruit is a considered a RAMSAR site therefore it should not be destroyed.	The impact on the RAMSAR site will be investigated and mitigation measures suggested.	9.6.2.7 Ecological assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
125	Ann de Jager Eastern Basin Land Owner	20/04/2012 One-on-one consultations	It seems as if the Blesbokspruit is used as a sacrificial zone	Comment noted	
126	Matthew Havinga Eastern Basin Land Owner	20/04/2012 One-on-one consultations	How can a RAMSAR site be used as a sacrificial zone?	It is not the projects intention to use the RAMSAR site as a sacrificial zone. Previously the mine water was being discharged through this zone.	
127	Charl van der Merwe,	10/03/2012Eastern Basin Open Day	Consider the RAMSAR site and its status!	This will be a focus of the specialist studies to be undertaken as part of the EIA.	9.6.2.7 Ecological assessment
128	Meyer, E. H. O	10/03/2012Eastern Basin Open Day	The Blesbokspruit is a RAMSAR site, since the early nineties the Blesbokspruit was put onto the Montreax Record as a "threatened" RAMSAR site due to water quality issues. If that could be addressed in the eastern basin intervention full RAMSAR status could be restored with significant eco-tourism benefits to the Springs area. The main "culprits" in the Blesbokspruit are sulphites and	Currently no water from the Eastern Basin is being discharged into the Blesbokspruit and there has been an improvement in the overall water quality. When pumping re-starts in the short term, the additional salts will have a further negative impact. However, in the long term solution the water quality of the spruit will be improved, as the water will either no longer be discharged to the spruit	9.6.2.7 Ecological assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			associated salts. Biological pollution in the river is also prevalent (from sewage).	(potable water sold on) or it will be discharged at an acceptable salt level.	
129	Mr Philip De Jager	10/02/2012Email	I live on the banks of the Blesbokspruit some 500m below the No 3 shaft Grootvlie mine. This is within the RAMSAR area and the proposed activities must not be allowed to have a negative impact on this eco sensitive area.	The impact on the RAMSAR site will be investigated in the EIA. The proposed plant will not increase the flows significantly above those which were previously experienced when Grootvlei was in operation and the quality of the water discharged will be improved.	9.6.2.7 Ecological assessment
2.18 Geological instability					
130	Sibu, Sibusiso	10/03/2012Eastern Basin Open Day	Seismicity and sinkholes if basin is lowered.	It is expected that the mine water level in the Eastern Basin will be stopped before it reaches ECL and that there will be no de-watering required. Therefore there will be no impact from water abstraction on the Eastern Basin. The Central Basin could be subject to low level seismicity due to possible dewatering from ECL down to a	9.6.2.5 Geohydrological study

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				potential mining level. The Western Basin is the most complex of the basins, because the water is already decanting and therefore dropping the water level to ECL will require dewatering. The dewatering could be problematic in dolomite areas, and result in sinkholes. The mine area would need to be superimposed onto the geological mapping, to determine potential problem areas.	
2.19 Ground Water					
131	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	How often are the underground water levels in the three basins assessed?	The basins were assessed during the Inter Ministerial Committee (IMC) team of experts report in 2010 and are regularly monitored by DWA. The monitoring programme differs at different points in the basins. Some areas have real time monitors which take reading more regularly than daily other areas have monthly monitoring	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				and the third category would be quarterly. This will be confirmed in the Geohydrology investigation as part of the EIA.	
132	Ilsa Kleinhans Dolomitic Consultant	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Springs is dolomitic area, it is recommended that a dolomite study should be undertaken. The study must be conducted in terms of SANS 1936 (Part1-4)	This can be included as part of the EIA specialist studies.	9.6.2.5 Geohydrolo-gical study
133	Ilsa Kleinhans Dolomitic Consultant		A geohydrology study will indicate the dolomites in the area	A geohydrology study forms part of the EIA.	9.6.2.5 Geohydrolo-gical study
134	Elsabeth van der Merwe Environmental Policy and Planning	03/04/2012 Meeting with Ekurhuleni Municipal Officials	How deep are the dolomites?	The depth of dolomites varies from area to area, it can be between 4m-100m.	
135	Elsabeth van der Merwe Environmental Policy and Planning	03/04/2012 Meeting with Ekurhuleni Municipal	It should be taken into consideration that there are coal deposits and shallow undermining has been undertaken in the Springs area.	Noted and this will be considered.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Officials			
136	Nico van den Berg Water and Sanitation Planning	03/04/2012 Meeting with Ekurhuleni Municipal Officials	A dolomites study should be undertake.	Noted and this will be considered.	9.6.2.5 Geohydrolo-gical study
137	Cllr Tania Campbell Ekurhuleni Metropolitan Municipality: Ward 31	30/03/2012 Meeting with affected Germiston ward councillors	Indicated that underground shallow mining was undertaken in the area and the underground fountains get full when it rains and the water decants on the surface, is this linked to AMD.	It is impossible to say that this is related to AMD without doing the necessary studies and understanding the area to which is being referred.	
138	Dumisane Sibeko Environmental Impact Management City of Johannesburg Metropolitan Municipality	20/03/2012 Email and registration form	Impact of the accumulation of water in mine shafts.	The impact of dewatering during history of deep level mining and the current and rise as a result of the mines stopping pumping is summarised in the IMC report The impact of maintaining water at ECL will be investigated as part of the EIA.	9.6.2.5 Geohydrolo-gical study
139	Albie Van Rooy. Danielsrust portion:	15/03/2012One-on-one	Indicated that he has a spring on his property which he uses to source water	Noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	16,17, 18 and 21	consultations	for household activities.		
140	Chris Grobler Plot 173 Sterkfontein	15/03/2012One-on-one consultations	Borehole water is used for household use. However, animals sometimes drink from the river.	Animals should also be kept away from the river as the water will have health impacts on the animals.	
141	Reg Tarr Sterkfontein 173 Portion 3	15/03/2012One-on-one consultations	Indicated that he uses borehole water to irrigate his crops	It was recommended that the water samples be taken from the boreholes and tested to verify the water quality is suitable for irrigation. A ground water investigation will be conducted as part of the EIA.	
142	Nezau Elididy	10/03/2012Eastern Basin Open Day	Is their demand for the underground water?	There is demand for underground water the second phase of the project, the long term solution will look at developing the ground water into a resource which can be used.	
143	Mark Helfrich Ptn 27 Koesterfontein	03/03/2012Central Basin Open Day	As a bore-hole dependant property, anything involving ground water may have a direct effect on my water. Therefor anything that is done in processing AMD water will eventually end up as ground (sub-surface) water	The comments are noted the project will be managed in line with the EMP developed for the interventions and will include management of impacts on ground water.	9.6.2.5 Geohydrological study

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			in time. Any failed AMD processing will/may have disastrous effects on the same underground water. I wish to be kept informed of all such events and their outcomes - good or bad.		
144	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	Over the long term, how will the ground water be affected ito available volume and quality and also the groundwater reserve?	This will be investigated as part of the EIA	9.6.2.5 Geohydrolo-gical study
2.20 Water Ingress					
145	Maritte Lieferink	23/01/2012 Meeting with FSE at the CSIR	The ingress into the Western Basin has increased	Noted	
2.21 Surface Water					
146	Elsabeth van der Merwe Environmental Policy and Planning	03/04/2012 Meeting with Ekurhuleni Municipal Officials	What will the effects be of discharging water to the natural streams be?	The impacts of discharged water on to the natural streams will be investigated in the EIA specialist studies.	9.6.2.1 Surface water assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
147	Elsabeth van der Merwe Environmental Policy and Planning	03/04/2012 Meeting with Ekurhuleni Municipal Officials	The Elsburgspruit ends at the Natalspruit, and the Natalspruit is filled with reeds. The discharged water will stimulate the growth of reeds.	The increased flow in the Elsburgspruit may impact the hydraulics which could change the geomorphology of the river. This will be investigated in the EIA.	
148	Barend Deming Roads and Stormwater	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Indicated that the Elsburgspruit is polluted and people living close to the stream use the water for house hold purposes	The stream is contaminated with sewage waste and other pollutants therefore people should not use water from the stream.	
149	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	There are wet areas in Marathon and Makause, during winter these areas evaporate. What causes these areas to evaporate.	The wet areas are fed by the rain in winter these dry up as there is no rain in winter.	
150	Dumisane Sibeko Environmental Impact Management City of Johannesburg Metropolitan	20/03/2012 Email and registration form	Detail the relationship and implications of pumping out the water on surface water.	Specialist studies on the hydrological an ecological impacts on surface water will be investigated as part of the EIA.	9.6.2.1 Surface water assessment 9.6.2.7 Ecological

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Municipality				assessment
151	Mr David Dorling Business DD Science	01/03/2012Email and Registration form	DD science has been analysing the AMD water streams for many years and would like to be informed of your progress.	Comment noted Digby Wells welcomes any contributions to the project and has registered DD science as an I&AP as requested	
152	Mariette Liefferink FSE	07/01/2012 Email	The remediation of the river systems into which the toxic water (neutralized AMD) will be released or have been released (e.g. Tweelopiespruit) and compensation for affected landowners have not been considered. The Tweelopiespruit East according to the above-mentioned Environmental Impact Document “could be considered a Class V River – Very High Acute Hazard – in terms of DWAF: Resource Quality Service’s Hazard Classification System for Natural Water.”	Comment noted. Aspects in terms of liabilities and compensation as well as other costs associated with addressing the AMD issue may be investigated as part of the long term feasibility study currently being undertaken by DWA. Mitigation of the impacts of the short term intervention will be identified in the EIA and included as part of project implementation. The neutralized mine water cannot be classified as Toxic and treatment will not increase toxicity levels. The polluter takes liability for the cost of treatment and remediation of pollution and any possible	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				compensation from third parties in terms of section 19 and 20 of NWA.	
153	Mariette Liefferink FSE	07/01/2012 Email	The impacts of seepage of AMD during heavy rainfall, in terms of the DMR's Regional Mine Closure Strategy for the West Rand Goldfield (2008) and the impact upon the Wonderfonteinspruit Catchment Area, have not been considered	We are not aware of any studies done in this regard. However by reducing the water level below the ECL level the impact will be reduced from the current decant situation.	
2.22 Water Volumes					
154	Dr Koos Pretorius	29/04/2012	Has any decision been reached as to how the extra 30 Mm^3 of AMD in the Westrand will be mitigated? If so what was decided and by whom was it decided? If not , why not and by when will a decision have been reached?	The solutions in the Western Basin includes the updating of the existing rand uranium plant and the construction of the new HDS treatment plant which will together be able to treat approximately 60Mm^3 per day.	
155	Ron Adams Eastern Basin Land Owner	20/04/2012 One-on-one consultations	How much water will be pumped per day	In the Eastern Basin it is expected that 110Ml/d of water will be pumped per day.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
156	Piet Schutte Sterkfontein 173. Portion 8	15/03/2012One-on-one consultations	He does not want the water volume that he has access to, to decrease as a result of the process of treating AMD.	The volume of water should not decrease during the immediate and short term interventions and in the Western Basin the volume will increase by approximately 35 Mℓ/day during the short term intervention when both the existing and new treatment plants are running. The volume may decrease when the long term solution comes on line as it is possible that the treated water might be sold and not released back into the river.	
157	Paul Hoogendyk Sterkfontein Country Estates	15/03/2012One-on-one consultations	How many litres of water will be pumped a day?	For the western basin. Sustained base flow = 27Mℓ/day Peak pumping flow = 35Mℓ/day	
158	Dr.van Eeden Eco Monitor	22/02/2012	Indicated that there will also be an increase of base flow into the in the Klipriver and the Blesbokspruit.	The impact of the increase in base flows will be investigated in the EIA.	9.6.2.1 Surface water assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
159	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	What volumes of AMD is anticipated to be treated at all 3 sites?	Maximum Treatment Capacity: Western: 35Ml/d Central: 84Ml/d Eastern: 110Ml/d	
160	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	What volumes of treated water will be released? How will this volume of water affect the ecological flows in the Blesbokspruit, Elsburgspruit and Tweelopiesspruit?	Western: 35Ml/d Central: 84Ml/d Eastern: 110Ml/d The ecological flows will be affected in that the base flows will be higher year round. In terms of how this will affect the ecology this will be investigated as part of the EIA.	9.6.2.1 Surface water assessment 9.6.2.7 Ecological assessment
161	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	How will the extra water and its quality affect the Ecological Reserve of each catchment and how will it affect the Upper Vaal catchment combined?	The Blesbok and Elsburg spruits discharge into the Vaal Barrage and therefore the Upper Vaal Catchment will be unaffected. The neutralised AMD forms but one source of pollution in the Suikerbos and Kilp Rivers and in order to maintain salinity levels below 600 mg/litre, fresh water is released from the Vaal Dam. The	9.6.2.1 Surface water assessment 9.6.2.7 Ecological assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				Western Basin discharges into the Crocodile River system The impact of discharging neutralised AMD will be investigated as part of the EIA. This must always be compared with the option of doing nothing and letting untreated AMD flow into the systems.	
162	Maritte Lieferink	23/01/2012Meeting with FSE at the CSIR	26-30 mega litres is what is required for the immediate intervention. Immediate capacity of the plant is 30mega litres and short term is 30 mega litres and 60 meg litres once the new plant has been constructed.	The figures are correct this will mean that an additional 30 mega litres of water will be released during peak pumping.	
163	Maritte Lieferink	23/01/2012Meeting with FSE at the CSIR	How will the project affect the Vaal river going into deficit.	Aurecon is looking at the long term solution which will also address the issue of the Vaal River going into deficit.	9.6.2.1 Surface water assessment
164	Mariette Liefferink FSE	07/01/2012 Email	The proposed volume to be treated in the West Rand, with lime dosing, is 36	In terms of the Western Basin, the project can be divided into two	9.6.2.1 Surface

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			million litres per day, yet during rainfall 62 million litres per day were recorded. From the recent data it is clear that when the partially treated AMD combines with the untreated AMD it does not have a dilution effect, and the water simply reverts back to untreated AMD.	phases. The immediate intervention will involve the upgrade of the existing Rand Uranium Treatment works to accommodate and treat 30 Ml per day. The short term intervention will entail the construction of a new 35 Ml treatment plant. This plant will operate in conjunction with the refurbished Rand Uranium treatment plant until such time as the ECL of the Western Basin has been achieved. Thereafter the new treatment plant will operate alone and maintain the AMD below ECL. Therefore a total capacity of about 65Ml/d would be available and will enable the water level in the basin to be lowered. The water level will be lower below the ECL to allow for some balancing volume. At this stage the phase 1 (existing Rand Uranium plant) will be decommissioned and the	water assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				phase 2 plant together with balancing volume in the basin will be used to manage the AMD.	
			2.23 Water quality		
165	Matthew Havinga Eastern Basin Land Owner	20/04/2012 One-on-one consultations	Concerned that the mine water will mix with sewage water from ERWAT which will result in the formation of Hydrogen sulphide.	The EIA will investigate impacts on the receiving water quality.	
166	Phil de Jager Eastern Basin Land Owner	20/04/2012 One-on –one consultations	Will the content of the salts in the water increase during pumping?	Yes the content of salts will increase due to the treatment process during the short term intervention. The long term intervention will remove the salts.	9.6.2.1 Surface water assessment
167	Matthew Havinga Eastern Basin Land Owner	20/04/2012 One-on –one consultations	It is not appropriate to discharge salts into the river as the accumulation of the salts will negatively impact their gardens	The EIA will investigate impacts on the receiving environment, including impacts to land.	9.6.2.1 Surface water assessment
168	Mr Schemker Sterkfontein 173.	15/03/2012One-on-one	Why does the water contain high concentration of salts?	AMD has a high salt load and high metals content. The HDS treatment	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Portion 8	consultations		will remove the metals and slightly lower the salt concentration, however only to 2400mg/l. It is acknowledged that this salt concentration is still too high and this is why it is envisaged that the sort term will only be in operating for less than two years.	
169	Pieter Delport Plot 88 Oaktree	15/03/2012One-on-one consultations	Enquired if there is a way to test their borehole water to ensure that it is not contaminated with AMD.	There are ground water tests which can be undertaken and a ground water study forms part of the EIA.	9.6.2.5 Geohydrolo-gical study
170	Garfield Krige Sterkfontein Country Estates	15/03/2012One-on-one consultations	Indicated that there is corrosion in water due to the high sulphates in the borehole water.	Noted	
171	Gideon Steyl (PhD Chem, MSc Appl Math, MSc Geohydro) PrSciNat Chemist/Hydrogeologist Associate Professor	14/03/2012 Email and registration form	I am mostly interested in the water qualities that will be pumped from site and the efficiency of treatment.	The PH level of the water will be between 6 and 9. The treated water will have a sulphate concentration of about 2400mg/l	9.6.2.1 Surface water assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	in Industrial and Environmental Chemistry Researcher at the Institute for Groundwater Studies				
172	Makola, Solomon	10/03/2012Eastern Basin Open Day	What happens after the water is being treated, is it going to be drinkable or discharged into the river?	For the immediate and short term interventions the water will not be drinkable. For the long term this has not been decided but it may be treatment up to drinking water standards.	
173	Makola, Solomon	10/03/2012Eastern Basin Open Day	What will be the pH level?	The pH level will be between 6 and 9. The treated water will have a sulphate concentration of about 2400mg/l.	
174	Feenstra. Altus	03/03/2012Central Basin Open Day	Discharge of sulphates.	The treated water will have a sulphate concentration of about 2400mg/l. This water for the short term will be discharged into the environment. Long term solutions will reduce the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				levels of sulphates.	
175	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	The project only mentions the neutralisation of the AMD and the removal of heavy metals but nothing much is said about salts. As a result WESSA would like to know how salts will be removed and disposed in this process?	The immediate and short term interventions only deal with the Neutralisation and heavy metal removal. The process also removes approximately 30-50% of the sulphates (down to the limit of solubility). The long term solution will deal with the additional removal of salts.	
176	Mark Biggers	27/02/2012Email and Registration form and comments	What are the consequences of the water only being partially treated and what is preventing desalination of the water as well as neutralization? There is concern that the salt load of the water discharged into the streams and rivers will still be extremely high (estimated at over 3 times the Department of Water Affairs regulatory limit of 600mg/l) even after partial treatment?	The impacts of the high salt loads will be investigated as part of the EIA. The reason that desalination is not implemented within the current phase, is to allow the correct selection of operation and treatment to be determined by the Long Term solution feasibility study.	9.6.2.1 Surface water assessment
177	Tracey Humby,	25/02/2012West	In the short-term the biggest concern is	Agreed this is a concern and is the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		ern Basin Open Day	the increased levels of sulphates in the partially treated water.	reason that the long term solution should be brought on line as soon as possible.	
178	Joshua Ellis Anglo Gold Ashanti	22/02/2012 EIA Interest Group Meeting	In terms of SABS, the water being discharged should be below allowed Uranium levels for health.	A radiation specialist study will be commissioned to investigate any radiological impacts. Should these be found to be problematic a health impact study will also be commissioned	9.6.2.3 Radiation study
179	Prof Mike Muller	10/02/2012Email	No information is presented about the implications on volume and quality of water, over time, of the pumping levels that are selected.	Very little information is available on this topic. The EIA will investigate such matters further	9.6.2.1 Surface water assessment
180	Elize Strydom Member of the public	10/02/2012Email	Do you guarantee that all the dangerous elements in the water will be purified to world accepted levels	At this stage the interventions are only for the neutralisation of the water and removal of heavy metals not the removal of salts. A long term solution is being investigated by DWA which will include the full treatment of the water to remove the salts.	

<table>
<tr><th>No</th><th>I&AP</th><th>Date and media</th><th>Issue</th><th>Response</th><th>Reference to Draft Scoping Report</th></tr>
<tr><td>181</td><td>Dr. Pieter van Eeden
Eco Monitor cc
Director</td><td>02/02/2012Email</td><td>What will the anticipated water quality be? I.t.o. chemistry, salts and TDS, and radio-activity?</td><td>As per the DWA directive to TCTA the water qualities will be managed within the following standards in line with the directive are as follows:

<table><tr><th>Variable</th><th>Value</th></tr><tr><td>pH</td><td>6.5 – 9.5</td></tr><tr><td>Conductivity</td><td>350</td></tr><tr><td>Sulphate (SO_4^2) (mg/l)</td><td>2500</td></tr><tr><td>Aluminium (Al) (mg/l)</td><td><1</td></tr><tr><td>Manganese (Mn) (mg/l)</td><td><10</td></tr><tr><td>Iron (Fe)n (mg/l)</td><td><1</td></tr><tr><td>Uranium (U) (ug/l)</td><td><50</td></tr></table></td><td></td></tr>
<tr><td>182</td><td>Dr Koos Pretorious
FSE</td><td>30/01/2012Email
In response to directives sent to</td><td>The basis for the discharge values</td><td>The expected water quality is based on the process design done as part of the ongoing project. The process</td><td></td></tr>
</table>

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		FSE	3.2 The discharge of treated mine water to the Tweelopies (East) shall not exceed the values stipulated in Table 1; Table 1 Variable (Symbol) (Unit) / Value pH / 6.5 – 9.5 Conductivity (EC) (mS/m) / 350 Sulphate (SO_4^{2-}) (mg/L)* / 2500 Aluminium (Al) (mg/L)* / <1 Manganese (Mn) (mg/L)* / <10 Iron (Fe) (mg/L)* / <1 Uranium (U) (µg/L)* / <50 *dissolved	design took possible chemical precipitation and other operating plants into account when determining the expected discharge values. Note that the directive from DWA indicates the water quality that is expected from the new short term plants. This however, will probably not be achievable from the upgraded Rand Uranium Plant.	
183	Maritte Lieferink	23/01/2012 Meeting with FSE at the CSIR	The sulphates levels will still be high?	Yes, pH levels will be dropped but the sulphates will not be removed and the water will not suitable for drinking and will contain high sulphates.	
184	Dr Koos Pretorius FSE	23/01/2012 Meeting with FSE at the CSIR	Enquired about the plants to remove the salts. Brine volumes are large, there is 70%-80% of brine. 2000 sulphates what is the cost to the river and downstream water users cost. Neutralisation	At this stage the removal of salts does not form part of the immediate and short term interventions and there will be no brine produced only sludge. The cost to the river and downstream water users still needs to be determined.	9.6.2.11 Economic analysis
185	Mariette Liefferink	17/01/2012	Desired Water quality	The Department of Water Affairs have	

<table>
<tr><th>No</th><th>I&AP</th><th>Date and media</th><th>Issue</th><th>Response</th><th>Reference to Draft Scoping Report</th></tr>
<tr><td></td><td>FSE</td><td>Email and attached report</td><td>• The water quality for the treated water must be disclosed.
• At minimum it is required to meet the needs and expectations of interested and affected parties.
• This area forms part of the Vaal river system, a national water resource, and the water quality is currently being established.
• Please note that the Water Research Commission (WRC) guidelines for participation in the IWRM stated that the classification process is significantly more than consultative. It is intended to be at the level of collaboration.</td><td>issued directives to the TCTA which stipulates the water quality standards that must be met.

The standards in line with the directive are as follows:

<table><tr><th>Variable</th><th>Value</th></tr><tr><td>pH</td><td>6.5 – 9.5</td></tr><tr><td>Conductivity</td><td>350</td></tr><tr><td>Sulphate (SO_4^{2}) (mg/l)</td><td>2500</td></tr><tr><td>Aluminium (Al) (mg/l)</td><td><1</td></tr><tr><td>Manganese (Mn) (mg/l)</td><td><10</td></tr><tr><td>Iron (Fe)n (mg/l)</td><td><1</td></tr><tr><td>Uranium (U) (ug/l)</td><td><50</td></tr></table></td><td></td></tr>
</table>

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				The process and infrastructure has been designed accordingly. Collaboration for water qualities for the long term solution can be entered into.	
186	Mariette Liefferink FSE	17/01/2012 Email and attached report	How was the stated quality of the water to be released, arrived at? ■ Previous directives went up and down on the quality objectives with no explanation and no rational scientific basis. This should be explained fully. ■ Please note that currently there is no directive in place for the release of any water. If the DWA is of the intention to issue a directive, we insist on consultation with all registered IAPs. If no directive is to be issued – what action will be	A Directive has been issued by the Department for the immediate intervention. The quality of the treated water to be released is based on the output performance of the HDS plant. The action taken by DWA is to prevent and partially treat decant and improve current conditions. There is no requirement for public participation when directives are issued. It is the intention of TCTA to apply for all authorisations and permits. The impact of the short term	

<table>
<tr><th>No</th><th>I&AP</th><th>Date and media</th><th>Issue</th><th>Response</th><th>Reference to Draft Scoping Report</th></tr>
<tr><td></td><td></td><td></td><td>taken against the illegal release of water?
■ Impact on the whole Vaal system needs to be taken into account. The significant impact of the high sulphate loads and the need for water release to dilute this is apparent from the graphs below.</td><td>intervention on the Vaal System will be evaluated in the EIA.</td><td></td></tr>
<tr><td>187</td><td>Dr Koos Pretorius
FSE</td><td>09/01/2012
Email</td><td>How is it possible that you do not know the final sulphate / TDS levels if the technology is proven and has already been decided upon?</td><td>The water qualities will be managed in accordance with the DWA directives namely.<table><tr><th>Variable</th><th>Value</th></tr><tr><td>pH</td><td>6.5 – 9.5</td></tr><tr><td>Conductivity</td><td>350</td></tr><tr><td>Sulphate (SO_4^{2}) (mg/l)</td><td>2500</td></tr><tr><td>Aluminium (Al) (mg/l)</td><td><1</td></tr><tr><td>Manganese (Mn)</td><td><10</td></tr></table></td><td></td></tr>
</table>

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				(mg/l) | Iron (Fe)n (mg/l) | <1 Uranium (U) (ug/l) | <50	
188	Jan H. van den Berg Private individual	06/01/2012 Email	Quality of discharged treated water – the current legislation from DWA on treated effluent (as per Water Use Licence) is not adequate to control the pollution levels in the rivers of Gauteng. The rivers within Gauteng is currently under severe urban pollution pressure and by adding insufficient treated acid mine water will turn the quality of the rivers systems into a disaster.	At this stage the directive from DWA, based on the recommendations of the team of experts appointed by the inter-ministerial committee, recommended that neutralisation and removal of heavy metals should be the immediate and short term interventions to treat untreated water discharging in the western basin and to prevent the decanting of untreated Acid Mine Drainage (AMD) water in the Western, Central and Eastern basins. It is acknowledged that these are not a long-term solution to AMD in place yet. The long term solution is currently being researched by the Department of Water Affairs (DWA). The immediate and short term interventions are the first phases in	

<table>
<tr><th>No</th><th>I&AP</th><th>Date and media</th><th>Issue</th><th>Response</th><th>Reference to Draft Scoping Report</th></tr>
<tr><td></td><td></td><td></td><td></td><td>treating AMD.

The quality of the treated water being discharged will be far better than if the water was left to decant untreated.</td><td></td></tr>
<tr><td>189</td><td>Dr Koos Pretorius
FSE</td><td>Email
09/01/2012</td><td>How the end quality of the water is not known beforehand is amazing to me.</td><td>The water qualities will be managed in line with the TCTA directive of:

<table><tr><th>Variable</th><th>Value</th></tr><tr><td>pH</td><td>6.5 – 9.5</td></tr><tr><td>Conductivity</td><td>350</td></tr><tr><td>Sulphate (SO_4^{2}) (mg/l)</td><td>2500</td></tr><tr><td>Aluminium (Al) (mg/l)</td><td><1</td></tr><tr><td>Manganese (Mn) (mg/l)</td><td><10</td></tr><tr><td>Iron (Fe)n (mg/l)</td><td><1</td></tr></table></td><td></td></tr>
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No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				Uranium (U) (ug/l) <50	
190	Mariette Liefferink Federation for a Sustainable Environment	08/01/2012 Emailed Documents The Impact of Acid Mine Drainage in the Witwatersrand on the Mining Industry in Mpumalanga, Free State, Limpopo, North West and Northern Cape Provinces	Although the treatment would neutralise the acidity and remove a significant percentage of the heavy metals the water would still have high sulphate content, which unless used as make up water in a closed industrial process, such is found in the mines, would have no value and would be discharged into the environment.	At this stage the directive issued to the TCTA only deals with the neutralisation and removal of heavy metals from the AMD water. It is acknowledged this is not the long-term solution to the treatment of AMD. The DWA is currently investigating options for the long-term solution to AMD.	
191	Mariette Liefferink Federation for a Sustainable Environment	08/01/2012 Emailed Documents The Impact of Acid Mine	AMD would have a detrimental impact on the receiving watercourses due to the high sulphate content.	The short term intervention aims to neutralise the water, reducing the sulphate content and heavy metal concentrations. Should the water be left to decant untreated these levels	9.6.2.1 Surface water assessment 9.6.2.7

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Drainage in the Witwatersrand on the Mining Industry in Mpumalanga, Free State, Limpopo, North West and Northern Cape Provinces		would be far higher. As part of the EIA, the impacts associated with the discharge of the treated water will be investigated.	Ecological assessment
2.24 Vaal River System					
192	Mariette Liefferink FSE	17/01/2012 Email and attached report	If AMD is not treated to a level where the salt load is removed, the Upper Vaal will go into deficit and if there is a drought, long overdue, either: ■ Restrictions will be placed on consumers in the Upper Vaal; or ■ The dilution standard at Vaal Barrage will be relaxed resulting in very poor quality water reaching the consumers in the	In The Vaal River Reconciliation Strategy of the DWA (Department of Water Affairs and Forestry, 2009) identifies that the Vaal system will go into deficit by 2014 unless the salt load in AMD is removed from the system.The long-term feasibility study is addressing this.	9.6.2.1 Surface water assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Middle and Lower Vaal (KOSH area, Free State Goldmines and all the mining activity in the Northern Cape on the Vaal Gamagara Scheme) ■ With the Upper Vaal in deficit there would then be no possibility of transferring water into the Olifants catchment (currently possible through the VRESS) and mining activities in 6 provinces could be affected if water consumption is curtailed.		
193	Mariette Liefferink Federation for a Sustainable Environment	08/01/2012 Emailed Documents The Impact of Acid Mine Drainage in the Witwatersrand on the Mining Industry in	The release of saline water into the Vaal River System will put the Upper Vaal catchment (i.e. the catchment that supplies Gauteng, North West Platinum mines and the Mpumalanga coalfields and power stations) into deficit , see Figure 1, requiring periodic releases of water from the Vaal Dam into the Vaal Barrage to ensure that the quality of	See above.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Mpumalanga, Free State, Limpopo, North West and Northern Cape Provinces	water released into the Middle Vaal meets the required standard of 600 mg/litre.		
194	Mariette Liefferink Federation for a Sustainable Environment	08/01/2012 Emailed Documents The Impact of Acid Mine Drainage in the Witwatersrand on the Mining Industry in Mpumalanga, Free State, Limpopo, North West and Northern Cape Provinces	Increase of the salt load in the Vaal River, which could only be mitigated by releases from the Vaal Dam, and a subsequent deficit in the Upper Vaal which could have severe economic impacts if a drought occurs (the last drought ended in December 1995).	Hence it is for this reason that the long term strategy must be implemented as soon as possible.	
195	Mariette Liefferink	07/01/2012	It was confirmed that by 2014 there will	It is under drought conditions when	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	FSE	Email	not be enough water to dilute the high sulphate loads in the Vaal River System and the Lesotho Highlands Phase 2 will be implemented in 2019. The water will be already oversubscribed and the Tugela Water Scheme will have to be accelerated. It should not be passed over in the above scenario the AMD has already been taken into account as a water resource and not as a polluted source. The costs of the high salinity will be carried by the domestic and agricultural sectors, and not by the industry, as would be expected. The costs include health costs.	there will not be enough water to dilute the salt loads in the Vaal System. All users in the Vaal system will pay. Again, for this reason the long term solution needs to be implemented.	
2.25 Discharge of Water					
196	Prof Terence McCarthy WITS Member of the IMC	22/02/2012 EIA Intrest Group Meeting	The disposal of the treated water in the Western Basin should be in the Wonderfonteinspruit which is already heavily polluted by mine dumps. Treated water should not be disposed	In terms of the Vaal and Crocodile River Systems and the future planning of the DWA, the department requires the partially treated water to report to the Crocodile Catchment to optimise	9.6.2.1 Surface water assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			into the Tweelopiespruit,	water resources.	
197	Maryna Storie Gauteng City Regional Observatory	22/02/2012 EIA Intrest Group Meeting	Noted that the "preferred option" is putting the treated water into the Tweelopiespruit, enquired whether there are any alternatives considered besides the Tweelopiespruit	Refer to response above	
198	Maryna Storie Gauteng City Regional Observatory	22/02/2012 EIA Interest Group Meeting	Does this mean that there are no other alternatives	Alternatives will be investigated during the EIA and will be presented to DWA. Reiterated that the Tweelopiespruit option is not a fait accompli.	
199	Maritte Lieferink	23/01/2012 Meeting with FSE at the CSIR	Where will the water be discharged in the Eastern Basin	Phase 1 which is the short term entails that water will be discharged into the Blessbokspruit and the water quality will have to meet with the standards set by the directive from the Department of Water Affairs.	
2.26 Water Decant					
200	Ann de Jager Eastern Basin Land Owner	20/04/2012 One-on-one consultations	If water is not pumped as proposed, where will it decant naturally?	On the eastern basin it is expected that the water will decant in Nigel.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
201	Mark Biggars	22/04/2012 Email	Johannesburg CBD levels above sea level if Central Basin does decant;	Johannesburg CBD should not be affected by the decant on the Central Basin even if the ECL is compromised	
202	Mark Biggars	22/04/2012 Email	Gold Reef City levels above sea level if Central Basin does decant;	Yes, Gold Reef City will be affected by the decant on the Central Basin if the ECL is compromised	
203	Mark Biggars	22/04/2012 Email	All decant points in the jurisdiction of Johannesburg Local Government;	Eastern basin decant is in Ekhuruleni. The western basin is decanting in Mogale City and the central basin will also decant in Ekhuruleni.	
204	Mark Biggars	22/04/2012 Email	What the highest level above sea level would be reached in the jurisdiction of Johannesburg Local Government;	The decant level will be approximately 1,617 mamsl.	
205	Mark Biggars	22/04/2012 Email	In the jurisdiction of Johannesburg Local Government, what is the lowest level that decant will take place and where;	As above.	
206	Mark Biggars	22/04/2012 Email	Digby Wells states that decant started in 2002, why did it decant, when on what date did DWA/DMR become aware of the danger of decant and	Does not form part of the EIA. Decant was started in 2002 on the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			what steps did they take before decant; did they issue a directive and press charges?	Western Basin. Directives were issued and mines were taken to court but DWA lost these court cases.	
207	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Concerned that the periods indicating the decanting levels are not consistent.	The basins are not connected therefore the levels are not the same in the basins and the basins will decant at different times.	
208	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Indicated that there is water decanting from the Grootvlei mine.	This will need to be confirmed whether this is decant of AMD or from other sources.	
209	Prof Terence McCarthy WITS Member of the IMC	22/02/2012 EIA Interest Group	The primary function of this project is to control decant from the Western Basin. The immediate and short term interventions will return water levels in the basins to the previous acceptable levels.	Comment is noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
2.27 Monitoring					
210	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Who monitors the basins?	The Department of Water Affairs monitors the rate of raise in the basins.	
211	Piet Schutte Sterkfontein 173. Portion 8	15/03/2012One-on-one consultations	The Department of Water Affairs often comes to his property to take water samples. The level of salts in the water varies from sample to sample.	Noted	
212	Reg Tarr Sterkfontein 173 Portion 3	15/03/2012One-on-one consultations	Who does water tests?	There are a number of companies who do tests the department of water affairs also undertakes tests.	
213	Garfield Krige Sterkfontein Country Estates	15/03/2012One-on-one consultations	Concerned that water monitoring is only undertaken along the river and the aquifers further away are not being monitored	The EIA will investigate the full extent of impact to the groundwater system and monitoring will then be required to be undertaken for all affected water resources.	9.6.2.5 Geohydrolo-gical study
214	Mariette Liefferink FSE	17/01/2012 Email and	Access to all monitoring data and production data and sites for the public.	Comment noted. The monitoring data can be accessed from the department	9.6.2.5 Geohydrolo-

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		attached report		of water affairs and will be included in the EIA Geohydrology study.	gical study
2.28 Water use licence					
215	Cecilia Rakgoale	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Will an application for Water Use License be undertaken?	The application for water use authorisation will be handled by TCTA and does not form part of the EIA.	
216	Cecilia Rakgoale	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Does an application for a Water Use Licence form part of the EIA process?	This does not form part of the EIA.	
217	Lillian Kwakwa Environmental Policy and Planning Directorate	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Why is an application for a Water Use Licence not part of the EIA?	This was a decision taken by TCTA and the Department of Water Affairs.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
218	Jaco Schoeman and Henry Gouws	08/03/2012 One on one consultation	There will need to be an agreement with DWA and an amendment of the approved IWULA will also be required.	Noted	
219	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	Discharging water to a river after treatment will require a Water Use Licence according to National Water Act section 21. WESSA would want to know if the Water Use Licence will be applied for before the construction can go ahead and will also want to know how compliance monitoring will be conducted?	DWA and TCTA have identified the required approvals. DWA is currently considering the same and will issue TCTA with the approvals that are required for the project.	
220	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	WESSA would like to find out why was the section 21 of National Water Act for Water Use Licence not listed as triggered on list of legislative documents?	DWA and TCTA have identified the required approvals. DWA is currently considering the same and will issue TCTA with the approvals that are required for the project.	
221	Dr. van Eeden Eco monitor	22/02/2012 EIA Interest	Will a Water Use Licence Application (WULA) be undertaken	DWA and TCTA have identified the required approvals. DWA is currently	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Group Meeting		considering the same and will issue TCTA with the approvals that are required for the project.	
222	Dr Koos Pretorius FSE	20/01/2012Email The issues raised are in response to an article By: Terence Creamer 19th January 2012	TCTA expects construction to begin in February. – Based on what plan and what authorisations by whom since we are only going to see a issues and response table in March 2012, never mind an EMP or water use license application?	In order to stop the existing decant on the Western Basin and to prevent decant in the other basins immediate action is required. This may require section 24(g) application under NEMA. The directive issued by DWA exempts TCTA from having to submit a water use licence for two years and the application for water use authorisation will be made in this period.	
2.29 Public Participation Process					
223	Ron Adams Eastern Basin Land Owner	20/04/2012 One-on-one consultations	Requested that there should be a meeting where all affected land owners living near the Blesbokspruit are invited to discuss issues regarding the short term intervention to treat AMD.	This is being arranged.	
224	Mark Biggars	22/04/2012	Could you please supply minutes of	The minutes form the EIA interest	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Email	above meeting (EIA Interest Group) given to any level of government;	group will be included in the scoping document of the EIA and the issues raised are included in this comments and response report.	
225	Mark Biggars	22/04/2012	A time table of forum meetings (EIA Interest Group) and how this forum has been constructed, plus contact info;	The forum consists of key stakeholders including NGOs such as FSE and Earth Life Africa. The forum is not open to the public as it is a smaller group of Key Stakeholders. The next meeting of the interest group will be held when the EIA scoping document is made available to the public for review.	
226	Mark Biggars	22/04/2012	When the Bid was opened and when Digby Wells got the tender for this EIA, what is the tender number.	The BIDs and notices were distributed in December 2011 and again in January and Feb 2012 and we continue to distribute BIDs as more I&APs are identified and registered. The initial registration period for I&APs closed on 29 February 2012 . However, we have taken a decision because of the scale of the project to	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				continue to register I&APs throughout the EIA process and continue to take comments up until the EIA is finalised for authorities approval.	
227	Mark Biggars	22/04/2012	Digby Wells has not given notice to registered parties of 3 March and 10 March Open Days; could you please give minutes of these meetings;	All registered parties on our database at the time were informed by Email of the meetings to be held and advertisements were placed in the following newspapers: Beeld, Sowetan, The Star, Randfontein Herald, The Springs advertiser and the African Reporter. Minutes were not taken at the meeting but comment forms the issues raised are included in this comments and response report.	
228	Mark Biggars	22/04/2012	30 days are up so why has Scoping Report not been made available to public or why has registered parties not been notified of availability of Scoping Report?	The scoping document has not been made available to the public yet and once this is ready for review I&APs will be informed of the availability of the report. The report is now available for review.	
229	Elsabeth van der	03/04/2012	Can comments be still sent to Digby	Comments can still be forwarded to	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Merwe Environmental Policy and Planning	Meeting with Ekurhuleni Municipal Officials	Wells even after when the registration period has closed?	Digby Wells even after the registration period has closed and these will be included in the Comments and Response Report to be submitted to the authorities.	
230	Elsabeth van der Merwe Environmental Policy and Planning	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Requested that a meeting should be held to discuss the Draft Scoping Report.	This can be considered and will be discussed with the project team. Representatives from the municipality are invited to the EIA interest group meetings.	
231	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Recommended that Digby Wells should present the AMD EIA project at the Klipriver and Blesbokspruit Forums	This is being arranged.	
232	Cllr Tania Campbell Ekurhuleni Metropolitan Municipality: Ward 31	30/03/2012 Meeting with affected Germiston ward councillors	Suggested that other officials responsible for environmental management should be informed about the AMD project	A meeting with officials from Ekuruleni was held on the 03/04/2012	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
233	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	Indicated that consultations were undertaken in 2008 by another company that was mandated by the Department of Water Affairs. Enquired if Digby Wells has received recommendations made during these consultations?	Digby Wells has not received this information and will make enquiries about the study.	
234	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	Will public meetings be held with the affected communities.	An open day was held on the 03/03/2012. More meetings will be held during the Scoping and EIA phase.	
235	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	The community members will not listen to him when he informs them about the AMD project. Suggested that TCTA, DWA and Digby Wells should have a public meeting to inform the communities about the immediate and short term interventions regarding AMD. The parliamentarians should also be present when meetings are held with	More meetings in the communities will be held and political officials can be invited to these meetings.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			the public.		
236	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	Concerned that he will not be able to explain the technical issues to communities within his ward.	A simple brochure has been developed explaining AMD and this will be translated and distributed. It has been decided that meetings with affected communities will be held. These will be held in the appropriate languages and at the appropriate venues. The message given will also be tailored for the audience.	
237	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	Suggested that Digby Wells should have a meeting with all ward councillors in Germiston and the relevant officials to discuss the immediate and short term interventions for treating AMD. This meeting should be arranged through the speaker's office.	A meeting with the Ekurhuleni officials has been held on the 03/04/2012 at this stage the consultation process is focusing on the affected wards. Further meetings are being arranged.	
238	Cllr Andy Mathibe, Mogale City	20/03/2012 Meeting with affected Mogale city ward	Recommended that Digby Wells should use Mogale City's website and newsletter to disseminate information about the AMD project.	Comment noted this will be investigated	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		councillors			
239	Cllr Paul Molapo, Mogale City	20/03/2012 Meeting with affected Mogale city ward councillo	Suggested that Mogale City should assist with the public participation process – we will inform communities.	All assistance is welcomed.	
240	Cllr Peter, Mogale City	20/03/2012 Meeting with affected Mogale city ward councillo	Have the farmers been informed about the AMD project?	Farmers along the Tweeloopiespruit have been informed and other farmers in the basins are being informed of the project. The consultation process with all stakeholders is on going.	
241	Paul Hoogendyk Sterkfontein Country Estates	15/03/2012One-on-one consultations	The Sterkfontein Home Owners Association comprises of owners from Portion 117- 184. The AMD project will be discussed in their next Annual General Meeting; it is therefore worthwhile to inform the chairperson of the Sterkfontein Homeowners Association.	Contact has been made with the chairperson and the necessary information was sent to him.	
242	Elize Strydom	15/03/2012One-	Concerned that people who live on the	Consultations with people who live	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Sterkfontein 173 Portion 6	on-one consultations	banks of the river have been disregarded.	along the Tweeloopiespruit have been undertaken as well as along the Blesbokspruit. Meetings are being arranged along the Elsburgspruit.	
243	Reg Tarr Sterkfontein 173 Portion 3	15/03/2012One-on-one consultations	How can farmers assist to ensure that the project succeeds?	Farmers can assist by getting involved and attending meetings and reading the information provided. They can also assist by providing local knowledge of the river.	
244	Sipa Muoediesmo,	10/03/2012 Eastern Basin Open Day	The venue was very difficult to locate.	For the next round of meetings this will be taken into consideration.	
245	Sipa Muoediesmo,	10/03/2012 Eastern Basin Open Day	It will be an added advantage to have all or most stakeholders present in such meetings.	The open days were well advertised and emails were sent to people on the I&AP database. For future meetings it will be investigated as to how to improve the attendance.	
246	Lea, Irene	10/03/2012 Eastern Basin Open Day	Good presentation and information!	Noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
247	Sheodin, Ramesh	10/03/2012 Eastern Basin Open Day	Very informative	Noted	
248	Jaco Schoeman and Henry Gouws	08/03/2012 One on one consultation	There are miss representations in the Background Information Document since DRD gold has not confirmed that its infrastructure can be used for the project and will only be able to do so once industry has received proper clarity on its proposal submitted in June 2010	The representations in the BID were made based on information provided to Digby Wells. It is noted that agreements are yet to be reached with DRD Gold By TCTA	
249	Mark Biggars	02/03/2012 Email	When will registered I&AP be notified of meeting, will directions also be given? I did search on your website for meetings or open days, but, the are no results. There are also no notices in the Soweto Area or community newspapers. How then does the public take part if notification is selective?	Registered I&APs were notified of all the meetings on 9/02/2011. The meetings were not advertised on the website but in the press and on site notices. The meetings were advertised in the Sowetan newspaper on 14/02/2012. The notifications were not selective.	
250	Mr Andrew Barker	02/03/2012Email	Thank you for your response with the	The BID sent out in December 2011	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			copy of the BID. I have already been registered as an IAP. In fact, Richard Bennet and myself were acknowledged as being registered on 21 December 2011. At that time we were also sent a copy of the BID. That document is different to the one that you have sent me now as page 6 did not contain any information regarding public open days. Trevor Khoza sent me the same document as the original bid I received with no information containing public meetings on 17 February 2012. Your copy of the BID is the first time I have received any information regarding the public open days. I also understand that there have other public meetings.	did not have information regarding the open days as these had not been scheduled a second BID and email was sent out to all registered I&APs on the 9 February 2012 we apologies if you did not receive this second BID and invite. A meeting relating to the scoping document will be held and I&APs will be informed of this meeting which will be held in a central venue.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			I am extremely concerned that we were not notified of any of the public open days or meetings despite being already registered as an IAPs. I'm afraid that my original question of 20 February 2012 is still stands. I have noted the dates of the forthcoming public open days however, I already have commitments on both 03 and 10 March at this stage. I will endeavour to make alternative arrangements. However, would like to know if there are any other centrally located meetings scheduled to take place.		
251	Dr Shan Holms	01/03/2012Email	The Public participation process for the above is open and IAPs can register and “participate” after the said due date of registration published as 29 February 2012.	This is correct we will take registration forms throughout the EIA process as we do not want to exclude anyone.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
252	Dr Shan Holms	01/03/2012Email	The attendance register for the Western Basin Decant Technical Committee held two weeks ago at the Sterkfontein Caves was used to register further IAPs for the above referenced “projects” and as such, my name plus those of other attendees would already be registered.	The Attendance register will be used to notify people of the project and people are welcome to register. The people on the register will be kept informed of the EIA.	
253	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	WESSA would like to see the consultant paying more attention to the public participation process as stated in the 2010 EIA Regulations adhered to as per the follows sections;	Comment noted Digby Wells has taken these into account.	
253	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	54d) Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken:	Adverts were placed in the following newspapers on two occasions once in December 2011 and again in February 2012 Newspaper adverts were published in the following newspapers:	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in subregulation (c)(ii); and	■ Sowetan 12 December 2011 ■ The Star 12 December 2011 ■ The Springs Advertiser 14 December 2011 ■ Randfontein Herald 16 December 2011 ■ The Springs African Reporter 16 December 2011 Media adverts were re-advertised in the following newspapers ■ Beeld -14 February 2012 ■ The Star-14 February 2012 ■ Sowetan -14 February 2012 ■ Randfontein Herald-21 February 2012 ■ Springs Advertiser- 22 February 2012 ■ African Reporter- 24 February	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				2012	
254	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	54e) Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to (i) illiteracy; (ii) disability; or (iii) any other disadvantage	Noted attention will be given to this.	
255	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	This is due to the fact that the project is too technical and the interested and affected parties have the right to have this project explained to them in a simplified manner which they can understand.	We are investigating options to make the information more accessible. A simple flyer has been developed and will be translated and distributed. Visual aids are also being used where possible.	
256	Lemson Betha Environmental Co-	29/02/2012 Email	WESSA would also want to find out on how far or how wide will the consultation during public participation	As widely as possible the media has been briefed regarding the project and as many people as possible are to be	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	ordinator: Northern Areas Region		process go as to the area of this project since the BID states it as a national project?	included.	
257	Mark Biggers	27/02/2012 Email and Registration form and comment s	How impartial is Digby Wells, past encounters at their Riverlea meeting have shown that they will replace Blacks employees and have let people argue on a racial bases, if I did not point that it was the ANC that made laws for Blacks to benefit from mining. Now it is perceived that they will hold meetings far from Black people's residents (maybe Pretoria) so that Soweto Residents cannot take part in the EIA that impact on these communities.	It is being investigated as how to be more inclusive of disadvantaged communities. It is not Digby Wells' intention to exclude any one form the EIA.	
258	Johann Tempelhoff	25/02/2012 Western Basin Open Day	There was a sound atmosphere for the thoughtful exploration of views on local AMD.	Comment noted	
259	Johann	25/02/2012	My only concern is that so few people	Comment noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Tempelhoff	Western Basin Open Day	of civil society are interested in taking note of the critical issue that potentially threatens human livelihoods in the area.		
260	Diana Tshivhase,	25/02/2012 Western Basin Open Day	Communication channels between stakeholders involved i.e. TCTA and BKS be more flexible to organisations with interest on AMD solution.	Comment noted	
261	Hardwick, Ed	25/02/2012Western Basin Open Day	Should be publicised better - too few people. Posters very informative. Good discussion.	The open days were extensively advertised in the media as indicated above.	
262	Prof Les Stoch	24/02/2012Email	Please accept my apologies for not attending your “Open Day” which, as I see it, is not a substitute for the mandated public participation. It would appear that at the TCTA meeting of a few days ago the opinion was floated that DWA should not entertain (or rather should not have	Noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			entertained) the public participation platform. Whether this is correct, or not, I am in no position to comment.		
263	Dr.van Eeden Eco Monitor	22/02/2012 EIA Interest Group Meeting	Indicated that he is a member of the Klipriver and Blesbokspruit Forums. Invited Digby Wells to attend the River Forums and present to their committee. The dates to present to the Klipriver forum and the Blesbokspruit forum are available on the following website www.reservoir.co.za.	Digby Wells is in the process of arranging to make these presentations.	
264	Maryna Storie Gauteng City Regional Observatory	22/02/2012 EIA Interest Group Meeting	The process needs to be properly explained especially to the disadvantaged communities.	It is being investigated as how to be more inclusive of disadvantaged communities a simple flyer has been designed and will be distributed and meetings with these communities are being scheduled.	
265	Dr. van Eeden	22/02/2012	Enquired how far the PPP process will	BKS was consulted to determine how	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		EIA Interest Group Meeting	be taken in terms of geographical localities	far downstream water will be affected. Studies are being undertaken to see how far the water will be affected and will feed into the PPP.	
266	Ms Maryna Storie Gauteng City – Region Observatory	22/02/2012 EIA Interest Group Meeting	Enquired as to whether this process will map a spatial delineation of the affected communities.	As part of the EIA studies the affected areas will be spatially delineated. There will be maps indicating the affected areas. All specialist studies will be incorporated into GIS and maps will be produced.	
267	Mr Peter Mills Cradle of Humankind	22/02/2012 EIA Interest Group Meeting	Recommended that PPP should stretch toward the Hartbeespoort Dam as there will be an increased base flow.	The PPP process will include consultations with people towards Hartbeespoort Dam.	
268	Dr. van Eeden	22/02/2012 EIA Interest Group Meeting	Requested that representatives from DEA, DMR and DWA should attend the EIA interest group meetings	The representatives from DEA, DMR and DWA attend an authorities forum meeting which is held every second month.	
269	Les Stoch	13/02/2012Email	Please send me a Tswana copy of the BID.	Tswana copy was sent	
270	Dr Koos Pretorius	20/01/2012Email	I have worked quite a few times with	If the accusation can be substantiated	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	FSE	The issues raised are in response to an article By: Terence Creamer 19th January 2012	Digby Wells and this is right up your street. Deny and placate and then come with a plan and documents that suits your client and ignores anyone else. I am protesting in the strongest possible sense to the way this is being done and reserve all our rights.	this can be addressed in a different forum outside of the EIA process.	
271	Mariette Liefferink FSE	17/01/2012 Email and attached report	I&APs must have access to any Environmental Authorisation's conditions.	As per the requirements I&APs will be informed of all ROD and their conditions	
272	Dr Koos Pretorius FSE	Email 09/01/2012	I have not had a very good experience thus far with TCTA. They have basically ignored and side lined us in this process and my numerous attempts to meet with them has not been fruitful. You and TCTA are doing the running in this process	The EIA process was only initiated in early December 2011 and it is our understanding that FSE has been fully included in all subsequent correspondence. Prior to this a meeting was held with FSE on 26 August 2011, which Mr Pretorius chose not to attend. A meeting with FSE and TCTA was	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				held on the 23 January 2012. The meetings with FSE, which far exceeds that with other stakeholders gives lie to the statement.	
273	Mariette Liefferink FSE	07/01/2012 Email	I apologise for encumbering you once more with the same issue. I respectfully request that my comments be included, unabridged, in the comments and response report.	The comments have been included unabridged.	
274	Mariette Liefferink FSE	07/01/2012 Email	I refer to the appended notification and subjoined correspondence, dated the 31st of August, 2011 and the 27th of September, 2011. I am perplexed regarding the above-mentioned process and respectfully request elucidation.	Please see response below.	
275	Mariette Liefferink FSE	07/01/2012 Email	On the 31st of August, 2011, I, on behalf of the Federation for a Sustainable Environment (FSE) registered as an interested and affected party pursuant to a notification which appeared in a local newspaper.	After advice from the Department of Environmental Affairs a decision was taken to withdraw the Basic Assessment application and rather follow the full EIA route.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			I append it hereto. I was notified of the basic assessment process for the proposed upgrade of the Rand Uranium Water Treatment Works in the Western Basin by a third party and not by the consultant. Has this basic assessment process commenced and if it had commenced, why were registered interested and affected parties not informed or consulted on an on-going basis?	An application for an EIA for the immediate and short term interventions has been lodged with the Department of Environmental Affairs and Tourism. This application has been accepted and the reference numbers are as follows: DEA/EIA/0000498/2011 & 12/12/20/2403	
276	Mariette Liefferink FSE	07/01/2012 Email	On the 22nd of September, 2011 you copied me on the correspondence with Mrs. Polla Wolvaardt. In the correspondence you confirmed that Digby Wells has been appointed as consultant in the basic assessment process for the proposed upgrade of the Rand Uranium Water Treatment Works in the Western Basin. There could therefore have been no uncertainty regarding the FSE's and my	An application for a BA was made by BKS which was subsequently amended to include a full EIA. Digby Wells became involved in the project when the EIA applications were made. The FSE was registered as an I&AP from the onset of the project and will be included in all future correspondence with regards to the AMD project. Advertisements were	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			interest in the AMD issue.	placed for the EIA for the project in late December 2011 and I&APs which responded to the advertisements were registered and sent BIDs. Updated BIDs including dates for open days were sent to all registered I&APs including the FSE. Focus group meetings will also be held to which the FSE will be invited as well as one on one meetings will also be held with representatives from FSE.	
278	Mariette Liefferink FSE	07/01/2012 Email	On the 5th of January, 2012 I received the Background Information Document for the Activities Associated with the Immediate and Short Term Interventions regarding Acid Mine Drainage in the Western, Central and Eastern Witwatersrand Basins from a third party, namely Janavi Jardine [Janavi@newla.co.za], and not the consultant.	As explained in the above issue this was not an oversight and the FSE and other I&APs will be sent the updated BID and will be kept informed of the process throughout.	
279	Mariette Liefferink	07/01/2012	Notwithstanding the FSE's long term,	As explained the FSE has not been	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	FSE	Email	visible and widely reported protagonist and proactive environmentalism pertaining to AMD, the consultants, namely Digby Wells, overlooked the FSE in its notification of the above-mentioned project. (Please see the appended extract from the FSE's draft Annual Report in substantiation and the academic paper by Prof. Elize van Eeden, an esteemed historian.) The FSE has furthermore been appointed by Commissioner Janet Love of the South African Human Rights Commission as a member of the Section 5 Committee on AMD.	overlooked and will be included in the process going forward.	
280	Mariette Liefferink FSE	07/01/2012 Email	In view of the aforesaid, it perplexes that the FSE was overlooked in the abovementioned notifications. Is this oversight to be conceived as a deliberate or an innocent oversight?	As explained above.	
281	Mariette Liefferink FSE	07/01/2012 Email	With reference to notification to affected communities, particularly the	Every effort will be made to notify as many of the I&APs as possible All	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			disadvantaged and vulnerable communities, have they been adequately and appropriately notified and empowered to participate in the above-mentioned processes? I think it relevant to refer to the findings of the Environmental Impact Document (3 December 2006) of Harmony, entitled "Impact of the discharge of Treated Mine Water, via the Tweelopies Spruit, on the receiving water body Crocodile River System, Mogale City, Gauteng Province" (DWAF 16/2/7/C221/C/24) namely that 11 491 persons within the Zwartkrans Compartment use the groundwater for domestic use, 2 654 Ha are under irrigation using borehole water and 458 Ha are under irrigation using river water. I respectfully request a record of the said affected parties who have been notified of the above-mentioned processes.	notification documentation will be made available in appropriate languages to ensure the inclusion of vulnerable communities. A copy of the I&AP database is attached to the scoping document.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
282	Mariette Liefferink FSE	07/01/2012 Email	There has been no public consultation regarding the advantages and disadvantages of desalination or other treatment options as opposed to the advantages and disadvantages of neutralization	These debates can be raised in the public participation process for the EIA, however the directive issued by the DWA only deals with the immediate and short term interventions.	
283	Leslie Stoch	06/01/2012 Email	We were invited to register for a previous PPP dealing with, if I recall correctly, the already decided Western Basin activities and which appears to have disappeared through the cracks.	An application for a basic assessment was submitted to DEAT for the immediate intervention in the Western Basin. This application was, however, amended to include all the basins and further activities, thus, requiring an EIA to be compiled.	
284	Leslie Stoch	06/01/2012 Email	As the Western basin has been decanting since 2002, we have a catastrophe that could have been avoided, rather than an emergency, and since the rate of rise for the Central Basin was miscalculated, there is an extra year in which to have had discussions with the community which, as I see it, are a Constitutional	Comment Noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			imperative.		
285	Leslie Stoch	06/01/2012 Email	Under the heading “Public Participation Process” I read that an as yet ignorant public are invited to make comments that “will be recorded and will contribute to the decision making process” regarding a “proposed project”. To quote your “flyer” in respect of the Western Basin: “The new HDS treatment plant for the short term intervention will be situated on …. The activities will include …”; and for the Central Basin “The proposed Central Basin AMD treatment plant is to be situated about …. The activities will include ….” If decisions have been made are you	Some of the decisions have been made and the process of upgrading the water treatment works has commenced as TCTA is acting on the directive which has been issued by the DWA. Therefore the Background Information Document (BID) reads will as at the time of providing the BID activities had not occurred. So some activities have taken place and a section 24 G application in terms of NEMA will be made for the authorisation of any triggered listed activities. However the EIA process will continue giving I&APs the opportunity to comment on the process and to offer their inputs so as to ensure that the design and process is as acceptable as possible.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			not 'trying to close the stable door after the proverbial horse has bolted'?	In order to apply for Environmental Authorisation activities have to be identified and included as part of the application. This, therefore, necessitates a certain degree of decision making prior to consulting the public.	
286	Leslie Stoch	06/01/2012 Email	Did I miss the information: Are sufficient public meetings to be held, if so where?	Three public open days will be held one per basin as well as one EIA focus group meeting will be held. I&APs will be informed as to when and where these open days and meetings will be held. Where appropriate one on one meetings will also be held with key I&APs.	
287	Eugene Viljoen	06/01/2012 Email	Yes I do have specific objections Not with the plants per sè, but several other aspects to be highlighted at the public meetings please note these to be conducted at venues were the public can easily attend	Open days will be held at locations in the basins close to where the treatment works are situated or at other central venues the BID will be updated with this information when it becomes available and will be redistributed to I&APs.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Correspondence to be addressed by email and a copy cd of scoping reports EIA investigations etc to be forwarded to my postal address. Including any mapping.	Compact disks (CDs) will be made available on request which will include all information contained in the hard copy reports.	
2.30 Requests to Register as I&AP					
288	Ms Elaine Vanessa Appies Ekurhuleni Griqua community Congress of the First National Nation	13/03/2012 Email and registration form	Request to register as I&AP	Registered as requested	
289	Ms Sonia Mothdini Ekurhuleni Metro Policy and Planning Section	09/03/2012Email Registration form	Ekurhuleni Metropolitan Municipality would like to be registered as an Interested and Affected Party. Comments on the application will be made upon receipt of the Environmental Impact Assessment report and electronic version (CD) All	The municipality has been registered and the documentation will be forwarded for comment as requested.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			correspondence regarding the application must be sent to the Environmental Development: Policy and Planning Section of the Municipality.		
290	Ms Ms Ilva Jorgo SOBEK Engineering (Pty) Ltd	09/03/2012Email Registration form	Request to be registered as an I&AP. No comments made.	Registered as requested	
291	Mr Jaco Schoeman DRD Gold Ltd	02/03/2012 Email Registration form	Affected land owner	Registered as an I&AP as requested.	
292	Ms Christine Colvin	01/03/2012 Email	Request to be registered	Registered as requested and sent BID.	
293	Henry Roman (PhD) Director: Environmental Services and Technologies	01/03/2012 Email	Can you add me to the mailing list for this meeting, please? I am a member of the AMD Project Executive Committee (PEC) of DWA and of the IGTT, but only joined both in October of last year.	Registered as requested	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
294	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	The aim of WESSA (Wildlife & Environment Society) is to contribute to conserving the Earth's vitality and diversity by (amongst other means) securing the protection and wise use of natural resources and promoting sound environmental values and sustainable living. WESSA would like to register as an I&AP and comment on this aforementioned project.	Noted and WESSA is registered as an I&AP as requested	
295	Andre du Plessis	22/02/2012Email	*Graag wil ons as belanghebbende of geaffekteerde party registeer op bogenoemde kennisgewing*. We would like to register as I&APs	Registered as requested	
296	Tsietsi B Letanta Divisional SHEQ	20/03/3012Email	Please register me as an interested and affected party on the Environmental Impact Assessment	Registered as I&AP as requested.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Manager: Platinum AFRICAN RAINBOW MINERALS LIMITED		(EIA) process for the Immediate and Short Term Interventions for the Management Measures of Acid Mine Drainage (AMD) in the Western, Central and Eastern Basins of the Witwatersrand.		
297	Paul Fairall	20/02/20 Email and registration form	Wetlands and riparian zones, Jukskei Reiver Catchment Area Management Forum Metsi a me Remediation Hartbeesport Dam.	Registered as I&AP	
298	John Wesson Region Manager Conservation Wildlife & Environment Society of SA - Northern Areas	17/02/2012Email	Please keep me on your data base and register us as an I&AP for the AMD EIA process. I am sure it is going to be rather interesting J Lemson will attend your upcoming EIA meeting Will future meetings be held in the Cradle area during the week for those	Registered as requested alternative venues are being investigated.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			of us living on the receiving end?		
299	Henry Roman (PhD) Director: Environmental Services and Technologies	16/02/2012Email	Can you add me to the mailing list for this meeting, please? I am a member of the AMD Project Executive Committee (PEC) of DWA and of the IGTT, but only joined both in October of last year.	Added to list as requested	
300	GS. Barkhuizen	16/02/2012Email	Request to be registered	Registered as requested.	
301	Peter Mahlaela	14/02/2012Email	I am a contractor within the water infrastructure division (Waste and Clean). I register my interest in the Acid Mine Cleaning project. May you kindly send me the details. A friend of mine gave me your details.	Registered as requested	
302	Tony Turton	10/02/2012Email	Request to register as I&AP and	Comment noted	

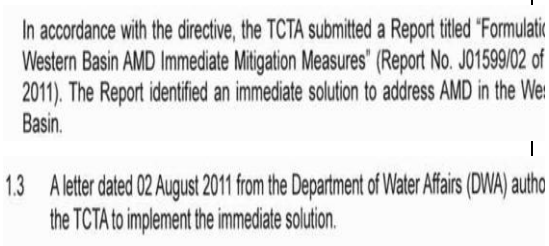
No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			commented. It is our belief that at the heart of your project is Water Stewardship, so we will encourage responsible behaviour, but will also oppose that which we consider to be inappropriate.		
303	Terry Baker Member of the Public	10/02/2012Email	Request to register as I&AP. No comments made	Registered as requested	
304	Nico Nel Grootvlei residential home owners association	01/02/2012Email	Request to be registered as I&AP	Registered as requested	
305	Prof. Ewa M Cukrowska School of Chemistry Faculty of Science University of the Witwatersrand	31/01/2012Email	Request to be registered as I&AP	Registered as requested	

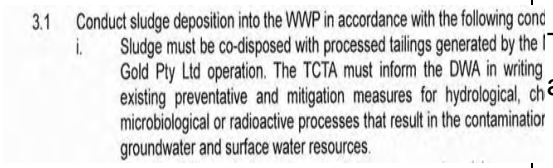
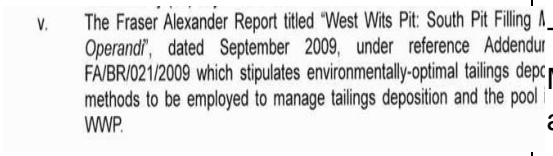
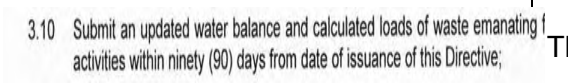
No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
306	Irene Lea Irene Lea Environmental and Hydrology	23/01/2012Email	Request to be registered as I&AP	Registered as requested	
307	Benedict Itholeng Gauteng Department of Agriculture and Rural Development (GDARD)	17/01/2012 Email	Request to register as I&AP. No comments made.	I&AP registered as requested.	
308	Vanessa Vermaak	09/01/2012 I&AP Registration form	Request to be registered as I&AP no issues raised	I&AP registered as requested.	
309	Jan Ratsoma Locial Business man	09/01/2012 Email	Request to be registered as I&AP. No issues raised.	I&AP registered as requested.	
310	Michal Wood Grootvaly Blesbokspruit Conservation Trust	06/01/2012 Email	Request to be registered as an I&AP	I&AP registered as requested.	

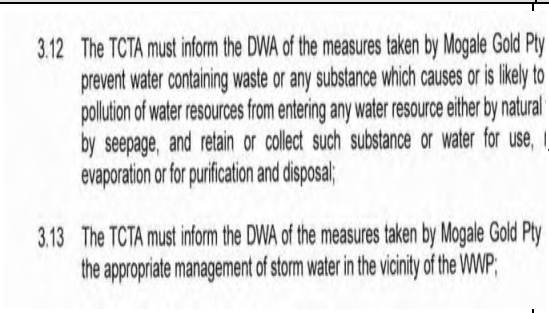
No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
311	Judith Taylor Branch Co-ordinator Earth Life Africa Johannesburg	05/01/2012 Email	Request to register as I&AP	I&AP has been registered as requested.	
312	Mariette Liefferink. CEO: FEDERATION FOR A SUSTAINABLE ENVIRONMENT	05/01/2012 Email	Request to register as I&AP	I&AP has been registered as requested.	
313	Andrew Barker Development Consultant	20/12/2011 Email	Request to register as I&AP	I&AP has been registered as requested.	
314	Andries Nkabinde	15/12/2011	Request to register as I&AP	I&AP has been registered as requested	
315	Philip de Jager	14/12/2011	I reside on the Banks of the Blesbokspruit and some five hundred meters below Shaft No. 3 Grootvlei Mine. Whatever happens will ultimately	I&AP has been registered as requested	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			have an impact on my property and I would request you to please register me as an interested and effected party.		
316	Edward Bramley	12/12/2011 Email	Request to register as I&AP	I&AP has been registered as requested	
317	Susan Stoffberg Environmental Officer West Rand District Municipality, Gauteng	13/12/2011 Email	Request to register as I&AP	I&AP has been registered as requested	
318	Stephinah Mudau Environmental Advisor Chamber of Mines, South Africa	13/12/2011	Request to register as I&AP	I&AP has been registered as requested	
2.31 Information Requests					
319	Dr Koos Pretorious	22/02/2012	Requested to be sent a document within seven days detailing the	See document from BKS attached to minutes of meeting. Annexure E:	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	FSE	EIA Interest Group Meeting	following: ■ Quality of water for each basin, ■ Waste that the HDS process will remove, ■ The treated water quality, ■ What the sludge will look like ■ Cost implications of putting desalination of the sulphates after neutralisation to drinking water standards	Summary of Technology Costs	
320	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE	Please send the following reports, letters, etc from the AMD directives: TCTA report " Formulation of Western Basin AMD Immediate Mitigation Measures (Report No JO1599/02 Letter Dated 2 August 2011 (DWA) authorised TCTA to implement the	It is the intention of TCTA to be transparent with information however the reports from the Diligence are two large to email or place on a website for down load. Special arrangements can be made for providing the Due Diligence report.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			immediate solution.  		
321	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE	All agreements between TCTA and Rand Uranium that must be reached as per the directives (AMD directive – 3.1, 3.3, 3.14, Reports showing compliance , or how compliance will be met – AMD directive – 3.13,	These are contractual agreements and the intention is not to make them publically available.	
322	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE	Water use license application – AMD Directive – 3.16	DWA and TCTA have identified the required approvals. DWA is currently considering the same and will issue TCTA with the approvals that are required for the project.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
323	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE	Sludge Disposal Directive – the following  3.1 Conduct sludge deposition into the WWP in accordance with the following cond i. Sludge must be co-disposed with processed tailings generated by the I Gold Pty Ltd operation. The TCTA must inform the DWA in writing existing preventative and mitigation measures for hydrological, ch microbiological or radioactive processes that result in the contaminatior groundwater and surface water resources.	This is in process and will be made available once issued.	
324	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE	 v. The Fraser Alexander Report titled "West Wits Pit: South Pit Filling A *Operandi*", dated September 2009, under reference Addendur FA/BR/021/2009 which stipulates environmentally-optimal tailings depc methods to be employed to manage tailings deposition and the pool WWP.	This document was commissioned by Mogale Gold and will need to be accessed from them.	
325	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE	Agreements between TCTA and Mogale Gold – Sludge disposal Directive- 3.1.(iv), 3.2(iii), 3.4, 3.17, 3.18, Sludge Directive – 3.2	This is in process.	
326	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE	 3.10 Submit an updated water balance and calculated loads of waste emanating f activities within ninety (90) days from date of issuance of this Directive;	This is in process	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
327	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE		This is in process	
328	Mariette Lieferink FSE	23/01/2012Meeting with FSE at the CSIR	Requested the due diligence report	The integrated due diligences report was emailed to the FSE as well as made available to the public on the website. The directives will also be made available to the public and are attached in the Draft Scoping Report as Appendix B.	
329	Mariette Lieferink	23/01/2012Meeting with FSE at the CSIR	Offered to provide the project team a number of documents	Noted.	
330	Dr Koos Pretorius FSE	20/01/2012Email The issues raised are in response to an	*A due diligence review undertaken last year by BKS and Golder Associate* - based on what plan?	The due diligence was based on the team of experts report which in turn led to the issuing of a directive to TCTA to implement the immediate	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		article By: Terence Creamer 19th January 2012		and short term interventions.	
331	Dr Koos Pretorius FSE	20/01/2012Email The issues raised are in response to an article By: Terence Creamer 19th January 2012	TCTA also acknowledges that water released into the river system after implementation of Phase 1 may still contain high salt levels, which requires dilution from expensive and scarce fresh water sources to mitigate the impact – is this not what we requested information about which could not be given? Please explain. We also requested information as to what scientific basis the salt content decision was based upon.	It is acknowledged that the water will contain high salt levels and this is not the long term solution to the problem of AMD. However, the treatment option will at least neutralise the AMD and remove most of the heavy metals; a situation that is better than allowing untreated AMD to decant.	
332	Dr Koos Pretorius FSE	20/01/2012Email The issues raised are in response to an	The DWA is currently undertaking a feasibility study to determine the long-term sustainable solution, but it is not yet clear when that study will be	The long-term study does not form part of the current Directive to TCTA or the activities of the EIA.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		article By: Terence Creamer 19th January 2012	finalised and what funding model will be incorporated – I once again refer you to our inputs. We specifically asked for details around this		
333	Mariette Liefferink Federation for A Sustainable Environment	10/01/2012 Email	It perplexes that the findings and the recommendations of the subjoined Reports were overlooked for almost a decade by the Department of Water Affairs and the Department of Mineral Resources. I respectfully request the DWA to respond to the failure of the DWA to implement the recommendations of the said Reports.	The DWA were fully aware of the historical predictions made around AMD The point is taken, however AMD is a legacy issue, which has been in the making for the past 120 years due to mining. The reason the state could not act was that they did not own or control the land on which mining activities were taking place. Form a legal perspective land owners and those in control of land need to control and mitigate their pollution in terms of the NWA (clause 19 and 20) and the puller pays principle in NEMA. Due to mining having ceased and the	.

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				companies who were responsible for the pollution no longer exist the government has now decided to step in to address the AMD issue.	
334	Mariette Liefferink Federation for A Sustainable Environment	10/01/2012 Email	It is the respectful opinion of the Federation for a Sustainable Environment, that the DWA, in view of the said documents, was not ill- or uniformed of the risks of hazards of the flooding of the Witwatersrand Basins and, therefore, had a duty to care to prevent the flooding of mining basins within the West, Central and East Rand Goldfields. It regrettably did not fulfil its duty of care which resulted in devastating consequences for the ecology and the people of South Africa.	The DWA accepts the duty of care bestowed on it by implementing the short term intervention and investigating the long term solutions to stop the uncontrolled decant.	
335	Mariette Liefferink Federation for A Sustainable Environment	10/01/2012 Email	I respectfully call upon Digby Wells and the TCTA to take into consideration the findings and recommendations of the subjoined Reports and if not, to please	The IMC report, which was integral in defining the treatment process considered the following reports you mention:	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			supply the FSE with justification for its failure to consider the findings and recommendations of the said Reports. 1. R Scott. Flooding of Central and East Rand Gold Mines: An Investigation into Controls Over the Inflow Rate, Water Quality and the Predicted 1. Impacts of Flooded Mines. 2. Grootvlei Proprietary Mines Limited Strategic Water Management Plan – Integration with the Entire Eastern Basin. 21 August 2000. 3. Grootvlei Technical Task team Report to the Inter-Departmental Committee for state Assistance to the Mining Industry. 31 August 2000. 4. EPRM (PTY) LTD. Findings of	Scott, R. (1995) Flooding of Central and East Rand Gold Mines: An investigation into controls over the inflow rate, water quality and the predicted impacts of flooded mines. Institute for Groundwater Studies, University of the Orange Free State, Bloemfontein. Prepared for: Water Research Commission: Report no. 486/1/95, Water Research Commission, Pretoria, South Africa, 237 pp.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			the Holings Investigation in the Area from ERPM to DRD. October 2001. 5. Department of Minerals and energy. Directorate Mine Economics. Investigation for the Interdepartmental Committee for State Assistance to the Minerals Industry Into Continued Assistance with the Pumping of Extraneous Water At Grootvlei Proprietary Mines Limited (Harmony East Rand Operations) for the 1988/1999 Fiscal Year. Compiled by O. Oncel. March 1998. 6. Department of Mineral and Energy Affairs. Department of water Affairs and Forestry. Grootvlei Socio-Economic and Environmental Cost Benefit Analysis. Grootvlei Mine Direct Cost Analysis. BKS Group. September 1996.		

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			7. Water Increase and Control Mechanisms for: Central Mining Basin: Gauteng Gold Mines: Geldenhuys Interchange to DRD by Johan Fourie and Associates. 20 September 2001. 8. Strategic Water Management Plan for the Central Witwatersrand Basin. Directorate: Mine Economics, Department Minerals and Energy. June 2002. 9. Grootvlei Proprietary Mines Limited: Application for assistance and support in securing jobs and ore reserves in the East Rand coupled to: East Rand Strategic Water Management Plan: Letter of Intent: Installation of a 35Ml/day Water Treatment Facility; a Canal System in the Blesbok Spruit: An Integrated		

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Discharge System and the Initiation of a Joint Venture Legal Entity to Fund the 'SWaMP' 10. Department of Mineral and Energy Affairs and the Department of Water Affairs and Forestry Grootvlei Socio-Economic and Environmental Cost Benefit Analysis Grootvlei Mine Direct Cost Analysis. September 1995. BKS Group. 11. Grootvlei Proprietary Mines Limited Enquiry GV/97. Treatment of Grootvlei No 3 Shaft Mine Water. Pilot Desalination Facility. Report on Tenders. June 1997. 12. ERPM: Environmental Assessment – Elsburgspruit. 7 June 1996.		

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			13. Department of Water Affairs and Forestry: Disposal of Water Found Underground in the Mine: Issue of Permit 50M in terms of Section 12B(2)(b) of the Water Act, 1956 Only for the Period Up to 31 March 2001: Grootvlei Proprietary Mines Limited. 14. Grootvlei Proprietary Mines Limited. Strategic water Management Plan. Integration with the Entire Eastern Basin. 21 August 2000. 15. Department of Water Affairs and Forestry: Submission to achieve objectives: Water Licence. Application in terms of Section 40 of the National Water Act For a Section (21)g Water Use Licence; Disposal of Water found Underground in the Mine. (Reference: Marius Keet).		

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			16. Participation in the construction of the East Rand Canal. Johan Fourie & Associates. 22 August 2001. 17. Wates, Meiring & Barnard. Evaluation of Impact of Mine Water Desalination on Vaal River System. Statement: An Assessment of the Economic and Socio Impacts of Dewatering Mines. FWR: Grootvlei Socio-Economic and Environmental Cost- Benefit Analysis. CSIR Investigation on Water Treatment. 18. WRC Report No 800/1/00. An Economic and Technical Evaluation of Regional treatment Options for Point source Gold Mine effluents Entering the Vaal Barrage Catchment. 19. Grootvlei Gold Mine. A		

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Preliminary Assessment of the Environmental, Social, Economic and Financial Implications of Dewatering the East Rand Basin into the Blesbokspruit or, Alternatively, Allowing it to Flood. September 1995. 20. Flooding of Central And East Rand Gold Mines. An Investigation into Controls over the Inflow Rate, Water Quality and the Predicted Impacts of Flooded Mines. WRC Report No 486/1/95. 21. Foundation for Water Research. Grootvlei Socio-Economic And Environmental Cost Benefit Analysis. Application of the UK Benefit Assessment Methodology to the Grootvlei Mine Discharge Problem. Report No RSA/0001. September 1996.		

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			22. The Stability of the Strata Overlying the mined out Areas of the Central Witwatersrand. June 1981. 23. Amanzi Project: Downstream Cost Impacts. July 2000. Prepared for: Department of Water Affairs and Forestry. Urban Econ Development Economists. 24. Investigation into Alternative Water Treatment technologies for the Treatment of An Underground Mine Water Discharged by Grootvlei Proprietary Mines Ltd. Into the Blesbokspruit. Water, Environment and Forestry Technology. CSIR. 25. Department of Water Affairs and Forestry. Vaal River Continuous Investigations. Assessment of the		

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			influence of the Amanzi Project on the surface water resources of the Vaal River system. BKS (Pty) Ltd. July 2000. 26. Blesbokspruit Cost-Benefit Analysis in Respect of Two Options of Water Treatment. 27. The Evaluation of the Impact of Mine Water Desalination form Gold Mines on the Vaal River System: Mining and Mine water Treatment Aspects prepared for The Amanzi Joint Technical Committee. Project. No 103/134/ Report No/ 4F/ July, 2000. 28. An Assessment of the Economic and Socio Economic Impacts of Dewatering Mines into the Blesbokspruit and the Effect thereof on Eco-Tourism, Agriculture and Other		

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Economic Activities.		
336	Dr Koos Pretorius FSE	09/01/2012 Email	Will we get full access to the due diligence that was done?	The due diligence report is available on the AMD short website www.amdshort.co.za	.
337	Leslie Stoch	06/01/2012 Email	Why is it not possible to obtain a copy of the TCTA “due diligence” report which recommendations now appear to be cast in stone?	The due diligence report is available on the AMD short website www.amdshort.co.za	
338	Leslie Stoch	06/01/2012 Email	If all the relevant data is not available, what does your client expect from this I&AP/EIA process?	The EIA team consists of a number of recognised specialists who have a sound knowledge of the areas and where specific data is unavailable methods to either collect or infer the data will be used.	
339	Leslie Stoch	06/01/2012 Email	When we requested copies of data which should be in the public domain, we were informed that the data was confidential and it was work in progress.	All documentation in the public domain can be made available.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			We were led to believe that this data was either sold, or provided to a consultant without charge.		
2.32 Team of Experts Report					
340	Koos Pretorius FSE	23/01/2012 Meeting with FSE at the CSIR	Indicated that he has been engaging with DWA for ten years. Enquired who were the team of experts and how did they come up with recommendations. What inputs were sourced from outside. The FSE has been ignored.	The team of experts was appointed by the Inter Ministerial Committee the recommendations were made after careful consideration. There was no process of stakeholder engagement in drafting the team of experts report. At this stage TCTA has only been directed to construct the treatment plants based on the team of experts report's recommendations and the directives issued to TCTA.	
341	Mariette Liefferink FSE	17/01/2012 Email and attached report	The identities and qualifications of the members of the task team and "working group"; ■ The entities that each member represents;	The names of the task team experts, their research institutions are contained on page (i) (ii) and (iii) of the IMC report i.e. the first three pages of the report.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			■ The team's research instructions; ■ The Minutes of all the team's meetings; and ■ Any documents used in the research. To the above bullets we need to specify that all the raw data be included.	The list of reference documents is contained in Chapter 13 The scope of work and the minutes of the technical task team meetings needs to requested from DWA.	
342	Mariette Liefferink FSE	07/01/2012 Email	The Team of Experts' Report to the Inter-ministerial Committee on AMD, dated December, 2010, stated that: a. A 20Ml/d emergency neutralisation plant to treat the uncontrolled decant in order to supplement the current treatment capacity must be installed immediately within the West Rand Basin;	Digby Wells have been contracted to assess the impacts associated with the immediate and short term interventions for the AMD project. In so doing, a number of the tasks listed will be addressed and studied. These are, but not excluded to, the following: ■ Investigating the impacts associated with the immediate intervention in the Western	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			b. Continuous prevention of ingress must commence immediately within the West Rand Basin; c. Continuous monitoring of water levels, flow, quality and profiles and seismic events and subsidences must commence immediately within the West Rand Basin; d. The pumping and treatment of the mine water must commence immediately within the Central Basin; e. Real-time monitoring and the installation for the entire Witwatersrand Basin must commence immediately; f. Prevention of ingress must commence immediately within the	Basin ■ Investigating the impacts associated with the short term intervention for the Western, Central and Eastern Basins ■ Inform and consult with I&APs regarding the project. Addressing issues they raise and provide an opportunity for concerns and recommendations to be made ■ Submit the required documentation to the relevant Authorities to assist them in making a decision A number of the tasks mentioned will, and are in some cases, being addressed by the relevant government departments.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Central Basin; g. Continuous monitoring of seismic events and the production of microzonation risk maps, research to optimise medium to long term solutions 4must commence immediately within the Central Rand Basin; h. With reference to the East Rand Basin the monitoring of pumping, the due diligence on the integrity of the pumping infrastructure, the issuing of a directive and the prevention of ingress;	The current AMD project is the start of addressing the recommendations of the Experts Report. TCTA has been given a directive from the DWA to implement the recommendation of treating AMD in all three basins.	
343	Mariette Liefferink FSE	07/01/2012 Email	10. Grounded upon the physical (real) evidence, the above statements now appear to be defective since none of the above-mentioned recommendations were implemented after the effluxion of more than a year; the current AMD situation remains	Filling the West Wits Pit will have a positive impact due to the reduction of ingress water into the void and the reduction of exposed pyrite bearing rock surface.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			unchanged and in fact, with reference to the West Rand Basin, the situation is exacerbated by the pumping and discharge of toxic acid mine water from the Lancaster Dam by the mining company, Mintails into the West Wits Pit. According to the Department of Mineral Resources' Draft Regional Mine Closure Strategy for the West Rand Goldfield (2008) "since the cessation of underground mining operations, mining operations have been limited to surface operations in the form of a number of large open pit operations. A number of these intersect the old underground operations providing direct continuity between the surface and the mine void. The numerous open pits in the West Rand have been identified as a source of ingress, with a study commissioned by the mining industry estimating that they contribute approximately 30% of the		

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			total ingress.		
344	Leslie Stoch	06/01/2012 Email	Be all that as it may, I believe that the Team of Experts' Report was first handed to the IMC during December, 2010 which was sent back for reasons unknown and resubmitted. The copy of the Report I have is dated December, 2010 and the term "draft" is nowhere to be found. It would be strange if Government saw fit to allocate R225-m on a "draft" which quantum has since escalated through R400-m, R750-m to R924-m within the space of less than nine months, without any evidence.	The current construction cost for the short term intervention is based on detailed engineering bill of quantities. Previous costs were merely estimations and not based on any engineering due diligence.	
345	Leslie Stoch	06/01/2012 Email	Because of claims that there was an emergency, the public was simply by-passed and neither the AMD document, or any practical alternatives	The EIA process is a public process whereby the public are given the opportunity to give their inputs.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			were discussed. And, sadly it would appear that the Parliamentary Portfolio Committee was not always given the correct information on which to base its decisions.	The team of experts made their recommendations based on reliable available information.	
346	Leslie Stoch	06/01/2012 Email	May I also enquire why are the lay public engaged after the Team of Experts' view has been "blessed", so to speak, by the IMC?	The directive issued to TCTA is based on the team of experts report and the EIA deals with the implementation of the recommendations of the team expert report namely the upgrading and construction of water treatment works for the treatment of AMD and the public are engaged to make comment and provide inputs into the EIA.	
2.33 Treatment Plants					
347	Mark Biggars	22/04/2012 Email	In the jurisdiction of Johannesburg Local Government, where is the best place to put a pumping station and AMD treatment plant.	In terms of the central basin which is where Johannesburg fits the best place is at ERPM south west vertical shaft in Germiston, which falls within the Ekurhuleni Metropolitan Municipality's area of jurisdiction	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
348	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Who will operate the treatment plants?	This still needs to be determined.	
349	Nico van den Berg Water and Sanitation Planning	03/04/2012 Meeting with Ekurhuleni Municipal Officials	The National Building Regulations indicates that any contaminated water should go into a sewage treatment plant. Concerned that ERWAT will be flooded, is there any possibility that treated water will go into the sewage plants of ERWAT?	At this stage the planning is to release the water into the streams.	
350	Nico van den Berg Water and Sanitation Planning	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Will ERWAT human settlements be affected as the AMD water decants?	This will need to be determined by the EIA, it is hoped that the project will be implemented before decant in the Eastern Basin starts. .	
351	Anthony Kesten DEMS: Disaster Management	03/04/2012 Meeting with Ekurhuleni Municipal	What will happen if the treatment plants stop operating?	Each of the plants is designed with sufficient flexibility and redundancy to allow for emergency situations and periodic maintenance.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Officials			
352	Anthony Kesten DEMS: Disaster Management	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Are there contingency plans in place?	Each of the plants is designed with sufficient flexibility and redundancy to allow for emergency situations and periodic maintenance.	
353	Miemie von Malitz Human Settlement	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Is the pumping station close to the treatment plant as illustrated in the diagram in the Background Information Document?	Yes, the plant will be close to the pumping station.	
354	Miemie von Malitz Human Settlement	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Concerned that the proposed pump station is within a residential declared area.	Noted this will be investigated.	
355	Jacobus Wilken	04/04/2012 Email Registration Form	Indicated that ERWAT was involved in the development of the Bio-sure process.	Comment noted.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
356	Cllr Tania Campbell Ekurhuleni Metropolitan Municipality: Ward 31	30/03/2012 Meeting with affected Germiston ward councillors	Will the treated water be sent to Rand water and ERWAT? Indicated that ERWAT has reached its full capacity and will not be able to treat the neutralised water.	For the immediate and short term interventions the water will be discharged into the streams. For the long term solution the water may be supplied to Rand Water or ERWAT but this has not been decided.	
357	Dumisane Sibeko Environmental Impact Management City of Johannesburg Metropolitan Municipality	20/03/2012 Email and registration form	Where will the centralized Water treatment Plant be constructed and details on the receiving environment	A centralised treatment plant does not form part of the immediate and short term interventions.	
358	Jannie Rykaard Krugersdorp Game Reserve	15/03/2012One-on-one consultations	Will a backup water treatment plant be constructed?	No. Each of the plants is designed with sufficient flexibility and redundancy to allow for emergency situations and periodic maintenance.	
359	Jaco Schoeman and Henry Gouws	08/03/2012 One on one consultation	Why is the new HDS plant being built less than 1km away from an existing plant that could be refurbished? To say that it is more cost effective to build a	Reasons for this were covered in the Due Diligence Report, which included the available space for the treatment plant, the existing technology, the age	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			new plant compared to refurbishing the old HDS is insufficient. Please provide detailed engineering costing for both options in order to answer the question.	of existing infrastructure and the requirement for future treatment. The Due Diligence report can be accessed from the AMD website, www.amdshort.co.za.	
360	Dr Koos Pretorius FSE	02/03/2012Email and Attachment of notes from SEF meeting	With high rainfall there will still be spills in the immediate future since the Rand Uranium plant is not big enough	The immediate intervention, which is the upgrading of the Rand Uranium plant will allow the treatment of the decant and once the new HDS treatment works that is part of the short term intervention comes on line the two plants will operate together to draw down the basin to the ECL. This will then allow room within the basin and thereafter the Rand Uranium plant to be decommissioned. Each of the plants is designed with sufficient flexibility and redundancy to allow for emergency situations and periodic maintenance.	
361	Mariette Liefferink	31/01/2012Email	I furthermore report that, grounded upon the physical or real evidence, two	As has been explained in separate meetings with FSE the upgrading of	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			bridges and a pilot plant have been constructed at the Rand Uranium (now Gold1) water treatment plant. I have no knowledge of additional mechanical structures that have been installed. Please advise.	the Rand Uranium plant largely comprises the rehabilitation of the existing concrete structures and supply and installation of new mechanical and electrical equipment. This is manufactured off site and brought complete to the site for installation	
362	Maritte Lieferink	23/01/2012 Meeting with FSE at the CSIR	Enquired if the Grootvlei plant will be upgraded	A separate project will be undertaken for each basin. Grootvlei Water Treatment Works will not be upgraded and a new treatment works will be built the shaft at Grootvlei mine will be used for water extraction.	
363	Charl van der Merwe [ZNC Zincor]	11/01/2012 I&AP registration form	The construction of new water treatment works should take into consideration the treatment of polluted water from other sources as well	The comment is noted, however, at this stage the project is only for the short term treatment of AMD and not the treatment of other sources of pollution.	
364	Mariette Liefferink	07/01/2012	It has not been decided who will operate the water treatment and	This is correct.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	FSE	Email	pumping activities.		
365	Mariette Liefferink FSE	07/01/2012 Email	The TCTA is only mandated to: 1. Install the pumps 2. Construct water treatment plants 3. Release treated water into the river system.	This is correct	
2.34 Water Treatment					
366	Ron Adams Eastern Basin Land Owner	20/04/2012 One-on-one consultations	Indicated that treated water from ERWAT is supplied to Sappi. What use will the AMD treated water have?	At this stage the plan is to release the treated water into the streams.	
367	Cllr Tania Campbell Ekurhuleni Metropolitan Municipality: Ward 31	30/03/2012 Meeting with affected Germiston ward councillors	How will the AMD water be neutralised?	Lime and quick lime as well as aeration will be added to the AMD water, this process will raise the PH level and remove the heavy metals.	
368	Cllr. Xakambana	30/03/2012	Recommended that the neutralised	This does not form part of the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Meeting with affected Germiston ward councillors	water should be purified and re-used.	immediate and short term interventions but may form part of the long term solution.	
369	Rachael Adatia Earth Life Africa	22/02/2012 EIA Interest Group	The Gypsum and sulphates levels need to be explained in more detail it is not clear why the heavy metals will not precipitate after a certain point.	Further detail will be available in the EIA. The limit of the gypsum solubility will precipitate at 2000-2500ppm of solubility depending on the Ph level of calcium.	
370	Maryna Storie Gauteng City Regional Observatory	22/02/2012 EIA Interest Group	Requested more clarity on waste that is going to be removed from treating AMD.	Further detail will be available in the EIA. The purpose of neutralisation is to improve the pH, and to remove iron. Lime will be used to remove heavy metals.	
371	Dr. van Eeden Eco Monitor	22/02/2012 EIA Interest Group	The Rhodes Biosure process should be resurrected and expanded to treat AMD. The Rhodes process entails treating AMD with sewage	BKS has looked at various tried and tested technologies at commercial scale. The treatment of AMD requires a technology process that will run full scale and has been proven. The validity of the Rhodes Biosure process will be investigated in the long term	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				feasibility study.	
372	Cllr Samukeliswe Mdlalose, Mogale City	20/03/2012 Meeting with affected Mogale city ward councillo	What is going to be done with the neutralised water? Is it not possible that water can be used for other purposes than just releasing it back into streams? Grey water can be used for many purposes.	At this stage the treated water will be released into the streams. The long term solution will look at using the water for other purposes.	
373	Cllr Samukeliswe Mdlalose, Mogale City	20/03/2012 Meeting with affected Mogale city ward councillor	Will the minerals removed from the AMD water be reused?	At this stage there are no plans to use the minerals removed from the AMD.	
374	Cllr Peter, Mogale City	20/03/2012 Meeting with affected Mogale city ward councillo	What is going to happen to the water that is currently being pumped from the mines?	The water will be treated and released into the streams as what was happening during active mining.	
375	Piet Schutte Sterkfontein 173. Portion 8	15/03/2012One-on-one consultations	Indicated that he uses a reverse osmosis method to purify borehole water which he uses for drinking water.	Noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
376	Jannie Rykaard Krugersdorp Game Reserve	15/03/2012One-on-one consultations	Once the water has been neutralised will it be suitable for drinking?	The water will not be suitable for drinking as it will contain high levels of salts.	
377	Charl van der Merwe,	10/03/2012Eastern Basin Open Day	By removing only part of the pollution is not going to address the problem in the long run. A critical level of pollutants will be reached in the system, What then?	The short term intervention is just for the removal of heavy metals and to neutralise the water. The long-term solution will look at long term solutions such as removing all the pollutants. It is hoped that the long term solution will come on line within the next few years.	
378	Charl van der Merwe,	10/03/2012Eastern Basin Open Day	Removal of sulphates: What will happen to the brine?	The removal of sulphates is the next phase of the project and therefore the disposal of brine will be investigated in the long term solution. No brine is produced in the immediate and short term interventions. The Department of Water Affairs have appointed Aurecon to undertake the feasibility study for the long term solution.	
379	Meyer, E. H. O	10/03/2012Easte	The town of Springs is "dying" it would	Noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		rn Basin Open Day	benefit hugely if the eastern basin intervention could be expedited with much urgency. Comprehensive treatment of the pumped water should go beyond neutralization and address the issues underpinning the decision by RAMSAR to place the Blesbokspruit on the threatened Montreux list.		
380	Mr Peter Mills Cradle of Humankind	22/02/2012 EIA Interest Group Meeting	Enquired if a decision has already been taken regarding the treatment process.	A decision has been made to use the HDS treatment option. It should be taken into account that the team of experts submitted a report to DWA and it was proposed that neutralisation was the best option for the immediate and short term interventions.	
381	Prof Mike Muller	10/02/2012Email	I am concerned that there appears to be no mention of the possibility of reducing water ingress into the system as an approach to addressing the AMD challenges.	This is being addressed by a separate process with the Council for Geoscience who are closing mine shafts, directing water over outcrop areas etc. It is also extensively covered in the IMC report.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
382	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	Where will all the lime come from?	Lime will be sourced from commercial suppliers.	
383	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	Where would the suitable discharge points be located? Are there a few alternatives for each?	The discharge points are within the Blesbokspruit, Elsburgspruit and Tweelopiesspruit as these are the rivers closest to the treatment plants and have been used previously for discharge of treated AMD during active mining. The actual point of discharge is being discussed in order to balance all the different factors and arrive at the best possible solution. Some alternatives were considered as part of the Due Diligence, however from an engineering perspective, these were not feasible (long distance, high cost, existing discharge points).	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
384	Mariette Liefferink FSE	17/01/2012 Email and attached report	It begs the questions: By whom and on what basis was the HDS process selected?	For neutralisation high density sludge plants are one of the few proven technologies available. There is considerable risk in adopting an unproven technology as there is not the option of stopping the plant if it fails to operate according to theory.	
385	Dr Koos Pretorius FSE	09/01/2012 Email	Where was the technology proven?	■ Emahleni Water Reclamation Plant (First Stage) ■ Optimum Coal Water Plant ■ Brugspruit ■ Wheal Jane Mine (UK) ■ Morrison Copper/Gold Project, (B.C. Canada) ■ Kristineberg mine site, (Sweden) ■ Noranda Inc, Heath Steele Division, (Canada) ■ Mount Morgan, (Australia)	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
386	Mariette Liefferink FSE	07/01/2012 Email	After the proposed oxidation by aeration, pre-neutralisation, final neutralization and gypsum crystallization will the sulphate levels be reduced to levels fit for irrigation, domestic use, the ecology and watering of cattle and if not, what provisions have been made to mitigate, compensate and remediate the impact of the high salinity upon end water users and the ecology?	The issue of water quality and its impact on the receiving environment will investigated in the EIA.	9.6.2.1 Surface water assessment
387	Mariette Liefferink FSE	07/01/2012 Email	Neither the diffuse sources of AMD will be addressed nor the failure to enforce environmental contraventions resulting from source pollution.	The DWA directive to TCTA only deals with AMD decanting from the Western Basin and the prevention of decant and treatment of AMD in the Central and Eastern Basins. No diffuse sources of pollution will be dealt with as part of this project	
388	Leslie Stoch	06/01/2012 Email	Who decided that the CSIR process was the correct option?	The HDS process was selected after evaluation of technologies that could meet the requirement for neutralisation and metals removal.	9.6.2.10 Technology evaluation

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				The selection process is documented in a report titled “Treatment Technology Selection” BKS Report J01599/07. The report started with the limitation that the technology should be (a) demonstrated and reliable at full industrial scale and (b) must have a proven track record. Most technologies would require a neutralisation step prior to further treatment, e.g. reverse osmosis, ion exchange.	
2.35 Treatment Alternatives					
389	Dr Koos Pretorius	29/04/2012	Has any decision about the portable RO plants been reached on whether or not they will be utilised to mitigate the high salinity content of the neutralised	Portable RO plants do not form part of the immediate and short term interventions. But RO may form part of the long term solution.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			water? If so what was decided and by whom was it decided? If not , why not and by when will a decision have been reached?		
390	Ann de Jager Eastern Basin Land Owner	20/04/2012 One-on-one consultations	Is there an alternative to the proposed short term intervention?	Alternatives will be investigated as part of the EIA.	
391	Jannie Rykaard Krugersdorp Game Reserve	15/03/2012One-on-one consultations	Suggested that wetlands should be constructed to treat AMD. Wetlands can aid in the removal of metals and effectively treat AMD. Reeds and poplars serve a good function in treating AMD.	The comment is noted however wetlands and bio treatment does not form part of the immediate and short term interventions.	
392	Koos Pretorius	02/03/2012Email and Attachment of notes from SEF meeting	TCTA acknowledges that they have knowledge of portable (2 ML/day RO plants, their cost, etc. These plants is only option for immediate and short term solution if desalination is to take place. Can be added after the neutralisation plant. Directive is however specific and cannot investigate or assess this option of	Desalinisation does not from part of the immediate and short term interventions. treatment options for the long term are being investigated and these could include RO.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			adding these plants. Will generate another 3 – 5 % of brine issue is where will this be discarded.		
393	Dr Shan Holms	01/03/2012Email	It is also noted that decisions taken for “interventions” on the Central and Eastern basins and reasons therefore, require further assessment and scrutiny, to determine whether these interventions are indeed the best practicable option and will result in mitigating the current and potential negative impacts to the environment.	The interventions on all three basins are based on recommendations made in the IMC team of experts report. The assessments have already been undertaken by the IMC team and the interventions are based on the outcomes of the investigations. It should be appreciated that the Short Term intervention returns to the status quo when the mines were operational. To do nothing would also have potential negative impacts.	
394	Mark Biggers	27/02/2012Email and Registration form and comment s	Can Digby Wells explain the water treatments systems: http://www.veoliawaterst.co.z/industrial-water-treatment/mine-water-treatment-solutions/ & http://www.amdwater.com/systems_services.htm and why they are not	The Veolia system (Amdro) uses aeration for metals removal (reactor plus clarifier), followed by membranes for salt removal, followed by pH correction and stabilisation using an Alkali (typically lime). It can be expected that this system will have a	9.6.2.10 Technology evaluation

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			considered for the prevention of high salt loads into streams and rivers?	high – fully imported, expensive materials (acids only neutralised at end of process). In essence the process is metals removal and neutralisation, with membranes to remove salts. Acid Solutions website does not give details on how the technology works.	
395	Mark Biggers	27/02/2012Email and Registration form and comment s	Is the mobile truck system not better for immediate use as it is cheaper and will prevent high salt loads in water systems?	Although there is a perception that mobile treatment systems, e.g. trucks or containers, are cheaper, this is not evident from the queries that have been made by the project team. The benefit of mobile treatment is generally the speed with which they can be established.	
396	Dr. van Eeden Eco Monitor	22/02/2012 EIA Interest Group Meeting	Enquired as to why a sealable project is not being considered. Referred to the Emalahleni project where AMD is converted into potable water and is sold and brine is converted into a type of gypsum.	What happened in Witbank is a separate process and a separate type of technology is being used. It must be taken into account that this is process is for the immediate and the short term interventions. There is a	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				long term solution which is being investigated and will consider these types of technologies. It must be taken into consideration that that the technology or processes that is being implemented now it is not going to be just for the short term it will form part of the first phase of the long term solution. It is part of the EIA process to make sure that this carries through into the long term solution.	
397	Mariette Liefferink FSE	22/02/2012 EIA Interest Group Meeting	The HDS process has already been decided upon, and saying that the alternatives will be considered is wrong.	Alternatives will be looked at as part of the EIA process.	9.6.2.10 Technology evaluation
398	Mariette Liefferink FSE	22/02/2012 EIA Interest Group Meeting	Desalination is the preferred option, not neutralisation.	The Neutralisation process can be upgraded to include desalination as part of the long term solution.	
399	Dr. Pieter van Eeden Eco Monitor cc	02/02/2012 Email	What happened to the Western Utilities project? What happened to the Rose Foundation project (treating AMD with sewage; Ancor WWTW)? Why are	The Western Utilities project proposal was rejected by the Department of Water Affairs for a number of reasons. The processes used in both the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Director		these proven and ready to go projects not given financial and political support?	projects are referred to in the IMC Report. The technologies used in the Western Utilities Corporation proposal are still at pilot stage, producing 0.024 to 0.1 Mlpd whereas the treatment plants are required to produce up to 100 Mlpd. The BIOSURE technology is restricted by the availability of sewage sludge or other organic wastes used as carbon and energy sources; however, it has the advantage of providing an option for the co-disposal of sewage sludge, reducing the costs of landfilling solid waste. The immediate and short term interventions do not preclude the use of the technologies proposed by both of these treatment options Cannot be used for the short term but could potentially be considered for the long term.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
400	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	Is the HDS process the best technology to use now? What alternatives are available?	The IMC listed a set of criteria that would be needed to be met in order to achieve pre-treatment-partial treatment for neutralisation and metal removal. The high Density Sludge Plant was chosen as being a proven technology (eMalahleni AMD Treatment Plant) that met these criteria. There is considerable risk associated with using unproven technology, as if it fails to work the AMD does not stop being generated and will need to be treated.	
401	Mariette Liefferink FSE	17/01/2012 Email and attached report	The assumptions that was used for the High Density Sludge (HDS) process is defective and was reached without consultation and input from other experts and the public	The alternatives can be considered, however construction activities have commenced for the treatment works and a section 24(g) application will be made for the authorisation of listed activities triggered under the NEMA regulations. The EIA process will, however, continue and the	9.6.2.10 Technology evaluation

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				alternatives can have and will be investigated.	
402	Mariette Liefferink FSE	17/01/2012 Email and attached report	Alternatives do exist- for example ■ Alkaline, Barium, Calcium (ABC) process ■ SAVMIN process ■ Ion exchange processes ■ Reverse osmosis ■ Barium precipitation	All of these refer to the 2nd stage of treatment or combined neutralisation / desalination and were identified as such in the IMC Report.	9.6.2.10 Technology evaluation
403	Dr Koos Pretorius FSE	09/01/2012 Email	Is there still an opportunity to change the technology in this process?	The technology has been decided for the short term however, there may be an opportunity to refine what has been decided. Long term solution treatment technology has not been decided yet.	9.6.2.10 Technology evaluation
404	Dr Koos Pretorius FSE	Email 09/01/2012	The same for the basic principle of whether or not alternatives are going to be investigated.	Alternatives will be investigated.	
405	Leslie Stoch	06/01/2012	As far as AMD is concerned cheaper	The IMC report dealt with a number of	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Email	and sustainable alternatives do exist.	alternatives and assessed the costs associated with each. Neutralisation is both the most cost effective and quickest treatment method for the immediate and short term intervention.	
2.36 Pumps					
406	Mark Biggars	22/04/2012	How do you get pumping facts of 82Ml/day, 57Ml/day; 27ml/day in the basins, where are these inflow calculations taken and who done them at what ingress hot spots;	The team of experts calculated the rate of inflow and thus the required volume to maintain ECL. Please refer to the IMC report	
407	Mark Biggars	22/04/2012	Only pumps from outside South Africa is claimed to be used as pumps are not available is South Africa; a minimum of 6 (six) pumps will be needed, if 2 (two) donated by CRG are used, then 4 (four) more are needed and they need a 18 month lead time. On what date were the other 4 pumps ordered and on what date will they be in South Africa in terms of the 18 month lead time?	Phasing of the installation of the pumps has been factored into the procurement of the long lead items	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
408	Mark Biggars	22/04/2012	In the jurisdiction of Johannesburg Local Government, where are the ingress points of AMD and what are the best ways for Johannesburg Local Government to seal this Hot Spot in order to prevent the perpetual cost of pumping;	The council for geoscience is undertaking the necessary studies to reduce the ingress. This is not part of the short term intervention.	
409	Nezau Elididy	10/03/2012Eastern Basin Open Day	The H2SO4 may lead to use of stainless steel in all engineering equipment, who will pay?	There is a need for stainless steel and other non-corrosive materials due to the corrosive properties of the water. At this stage the government is paying for the infrastructure.	
410	Mr Bruce Bouwe Jachris Hose and Coupling Specalists	08/03/2012 Email Registration form	Thanks for taking my call earlier, as discussed Jachris cc is a company specializing in Victaulic piping systems and all types of hoses and couplings we have been established since 1976 and are Africa's leading company in finding solutions to the type of problems that Tans Caledon Tunnel Authority might come across in their dealings with AMD in Gauteng. The	Information forwarded to BKS.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Victaulic piping systems are the fastest way to install all pipe lines and the most reliable. Jachris would appreciate it if you could assist us in getting to the right people to speak to in this regard. A quick look at our web site should illustrate our capabilities.		
411	Biggars, Mark	03/03/2012Central Basin Open Day	I need to know who the pumps used in the project belongs to? If CRG used community SLP money to buy the pumps, does the pumps then belong to the community. Will these remain in the area to continue pumping?	The negotiations with CRG are ongoing, but the pumps will be transferred to the project, i.e. ownership of the pumps will be transferred to the operator or Department of Water Affairs. Whether CRG will get any social credits for the transfer of the pumps, will be decided by the Department of Mineral Resources.	
412	Koos Pretorius	29/02/2012Email and attachment	At the last meeting it was stated that the pumps are ready for assembly in Germany now .	TCTA said that the pumps are ready for assembly when required. The pumps were successfully tested (as stated in the CRG media release	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Please look at the attached document. It does not seem to tie up with what was stated. Why are they not in SA? I think a honest explanation is needed.	which you forwarded) and that they have been dismantled and stored at Ritz Pumps in Germany. It is clearly stated that TCTA are negotiating with CRG to take over the pumps and are currently in the process of concluding an Agreement in this regard. The pumps are only needed in September 2012, by which time the pipe stacks will be ready. The attached document doesn't refute any of the statements previously made by TCTA.	
2.37 Sludge					
413	Dr Koos Pretorius	29/04/2012	Has any decision been reached about the disposal of the sludge in the Westwits pit? If so what was decided and by whom? If not, why not and by when will a decision have been	TCTA has been directed by DWA to dispose in the West Wits Pit. The impact and implications will be assessed in the EIA.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			reached?		
414	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Will the disposal of sludge form part of the EIA project?	The disposal of sludge will form part of the EIA however the proposed tailings facilities to be used have their own EMPs which might need to be amended and this does not form part of this EIA.	
415	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	For each amount of water being treated, how much sludge will be produced?	Western basin treated volume 27,000- m3/day, sludge volume 1580m3/d Will produce 1252m3/day sludge Central basin 57,000m3/day will produce 23570m3/day Eastern Basin treated volume 82,000 m3/day will produce 1059 1349 m3/day The sludge will contain approximately 10 – 15% solids.	
416	Mr Smuts Marais Water Quality	03/04/2012 Meeting with	Is it an assumption that sludge will be disposed of at the existing tailings	Yes relatively small volumes of sludge will be disposed, at the moment it is	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	(South West Area)	Ekurhuleni Municipal Officials	dams.	assumed that the sludge will be disposed of at the existing tailings dams. A comprehensive hazardous classification of sludge will be undertaken as part of the EIA and if the sludge is hazardous it will be disposed of appropriately.	
417	Charl van der Merwe,	10/03/2012Eastern Basin Open Day	What about waste management?	The proposal is that sludge will be disposed of on existing licenced Tailings Storage Facilities. If the sludge, after analysis is done proves to be hazardous alternative disposal options will be investigated	
418	Koos Pretorius	02/03/2012Email and Attachment of notes from SEF meeting	HDS will give 3 % sludge – that is 1 ML/day on the 30 Ml to be treated. TDS will still be >2500 mg/L and this will be released into system.	The sludge from the HDS plant is expected to be between 10 and 15%. Sulphates will be in the order of 2400mg/l.	
419	Mariette Leifferink FSE	01/03/2012 Email	I, on behalf of the Federation for a Sustainable Environment (FSE), respectfully request verification of the sludge disposal sites pertaining to the	This is correct. The environmental impact assessment will evaluate these options. They are also conditional on reaching agreement with the owners	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Eastern Basin and the Central Basin after the AMD has been neutralised since some of the options proposed may have long term adverse impacts Document there are two options proposed for the disposal of the sludge from the respective basins, namely: Central Basin Investigation and planning for a possible future waste sludge pipeline to the ERGO Brakpan Tailings Storage Facility (TSF) and, alternatively, to ERPM's old underground workings	of the facilities (for the short term only). These sites will be reassessed for the long term.	
420	Mariette Leifferink FSE	01/03/2012 Email	I, on behalf of the Federation for a Sustainable Environment (FSE), respectfully request verification of the sludge disposal sites pertaining to the Eastern Basin and the Central Basin after the AMD has been neutralised since some of the options proposed may have long term adverse impacts	All these options will be investigated in terms of their environmental impacts as well as costs etc. Note that although the Daggafontein TSF was investigated as part of the Due Diligence Report.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Eastern Basin Investigation and planning for the possible construction of a waste sludge pipeline to the Daggafontein or Brakpan TSF;		
421	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	WESSA believes that after the acid neutralisation process and heavy metals removal process will end up with hazardous sludge and the consultant has stated that this sludge will be disposed at an old opencast pit. As a result we would like these hazardous outputs to be discharged of at a registered hazardous waste which is properly lined to prevent seepage and contamination of the underground water.	An assessment of the sludge will be undertaken to determine if it is hazardous if it is shown to be hazardous it will be disposed of in a suitable manner. It should be noted that the treatment process does not add anything hazardous into the process, therefore the potential hazardous sludge is due to elements extracted from the mine basin and concentrated in the treatment process.	
422	Tracey Humby,	25/02/2012 Western Basin	The disposal of the sludge on the West Vaal Pits dam seems problematic. Are	Mogale Gold has done extensive studies and an EIA on deposition into	9.6.2.5 Geohydrolo-

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Open Day	we not going to re-pollute groundwater as this facility is not lined?	the West Wits Pit. The risk of polluting the ground water is low, which has been proven through on-going monitoring. The connection of the West Wits Pit into the mining void is known, therefore one of the benefits of sludge deposition is the eventual sealing of the pit, which will disconnect the pit from the mining void. This has a number of benefits, namely: 1. The ingress of water into the mining void is reduced, which in turn reduces the volume of water that need to be treated. 2. Filling of the pit also prevent water / oxygen reacting with exposed rock in the pit, which is a source of AMD. 3. Both the sludge and the gold tailings are alkaline (high pH).	gical study

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				This is an ideal environment for metals of concern, as for many metals the lowest solubility coincides with an alkaline pH. After filling the pit, the pit will be shaped and capped to prevent the infiltration of water through the tailings, which could potentially re-mobilise any chemicals of concern.	
423	Prof Terence McCarthy WITS Member of the IMC	22/02/2012 EIA Interest Group Meeting	Sludge must be disposed into a dump and should not be co-disposed in a pit.	The due diligence identified the preferred option as being co-disposal with an operating licensed tailings facility for the short term. The impact on these facilities will be investigated during the EIA	9.6.2.5 Geohydrolo-gical study
424	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	What volumes of waste lime sludge will be produced? What will the anticipated quality be? I.t.o. chemistry, salts and TDS, and radio-activity?	The sludge volumes will be approximately: Western: 1.6Ml/d Central: 3.6Ml/d Eastern: 1.4Ml/d	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				The sludge will be a mixture of ferric hydroxide and gypsum (Calcium Sulphate). The radioactivity will be investigated as part of the EIA.	
425	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	Why does the lime waste have to be wasted on a TSF or in an old open pit or old underground workings? Why can't the lime waste be used as a potential resource? Refer to the latest CSIR invention attached as a pdf.	At this stage the waste is to be disposed of on TSF in future there may be opportunities to use the lime waste for other uses.	
426	Mariette Liefferink	31/01/2012Email	The idea of disposing of sludge into the West Wits Pit confuses me thoroughly and here is why: As much I know, WWP has never been lined, which is very, very wrong. I remember the cost estimates for lining Millsite, and they were surprisingly modest. Placing dense, but permeable	The long term sealing of the WWP is to be investigated the WWP is a licesensed disposal facility under the MPRDA and the AMD sludge will be classified before it is disposed of in the WWP if the classification shows that the sludge will have no adverse impacts it will be co disposed with tailings from Mogale Gold. If the classification shows the sludge cannot	9.6.2.5 Geohydrolo-gical study

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			lining over old mine holings, over faults, joints and WAD within a pit, prevents escape of particles -in case of tailings: of almost pure silica flour, while the lining permits drainage of water into the void, and drying-off of the tailings. There shouldn't be much there in tailings, to be carried into the void in solution. Pity, Mintails isn't removing uranium though. Without lining, like in WWP however, fine stuff will be permitted to escape back into the void, unless the cap of the pit is completely impermeable. Even then, there will be substantial through-flow from the WAD on the south pit-face. So, tailings will trickle grain by grain, forming soil pipes, quasi-sinkholes and similar, until the cap collapses. It is simple: we are having something like fine sand in a pot with a hole in the bottom, and we are running water over it. You just can-not have a pile of fines on top of an empty	be disposed of in the WWP alternatives will be investigated.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			space (mine void), unless you seal really, really well. For Millsite such sealing (I hope) is still on the cards.		
427	Mariette Liefferink	31/01/2012Email	If you put sludge into WWP, it will with time all end up in the void, where these metals originally come from. When you want to deposit poison, you should choose something that works like a bathtub, not like not a sieve. I would like here to recommend that when testing the chemical reactivity of the sludge, the latter be subjected to AMD, as it is this medium, sludge from WWP will be exposed to, sooner or later. When it comes to those wonderful contents of the plant sludge, which dissolve and travel around in solution, please note that the entire South face of the WWP from the very bottom to the very top, is made of WAD, which is highly porous. Probably WAD contains pores and soil pipes, which can even transfer particles of different sizes, but	Mogale Gold has successfully sealed the northern portion of the West Wits Pit and the current operational procedure is to continue sealing the southern portion. This operational procedure was based on a number of studies undertaken by specialist tailings engineers. These pits are known ingress points for water into the Western Basin. Therefore the added benefit of sealing these pits through filling with tailings/sludge is that the water ingress will be reduced, leading to less treatment required.	9.6.2.5 Geohydrolo-gical study

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			we can be sure, water from outside, will enter this pit through its southern pit-face, chemically interact with sludge, and then exit the same way, or elsewhere. Acidity of local water, as it seeps through the soil, can be as low as 4.5, I have read somewhere, so slowly many things dissolve in it. Even if rates of dissolution for sludge are very low, accepting WWP, as a good depositional site for sludge seems unusual, due to unsealed old mine holings and WAD -unless they can still place some kinds of linings.		
428	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE	ii. A sludge-tailings co-disposal method must be developed by an accredit engineer and submitted to the DWA for approval within ninety (90) days fr date of issuance of this Directive.	This is in process. An extension has been requested and in principle agreed with DWA.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
429	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE	iii. Waste classification tests must be conducted on the sludge including appropriate studies to establish the physico-chemical properties of the sludge and its suitability for co-disposal with tailings into the WWP. These studies include, but are not limited to chemical and physical composition, potential to generate acid and / or leach heavy metals, stability, behaviour under varying conditions of hydration, resistance to natural elements and panning (crusting) tendency of the sludge-tailings compound. The chemical tests should be performed to the same standards as those performed in the licensing of the disposal of tailings to the WWP and should include, as a minimum, paste pH, acid-base accounting, synthetic acid rain leaching and toxicity characteristic leach procedure (TCLP), with all tests to be performed on the tailings, sludge and the likely tailings-sludge mixture.	The classification of sludge will be undertaken as part of the EIA and is also been done by the design team to comply with the directive.	
430	Dr Koos Pretorious FSE	30/01/2012Email In response to directives sent to FSE	iv. The TCTA must inform the DWA of current measures applied to p ingress of the sludge-tailings deposit into the underground mine void in the management/remediation of sinkholes and subsidences that m incurred during sludge-tailings co-deposition. v. The TCTA must inform the DWA of contingency measures that will be place should sludge-tailing co-deposits decant or if there is any evide groundwater pollution.	This is in process	
431	Maritte Lieferink	23/01/2012 Meeting with FSE at the CSIR	Concerned that the Department of Water Affairs granted Rand Uranium authorisations to discharge sludge into the Wits west pits however this would result in recirculation.	From a technical perspective there could be some recirculation.	9.6.2.5 Geohydrolo-gical study
432	Maritte Lieferink	23/01/2012 Meeting with FSE at the CSIR	Will sludge be discharged into the ERPM underground works.	Discharging sludge into the ERPM underground works is an option which will be investigated.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
433	Mariette Liefferink FSE	17/01/2012 Email and attached report	Brine ■ Where will this be stored for the short term option? ■ How much brine is expected during the short term option? ■ If the West Wits Pit is used – how will revolving pollution from West Wits Pit to the underground water be prevented as was stated in the Expert Report?	It is preferred that the High Density Sludge Treatment by-product be referred to as sludge to differentiate it from brine, which is typically used to define waste / by products from membrane treatment processes like reverse osmosis. The sludge volumes will be approximately: Western: 1.6Ml/d Central: 3.6Ml/d Eastern: 1.4Ml/d As you have stated yourself anything that escapes from the West Wits Pit will be revolving i.e. it will go back into the mine void from where it originally came, and will be recirculated through the plant. It will not escape into the wider underground resource Over time, the sludge and gold	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				tailings will create a very low permeability membrane that will prevent further ingress of water. The ingress will be finally sealed with a capping once the pit is filled. The capping will be shaped to direct the majority of water away from the filled pit.	
434	Dr Koos Pretorius FSE	09/01/2012 Email	What % of water is left as brine after treatment?	No brine is produced. The ferric gypsum sludge produced by the HDS plant will have approximately 80% water (20% solids) content.	
435	Dr Koos Pretorius FSE	09/01/2012 Email	Hazardousness of the sludge – will it go to a hazardous waste site or if EPRM's old underground workings is to be used what will the environmental implication be.	Part of the EIA will be to classify the waste which will be produced and appropriate disposal methods will be recommended. At this stage if the waste is not hazardous it will be disposed of on existing Tailings Storage Facilities (TSF). If the sludge proves to be unsuitable to dispose in	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				this manner other options will be investigated and implemented. The necessary licencing and associated processes will then be undertaken. These process falls outside the scope of this EIA. The development of dedicated hazardous waste sites is an option. Whatever treatment technology is applied will generate waste of some sort. The only way to avoid this is not to treat.	
436	Jan H. van den Berg Private individual	06/01/2012Email	Hazardousness of the sludge – will it go to a hazardous waste site or if EPRM's old underground workings is to be used what will the environmental implication be.	Part of the EIA will be to classify the waste which will be produced and appropriate disposal methods will be recommended. At this stage if the waste is not hazardous it will be disposed of on existing Tailings Storage Facilities (TSF). If the sludge proves to be unsuitable to dispose in this manner other options will be investigated and implemented. The	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				necessary licencing and associated processes will then be undertaken. These process falls outside the scope of this EIA.	
437	Dr Koos Pretorius FSE	Email 09/01/2012	What is the basis for the statements about opencast pits and brine disposal in the BID if this is not known now as you claim?	Part of the process of undertaking the EIA is to investigate which is going to be the most appropriate methods of disposing of sludge produced by the treatment process. Brine will not be a waste produced generated by the HDS treatment option. Brine is not mentioned anywhere in the BID.	
438	Mariette Liefferink FSE	07/01/2012 Email	The proposed neutralization of the AMD will produce large volumes of sludge. The sludge will be disposed in unlined pits with holings. It is proposed that the West Wits Pit and at a later stage, the Millsite Pit will be used. There are concerns that polluted media will translate into the West Rand Basin	The chemical constituents of the sludge still need to be established. The quantities of sludge being produced are minimal in relation to the tailings being produced by Mogale Gold (<5%). The current disposal of tailings by Mogale has been authorised by the DMR as a disposal	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			from the pit.	site. This will be investigated in further detail in the EIA.	
2.38 Tailings Storage Facilities					
439	Dumisane Sibeko Environmental Impact Management City of Johannesburg Metropolitan Municipality	20/03/2012 Email and registration form	Impacts of disposal of waste at existing mine waste disposal facility including information on the name of the facility, ownership and rehabilitation plans	This will be included in the EIA	9.6.2.5 Geohydrolo-gical study
440	Sibu, Sibusiso	10/03/2012Eastern Basin Open Day	Envisaged treatment of tailings by Mintails, wouldn't that have an impact on the project?	Mintails will not be processing the sludge only managing the disposal of the sludge. The preferred option is for co-disposal of sludge and gold tailings, due to the potential stability problem of deposition of only HDS sludge.	
441	Jaco Schoeman and Henry Gouws	08/03/2012 One on one consultation	Should DRD gold agree to the use of the Brakpan Tailings Storage site as a possible co-disposal of AMD sludge site, then technical, financial, current	This is correct and these requirements have already been recognised and are in the process of being resolved.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			and future liability discussions need to take place. An amendment to the existing EMP to include the sludge disposal will have to be submitted.		
442	Jaco Schoeman and Henry Gouws	08/03/2012 One on one consultation	There are a number of questions around the tailings facilities for instance: DRD gold would want to be indemnified of ground water issues as it is unclear what the heavy metals in the sludge will do to the groundwater or if elements put on the dams could go back into solution and precipitate into the ground water and the environment. TCTA has failed to produce any information in this regard to date.	The sludge classification process is currently underway and negotiations for the disposal of the sludge are similarly on-going.	
443	Jaco Schoeman and Henry Gouws	08/03/2012 One on one consultation	DRD gold recycles water from the tailings facilities. What will the qualities of this water be if the sludge is also disposed of on these facilities and will DRD gold still be able to use the water?	This is an on-going investigation.	
444	Koos Pretorius	02/03/2012Email and Attachment	Stopping ingress (ex from west wits pit) is not part of directive and cannot be	Stopping Ingress is not part of the scope of work for the short term	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		of notes from SEF meeting	addressed.	intervention.	
445	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	Re Western Basin, why is the lime sludge disposed of in old open cast pits? Will these pits be properly lined and impermeable to AMD drainage leaching out of the lime waste?	The existing pits are licenced under the MPRDA and are licenced for tailings disposal the additional sludge volume will be insignificant in relation to the existing tailings. They are not impermeable but the water will go back into the mine void, where the harmful elements came from in the first place, and then recirculated through the plant. The tailings and sludge will over time seal the pit, which has been successfully applied to the northern side of the pit.	
446	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	Does the ERGO Brakpan TSF and Daggafontein TSF have sufficient capacity?	Yes. The design life for the ERGO Brakpan TSF is in excess of 30 years. The Daggafontein TSF is no longer being considered, due to it not being operation and therefore not able to	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				allow co-disposal with gold tailings.	
447	Mariette Liefferink	31/01/2012Email	This way Millsite was planned to leak only water, while WWP was made to leak tailings as well. I hope they won't have a sudden sink of tailings, like they once had, but they will indeed have a slow disappearance of tailings into the void. This slowness may however speed up with time, as all obstructions on the way of tailings, down into partially -dewatered void, will with time erode and open up. It seems engineers like the principle of hourglass –the one you use for soft- boiling eggs. (Old mine holings were until recently being filled with soil, so their fills could function like hourglass and collapse again and again. Slowly but surely, through decades perhaps, we were well on our way, of delivering much of the Randfontein soil into the void -the same soil, it takes a millennium to	The comment is noted but as stated above the WWP is an existing licensed Tailing Storage Facility. Mogale Gold has successfully sealed the northern portion of the West Wits Pit and the current operational procedure is to continue sealing the southern portion. This operational procedure was based on a number of studies undertaken by specialist tailings engineers. These pits are known ingress points for water into the Western Basin. Therefore the added benefit of sealing these pits through filling with tailings/sludge is that the water ingress will be reduced, leading to less treatment required.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			form.)		
			2.39 Backfilling		
448	Jaco Schoeman and Henry Gouws	08/03/2012 One on one consultation	Putting sludge down underground workings at ERPM is not an option. Golder was appointed by WUC and Industry to investigate this option and it was rejected due to environmental concerns. ERPM has identified a significant resource within the old workings which has been isolated from the AMD and therefore believe that the DMR will not approve this as it could potentially sterilise a mineral resource.	Noted	
449	Mark Biggers	27/02/2012Email and Registration form and comment s	Ferreira Estates & Investments Company previous EIA states that they will use BACKFILLING to stabilize the area and not create tailing dams. Will this BACKFILLING have the appropriate lining, to stop contents from seeping into underground water sources?	Backfilling is one option which is being investigated in the Long Term feasibility study. It must be appreciated that the water in the mining void will be kept below the Environmental Critical Level (ECL). The selected ECL is well below the perched ground water table and therefore pollution within the mine	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				void will not pollute the perched ground water table. Furthermore the sludge from the treatment of AMD only contains potentially hazardous elements that were abstracted from the mine void (in a concentrated form).	
450	Dr. Pieter van Eeden Eco Monitor cc Director	02/02/2012Email	Why would the lime waste be disposed of inside ERPM's old underground workings? Of all the options this sounds the most stupid in the sense that the old workings cannot be sealed of (like a modern landfill site) nor capped nor inspected and properly monitored. Everything captured in the lime waste would slowly leach out again as seepage water from above percolates through the old workings. If my understanding is wrong, please correct me.	As stated in the BID this is an option and will be investigated if this option is unsuitable it will not be utilised. The conceptual idea behind this proposal is to find a portion of the underground workings where the recycling of lime sludge will not occur. If an alkaline area can be developed, then the metals and sulphates will not leach out of the sludge. The reason for this idea is that it will be the lowest cost option and possibly have far less environmental impacts than an above ground tailings facilities.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
2.40 Pipelines					
451	Elsabeth van der Merwe Environmental Policy and Planning	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Does the construction of the pipelines form part of the EIA project?	Yes, this does form part of the EIA.	
452	Mariette Leifferink FSE	01/03/2012 Email	Construction of a treated water pipeline to a suitable discharge point on the Blesbokspruit.	This will be investigated in the EIA, although the preferred option at this stage is to discharge at the current Grootvlei plant discharge point.	
2.41 Mine Voids					
453	Garfield Krige Sterkfontein Country Estates	15/03/2012One-on-one consultations	All mine voids have been digitised and he has compiled a report based on the digitised mine voids. Mr Krige will send the report to Digby Wells.	Digby Wells will follow up with Mr Krige to get the report.	
454	Sibu, Sibusiso	10/03/2012Eastern Basin Open Day	Pumping out of water from the basin wouldn't that aggravate already settled contaminated sediments?	There will be some aggravation of sediments but this will be localised and these will not go into solution as the water is already saturated.	9.6.2.5 Geohydrological study
455	Biggars, Mark	03/03/2012Centr	Why does the mining industry not fill up	As stated in the BID it will be	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		al Basin Open Day	these holes they made that are causing the production of AMD?	investigated whether the sludge can be put back into the voids. However, other studies have shown that this is not an option.	
456	Mariette Liefferink	31/01/2012Email	What I see, as topic one, is purifying treatment of the AMD, as it is pumped from the shafts: There is a small "detail" namely that the void is leaking, and that we don't yet know how much, so all AMD, we pump and treat, is only but a portion, of what nature around Randfontein receives. What runs under Tweelopies, worries me more, than what runs on surface, including, what we treat and release. I have often described the material under Tweelopies as 80m thick "sponge" made of WAD, sitting on top of Black Reef mine-workings, filled with pressurized AMD. On the volume of underground AMD flow under	This issue was previously addressed at the Cradle of Humankind meeting on 10 December 2010 when it was pointed out that the quartzite formation to the north of the Western Basin has very low permeability and the AMD comes to the surface before flowing over ground. The wad you refer to is an integral part of the Western Basin and stretches to just below the Hippo pools in the Krugersdorp Game Reserve. It is currently saturated with AMD and decants through various springs and widespread surface seepage where it comes up against the Quartzite formations to the north. With the drawdown of the Western	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Tweelopies: the great depth of unconsolidated WAD, and its porosity possibly mean that whatever we treat and release there, may be dwarfed by the quantity of AMD that escapes under our feet (not to mention all escape routes other than the Tweelopies WAD).	Basin to the environmental critical level AMD will be drained from this wad and the surface seepage will disappear. The Western Basin, therefore, does not leak in the manner that you have described	
457	Mariette Liefferink	31/01/2012Email	Water treatment, with its strictly regulated chemical composition is great, but we should pump the AMD from the Tweelopies valley -from the depth of about 80-90m, and just to the North of the last underground Black Reef workings,- as to stop the escape of AMD underground. Tweelopies is a valley, with bottom and sides of Wits quartzites, so the valley itself represents a perfect funnel, where we can control the outflow of AMD. It was stated clearly in the report of the	As pointed out above the Tweeloopeis does not act as a funnel with underground flow. The IMC did not, in any basin, identify the construction of boreholes as a measure to control water ingress. The IMC report identified the need for detailed monitoring, which would probably involve the construction of boreholes to intersect the mine void where currently there is no access.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Special Task-Team, of the Inter Ministerial Panel that we need to use boreholes around mining voids, to control water ingress, as well as to stop leakage of AMD from voids. I fully agree with the experts. If we could just add one single, lonely borehole into Tweelopies, and pump from there as well, -to start testing flows and chemistry there, from there we could talk of a permanent solution.		
458	Mariette Liefferink FSE	07/01/2012 Email	There are uncertainties regarding the underground workings, fractures, fissures and faults. Have the transmissive properties of especially the West Rand strata been properly investigated?	We are reliant on existing information from the mines and the available information was accessed as part of the due diligence.	
2.42 Service Providers					
459	Jacques de Villiers New World Sanitation and Solar	27/02/2012Email	Dear Grant/Steve, I confirm having introduced myself to	Information has be forwarded to BKS.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Solutions (Pty) Ltd		you at the recent public day for the AWD project at Randfontein Golf Club. I am the local representative of New Word Sanitation and Solar Solutions. NWSSS is the South African agent for Blue Gold water purification systems which has developed a state of the art system for water purification making use of Nano technology. Although the technology is still in its infancy, Blue Gold has been successful with a number of large water purification projects around the world, including dams and rivers, which have produced perfect results while being cost effective at the same time. We are certain that our offering will prove very effective with the AWD problem on the Witwatersrand at present, and we would like to arrange a meeting with you to do a presentation on our product		

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			to you. I look forward to hearing from you in this regard at your earliest convenience.		
460	Peter Lawrence, Lime-Chem (Pty) Ltd.	25/02/2012Western Basin Open Day	We mine limestone and introduce facilities ultra-fine limestone for treatment of AMD water.		
461	Peter Lawrence, Lime-Chem (Pty) Ltd.	25/02/2012Western Basin Open Day	We also have access to Steel Plant slag which can be used in the treatment of AMD. (Refer work done in the USA, using "Leech bed" to produce high alkalinity water, which is used for neutralisation of AMD).	Comment noted	
462	Peter Lawrence Lime-Chem (Pty) Ltd.,	25/02/2012Western Basin Open Day	Benefit: slag is cheaper than limestone, has a higher yield (due to its properties which prevent "armoring" and loss of reactivity compared to limestone). Lime-Chem (Pty) Ltd.	Comment noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
463	Diana Tshivhase,	25/02/2012Western Basin Open Day	On the short-term solution- one would wish to get information timeously on the solution so as to position one's company in terms of contributing to the solution.	Comment noted	
464	Mr Peter Laurance Lime-Chem	23/02/2012Email and registration form	Lime /Limestone supply as a solution to the environmental problem.	Comment noted	
2.43 Flooding					
465	Phil de Jager Eastern Basin Land Owner	20/04/2012 One-on –one consultations	Will a 100 year flood line be compiled?	Yes it will be compiled.	9.6.2.1 Surface water assessment
466	Mr Smuts Marais Water Quality (South West Area)	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Concerned about the increased river flows.	This will be investigated in the EIA.	9.6.2.1 Surface water assessment
467	Anthony Kesten	03/04/2012	Indicated that the Ekurhuleni	It will be determined in the EIA if there	9.6.2.1

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	DEMS: Disaster Management	Meeting with Ekurhuleni Municipal Officials	experiences a lot of floods. Concerned about the increased water flow to the rivers which will cause flooding. The consequence of flooding is people dying and relocation of people	will be increased flooding due to the release of additional water. However, it is likely that the additional water will fall within the existing flood lines.	Surface water assessment
468	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	Concerned that there will be increased base flows which may result in floods as there is a shortage of bridges.	The impact on infrastructure will need to be investigated as part of the EIA.	9.6.2.1 Surface water assessment
469	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	Pumping will be beneficial, however it will come at a cost as there will be increased base flows which might cause flooding.	Noted	
470	Paul Brits Director: Health Care Waste and Occupational Hygiene Risk	19/03/2012 Email and registration form	Health and Safety of our workers based in buildings affected by underground e.g. the Fox Str building being flooded by underground water sources allegedly from old mine shafts. Responsibility is to ensure health and	The comment is noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Management Gauteng Health Department		safety of our workers which include physical safety such as infrastructure challenges. Our building has been flooded in the past from these underground sources.		
471	Paul Hoogendyk Sterkfontein Country Estates	15/03/2012One-on-one consultations	Concerned that during pumping there will be an increased base flow which will flood the road to their properties.	An investigation of the impacts on infrastructure will need to be undertaken as part of the EIA	9.6.2.1 Surface water assessment
472	Paul Hoogendyk Sterkfontein Country Estates	15/03/2012One-on-one consultations	Suggested that the road to the Sterkfontein Country Estates must be elevated. Culverts should be constructed to prevent flooding.	Noted	
473	Garfield Krige Sterkfontein Country Estates	15/03/2012One-on-one consultations	Concerned that when it rains, the road that leads to the Sterkfontein Country Estates will be washed away if the AMD interventions are implemented.	An investigation of the impacts on infrastructure will need to be undertaken as part of the EIA.	9.6.2.1 Surface water assessment
474	Charl van der Merwe,	10/03/2012Eastern Basin Open	The Blesbokspruit is currently inundated with water, there is too much	The impacts of the additional water will be investigated in the EIA.	9.6.2.1 Surface

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Day	water with no seasoned fluctuations as is required for a wetland of this type. Another 80 mega litres a day will not benefit the system.		water assessment
475	Mr Philip De Jager	10/02/2012Email	The existing water levels are already high and to prevent flooding the discharge point will have to be agreed upon by all interested and affected parties.	The request is noted and the project team will be made aware of the concern. The causes of the existing high water levels will be investigated and will be communicated to the appropriate authorities for action.	
476	Mariette Liefferink FSE	07/01/2012 Email	The flooding and decant of the Eastern- , Western and Central Basins have been considered. There has been no consideration given to the flooding and probable decant from the Far Western Basin, the KOSH Basin and the Free State goldfields and there are no proactive plans in place.	The project only deals with the Western, Central and Eastern Basins. The far Western Basin does not form part of the scope of work for this process.	
2.44 Infrastructure					
477	Elsabeth van der Merwe	03/04/2012 Meeting with	Concerned that the reeds will cover the storm water pipes.	Reeds covering storm water pipes will need to be addressed by the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Environmental Policy and Planning	Ekurhuleni Municipal Officials		municipality.	
478	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	Who will be responsible for constructing bridges? The municipality does not have funds to construct bridges	An investigation of the impacts on infrastructure will need to be undertaken as part of the EIA.	
479	Cllr Samukeliswe Mdlalose, Mogale City	20/03/2012 Meeting with affected Mogale city ward councillo	Who will own the infrastructure that is being upgraded?	This has not been determined yet.	
480	Dumisane Sibeko Environmental Impact Management City of Johannesburg Metropolitan Municipality	20/03/2012 Email and registration form	The City of Joburg is concerned about the potential impacts of AMD on the underground and above surface bulk services infrastructure, buildings, roadways, biodiversity, urban forest and related greenbelts ecosystems.	Should the pumping of the central basin commence in time this infrastructure and ecosystems should not be impacted by AMD.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
481	Dumisane Sibeko Environmental Impact Management City of Johannesburg Metropolitan Municipality	20/03/2012 Email and registration form	Dust pollution, water pollution, impacts on infrastructure	An economic impact assessment will look at the impacts on infrastructure and water pollution. Water quality and dust pollution studies will be undertaken as part of the EIA.	9.6.2.11 Economic analysis
482	Jannie Rykaard Krugersdorp Game Reserve	15/03/2012One-on-one consultations	Indicated that the Game Reserve is owned by Mogale Local Municipality and there are limited funds to maintain the game reserve. He is concerned about the impact of the higher flows on infrastructure such as culverts under roads and bridges over the river.	An investigation of the impacts on infrastructure will need to be undertaken as part of the EIA.	9.6.2.11 Economic analysis
483	Jannie Rykaard Krugersdorp Game Reserve	15/03/2012One-on-one consultations	Concerned that the dam wall at the game reserve will collapse due to the increased base flow during pumping.	An investigation of the impacts on infrastructure will need to be undertaken as part of the EIA.	9.6.2.1 Surface water assessment
484	Garfield Krige Sterkfontein Country Estates	15/03/2012One-on-one consultations	Suggested that the road at the Sterkfontein Country Estates must be raised	An investigation of the impacts on infrastructure will need to be undertaken as part of the EIA.	9.6.2.1 Surface water

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
					assessment
485	Garfield Krige Sterkfontein Country Estates	15/03/2012One-on-one consultations	Recommended that a proper bridge and culvert system must be constructed.	An investigation of the impacts on infrastructure will need to be undertaken as part of the EIA.	9.6.2.1 Surface water assessment
486	Lea, Irene	10/03/2012 Eastern Basin Open Day	Can the Blesbokspruit and infrastructure crossing it (roads, railway) keep up with increased discharge? To what extent will it cause flooding?	This will form part of the specialist studies to be undertaken as part of the EIA. In work undertaken as part of the Welgedacht WwTW upgrade EIA, it was estimated that an increase of about 45Ml/d (due to the WwTW upgrade) would have a maximum of 40mm impact on water levels in the Blesbokspruit (at the Marivale Bird Sanctuary) – this was assuming a flow from Grootvlei of 61Ml/d. However, due to the wetland being in a flat area,	9.6.2.1 Surface water assessment

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				this would result in a maximum width increase of 4m. The depth of water and width increase would vary depending on the position of the point of interest.	
2.45 Zoning					
487	Miemie von Malitz Human Settlement	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Has Shaft City being informed of the project as they own property close to the proposed project site in the Central basin.	They have been notified.	
488	Miemie von Malitz Human Settlement	03/04/2012 Meeting with Ekurhuleni Municipal Officials	The Ekurhuleni Metropolitan Municipality is in the process of developing a residential area close to the proposed site in the Central Basin. An EIA has been undertaken for a housing development within the Central Basin.	Noted this will be taken into consideration. Digby Wells will follow up to get a copy of the EIA.	
489	Miemie von Malitz	03/04/2012 Meeting with	There are Petro SA pipelines that run along the Central Basin site. Suggested	Petro SA will be informed	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Human Settlement	Ekurhuleni Municipal Officials	that Petro SA must be informed of the project as well.		
2.46 Legal					
490	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	What are the legal implications of constructing a water treatment plant on a property that has already been liquidated?	The TCTA legal department is investigating the legal implications thereof.	
491	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Who will be liable for the treatment plants?	We understand liability to mean ownership and this will vest in TCTA /DWA dependent on funding constraints.	
492	Cecilia Rakgoale	03/04/2012 Meeting with Ekurhuleni Municipal Officials	The situation in the Western Basin should be treated as an emergency and therefore the client should apply for a Section 30.	An application for a Section 30 is undertaken by the polluter, in this case TCTA is not the polluter. All legal aspects were considered and it was recommended that the EIA process be followed and that possibly a section 24G application under NEMA	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				could be made if activities trigger the regulations before the EIA is approved.	
493	Anna Alcano SERI	22/02/2012 EIA Interest Group Meeting	Enquired if there will be a legal assessment, with regards to polluter pays principles retrospectively.	A legal assessment will form part of DWA's long term feasibility study.	
494	Mariette Liefferink FSE	07/01/2012 Email	Having mistaken and distorted the AMD situation as an emergency situation, the provision of Section 110(2) of the National Water Act (36 of 1998), namely that consultation and an environmental impact assessment do not apply "to a water work which is constructed in emergency circumstances" was inappropriately applied by the Department of Water Affairs. Is it to be assumed that this erroneous view has been corrected?	Section 110(2) does not apply to the project as the emergency action applies to the action being undertaken by the polluter in this instance TCTA is not the polluter and therefore cannot apply for a Section 110 (2). However it is likely that construction activities will commence before environmental authorisation and therefore a section 24 (G) application in terms of NEMA will be applied for.	
495	Leslie Stoch	06/01/2012 Email	Your "Legislative Requirements" makes impressive reading.	Comment noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			Could you please encourage some enthusiasm for the EIA process when other Legislative Requirements were simply ignored and which has led to the devastation we now experience. You will understand that to interact effectively is a time consuming process.		
2.47 Section 24 G Application					
496	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	It came to our attention at the stakeholder's meeting on the 22nd February that the construction of the treatment plants will start before the EIA process is completed due to the emergency of the situation. WESSA feels that this will be a mockery to the EIA procedure and it can be a doorway to more excuses of disrespecting the legislative environmental processes. What conditions will be followed by the developer if construction were to start	Construction in the western basin has started on the Immediate Intervention and therefore a section 24g application will be made should the construction activities trigger a listed activity. The EIA process will still continue even if a section 24g application is made.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			before the EIA process is finalised?		
497	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	Is the developer prepared to pay the fine under section 24G? Since it is the tax payer's money which will be financing this project, why not putting the money in a good use of fixing the problem in a right legislative way rather than cutting corners?	If the TCTA is fined the fine will be paid.	
498	Lemson Betha Environmental Co-ordinator: Northern Areas Region	29/02/2012Email	WESSA also believes that Section 24G of NEMA should be highlighted as well since the developer is considering starting construction before an EIA has been finalised.	At the time of drafting the BID the section 24g was not being contemplated.	
499	Maritte Lieferink	23/01/2012 Meeting with FSE at the CSIR	Will TCTA commence with construction without environmental authorisation.	TCTA has taken a decision to proceed with construction without environmental authorisation and then apply for a section 24 G. If TCTA wait for authorisations, the ECL will be breached and decant in the Central and Eastern Basin will occur.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
500	Sutton Chris	11/01/2012 Email	As the proposed interventions need to comply with legislative requirements will this along with the EIA affect the start date of interventions? Just basically want to know if work can commence prior to the EIA been completed?	The interventions need to be implemented as a matter of urgency. The EIA cannot delay the implementation of the interventions. Some of the activities for the upgrade of the water treatment plant in the Western Basin has commenced and a section 24 (g) application in terms of NEMA will be made for the authorisation of the listed activities which will be triggered.	
2.48 Disaster Management / Emergency Measures					
501	Anthony Kesten DEMS: Disaster Management	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Was the provincial disaster management informed as the project may be declared as a potential disaster?	This has been considered and is not deemed to be applicable.	
502	Anthony Kesten DEMS: Disaster Management	03/04/2012 Meeting with Ekurhuleni Municipal	Indicated that amendments to the existing disaster management plan are currently being made. The amended disaster management plan will be more	Noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Officials	stringent.		
503	Maritte Lieferink	23/01/2012 Meeting with FSE at the CSIR	Referred to a presentation in which it was indicated that the minister regarded the AMD as an emergency. However it cannot be an emergency as the problem started before 2002 when the decant started in the Western Basin. Requested clarity on whether the AMD is still regarded as an emergency or not.	The directive refers to the emergency works. The directive classifies the works that TCTA needs to implement as emergency works.	
504	Maritte Lieferink	23/01/2012Meeting with FSE at the CSIR	DWA has indicated that the central basin is not an emergency.	TCTA still needs to act on the directives as issued by DWA. If nothing is done it could become an emergency.	
2.49 Liabilities					
505	Matthew Havinga Eastern Basin Land Owner	20/04/2012 One-on-one consultations	Indicated that banks no longer want to fund their homes because of the potential risks posed by the water.	Such issues will be investigated as part of the long term feasibility study and does not form part of the scope of works for the short term/	
506	Matthew Havinga Eastern Basin Land	20/04/2012 One-on-one	Negative impacts should be mitigated and all the affected landowners should	Noted. Such issues will be investigated as part of the long term	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Owner	consultations	be compensated.	feasibility study and does not form part of the scope of works for the short term	
507	Phil de Jager Eastern Basin Land Owner	20/04/2012 One-on-one consultations	Concerned that the value of their properties will be decreased as the area is viewed as a waste zone.	Such issues will be investigated as part of the long term feasibility study and does not form part of the scope of works for the short term	
508	Jaco Schoeman and Henry Gouws	08/03/2012 One on one consultation	There are a number of unanswered questions around liabilities. Once understanding the impacts, will TCTA accept responsibility and liability for the infrastructure which will be used?	These treatment plants will be the responsibility of the TCTA/DWA dependent on funding constraints.	
509	Tracey Humby,	25/02/2012Western Basin Open Day	It would be good to have some clarity on whether govt intends to use s28 of NEMA or s19 of the NWA to recover some of the costs of this venture from the polluters.	Such issues will be investigated as part of the long term feasibility study and are not within the current scope.	
2.50 Transparency					
510	Pieter Delport Plot 88 Oaktree	15/03/2012One-on-one consultations	Requested that the project must be conducted in a transparent manner.	Noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
511	Elize Strydom Sterkfontein 173 Portion 6	15/03/2012One-on-one consultations	Indicated that she does not trust the Department of Water Affairs, the government or the Cradle of Human Kind.	Noted	
512	Elize Strydom Sterkfontein 173 Portion 6	15/03/2012One-on-one consultations	Indicated that she will organise people from Tarlton to mobilise against the project.	Noted	
2.51 Contracts					
513	Mark Biggars	22/04/2012 Email	When did Digby Wells sign the contract and when will the 18 months be up from the date that Digby wells signed the contract?	Digby Wells was appointed in December 2011 and the contract will continue until the EIA process is complete.	
514	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	Is Digby Wells appointed by DWA?	Digby Wells is appointed by the TCTA who in turn have been directed by DWA.	
515	Prof Terence Mc McCarthy	22/02/2012 EIA Interest Group Meeting	Recommended that DWA should have a contract with TCTA to form a consortium with DRD Gold, Grootvlei	Comment noted the TCTA are in discussions with the mines on various aspects related to the project.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			mines and Rand Uranium mines		
516	Rachael Adatia Earth life	22/02/2012 EIA Interest Group Meeting	Who is BKS	BKS has been appointed by TCTA to define the scope of work that needs to be implemented from the engineering point of view.	
517	Maritte Lieferink	23/01/2012 Meeting with FSE at the CSIR	Enquired if the appointment of contractors was an open tender process.	TCTA followed the Treasury tender guidelines.	
518	Koos Pretorius FSE	23/01/2012 Meeting with FSE at the CSIR	Asked what is a close ended process	The treasury guideline entails that procurement of state owned entities must undertake a public tender process. This process entails inviting BIDS and identifying service providers in terms of their skills.	
519	Koos Pretorius FSE	23/01/2012 Meeting with FSE at the CSIR	How many bidders were invited	About five or six bidders were invited. BKS was appointed for the immediate and short term interventions. Initially BKS worked in association with Golder and Associates. BKS was appointed to conduct a due diligence and assist TCTA with the feasibility for	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
				engineering designs and construction supervision. BKS started with the due diligence in May 2011. The due diligence that was undertaken in May by BKS is regarded as a prefeasibility study. The draft due diligence report was compiled in August 2011 and has been reviewed by the Department of Water Affairs, TCTA and the IMC group. Digby Wells Environmental was appointed as the independent environmental consultant to conduct the Environmental Impact Assessment studies for the Immediate and Short Term Interventions.	
520	Maritte Lieferink	23/01/2012Meeting with FSE at the CSIR	Enquired if the construction contractor is still open for tender.	The contractors have been identified and the tender for construction contractors is not open anymore.	
521	Mariette Liefferink	17/01/2012 Email and	I&APs must have access to any contract Public scrutiny of any contract	It is unclear as to what contracts are being referred to here. However, it	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	FSE	attached report	for the short and long term solutions must be allowed for.	should be noted that any contracts awarded by TCTA be part of a recognised and formalised commercial process and availability is subject to the commercial conditions of that contracting process.	
2.52 Western Utilities Corporation Proposal					
522	Anna Marie Water Quality & Water Sanitation	03/04/2012 Meeting with Ekurhuleni Municipal Officials	Why was the WUC project not considered?	The Western Utilities project proposal was rejected by the Department of Water Affairs for a number of reasons. TCTA is simply responding to the requirements of the directives. The processes used in both the projects are referred to in the IMC Report. The technologies used in the Western Utilities Corporation proposal are still at pilot stage, producing 0.024 to 0.1 Mlpd whereas the treatment plants are required to produce up to 100 Mlpd.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
2.53 Mines					
523	Mark Biggars	07/05/2012 Email	Has the team taken into consideration that CRG is a new company; it does not uphold its MOU with host communities, and what it says today it does not keep tomorrow, therefore in long term solutions CRG's track record has to be taken into account as to its involvement in any solution.	Noted	
524	Cllr Tania Campbell Ekurhuleni Metropolitan Municipality: Ward 31	30/03/2012 Meeting with affected Germiston ward councillors	It will be best if mining companies address communities about AMD.	This would fall outside of the scope of the EIA. The EIA is providing as much information as possible on AMD, mining companies would need to undertake their own consultation process.	
525	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	Some people were affected by inhaling acid, will the mines compensate these people?	This is an issue which will need to be taken up with the mines.	
526	Cllr. Xakambana	30/03/2012	Recommended that a survey must be	The survey would not form part of the	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		Meeting with affected Germiston ward councillors	undertaken to investigate the effects of post mining on people's health. The findings of this study must be made available	EIA for the AMD project as the issue relates to mining.	
527	Anonymous	10/03/2012Eastern Basin Open Day	What responsibilities are the mines taking?	The DWA has taken responsibility for addressing the AMD issues and apportioning responsibility in the future is subject to the outcomes of the long term solution feasibility study.	
528	Mostert, P.J.	10/03/2012Eastern Basin Open Day	In the 50/50 show about six mine houses, past and present, were mentioned. Why is a shortage of funds a problem? Must the past and present mine houses not be responsible for some of the funds.	The DWA has taken responsibility for addressing the AMD issues and apportioning responsibility in the future is subject to the outcomes of the long term solution feasibility study.	
529	Meyer, E. H. O	10/03/2012Eastern Basin Open Day	Springs has suffered hugely from the closures at Grootvlei, Zincor and cut-backs at Sappi, Mondi and Impala. There are claims that significant gold resources still exist in the eastern basin. A pumping intervention at Grootvlei shaft 3 would facilitate	It is possible that the proposed interventions could assist a possible future operator of Grootvlei with dewatering. But, that would depend on a buyer being found for the mine.	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			possible future mining activity.		
530	Jaco Schoeman and Henry Gouws	08/03/2012 One on one consultation	Recent communication from DWA to the mines are noted but the mining industry still want clarity on the industry proposals.	Noted	
531	Biggars, Mark	03/03/2012Central Basin Open Day	When the mine leaves the area will community ownership ensure sustainable development.	This is a matter to be dealt with through discussions with the mines and falls outside of this project.	
532	Mark Biggers	27/02/2012 Email and Registration form and comment s	To what extent has the partners of current underground and surface mining companies in the central basin contributed to the problem of AMD (e.g) digging open and exposing a polluting rock face?	It is difficult to determine the impact of the surface operations and this does not form part of this EIA. One positive aspect of the ongoing re-mining of old tailings dams, is that the potential AMD generated by these tailings dams will be far reduced once removed (and disposed of at a well-designed TSF).	
533	Mark Biggers	27/02/2012 Email and Registration	How much do the mining companies pay back to the public funding used?	The DWA has taken responsibility for addressing the AMD issues and apportioning responsibility in the future is subject to the outcomes of	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
		form and comment s		the long term solution feasibility study.	
534	Mark Biggers	27/02/2012Email and Registration form and comment s	Holes and Tailings thereof made by previous mine at Ferreira Estates & Investments Company benefit DRD Gold recoveries, therefore in their SLP / LED for local communities, can the Treatment be given to communities to ensure sustainable development after the mine close and leave the area as communities will stay and continue treatment of AMD Legacy?	The issue of the SLP and LED will need to be taken up with the mining houses involved and does not form part of this project.	
2.54 Risks					
535	Cllr. Xakambana	30/03/2012 Meeting with affected Germiston ward councillors	What are the risks associated with pumping?	The impacts on water quality and flow volumes as a result of pumping will be investigated in the EIA	
2.55 No objections to the project					
536	Bill Taylor Eastern	20/04/2012 One-	Has no objections regarding the short	Comment noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Basin Land Owner	on-one consultations	term intervention		
537	Albie Van Rooy. Danielsrust portion: 16,17, 18 and 21	15/03/2012One-on-one consultations	Has no objection against the proposed immediate and short term interventions to treat AMD.	Noted	
538	Piet Schutte Sterkfontein 173. Portion 8	15/03/2012One-on-one consultations	He is positive about the proposed AMD treatment interventions.	Noted	
539	Mr Carel Botes Sterfontein 173 Portion 7	15/03/2012One-on-one consultations	Positive about the project but not sure if it will be a success, as they have heard about initiatives to address the problem but nothing has come of this in the past.	The concern is noted and every effort will be made to make the project a success.	
540	I Jardin	15/03/2012One-on-one consultations	The project is a good initiative	Noted	
541	Pieter Delport Plot 88 Oaktree	15/03/2012One-on-one consultations	The project is headed by credible people such as the TCTA this assures him that the project will be a success.	Noted	
542	Reg Tarr	15/03/2012One-	He has no objections against the	Noted	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
	Sterkfontein 173 Portion 3	on-one consultations	project.		
543	Meyer, E. H. O	10/03/2012Eastern Basin Open Day	As a general comment the Blesbokspruit Trust applauds these initiatives to improve water quality in this area. Go for it! We should like to be involved and assist where we can.	Noted	
2.56 No Comments					
544	Mr Kougan Naidoo Mogale Local Municipality	07/03/2012	No comment will comment on reports	Noted reports will be made available.	
545	Andre du Plessis Environment and Conservation Association (Pty) LTD	02/03/2012Email Registration form	Once we have study the scope of works we will have comments.	Noted and registered as I&AP as requested	
546	Elize Tempelhoff	25/02/2012Western Basin Open Day	Will send comments by e-mail.	Await comments	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
547	Dr Pieter van Eeden,	25/02/2012Western Basin Open Day	Will send comments by e-mail.	Await comments	
548	White, R.P.	25/02/2012Western Basin Open Day	Council for GeoScience. Internal mine flooding. No comments made	Noted	
2.57 General					
549	Mr Fortress Khangwe Netili Council for Geoscience	21/02/2012 Email and registration form	General interest as I am working on the AMD problem with the council of Geoscience.	Comment noted and registered as requested.	
550	Mariette Liefferink	31/01/2012Email	I have received preliminary comments from experts regarding the proposed neutralisation of AMD, the proposed disposal of uraniferous slurry into the West Wits Pit, and the subsurface impacts of AMD. May I kindly request you to please respond to the concerns	The team who compiled the report, and the associated institutions are listed on page (ii) of the IMC Report	

No	I&AP	Date and media	Issue	Response	Reference to Draft Scoping Report
			raised by the said experts, subjoined hereunder, with reasonable promptitude? It will assist in ripening the judgement of the public.		

Annexure A: FSE Meeting Minutes

DIGBY WELLS
ENVIRONMENTAL

ATTENDANCE REGISTER

FOR

Trans Caledon Tunnel Authority (TCTA)
Witwatersrand Goldfields AMD

Consultation Meeting with the Federation of Sustainability Environment

CSIR Convention Centre

Monday, 23 January 2012

NAME/NAAM	ORGANISATION/ FARM & PORTION/ COMMUNITY	PHYSICAL ADDRESS/ POSTAL ADDRESS	CONTACT DETAILS
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Richard Holden	JCTA		TEL: 012 683 1207 CELL: 082 451 4796 FAX: 012 683 5107 E MAIL: rholden@jcta.co.za
Charles Wells	Digby Wells	Randburg, JHB.	TEL: CELL: 083 571 5292. FAX: E MAIL: charles@digbywells.co.
Peter Ashton	CSIR - Natural Resources & the Environment	P.O. Box 395 Pretoria 0001 South Africa	TEL: 012-8413293 CELL: N/A FAX: 012-8413594 E MAIL: pashton@csir.co.za
			TEL:

			CELL: EMAIL

NAME	ORGANISATION/ FARM & PORTION/ COMMUNITY	PHYSICAL ADDRESS	CONTACT DETAILS
Kas Pretorius	FSE	Borjol, Belfast, 1100	TEL: CELL: 083 986 4400 FAX: 0865146085 E MAIL: d.jockey@land.co.z
SIMONE Liefferink	FSE	8 Palladio, cnr Ryk & Roux, Beverley Gardens, Randburg	TEL: 011 7877965 CELL: 079 358 9083 FAX: – E MAIL: liesalief@yahoo.com
Mariette Liefferink	FSE	8 Palladio, cnr Ryk & Roux, Beverley Gardens	TEL: 011 7877965 CELL: 073 231 4893 FAX: – E MAIL: mliefferink@iburst.co.za
Nigel Russell	TCTA		TEL: CELL: FAX: E MAIL:
			TEL: CELL: FAX: E MAIL:
			TEL:

DIGBY WELLS
ENVIRONMENTAL

DRAFT MINUTES FROM THE MEETING HELD WITH FSE FOR THE: EIA FOR THE IMMEDIATE AND

SHORT TERM INTERVENTIONS REGARDING ACID MINE DRAINANGE

IN THE WESTERN, CENTRAL AND EASTERN WITWATERSRAND

BASINS

A focus group meeting was held at the CSIR in Pretoria, Gauteng Province on 23 January 2012. The objectives of the meetings were to:

- Provide information on the Acid Mine Drainage Project;
- Gather and record issues of concern, comments, suggestions or objections to the project; and
- Present a way forward for future communication.

Please find attached a copy of the draft minutes for your perusal and comment. Kindly review these minutes and submit comments to *Steve Horak* at Digby Wells Environmental (Digby Wells) by no later than 14 March 2012 should no comments be received 14 March 2012 , these minutes will be regarded as final.

Comments can be forwarded to:

Steve Horak

Tel: 011 789 9495

Fax: 011 789 9498

Email: steve@digbywells.com

Yours sincerely,

Steve Horak

Public Participation Practitioner

DRAFT MINUTES FROM THE MEETING WITH FSE FOR THE EIA FOR THE IMMEDIATE AND

SHORT TERM INTERVENTIONS REGARDING ACID MINE DRAINANGE

IN THE WESTERN, CENTRAL AND EASTERN WITWATERSRAND

BASINS

DIGBY WELLS
ENVIRONMENTAL

Date: 23 January 2012

Time: 08h00

Venue: CSIR Convention Centre

1 TABLE 1: PROJECT TEAM

Name	Designation	Telephone number
Digby Wells Environmental (Digby Wells)		
Mr Steve Horak	Public Participation Practitioner	+27 11 789 9495
Mr Charles Wells	Project Sponsor	+27 11 789 9495
Mr Grant Beringer	Project Manager	+27 11 789 9495
TCTA		
Mr Nigel Rossouw	Senior Environmentalist	+27 12 683 1239
Mr Richard Holden	Business analyst	+27 12 683 1207
BKS (PTY) LTD		
Mr Stuart Seath	Project manager	+27 12 421 3554
Ms Nicola Liversage	IRP Assistant	+27 12 421 3554
CSIR		
Dr Peter Ashton	Consultant to TCTA	+27 12 84 13293

ATTENDEES

FEDERATION FOR SUSTAINABLE ENVIRONMENT	
Dr. Koos Pretorius	+27 11 789 7965
Ms Mariette Liefferink	+27 11 789 7965
Ms Simone Liefferink	+27 11 789 7965

2 OPEN DISCUSSION FORUM

An open discussion forum was initiated with all attendees. Please refer to Table 2 for a synopsis of the issues raised at the forum and respective responses.

ISSUES RAISED DURING THE MEETING

Aspect	Name	Farm/Organisation	Issue/Comment	Responder	Response
Due Diligence	Stuart Seath (SS)	BKS	Explained that BKS was appointed by TCTA in May 2011 as the engineering design consultants. BKS compiled a due diligence report which included information on the process technology to be used, the engineering design type, extraction of water and the Environmental critical levels. The due diligence report was reviewed by the Inter Ministerial Committee (IMC) group. BKS has been looking at the design and abstraction of water from the mine void and the HDS technology. Indicated that the Western Basin immediate intervention is part of the scope of work. Engineers were appointed to upgrade the plant in order to get higher capacity out of the existing works at a reasonably low capital input. Indicated that it is expected that the immediate solution should be commissioned at the end of March 2012. The existing plant and a new plant under the short term intervention will be used reduce the Western Basin water levels		.

Aspect	Name	Farm/Organisation	Issue/Comment	Responder	Response
			to stop the decant.		
	Mariette Liefferink (ML)	FSE	Concerned that the Department of Water Affairs granted Rand Uranium authorisations to discharge sludge into the Wits west pits however this would result in recirculation.	SS	From a technical perspective there could be some recirculation.
	Koos Pretorius (KP)	FSE	TCTA is spending money to lower the ECL whilst another company (Rand Uranium) is increasing the ECL.	SS	Noted
	ML	FSE	The ingress into the Western Basin has increased.	Steve Horak (SH)	Noted
	ML		Enquired if the Grootvlei plant will be upgraded or will sludge be discharged into the ERPM underground works.	SS	Indicated that a separate project will be undertaken for each basin. Grootvlei Water Treatment Works will not be upgraded and the shaft at Grootvlei mine will be used for water extraction. Discharging sludge into the ERPM underground works is an option which will be investigated. Phase 1 which is the short term entails that water will be discharged into the Blessbokspruit and the water quality will

Aspect	Name	Farm/Organisation	Issue/Comment	Responder	Response
					have to meet with the standards set by the directive from the Department of Water Affairs.
	ML		The sulphates levels will still be high?	SS	Yes, pH levels will be dropped but the sulphates will not be removed and the water will not suitable for drinking and will contain high sulphates.
	NR		Indicated that during April (2011) TCTA was directed by the DWA to implement the immediate and short term interventions as recommended in the IMC team of experts report.		
	ML		Referred to a presentation in which it was indicated that the minister regarded the AMD as an emergency. However it cannot be an emergency as the problem started before 2002 when the decant started in the Western Basin. Requested clarity on whether the AMD is still regarded as an emergency or not.	NR	The directive refers to the emergency works. The directive classifies the works that TCTA needs to implement as emergency works.
	ML		Enquired if the appointment of contractors was an open tender process.	NR	TCTA used a recognised closed tender process where BKS was appointed as the engineering design consultants.
	KP		Asked what is a close ended process		The treasury guideline entails that

Aspect	Name	Farm/Organisation	Issue/Comment	Responder	Response
					procurement of state owned entities must undertake an open public tender process. This process entails inviting BIDS and identifying service providers in terms of their skills.
	KP		How many bidders were invited	NR	About five or six bidders were invited. BKS was appointed for the immediate and short term interventions. Initially BKS worked in association with Golder and Associates. BKS was appointed to conduct a due diligence and assist TCTA with the feasibility for engineering designs and construction supervision. BKS started with the due diligence in May 2011. The due diligence that was undertaken in May by BKS is regarded as a prefeasibility study. The draft due diligence report was compiled in August 2011 and has been reviewed by the Department of Water Affairs, TCTA and the IMC group. Digby Wells Environmental was appointed as the independent environmental consultant to conduct the Environmental Impact Assessment studies for the Immediate and Short

Aspect	Name	Farm/Organisation	Issue/Comment	Responder	Response
					Term Interventions. Indicated that TCTA is still in the process of evaluating the construction contractors tenders.
	ML		Enquired if the construction contractor is still open for tender.	RH	The contractors have been identified and the tender for construction contractors is not open anymore.
	ML		Will TCTA commence with construction without environmental authorisation.	NR	TCTA has taken a decision to proceed with construction without environmental authorisation and then apply for a section 24 G. Indicated that if they wait for authorisations, the ECL will be breached and decant in the Central and Eastern Basin will occur.
	CW		An application for a Basic Assessment (BA) for the Western Basin was undertaken in August 2011 but it was never submitted. The project team then decided after advice from environmental affairs to conduct an EIA for all three basins.		
	ML		DWA has indicated that the Central basin is not an emergency	NR	TCTA still needs to act on the directive

Aspect	Name	Farm/Organisation	Issue/Comment	Responder	Response
	ML/KP		Requested the due diligence report	NR	The due diligences report will be made available to the public. The directives can be made available to the public.
	ML		26-30 mega litres is what is required for the immediate intervention. Immediate capacity of the plant is 30mega litres and short term is 30 mega litres and 60 meg litres once the new plant has been constructed.	ST	This is correct
	KP		Indicated that he has been engaging with DWA for ten years. Enquired who were the team of experts and how did they come up with recommendations. What inputs were sourced from outside. The FSE has been ignored. Where are the financials to prove that this is the cheapest cost and apex.	NR	The team of experts was appointed by the inter-ministerial committee the recommendations made were made after carful consideration. There was no process of stakeholder engagement in drafting the Team of experts report. At this stage TCTA has only been directed to construct the treatment plants based on the team of experts report's recommendations.
	KP		Enquired about the plants to remove the salts. Brine volumes are large, there is 70%-80% of brine. 2000 sulphates what is the cost to the river and downstream	CW	At this stage the removal of salts does not form part of the immediate and short term interventions.

Aspect	Name	Farm/Organisation	Issue/Comment	Responder	Response
			water users cost. Neutralisation		
	ML		How will the project affect the Vaal river going into deficit.	RH	Aurecon is looking at the long term solution which will also address the issue of the Vaal River Going into deficit
	ML		Offered to provide the project team a number of documents	GB	Arrangements will be made to make copies of the documentation.

Annexure B: EIA Interest Group Meeting Minutes

DIGBY WELLS
ENVIRONMENTAL

ATTENDANCE REGISTER

FOR

Trans Caledon Tunnel Authority (TCTA)
Witwatersrand Gold Fields AMD EIA

Key Stakeholders Meeting

The Turbine Hall

Wednesday, 22 February 2012

NAME/NAAM	ORGANISATION	PHYSICAL ADDRESS/ POSTAL ADDRESS	CONTACT DETAILS
P.T. CHITAKA	RAND WATER	P.O. BOX 1748 GLENVISTA tchitaka@randwater.co.za	TEL: 011 682 0520 CELL: 083 563 3226 FAX: 011 682 0862 E MAIL:
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M.K Maduka	DMR: Gauteng Region	209 Smit str. Braamfontein mashudu.maduka@dmr.gov.za	TEL: 011 358 9700 CELL: 079 872 5062 FAX: 011 339 2425 E MAIL:
T.S. McCARTHY	WITS UNIVERSITY	School of Geosciences, Wits University WITS 2050	TEL: 011-717-6558 CELL: FAX: E MAIL: terence.mccarthy@wits.ac.za
V. Vermaak	Independent Consultant	P.O. Box 1375 Randpark Ridge, 2156	TEL: CELL: 072 260 8716 FAX: E MAIL: vanessa.vermaak@kndian.net
ISRAEL Mosala	Earth Life Africa	398 M/lands zones	TEL: CELL: 072-948-7671 EMAIL

NAME	ORGANISATION	PHYSICAL ADDRESS	CONTACT DETAILS
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KGAUTA MOKOENA	DMR Head Office	Trevenna Campus Corner Schoeman & Meintjies Str. PTA 0001	TEL: (012) 444 3831 CELL: 083 642 1453 FAX: 086 710 1307 E MAIL: kgauta.mokoena@dmr.gov.za
			TEL: CELL: FAX: E MAIL:
			TEL: CELL: FAX: E MAIL:
			TEL: CELL: FAX: E MAIL:
			TEL: CELL: FAX: E MAIL:

NAME/NAAM	ORGANISATION	PHYSICAL ADDRESS/ POSTAL ADDRESS	CONTACT DETAILS
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M. Lieffering	FSE	0732314895 mariette@pea.org	TEL: CELL: FAX: E MAIL:
Anna Alcaro	SERI	54 De Korte St 6th Floor Aspen House Braamfontein	TEL: CELL: FAX: E MAIL: anna@seri-sa.org
			TEL: CELL: FAX: E MAIL:
			TEL: CELL: FAX: E MAIL:
			TEL: CELL: EMAIL

NAME/NAAM	ORGANISATION	PHYSICAL ADDRESS/ POSTAL ADDRESS	CONTACT DETAILS
Maryna Stone	Gauteng City-Region Observatory (Wits-UJ-CSIR)	4th Floor, University Corner, Cnr. Jorissen/Bertha Street	TEL: 011 717 7280 CELL: 0833062804 FAX: E MAIL: maryna.stone@gcro.ac.za
Rachel Adatia	Earthlge Africa Johannesburg		TEL: CELL: FAX: E MAIL: rachel@iafrica.com
Tsietsi Letanta	African Rainbow Minerals	24 Impala Rd Chiselhurston Sandton	TEL: 011 779 1156 CELL: 0820726931 FAX: E MAIL: tsietsi.letanta@arm.co.za
Lemson Betha	WESSA	18 Blackwood Street Brynston EXT 3 Sandton	TEL: 011 462 5663 CELL: 0799026261 FAX: E MAIL: lbetha@wessanorth.org.za
FORTRESS NETILI	COUNCIL FOR GEOSCIENCE	280 PRETORIA ROAD SILVERTON PRETORIA - 0184	TEL: 012 841 1092 CELL: 072 577 2567 FAX: 086 6175 842 E MAIL: fnetili@geoscience.org.za
LESLIE STRACHAN	COUNCIL FOR GEOSCIENCE	280 PRETORIA ST. SILVERTON PRETORIA 0184 / P/BAG X112 PRETORIA 0001	TEL: 012 841 1299 CELL: 072 183 1415 EMAIL lesliesa@geoscience.org.za

NAME	ORGANISATION	PHYSICAL ADDRESS	CONTACT DETAILS
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			TEL: CELL: FAX: E MAIL:
			TEL: CELL: FAX: E MAIL:
			TEL: CELL: FAX: E MAIL:
			TEL: CELL: FAX: E MAIL:
			TEL: CELL: FAX: E MAIL:

DIGBY WELLS
ENVIRONMENTAL

DRAFT MINUTES FROM THE EIA INTEREST GROUP MEETING FOR THE: EIA FOR THE IMMEDIATE AND SHORT TERM INTERVENTIONS REGARDING ACID MINE DRAINAGE

IN THE WESTERN, CENTRAL AND EASTERN WITWATERSRAND

BASINS

An EIA Interest group meeting was held at the Turbine Hall, in Johannesburg Gauteng Province on 22 February 2012.

The objectives of the meetings were to:

- Provide information on the Acid Mine Drainage Project;
- Gather and record issues of concern, comments, suggestions or objections to the project; and
- Present a way forward for future communication

Please find attached a copy of the draft minutes for your perusal and comment. Kindly review these minutes and submit comments to *Steve Horak* at Digby Wells Environmental (Digby Wells) by no later than **14 March 2012**. Should no comments be received by **14 March 2012**, these minutes will be regarded as final.

Comments can be forwarded to:

Steve Horak

Tel: 011 789 9495

Fax: 011 789 9498

Email: steve@digbywells.com

Yours sincerely,

Steve Horak

Public Participation Practitioner

DRAFT MINUTES FROM THE EIA INTEREST GROUP MEETING, IMMEDIATE AND SHORT TERM INTERVENTIONS FOR THE TREATMENT OF AMD IN THE WESTERN, CENTRAL AND EASTERN WITWATERSRAND BASINS, GAUTENG

DIGBY WELLS
ENVIRONMENTAL

Date: 22 February 2012

Time: 14h00-16h00

Venue: The Tubine Hall, Newtown, Johannesburg

1 PURPOSE OF MEETING

The purpose of the meeting was to discuss the Environmental Impact Assessment and associated Public Participation Process for the Witwatersrand AMD project.

2 ATTENDEES

A copy of an attendance register is attached as Appendix A.

3 APOLOGIES

Dr. Paul Oberholster

4 PROJECT TEAM MEMBERS

Please refer to Table 1 for the project team members

Table 1: Project Team Members

NAME	COMPANY
Grant Beringer	Digby Wells Environmental
Marike de Klerk	Digby Wells Environmental
Steve Horak	Digby Wells Environmental
Nigel Rossouw	TCTA
Mike Howard	BKS
Stuart Seath	BKS
Nicola Liversage	BKS

5 WELCOME AND INTRODUCTIONS

Steve Horak welcomed and thanked everyone for their time in attending the meeting.

6 PURPOSE OF THE MEETING

The purpose of the meeting was to:

- Provide key stakeholders with information on the immediate and short term interventions for the AMD project.

- Allow key stakeholders the opportunity to be part of the Environmental Impact Assessment (EIA) process.
- Exchange information between the project team and the stakeholders and visa versa.
- Provide a regular forum for the EIA team to present stakeholders with detailed information and interact at key milestones during the EIA process.

7 PRESENTATION

Digby Wells Environmental presented project information regarding the Short term and immediate interventions measures for the AMD as well as the EIA and public participation process, Please refer to Appendix B for a copy of this presentation.

8 OPEN DISCUSSION FORUM

After the presentation, an open discussion session was initiated with all attendees. Please refer to Table 2 for a synopsis of the issues raised and respective responses.

DIGBY WELLS
ENVIRONMENTAL

Table 2: Issues and comments raised.

ASPECT	NAME	ORGANISATION	ISSUE	RESPONDENT	RESPONSE
Neutralisation Process	Ms Mariette Liefferink	Federation for Sustainable Environment	Read summary of the letter, with reference to "Best Practice". Indicated that condition 2 of the directive states that "the best current practice must be applied". Enquired as to how the neutralisation process can be the best practice. The neutralisation process is possibly the cheapest option but it is not an ecologically sustainable option. The water that will be discharged after neutralisation will contain 2500 milligrams (mg) per litre of	Steve Horak	TCTA's legal department is in the process of responding to the legal letter that was sent by the FSE.

			sulphates. According to the World Health Organisation, the standards for sulphates drinking water are 200mg per litre and the Department of Water Affairs' standards for sulphates for drinking water is 600 mg per litre. Reiterated that the quality of the water that will be discharged will remain toxic and unfit for any purposes. In addition, the costs will be externalised to the users. Condition 3 of the directives stipulates that TCTA must obtain all the required authorisations and comply with all environmental legislation.		
Public	Mariette	Federation for	Referred to section 9 of the	Steve Horak	TCTA's legal department is in the

Participation Process **PPP**	Liefferink	Sustainable Environment	directive which states that there should be meaningful public participation. Indicated that the public participation process is not meaningful since the decision for neutralisation has already been decided upon and the public was not allowed to participate in the decision making process. TCTA is in contravention with the conditions stipulated in the directive. Hence FSE sent a legal letter regarding possible criminal charges. Should the TCTA not implement these measures immediately, criminal sanctions may be taken.		process of responding to the legal letter that was sent by the FSE.
	Dr. van Eeden	Eco monitor	Enquired how far the PPP process will be taken in terms of geographical localities.	Nigel Rossouw	BKS was consulted to determine how far downstream water will be affected. Studies are still being undertaken and

					will feed into the PPP.
	Ms Maryna Storie	Gauteng City – Region Observatory	Enquired as to whether this process will map a spatial delineation of the affected communities.	Nigel Rossouw Grant Beringer	As part of the EIA studies the affected areas will be spatially delineated. There will be maps indicating the affected areas. All specialist studies will be incorporated into GIS and maps will be produced.
PPP	Mr Peter Mills	Cradle of Humankind	It should be -noted that nothing is living in the Tweelopiespruit. Recommended that PPP should stretch toward the Hartbeespoort Dam as there will be an increased base flow.	Steve Horak	Noted.
HD Process	Mr Peter Mills	Cradle of Humankind	Enquired if a decision has already been taken regarding the treatment process. Indicated that during the EIA,	Grant Beringer	Digby Wells will consider alternatives as part of the EIA process. Indicated that it should be taken into account that the team of experts submitted a

			provision must be made for two additional alternatives.		report to DWA and it was proposed that neutralisation was the best option for the immediate and short term interventions.
Specialist Studies	Mr Peter Mills	Cradle of Humankind	It must be taken into consideration that there will be increased river flows which will have a huge impact on the ecology, therefore, ecological specialist studies needs to be undertaken as part of the EIA. Indicated that about 60Ml of sulphates are transmitted through the Cradle which is a world heritage site. Recommended that a Heritage Impact Assessment should be undertaken.	Grant Beringer	Indicated that Hydrological, Fauna and Flora, Aquatic studies will be undertaken to address the ecological impacts. A heritage Impact Assessment will form part of the specialist studies that will be undertaken for the EIA.
EIA/EMP	Prof Terence McCarthy	WITS Member of the IMC	The primary function of this project is to control decant from the Western Basin. The immediate and short term	Nigel Rossouw	Conducting an EIA is a regulatory process and forms part of the directive. The overriding directive from the minister was to ensure that the

			interventions will return water levels in the basins to the previous acceptable levels. Indicated that the EIA/EMP is a waste of time, as it was not required when ERPM was discharging water into the Natalspruit. Enquired as to why permission should be sought to return to a condition that existed during mining. The disposal of the treated water in the Western Basin should be in the Wonderfonteinspruit which is already heavily polluted by mine dumps. Treated water should not be disposed into the Tweelopiespruit,		ECL are not exceeded in the Central and Eastern basins. TCTA has been in a difficult position to achieve the objective of the ministerial directive. Some processes must run in parallel and construction may happen before environmental authorisation has been granted and a section 24G application will be required, legislation does not make provision for emergency interventions. TCTA is committed to implementing certain mitigation measures which includes placing pre-treated and neutralised water into the Tweeloppiespruit. The EIA will provide information on how the increased base flows can be mitigated in the Tweelopiespruit and what interventions can put in place to

					ensure that the landowners are not adversely affected. Mitigation measures for pumping and releasing water will be investigated.
	Dr. van Eeden	Eco Monitor	Indicated that what constitutes an "emergency" is not exactly what is happening in the basins. Concerned that the approach undertaken by TCTA will set wrong precedence, as some projects will be categorised as an "emergency" and EIAs will be undertaken without adequate procedure	Nigel Rossouw	Emphasised that the scope of the EIA is to look at the short term intervention which is neutralisation. Referred to Page 99 of the IMC report which sets out the aspects on how to deal with and treat AMD.
	Joshua Ellis	Anglo Gold Ashanti	Recommends that TCTA to go back to government to reconsider the approach. Considers this process of making	Steve Horak	Noted

			a mockery of the regulatory process and what it entails.		
	Lemson Betha	WESSA	What is the point of doing an EIA as the project will be implemented without environmental authorisation? The outcome of the EIA must inform implementation of the project.	Nigel Rossouw	TCTA was appointed to ensure that the ECL in the Central and Eastern basins is not exceeded. In consultation with DEA, TCTA were advised to undertake an EIA. If TCTA waits for an environmental authorisation, the western basin will continue to decant, and the central and eastern basin may surpass ECL.
Waste Management	Prof Terence McCarthy	WITS Member of the IMC	Sludge must be disposed into a dump and should not be co-disposed in a pit.	Steve Horak	Noted
Water quality and quantity **wate**	Dr.van Eeden	Eco Monitor	Indicated that there will also be an increase of base flow into the in the Klipriver and the Blesbokspruit.	Steve Horak	Noted

			Indicated that he is a member of the Klipriver and Blesbokspruit Forums. Invited Digby Wells to attend Klipriver Forums and present to their committee. The dates to present to the Klipriver forum and the Blesbokspruit forum are available on the following website www.reservoir.co.za. If there are 2500 Milligrams of litres of sulphates disposed into the upper part of the Vaal catchment, it will have astronomical impacts on the agricultural industry. Requested that an agricultural study must be undertaken. Recommended that a separate agricultural study must be		One of the studies to be undertaken will be an Economical Impact Assessment which will investigate the agricultural impacts.

			undertaken.	Grant Beringer	A separate agricultural study will be considered.
	Joshua Ellis	Anglo Gold Ashanti	In terms of SABS, the water being discharged should be below allowed Uranium levels for health.	Stuart Seath	Noted.
Financials	Dr. van Eeden	Eco monitor	Is there a guarantee that the government will support this project in the long run?	Nigel Rossouw	TCTA is a parastatal therefore cannot comment on whether the government will support the project in the long run. The implementation of AMD is part of DWA planning for providing water in the Vaal system. In years to come treated AMD will be an option for clean water or phase 2 of the Lesotho Highlands project might also be an option. The unit costs for treating AMD are cheaper than other sources such as phase 2 of the Lesotho Highlands

					project.
Financials	Dr Koos Pretorius	FSE	Enquired as to what will be the costs after the sulphates have been desalinated. Suggested that the process should include the removal of sulphates.	Grant Beringer	During the EIA process the cost benefit for various technologies will be considered. When the information becomes available, it will be provided. Welcomes the input of technical expertise to consider the cost-benefit analysis.
	Rachael Adatia	Earth life	Enquired as to when the rest of the funding will be secured, as only half the capital has been secured currently.	Nigel Rossouw	In the due diligence report a cost analysis of what the infrastructure component is required for the short term solution was done. Confirmed that half of the capital was made available by the treasury. Consultations are taking place to consider how the rest will be funded as the government will not cover the excess of R900 million for the short term interventions. DWA has been instructed to look for other sources of

					funding. Options such as public-private partnerships are being considered. It is likely that TCTA may have to prioritise in terms of the basins. Indicated that a focus may shift to the central basin. TCTA will be communicating further with treasury regarding this matter.
Financials	Joshua Ellis	Anglo Ashanti	Enquired on how an EIA can be undertaken without having secured all the funding needed for the project. The current funding will not execute the scope of work required for the project. Suggested that for those basins in which funding has not be allocated for, should be taken out of the scope of work.	Steve Horak	Noted
Alternative processes	Dr. van Eeden	Eco Monitor	Enquired as to why a sealable project is not being considered. Referred to the Emalahleni	Grant Beringer	Indicated that what happened in Witbank is a separate process and a separate type of technology is being

			project where AMD is converted into potable water and is sold and brine is converted into a type of gypsum.		used. It must be taken into account that this is the immediate and the short term interventions. There is a long term solution which is being investigated and will consider these types of technologies. It must be taken into consideration that that the technology or processes that is being implemented now it is not going to be just for the short term it will form the first phase of the long term solution. It is part of the EIA process to make sure that this carries through into the long term solution.
	Rachael	Earth Life Africa	The Gypsum and sulphates levels	Stuart Seath	The limit of the gypsum solubility will

	Adatia		need to be explained in more detail it is not clear why the heavy metals will not precipitate after a certain point.		precipitate. 2000-2500 is the limit of solubility depending on the Ph level of calcium
Funding	Pakso Chitaka	Rand Water	Enquired why the tax payer's money is being used when some of the mines are still in operation.	Nigel Rossouw	It was the decision of the government and the DMR ministers to use tax payers money.
Water Discharge	Maryna Storie	Gauteng City Regional Observatory	Noted that the "preferred option" is putting the treated water into the Tweelopiespruit, enquired whether there are any alternatives considered besides the Tweelopiespruit.	Grant Beringer Nigel Rossouw	Alternatives will be considered as part of EIA. Initially it considered that pre-treated water will be disposed into the Wonderfontein however, DWA indicated that Wonderfontein is not an option to consider. TCTA will get DWA to explain the basis of their decision. The Wonderfontein has high salts,

				Stuart Seath	therefore DWA decided that Tweelopiesspruit is the best option.
	Maryna Storie	Gauteng City Regional Observatory	Does this mean that there are no other alternatives	Nigel Rossouw	Alternatives will be investigated during the EIA and will be presented to DWA. Reiterated that the Tweelopiespruit option is not a fait accompli.
Legislation	Anna Alcano	SERI	Enquired if there will be a legal assessment, with regards to polluter pays principles retrospectively.	Nigel Rossouw	A legal assessment will form part of DWA's long term feasibility study.
HDS Process	Mariette Liefferink	Federation of Sustainable Environment (FSE)	The HDS process has already been decided upon, and saying that the alternatives will be considered is wrong. Radiological assessment needs	Nigel Rossouw	Emphasised that alternatives will be looked at as part of the EIA process. Radiological studies will be considered during the EIA phase.

			to be determined and health assessments needs to be conducted. It was reported that rapid dewatering may cause geological instability; therefore studies need to be conducted on rapid dewatering. Desalination is the preferred option, not neutralisation.	Steve Horak	The Neutralisation process can be upgraded to include desalination
	James	Department of Housing	The short term measures needs to be considered in perspective. It should be taken into consideration that the short term solution will feed into the long term solution.	Steve Horak	Noted
Treatment of AMD	Maryna Storie	Gauteng City Regional Observatory	The process needs to be properly explained especially to the disadvantaged communities. Requested more clarity on waste that is going to be removed from	Steve Horak Steward Seath	Noted The purpose of neutralisation is to improve the pH, and to remove iron. Lime will be used to remove heavy

			treating AMD.		metals.
	Dr. van Eeden	Eco Monitor	The Rhodes Biosure process should be resurrected and expanded to treat AMD. The Rhodes process entails treating AMD with sewage	Grant Beringer Stuart Seath	The Rhodes Biosure process will be researched. BKS has looked at various tried and tested technologies. The treatment of AMD requires a technology process that will run full scale and has been proven. Suggested that Professor Rose should be contacted to provide information on the success of the Bio sure process.
Water Use Licence Application	Dr. van Eeden	Eco monitor	Will a Water Use Licence Application (WULA) be undertaken?	Nigel Rossouw	TCTA is in the process of applying for a WULA.
Independence of EIA Consultants	Dr. van Eeden		It should be noted that, as environmental consultancy, Digby Wells is required to remain independent. If TCTA instructs the environmental consultant to	Grant Beringer	The process will be conducted in an unbiased manner.

			conduct a study, Digby Wells is legally responsible to consider the alternatives. The rehabilitation also needs to be considered.		
General	Prof Terence Mc McCarthy		Recommended that DWA should have a contract with TCTA to form a consortium with DRD Gold, Grootvlei mines and Rand Uranium mines.	Steve Horak	Noted
	Dr Pretorius	FSE	Requested to be sent a document within seven days detailing the following: • Quality of water for each basin, • Waste that the HDS process will remove, • The treated water quality, • What the sludge will look like	Stuart Seath	Will respond within seven days as the information is contained in the due diligence report.

			• Cost implications of putting desalination of the sulphates after neutralisation to drinking water standards		
	Rachael Adatia	Earth life	Who is BKS	Nigel	BKS has been appointed by TCTA to define the scope of work that needs to be implemented from the engineering point of view.
	Dr. van Eeden	Eco Monitor	Requested that representatives from DEA, DMR and DWA should attend the EIA interest group meetings	Grant Beringer	The representatives from DEA, DMR and DWA attend an authorities forum meeting which is held every second month.

CLOSURE

The meeting was adjourned at 16H00, Steve Horak thanked everyone for attending the meeting.

ACTION ITEMS

Various action items were recorded at the meeting, refer to Table 3 for action items that were discussed.

Table 3: Action Items discussed during the meeting

ACTION	RESPONSIBLE PARTY
Send dates for presentations at the Klipriver Forum	Dr. van Eeden
Contact Prof Rose from Rhodes University to provide information on the success of the Rhodes Biosure process	BKS
Send report detailing the following: • Quality of water for each basin, • Waste that the HDS process will remove, • The treated water qualities, • What the sludge will look like, • Cost implications of putting desalination of the sulphates after neutralisation to drinking water standards.	BKS

Annexure C: Public Open Day Comments Sheets

DIGBY WELLS
ENVIRONMENTAL

ATTENDANCE REGISTER

FOR

Trans Caledon Tunnel Authority (TCTA)
Witwatersrand Gold Fields AMD-EIA

Public Open Day Meeting

Germiston Golf Club

Saturday, 03 March 2012

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DIGBY WELLS
ENVIRONMENTAL

ATTENDANCE REGISTER

FOR

Trans Caledon Tunnel Authority (TCTA)
Witwatersrand Gold Fields AMD-EIA

Public Open Day Meeting

Randfontein Golf Club

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DIGBY WELLS
ENVIRONMENTAL

ATTENDANCE REGISTER

FOR

Trans Caledon Tunnel Authority (TCTA)
Witwatersrand Gold Fields AMD-EIA

Public Open Day Meeting

Springs Country Club

Saturday, 10 March 2012

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COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

25 FEBRUARY 2012

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Do you have any comments or concerns regarding the project information given on this project?

There was a sound atmosphere for the fruitful exploration of views on local AMD.

My only concern is that so few people of civil society are interested in taking note of the critical issue that potentially threatens human livelihoods in the area.

Tempel

2012.02.25

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

25 FEBRUARY 2012

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Tel: 011 7178460

Cell: 0877771713

Do you have any comments or concerns regarding the project information given on this project?

- The disposal of the sludge on the West Vaal Pit dam seems problematic. Are we not going to repollute groundwater as this facility is not lined?
- The economic + institutional arrangements for the long-term treatment of AMD need to be transparent.
- In the short-term the biggest concern is the increased levels of sulphates in the partially treated water. The impacts of this on agricultural users downstream must be thoroughly investigated.
- It would be good to have some clarity on whether govt intends to use s28 of NEMA or s 19 of the NWA to recover some of the cost of this ~~~~ venture from the polluters.

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

25 FEBRUARY 2012

Name and surname ED HARDWICK

Organisation CWENGA

Tel:

ed@cwenga.com

Cell:

Do you have any comments or concerns regarding the project information given on this project?

SHOULD BE PUBLICISED BETTER - TOO FEW PEOPLE.

POSTERS VERY INFORMATIVE.

GOOD DISCUSSION

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

25 FEBRUARY 2012

Name and surname Elsje When start construction.

Organisation

Tel:

Cell:

Do you have any comments or concerns regarding the project information given on this project?

Nee

Mr Philiphlip.

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

25 FEBRUARY 2012

Name and surname Diana Tshivhase

Organisation Robor (Pty) Ltd

Tel: 011 971 4300

Cell: 083 273 6714

Do you have any comments or concerns regarding the project information given on this project?

On the short-term solution:- One would wish to get information timeously on the solution so as to position One's company in terms of contributing to the solution. Communication channels between stakeholders involved i.e TCTA and BKS be more flexible to organisations with interest on AMD solution

Long term solution:- Appreciate the fact that the Short-term solution will link into Long term solution. Constant Communication and information flow from TCTA ~~Republic~~/Aurecon to interested and affected parties should please be effective.

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

25 FEBRUARY 2012

Name and surname PETER LAWRENCE

Organisation LIME-CHEM (PTY) LTD

(PETER @ LIME-CHEM.CO.ZA)

Tel:

Cell: 084 520 3340

Do you have any comments or concerns regarding the project information given on this project?

(1) WE mine limestone and are introducing facilities to produce ultra-fine limestone (-70 µmm) for treatment of AMD water.

(2) We also have access to Steel Plant slag (0-8 mm) which can be used in the treatment of AMD. (Refer work done in the USA, using "Leech bed" to produce high alkanity water, which is used for neutralisation of AMD.)

Benefit i) Slag is cheaper than limestone

ii) Has a higher yield (due to its properties which prevent "armouring" and loss of reactivity compared to limestone).

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

03 MARCH 2012

Name and surname VICTOR MAZIBUKO

Organisation NCAMISO TRADING

Tel: 0

Cell: 083 765 4284

Do you have any comments or concerns regarding the project information given on this project?

THANKS FOR the opportunity afforded by the DEPARTMENT and would like to get more clarity on why the mining companies are not being allowed to fund the project themselves.

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

03 MARCH 2012

Name and surname Sipo Machemo

Organisation Private

Tel: N/A

Cell: 074 728 7008

Do you have any comments or concerns regarding the project information given on this project?

~~The box~~

① The venue was very difficult to locate

② It will be an added advantage to have all or most stakeholders present in ~~each~~ such meeting / gatherings. Open days ?.

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

03 MARCH 2012

Name and surname

Organisation

Tel:

Cell:

Do you have any comments or concerns regarding the project information given on this project?

What responsibility are the mines taking?

How much will this cost & who pays?

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

03 MARCH 2012

Name and surname ALTUS FEENSTRA.

Organisation Robot Galvanizers.

Tel: 011 876 2900

Cell: 083 678 6367.

Do you have any comments or concerns regarding the project information given on this project?

1) Discharge of Sulphates.

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

03 MARCH 2012

Name and surname MARK BIGGARS

Organisation IAP

Tel:

Cell: 082 722 8566

Do you have any comments or concerns regarding the project information given on this project?

1. NEED TO KNOW WHO THE PUMPS USED IN THE PROJECT BELONGS TOO? IF GRC USED COMMUNITY SLP MONEY TO BUY THE PUMPS, DOES THE PUMPS THEN BELONG TO THE COMMUNITY & WHEN THE MINE LEAVES THE AREA WILL COMMUNITY OWNERSHIP ENSURE SUSTAINABLE DEVELOPMENT AS THE COMMUNITY WILL REMAIN IN THE AREA TO CONTINUE PUMPING?

2. WHY DOES THE MINING INDUSTRY NOT FILL UP THESE HOLES THEY MADE THAT ARE CAUSING THE PRODUCTION OF AMD?

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

03 MARCH 2012

Name and surname: Fikile Mashinini

Organisation: Acamizo Trading cc

Tel: (011) 739 4306

Cell: 083 338 1301

Do you have any comments or concerns regarding the project information given on this project?

This could be self sustainable project if it's done correctly

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

/ 08 MARCH 2012

Name and surname Nezau

Organisation

Tel: 0117915254

Cell: 083554775

Do you have any comments or concerns regarding the project information given on this project?

* Impact of high rate draw off on soil stability?

* Is their demand for the underground water?

* Why do you call it short term intervention and how short is "short"

* the H_2SO_4 may lead to use of stainless steel in all engineering equipment & R.C. who shall pay?

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

10 MARCH 2012

Name and surname SOLOMON MAKOLA

Organisation PRIVATE

Tel:

Cell: 0732518632

Do you have any comments or concerns regarding the project information given on this project?

1) WHAT HAPPENS AFTER THE WATER IS BEING TREATED, IS IT GOING TO BE DRINKABLE OR DISCHARGED TO THE RIVER?

2) WHAT WILL BE THE PH LEVELS?

3) HOW LONG IS IT GOING TO TAKE TO BUILD THE TREATMENT PLANT. FOR EMPLOYMENT PURPOSES?

4) IS THERE SOMETHING IN PLACE FOR LOCAL PEOPLE WHO ARE QUALIFIED IN WATER TREATMENT?

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

10 MARCH 2010

Name and surname SIBUSISO DUBE

Organisation GOLD ONE International

Tel: 011 730 7709

Cell: 082 041 4865

Do you have any comments or concerns regarding the project information given on this project?

1. Envisaged treatment of tailings by mintails, would'nt that have an impact on the project.

2. Pumping out of water from the basin would that agitate already settled contaminated sediments.

3. Impact on downstream water users such as Karen Beef, the marievale bird sanctuary

4. Seismicity & sinkholes if basin is lowered

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

10 MARCH 2010

Name and surname: EWALD H O MEYER

Organisation: BLESBOKSPRUIT TRUST

Tel: 012 991 5156

Cell: 082 651 9962.

Do you have any comments or concerns regarding the project information given on this project?

1. THE BLESBOKSPRUIT IS A RAMSAR SITE. SINCE THE EARLY NINETIES THE BLESBOK SPRUIT WAS PUT ONTO THE MONTREUX RECORD AS A "THREATENED" RAMSAR SITE DUE TO WATER QUALITY ISSUES. IF THAT COULD BE ADDRESSED IN THE EASTERN BASIN INTERVENTION FULL RAMSAR STATUS COULD BE RESTORED WITH SIGNIFICANT ECO-TOURISM BENEFITS TO THE SPRINGS AREA. THE MAIN "CULPRITS" IN THE BLESBOKSPRUIT ARE SULPHATES AND ASSOCIATED SALTS. BIOLOGICAL POLLUTION IN THE RIVER IS ALSO PREVALENT (FROM SEWAGE!).

2. SPRINGS HAS SUFFERED HUGELY FROM THE CLOSURES AT GROOTVLEI, JINCOR AND CUT-BACKS AT SAPPI, MONDI AND IMPALA. THERE ARE CLAIMS THAT SIGNIFICANT GOLD RESOURCES STILL EXIST IN THE EASTERN PA

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

10 MARCH 2010

Name and surname P.J. MOSTERT.

Organisation PEOPLE FOR WILDLIFE.

Tel: 011 360-3034

Cell: 082 905 6688.

Do you have any comments or concerns regarding the project information given on this project?

IN THE 50/50 SHOW ABOUT SIX MINE HOUSES, PAST & PRESENT, WERE MENTIONED.

WHY IS A SHORTAGE OFF FUNDS A PROBLEM? MUST THE PAST & PRESENT MINE HOUSES NOT RESPONSIBLE FOR SOME OF THE FUNDS.

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

10 MARCH 2012

Name and surname Chad Mc Nerse

Organisation Exxaro Zincor

Tel: 011 812 9769

Cell: 083 415 2590

Do you have any comments or concerns regarding the project information given on this project?

1) The Blesbokspruit is currently inundated with water there is to much water with no seasonal fluctuations as is required for a wetland of this type. Another 80 megs a day will not benefit the system.

2) By removing part of the pollutant is not going to address the problem in the long run. A critical level of pollute will be reached in the system: what then?

3) Waste management?

4) Revised time scales!

5) Removal of sulphates = What will happen to the brine

6) Transport routes for lime trucks - Rail?

7) Consider the Ramsar Site and its status.

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

I 08 MARCH 2012

Name and surname RAMESH SHEODIN

Organisation DA CLLR WARD 72

Tel: ©

Cell: 0829203521

Do you have any comments or concerns regarding the project information given on this project?

VERY INFORMATIVE

COMMENT FORM

WITWATERSRAND GOLDFIELDS ACID MINE DRAINAGE EIA

1 03 MARCH 2012

Name and surname Irene Lea

Organisation iLEH

Tel: 011-363 2926

Cell: 083447 8377

Do you have any comments or concerns regarding the project information given on this project?

Good presentation & information.

1) Check elevation of Eastern Basin relative to Central Basin. I understand it is @ higher elevation than Central Basin.

2) Construction of infrastructure + treatment plant must not be delayed to ensure the ECL is managed effectively (not retro-actively)

3) Can the Blackbook pumit & infrastructure crossing it (roads, railway) keep up with increased discharge? To what extent will it cause flooding?

Annexure D: Attendance Registers – One-on-one Consultations

DIGBY WELLS
ENVIRONMENTAL

CONSULTATION REGISTER

FOR

Trans Caledon Tunnel Authority (TCTA)
Witwatersrand Gold Fields AMD-EIA

One-on-one Consultations

Friday, 20 April 2012

NAME/NAAM	ORGANISATION	PHYSICAL ADDRESS/ POSTAL ADDRESS	CONTACT DETAILS
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PHILIP DE JAGER	PRIVATE LANDOWNER	42A NEWBY ST. GROUTVILLE	TEL: 0832804536 CELL: FAX: 011 3624493 E MAIL: pdejager@webmail.co.
BILL ROSS-ADAMS.	PRIVATE RESIDENT.	PLOT 40 PORTION 1 HAASBROEK AH.	TEL: CELL: 0832831382. FAX: E MAIL: pc2@billsbest.co.za.
JUDY FUCHS	RESIDENT	40 Haasbroek Rd	TEL: CELL: 0827844357 FAX: E MAIL:
ROB + GILL TAYLOR	RESIDENT	43 NEWBY ROAD	TEL: 011 362 9516 CELL: 082 677 3617 FAX: E MAIL:
Pwd Wall	President.	30 Hugo Bus 10143 Stanvale	TEL: CELL: 084 27 16340 EMAIL

NAME	ORGANISATION	PHYSICAL ADDRESS	CONTACT DETAILS
SAM Khoza		Plot 28 Malanie Street	TEL: CELL: 083 997 4066 FAX: E MAIL:
Ria Jacobs	Privaat	Plot 28 Malan St	TEL: CELL: 0825707 185 FAX: E MAIL:
Sibongile Sithole		Plot 28 CM + Mrs Botha's Plot	TEL: CELL: 072 447 ~~388~~ 3884 FAX: E MAIL:
JOHN DUNCAN	PATCON	PLOT 16 GROOTVALY	TEL: CELL: 082-5518405 FAX: E MAIL:
THABO SIBUYI	PRIVATE	44 DYER RD STRUBENVALE SPRINGS	TEL: CELL: 0713057865 FAX: E MAIL:
Gerte Jacques Kommer	Stable Yard	Plot 11 Vleisch. Grootvaly	TEL: CELL: 0828932921 FAX: E MAIL:

NAME	ORGANISATION	PHYSICAL ADDRESS	CONTACT DETAILS
O. Klonaris	Resident.	39 Haasbroek St	TEL: 011-3622284 CELL: — FAX: — E MAIL: —
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FOR

Trans Caledon Tunnel Authority (TCTA)
Witwatersrand Gold Fields AMD Project

One-on-one Consultations

Tuesday, 03 April 2012

NAME/NAAM	ORGANISATION	PHYSICAL ADDRESS/ POSTAL ADDRESS	CONTACT DETAILS
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Miemie Von Maltitz	EMM Human Settlement	Kleinfontein Lake Office Park Benoni	TEL: 011 9947404 CELL: 0824951030 FAX: E MAIL: miemievmaltitz@ek.
Annamarie Mauriri	EMM WATER Quality WATER AND SANITATION	SPRINGS DEPOT WATER QUALITY OFFICE DIESEL ROAD BUHLEBUHLE, SPRINGS	TEL: 011 994 5736 CELL: 0824532945 FAX: E MAIL: annamarie.mauriri@eku.
Sonia Mothodini	EMM: Environmental Policy and Planning	cnr van ribeeck and potgieter street P.O Box 25 1610 Edenvale	TEL: 011.999.3395 CELL: FAX: E MAIL: Sonia.mothodini@ekurhuleni.gov.za
Elsabeth van der Merwe	EMM: Environmental Policy & Planning	"	TEL: 011 999 3013 CELL: 082 494 4167 FAX: E MAIL: elsabeth.vdmerwe@ekurhuleni.gov.za.
Vico van den Berg	EMM Water & Sanitation Planning	Kempton Park Civic Centre	TEL: (011) 999 - 3881 CELL: 082 818 9038 EMAIL Vico.vdberg@ekurhuleni.gov.za.

NAME	ORGANISATION	PHYSICAL ADDRESS	CONTACT DETAILS
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CALLIE SMIT	Water Quality Southwest	Swartkoppies Ave Alberton	TEL: 011 999 2631 CELL: 072 174 5111 FAX: E MAIL: CALLIES@ekurhuleni.gov.z
Barend Deming	Emm (Roads & Stormwater Dept)	SAAME Building	TEL: 011 999 1111 CELL: FAX: 011 874 6682 E MAIL: barend.deming@ekurhuleni.gov.za.
Ilsé Kleinhans	VGI consult Dolomite Consultant EMM	2 Mulberry Office Park Dainfern	TEL: 012 991 0890 CELL: 082 826 2680 FAX: 086 519 5639 E MAIL: ilse@vgiconsult.co.za
Lilian kwakwa	Ekurhuleni Municipality Environmental Policy & Planning Directorate	Cnr Hendrick Potgieter & Van Riebeeck Avenue Edenvale 1610	TEL: 011 999 3171 CELL: 0835898203 FAX: 0864810582 E MAIL: lilian.kwakwa@ekurhuleni.gov.
Maphuti Moabelo	Ekurhuleni Municipality Environmental Policy & Planning Directorate	Cnr Hendrick Potgieter & Van Riebeeck Avenue Edenvale 1610	TEL: 011 999 3395 CELL: 078 787 3023 FAX: E MAIL: Maphuti.Moabelo@ekurhuleni.gov.za

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NKOSI MTHO	ENV. POLICY & PLANNING	EDENVALE CCC	TEL: 011 999 2033 CELL: FAX: E MAIL: MTHOKO2157.MKOSI@EKURHULENI.GOV.ZA
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FOR

Trans Caledon Tunnel Authority (TCTA)
Witwatersrand Gold Fields AMD Project

One-on-one Consultations

Tuesday, 15 March 2012

NAME/NAAM	ORGANISATION/FARM	PHYSICAL ADDRESS/ POSTAL ADDRESS	CONTACT DETAILS
P. J. SCHUTTE	Sterkfontein 173 Port. 8.		TEL: CELL: 082 376 2488. FAX: E MAIL:
M. SCHENKER	STERKFONTEIN 173 GEOEUTE 8		TEL: CELL: 0828208095 FAX: E MAIL: mschoolts@UOSAMAIL.CO.ZA
C. Bates	Sterkfontein 173 Geelte 7		TEL: CELL: 078 456 1026 FAX: E MAIL: carel.vanvlam@gmail.com
C. Grobler	Plot 173 Sterkfontein.		TEL: CELL: 082 445 1595 FAX: E MAIL: chrisgrobler01@gmail.com
I. JARDIM	66/25 Sterkfontein		TEL: 011 662-9007/8/9 CELL: 083 294 4770 FAX: 011 662-9013 E MAIL: admin@boiletradisco.za
E. H.	Van der Westhuizen		TEL: CELL: EMAIL

NAME	ORGANISATION	PHYSICAL ADDRESS	CONTACT DETAILS
ALBIE VAN ROOY		DANIELSRUST PORTION 16/17/21	TEL: 011 660 2420 CELL: FAX: 011 9534884 E MAIL: [illegible]
PIETER DELPORT Mariana Delport.		PLOT 88 OAKTREE	TEL: 082 927 7520 CELL: 082 466 [illegible]60 FAX: E MAIL: pieterdelport@live.co[illegible]
[illegible]	KENGIESDORP COMME RESERVE	KCR	TEL: CELL: 083-268-0566 FAX: E MAIL: [illegible]
Paul Hoogendijk	Sterkfontein Country Estate	NO 134 Sterkfontein Country Estate	TEL: 011 762 5541 CELL: 082-771 4550 FAX: E MAIL: [illegible]
Elize Strydom.	Portion 6 Sterkfontein.		TEL: CELL: 0834495796 FAX: E MAIL: elize@miracle.co.[illegible]
REG TARR OAKTREE FARM	PORTION 3 FARM STERKFONTEIN	FONTEIN ST OAKTREE STERKFONTEIN	TEL: 071 6938119 CELL: 0828966597 FAX: 0865324946 E MAIL: OAKTREE@iONLINE.co.[illegible]

NAME	ORGANISATION	PHYSICAL ADDRESS	CONTACT DETAILS
Garfield Krige	African Env. Development	No 129 Malmani Rd Sterkfontein Country Estates	TEL: CELL: 0836570560 FAX: 0866705102 E MAIL: garfieldk@qed.co.
Louis TRICHARDT	PVT. STERKFONTEIN COUNTRY ESTATE	NO 136 MALMANI Rd. STERKFONTEIN Country ESTATES	TEL: 0829223581 CELL: FAX: E MAIL: LTRICHARD@VODAMAIL.CO.ZA
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			TEL: CELL: FAX: E MAIL:

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CONSULTATION REGISTER

FOR

Trans Caledon Tunnel Authority (TCTA)
Witwatersrand Gold Fields AMD Project

One-on-one Consultations

Tuesday, 20 March 2012

NAME/NAAM	ORGANISATION	PHYSICAL ADDRESS/ POSTAL ADDRESS	CONTACT DETAILS
Samukelisiwe Mdlalose	MCLM-Environment Management	P.O. Box 94 Krugersdorp	TEL: 011 951 2112 CELL: 083 763 9115 FAX: 011 660 1507 E MAIL: samum@mogalecity.gov.z
Paul Molapo	MCLM - Ward Cllr (27)	11	TEL: 011 951 2000 CELL: 083 599 4578 FAX: E MAIL: MShebelezi@gmail.co
Bikgang Sithole	MCLM - Ward Cllr (30)	11	TEL: 011 952-2485 CELL: 0838902175 FAX: E MAIL: Sithsledikgang@gmail.C
Zakhele Dlamini	Local Rand Debt	11	TEL: CELL: 071 882 4637 FAX: E MAIL: zdlamini.dpvdp
PETER TLADI	MCLM	Box 94 KRUGERSDORP	TEL: 0119512110 CELL: 0834889166/0725801216 FAX: 011 660 1507 E MAIL: petert@mogalecity.go
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FOR

Trans Caledon Tunnel Authority (TCTA)
Witwatersrand Gold Fields AMD-EIA

One-on-one Consultations

Friday, 30 March 2012

NAME/NAAM	ORGANISATION	PHYSICAL ADDRESS/ POSTAL ADDRESS	CONTACT DETAILS
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Cllr. Nomsa Sibidli	Ekurhuleni Metro. Municipality Ward Councillor: Ward 35		TEL: CELL: 084 298 9676 FAX: E MAIL: lindiwe.sibidli@ekurhuleni.gov.za
Cllr. M. Xakambana	Ekurhuleni Metropolitan Municipality Ward Councilbr: Ward 93		TEL: CELL: 078 227 3246 FAX: E MAIL: mbyiseli.x@ekurhuleni.gov.za
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Annexure E: Summary of Technology Costs

TCTA ACID MINE DRAINAGE

CONTRACT TCTA 08-041

CONSULTING SERVICES FOR TCTA AMD

SUMMARY OF TECHNOLOGY COSTS

APRIL 2012

PREPARED BY:

BKS (Pty) Ltd
PO Box 3173
PRETORIA
0001

CONTACT PERSON

Dr Gideon de Villiers
Tel No: 012 421 3500

PREPARED FOR:

TCTA
PO Box 10335
CENTURION
0046

CONTACT PERSON

Mr C Hasenjager
Tel No: 012 683 1227

IN ASSOCIATION WITH:

What is the additional cost of adding portable reverse osmosis plants to the HDS plants?

Dr Koos Pretorius raised the above question at the EIA Interest Group Meeting on 22 February 2012. To answer this question it was broken down into the following sections:

- What is the raw water quality of AMD?
- What is the Treated Water Quality using HDS neutralisation?
- What are the expected sludge quantities and qualities?
- What are the estimated capital and operating costs for the HDS plants?
- What are the potential and estimated costs of installing portable reverse osmosis plants?

1. ASSUMPTIONS

- Note that the information provided to respond to the question is a simplified summary, with some calculations done to provide order of magnitude answers.
- It is assumed that the water will be discharged in the same manner as the proposed Short Term solution, i.e. does not include treatment of the water to potable standards, due to the requirement for a distribution system and institutional arrangements, which are not currently in place.
- For demonstration purposes, the calculations are based on 500mg/l of sulphate (the potable water sulphate limit in accordance with SANS 241) discharged to the environment.
- The costs of the portable RO plants was taken as a capital cost. No option of leasing or future re-sale was investigated.
- The costs do not include land acquisition.
- The costs do not include any external costs or long term liability costs.
- It is assumed that the full cost of operating a membrane plant is taken into the operational cost, e.g. chemical, personnel, power, maintenance, etc.

2. WHAT IS THE RAW WATER QUALITY OF AMD?

Table 1 - Expected Water Quality by Basin

Water quality Parameter	Units	Western Basin (95th percentile)	Central Basin (95th percentile)	Eastern Basin (flooded condition)
TDS	mg/ℓ	7,174	7,700	5,500
Conductivity	mS/m	548	730	450

Water quality Parameter	Units	Western Basin (95th percentile)	Central Basin (95th percentile)	Eastern Basin (flooded condition)
Calcium (Ca)	mg/ℓ	461	580	550
Magnesium (Mg)	mg/ℓ	345	380	230
Sodium (Na)	mg/ℓ	139	150	325
Sulphate (SO_4)	mg/ℓ	4,556	5,200	3,275
Chloride (Cℓ)	mg/ℓ	65	260	260
pH	-	3.4-4.0	2.3 (5th percentile)	5.0
Acidity ($CaCO_3$)*	mg/ℓ	2,560	2,425	750
Iron (Fe)	mg/ℓ	933	1,000	370
Aluminium (Aℓ)	mg/ℓ	54	50	1
Manganese (Mn)	mg/ℓ	312	60	10
Uranium (U)	mg/ℓ	0.2	--	--

3. WHAT IS THE TREATED WATER QUALITY USING HDS NEUTRALISATION?

Table 2 - Target Mine Water Discharge Standards

Water Quality Variable	Units	Concentrations
pH	-	6-9
Iron	mg/ℓ	<1
Manganese	mg/ℓ	<3
Aluminium	mg/ℓ	<1
Uranium	µg/ℓ	<50
Sulphate	mg/ℓ	<2,400

4. WHAT IS THE EXPECTED SLUDGE QUANTITIES AND QUALITIES?

Table 3 – Sludge Quantities per Basin

	Western Basin	Central Basin	Eastern Basin
Treated Volume (Avg - m^3/day)	27,000	57,000	82,000
Sludge Volumes (Normal - m^3/day)	1252	2827	1059
Sludge	15% Solids	15% Solids	15% Solids
Sulphates (mg/l)	46480	56455	67737

	Western Basin	Central Basin	Eastern Basin
Iron (mg/l)	20092	20142	28565
Manganese (mg/l)	6662	1149	542
Aluminium (mg/l)	1143	988	0
Uranium (mg/l)	3	0	0

It should be noted that the HDS sludge will be blended with gold mine tailings before deposition. There is still some work being done on the blend ratios, but it is expected that the HDS sludge will make up less than 3% of the total dry solids (tailings / sludge blend).

5. WHAT ARE THE ESTIMATED CAPITAL AND OPERATING COSTS FOR THE HDS PLANTS?

Table 4 – Capital cost

Number	Description	Western Basin	Central Basin	Eastern Basin
1	AMD collection infrastructure	R41 million	R45 million	R60 million
2	AMD treatment plant	R73 million	R91 million	R108 million
3	Neutralised water discharge	R1,3 million	R1,1 million	R1,6 million
4	Sludge handling and disposal	R1,7 million	R6,2 million	R6,8 million
5	Earthworks and pipe work	R31 million	R46 million	R28 million
6	Electrical control and instrumentation	R26 million	R24 million	R31 million
7	Preliminaries and Generals (12%)	R21 million	R26 million	R28 million
	Total	**R195** million	**R239** million	**R264** million
	Total (all Basins)	**R698** million		

- *Note that the Due Diligence Report did not take any overhead costs (professional and project management fees) or allow for contingencies. Hence the total estimated cost for the project is in the order of R950million.*
- *Furthermore, it is expected that this cost will increase due to aspects like escalation and further refinement of the required scope of works during the detail design phase.*

Table 5: Annual Operating Cost

Number	Description	Western Basin	Central Basin	Eastern Basin
1	O&M on CAPEX	R3,6 million	R4,1 million	R4,6 million
2	Chemical costs	R31 million	R61 million	R60 million
3	Electricity costs	R14 million	R15 million	R16 million
	Total	R48 million	R81 million	R81 million
		R4.90/kl (27Ml/d)	**R3.89/kl (57Ml/d)**	**R2.69/kl (82Ml/d)**
	Total (all Basins)	**R210** million		

6. WHAT IS THE POTENTIAL OF INSTALLING PORTABLE REVERSE OSMOSIS PLANTS AND ITS ESTIMATED COSTS?

Potentially the neutralised AMD water could be further treated through portable RO plants. For the purposes of this review, it is assumed that this is a short term measure (supply of portable RO plants for a period of 3 to 4 years), before implementation of the Long Term solution feasibility study recommendations. Information available to the design team indicates the following:

- Portable plants are generally available in 2.5Ml/d modules;
- The recovery of these plants is generally between 70 and 80% (we have used 75% for demonstration purposes);
- The cost of each module is between R10 and R15 million per Ml (used R12.5 million for calculations);
- The O&M costs are between R6 and R10 per m^3 (used R8/m^3 for calculations), including power, maintenance and chemicals.
- We have assumed that a 500mg/l of sulphate will be acceptable for discharge into the river. This reduces the required treatment capacity, as 21% of the water requires no treatment. The RO treated water is then blended back with the small bypass stream of untreated water to produce the required treatment quality. For the purposes of this review, we have assumed that the water will be discharged to river, for the reason that potable water will require a distribution system and institutional arrangements, which are not currently in place.

Table 6 – Sludge Quantities per Basin

	Western Basin	Central Basin	Eastern Basin	Total (R)
Flow Treated (Ml/d) – 75% of maximum flow for Capital Cost	28	67	82	
Capital Cost (R)	R 346 million	R 831 million	R 1 billion	R 2,2 billion
Flow Treated (Ml/d) – 75% of average flow for Operational Cost	20.25	42.75	61.5	
Operational cost per year (R)	R 59 million	R 125 million	R 180 million	R 364 million

Due to the low recovery of these RO plants (70 to 80%), one of the biggest problems will be disposing of the large volume of brine. Due to the tailings operation and pool control, large volumes of water cannot generally be handled on a tailings facility. This would therefore require additional RO and dewatering equipment, which has not been reviewed in this summary.

It should further be noted that due to the low capacity of the portable RO unit (2.5Ml/unit), a large number of units will be required to treat the flow (about 11, 25 and 31, for the Western, Central and Eastern Basin respectively). This may not be practical in terms of operational capacity and space requirements.

Annexure F: Summary of the Sludge Discharge into the West Wits Pit

TCTA ACID MINE DRAINAGE

CONTRACT TCTA 08-041

CONSULTING SERVICES FOR TCTA AMD

SUMMARY OF SLUDGE DISCHARGE TO THE WEST WITS PIT

APRIL 2012

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1. What are the physical and chemical (toxicity/level of hazardousness and radioactivity) characteristics of the tailings (currently being deposited) and sludge to WWP?

There is currently ongoing work that is being done to characterize the blended tailings and sludge, as required by the DWA directive to Discharge sludge into the West Wits Pit.

Quantities:

Mogale Gold is depositing approximately 130,000 dry tonnes per month of gold tailings (plus some HDS sludge from the Mogale Gold Treatment Plant) into the West Wits Pit and are in advanced stage of planning to increase this to about 500,000 dry tonnes per month. This should be compared to the 7,320 dry tonnes per month of HDS plant sludge that will be disposed.

Quality:

Note that the work to date was done on tailings from operations in the Central Basin, using sludge from the existing Rand Uranium HDS plant. Characterisation work using Mogale Gold tailings is ongoing.

Work related to the hazard rating of the mine tailings and the blend of mine tailings: HDS sludge had been done using two complementary methodologies:

- Minimum Requirements (DWA, 1098)
- Draft waste classification and Management Regulations (DEA, 2010)

According to the DWA Minimum Requirements, the residues would have a HR2 rating due to elevated Mn, Cu, Ni and Zn concentrations. The results of the TCLP tests done on the mine tailings and the blend of treatment plant sludge and tailings are reflected in the table. Note that the addition of HDS treatment plant sludge does not change the hazard rating of the mine tailings.

Table 1 - Analytical results of TCLP extraction of blended waste samples (blend refers to Tailings mass: HDS Treatment plant sludge mass)

Constituent	**Blend 1 (90:10)**	**Blend 2 (95:5)**	**Blend 3 (98:2)**
Final pH	5.7	5.3	5.1
Unit	mg/l		
Aluminium	0.28	2.1	4.8
Ammonia	<0.2	<0.2	<0.2
Arsenic	0.0036	0.006	0.014
Barium	0.11	0.11	0.082
Beryllium	0.0008	0.0023	0.0024
Cadmium	0.022	0.019	0.012
Calcium	460	340	260

Constituent	**Blend 1 (90:10)**	**Blend 2 (95:5)**	**Blend 3 (98:2)**
Chloride	Unavailable		
Chromium	0.0022	0.0027	0.01
Chromium (VI)	<0.01	<0.01	<0.01
Cobalt	0.96	0.73	0.57
Copper	**0.12**	**0.16**	0.099
Fluoride	0.13	0.26	0.25
Iron	0.05	<0.05	0.11
Lead	0.002	0.0026	0.0029
Lithium	0.044	0.016	0.011
Magnesium	43	29	27
Manganese	**15**	**10**	**5.5**
Mercury	<0.0001	<0.0001	<0.0001
Nickel	**2.1**	**1.7**	**1.4**
Nitrate	<0.1	<0.1	<0.1
Potassium	11	3.8	4.4
Silicon	11	10	8.8
Sodium	1400	1400	1400
Strontium	0.13	0.095	0.087
Sulphate	430	430	610
Uranium	0.75	1.7	1.4
Vanadium	<0.001	<0.001	<0.001
Zinc	2.6	2.4	1.5
Hazard Rating	**HR2**	**HR2**	**HR2**

According to the DEA draft Waste Classification and Management Regulations, the risk profiles of the blend of mine tailings and treatment plant sludge are Type 3 (Low risk). The risk profile is reflected based on the water extractable fraction of a range of constituents of concern

Table2 – Constituents of concern concentration in the water extract (1:20 extract) from the tailings material.

Constituent	**Blend 1 (90:10)**	**Blend 2 (95:5)**	**Blend 3 (98:2)**
Final pH	8.2	8.3	8.4
Unit	mg/l		
Aluminium	0.23	0.31	0.43
Arsenic	0.0031	0.0047	**0.011**
Barium	0.067	0.062	0.058
Beryllium	<0.0001	<0.0001	<0.0001

Constituent	Blend 1 (90:10)	Blend 2 (95:5)	Blend 3 (98:2)
Cadmium	0.00012	0.00011	<0.0001
Calcium	160	140	200
Chloride	0.95	0.77	1
Chromium	0.0025	0.0032	0.0033
Cr (VI)	<0.01	<0.01	<0.01
Cobalt	0.081	0.074	0.12
Copper	<0.02	<0.02	<0.02
Fluoride	2.7	2.3	<0.05
Iron	<0.05	<0.05	<0.05
Lead	<0.0005	<0.0005	0.0014
Lithium	0.012	0.0055	<0.005
Magnesium	18	12	11
Manganese	0.2	0.11	0.059
Mercury	<0.0001	<0.0001	<0.0001
Nickel	0.014	0.011	0.013
Nitrate	<0.1	<0.1	<0.1
Potassium	1.1	0.91	1.4
Silicon	<1	<1	<1
Sodium	6.7	4.9	6
Strontium	0.075	0.066	0.073
Sulphate	**260**	**240**	58
Uranium	0.015	0.0087	0.0099
Vanadium	<0.001	<0.001	<0.001
Zinc	<0.01	<0.01	<0.01
WCMR Risk Profile	**Type 3 (Low Risk)**	**Type 3 (Low Risk)**	**Type 3 (Low Risk)**

Note again that the addition of a small amount of HDS sludge to the mine tailings does not change the risk profile of the mine tailings.

Similar work undertaken by Mogale Gold on their mine tailings indicates that the risk quotients (environmental concentration of chemical / DWA guideline concentration) for no samples exceed one on a batch basis, but do exceed one for Fe, Mn, Zn and U for some or all of the samples tested on the availability leach basis.

There is currently no data available on the radiological properties of the Treatment Plant sludge or blends with the mine tailings. This work is being done as part of this project.

It should be kept in mind that the HDS sludge contains constituents that are extracted from the Western Basin acid mine drainage. The sludge produced by the AMD treatment process, however is a concentrated form of these same constituents.

2. What is the permeability of the bottom of the WWP?

The northern portion of the West Wits Pit has been successfully sealed off from the Western Basin. The tailings deposits onto the northern portion are therefore no longer in contact with the AMD contained in the mine voids. The southern portion, however, is still connected to the mining void below, through past holings. These holings could not be identified before the filling of the Pit started, as the base of the Pit has been covered with water for many years. During open cast mining operation of the WWP, it is expected that these holings were most probably filled with waste rock, as it is unlikely that completely open adits and/or stopes would have been left exposed (which would have been a health and safety hazard as regulated under the Mine Health and Safety Act). Even though the WWP is connected to the mining void, there is a hydraulic gradient between the Pit water level and the water level at the decant points, i.e. the water level is lower in the Pit. This hydraulic gradient is created by a resistance to flow caused by some restriction, which is assumed to be caused by the imperfectly sealed holings.

3. Is the bottom of the WWP sealed and if not, is there a link to the basin or mine void?

Currently the southern portion of the Pit is not sealed, but will 'self-seal' through the ongoing deposition of mine tailings. One of the benefits of disposing the tailings / sludge blend into the West Wits Pit is the fact that the low permeability tailings will over time, through additional deposition, form a seal. This will effectively isolate the WWP from water contained in the mine void. This method of sealing has already been demonstrated to be effective in the northern portion of the WWP

Since the WWP is a significant contributor of water ingress into the underground voids and because surface runoff infiltrates through mine waste (tailings, waste rock and exposed geology), filling the Pit will reduce water recharge into the mine void. Once the pit is filled, the surface will be shaped and capped to form a free draining surface (as opposed to infiltration), which would reduce ingress and therefore the amount of AMD generated in the Western Basin mine voids. .

It should be noted that during the filling of the northern portion of the WWP, there were two sinkholes formed due to the collapse of an old rock filled adits/stopes below the Pit. These were successfully sealed using a dump rock plug and selected filter material.

4. Is there a likelihood of pollution from the WWP to the adjacent groundwater aquifer and if so, what is its significance?

Based on the available information, the risk of the mine tailings or sludge co-disposed with mine tailings causing groundwater pollution is low. This has been proved through the 6 monitoring boreholes located around the Pit. Minor pollution, that can be attributable to the WWP, has been identified in one of these boreholes.

Two further aspects will assist in limiting any pollution migrating from the Pit to the surrounding groundwater:

- Capping of the tailings contained in the WWP and free draining the surface water after the Pit has been filled; and
- The alkaline nature of the tailings/sludge, which will prevent the metals or chemicals of concern from leaching out of the Pit.

One aspect that has been studied by Mogale Gold, was the potential for WWP mine tailings to be discharged through a decant point from the Western Basin mine voids. . Work was done on the underground mine plans, in terms of shafts and tunnels. It was concluded that the decant flow (velocity required for suspension) required at the decant point would need to be almost 10 to 20 times higher than currently experienced, to mobilize the WWP tailings and cause decant into the surface water courses.

The best preventative measure will be to lower the mine void water level to the Environmental Critical Level (ECL). This will allow any tailings that enters the mine void (during filling of the Pit) to form an alkaline area, with low risk of mobilization. After forming of a seal in the WWP, it is unlikely that significant amount of deposited tailings will enter the mining void.

5. Will capping of the WWP effectively seal it from water ingress?

Once the pit is filled, the surface will be shaped and capped to encourage surface run-off (instead of infiltration), which would reduce ingress and therefore the amount of AMD to be treated.

Capping, using material with a low permeability (high resistance to water flow, e.g. clay) would effectively seal the tailings from water ingress. Water is a requirement to mobilize chemicals and transfer them.). Once the tailings body has been capped and water ingress minimized, the potential for pollutant mobilization of also minimized.

Since the WWP is a significant contributor of surface water into the underground voids and because rain water leaches through oxidized waste (tailings, waste rock and exposed geology), filling the Pit will reduce ingress of water into the mine void or groundwater.

6. Once co-disposed, will the metals, iron and uranium in the sludge remain stable? In other words, under what conditions will the key chemicals in the sludge (i.e. Fe, Mn, Mg and U) become soluble and mobilize? What are the implications for management of the WWP (i.e. keeping water at alkali conditions)?

The gold tailings and HDS sludge have a high pH due to the use of alkaline chemical, like Lime. Generally at near neutral pH levels, the solubility of metals is at its lowest point. Maintaining an alkaline environment within the sludge is therefore very important requirement to keeping the metals/chemicals of concern retained in the tailings. It is also therefore important that the capping of

the tailings prevents the ingress of future low pH water (such as rainfall), which could mobilize the metals.

Appendix M: Risk Assessment Summary

Ranked Risks for the AMD project

No	Potential unwanted event	Cons	Prob	Risk
1	Insufficient information to defend the proposed short term solution (availability, quality and access)	5P	4	24
2	The EIA process shows that the short term solution is not the best option to treat the water pollution problem	4E & P	5	23
3	Failure to fully fund the short term solution	4E	5	23
4	Failure of mines to allow the disposal of treatment waste on their facilities	4L	4	21
5	Radiation Pathways	4E & P	4	21
6	Water shortage in the upper Vaal catchment	4E & P	4	21
7	Failure to adequately defend this work in the public domain	4P	4	21
8	Failure to do Economic Analysis	3P	5	20
9	Incorrect or inconsistent messages cause social opposition: 1. Public Knowledge (educate the public) 2. Information provided through trusted sources (media and government)	3P	5	20
10	Doing the EIA "do nothing" assessment shows it is better to do nothing than to partly treat	5L	2	19
11	Effects on heritage sites (Cradle)	5P	2	19
12	EIA is successfully appealed by the public as the process or content is flawed	4L	3	18
13	Community Health Impact	3E	4	17

No	Potential unwanted event	Cons	Prob	Risk
14	EIA Process fails to ID consequential issues on changes in the hydrology, quality, health and ecology	4E	2	14
15	Irrigation Impacts	4E	2	14
16	Downstream Ecology (Western, Eastern and Central Basins)	3E	3	13
17	Social Impact	2P	4	12
18	Downstream users costs (treatment, deterioration, pumps and pipes)	2P	4	12
19	The DEA rejects the EIA for the Project	4E	1	10
20	Wetland Functioning	3E & P	2	9
21	Failure to convince the public of difference between Western, Eastern and Central Basins	2P	3	8
22	Increased base flow and change in the hydrology systems	3E	1	6
23	Trans-boundary Legal Issues	2P	1	3

Appendix N: Impact Map – Operational Phase

AMD - IMPACT MAP - OPERATIONS