INTEGRATED WATER AND WASTE MANAGEMENT PLAN

UPDATE OF THE EXISTING IWWMP AND APPLICATION FOR A WATER USE LICENSE FOR THE PROPOSED UNDERTAKING OF WATER USES IN TERMS OF SECTION 21(C) AND (I) OF THE NATIONAL WATER ACT 36 OF 1998 ON PORTION 5 OF THE FARM ZAND PLAATS 102, THE REMAINDER OF THE FARM KLIPFONTEIN 99, VOGELSTRUISPAN 101, VOGELSTRUISPAN 98 AND BERGPLAATS 100, KIMBERLEY DISTRICT, NORTHERN CAPE

License Number: 10/C92B/AG/4017

File: 27/2/2/C1092/1/1

November 2018

ROOIPOORT

DEVELOPMENTS

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ROOIPOORT
DEVELOPMENTS

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Site Information:

Farm / Erf Name	: Portion 5 of the farm Zand Plaats 102, Farm Bergplaats 100, Portion of Farm Vogelstruis Pan 98, Portion of Farm Vogelstruis Pan 101, Farm Klipfontein 99.
21 Digit Surveyors Codes	: C03700000000010200005 C03700000000010000000 C03700000000009800000

	C03700000000010100000 C03700000000009900000
District	: Kimberley
District Municipality	: Frances Baard
Site coordinates (Centre of Vaal River)	: -28.597371° South 24.121624° East

Abbreviations:

CA : Competent Authority

DBCM : De Beers Consolidated Mines

DMR : Department of Mineral Resources

DWS : Department of Water and Sanitation

EA : Environmental Authorization

EAP : Environmental Assessment Practitioner

EIA : Environmental Impact Assessment

EMPr : Environmental Management Programme report

I&AP : Interested and Affected Parties

IWUL : Integrated Water Use License

IWULA : Integrated Water Use License Application

MPRDA : Minerals and Petroleum Resources Development Act (Act 28 of 2002)

MWP : Mining Works Programme

NEMA : National Environmental Management Act (Act 107 of 1998)

NWA : National Water Act (Act 36 of 1998)

SAHRA : South African Heritage Resource Agency

SLP : Social and Labour Plan

WULA : Water Use License Application

WUL : Water Use License

TABLE OF CONTENTS

LIST OF ANNEXURES

SUPPORTING DOCUMENTATION (SUBMITTED ALONG WITH THIS IWWMP)

- Water Use License Application documentation (i.e. Water Use License application forms)
- Rooipoort Developments (Pty) Ltd approved Environmental Management Plan (to be amended in EIA Phase)
- Rooipoort Developments (Pty) Ltd Social and Labour Plan (to be amended in EIA Phase)
- Rooipoort Developments (Pty) Ltd Mining Work Programme (to be amended in EIA Phase)
- Ecological and Wetland Assessment, 2018
- Aquatic Impact Assessment, 2018
- Rehabilitation Plan, 2018
- Landscape Maintenance Plan, 2018
- Storm Water Management Plan, 2018
- Engineer report on the Proposed River Diversion in the Vaal River, 2018
- Surface and Groundwater Monitoring Programme
- Mining Right (NC 147)
- RoD
- Water Use License

EXECUTIVE SUMMARY

Background

Rooipoort Developments (Pty) Ltd (**"RD"**) established an alluvial diamond processing and recovery plant to extract diamonds from gravel on the following properties:

- Zand Plaats 5/102
- Vogelstruispan 101
- Vogelstruispan 98
- Bergplaats 100
- Klipfontein 99

These properties are located towards the north east and east of the town of Schmidtsdrift in the Northern Cape. The most southern border starts at the N8 from Kimberley to Schmidtsdrif and the northern border of the mining area borders the Vaalbos National Park. The Vaal River borders the western side of the mining area.

The initial Mining Right was held by DBCM. A Section 11 transfer application in terms of the MPRDA was submitted to the DMR. (Refer to **Annexure 2**). As part of the WULA submitted with this IWWMP a new application for EA and an amendment of the, SLP, MWP and EMP is submitted to the DMR. However, the final amended reports will only be submitted to the DMR and DWS during the EIA Phase of the project. The previous reports are attached for reference to the current mining activities.

A Water Use License was issued by the DWS on 19 November 2015 for the following water uses in terms of Section 21 of the NWA:

Section 21(a): The abstraction of a volume of 248 000 m^3/annum of water from the Vaal River for mining purposes.

Section 21(g):

- The disposal of water containing waste in a manner which may detrimentally impact on a water resource: allowing the fine material to settle in the Fine Tailings settling Panels (FTSP) to be used during rehabilitation to backfill voids, and
- Dust suppression on roads using the process water.

The WUL was only authorised on one property (i.e. Zand Plaats 102/5) with one location for each use which is as follows:

Activity	Latitude	Longitude

Section 21(a): Abstraction of water from the Vaal River (**Abstraction point**)	28° 40' 45.444"	24° 03' 40.1508"
Section 21(g): Disposing of water and fine tailings in the settling panels (**Location of panels**).	28° 40' 42.6360"	24° 04' 03.0360"
Section 21(g): Dust suppression	28° 41' 38.4"	24° 05' 39.84"

The mining operation on Zand Plaats 102/5 was completed in 2016 during which time the entire operation relocated to Vogelstruis Pan 101, Vogelstruis Pan 98 and Bergplaats 100. This included that new voids/cuts be made for the excavation of gravels. The first cut, which contains a separation wall is used for the discharge the fine material suspended in water where the fine material settles, and water drains through the screen from where it is recovered and reused in the process plant. This is done to rehabilitate the first cut with material. When the first cut is full it will be left to dry and covered with overburden and topsoil and the second cut will be rehabilitated in the same way. The use of the Zand Plaats Fine Tailings Settling Panels ceased, and the facility was rehabilitated early in 2018 as it is dry.

The area as indicated in the WUL where roads are sprayed with water also moved. An IWULA was submitted to the DWS in June 2017 for a license to authorise the already licensed water uses on all 5 properties as indicated above.

As per the request by the DWS the abstraction point of water from the Vaal River is still on Portion 5 of Zand Plaats 102 as per the license. This water is then transported through a pipe to the processing plant and mining operations on Vogelstruis Pan 101, Vogelstruis Pan 98 and Bergplaats 100. The abstraction point will relocate to Bergplaats 100 if the WUL is issued to include all 5 properties.

The 2017 IWULA included applications for the following water uses:

Section 21(a): Ground water will be abstracted from two boreholes. The water will be utilised for domestic use for employees at the plant and the site offices. The volume applied for is 10 000 m^3/annum. This volume is less than the threshold as indicated for the C92A and C92B catchments in the Revision of the General Authorisation for the taking and storing of water (Notice 538 of 2 September 2016). Note that with the domestic water use at the office, a small volume of water will be abstracted for drinking water for the game on the farm. However, this will not amount to a large volume of water. This water will be pumped into a 5 000 L tank with sloped sides to allow animals to access the water. It should be noted that the same borehole will be used for the abstraction of water at the site offices.

Section 21(b): Applications are also submitted for the storage of water in the First Cut and the Process Water Dam (**PWD**). It is important that the reader note that the water contained in these dams is not water taken from the drainage system. Water in the First Cut consists of gravel suspended in water from the processing plant. The water is recovered and pumped to the PWD from where it is re-used in the plant or for dust suppression. Water from the Vaal River is pumped to the PWD to top-up the level. Neither of these facilities are in-stream storage dams which will have an impact on downstream water users.

The capacity of these facilities is as follows:

- First Cut – 250 000 m^3. The First Cut is not lined and consists of previously mined voids and is therefore an excavation in the ground. There are no surface walls and the facility maintains a freeboard of 1 m beneath the soil suface.
- PWD – 3 200 m^3. An excavation was made which was lined by plastic liner. This facility receives water abstracted from the Vaal River and the First Cut. Water from the PWD is re-used in the plant and for dust suppression.

Section 21(c) and (i): This application is submitted for the establishment of roads/"driveways" through watercourses (**Crossings**). The applicant is in the process of compiling all necessary information and specialist studies to submit such an application. Note that these Crossings are not intended to impede the flow of water in the watercourses as it is constructed on the bed of the watercourses where possible. However, some of the Crossings have resulted in ridges impeding any flow, although the obstructions are only about 0.5 m. Other crossings have pipes or other infrastructure to allow water to drain freely. The watercourses are non-perennial in a low rainfall area.

An application is also submitted for the applicant to undertake the operations within 100 m from watercourses on the mining area.

Section 21(e): An application is submitted for the spraying of water from the PWD on roads in an attempt to suppress dust. This water is regarded as "dirty water". The volume of water sprayed on the roads is approximately 300 m^3/day depending of operation and weather conditions.

Section 21(g): Applications are submitted for the "disposal" of water containing waste into the First Cut and the PWD, although water is recovered and re-used in these facilities (please refer to the section 21(b) part for indication of volumes and extent).

An application is also included for the backfilling of material from the process plant and screens into voids to rehabilitate them. The material used for backfilling the voids amounts to approximately 135 000 m^3/month.

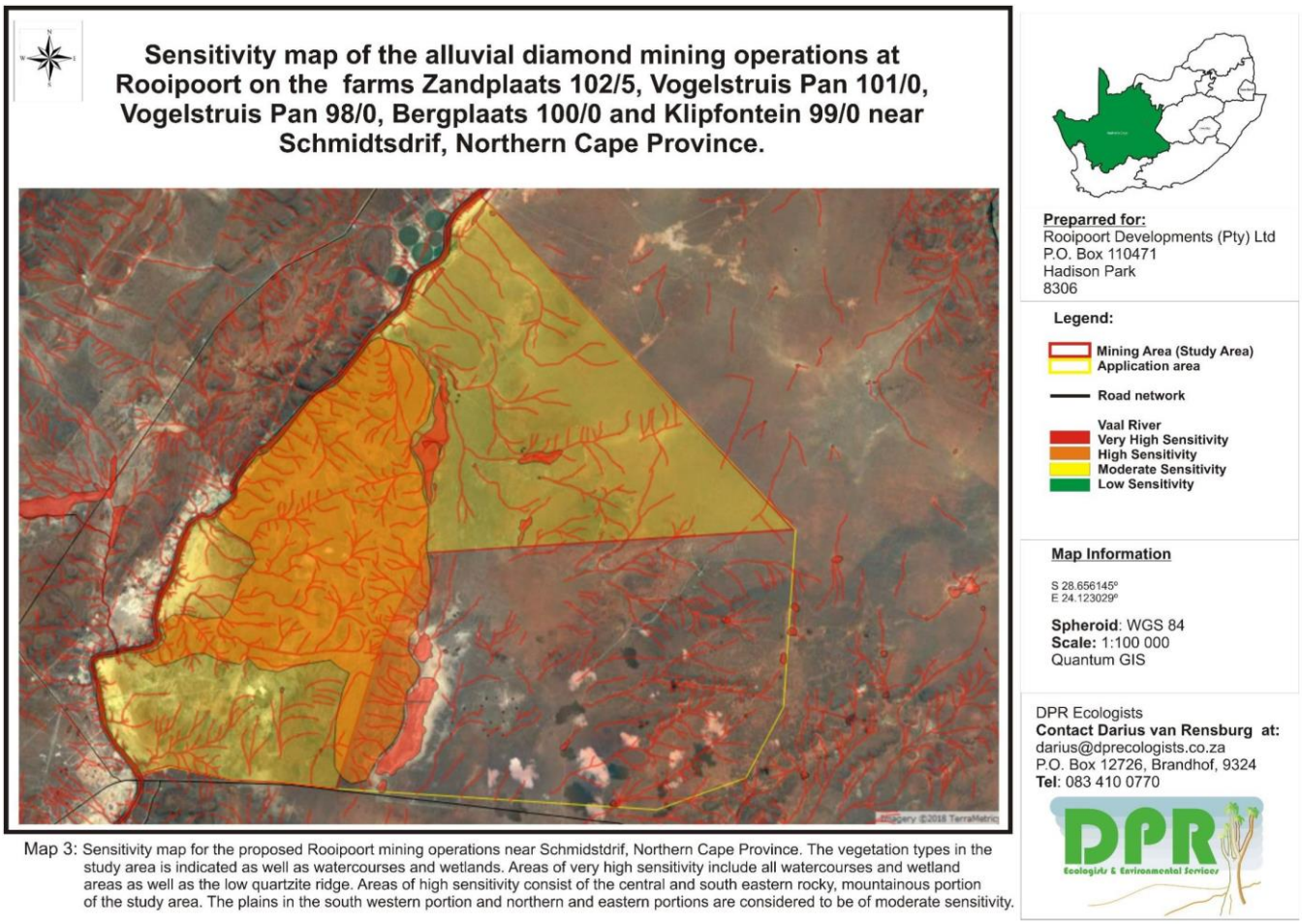
NEW APPLICATION IN 2018

Although this IWWMP is submitted as an updated report on the existing WUL it also serves as a supporting document to the new WULA submitted for the undertaking of an additional water use by RD. The additional water use will involve the mining of alluvial gravel for diamonds inside the Vaal River, drainage lines and watercourses located within the mining right area on the previously mentioned 5 properties, including the riparian habitat areas. An application is therefore submitted in terms of Section 21(c) and (i) to authorise the above water use associated with conducting the mining operations on the entire footprint of the mining right area where diamonds can be feasibly mined.

The new WULA includes all watercourses on all 5 properties under the mining right of RD and will include the entire length of the Vaal River bordering the mining right area to the west, which is approximately 28 km as well as all watercourses, drainage lines, wetlands and sensitive areas located on the interior of the mining right area to the east of the Vaal River. The total footprint of the mining right area is approximately 20 721 ha and covers Portion 5 of the farm Zand Plaats 102, a Portion of the farm Vogelstruis Pan 98, a Portion of the farm Vogelstruis Pan 101, the farm Klipfontein 99 and the farm Bergplaats 100.

For the purpose of this WULA the entire mining right are was subdivided into 4 different areas due to the extent of the study area. The area and project is divided into the following areas and activities:

- Mining inside and within 100m from the Vaal River,
- Mining inside and within 100m from interior watercourses subdivided into the following areas:
  - The south western portion,
  - Central and south eastern portion, and
  - The northern and eastern portion.



Map 3: Sensitivity map for the proposed Rooipoort mining operations near Schmidtsdrif, Northern Cape Province. The vegetation types in the study area is indicated as well as watercourses and wetlands. Areas of very high sensitivity include all watercourses and wetland areas as well as the low quartzite ridge. Areas of high sensitivity consist of the central and south eastern rocky, mountainous portion of the study area. The plains in the south western portion and northern and eastern portions are considered to be of moderate sensitivity.

Figure 1: Map indicating the footprint of the mining right area and the subdivided areas (Ecological and Wetland Assessment, Van Rensburg, 2018)

Vaal River:

Mining of the areas inside the Vaal River will occur by making diversion channels inside the Vaal River diverting the flow of water in the river and drying the bed and banks of the river. Mining will occur on sections of approximately 1,5 km in length inside the Vaal River and will occur mainly in the dry season (between April and December) when the water level inside the Vaal River is low. Only one diversion channel is to be constructed and operational at any given time to minimise the risk of contamination of the river system.

The diversion channels will be constructed to consist of the following:

- A transitional zone where the natural river channel is diverted towards the new constructed diversion channel,
- The diversion channel with an embankment on the right flank to separate the natural river channel from the diversion channel, and
- A transition zone that allows the flow back to the natural river channel.

It was recommended by the Civil Engineer that the Diversion Channels be constructed to allow for flow of 50m^3/s. This was determined by analysing the flows at gauging station C9H024 in the Vaal River. Based on the flow data it was determined that the maximum monthly flood sizes in the Vaal River was experienced during the months of January to March. Although the data indicated that the flow was greater than 50m^3/s during December it was recommended that no Diversion Channels will be operated during December breaks. Diversion channels will therefore be constructed and operated during April to November. However, there is still a moderate risk of flooding during April months if the Diversion Channels are constructed to cater for a flow of 50m^3/s. It is therefore recommended that weather patterns and current flow be monitored during this month and the risks of flooding be assessed prior to construction during April months. It is advised that the appointed Civil Engineer be consulted prior to construction.

As mentioned above each Diversion Channel will be designed with a length of 1.5km. The berm inside the river downstream of the transition zone and downstream of the diversion channel will be approximately 3.5m in height including the freeboard of 0.8m. The purpose of the berm will be to reduce and /or prevent the risk of sedimentation downstream in the Vaal River and to divert the flow into the diversion channel to prevent contamination. However, this berm might be higher but will never exceed a height of 4.5m. Due to the fluctuating width of the Vaal River over the study area each diversion channel will be designed separately to include the structure width. It is however expected that the entire diversion channel and river bed area will have a width of approximately 50m. Due to the location of the mining activities it is not expected that the mining activities will exceed a depth of 3m.

Only 1 Diversion Channel will be constructed and operational at any given time.

Please refer to the MVD Kalahari Civil Engineers Report in **Annexure 6**.

<u>Mining inside interior watercourses:</u>

The entire study area contains approximately 434 seasonal (non-perennial) streams where mining is proposed. The largest amount of these watercourses is mainly found close to the Vaal River. The mining method to be used during the mining of the interior watercourses will involve the strip-mining method where topsoil and vegetation will be stripped from the surface and stockpiled. Overburden will be removed and stockpiled separately where after the diamond bearing gravel will be excavated from the void and transported to the process plant. Gravels will be returned from the process plant and will be used to fill the void where after overburden and topsoil will be returned to complete rehabilitation. Before replacing the topsoil layer, the area will be sloped to allow watercourses to drain to the Vaal River. The banks of the watercourse will then be revegetated. The main focus will be to prevent ponding and/or erosion from occurring inside the watercourses and the banks of these watercourses. The miing activities will occur in the following order:

- Mining of the catchment outside a 30m buffer from watercourses,

- Rehabilitation of the catchment until a manner of natural vegetation has established,
- Mining of interior watercourses,
- Rehabilitation of the interior watercourses,
- Mining of the banks (i.e. 100m from active channel) of the Vaal River,
- Rehabilitation of Vaal River banks,
- Construction of Diversion Channels and mining inside the Vaal River, and
- Rehabilitation of the Vaal River mining areas and Diversion Channel.

It should be noted that the catchments of areas Diamant Koppie and M6 have been mined and rehabilitated as part of the existing mining operations. The M5 area is currently mined and areas L1 and L2 will be mined in the future following the above order of mining activities. If this WULA is authorised RD will return to the areas where mining and rehabilitation was completed to mine the interior watercourses and the Vaal River.

"Mining in the catchment will mobilise sediments and clear the vegetation layer which will increase the sediment load in watercourses significantly. As long as they are unmodified, they will be able to manage this increase to some extent. However, if they are mined at the same time as the catchment the increased sediment load will have an unacceptably high impact and will also affect the Vaal River into which these flows." (*Rehabilitation Plan, D. Van Rensburg, 2018*).

Although the construction of the diversion channels and the excavation of the gravel will occur inside the river and interior watercourses the existing process plant will be used which is located further than 100 m from any watercourse. Activities inside the watercourses will be limited to excavation, loading and hauling and backfilling of material from the process plant. No material storage, toilet facilities, vehicle maintenance and repair, plant or any other structure, infrastructure and/or activities will occur within watercourses apart from construction of diversion channels, excavation and loading and hauling. The existing DMS plant as described below will be used for the processing of gravels.

PROCESS DESCRIPTION

The various identified mining sites, demarcated by an extensive prospecting programme conducted by De Beers, is mined by conventional open cast alluvial mining methods.

All of the gravel resources on Rooipoort are mined using the strip mining method, which utilises excavators, front-end loaders and dumper trucks.

The areas which are mined is surveyed and a survey base line is established across the working area of each resource. In the case of Diamond Koppie, blocks of approximately 100m X 50m was, and will be demarcated along its base line, whereas 100m X 200m strips are demarcated for each of the remaining

deposits (M5, M6 and L2). The width of these cuts are ussually not 100 m as it becomes difficult to clear overburden over such a large area. One block at a time is opened for each deposit, but three blocks are open at any given time. One block is stripped of overburden, gravel is removed from a second block and a third block is backfilled and rehabilitated. Any topsoil from these blocks is removed and stockpiled on the high ground side of the excavation. Overburden is also removed and kept separate from the topsoil. The landowner permits the applicant to have a maximum of 6 ha of voids open at any given time.

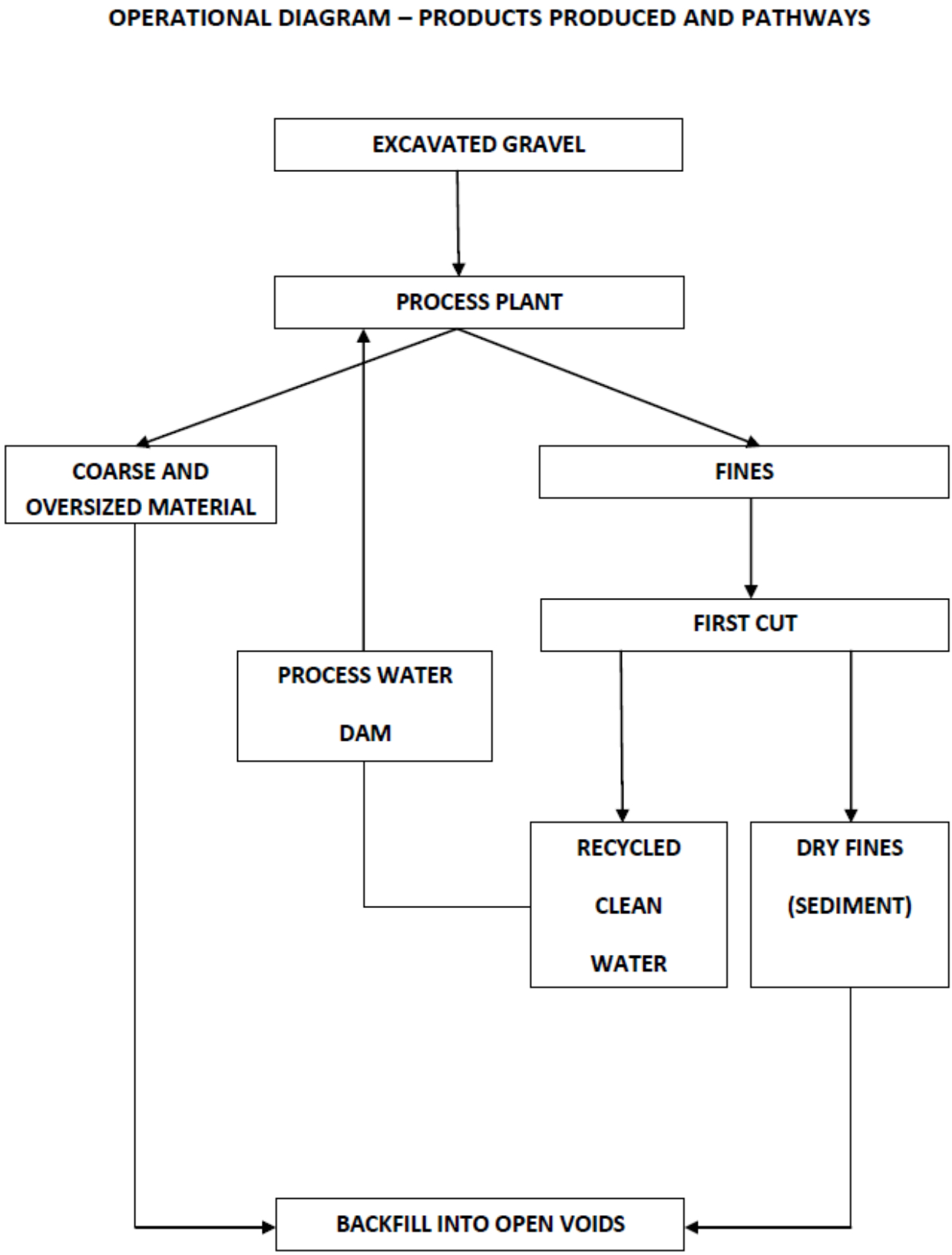
The gravels are extracted from each block using a 70 ton excavator. The gravels are then transported to the Dense Medium Separator (**"DMS"**) plant by haul trucks where it is screened through rotary barrel screens to <75mm. The remaining <75mm material is scrubbed and screened to -32mm, +2mm, whereafter it is processed through the DMS plant and the final recovery section. The DMS units have been reduced from 4 units to only 2 units with the addition of the Bourevestnik Plant (**"BV"**). The BV plant is an X-Ray machine treating -50 mm to +5 mm material and uses little water making the plant water efficient as is evident when comparing the volume licensed to the volume abstracted. The BV only uses water for cooling purposes and will top-up a small volume of water every hour. This is minimal.

Once processed, the plant tailings and oversize material are hauled back to the excavation and backfilled into the same trench from which it was extracted. This is performed by the haul trucks that were used to transport the gravels from the excavation site to the Plant.

Figure 2 indicates the process and the products produced by the process. During the processing of the material, the grits and fine material will continuously be pumped to the First Cut on site. The First Cut was designed to allow the suspended fine material to settle in the first pond. Water will flow through a stone diversion between the two ponds. Clean water will be pumped from the second pond back to the PWD to be re-used in the process plant or for dust suppression. When the mining in the area is completed the First Cut will be left to dry and will be backfilled with oversized material, overburden and soil. The overburden and topsoil will be replaced to the voids to cover the backfilled dry fine gravel and plant gravels (refer to the layout drawing of the M5 site in **Annexure 4**).

The mining process inside the Vaal River and interior watercourses is described in the Executive Summary above.

Figure 2: Diagram of the operational process



ENVIRONMENTAL DESCRIPTION

The Process Plant is situated in the Lower Vaal Water Management Area in the quaternary drainage area of C92B. The farms located north of the farm Zand Plaats 102/5 are in the C92A quaternary catchment drainage area. These farms include a Portion of Vogelstruis Pan 101/RE, a Portion of Vogelstruis Pan 98, Bergplaats 100 and Klipfontein 99.

The Vaal River forms the western boundary of all 5 farms applied for. There are no major rivers that extend through the farms on which the operational activities occur. However, there are numerous non-perennial watercourses, drainage lines, pans and wetlands located on the farms which drain into the Vaal River.

According to D. Van Rensburg (Ecological and Wetland Assessment, 2018) The study area consists of Kimberley Thornveld (SVk 4) and Schmidtsdrif Thornveld (SVk 6) with the Hoffman's Pan system consisting of Highveld Salt Pan (AZi 10) vegetation. These areas are listed as being of Least Concern (LC) within the National List of Threatened Ecosystems and are not subjected to any pronounced development pressures.

The study area is located in the Savanna Biome and contains a well-developed tree-layer with grass and dwarf shrub understorey (D. Van Rensburg, 2018).

Habitat diversity within the mining area is considered to be moderate. The different vegetation communities within the study area and varied habitats associated with the Vaal River and its floodplain contribute to species diversity. The natural fountain in the northern portion of the study area is considered a unique habitat and contributes to both habitat and species diversity (Ecological and Wetland Assessment, 2018). It also performs a unique ecosystem function. The riparian zone along the Vaal River plays an important role as habitat for animals as there is food and water. According to the Ecological and Wetland Assessment, 2018, there is a likelihood that animal species of conservational importance may occur in the study area.

The Vaal River and its associated floodplains are considered a fifth order watercourse partly due to the river being a large lowland river (Wetland Assessment, 2017). Large containment dams in the Vaal River upstream of the study area alter the flooding regime and the ecological functioning and habitat of the river and floodplains. According to an Index of Habitat Integrity (**IHI**) conducted within the study area along the Vaal River the Instream IHI of the river is rated as category C: Moderately Modified; and a Riparian IHI of category C/D: Moderately to Largely Modified. The EI&S of the floodplains associated with the Vaal River has been rated to be Moderate: Floodplains that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications and play a small role in moderating the quantity and quality of water of major rivers.

The oldest and predominant rock type on the Rooipoort Nature Reserve is the Archaean (2.7 Ga) Andesitic lavas of the Allanridge Formation, Ventersdorp Supergroup. Quartzites and slates of the Paleo-proterozoic Vryburg Formation, Griqualand West Sequence occur to a lesser extent and rest unconformably on the Ventersdorp lavas. Also resting unconformably on the Ventersdorp lavas are Carboniferous Dwyka Group glacial deposits of the Karoo Supergroup, however, these are preserved mostly in the vicinity of the Vaal River and in adjacent pre- Karoo valleys. Many of these lithologies are covered by recent red Hutton sands.

Cretaceous kimberlites have intruded the Ventersdorp volcanics and Karoo rock types on Rooipoort, but from previous exploration results are not deemed to be of any economic value (Rooipoort Developments MWP, J. L. C. Kilham)

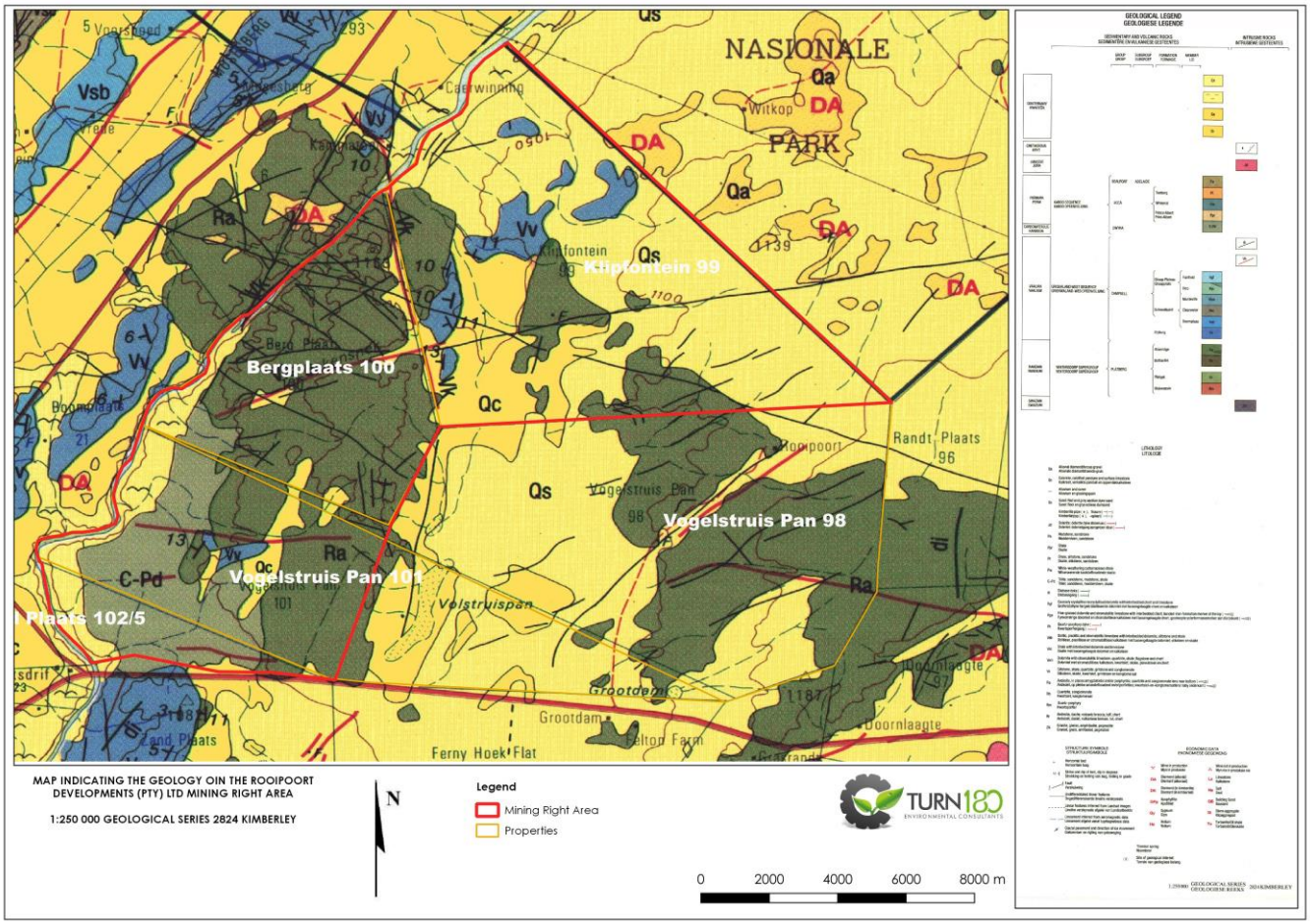


Figure 3: Geological Map of the study area

The study area contains a varied topography also due to the large size of the area. Topography includes relatively flat plains with uneven and rocky terrain in the central portion of the study area with numerous ridges and hills. Altitude varies from 1009 m to 1150 m and should illustrate that topography varies considerably over the study area. Most of the study area contains a gradual slope toward the river except for hills and ridges where the slope can become quite steep. The general slope of the study

area is toward the Vaal River. Where a gradual slope occurs such as in the south and north of the study area, watercourses are few. There is a definite increase in drainage lines closer to the river as the slope increases and flood sediments promote the formation of drainage lines. Uneven terrain such as occur in the central portion of the sturdy area contains numerous watercourses. The north eastern portion contains a very low slope and deep sandy soils. In this area watercourses are largely absent although a few drainage lines and pans occur. The floodplain of the Vaal River can also become quite extensive in areas of the study area. According to Bezuidenhout (2009), the following topographical positions occurs in the study area: crest, scarp, midslope, footslope, plain, floodplain, pan and riverbank (Ecological and Wetland Assessment, D. Van Rensburg, 2018).

The Mean Annual Rainfall (**"MAR"**) in the area is between 300 – 400mm per annum with the Mean Annual Evaporation (**"MAE"**) being between 2 000 and 2 200mm per annum (Water Research Commission, 2005). Please refer to Section 4.1 of this report for a detailed description of the climatic conditions.

WATER SYSTEM CHARACTERISATION

The aquatic ecosystem within the surrounding area of the proposed new diamond mining activities were assessed as being **largely modified (D)** after the current assessment. Most of the impacts on this system were associated with upstream activities, agriculture and instream habitat changes. These modifications in turn influenced the macro-invertebrate and fish community structures. The water quality results indicated that the water quality was good indicating only high levels of conductivity at some of the sites. The main sources of the absence of the expected fish species and macro-invertebrates at the sites were from the accumulative effects of upstream mining and agricultural activities, impoundments and general anthropogenic activities.

As the study area does not fall within a Freshwater Ecological Protected Area (FEPA) it is not governed by its stringent management guidelines. However, normal guidelines should still be adhered to in regard to any planned development as well as future management of the river. The impacts of the proposed new diamond mining activities in the system were found to be potential loss of aquatic habitat and increased turbidity and siltation in the river. The impacts will have an effect on the water quality and also on the biotic integrity of the system and mitigation measures need to be implemented to limit any adverse effects (Aquatic Assessment, 2018).

The Rooipoort Mining Operation abstracts water from the Vaal River to be used at the Process Plant for which a WUL was issued by DWS on 19 November 2015. An amendment was submitted to DWS to include abstraction points from the Vaal River on all 5 properties. A new IWULA was also submitted to the DWS in June 2017 to make provision for the abstraction of water from the Vaal River on all 5 properties. The proof of submissions of these applications are attached.

Recovered water is also abstracted from the first cut to supplement the water from the Vaal River in the plant. This water is also used for dust suppression.

Septic tanks are used at the site offices and chemical toilets are used on the plant and excavation operational areas. A contractor was appointed to manage the waste from these facilities.

MANAGEMENT PROGRAMMES

Waste minimisation and recycling

Waste generation at the mine is minimised as far practicable possible. RD manages solid waste generated in accordance with its EMP (Attached in **Annexure 6**). The main objectives of the waste management implemented at the mine is to prevent and/or limit any potential impacts from waste generation, storage and management through the implementation of appropriate waste management measures in accordance with the applicable legislative requirements. This includes the following:

- Characterisation of the waste;
- Separation of waste into the different waste streams;
- Re-use of waste where possible; and
- Recycling of recyclable waste (e.g. scrap metal, old oil, etc.).

The following measures are implemented to minimise and recycle waste:

- Although not considered to be a waste product, oversized material and gravel from the process plant is returned to the open voids where it is backfilled,
- Fine material is discharged from the Process Plant to the First Cut where the sediment is allowed to settle, water is recoverred and reused in the Process Plant. The fine material will fill and rehabilitate the First Cut untill it is full,
- Oil drained from vehicles and machinery is recycled by a contractor,
- The volume of contaminated soil is reduced by the implementation of a service and repair SOP whereby drip trays are used to collect all hazardous substances during the service and repair of vehicles and therefore reducing the number of spills which contributes to the volume of contaminated soil produced.

Water Use Efficiency

To limit the use of water abstracted from the Vaal River in the processing plant, the mine re-uses the water from the First Cut. Refer to Fig. 2 for the operational diagram. Fine material in suspension is discharged into the First Cut where water will seep through a barrier inside the First Cut. The barrier is

constructed with oversized materials. Water from the pond will be recovered and reused in the Process Plant.

Water is also recovered from material in the plant by use of cyclones which dries the tailings. This water is reused in the processing plant.

The BV plant is an X-Ray machine treating -50 mm to +5 mm material and uses little water making the plant water efficient as is evident when comparing the volume licensed to the volume abstracted. The BV only uses water for cooling purposes and will top-up a view liter every hour. This is minimal. Two of the DMS plants have been replaced with the BV plant.

Water containing waste

First Cut

As part of the opencast surface mining and processing of the alluvial diamonds, fine material in suspension with water will be produced (i.e. the -0.8mm material and water from the processing plant). The fine material will be discharged into the first cut which consists of a void with a screen to separate the fine material and water. The 2 dams are separated by a stone/oversize barrier which allows fine material to settle in the first dam and cleaner water to flow through to the second dam. Refer to Section 2.1 in this report for the description of the first cut.

Process Water Dam (**PWD**)

The plant has one lined (i.e. plastic liner) PWD where water abstracted from the Vaal River, water recovered from the First Cut and water recovered from the plant is stored for use in the plant. The PWD is situated at the process plant.
Water from the PWD will be used for dust suppression.

Storm water on operational areas

Storm water is contained on operational areas (i.e. workshop, parking areas, diesel storage bunded areas and voids) and clean water is diverted around operational areas. Trenches and berms are used to separate clean and dirty storm water on the mining area.

Storm water management

Storm water management measures such as diversion berms and trenches are implemented on all operational areas to separate clean- and dirty storm water. These operational areas include the following:

- Plant,
- Workshop,
- Vehicle and machinery parking areas,

- Potentially hazardous substances storage areas,
- Discard areas,
- Open voids,
- Roads,
- Cut-off drains to be implemented around proposed mining areas inside the Vaal River to prevent clean water from entering the mining areas,
- First Cut, etc.

When voids are opened, topsoil and oversized material removed from the void is stockpiled on the highest side of the void. Overburden is also removed and stockpiled separately around the open void. These stockpiles act as berms to prevent clean storm water from entering the voids.

Berms are made around all parking, storage and working areas to divert clean water around these areas.

Cut-off drains will be constructed around all the mining areas inside the Vaal River and other inland watercourses to divert clean stormwater around operational areas following the natural contours into the Vaal River downstream and to prevent it from entering the operational areas as these areas are considered to be "dirty areas".

Refer to the Storm Water Management Plan and the Civil Engineer Report in **Annexure 6**.

Groundwater management

The main objectives of groundwater management during the operational phase at the mine are as follow:

- Contain pollution as far as is practicably possible;
- Minimize the spillages of water in the plant during the processing of gravel;
- Prevent any spillages of potentially hazardous substances which may contaminate groundwater.

The main Operational Objective is to limit residual impacts related with pollution to the groundwater.

It should be noted that the processing of the gravel in the processing plant do not require any chemicals to be added to the process. This ensures that water from the plant which is recovered in the First Cut is clean. However, water from the Vaal River is used in the processing plant and discharged with the fine material into the first cut. Therefore, the water in the first cut may contain e.coli. Sampling and analysis of the recovered water at the second dam indicated that the water is within the limit for drinking water, apart from some bacteriological elements. This most recent results of the analysis in August 2018 is attached in **Annexure 6.** A groundwater monitoring programme will however remain implemented to monitor groundwater in the area by using existing boreholes.

Remediation and rehabilitation

Voids/excavated areas

Opened voids will be backfilled after the excavation of the gravel with gravel processed in the plant and overburden. After backfilling, the pit will be covered with topsoil to ensure that natural vegetation re-establishes. The First Cut will be rehabilitated with the fine material suspended in water from the processing plant which settles in the void. When the void is full the fine material will be left to dry after which it will be covered with the overburden and topsoil excavated from that void.

Watercourses

Mining operations will also include watercourses within the interior of the study area as well as the Vaal River. This will have a high impact and will therefore require comprehensive rehabilitation in order to re-establishing similar functioning watercourses. The functioning of watercourses is dependent on the functioning of the catchment, i.e. the catchment drains into the watercourse and determined its flow and flooding regime. Mining within the catchment will therefore affect the watercourses.

As a result of the connection between the watercourses and the catchment feeding into them it is highly recommended that mining not take place within the watercourse and catchment at the same time. It is rather recommended that the catchment be mined first, then rehabilitated until a manner of natural vegetation has established and only then watercourses should be mined where desired. A buffer of 30 meters from watercourses is recommended whilst the catchment is being mined. Mining in the catchment will mobilise sediments and clear the vegetation layer which will increase the sediment load in watercourses significantly. As long as they are unmodified, they will be able to manage this increase to some extent. However, if they are mined at the same time as the catchment the increased sediment load will have an unacceptably high impact and will also affect the Vaal River into which these flows.

The Vaal River, especially the banks and areas where alluvial fans occur, will also be subjected to mining. As above it is strongly recommended that the catchment and watercourses in the study area not be mined at the same time as the Vaal River for the same reasons. As a result, it is recommended that the catchment first be mined, rehabilitated to a point where the soil surface stabilises, and a manner of natural vegetation cover establishes, and only then desired watercourses be mined. Mined watercourses should then be rehabilitated up to a point that the bed and banks become stabilised and a manner of riparian vegetation establish. This will decrease the mobilisation of sediments. The placement of transverse rocky berms within mined watercourses should also be considered to prevent sediments from being washed into the Vaal River. This will also stem gully erosion to some extent. Thereafter the Vaal River and associated alluvial fans should be mined. If this method of mining is undertaken the accumulation of impacts will also be decreased.

The recommended mining order can be summarised as follows:

- Mine the catchment in the interior of the study area and rehabilitate.
- Mine the smaller watercourses within the interior of the study area and rehabilitate.
- Mine the bed and banks of the Vaal River and associated alluvial fans and rehabilitate.

Refer to the Rehabilitation Plan by D. Van Rensburg in **Appendix 6.**

A proper photographic record will be kept of the mining areas prior to commencement of mining inside the watercourses and during the mining activities. Land surveying is also proposed to be done prior to commencement of the mining activities to ensure that rehabilitation occurs in a manner to rehabilitate the land to the condition it was prior to mining.

Infrastructure

Infrastructure (i.e. plant, workshop, offices, etc.) will be taken down and removed from the current mining area to be re-established on another portion of the mining right area where future mining will occur. The disturbed areas will be rehabilitated by removing all waste products from the site, ensuring that there are no contaminated soils and pollution. All compacted areas will be ripped and/or ploughed. These areas include roads which will not be used, surfaces where plant and workshop were established and all office sites.

Pumps used for abstraction of water from the Vaal River will be removed and installed at a new location where the new process plant will be established. Borehole pumps will also be removed and taken to new boreholes at the new plant (if any). The previously used boreholes will not be closed as it might be used by future landowners. It can also be included into a groundwater monitoring plan.

Water monitoring

Surface water

Water samples from the Vaal River are taken quarterly upstream of the operation and downstream of the operation. Samples are submitted to the SMT labs in Bloemfontein for bacteriological analysis and to Aquatico for chemical analysis.

The recovered water from the First Cut is also sampled and analysed during the surface water sampling.

Any other surface water resources near the operation (i.e. streams, dams, etc.) may be sampled and analysed if it is determined that there is a need for that. However, this has not occurred to date.

The water recovered in the First Cut is also sampled and analysed.

Should mining occur inside watercourses the surface water monitoring programme will be updated to include sampling of watercourses upstream and downstream of the Diversion Channels and mining areas inside rivers on a monthly basis to determine the possible impacts of sedimentation of the river. An upstream sample will also be taken upstream (i.e. northern boundary with Vaalbos National Park) and

downstream (N8/Vaal River bridge) of the entire mining operation of the mining right area on a monthly basis to determine the impact of the mining operation on the Vaal River.

It is not anticipated that mining activities in the interior watercourses will occur when they contain water (i.e. summer months) and that mining inside these watercourses will only occur when they are dry.

Please refer to the Surface- and Groundwater Monitoring Programme in **Annexure 6.**

Groundwater

Groundwater sampling is conducted on a quarterly basis. The sources sampled and analysed are the borehole used at the site office for domestic purposes, a monitoring borehole at the M5 operational area and a borehole located at the living quarters (this borehole is located outside the mining right area.

Please refer to the Surface- and Groundwater Monitoring Programme in **Annexure 6.**

1. INTRODUCTION

1.1. Activity Background

RD obtained a mining right for the excavation and processing of gravel for the extraction of diamonds by use of opencast surface mining (Please refer to the Mining Right in **Annexure 2**).

A Water Use License was issued for RD on 19 November 2015 for the abstraction of water from the Vaal River for mining purposes and for the operation of Fine Tailings Settling Panels.

As part of the opencast surface mining and processing of the alluvial diamonds, fine material is produced. (Fine material: being the -0.8mm material and water from the plant). The fine material is discharged into the First Cut of the mining area (Refer to Section 2.1 of this report for the operation of the First Cut). In the first cut the fine material can settle and clean water can seep through a barrier made of oversized material into a pond from where it is recovered and reused in the processing plant.

One of the licensing conditions of the WUL is that the IWWMP be updated annually. The IWWMP provides a summary of all the existing water uses of RD and describes the water and waste management measures currently implemented at the mine in terms of all its water uses. This IWWMP was compiled in accordance with the structure as set out in the Operational Guideline for the compilation of an Integrated Water and Waste Management Plan (DWAF, 2010). It is submitted as an updated IWWMP since the WUL was issued. Furthermore, this IWWMP also serves as supporting document to the new WULA submitted in terms of Section 21(c) and (i) for the proposed mining of gravel inside the Vaal River and other inland watercourses on the mining right area.

The proposed new activities will include the following:

Mining of the areas inside the Vaal River will occur by making diversion channels inside the Vaal River diverting the flow of water in the river and drying the bed and banks of the river. Mining will occur on sections of approximately 1,5 km in length inside the Vaal River and will occur mainly in the dry season (between April and December) when the water level inside the Vaal River is low. Only one diversion channel is to be constructed and operational at any given time to minimise the risk of contamination of the river system.

The diversion channels will be constructed to consist of the following:

- A transitional zone where the natural river channel is diverted towards the new constructed diversion channel,
- The diversion channel with an embankment on the right flank to separate the natural river channel from the diversion channel, and
- A transition zone that allows the flow back to the natural river channel.

It was recommended by the Civil Engineer that the Diversion Channels be constructed to allow for flow of 50m^3/s. This was determined by analysing the flows at gauging station C9H024 in the Vaal River. Based on the flow data it was determined that the maximum monthly flood sizes in the Vaal River was experienced during the months of January to March. Although the data indicated that the flow was greater than 50m^3/s during December it was recommended that no Diversion Channels will be operated during December breaks. Diversion channels will therefore be constructed and operated during April to November. However, there is still a moderate risk of flooding during April months if the Diversion Channels are constructed to cater for a flow of 50m^3/s. It is therefore recommended that weather patterns and current flow be monitored during this month and the risks of flooding be assessed prior to construction during April months. It is advised that the appointed Civil Engineer be consulted prior to construction.

As mentioned above each Diversion Channel will be designed with a length of 1.5km. The berm inside the river downstream of the transition zone and downstream of the diversion channel will be approximately 3.5m in height including the freeboard of 0.8m. The purpose of the berm will be to reduce and /or prevent the risk of sedimentation downstream in the Vaal River and to divert the flow into the diversion channel to prevent contamination. However, this berm might be higher but will never exceed a height of 4.5m. Due to the fluctuating width of the Vaal River over the study area each diversion channel will be designed separately to include the structure width. It is however expected that the entire diversion channel and river bed area will have a width of approximately 50m. Due to the location of the mining activities it is not expected that the mining activities will exceed a depth of 3m.

Only 1 Diversion Channel will be constructed and operational at any given time.

Please refer to the MVD Kalahari Civil Engineers Report in **Annexure 6**.

The entire study area contains approximately 434 seasonal (non-perennial) streams where mining is proposed. The largest amount of these watercourses is mainly found close to the Vaal River. The mining method to be used during the mining of the interior watercourses will involve the strip-mining method where topsoil and vegetation will be stripped from the surface and stockpiled. Overburden will be removed and stockpiled separately where after the diamond bearing gravel will be excavated from the void and transported to the process plant. Gravels will be returned from the process plant and will be used to fill the void where after overburden and topsoil will be returned to complete rehabilitation. Before replacing the topsoil layer, the area will be sloped to allow watercourses to drain to the Vaal River. The banks of the watercourse will then be revegetated. The main focus will be to prevent ponding and/or erosion from occurring inside the watercourses and the banks of these watercourses. The miing activities will occur in the following order:

- Mining of the catchment outside a 30m buffer from watercourses,
- Rehabilitation of the catchment until a manner of natural vegetation has established,

- Mining of interior watercourses,
- Rehabilitation of the interior watercourses,
- Mining of the banks (i.e. 100m from active channel) of the Vaal River,
- Rehabilitation of Vaal River banks,
- Construction of Diversion Channels and mining inside the Vaal River, and
- Rehabilitation of the Vaal River mining areas and Diversion Channel.

It should be noted that the catchments of areas Diamant Koppie and M6 have been mined and rehabilitated as part of the existing mining operations. The M5 area is currently mined and areas L1 and L2 will be mined in the future following the above order of mining activities. If this WULA is authorised RD will return to the areas where mining and rehabilitation was completed to mine the interior watercourses and the Vaal River.

"Mining in the catchment will mobilise sediments and clear the vegetation layer which will increase the sediment load in watercourses significantly. As long as they are unmodified, they will be able to manage this increase to some extent. However, if they are mined at the same time as the catchment the increased sediment load will have an unacceptably high impact and will also affect the Vaal River into which these flows." (*Rehabilitation Plan, D. Van Rensburg, 2018*).

Although the construction of the diversion channels and the excavation of the gravel will occur inside the river and interior watercourses the existing process plant will be used which is located further than 100 m from any watercourse. Activities inside the watercourses will be limited to excavation, loading and hauling and backfilling of material from the process plant. No material storage, toilet facilities, vehicle maintenance and repair, plant or any other structure, infrastructure and/or activities will occur within watercourses apart from construction of diversion channels, excavation and loading and hauling. The existing DMS plant as described below will be used for the processing of gravels.

1.2. Contact details

1.2.1. Contact details of the Applicant

Applicant Contact Person	: Pieter Meyer
Physical Address	: 2 Barnard Street Potchefstroom 2531
Postal Address	: P.O. Box 161 Delportshoop

	8377
Tel	: 073 463 1747
E-mail	: compliance@rooipoortmining.co.za

1.2.2. Contact details of the Environmental Consultant

Environmental Assessment Practitioner (EAP)	: Louis De Villiers
Geohydrologist and Assistant to the EAP	: Morne Van Wyk
Postal Address	: Suite 221 Private Bag X01 Brandhof 9324
Physical Address	: 8 Conde Street Bayswater Bloemfontein 9324
Tel	: 072 967 7962 / 072 873 6665
E-mail	: admin@turn180.co.za louis@turn180.co.za

1.3. Location of project

1.3.1. Regional locality

Farm Name	: Portion 5 of the farm Zand Plaats 102, Farm Bergplaats 100, Farm Vogelstruis Pan 98,

	Farm Vogelstruis Pan 101, Farm Klipfontein 99.
21 Digit Surveyors Codes	: C03700000000010200005 C03700000000010000000 C03700000000009800000 C03700000000010100000 C03700000000009900000
District	: Kimberley
District Municipality	: Frances Baard
Site coordinates (Centre of Vaal River)	: -28.597371° South 24.121624° East

The nearest town to the operations: Schmidtsdrift Village

Campbell (38 km southwest)

Kimberley (60 km west)

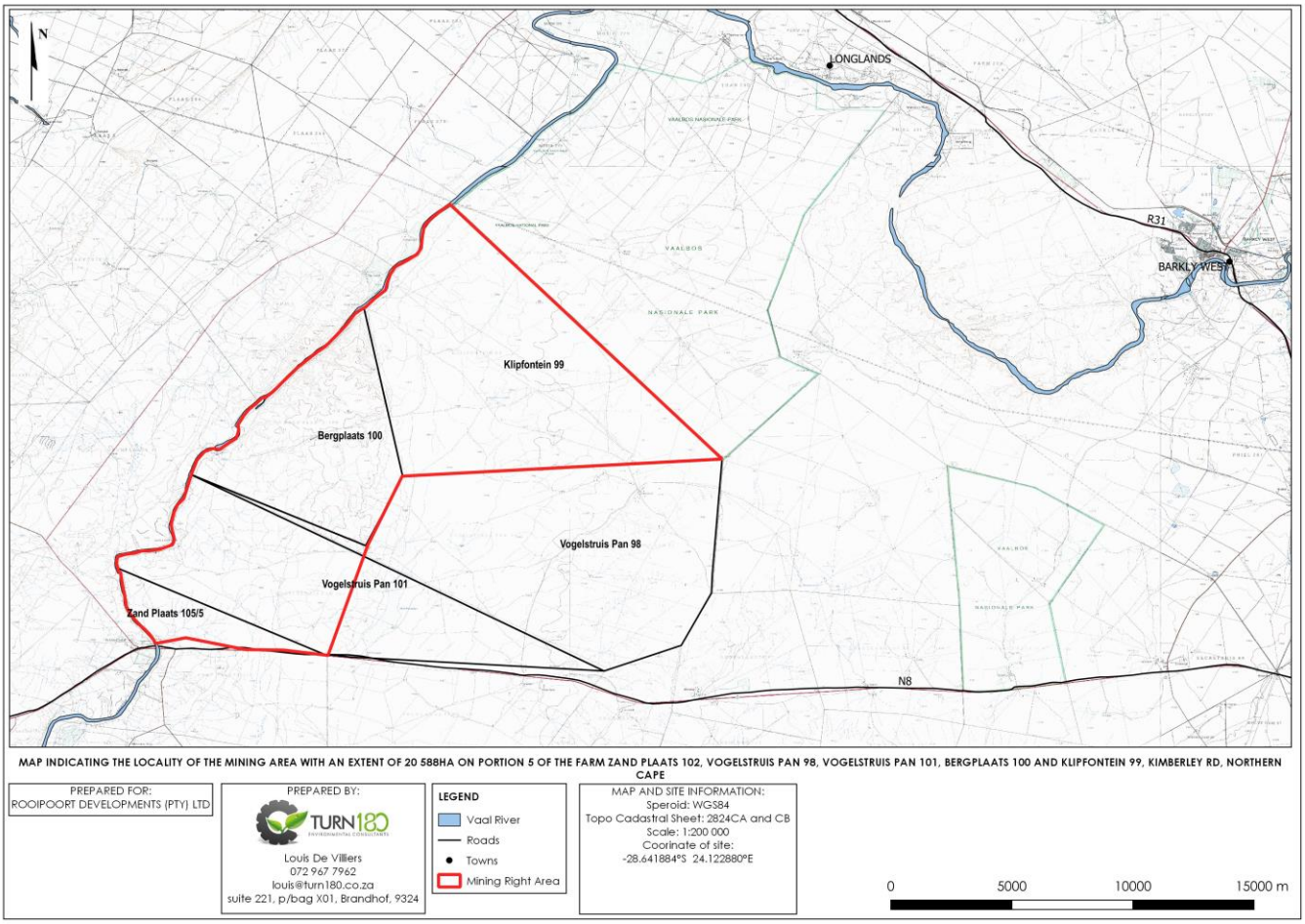


Figure 4: Locality Map of the Rooipoort Developments (Pty) Ltd mining area

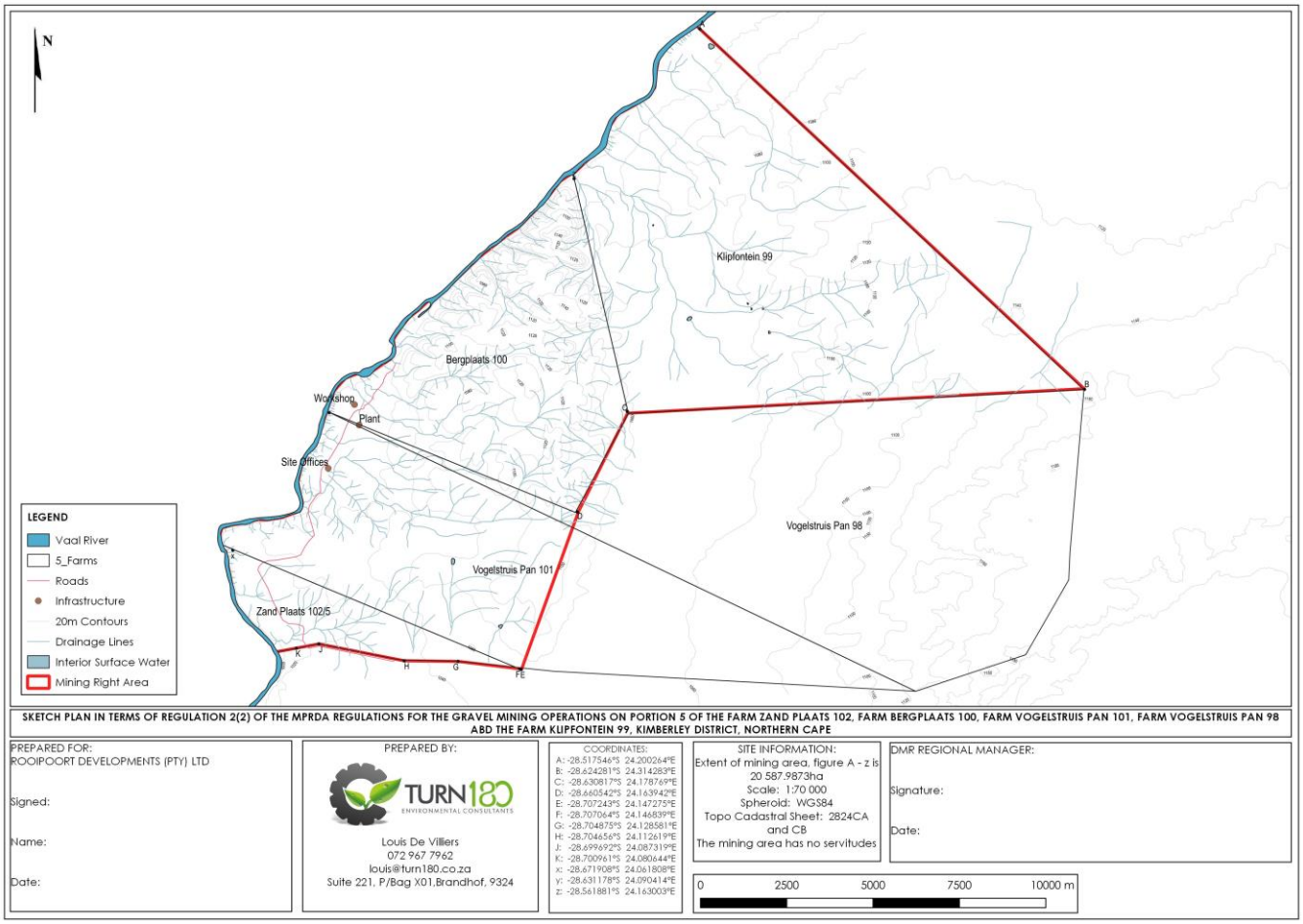


Figure 5: Sketch Plan in terms of Regulation 2(2) of the MPRDA which indicated the study area, watercourses and topography of the study area.

1.3.2. Water management area

The mine is located in the Lower Vaal Water Management Area. The quaternary catchment of the operational area is C92A and C92B.

The Vaal River forms the western boundary of the farms Zand Plaats 102/5, Vogelstruis Pan 101/RE, Vogelstruis Pan 98, Bergplaats 100 and Klipfontein 99 on which the mining activities occur and will occur in future. There are numerous unnamed drainage lines and non-perennial streams draining into the Vaal River over the mining right area. No other major surface water resources are located at the mining area.

1.4. Property description

1.4.1. Surface owners

The property on which the water uses, and mining activities occur is owned by DBCM.

1.4.2. Land tenure and use of immediately adjacent land

The 5 properties on which the mining right was issued forms part of the Rooipoort Nature Reserve. The land use in the area is mainly agriculture (i.e. game farming and hunting).

Land surrounding the RD mining right land is also used for alluvial diamond mining along the Vaal River. The adjacent land is also used for agriculture, including grazing, game farming and irrigation.

The settlement of Schmidtsdrift is located to the west of the Vaal River.

Refer to Section 1.3 in the EMP in **Annexure 6** for the concise description of the land use.

1.4.3. Surface infrastructure and presence of servitudes

Power lines

The power lines for the supply of electricity at the mine extend from the west of the Vaal River (Schmidtsdrift) to the plant.

Roads

Access to the mining operations, plant and offices are obtained by an internal gravel road system extending from the N8 in the south. An internal network of gravel roads is used to gain access to different mining areas, monitoring points, etc.

These gravel roads cross numerous non-perennial watercourses over the mining right area for which WULAs was submitted in June 2017.

Workshop and offices

A workshop is currently located on the mining right area on the Remainder of the farm Bergplaats 100. The facility is used for the storage of material and repairs and services of mining equipment and machinery. The workshop will move as new areas are mined in the future.

Site offices were established for use by employees. These will also move as the operation moves during future mining activities.

Plant

The process plant was established on the farm Bergplaats in 2016. It is currently still located on this property. As future mining will occur on different areas the plant will be moved.

1.5. Purpose of the IWWMP

Applications in terms of Section 21 of the NWA were included in the 2017 IWULA for all current water uses at the mining operation. The IWULA includes some new water uses which were not applied for in the original WULA and amendments to the WUL issued by DWS.

A new WULA in terms of Section 21(c) and (i) is also submitted with this version of the IWWMP to allow the applicant to mine within watercourses on the mining area at Rooipoort.

Apart from the IWWMP being used as Supporting Documentation to the IWULA it will assist RD to implement the best practice principles as described in the Best Practice Guidelines (**BPG**) of DWS. RD is also committed to implement Best Practice Environmental Objectives (**BPEO**) as defined in the NEMA.

The purpose of the IWWMP is to describe the Water and Waste Management System currently implemented by the mine. The main objectives are as follow:

- Limit the volume of water abstracted for use at the plant to a minimum (as per the volume indicated in the water balance) by optimising the reclamation, re-use and treatment (where possible) of process water;
- Limit potential significant environmental risks by considering site-specific aspects;
- Limit potential surface- and groundwater pollution through the implementation of appropriate management and / or mitigation measures;
- Manage identified possible long-term residual groundwater impacts after closure of operations at all operational areas; and
- Apply the "Cradle to grave" principle.

2. CONTEXTUALISATION OF ACTIVITY

2.1. Description of Activity

Operational methods

The new WULA includes all watercourses on all 5 properties under the mining right of RD and will include the entire length of the Vaal River bordering the mining right area to the west, which is approximately 28 km as well as all watercourses, drainage lines, wetlands and sensitive areas located on the interior of the mining right area to the east of the Vaal River. The total footprint of the mining right area is approximately 20 721 ha and covers Portion 5 of the farm Zand Plaats 102, a Portion of the farm Vogelstruis Pan 98, a Portion of the farm Vogelstruis Pan 101, the farm Klipfontein 99 and the farm Bergplaats 100.

For the purpose of this WULA the entire mining right are was subdivided into 4 different areas due to the extent of the study area. The area and project is divided into the following areas and activities:

- Mining inside and within 100m from the Vaal River,
- Mining inside and within 100m from interior watercourses subdivided into the following areas:
  - The south western portion,
  - Central and south eastern portion, and
  - The northern and eastern portion.

<u>Vaal River:</u>

Mining of the areas inside the Vaal River will occur by making diversion channels inside the Vaal River diverting the flow of water in the river and drying the bed and banks of the river. Mining will occur on sections of approximately 1,5 km in length inside the Vaal River and will occur mainly in the dry season (between April and December) when the water level inside the Vaal River is low. Only one diversion channel is to be constructed and operational at any given time to minimise the risk of contamination of the river system.

The diversion channels will be constructed to consist of the following:

- A transitional zone where the natural river channel is diverted towards the new constructed diversion channel,
- The diversion channel with an embankment on the right flank to separate the natural river channel from the diversion channel, and
- A transition zone that allows the flow back to the natural river channel.

It was recommended by the Civil Engineer that the Diversion Channels be constructed to allow for flow of 50m^3/s. This was determined by analysing the flows at gauging station C9H024 in the Vaal River. Based on the flow data it was determined that the maximum monthly flood sizes in the Vaal River was experienced during the months of January to March. Although the data indicated that the flow was greater than 50m^3/s during December it was recommended that no Diversion Channels will be operated during December breaks. Diversion channels will therefore be constructed and operated during April to November. However, there is still a moderate risk of flooding during April months if the Diversion Channels are constructed to cater for a flow of 50m^3/s. It is therefore recommended that weather patterns and current flow be monitored during this month and the risks of flooding be assessed prior to construction during April months. It is advised that the appointed Civil Engineer be consulted prior to construction.

As mentioned above each Diversion Channel will be designed with a length of 1.5km. The berm inside the river downstream of the transition zone and downstream of the diversion channel will be approximately 3.5m in height including the freeboard of 0.8m. The purpose of the berm will be to reduce and /or prevent the risk of sedimentation downstream in the Vaal River and to divert the flow into the diversion channel to prevent contamination. However, this berm might be higher but will never exceed a height of 4.5m. Due to the fluctuating width of the Vaal River over the study area each diversion channel will be designed separately to include the structure width. It is however expected that the entire diversion channel and river bed area will have a width of approximately 50m. Due to the location of the mining activities it is not expected that the mining activities will exceed a depth of 3m.

Only 1 Diversion Channel will be constructed and operational at any given time.

Please refer to the MVD Kalahari Civil Engineers Report in **Annexure 6**.

<u>Mining inside interior watercourses:</u>

The entire study area contains approximately 434 seasonal (non-perennial) streams where mining is proposed. The largest amount of these watercourses is mainly found close to the Vaal River. The mining method to be used during the mining of the interior watercourses will involve the strip-mining method where topsoil and vegetation will be stripped from the surface and stockpiled. Overburden will be removed and stockpiled separately where after the diamond bearing gravel will be excavated from the void and transported to the process plant. Gravels will be returned from the process plant and will be used to fill the void where after overburden and topsoil will be returned to complete rehabilitation. Before replacing the topsoil layer, the area will be sloped to allow watercourses to drain to the Vaal River. The banks of the watercourse will then be revegetated. The main focus will be to prevent ponding and/or erosion from occurring inside the watercourses and the banks of these watercourses. The miing activities will occur in the following order:

- Mining of the catchment outside a 30m buffer from watercourses,

- Rehabilitation of the catchment until a manner of natural vegetation has established,
- Mining of interior watercourses,
- Rehabilitation of the interior watercourses,
- Mining of the banks (i.e. 100m from active channel) of the Vaal River,
- Rehabilitation of Vaal River banks,
- Construction of Diversion Channels and mining inside the Vaal River, and
- Rehabilitation of the Vaal River mining areas and Diversion Channel.

It should be noted that the catchments of areas Diamant Koppie and M6 have been mined and rehabilitated as part of the existing mining operations. The M5 area is currently mined and areas L1 and L2 will be mined in the future following the above order of mining activities. If this WULA is authorised RD will return to the areas where mining and rehabilitation was completed to mine the interior watercourses and the Vaal River.

"Mining in the catchment will mobilise sediments and clear the vegetation layer which will increase the sediment load in watercourses significantly. As long as they are unmodified, they will be able to manage this increase to some extent. However, if they are mined at the same time as the catchment the increased sediment load will have an unacceptably high impact and will also affect the Vaal River into which these flows." (*Rehabilitation Plan, D. Van Rensburg, 2018*).

Although the construction of the diversion channels and the excavation of the gravel will occur inside the river and interior watercourses the existing process plant will be used which is located further than 100 m from any watercourse. Activities inside the watercourses will be limited to excavation, loading and hauling and backfilling of material from the process plant. No material storage, toilet facilities, vehicle maintenance and repair, plant or any other structure, infrastructure and/or activities will occur within watercourses apart from construction of diversion channels, excavation and loading and hauling. The existing DMS plant as described below will be used for the processing of gravels.

The various identified mining sites, demarcated by an extensive prospecting programme conducted by De Beers, is mined by conventional open cast alluvial mining methods.

All of the gravel resources on Rooipoort are mined using the strip mining method, which utilises excavators, front-end loaders and dumper trucks.

The areas which are mined is surveyed and a survey base line is established across the working area of each resource. In the case of Diamond Koppie, blocks of approximately 100m X 50m was, and will be demarcated along its base line, whereas 100m X 200m strips are demarcated for each of the remaining deposits (M5, M6 and L2). The width of these cuts are ussually not 100 m as it becomes difficult to clear

overburden over such a large area. One block at a time is opened for each deposit, but three blocks are open at any given time. One block is stripped of overburden, gravel is removed from a second block and a third block is backfilled and rehabilitated. Any topsoil from these blocks is removed and stockpiled on the high ground side of the excavation. Overburden is also removed and kept separate from the topsoil. The landowner permits the applicant to have a maximum of 6 ha of voids open at any given time.

The gravels are extracted from each block using a 70 ton excavator. The gravels are then transported to the Dense Medium Separator (**"DMS"**) plant by haul trucks where it is screened through rotary barrel screens to <75mm. The remaining <75mm material is scrubbed and screened to -32mm, +2mm, whereafter it is processed through the DMS plant and the final recovery section. The DMS units have been reduced from 4 units to only 2 units with the addition of the Bourevestnik Plant (**"BV"**). The BV plant is an X-Ray machine treating -50 mm to +5 mm material and uses little water making the plant water efficient as is evident when comparing the volume licensed to the volume abstracted. The BV only uses water for cooling purposes and will top-up a small volume of water every hour. This is minimal.

Once processed, the plant tailings and oversize material are hauled back to the excavation and backfilled into the same trench from which it was extracted. This is performed by the haul trucks that were used to transport the gravels from the excavation site to the Plant.

Figure 2 indicates the process and the products produced by the process. During the processing of the material, the grits and fine material will continuously be pumped to the First Cut on site. The First Cut was designed to allow the suspended fine material to settle in the first pond. Water will flow through a stone diversion between the two ponds. Clean water will be pumped from the second pond back to the PWD to be re-used in the process plant or for dust suppression. When the mining in the area is completed the First Cut will be left to dry and will be backfilled with oversized material, overburden and soil. The overburden and topsoil will be replaced to the voids to cover the backfilled dry fine gravel and plant gravels (refer to the layout drawing of the M5 site in **Annexure 4**).

The mining process inside the Vaal River and interior watercourses is described in the Executive Summary above.

2.2. Extent of activity

During prospecting activities, it was determined that economic, diamondiferous alluvial gravel deposits are located on the farms Zand Plaats 102, a Portion of the farm Vogelstruispan 101, a Portion of the farm Vogelstruispan 98, Klipfontein 99 and Bergplaats 100. Mining will occur on these 5 properties.

A WULA is also submitted to allow RD to mine the section of the Vaal River bordering the 5 properties and all watercourses inland of the Vaal River located on the mining right area. This section of the Vaal River is approximately 28 km in length.

The total footprint of the 5 farms is 20 721 ha and contains numerous non-perennial drainage lines, watercourses and wetlands where mining activities is also proposed to occur.

2.3. Key activity related processes and products

Activity related processes

(Refer to Section 2.1 in this report)
The key activity related processes are the following:

- Stripping of vegetation and topsoil and stockpiling topsoil,
- Removing of overburden,
- Excavation of gravel using excavators,
- Screening of material into different sizes,
- Transporting gravel to processing plant,
- Processing of gravel in the plant for the extraction of diamonds,
- Discharge of fine gravel suspended in water to the First Cut where the recovery of water occurs,
- Use of water abstracted from the Vaal River and recovered from the First Cut in the plant,
- Backfilling of open voids with oversized material, gravel from the plant and overburden,
- Covering of backfilled areas with topsoil,
- Construction of Diversion Channels according to Civil Engineer Designs,
- Excavation of gravels from the Vaal River,
- Processing of gravels in the Process Plant,
- Returning gravels for rehabilitation purposes.

Products

The following products are produced by the plant:

- Gravel from the plant;
- suspended fine material in water in the First Cut;
- oversized material from screens;
- Recovered water.

(Refer to the EMP in **Annexure 6)**

2.4. Activity life description

The life of mine is expected to be until 2025 depending on the volume of available gravel to be mined feasibly. The life of mine will be extended should the new WULA be authorised as large volumes of gravels will be mined.

2.5. Activity infrastructure description

The following infrastructure has been established on the mining area:

- First Cut (water recovery pond):

  During the processing of the material, the grits and fine material will continuously be pumped to the First Cut on site where fine material is allowed to settle and water is recovered through a screen to be reused in the processing plant (refer to the design drawing of the First Cut in **Annexure 4**).

- Roads:

  A gravel road network was established to gain access to the different mining areas. The gravel roads lead through numerous non-perennial watercourses. No bridges were constructed for these crossings as heavy rain events (which are scarce in the area) causes obstruction of the pipes installed and bridges tend to wash away making it unusable. By making an only "drive-through" in the watercourse the flow of water will drain to the Vaal River naturally, but the area will still be drivable. The watercourses are therefore not heavily obstructed, and water will still flow/drain more freely during higher rain events. Applications were submitted for the crossings in terms of Section 21(c) and (i) of the NWA.

  It is expected that new roads will be established when mining commences within the watercourses. However, the number and extent of new roads will be limited to prevent impacts from occurring.

- Buildings:

  The workshop was erected on the current mining area. The floor of the workshop was lined with conveyors. The workshop is semi-permanent but will be moved as mining ceases on the current area and moves to another area on the mining right land.

  No other permanent/semi-permanent buildings were erected. Concrete slabs were made in certain areas for storage of diesel. The concrete structures will be demolished, and the areas rehabilitated when mining in the area ceases. Park-homes are used for offices. The offices will be moved as mining moves to other areas.

- Plant:

  The plant was moved from Zand Plaats 102/5 to Bergplaats 100, a portion of Vogelstruis Pan 101 and a portion of Vogestruis Pan 98. It will remain in this area until all gravel has been processed

after which it will probably move to Klipfontein 99. Note that the IWWMP will be amended and new applications will be submitted before the operation relocates in the future.

- Process Water Dam:

  A PWD was constructed for the storage of water abstracted from the Vaal River, the recovered water from the First Cut and water recovered from the plant. From the PWD the water will be reused in the Process Plant and used for dust suppression.

2.6. Key water uses and waste streams

Key water uses

The following are the water uses applied for in the previous IWULA and the new WULA:

- *Section 21(a)*: Abstraction of water:
  - Water abstracted from the Vaal River (Water Use License issued by DWS in 2015). A WULA was submitted in June 2017 to license the abstraction of water from 4 additional points on 4 additional properties as indicated above (Refer to **Annexure 2** for proof of submission of the 2017 WULA. The license is attached in **Annexure 2**),
  - Abstraction of water from boreholes for domestic use. This only includes water for use only by employees for drinking (if suitable) and washing and flushing of toilets, etc. This water is not used for mining/industrial purposes.
- *Section 21(b)*: Storage of water:
  - An application was submitted for the storage of water in the PWD. Note that the water stored in the PWD is only water abstracted from the Vaal River and water recovered from the First Cut. It is not an in-stream storage dam or a runoff collection dam.
- *Section 21(c) and (i)*: The impeding of a watercourse and the altering of the beds, banks and characteristics of a watercourse:
  - Numerous (i.e. 12) crossings have been made to pass watercourses. These are areas where the road will only pass the watercourse. Bridges were not constructed in these areas. The reason for this is that material (i.e. dead branches, etc.) carried in watercourses after heavy rainfall, which occurs seldom, blocks the infrastructure to ensure free drainage of the water. This results in the bridges/crossings being washed away and damaged to such a degree that it cannot be used until it is repaired. Currently the water in the streams will pass over the road which can still be used or easily be repaired.

  - An application was also included in the IWULA for the mining of material within 100 m from a watercourse. This includes mining within 100 m from the Vaal River and other watercourses over the mining right area.
  - An application is submitted to the DWS with this report for the undertaking of mining activities within the Vaal River and watercourses located on the interior of the mining right area and on the banks of these watercourses. Mining will be conducted by constructing diversion channels to divert the flow of the Vaal River, drying the bed and excavating the gravels from the bed and bank of the watercourses.

- *Section 21(e)*: Dust suppression with water containing waste:
  - An application is included in the IWULA for the use of water abstracted from the PWD for dust suppression. Water in the PWD is water abstracted from the Vaal River, recycled water from the First Cut and water recovered from the plant.
- *Section 21(g):* Waste disposal related water use:
  - The disposal of waste, and water containing waste in the First Cut. Note that this water use was authorised by DWS in 2015 as it was included in the WULA of 2013. However, the 2016 IWULA includes an amendment to the IWULA for the establishment of a First Cut dam on other locations over the mining right area, including the currently used one and facilities to be used in future.
  - An application is included in the IWULA for the backfilling of voids with oversized material, screened and processed gravel from the plant which is regarded as a waste product.
  - The disposal of waste water into the PWD. Water recovered from the First Cut dam is pumped to the PWD.

Please note that the WULA in terms of Section 21(g) of the NWA was submitted on request from DWS. The process followed is not the disposal of waste but the concurrent backfilling and rehabilitation of open voids with the material removed from the voids.

Key waste streams

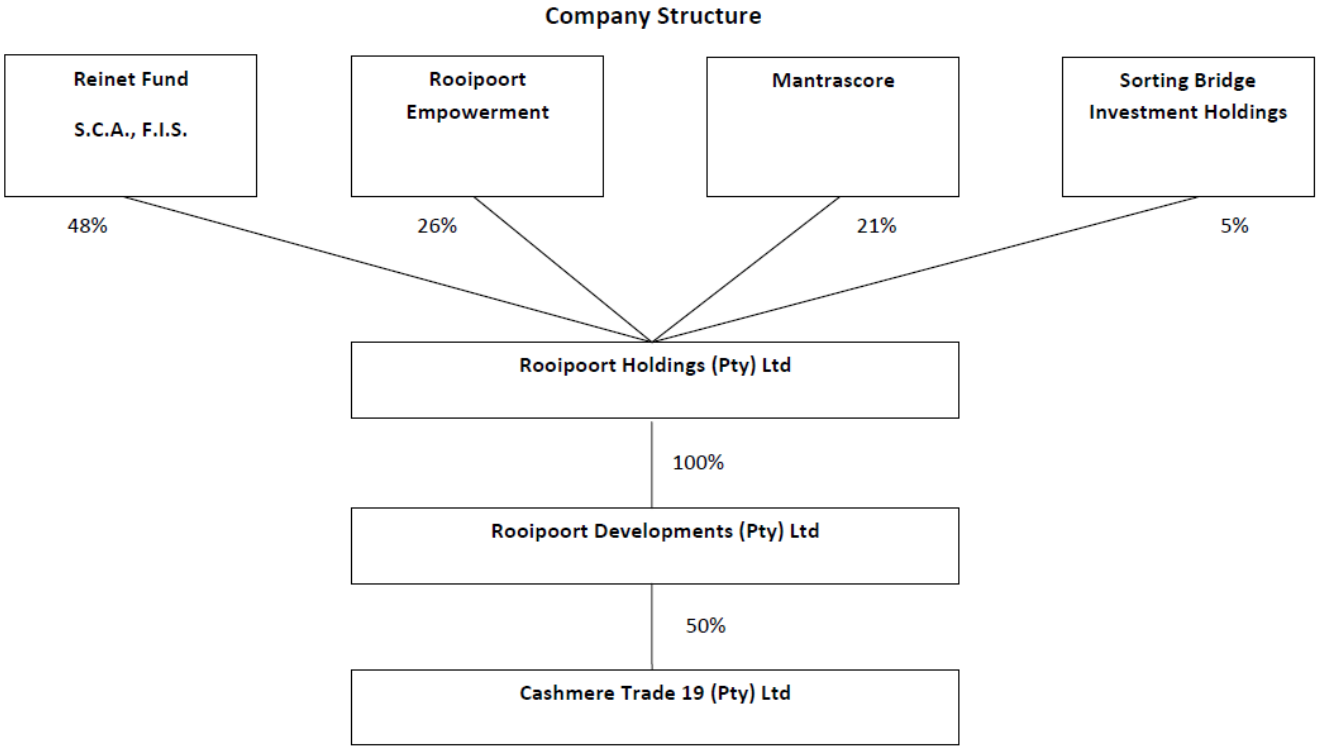
The waste streams generated at the Rooipoort Mine during the different operational stages include the following:

- Water containing waste (fine material in First Cut, water in the PWD which is also used for dust suppression);
- Building rubble. This waste stream is minimal as no infrastructure exists on the mining right area which is demolished;
- Industrial waste (including hazardous- and non-hazardous waste);

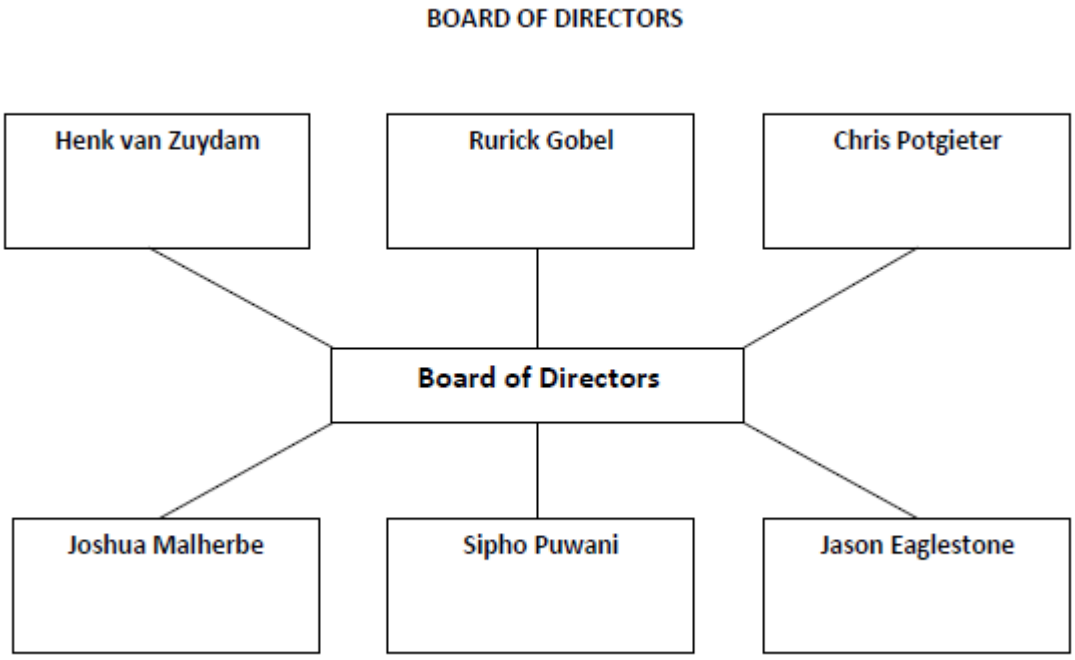
- General / domestic waste; and
- Sewage from offices and chemical toilets.
- Stormwater from the operational areas.

2.7. Organisational structure of activity/organisation

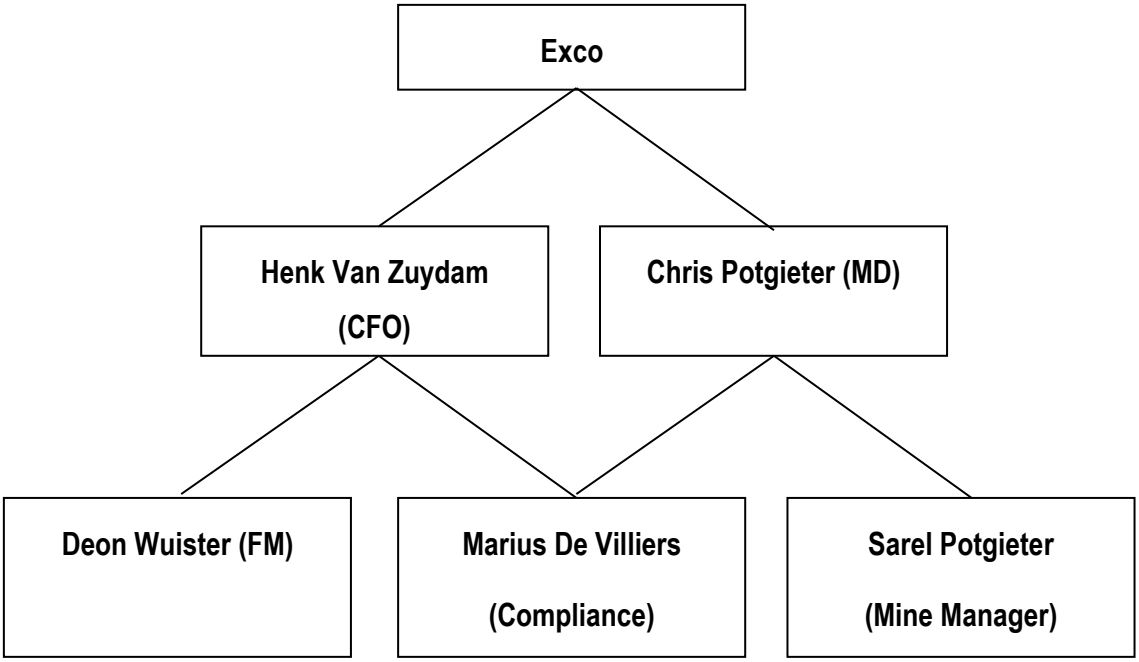
- Company Structure:



- Board of directors



- Company Management Team



2.8. Rooipoort Developments (Pty) Ltd Environmental Policy

ROOIPOORT
DEVELOPMENTS

ENVIRONMENTAL POLICY

EVALUATE, ON A REGULAR BASIS, THE POTENTIAL IMPACT OF THE OPERATION AND ALL ASSOCIATED ACTIVITIES ON THE ENVIRONMENT

RAISE AWARENESS ON ENVIRONMENTAL RESPONSIBILITIES AND ACTIVELY PROMOTE GOOD ENVIRONMENTAL PRACTICES BY STAFF

ENSURE THAT ALL CONTRACTORS, CONSULTANTS AND SERVICE PROVIDERS ARE FAMILIAR WITH THE ENVIRONMENTAL MANAGEMENT POLICY AND THAT THEY ASSIST IN THE IMPLEMENTATION AND MAINTENANCE OF THE SAID POLICY

ALL CONTRACTORS, CONSULTANTS AND SERVICE PROVIDERS WILL ENSURE LEGAL COMPLIANCE TO ENVIRONMENTAL LEGISLATION WHEN ENTERING AND WHILE ON THE SITE

RENEWABLE AND NON-RENEWABLE NATURAL RESOURCES WILL BE CONSERVED AND ANY AND ALL FORMS OF ENVIRONMENTAL POLLUTION AND DEGRADATION INCLUDING AIR, WATER, SOIL WILL BE PREVENTED AND/OR MANAGED

AS FAR AS PRACTICALLY POSSIBLE USE PRODUCTS AND SERVICES WHICH ARE ENVIRONMENTALLY FRIENDLY AND ENERGY EFFICIENT. CONSIDERATION SHOULD ALSO BE GIVEN TO BUYING FAIR TRADE AND LOCALLY GROWN AND MANUFACTURED PRODUCTS AS THESE HAVE POSITIVE IMPACTS ON THE ENVIRONMENT AND LIVELIHOODS

THIS POLICY WILL BE MAINSTREAMED THROUGHOUT THE COMPANY AND SHALL BE SHARED WITH AUTHORITIES, PARTNERS AND OTHER STAKEHOLDERS TO ADVOCATE RESPONSIBLE AND EFFECTIVE ENVIRONMENTAL PRACTICES

3. REGULATORY WATER AND WASTE MANAGEMENT FRAMEWORK

3.1. Summary of all water uses

The following table indicates a summary of the water uses and the property on which it occurs.

Table 1: Summary of all water uses

Water use in terms of Section 21 of the NWA, 1998 (Also refer to Table 1 and Section 2.6 of this report)	Zand Plaats 102/5, Vogelstruis Pan 98, Vogelstruis Pan 101, Bergplaats 100 and Klipfontein 99
21(a): Taking water from a water resource.	• Abstraction of water from the Vaal River, • Abstraction of water from boreholes for domestic use.
21(b): Storage of water.	• Storage of water in a Process Water Dam. • Storage of water in the First Cut.
21(c) and (i): Impeding and/or diverting the flow of water in a watercourse and the altering of the bed, banks and characteristics of a watercourse.	• Establishment of watercourse crossings through watercourses, • The undertaking of mining activities within the Vaal River and other drainage lines and watercourses located on the mining right area.
21(e): Controlled activity – Irrigation with wastewater.	• Dust suppression on roads by use of recycled water which may contain waste.
21(g): Disposal of waste, or water containing waste which may detrimentally impact on a watercourse.	• Storage of water from the process plant which contains fine material in suspension in the First Cut, • The backfilling of open voids with oversized material and gravel from the process plant, • The use of the PWD where water from the process plant is reused.

3.1.1.1. Section 21(a): Taking water from a water resource

Refer to Table 2 for a summary of the abstraction points and respective abstraction volumes relevant to each water resource.

Please note that 5 abstraction points have been identified. Only the point as indicated in the WUL is in use on portion 5 of the farm Zand Plaats 102. A WULA was submitted in June 2017 which included abstraction points on all 5 properties of the mining right area. Although an application was made to abstract water from all 5 properties the abstraction of water from the Vaal River will only occur on 1 property at any given time and water will not be abstracted from more than 1 point at any time. The application also does not provide for a larger volume of water to be abstracted and the licensed

volume remains the same. It only makes provision for the abstraction of water closer to the processing plant when it relocates.

The change in the location of the abstraction point have been included in the June 2017 IWULA (Proof of submission is attached in **Annexure 2**).

Table 2: Co-ordinates of the water resources

Description	Purpose	Time of use	Co-ordinates		Volume (m^3/annum)
			Latitude	Longitude	
Abstraction of water from the Vaal River.	Use in the processing plant.	Used in the past	28˚ 40.735'	24˚ 03.676'	248 628
Abstraction of water from the Vaal River.	Use in the processing plant.	Currently used	28˚ 38.466'	24˚ 5.239'	
Abstraction of water from the Vaal River.	Use in the processing plant.	Future use	28˚ 37.763'	24˚ 5.439'	
Abstraction of water from the Vaal River.	Use in the processing plant.	Currently used	28˚ 35.8'	24˚ 7.415'	
Abstraction of water from the Vaal River.	Use in the processing plant.	Currently used	28˚ 33.129'	24˚ 10.311'	
Abstraction of water from a borehole.	Use at site office for domestic use (i.e. toilet flushing and cleaning).	Currently used	28˚ 38.857'	24˚ 5.399'	50
Abstraction of water from a borehole.	Used for domestic use at plant.	Currently used	28˚ 38.083'	24˚ 5.932'	50

Description	Purpose	Time of use	Co-ordinates		Volume (m^3/annum)
			Latitude	Longitude	
		Total water abstracted			**248 628**

3.1.1.2. Section 21(b): The storage of water

Refer to Table 3 for the coordinates of the storage dams/facilities.

Table 3: List of water storage facilities

Description	Purpose	Time of use	Co-ordinates		Volume/Capacity (m^3/annum)
			Latitude	Longitude	
Storage of water	Storage of water in a PWD	Currently used	28˚ 37.807'	24˚ 5.979'	**3 200**
Storage of water	Storage of water in a First Cut	Currently used	28° 37.705'	24° 5.899'	**250 000**

3.1.1.3. Section 21(c) and (i): Impeding and/or diverting the flow of water in a watercourse and the altering of the beds, banks and characteristics of a watercourse

Table 4 indicates all the water uses which occurs in terms of Section 21 (c) and (i):

Table 4: Coordinates indicating all crossings

Description	Purpose	Time of use	Number	Co-ordinates	
				Latitude	Longitude
Impeding the flow of water in a watercourse and altering the beds and banks of watercourses.	Establishing road crossings through watercourses.	Current and future use	1	28˚ 41.784'	24˚ 4.949'
			2	28° 41.611'	24° 4.885'
			3	28° 39.618'	24° 5.042'
			4	28° 39.283'	24° 5.317'
			5	28° 41.197'	24° 4.581'
			6	28° 41.586'	24° 4.896'
			7	28° 41.744'	24° 5.051'
			8	28° 41.282'	24° 4.426'
			9	28° 40.914'	24° 4.291'
			10	28° 40.910'	24° 4.345'
			11	28° 37.693'	24° 6.112'
			12	28° 37.455'	24° 6.280'

Description	Purpose	Time of use	Number	Co-ordinates	
				Latitude	Longitude
Mining within the Vaal River.	Excavation of gravel from watercourses for the extraction of diamonds	After license is obtained to end of life of mine.	Northern border of Vaal River	28° 30.988'S	24° 11.945'E
			Southern border of Vaal River	28° 42.123'S	24° 4.476'E
Mining within drainage lines and watercourses on the mining right area	Excavation of gravel from watercourses for the extraction of diamonds	After license is obtained to end of life of mine.	All watercourses within the mining right area.		

Note the following: No bridges were built at the areas where the road passes through the watercourses. This method was done in the past by placing pipes under the road to allow for free drainage of water in the watercourse during heavy rain events which rarely occurs in this arid part. However, it was found that during the first heavy rain of the summer all dry branches and leaves from trees are transported down the watercourse which causes the pipes to block and the water thus damaging the road crossing to such an extent that it cannot be used until it is repaired.

The pipes were then removed from under the road and the road was lowered onto the bed of the watercourse. Now the water can drain freely without major damage to the road.

3.1.1.4. Section 21(e): Controlled activity – Irrigation of land with water containing waste

Refer to Table 5 for an indication of the volumes of water to be used for dust suppression.

Table 5: Area and volume of dust suppression

Facility	Co-ordinates		Volume (m^3/a)
	Latitude	Longitude	
Dust suppression	28° 38.245'	24° 5.951'	**97 500**

Dust suppression will occur as the mining activities proceed to different areas on the mining permit area which includes all the farms as indicated in the summary.

3.1.1.5. Section 21(g): Storage of waste or water containing waste in a manner which may detrimentally impact on a water resource

The WUL authorised by the DWS on 19 November 2016 included an authorisation for the use of the settling panels on the farm Zand Plaats 102/5. However, as mining activities proceeds to other areas new First Cuts will be established and the previous facilities will be rehabilitated.

A new First Cut was established on the farm Bergplaats 100 for the current mining activities. However, another First Cut will be established on a portion of the farm Klipfontein 99 in the future. It should be noted that these facilities can be established on any farm over the mining right area. The location change of these facilities will be communicated to DWS before any changes.

Table 6 indicated the location and sizes of the First Cuts.

Table 6: Coordinates and information of First Cut, PWD and voids

Facility	Status	Co-ordinates		Size (ha)
		Latitude	Longitude	
Fine Tailings Settling Panels	Previously used. In the process of being rehabilitated.	28° 40.711'	24° 4.051'	8.9
First Cut Dam	Currently in use	28° 37.705'	24° 5.899'	4
First Cut Dam	Future use	28° 35.164'	24° 15.538'	5
PWD	Currently used	28˚ 37.807'	24˚ 5.979'	0.15
PWD	Future use	28° 35.164'	24° 15.538'	0.15
Oversized material and gravel from process plant used for backfilling	Current	28° 38.245'	24° 5.951'	Farm Bergplaats 100, Vogelstruis Pan 101 and Vogelstruis Pan 98.
Oversized material and gravel from process plant used for backfilling	Future	28° 38.245'	24° 5.951'	Farm Klipfontein 99 and Bergplaats 100.

3.2. Existing lawful water uses

According to Section 32 of the NWA, 1998, an Existing Lawful Water Use is defined as:

(1) An existing lawful water use means a water use -

(a) which has taken place at any time during a period of two years immediately before the date of commencement of this Act; or

(b) which has been declared an existing lawful water use under section 33, and which -

(i) was authorised by or under any law which was in force immediately before the date of commencement of this Act;

(ii) is identified as a stream flow reduction activity in section 36(1); or

(iii) is identified as a controlled activity in section 37(1).

No water was registered as an existing lawful use.

3.3. Relevant exemptions

Not applicable

3.4. Generally authorised water uses

The application for the Section 21(g) water use is Generally Authorised in terms of Notice No. 1091 (6 September 2013): *Revision of general authorisations in terms of section 39 of the National Water Act, 1998 (Act No. 36 of 1998)*

In terms of the Section 21(a) General Authorisations Notice 538 of 2016 a water user may abstract 75 m3/ha/a in the C92A and C92B catchments. Therefore, the abstraction of water from boreholes on these farms will be generally authorised as the volume of water abstracted on each property will be less than the limit as specified under the General Authorisations.

3.5. New water uses to be licensed

Refer to Section 3.1. All water uses included in the IWULA are new water uses apart from the Section 21(a) for the abstraction of water from the Vaal River and the Section 21(g) for the establishment of the First Cut. However, this IWULA includes an amendment for the water uses to occur on all 5 properties under the mining right.

A new WULA in terms of Section 21(c) and (i) is submitted with this IWWMP for the proposed mining of diamonds inside the Vaal River and non-perennial drainage lines and watercourses located on the mining right area. Please refer to the Executive Summary and Section 4 of this report for a description of the process.

3.6. Waste management activities (NEM:WA)

Some activities undertaken at the operation do produce waste such as used oil, filters, domestic waste, etc. However, none of the activities undertaken during any process at the processing plant, screens excavation areas, etc. disposes and/or stores waste in such a manner (volume and/or period) to trigger a waste management activity in terms of the listed activities of Government Notice 581 of 29 November 2013 published under the NEMWA, 2008 (Act No. 59 of 2008).

Please refer to Section 3.1.1.5 for the waste management activities in terms of the National Water Act.

Waste is managed according to best practice guidelines.

3.7. Waste related authorisations

No authorisations have been issued for any waste related activities at the operation as there are no activities which requires waste related authorisations in terms of the NEMWA, 2008 (Act No. 59 of 2008).

A WUL was authorised on 19 November 2015 to authorise the use of the FTSP and for dust suppression by using water which contains waste. However, this new application includes applications for WUL for the establishment of the First Cuts on other areas of the mining right area as mining activities will move to other areas.

3.8. Other authorisations and regulations (EIAs, EMPs RoDs)

The following other authorisations have been issued:

- Mining Right,
- Record of Decision (RoD).

  Refer to the relevant documents (i.e. MWP, EMPs, SLP **Annexure 6** and RoD and Mining Right in **Annexure 2**)

An application was made to the DMR for the amendment of the SLP, MWP and EMP through a Section 102 process and a new application for EA to allow for the mining of diamonds inside the Vaal River and other non-perennial drainage lines and watercourses located inland from the Vaal River on the mining right area. It should be noted that the project is still in the Scoping Phase and the reports will be amended and submitted in the EIA Phase of the project.

4. PRESENT ENVIRONMENTAL SITUATION

4.1. Climate

4.1.1. Regional Climate

The mine is located in a semi-arid region in the Schmidtsdrift Thornveld Biome (SVk 6) and in Rain Zone C9C. The rainfall mainly occurs in summer and autumn with dry winters. The rainfall in the study area varies from 300 mm to 400 mm (WRC, 2005). The peak of the rainy season is normally March or February. The summers are hot with cool winters.

The nearest weather station to the mine is at Ulco.

Table 7: Average monthly maximum and minimum temperatures

Month	Daily Maximum °C	Daily Minimum °C
January	33.19	18.93
February	31.91	18.2
March	29.94	16.04
April	26	11.12
May	22.04	7.29
June	20.19	3.89
July	20.39	4.01
August	23.2	6.18
September	27.73	9.74
October	30.33	13.4
November	32.71	15.64
December	33.55	17.55
Year	**27.6**	**11.8**

Source: Agricultural Research Council, Weather Station Barkley Wes - Ulco (2003 - 2014)

4.1.2. Rainfall

The rainfall in the area is mostly derived from thunderstorms. The Mean Annual Precipitation (**"MAP"**) at the study area is between 300 mm – 400 mm per annum.

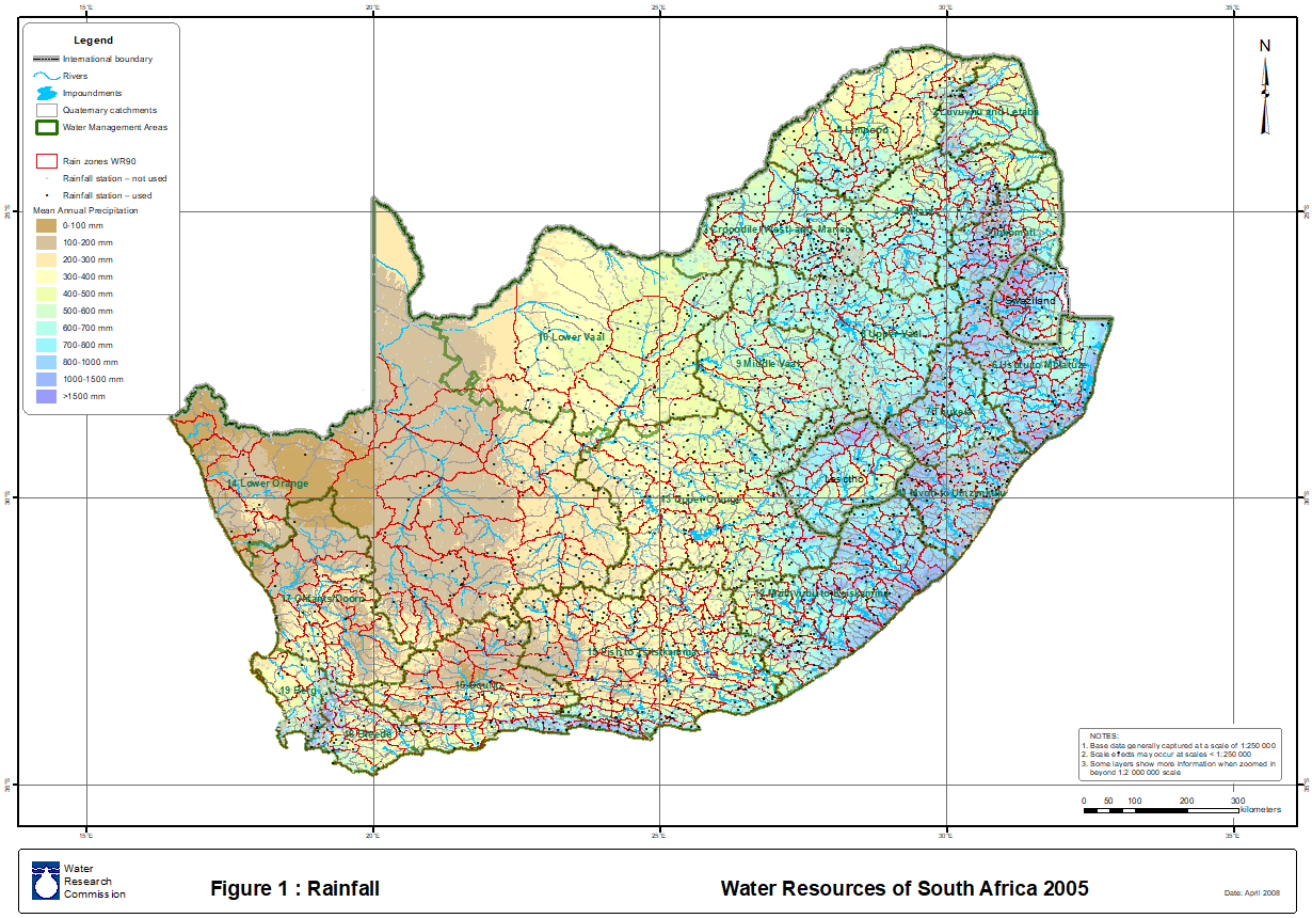


Figure 6: Rainfall Map of South Africa

4.1.3. Evaporation

The Mean Annual Evaporation (**MAE**) at the study area is between 2 000 mm and 2 200 mm/annum. The study area is located in Evaporation Zone 7A (WRC, 2005).

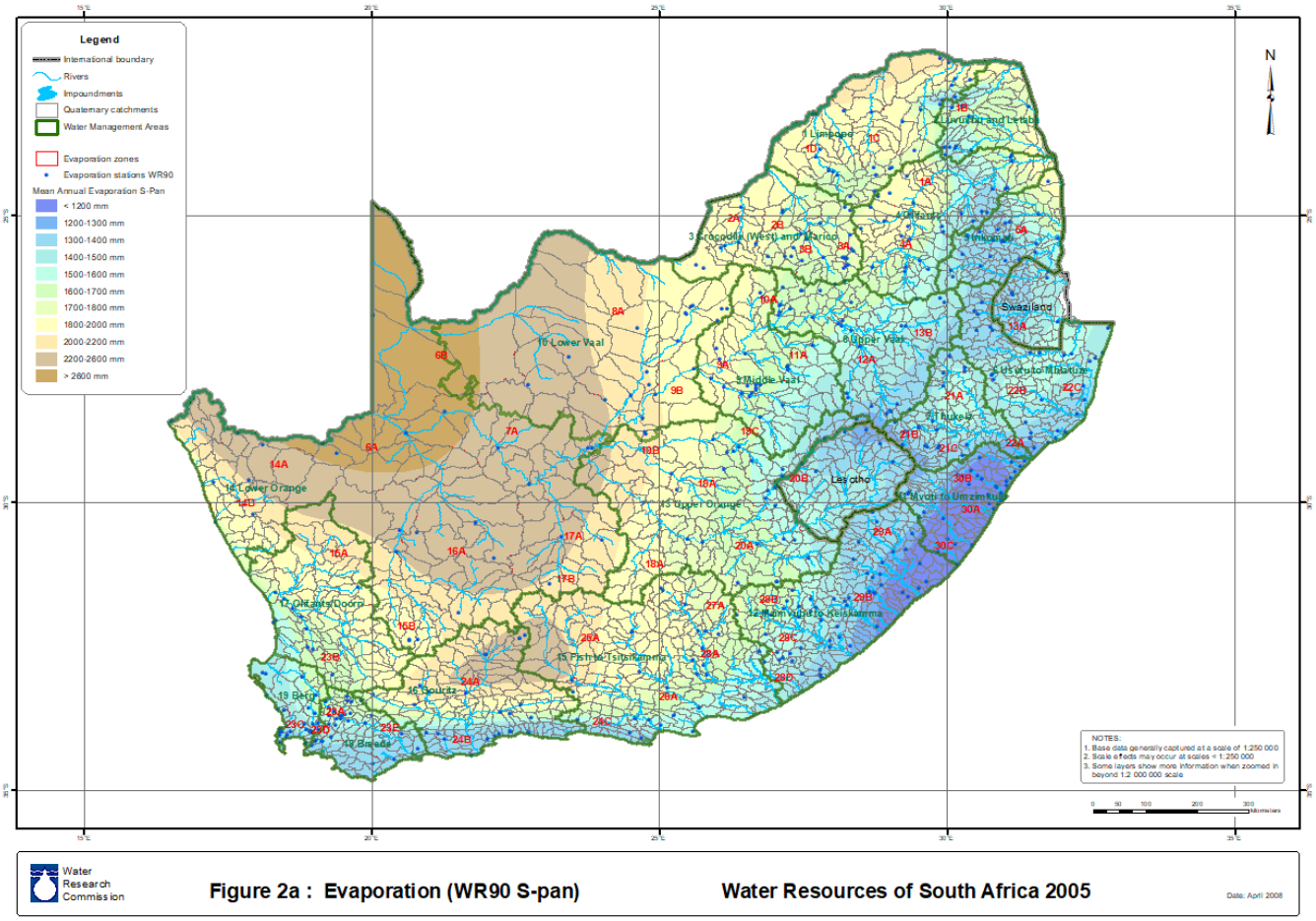


Figure 7: Evaporation Map of South Africa

4.2. Surface water

4.2.1. Water Management Area

The water abstraction points in the Vaal River are located in the C92A and C92B quaternary catchment regions in the Lower Vaal Water Management Area (**"WMA"**).

4.2.2. Surface water hydrology

The mining area is naturally sloped towards the Vaal River and contains floodplains, seasonal streams, pans, wetland areas and numerous drainage lines, especially towards the west of the study area near the Vaal River. Please refer to the Storm Water Management Plan and the Rooipoort Ecological and Wetland Assessment in **Annexure 6**.

Please refer to Section 4 of the Civil Engineer report for a detailed description of the hydrology of the Vaal River.

4.2.3. Surface water quality

Water from the Vaal River is sampled quarterly. Samples are taken up- and downstream after which the samples are submitted to the **SMT Labs** in Bloemfontein for bacteriological analysis and to Aquatico in Pretoria for chemical analysis. The chemical analysis indicated that the water is within the limits for drinking water. However, due to the quality of the water from the Vaal River used in the process plant the sources associated with it (i.e. Vaal River and First Cut) contained higher bacteriological counts. The last results (i.e. August 2018) is attached to this report.

4.2.4. Mean Annual Runoff (MAR)

The mining right area is in the C92A and C92B quaternary drainage area of the Lower Vaal Water Management Area. This area has a MAR of between 5 - 10 mm/annum.

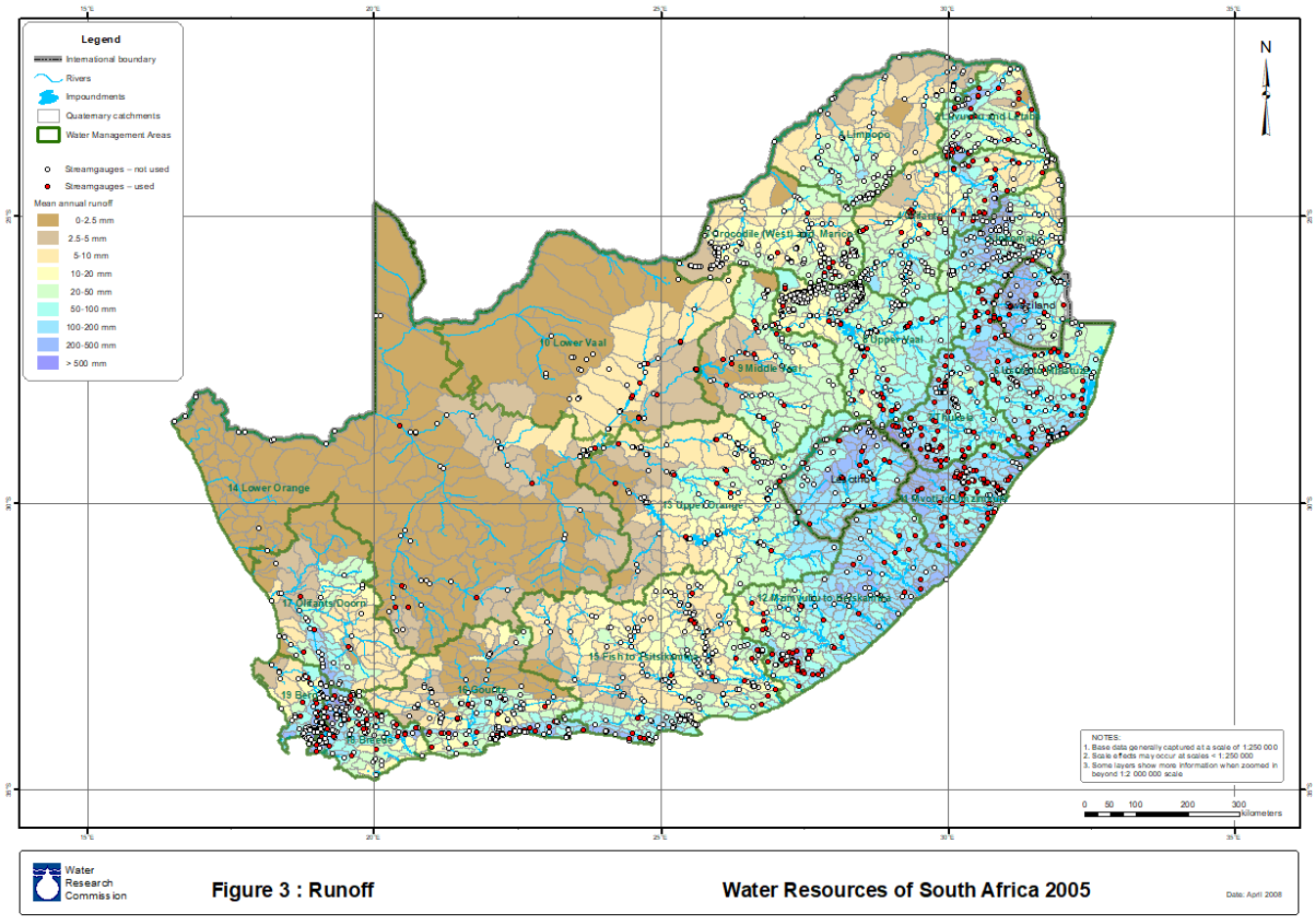


Figure 8: Runoff map of South Africa

The Mean Annual Precipitation MAP in the area is between 300 – 400 mm/annum and a Mean Annual Evaporation of between 2 000 and 2 200 mm per annum. Due to the low rainfall and high evaporation conditions of the study area the volume of runoff in the area is relatively low. The first rain will infiltrate the soil until it is saturated where after runoff will occur. Rainwater falling onto the sub-catchment area will result in surface flow (sheet flow) being directed towards the drainage lines. However, the area is

not known for extended, continuous rainfall events continuing for periods of more than a few days. Also taking into consideration that rainfall mainly occurs in the summer and autumn seasons with very high temperatures and therefore a high evaporation rate the volume of runoff is further reduced.

Runoff is also dependent on the activities and infrastructure on a specific site. Runoff is much higher in cities with concrete, roads and other paved surfaces where water cannot infiltrate. The study area has very limited areas where concrete is used and where structures and infrastructure are established. Furthermore, there are no paved or tarred roads on the study area. Therefore, the infiltration rate will be higher and runoff on the study area is low.

Please refer to the Storm Water Management Plan in **Annexure 6**.

4.2.5. Resource class and river health

The Vaal River is classed as a Class III resource.

Samples taken from the Vaal River at the operation indicate that the chemical values of the water fall within the recommended levels. However, bacteriological content should be higher because of discharge of sewage treatment works and other industrial processes upstream.

The Vaal River and its associated floodplains are considered a fifth order watercourse partly due to the river being a large lowland river. Large containment dams in the Vaal River upstream of the study area alter the flooding regime and the ecological functioning and habitat of the river and floodplains. According to an Index of Habitat Integrity (**IHI**) conducted within the study area along the Vaal River the Instream IHI of the river is rated as category C: Moderately Modified; and a Riparian IHI of category C/D: Moderately to Largely Modified. The EI&S of the floodplains associated with the Vaal River has been rated to be Moderate: Floodplains that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these floodplains is not usually sensitive to flow and habitat modifications and play a small role in moderating the quantity and quality of water of major rivers (Van Rensburg, 2017).

4.2.6. Receiving water quality objectives and the reserve

The reserve of the Vaal River is determined by the DWA.

There are no water quality objectives for the rivers in the Lower Vaal WMA (DWA, 2004)

No pollutants are permitted to be discharged into the Vaal River by the mining operation, therefore, the mine will not have a negative impact on the quality of water in the river. It should however always be ensured that storm water management measures are implemented and maintained.

The water containing fine material in the First Cut was tested. The analysis indicated that the quality of the water falls within the permitted levels, except for the bacteriological analysis.

The risks associated with the mining inside the Vaal River and inland watercourses (active channels) will be high and moderate when mining occurs on the banks. It will therefore be of high importance to implement measures to reduce sedimentation inside the watercourses during mining and rehabilitation of the mined sections. Furthermore, inspections and maintenance of machinery and vehicles, the placement of toilet facilities and hydrocarbon storage will have to be strictly implemented to reduce the risks of pollution occurring inside watercourses. No hazardous substances (i.e. hydrocarbons) of toilet facilities will be allowed to be stored in close proximity to any of the watercourses (i.e. closer than 100 m) and all maintenance and repairs will also be done further than 100 m from the watercourses. No activities, apart from the excavation, loading and hauling will be permitted inside the watercourses or within 100 m from any watercourse measuring from the edge of the active channel. to reduce the contamination risks. A strict spill and waste management procedure will also be enforced to clean any hydrocarbon spills if it occurs.

4.2.7. Surface water user survey

Water from the Vaal River is mainly used for industrial and agricultural purposes further upstream (i.e. mainly Gauteng). The use of water for irrigation intensifies downstream towards Douglas.
There are numerous diamond mining operations located next to the Vaal River up and downstream of the Rooipoort operations.

4.2.8. Sensitive areas survey

Refer to the following specialist reports attached in **Annexure 6** for a detailed description to the sensitive areas and protected species on the mining area:

- *Wetland Assessment by Mr. Darius Van Rensburg (2017),*
- *Ecological and Wetland Assessment by Darius Van Rensburg (2018), and*
- *Aquatic Assessment by Darius Van Rensburg (2018)*.

"According to Mucina & Rutherford (2006) the area consists of Kimberley Thornveld (SVk 4) and Scmidtsdrif Thronveld (SVk 6) with the Hoffman's Pan system consisting of Highveld Salt Pan (AZi 10) vegetation. All of these are listed as being of Least Concern (LC) within the National List of Threatened

Ecosystems (Notice 1477 of 2009) (National Environmental Management Biodiversity Act, 2004). They are not currently subjected to any pronounced development pressures" (Ecological and Wetland Assessment, Van Rensburg, 2018). Numerous protected plant species have been identified on the mining area. Observed protected species in the study area includes *Vachellia erioloba, Lapeirousia plicata, Boscia albitrunca, Titanopsis clacarea, Orbea sp., Haemanthus humilis, Freesia andersoniae, Moraea polystachya, Mestoklema tuberosum, Ruschia sp., Boophone distichia, Dianthus micropetalus, Anacampseros filamentosa, Babiana hypogaea, Crinum bulbispermum, Combretum erythrophyllum, Olea europaea* subsp. *africana* and *Nananthus sp.* Please refer to the above-mentioned reports for lists and detailed descriptions on the protected plant species.

The study area also likely contains numerous Red listed fauna species. The following table indicates these species:

Common name	Scientific name	Status
SA hedgehog	Erinaceus frontalis	Near Threatened
Pangolin	Smutsia temminnki	Vulnerable
Small spotted cat	Felis nigripes	Vulnerable
Brown hyena	Parahyyaena brunnea	Near Threatened
Leopard	Panthera pardus	Vulnerable

The landowner has a zero tolerance for the killing or harming of animals on the study area and all animal species are protected by RD.

As the study area does not fall within a Freshwater Ecological Protected Area (FEPA) it is not governed by its stringent management guidelines.

The study area includes sensitive areas such as wetlands and watercourses and their riparian areas where the mining activities are proposed.

4.2.9. Groundwater

4.2.10. Aquifer characterisation

The Rooipoort aquifers can be classified as minor aquifers with no regional importance.

Groundwater flow is in the direction of the Vaal River following the surface drainage direction from the hills in the east towards the lowlands and floodplains in the west.

4.2.11. Groundwater quality

Please refer to the latest water results of the analysis for the groundwater quality.

4.2.12. Hydro-census

Groundwater is not utilized for irrigation purposes in the area. The only use for groundwater is to provide water for animals.

The mine at Rooipoort will not use groundwater in the Processing Plant.

Refer to the Public Participation Process undertaken during the first WULA in 2014.

4.2.13. Potential Pollution Source Identification

The potential pollution sources are the following:

- The First Cut,
- Process water dam,
- Operational areas (i.e. open voids),
- Workshop area,
- Sedimentation of watercourses, including the Vaal River during mining inside the watercourses,
- Drainage of stormwater from operational areas,
- Spills from: Maintenance materials, operational areas, processing plant, septic tanks.

It should be noted that the water from the First Cut was tested and indicated that the tested units fall within the recommended levels. This is due to the mine not using any chemicals in the plant which may contaminate the water. Water in the First Cut was compared with water from the Vaal River. This comparison indicated that the quality of water is a little better than that of the Vaal River, but also contains E.coli.

Seepage of water will occur from the First Cut. The impact caused by the seepage of the water will be negligible due to the quality of the water and the material processed in the plant (i.e. alluvial gravel).

The PWD is lined and the seepage will be minimal.

4.2.14. Groundwater model

There is no groundwater model as groundwater is not used in the process plant.

4.3. Socio-economic Environment

Refer to the Social Impact Assessment in **Annexure 6**.

5. ANALYSIS AND CHARACTERISATION OF ACTIVITY

5.1. Site delineation and characterisation

Refer to the Mining Work Programme attached in **Annexure 6**.

5.2. Water and Waste Management

5.2.1. Process water

- Water supply:

  Water used in the processing plant at Rooipoort is abstracted from the Vaal River and water recovered in the First Cut.

  Water for domestic use at the plant and the site offices are abstracted from a borehole.

- Reuse and Recycling:

  Fine material in suspension from the processing plant is discharged into the First Cut where the fine material will settle, and water will seep through a barrier constructed with oversized material into a pond from where it is recovered and reused in the plant.

  Oversized material and gravel from the excavations will be screened and returned to the voids to be used for backfilling.

  Scrap metal is stored separately in a skip on site. When full the skip is collected, and the scrap metal is recycled.

  Old oil is also recycled.

  All overburden, oversized material and processed gravel will be returned to the void from where it originated to be used for backfilling.

- Water conservation and demand management:

  As indicated above, water recovered from the First Cut is reused in the processing plant to supplement the water abstracted from the Vaal River.

  Flow meters were installed on pumps used for the abstraction of water from the Vaal River to ensure that the volumes of water abstracted does not exceed the permitted volumes applied for with DWS.

  Furthermore, the BV plant was implemented at the operation to reduce the volume of water used. This reduced the volume of water used in the process plant significantly as the BV plant uses no water.

- Sewage management:

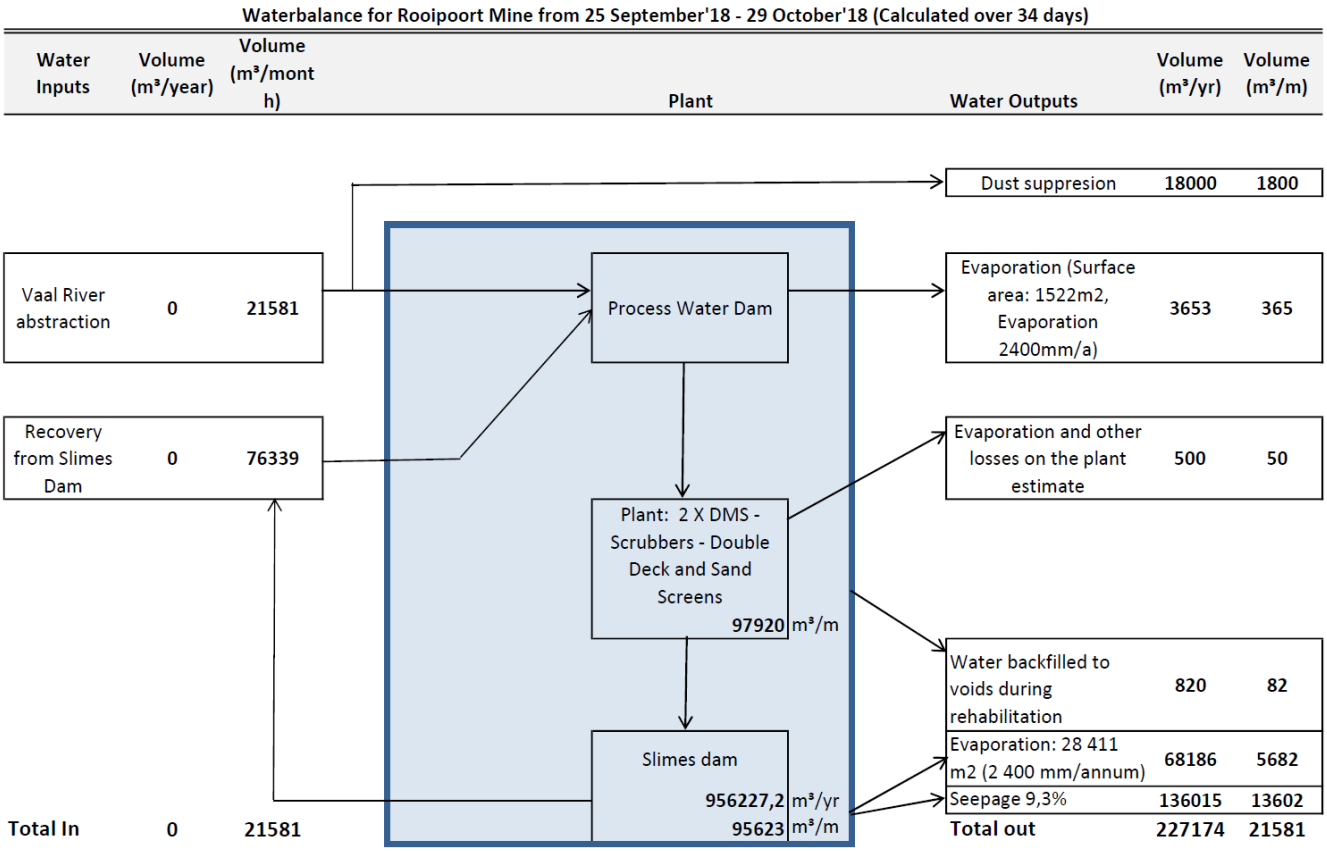
  The site offices make use of septic tanks to manage their sewage. Chemical toilets are placed at all operational areas. The sewage from the toilets is managed by a contractor.

- Point source discharges:

  The fine material and water from the plant is discharged into the First Cut from where water is reused in the plant.

- Water balance:

  The following figure indicates the latest available water balance for the mine:



5.3. Storm water (clean and dirty water management)

5.3.1. Groundwater

- Identification of potential sources of pollution:
  - First Cut
  - Process Water Dam
  - Workshop and wash bays
  - Septic tanks and sewage management

Seepage occurs from the First Cut. However, the impact of pollution occurring from the seepage is negligible as no chemicals are added and/or used in the processing plant that may contaminate water.

The PWD is lined which will limit/prevent seepage from occurring from it. Water contained in the PWD is water abstracted from the Vaal River and the First Cut. Seepage will thus have a negligible impact on groundwater.

Due to restrictions placed on RD on the construction and use of concrete structures and surfaces only key essential areas such as the bunded area containing the diesel storage tank is constructed from concrete. However, RD implements training and toolbox talks and implement strict spill procedures to clean and manage spills occurring on the mining area. All hazardous substances stored on large quantities (i.e. oil) is stored under a roof on soil that has been compacted. Steel bunds are also used for the storage of hazardous substances. Other areas where smaller quantities of hazardous substances are stored are lined with plastic liner. The floor of the workshop is lined with old conveyor and is roofed. Contaminated soil on the mining area is stored in a skip which is removed and replaced by EnviroServ.

Chemical toilets are placed on site for use by employees. These toilets are serviced by a contractor who removes the sewage and/or replaces toilets. The site office makes use of a septic tank. The septic tank is also emptied by a contractor. Employees received induction and training on the importance of using toilet facilities.

5.3.2. Waste

The management of waste includes the characterisation and the separation of the waste into different waste streams (Refer to Part 2.6).

- **General and/or domestic waste**

Domestic waste includes office waste, building rubble, commercial waste and business waste. It is collected in appropriate receptacles at the different areas generating the waste (e.g. offices, plant, workshop, etc.) and disposed of at the solid waste disposal site in Kimberley.

- **Industrial waste (Hazardous- and non-hazardous industrial waste)**

Industrial waste includes heavy metal compounds, oil sludges, rope grease, fluorescent tubes, oils contaminated soil and petrochemical substances. This waste is managed as follows:

- Oil drained from machinery and vehicles and oil filters removed during services is stored in metal tanks and collected by a contractor who recycles the oil. The hydraulic liquid and grease is also collected by the contractor.
- Scrap metal is stored in a skip which is collected and sold to a contractor.
- Contaminated soil is stored in a skip at the workshop and the screening operation area. These skips are collected and replaced by EnviroServ when they are full.

- **Seepage from the First Cut**

Fine material is stored in the First Cut. Water from the First Cut is reused in the Process Plant. Seepage can occur from the First Cut. However, it is not expected that the seepage can contaminate groundwater as no chemicals are added and/or used during the processing of the gravel in the process plant.

5.4. Operational Management

5.4.1. Organisational structure

Refer to the company structure (i.e. Organogram) in Section 2.7 of this report.

5.4.2. Resources and competencies.

RD has a high level of competency as they strife to be compliant with all relevant legislation. The following companies have been contracted to assist and advise management of RD with environmental issues:

- **Cliffe Decker Hoffmeyr attorneys (CDH)**

CDH was appointed by RD to monitor compliance with all legal aspects of the operation, including environmental legislation. Monthly meetings are held to report back to CDH on legal issues for them to assist.

- **Turn 180 Environmental Consultants ("Turn 180")**

Turn 180 was contracted by RD to conduct monthly compliance audits to ensure that RD complies with legal aspects and to assist in the application process of projects that needs to be authorised by relevant authorities in order to legalise activities undertaken at the operation.

Turn 180 is also responsible for the quarterly water sampling.

(Refer to the project team in **Annexure 1**)

5.4.3. Education and training

Issues regarding the conservation and use of water and waste management are discussed during toolbox talks and induction at the employment of individuals.

Among the talks on environmental aspects are issues regarding the management and conservation of water resources.

Please refer to the Rooipoort Development Environmental Training manual attached in **Annexure 6**.

5.4.4. Internal and external communication

Employees at the mine are made aware of environmental issues during induction at the appointment and during toolbox talks during employment.

5.4.5. Awareness raising

Employees at the mine are made aware of environmental issues during induction at the appointment and during toolbox talks during employment. The mine also makes use of signage to raise awareness.

5.5. Monitoring and control

5.5.1. Surface water monitoring

Samples are taken at two locations in the Vaal River (i.e. upstream and downstream) on a quarterly basis and submitted to a laboratory for analysis.

Water in the First Cut is also sampled and analysed quarterly.

Should the WUL be authorised for the mining activities inside the Vaal River and other watercourses samples will be taken up-and downstream at each mining section and upstream of the entire mining operation and downstream of the entire mining area (N8 – Vaal River bridge) to determine if there is an impact on the water quality of the Vaal River resulting from the mining operation and if so, the significance of the impact.

5.5.2. Groundwater monitoring

Existing boreholes on the mining area will be used for groundwater monitoring to determine if there are any impacts on the groundwater.

5.5.3. Bio monitoring

Although there is no formal Bio Monitoring at the mine, the ecologist from DBCM undertakes regular (monthly) site visits to inspect the biodiversity. Biomonitoring will be conducted during the mining activities inside watercourses.

5.5.4. Waste monitoring

There is no waste monitoring program for the mine as the chemical composition of the gravels does not pose a major risk (i.e. Acid Mine Drainage, etc.). However, the level of the First Cut and Process Water Dam is monitored throughout the project to ensure that the capacity of the facilities are not exceeded, and a sufficient freeboard of 0.8 m is maintained

The bins containing contaminated soil, old oil and scrap metal is also monitored to ensure that they are emptied by the relevant contractor before they reach full capacity.

5.6. Risk Assessment / Best Practice assessment

Please refer to the IWWMP submitted in July 2018 as an updated report to the IWUL and which served as a supplementary report to the IWULA submitted in July 2017.

An Environmental Risk Assessment was done by Mr. D. Van Rensburg and is included in the Ecological and Wetland Assessment. The risk assessment was done for the undertaking of the mining activities inside the Vaal River and other watercourses located on the interior of the mining area. The following table is a summary of the conclusion of the Risk Assessment done by the specialist revealed the following:

Aspect	Impact	Risk Rating	Control measures
Mining within watercourses in the interior of the study area	Mining within the main channel of the ephemeral and seasonal watercourses in the interior of the study area will remove riparian vegetation, transform the soil profile and in so doing the hydrology, geomorphology, flow and flooding regime. Increased establishment of exotic weeds and invaders due to disturbance caused by mining is also probable.	**High**	This impact will be mainly during the operational phase but due to its nature will extend into the closure phase and it is highly likely that the impact will have a permanent impact on the affected watercourses. Due to the nature of this activity is likely to permanently affect the watercourses at least to some extent. Should this activity take place it is recommended that a comprehensive rehabilitation plan be compiled, and monitoring be constantly applied. Despite this it is unlikely that the watercourses will be

			able to be rehabilitated to their condition prior to mining. Through a comprehensive rehabilitation program it is however likely to re-establish functioning watercourses.
Mining in close proximity to watercourses in the study area	Mining will require removal of the vegetation layer in the catchment of the watercourses. This activity will most likely alter the flow- and flooding regime and sediment load to some extent. The geomorphology and basic functioning is however anticipated to remain unchanged. Increased establishment of exotic weeds is likely due to disturbance caused by mining.	**Medium**	This impact will be mainly during the operational phase but will only cease once rehabilitation has been completed and an indigenous vegetation layer has become established. This activity is anticipated to have a moderate risk of impact as long as the adequate mitigation and comprehensive rehabilitation is adhered to. Measures must be implemented to minimise the amount of sediment entering the watercourses. Comprehensive rehabilitation should be applied and should aim to re-instate the natural topography and establish indigenous vegetation layer.
Mining within or on the banks of the Vaal River	Mining within the main channel or the banks of the Vaal River will remove riparian vegetation, transform the soils profile and in so doing the hydrology, geomorphology, flow and flooding regime. Due to the higher larger	**High**	This impact will be mainly during the operational phase but due to its nature will extend into the closure phase and it is highly likely that the impact will have a permanent impact on the Vaal River. Due to the nature of this activity is likely to permanently affect the Vaal River to some extent. Historical mining has

	volume of water transportation and general higher level of ecosystems services this rick is anticipated to be higher. It is however less probable to influence the larger hydrological functioning and will impact higher at a localised scale. Increased establishment of exotic weeds and invaders due to disturbance caused by mining is also probable.		illustrated that this permanently alters the geomorphology although the functioning of the system does repair itself to a large extent. Consequently, should comprehensive rehabilitation and monitoring be applied the impact on the river can be contained to medium term alteration. However, some impacts to the geomorphology and biota will have a lasting impact.
Mining in close proximity to the Vaal River	Mining will require removal of the vegetation layer in the catchment of the Vaal River and especially the floodplain. Due to the large scale of this lowland river it is unlikely to significantly alter the flow- and flooding regime and will most likely have the highest impact on sediment load. The geomorphology and basic functioning is however anticipated to remain unchanged. Increased establishment of exotic weeds is likely	**Medium**	This impact will be mainly during the operational phase but will only cease once rehabilitation has been completed and an indigenous vegetation layer has become established. This activity is anticipated to have a moderate risk of impact as long as the adequate mitigation and comprehensive rehabilitation is adhered to. Measures must be implemented to minimise the amount of sediment entering the river. Comprehensive rehabilitation should be applied and should aim to re-instate the natural topography and establish an indigenous vegetation layer. Due to the large scale of the river it is

	due to disturbance caused by mining.		unlikely to alter the geomorphology and flow regime but may influence the sediment load and therefore biota of the river.
Mining in close proximity to wetland areas in the study area	Mining will require removal of the vegetation layer in the catchment of wetland area. This includes pans, wetland areas associated with streams and backwaters. This activity will most likely alter the flow- and flooding regime and sediment load to some extent. The geomorphology and basic functioning is however anticipated to remain unchanged. Increased establishment of exotic weeds is likely due to disturbance caused by mining.	**Medium**	This impact will be mainly during the operational phase but will only cease once rehabilitation has been completed and an indigenous vegetation layer has become established. This activity is anticipated to have a moderate risk of impact as long as the adequate mitigation and comprehensive rehabilitation is adhered to. Measures must be implemented to minimise the amount of sediment entering the wetland areas. Comprehensive rehabilitation should be applied and should aim to re-instate the natural topography and establish an indigenous vegetation layer. Alteration of the topography and flow patterns may alter the inflow and therefore hydrology and it is therefore important that the natural topography be accurately re-instated.
Mining within wetland areas in the study area.	Mining within the wetland areas as described in the study area will entail a high risk and will include	**High**	This impact will be mainly during the operational phase but due to its nature will extend into the closure phase and it is highly likely that the impact will have a

	removal of the vegetation layer, transform the soil profile and in so doing the hydrology, geomorphology, flow and flooding regime. Increased establishment of exotic weeds and invaders due to disturbance caused by mining is also probable.		permanent impact on the affected wetlands. Due to the nature of this activity is likely to permanently affect the wetland systems to a large extent. The hydrological functioning of wetlands is complex and often associated with a saturated or impenetrable layer which will be irreversibly transformed by mining and its therefore unlikely to restore the functioning of these systems. Consequently, mining within wetlands should be avoided as far as possible. Comprehensive rehabilitation and monitoring may establish a natural vegetation layer but is unlikely to re-establish a naturally functioning wetland system.
Construction of roads and infrastructure through watercourses and wetlands	Construction of roads and infrastructure over watercourses and wetlands will also cause disturbance although on a local scale. These structures will act as flow barriers and will alter the hydrology of these systems. Increased erosion, sediment load and exotic weed establishment is also likely.	**Medium**	The impact will be largely confined to the operational phase as long as roads and infrastructure are removed and rehabilitated. This is likely reversible impacts and therefore only has a moderate risk. It is still of paramount importance that adequate rehabilitation and monitoring thereof takes place. Mitigation should include the correct design of roads and structures so that they not act as flow barriers and minimise disturbance to the flow regime.

			Rehabilitation and monitoring should be comprehensive and should aim to remove all structures, re-instate the watercourse or wetland morphology and establish an indigenous vegetation layer. Watercourses being linear by nature is almost unavoidable although circular wetland systems are much more easily avoided.

Please refer to the full impact assessment by Mr. Darius Van Rensburg in the Ecological and Wetland Assessment in **Annexure 6**.

5.7. Issues and responses from public consultation process

The 2018 WULA made in terms of Section 21(c) and (i) of the NWA to allow RD to mine inside the Vaal River and watercourses on the interior of the mining area requires EA from the DMR. The Scoping and Environmental Impact Reporting (**"S&EIR"**) process requires that a Public Participation Process (**"PPP"**) be conducted in terms of the 2014 EIA Regulations as amended in 2017. At the time of this report the S&EIR was in the Scoping Phase and the PPP was not completed. The outcome of the PPP will be sent to the DWS with the Environmental Impact Assessment report and the Environmental Management Programme report during the EIA phase of the project.

However, after commencement of the PPP the following table indicates the I&AP notified of the project and comments that were received regarding the project:

Name	Organisation / Interest	Contact Information	Manner of Notification	Comments received
Authorities				
Ms. Z.M. Bogatsu (Municipal Manager)	Frances Baard District Municipality	Private Bag X6088 Kimberley 8300 51 Drakensberg Ave	Per email on 11/07/2018	No comment

		Carters Glen Kimberley Contact: Fatima Ruiters (Personal Assistant) (053) 838 0998 Email: fatima.ruiters@fbdm.co.za		
Mr. G. Akharwaray (Municipal Manager)	Sol Plaatjies Local Municipality	Tel: 053 830 6100 Email: gakharwaray@solplaatje.org.za Private Bag X5030 Sol Plaatje Drive Kimberley 8300	Per Email on 11/07/2018	No comment
Mr. W. Mothibi (HOD – Agricultural and Rural Development) OF Harm Voster	Department of Agriculture, Land reform and Rural Development (Northern Cape)	053 838 9100 (T) Private Bag X5018 Kimberley 8300 162 George Street Kimberlite Building 051 409 2624 082 413 1796	Per Registered Letter on 11/07/2018	No comment
Ms. J. Mans (Chief Forester: NFA Regulations)	Dept. of Agriculture, Forestry & Fisheries	Tel: 054 – 338 5909 PO Box 2782 Upington 8800 Email: jacolinema@daff.gov.za		Ms. Mans gave the following comments in an email on18/07/2018: Referring to mining activities inside Vaal

				River: 1) - may negatively impact the riparian vegetation etc -developer to assess impact and avoid as far as possible. -If disturbance of trees to take place, a valid Forest Act License to be obtained prior 2) Supporting docs req When submitting NFA License includes: EA, Final approved layout, Flora permit ref nr. And Applicants ID. -then site inspection -time frame to be 30days from receipt of information. 3) Impact on trees

				Indirectly affect bird habitats. Therefore specialist studies must Include: terrestrial fauna and flora impact study with specific attention to Avifauna impacts and IBA. Aquatic study as well. 4) No trees with birdsnests to be disturbed without valid fauna permit 5) Site must be overlaid on the NC Critical biodiversity Area (CBA) Map. Avoid impacts on CBA's and ESA's to be avoided. If not, inputs from provincial conservation authority. 6) Rehabilitation

				must include re-planting of indigenous riparian vegetation. Recommended that seeds be harvested before disturbance.
Ms Elizabeth Botes (HOD-Environment and Nature Conservation)	Department of Environment and Nature Conservation (Northern Cape)	Private Bag X6010 Kimberley 8301 90 Long Street Kimberley 8300 053 807 7300 (Tel) 053 807 7328 (Fax)	Per Registered Letter on 11/07/2018	No comment
Mr. Pieter Swart (Regional Manager)	Department of Mineral Resources (Northern Cape)	Email: Pieter.Swart@dmr.gov.za 65 Phakamile Mabija Street Perm Building Kimberley 8300 (053) 807 1700 (T) (053) 830 0827 (F)	Per Email on 11/07/2018	No comment

Mr. A. Abrahams (Chief director)	Department of Water affairs – Water Management Area 10	053 830 8803 (T) 0082 883 6741 (C) 0053 831 4534 (F) Private Bag X6101 Kimberley 8300 Email: AbrahamsA@dwa.gov.za	Per Email on 11/07/2018	No comment
Mr. A. Salomon	South-African Heritage Resource Agency	021 462 4502 (T) PO Box 4637 Cape Town 8000	Submitted online on 16/07/2018	Interim comments were received via email on 3 August: Developer to ensure that a Heritage Impact Assessment (HIA) is done and must include an archaeological, paleaentological and any other applicable heritage components and must be conducted as part of the EA. The proposed prospecting area is located within an area of moderate to

				high sensitivity in terms of palaeontological resources. Any other heritage resources as defined in section 3 of the NHRA that may be impacted must also be assessed. Scoping and EIA reports with all appendices must be submitted to the SAHRIS application at the start of each Public Review period for informed comment to be issued.
Ms. Pauline Williams (MEC)	Northern Cape Provincial Heritage Authority	1 Monridge Office Park c/o Kekewich Drive & Memorial Road Kimberley 8300 079 036 9695 (C) Email: rtimothy@nbkb.org.za	Per Email on 11/07/2018	No comment
Identified interested and Affected Parties				

Adre Els Safaries CC (Adjacent Landowner)	Zand Plaats 102/3 Zand Plaats 102/14	083 451 1007 (C) Email: adreels@yahoo.com	Per Email 11/07/2018	No comment
Schmidtsdrift Communal Property Association (Contact – Mr. Ezekiel Molelekwa) (Adjacent Landowner)	Schmidtsdrift 248/RE	082 427 0008 (C) Schmidtsdrift CPA P.O. Box 688 Kimberley 8300	Per Registered Letter on 11/07/2018	No comment
Mr. Adriaan Jocobus Steenkamp (Adjacent Landowner)	Doornlaagte 97/RE	Email: boeta.steenkamp@yahoo.com	Per Email on 11/07/2018	No comment
Grootdam Trust (Adjacent Landowner)	Ferny Hoek Flat 108/1	Kry niks		No comment
Corne Anderson Piet Oosthuizen (De Beers consolidated mines Pty Ltd)	Grasrandt 109/RE Randt Plaats 96/RE	Email: Corne.Anderson@debeersgroup.com Email: Piet.Oosthuizen@debeersgroup.com	Per Email 11/07/2018	Mr. Anderson indicated in an email that he would like to register as an I&AP on the project. He also indicated that

(Adjacent Landowner)				no comments will be presented until amendments to Annexure 1 has been approved at a higher lever. Turn 180 responded by assuring that Mr Anderson is automatically registered as an I&AP as a landowner and that all future reports and information will be forwarded regarding the project.
Koos Van Staden and Johan van Staden Paalsewerf Boerdery CC (Adjacent Landowner).	Mosesberg 6/3	Koos: 082 326 7657 (C) koos@douglas.co.za Johan: 081 013 3560 (C) cjvanstaden1@gmail.com	Per Email 11/07/2018	No comment
Regal Royal Development Pty Ltd (Adjacent Landowner)	Mosesberg 6/14 - 18	Kry niks		No comment

Mr. William Kenneth Shaw (Adjacent Landowner)	Mosesberg 6/19	084 561 1939 (C) PO Box 486 Kimberley 8300	Per Registered Letter on 11/07/2018	No comment
Mr. Duncan Clifford Shaw (Adjacent Landowner)	Mosesberg 6/21	072 463 5604 (C) 7 Buster Bowden Rhodesdene 8301 PO Box 1100 Kimberley 8300	Per Registered Letter on 11/07/2018	No comment
Danie Kuhn (Adjacent Landowner)	Zand Plaats 102/15	082 524 8567 (C) Email: ddk@wam.co.za	Per Email on 11/07/2018	No comment
Sol Plaatjies Local Municipality (Adjacent Landowner)	Drooge Veldt 292/RE	Mr. G. Akharwaray (Municipal Manager) Tel: 053 830 6100 Email: gakharwaray@solplaatje.org.za Private Bag X5030 Sol Plaatje Drive Kimberley 8300	Per Email on 11/07/2018	No comment
Bosman Estate	Farm 293/2 Farm 293/RE	Kry niks		No comment
Adjacent		charleskros@vodamail.co.za	Per Email on	No comment

landowner			11/07/2018	
Adjacent landowner		hsadup@lantic.net	Per Email on 11/07/2018	No comment
Adjacent landowner		Deon.joubert@sanparks.org nico@africantrophysafaris.com koketso.kotsoe@sanparks.co.za	Per Email on 11/07/2018	Original notification was E-mailed to Mr Deon Joubert of Sanparks. Turn 180 received feedback from Mr Joubert that he resigned from Sanparks and that all correspondence should be sent to the acting park manager Mr. Kotsoe. The notification was then forwarded to him.
Rooipoort Community Development Trust	Land Claim	Vernon Mostert (Chairman) Email: Vernon@xcelentproperties.co.za P.O. Box 110025 Hadison Park Kimberley 8306		Turn 180 received an email from Mr. Mostert on 13/07/2018 with a formal letter of objection against the project because

				of a land claim. Turn 180 responded on 16/07/2018 indicating that all future correspondence regarding this project will be forwarded to Mr Mostert and that the letter will be included in the comments and response register. Turn 180 also indicated that they await the land claims letter from Dept of Rural Development and Land Reform which will then also be included in the register.
Rooipoort Trust (Mr. Richard Hoogstander)	Land Claim	073 210 4644 (Cell) rooipoorttrust@webmail.co.za	Notified telephonically and via e-mail on 30/7/2018	No comment
Romance	Farm Harrisdale	082 820 3393 (Cell)	Registered as I&AP on 25	Mr. De Kock requested to be

(Pty) Ltd Mr. L. Kock	2/226	053 531 9701 (Fax) louis@wildeklawer.com	September 2018.	kept informed of the project on 25/9/2018.

As indicated above a response to the comments received will only be sent before submission of the Scoping Report. The Scoping Report will be sent to all registered I&AP.

5.8. Matters requiring attention / problem statement

All comments will be addressed as part of the WULA and EIA processes and the outcome of the PPP will be submitted to the Competent Authorities.

5.9. Assessment of level and confidence of information

Information was received from qualified specialists appointed to undertake specialist studies and compile the necessary reports of their findings. This report indicates the outcomes of the specialist reports, information gathered from the applicant and information gathered on site by Turn 180. The confidence of the information contained in the report is therefore regarded as true and very high.

6. WATER AND WASTE MANAGEMENT

6.1. Water and waste management philosophy

RD's water and waste management philosophy is derived from the companies EMP and IWWMP which aims to identify all possible impacts which may occur because of the mining and the mitigation and management measures that will be implemented to address these impacts to enhance positive aspects and minimise negative aspects.

- **Surface water philosophy**

It will always be ensured that water from the Vaal River is not abstracted at rates exceeding the volume applied for with DWS.

Storm water measures will be implemented and maintained to divert clean storm water around the operational area to prevent contamination of the 'off-site' area.

Should the WUL be authorised to undertake mining activities within and close to watercourses on the mining area, including the Vaal River a very strict water monitoring programme will be enforced and the operation close to and inside watercourses will be monitored constantly and inspected by internal and external Environmental Compliance Officers, ecologists, wetland specialists and engineers. All measures proposed by the Civil Engineer will be implemented to prevent or limit sedimentation and/or pollution of watercourses.

- **Groundwater philosophy**

The potential for pollution on groundwater resources to occur is negligible.

- **Storm water**

Storm water management measures have been implemented, not only to ensure that clean water is diverted around the site, but also in such a manner to prevent and/or minimise the potential for erosion to occur on the site.

- **Waste**

Waste is disposed of according to key waste streams and the collection and disposal of the waste is done according to the EMP for RD.

6.2. Strategies

- **Surface water**

The management strategy for the surface water resources includes the following:

  - The abstraction volume from surface water resources applied for with DWS will not be exceeded;

- Surface water monitoring will be conducted quarterly over the lifespan of the operation;
- Pollution sources will be contained to prevent surface water resources from being contaminated;
- A freeboard will be maintained to prevent the pollution sources from overflowing during a possible heavy rain event, even if this is highly unlikely.
- On commencement of the activities within watercourses the surface water monitoring will be conducted on a monthly basis or before, during and after a section of a watercourse is mined.

- **Groundwater**

The management strategy for the groundwater resources includes the following:

- Groundwater will not be used in the processing plant;
- Groundwater used for domestic use will be used sparingly and will not be wasted;
- Water abstracted from boreholes will be metered to ensure that the volume of water abstracted do not exceed the volume applied for.

- **Storm water**

The management strategy for the storm water includes the following:

- Contaminated storm water will be contained and allowed to evaporate;
- Seepage from the First Cut will be contained to be reused in the Process Plant;
- Clean and dirty storm water will be separated by means of trenches and berms around operational areas;
- Any contaminated substances (i.e. soil, rags, etc.) will be stored in marked bins preventing the contamination of storm water;
- Cut-off trenches will be constructed around all diversion channels to divert clean water to the Vaal River and to prevent water from the operational area to drain into watercourses;
- Hazardous substances and/or waste will be stored in a bunded area.

- **Waste**

The strategy for the management of storm water is the following:

- Waste will be disposed of according to the RD EMP;
- Waste will be separated into different key waste streams;
- The reuse, reduction and recycling of waste on site will be promoted throughout the lifetime of the project.

6.3. Performance objectives / goals

An EMP was developed for the mine wherein RD commits to environmental management and provides a broad framework for environmental activities at the operation.

Table 8: Performance objectives for Rooipoort Developments

Theme	Performance objective / goal
Surface water	• Abstraction of water does not exceed the volume of water applied for with DWS, • Maintaining good water quality, • Separation of clean and dirty water, • Containing the seepage from the First Cut to be reused in the processing plant, • Minimal siltation of watercourses.
Groundwater	• No groundwater used in the processing plant, • Maintaining good groundwater quality, • Identify and manage any pollution source that might contaminate the groundwater.
Storm water	• Separation of clean and dirty storm water, • No pollution of the Vaal River as a result of the mining activities, • Maintain berms and trenches for the diversion of storm water.
Waste	• Waste is separated into different key waste streams, • Waste is stored and disposed of according to the EMP for waste compiled by RD, • The operational area is kept clean and tidy, • Fine tailings are only backfilled into the First Cut and the structure of the First Cut is maintained.

6.4. Measures to achieve and sustain performance objectives

The measures to achieve and sustain the performance objectives will be implemented as indicated in the EMP, Mining Works Programme and specialist reports in **Annexure 6**.

6.5. Option analysis

This section is not applicable as there are not many preferred options for water and waste management measures to be implemented apart from what is indicated in this report.

6.6. IWWMP action plan

The priority actions and other short, medium and long-term actions are as follow:

Theme	Performance objective	Actions / Measures implemented	Responsible person
Surface water	Abstraction of water from sources within safe yield	• Monthly recording of abstraction volumes from sources, • No increase in the volume of water needed by Process Plant, • Optimal reuse and recycling of water from the Process Plant.	• Environmental officer • Mine manager • Mine manager
	No contamination of surface water resources	• Quarterly monitoring of surface water quality. Will be implemented to monthly after authorisation is received to mine inside watercourses. • Identify and manage pollution sources to reduce risk of contamination, • Contain seepage from First Cut and reuse in Process Plant. • Contain water in PWD.	• Environmental officer • Environmental officer • Environmental officer
	Free drainage of watercourses	• Ensure that there are no obstructions within	• Environmental officer

Theme	Performance objective	Actions / Measures implemented	Responsible person
		watercourses.	
Groundwater	Maintain good groundwater quality	• Identify and manage pollution sources to reduce risk of contamination, • Establish a groundwater monitoring programme to identify pollution.	• Environmental officer • Environmental officer
Storm water	Separation of clean and dirty storm water	• Delineate operational areas to identify areas with potential dirty storm water, • Implement and maintain berms and trenches around operational areas, • Storage and disposal of hazardous waste and material should be done in a manner to prevent contamination of storm water.	• Environmental officer • Environmental officer
Waste	Classification and separation of waste into key waste streams	• Provide marked disposal areas / bins for the disposal of different waste streams (i.e. hazardous-, general waste, etc.)	• Environmental officer / Section foreman
	Legal compliance	• Waste is stored and	• Environmental officer

Theme	Performance objective	Actions / Measures implemented	Responsible person
		disposed of according to the EMP	
	Reuse, reduce and recycling of waste	• Maintain the reuse of the First Cut water.	• Environmental officer / Mine manager
	Management of First Cut	• Monitor the capacity of the First Cut	• Environmental officer

- **Short term actions:**

  Ensure compliance with all relevant legislation by obtaining authorisation for all applications as included in the IWULA.

- **Medium term actions:**

  Ongoing investigation, development and implementation of additional measures for the reduction, reuse and recycling of process water to ensure optimal water use.

- **Long term actions:**

  The long-term actions of the operation include the ongoing monitoring of all water resources and investigating, developing and implementing management measures to reduce any environmental impacts.

6.7. Control and monitoring

6.7.1. Monitoring of change in baseline information

The information on the baseline environment has been established by the various reports compiled at the initiation of the operation as well as reports compiled by specialists during the operation. Refer to **Annexure 6**

Baseline conditions will be monitored and changes in the baseline environmental conditions will be investigated and reported. It is not foreseen that the baseline environment will change if concurrent rehabilitation is done on mining areas and the mitigation measures are implemented as indicated in the specialist reports.

6.7.2. Audit and report on performance of measures

Turn 180 was appointed to conduct monthly environmental compliance audits and compile a report including all findings of the audit. This report will also include the results of the sampling after every quarter. The audit entails the monitoring of the implementation of management measures.

An engineer will be appointed to conduct inspections on the mining operations within watercourses if authorised.

Cliffe Decker Hoffmyer (**CDH**) was appointed to ensure legal compliance to all aspects of the operation. Monthly compliance meetings or feedback and advise sessions are conducted between the various parties (i.e. RD, Turn 180, CDH).

6.7.3. Audit and report on relevance of action plan

In order to ensure compliance with the requirements of DWS and best practices, as well as to ensure continued relevancy of the IWWMP, RD conducts the following audits and reports as required:

- Compile an IWWMP performance assessment report based on verification of compliance of this IWWMP to be implemented annually;
- Surface water monitoring results will be submitted to DWS annually;
- A water and waste report will be compiled annually, reporting on surface water qualities, water quantities used and disposed, waste generated and disposed and water balances; Compliance to set targets will be evaluated and reported.
- Involve identified I&APs and stakeholders during the IWULA process of this registration process and any potential new water uses in future. Any complaints received during the consultation process or during the Operational Phase will be recorded in the complaints register and addressed where possible.

7. CONCLUSION

7.1. Regulatory status of the activity

A WUL was issued for RD on 19 November 2015 authorising the following water uses:

- **Section 21(a):**
  - Abstraction of water from the Vaal River
- **Section 21(g):**
  - Disposal (storage/drying) of fine tailings in the FTSP
  - Dust suppression with water from the RWD.

Note that an amendment was submitted to DWS to apply for the abstraction of water from the Vaal River on 4 alternative points as the operation will move over the mining right area.

A new IWULA is submitted to the DWS Northern Cape to apply for the following additional water uses:

- **Section 21(a):**
  - Abstracting of water from boreholes for domestic use.
- **Section 21(b):**
  - Storage of water in the PWD, and
  - Storage of water in the First Cut.
- **Section 21(c) & (i):**
  - The impeding and altering of the beds and banks of watercourses to establish road crossings through the watercourses,
  - The undertaking of activities within 100 m from a watercourse.
- **Section 21(e):**
  - The use of water containing waste for dust suppression.
- **Section 21(g):**
- The disposal of water containing waste in the First Cut and the PWD,
- The disposal of waste product by backfilling into open voids during rehabilitation of the voids.

A new WULA is submitted with this report in terms of Section 21(c) and (i) to authorise RD to undertake mining activities inside watercourses. This application has not been authorised at the time of this report and the activities will only commence after authorisations is received.

7.2. Statement on water uses requiring authorisation, dispensing with the requirement for a license and possible exemption from Regulations

A WULA was submitted to authorise the abstraction of water from the Vaal River on all 5 properties as indicated in this report in June 2017. The authorisation for this application has not been received to date.

This reports forms part of an application made in terms of Section 21(c) and (i) of the NWA to allow RD to undertake mining activities inside watercourses. The application will be reviewed and assessed before a decision is made.

7.3. Section 27(1) motivation

7.3.1. Section 27(1)(a): Existing lawful water uses

There are no existing lawful uses for the operation.

RD has a water use license i.t.o. Section 21(a) and (g) as indicated in Section 7.1 of this report.

7.3.2. Section 27(1)(b): The need to redress the results of past racial and gender discrimination

The mining operation is authorised in terms of the Minerals and Petroleum Resources Development Act (**MPRDA**) 28 of 2002 which is guided by principles in the mining charter with clear black empowerment objectives. RD has 26% HDSA partners. Refer to the company structure in Section 2.7 and the SLP in **Annexure 6**.

7.3.3. Section 27(1)(c): Efficient and beneficial use of water in the public interest

RD creates direct job opportunities to 180 people excluding top management and contractors and forms an integral part of the local economy in terms of the supporting services and job creation.

Diamond mining plays an integral part in the economic development locally and nationally to which RD contributes.

7.3.4. Section 27(1)(d): The socio-economic impact -

(i) of the Water Use or Uses if authorised; or

(ii) of the failure to authorise the Water Use or Uses

(i) The authorization of the water uses will secure employment opportunities to 180 individuals (excluding top management) for a longer period as it is expected that the authoirsation of the water use will extend the life of mine.

(ii) If the water use is not licensed the opportunity for the applicant to mine diamonds from the watercourses and sensitive areas will be lost. With that the opportunity to contribute to the local and

national economy will also be lost. Not authorising the activity will limit the life of mine and employees will be employed for a shorted time. Not authorising the water use will sterilise the mineral resource available on the property.

Furthermore, the application is made in an attempt to extract all diamonds from the mining right area in order to rehabilitate the land for future use as a nature reserve.

7.3.5. Section 27(1)(e): Any catchment management strategy applicable to the relevant water resource

The applicable area is situated within the Lower Vaal Water Management Area and falls under the Internal Strategic Perspective for the Lower Vaal Water Management Area issued by the Department of Water Affairs and Forestry, Directorate: National Water Resource Planning (October 2004). However, there are no specific catchment management strategy objectives for this specific resource applicable to this application.

7.3.6. Section 27(1)(f): The likely effect of the water uses to be authorised on the water resource and other water users

The quality of the water in the First Cut is better than the quality of the water from the Vaal River from where the First Cut water originates. The chemical analysis of this water indicates that it falls within the recommended levels for drinking water (chemical elements). However, water used in the process plant is abstracted from the Vaal River and the bacteriological values are higher than the limits and the water contains e.coli. This water is used in the plant and then discharged to the First Cut. Water in the first cut therefore is contaminated by industries upstream of the mining operation. No waste will be allowed to be discharged into any other surface water resource (i.e. the Vaal River). No other water users will be negatively affected by the discharge of the water into the First Cut. The potential impact on surface- or groundwater is insignificant as the quality of the water from the First Cut is similar to the quality in the Vaal River and also complies with the general quality limits for waste water that may be discharge into a water resource.

Water from the Vaal River will only be abstracted according to permitted volumes. This will ensure that there are no, or little, impact on other water users. Water from the processing plant is recovered from the First Cut to optimize water use on the plant.

Other water users in the area relates to downstream agricultural activities where water is used for crop irrigation. The proposed water use will not affect the volume of available water for downstream users as the flow of the river will never be blocked and will only be diverted. Should the abstraction of water on properties adjacent to the river be impacted by the diversion RD will ensure that water is supplied to the adjacent properties by placement of the pumps inside the diversion channel to prevent any negative impacts relating to accessibility of water for adjacent landowners.

The risk of impacts occurring as indicated in the Environmental Impacts Assessment is high when mining inside the watercourses as this can contribute to additional sedimentation of the Vaal River. Although the creation of the diversion channels will not block the flow of water completely the flow of water in the river will change. However, this is a temporary activity and it is likely that each section will be mined in a month after which it will be rehabilitated. Only one section will be mined at any given time to further reduce impact on stream flow and sedimentation. Although it is expected that sedimentation will occur as a result of the disturbance of the bed of the watercourses all effort will be made to reduce the impacts. Specialists

7.3.7. Section 27(1)(g): The class and resource objectives of the water resource

The Vaal River in the Lower Vaal WMA is classed as a "workhorse" river. A formally published classification system does not exist and none of the rivers in the Lower Vaal WMA have approved Water Quality Objectives.

7.3.8. Section 27(1)(h): Investments already made and to be made by the water user in respect of the water use in question

The total investments made to recover water for re-use and infrastructure in place to abstract water from the Vaal River (as approved in the temporary transfer) is approximately R430 000.00.

The only investment made towards the new application in terms of Section 21(c) and (i) to date was the appointment of specialists and consultants to commence with specialist studies and application processes.

7.3.9. Section 27(1)(i): The strategic importance of the water uses to be authorised

The mining industry is a major role player in the local and national economy, not only for the generation of revenue but also an important sector to create and sustain job opportunities. The authorization of the water use is pivotal to the RD operations with 180 direct jobs at this time excluding top management and contractors. The operation is also the lifeline of various other sub-contractors.

7.3.10. Section 27(1)(j): The quality of water in the water resource which may be required for the Reserve and for meeting international obligations

There will be no impact on the quality of the Vaal River because of the water use as water will only be abstracted from the resource. No waste or water containing waste will be allowed to discharge into the river. The reserve or international obligations to Namibia will not be affected.

7.3.11. Section 27(1)(k): The probable duration of any undertaking for which a water use is to be authorised

The mine has a lifetime of approximately 15 years from commencement in 2011. The authorisation of the water use will extend the life of mine which will ensure job stability for the workforce for a longer period.

7.4. Key commitments

Rooipoort Developements (Pty) Ltd commits to the following conditions:

- Abstraction volumes from the Vaal River will be recorded as stipulated in the monitoring programme;
- Quarterly monitoring will be ongoing throughout the lifetime of the operation to ensure that any impact on any water resource is identified and rectified. The monitoring programme will be amended to undertake monthly sampling in the Vaal River if the new water use is authorised;
- Waste will be managed according to the EMP of RD;
- Sections to be mined inside the watercourses will be undertaken in accordance with the Civil Engineer design and report and the conditions of the WUL;
- No activity will be undertaken without the required authorisation.

8. REFERENCES

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Bezuidenhout, H, Conservation Services, South African National Parks, (2009). *The Classification, Mapping and Description of the Vegetation of the Rooipoort Nature Reserve, Northern Cape, South Africa*

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Rooipoort Developments (Pty) Ltd (2008). *Environmental Management Plan*

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Water Resource Council, 2005

Annexure 1

Project Team – EAP CV and Experience

Curriculum Vitae of
Louis de Villiers

Nationality	: South Africa
Profession	: Environmental Consultant
Specialization	: Environmental Management and GIS
Date of birth	: 22 December 1983
ID Number	: 831222 5030 080

CONTACT DETAILS

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QUALIFICATIONS:

- **UNIVERSITY OF THE FREE STATE**

2010: B.Sc. Environmental Geography

- **NOSA Bloemfontein**

2013: SAMTRAC

EXPERIENCE:

2009:

Practical demonstrator at the UFS (Geography Department): Second Year Geographic Information Systems Students

2010:

Practical demonstrator at the UFS:

- First year Introduction to Chemistry
- Second year Soil Science
- First year Introduction to Geography
- First year Urban Geography
- Second year Geographic Information Systems

Dec 2010 – March 2018:

Environmental Consultant at Eko Environmental

April 2018 – Current:

Director and Environmental Consultant at Turn 180 Environmental Consultants

FIELD OF EXPERTISE AND PROJECTS:

Environmental Impact Assessments
Environmental Management Reports
Mining authorisations
Waste license applications
Atmospheric Emission license applications
Water Use Authorisations
Data and GIS management
Environmental Compliance Audits and Monitoring

EAP Past Experience:

The following table indicates relevant experience under Turn 180 Environmental Consultants and previous employers:

Start and end Date	**Project**	**Applicant**
2013 – current	Environmental Compliance monitoring for the diamond tailings operation at Jagersfontein, including monthly dust fallout sampling and water quantity and quality monitoring	Jagersfontein Developments (Pty) Ltd
2013 – current	Environmental Compliance monitoring for the alluvial diamond mining operation at Rooipoort, Kimberley District, including water quantity and quality monitoring	Rooipoort Developments (Pty) Ltd
2013 (Issued in 2016)	Application for a Water Use License for the Rooipoort Developments Diamond Mining Operation, Kimberley District, Northern Cape	Rooipoort Developments (Pty) Ltd
2014 (Issued in 2018)	Application for a Water Use License for the Jagersfontein Diamond Tailings Operation, Fauresmith District, Free State	Jagersfontein Developments (Pty) Ltd
2011	Application for Environmental Authorization through BAR process for the construction of chicken broiler houses and an abattoir on the farm Welton RE/1587, Bloemfontein	Department of Public Works – Free State
2011	Applications for Environmental Authorization through BAR Process for the construction of chicken broiler houses on various farms (Approximately 15) in the Reits District of the Free State	Various applicants – Project managed by Grain Field Chickens
2011	Applications for Environmental Authorization through BAR Process for the construction of a pipeline for the bulk transportation of water on the farms Loverswalk 1063, Holpan 260 and Smithskraal 1519, Boshof RD	Mr. J. Greyling
2014	Applications for Environmental Authorization through BAR Process for the construction of chicken houses on the	Sunell Griesel Trust

	farm Daniels Kuil RE/393, Bloemfontein RD	
2014	Applications for Environmental Authorization through BAR Process for the construction of chicken houses on the farm Opdiekoppie RE/2904, Bloemfontein RD	Opdiekoppie Trust
2012	Application for Environmental Authorization through S&EIR Process in terms of Section 24G of the NEMAA and an application for an Atmospheric Emissions License for the operation of an incinerator on the farm Grootvlei RE/206, Bloemfontein	Department of Public Works – Free State
2013	Application for Environmental Authorization through BAR Process in terms of Section 24G of the NEMAA for the infilling of material into a watercourse for access on the farm Jagersfontein 16/14, Fauresmith RD	Jagersfontein Developments (Pty) Ltd
2014	Application for Environmental Authorization through BAR Process in terms of Section 24G of the NEMAA for the clearance of more than 1 ha of indigenous vegetation of the farm Zand Plaats 15/102, Kimberley RD.	Rooipoort Developments (Pty) Ltd
2015	Applications for Environmental Authorization through BAR Process and a Water Use License for the construction of a weir in the Wilge River on the farm Riverview RE/1062, Reitz	Department of Water and Sanitation
2015	Applications for Environmental Authorization through BAR Process and a Water Use License for the construction of a weir in the Vals River on the farm Brandhoek RE/20, Lindley	Department of Water and Sanitation
May 2018	Storm Water Management Plan for the kimberlite diamond operation on the farm Blaauwboschfontein 4/229, Boshoff, Free State	Kophia Diamonds
April 2018	Storm Water Management Plan for the alluvial diamond operation on the farm Slangheuvel 4/160, Barkley West	Thunderstone Investments (Pty) Ltd
2016	Application for a mining permit and Water Use License Application for the sand mining operation on the farm Glen Alphen 4/73, Ladybrand, Free State	Tewie Wessels Familie Trust
2015	Application for 2 mining authorisations for the dolerite mining operation on the farm Lower Tele 15 (communal	Department of Roads and Public Works –

	land), Musong Village, Sterkspruit District, Eastern Cape	Eastern Cape
2014	Application for a mining permit for the dolerite mining operation on Erven 226 and 238/RE, Indwe, Eastern Cape	Tau-Pele Construction (Pty) Ltd
2014	Application for a mining permit and Water Use License Application for the sand mining operation on the farm Van Niekerksrust RE/1782, Bloemfontein, Free State	Mr. C. Van Niekerk
2013	Application for a mining permit for the dolerite mining operation on the farm Plooysfontein 177, Hanover, Northern Cape	African Mining and Crushing
2012	Applications for mining authorisations for borrow pits and quarries on the N6 Bloemfontein – Onze Rust road upgrade project, Bloemfontein District, Free State	SANRAL

Annexure 2

Existing Permits and Exemptions

Annexure 3

Water Balance and results of water analysis

Waterbalance for Rooipoort Mine from 25 September'18 - 29 October'18 (Calculated over 34 days)

Water Inputs	Volume (m^3/year)	Volume (m^3/month)	Plant	Water Outputs	Volume (m^3/yr)	Volume (m^3/m)
				Dust suppresion	**18000**	**1800**
Vaal River abstraction	**0**	**21581**	Process Water Dam	Evaporation (Surface area: 1522m2, Evaporation 2400mm/a)	**3653**	**365**
Recovery from Slimes Dam	**0**	**76339**		Evaporation and other losses on the plant estimate	**500**	**50**
			Plant: 2 X DMS - Scrubbers - Double Deck and Sand Screens **97920** m^3/m			
				Water backfilled to voids during rehabilitation	**820**	**82**
				Evaporation: 28 411 m2 (2 400 mm/annum)	**68186**	**5682**
			Slimes dam **956227,2** m^3/yr **95623** m^3/m	Seepage 9,3%	**136015**	**13602**
Total In	**0**	**21581**		**Total out**	**227174**	**21581**

Annexure 4

Layout Plans, Maps, Design Drawings

Annexure 5

Public Participation Documentation

Please note that the Public Participation Process is currently underway as part of the Scoping and Environmental Impact Assessment process. The results of the final PPP will be delivered to DWS during the EIA phase.

Annexure 6

Supporting Documentation / Information and Specialist Reports