INTEGRATED WATER AND WASTE MANAGEMENT PLAN

PREPARED FOR ELANDSFONTEIN COLLIERY

2020

1315: Integrated Water and Waste Management Plan for Elandsfontein Colliery

DOCUMENT CONTROL

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REVISION AND AMENDMENTS

Date	No.	Description of Revision or Amendment
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Abbreviations and Definitions

BOD	:	Biological Oxygen Demand
CMA	:	Catchment Management Area
CMS	:	Catchment Management Strategy
COD	:	Chemical Oxygen Demand
DEA	:	Department of Environmental Affairs[1]
DMR	:	Department of Mineral Resources[2]
DWS	:	Department of Water and Sanitation[3]
EAP	:	Environmental Assessment Practitioner
ECO	:	Environmental Control Officer
EI	:	Ecological Importance
EIA	:	Environmental Impact Assessment
EIS	:	Ecological Importance and Sensitivity
EMP	:	Environmental Management Plan
EMPr	:	Environnemental Management Program
EMS	:	Environnemental Management System
EO	:	Environmental Officer
ES	:	Ecological Sensitivity
GSW	:	Geo Soil and Water cc
GDP	:	Gross Domestic Product
HRDP	:	Human Resources Development Programme
I&AP	:	Interested and Affected Party
IDP	:	Integrated Development Plan
ISO	:	International Organisation for Standardisation
IUA	:	Unit of Analysis
IWWMP:		Integrated Water and Waste Management Plan
LED	:	Local Economic Development

[1] This Ministry was recently renamed as Department of Environment Forestry and Fisheries (DEFF). All reference in this report to DEA should be read synonymously with DEFF.

[2] This Ministry was recently renamed as Department of Mineral Resources and Energy (DMRE). All reference in this report to DMR should be read synonymously with DMRE.

[3] This Ministry was recently renamed as Department of Human Settlements Water and Sanitation (DHSWS). All reference in this report to DWS should be read synonymously with DHSWS.

LoM	:	Life of Mine
MAE	:	Mean Annual Evaporation
mamsl	:	Metres Above Mean Sea Level
MAP	:	Mean Annual Precipitation
MAR	:	Mean Annual Runoff
MPRDA	:	Mineral and Petroleum Resources Development Act (Act 28 of 2002)
MSDS	:	Material Safety Data Sheet
NEMA	:	National Environmental Management Act, (Act 107 of 1998).
NEMBA	:	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMWA	:	National Environmental Management: Waste Act (Act 59 of 2008)
NFEPA	:	National Freshwater Ecosystem Priority Areas
NWA	:	National Water Act (Act 36 of 1998)
NWRS	:	National Water Resource Strategy
PCD	:	Pollution Control Dam
PES	:	Present Ecological Status
PPP	:	Public Participation Process
PPR	:	Public Participation Report
Ptn	:	Portion (in relation to farms and portions)
RE	:	Remaining Extent (in relation to farms and portions)
RQO	:	Resource Quality Objectives
SANS	:	South African National Standards
SASS	:	South African Scoring System
SAWQG	:	South African Water Quality Guidelines
SDS	:	Safety Data Sheet
SHE	:	Safety, Health and Environmental
SHEQ	:	Safety, Health, Environment and Quality
SLP	:	Social and Labour Plan
SWMP	:	Storm Water Management Plan
TDS	:	Total Dissolved Solids
WARMS	:	Water Authorisation Registration and Management System
WMA	:	Water Management Area

WML : Waste Management License

WMS : Waste Management Strategy

WCDSS : Water Conservation, Demand and Supply Strategy

WUL : Water Use Licence

WULA : Water Use Licence Application

1 INTRODUCTION

Geo Soil and Water CC. was appointed to assist Elandsfontein Colliery (Pty) Ltd (hereafter referred to as the "Elandsfontein Colliery"), with the compilation of an Integrated Water and Waste Management Plan (IWWMP) in-line with Department of Water & Sanitation (DWS) conditions to support an Integrated Water Use Licence Application (IWULA) renewal and associated amendments. Elandsfontein Colliery has an existing Water Use Licence (WUL) (Ref.no.: 04/B20G/CGI/3843) issued on 2015/10/22 for the Colliery and this WUL expires on 2020/10/22. An approval issued by the DWS to amend the co-ordinates of the Western Opencast Pit and wetland buffers in the Colliery was received on 2019/03/23. In addition to renewal of the existing licence, additional water uses have been identified that have been triggered by current site conditions/activities that were approved under the 2017 S102 as well as future water uses which are associated with a revised Mine Works Programme (MWP) to extend the current mining operation by 12 years (up to 2032).

1.1 ACTIVITY BACKGROUND

The Colliery was developed by Fraser Alexander in the 1980's and sold to Anker Coal in 1997. The Colliery is located in the Emalahleni Local Municipality within the Nkangala District Municipality in the Mpumalanga Province. Prior to 1991 and the passing of the Minerals Act, 1991 (Act No. 51 of 1991), there was no requirement for any mining licence or mining right, since the Mining Rights Act, 1967 did not apply to base minerals (although the provisions of the Mines and Works Act, 1956, dealing with mine safety, applied to all mines including coal). Accordingly, all mining conducted up to 1991 would have been unregulated particularly as far as environmental measures were concerned. Thereafter, the owners of all mines were required to obtain mining authorisations and to prepare Environmental Management Programmes. Elandsfontein Colliery has two mining rights, MP 30/5/1/2/2/63MR and MP 30/5/1/2/2/314MR in terms of the MPRDA for the Colliery. As Section 102 amendment application was submitted in 2017 to extend the mining areas and approval of the S102 was received in 2019. A further revision to the current MWP has been prepared in late 2019 to again expand upon the mining areas which will extend the life of mine (LoM) by another 12 years (year 2032).

1.2 CONTACT DETAILS OF THE APPLICANT

The applicant is Elandsfontein Colliery (Pty) Ltd. The relevant contact person for the project is provided in Table 1 below.

Table 1: Applicant Details

Item	Company Contact Details
Name of Applicant:	Elandsfontein Colliery (Pty) Ltd
Name of Mine:	Elandsfontein Colliery
Delegated responsible person:	Bridget Moeketsi
Physical Address:	Farm Elandsfontein 309JS, Clewer, Mpumalanga
Postal Address:	P.O. Box 33, Clewer, 1036
Tel:	+27 13 659 9900
Fax:	+27 11 867 0520
Email:	Bridgetm@ankercoal.co.za

1.3 REGIONAL SETTING AND LOCATION OF ACTIVITY

The Colliery operations are currently located on the remaining extent of portion 1, remaining extent of portion 6, remaining extent of portion 7, remaining extent of portion 8, portion 14 and portion 44 of the Farm Elandsfontein 309 JS (Figure 2) approximately 12km east of the Emalahleni town centre, which falls within the Emalahleni Local Municipality which in turn falls in the Nkangala District Municipality (NDM) in the Mpumalanga province of South Africa. See Figure 1 for the locality of the Colliery.

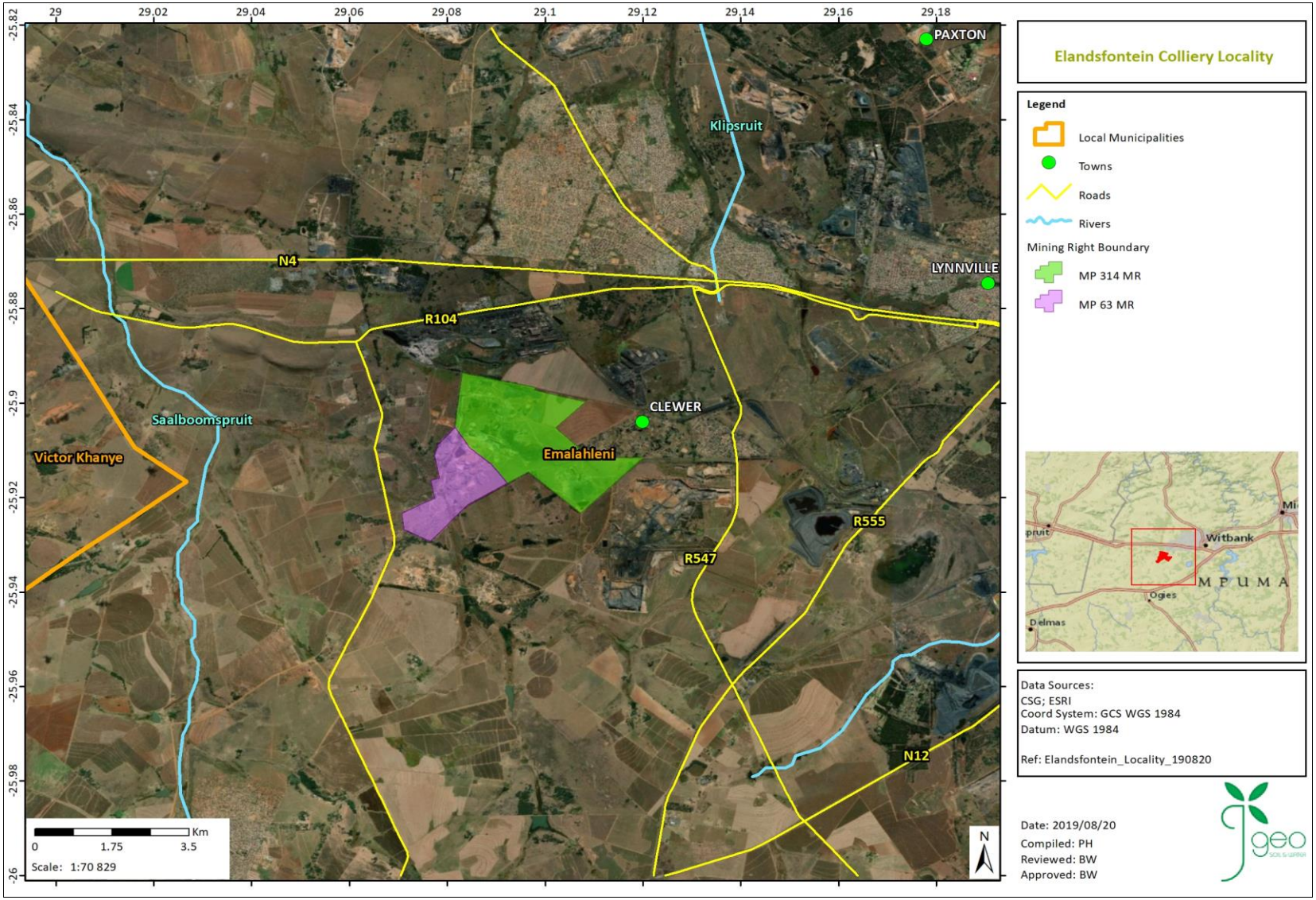


Figure 1: Locality of the Colliery

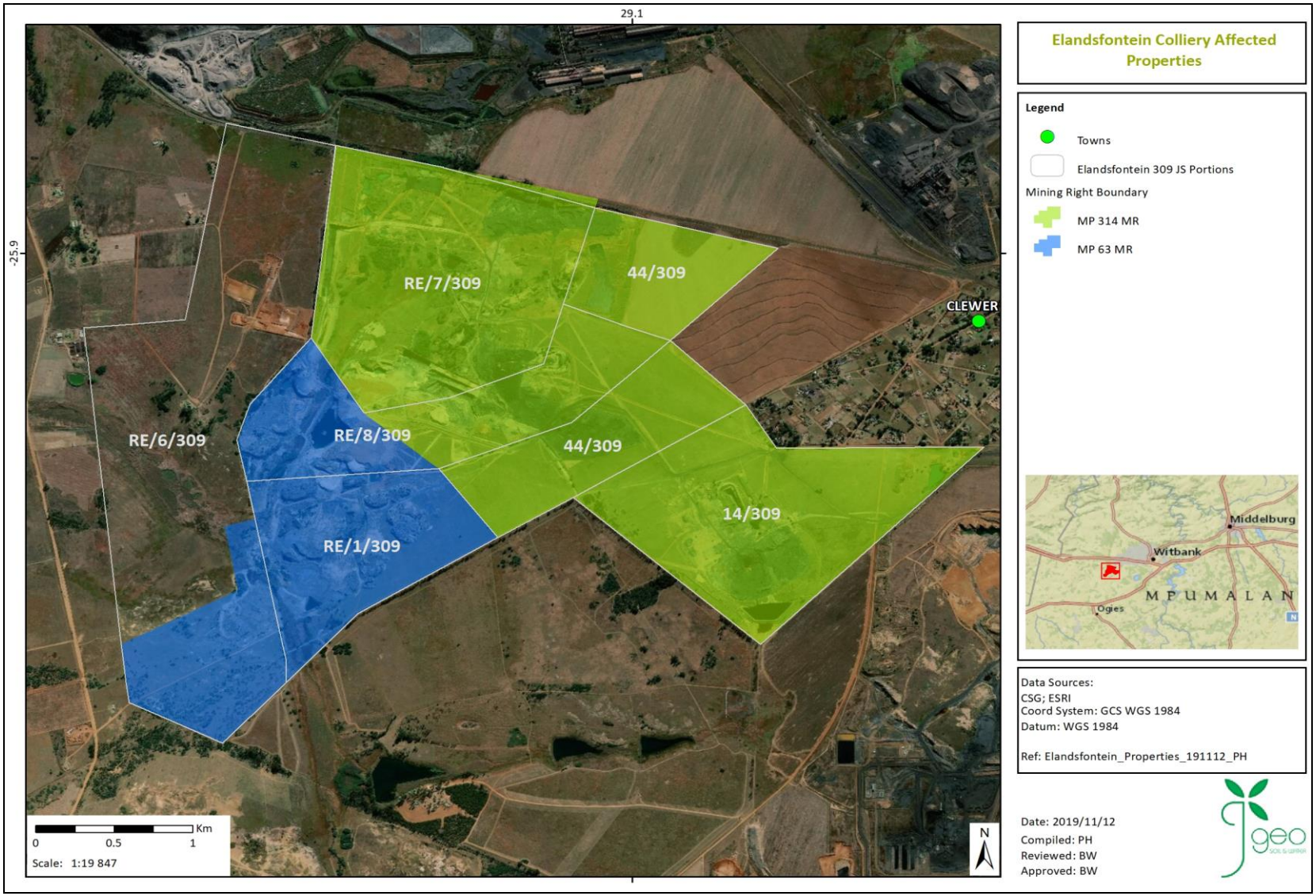


Figure 2: Mining right areas and properties

Highveld Steel and Vanadium complex (hereafter Highveld steel) is located north of Elandsfontein and Anglo Thermal Coal's Umlalazi operations (Umlalazi) is located directly east on portion 2 of the farm Elandsfontein 309JS. The site falls within the DWA quaternary catchment B20G in the Olifants Water Management Area (WMA) and falls under the Witbank Coalfields of Mpumalanga, where most of the country's coal is recovered.

1.4 PROPERTY DESCRIPTION

The mining activities take place on various portions of the farm Elandsfontein 309JS within the Emalahleni Local Municipality which in turn falls in the Nkangala District Municipality. Elandsfontein Colliery is the holder of the approved Mining Rights MP 30/5/1/2/2/63MR and MP 30/5/1/2/2/314MR). The copies of the Mining rights are attached as APPENDIX B, Table 2 indicates the farm portions that fall within the mining right area of the Colliery.

Table 2: Properties that form part of the Colliery

Mining Rights MP 30/5/1/2/2/63MR (237.35 hectares)				
Property details	**Farm Name:**	**Portion:**	**Title Deed**	**Owner**
	Elandsfontein 309JS	1 (RE)	T60885/2003	Elandsfontein Colliery (Pty) Ltd
	Elandsfontein 309JS	6 (RE)	T18520/2014	Plaas 309 Elandsfontein (Pty) Ltd
	Elandsfontein 309JS	8 (RE)	T14671/2010	Elandsfontein Colliery (Pty) Ltd
Mining Rights MP 30/5/1/2/2/314MR (314MR) (591.17 hectares)				
Property details	**Farm Name:**	**Portion:**	**Title Deed**	**Owner**
	Elandsfontein 309JS	7 (RE)	T114486/1996	Anker Coal & Mineral Holdings South Africa (Pty) Ltd
	Elandsfontein 309JS	8 (RE)	T14671/2010	Elandsfontein Colliery (Pty) Ltd
	Elandsfontein 309JS	14	T114486/1996	Anker Coal & Mineral Holdings South Africa (Pty) Ltd
	Elandsfontein 309JS	44	T114486/1996	Anker Coal & Mineral Holdings South Africa (Pty) Ltd

A description of existing authorisations for each of these properties is provided in Table 3 and Figure 3 indicates the locality of the Colliery and relevant mining areas.

Table 3: Authorisations/Permits and associated Property details

Document	Consultant	Applicable Properties	Reference Number
MPRDA EIA and EMPr (2017)	Digby Wells Environmental	Portion 6 (RE), 7 (RE), 14, and Portion 44 of the farm Elandsfontein 309JS	MP30/5/1/2/2/10132MR
IWWMP and Water Use License (2015)		Portion 1, 7, 8 and 14 of the farm Elandsfontein 309JS	04/B20G/CGI/3843

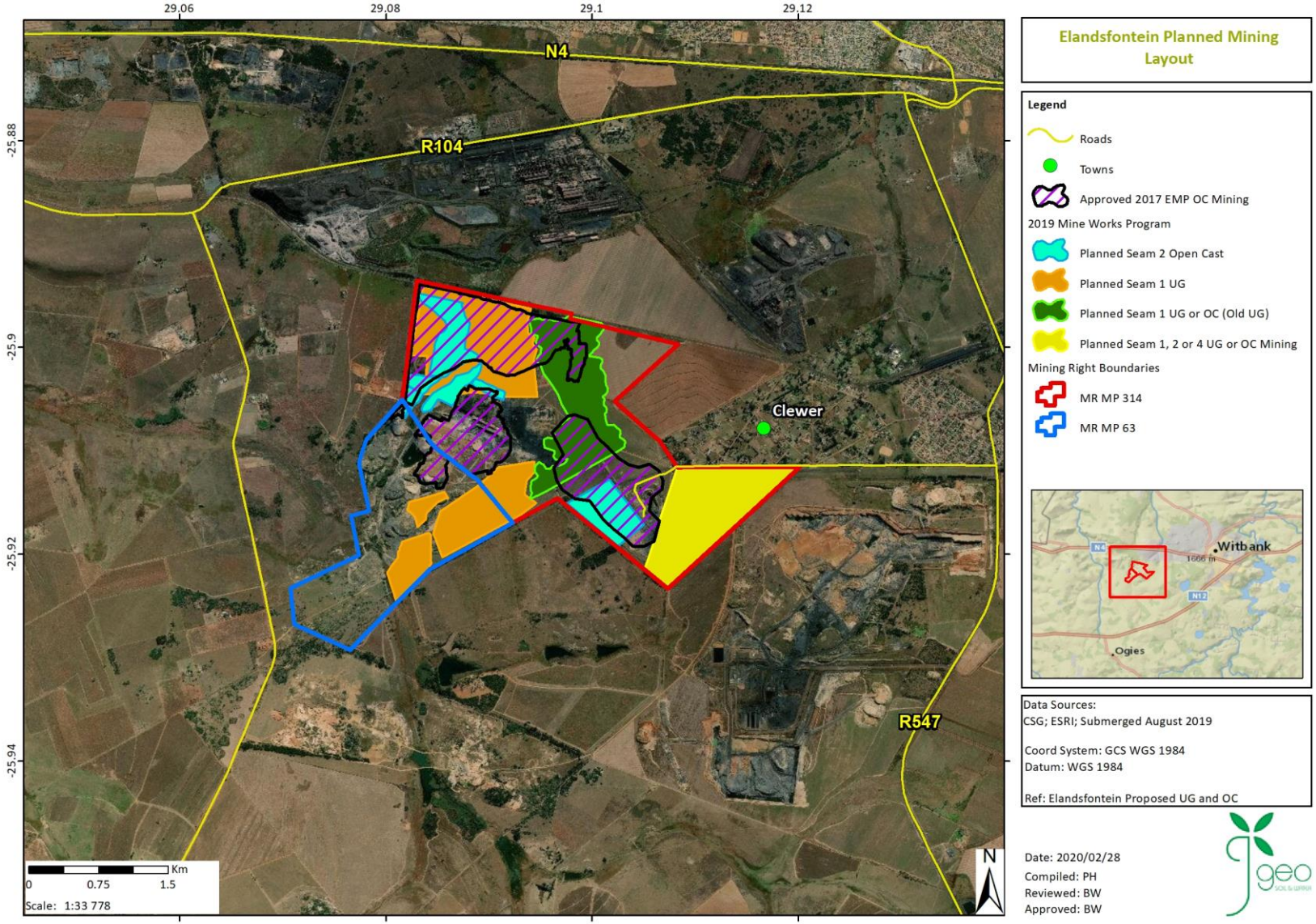


Figure 3: Location of the Colliery and the relevant mining areas

1.5 PURPOSE OF IWWMP

Although the requirement for the compilation of an IWWMP was originally aimed at collating and rationalising the information submitted for Water Use Licence Applications (WULA) to the DWS, it has progressed beyond this purpose to:

- Provide the regulatory authorities with focused and structured information not only to meet their general information needs, but also to articulate the required management measures and actions to achieve the water and waste related performance on an on-going basis; and
- Provide direction and guidance to the water user on water and waste management of any activity.

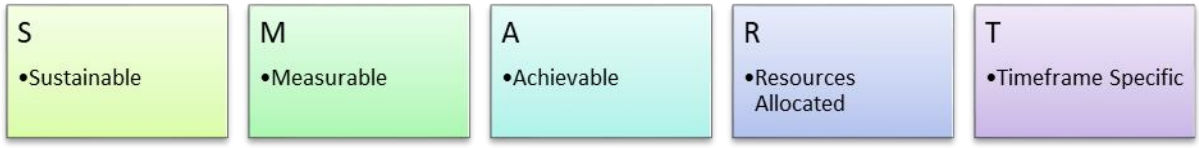
The IWWMP should be used in conjunction with other guidelines developed by DWS, such as the External Guideline on the Water Use Authorisation Process and the series of Best Practical Guidelines for water resource protection in the Industries and Mines. The Department and/or relevant Catchment Management Agencies (CMA) implement the integrated water resource management (IWRM) at source by means of an IWWMP.

The Department requires an IWWMP as a simple feasible, implementable plan for water users based upon site specific programmes, also taking into account the National Water Resource Strategy (NWRS), Catchment Management Strategy (CMS), Resource Quality Objectives (RQO's) and sensitivity of the receiving water resource, upstream and downstream cumulative impacts of water use activities, external water use authorisation guidelines, as well as water use specific supplementary information requirements. The most important component of the IWWMP development process is the formulation of various strategies, goals and objectives for the water use or waste management of an activity, in accordance with the set philosophies and policies. The policies must address the four key areas related to IWWMP development, namely process water, storm water, groundwater and waste. The purpose of an IWWMP is as follows:

- Compilation of a site specific, implementable, management plan addressing all the identified water use and waste management related aspects (e.g. process water balances, storm water management, groundwater management, water re-use and reclamation, water conservation and demand management, waste minimization and recycling) of the specific activity, in order to meet set goals and objectives, in accordance with Integrated Water Resources Management principles;
- Provision of management plan to guide a water user regarding the water and waste related measures which must be implemented on site in a progressive, structured manner in the short, medium and long term;
- Documentation of all the relevant information, as specified in this guideline, to enable the Department to make the decision regarding the authorisation of a water use;
- Clarification of the content of the IWWMP for DWS officials and the water users, as the various regional offices of DWS might have different interpretations regarding the content of an IWWMP;
- Standardisation of the format of the supporting documentation which the Department requires during submission of a WULA;
- Provision of guidance on the content of information required in an IWWMP as part of the water use authorisation process and level of detail that the Department requires to enable them to evaluate the supporting documentation to make a decision on authorisation water use; and

- Ensuring that a consistent approach is adopted by the Department and the various Regional Offices and CMA's with regards to IWWMPs.

It is the responsibility of the water user to demonstrate to the Department that the selected management measures in the IWWMP action plan adhere to the "SMART" concept i.e.:



It is a Departmental requirement that a water user needs to compile an IWWMP for any one of the following purposes:

- As the supporting technical documentation for any IWULA (the main purpose of this document);
- When converting Existing Lawful Use (ELU) to licensed water use; and
- In order to comply with the conditions of an existing water use licence.

The implementation of the IWWMP is an interactive process whereas its performance is monitored on an annual basis. The assessment of the IWWMP document itself, as well as the submission of information relating to monitoring and auditing conducted in terms of it could lead to its shortcomings, which must be addressed in the annual update of the action plan of the IWWMP. This will ensure that the concept of continual improvement is applied throughout the life cycle of the activity (Operational Guideline: IWWMP dated February 2010 and GNR 267, the Water Use Licence Application and Appeals Regulations, dated March 2017).

In line with the guidelines of the DWS Operational Guideline: Integrated Waste and Water Management Plan (2010) and GNR 267, Water Use Licence Application and Appeals Regulations (2017). Figure 4 and Table 4 provides a guide to the structure of the IWWMP.

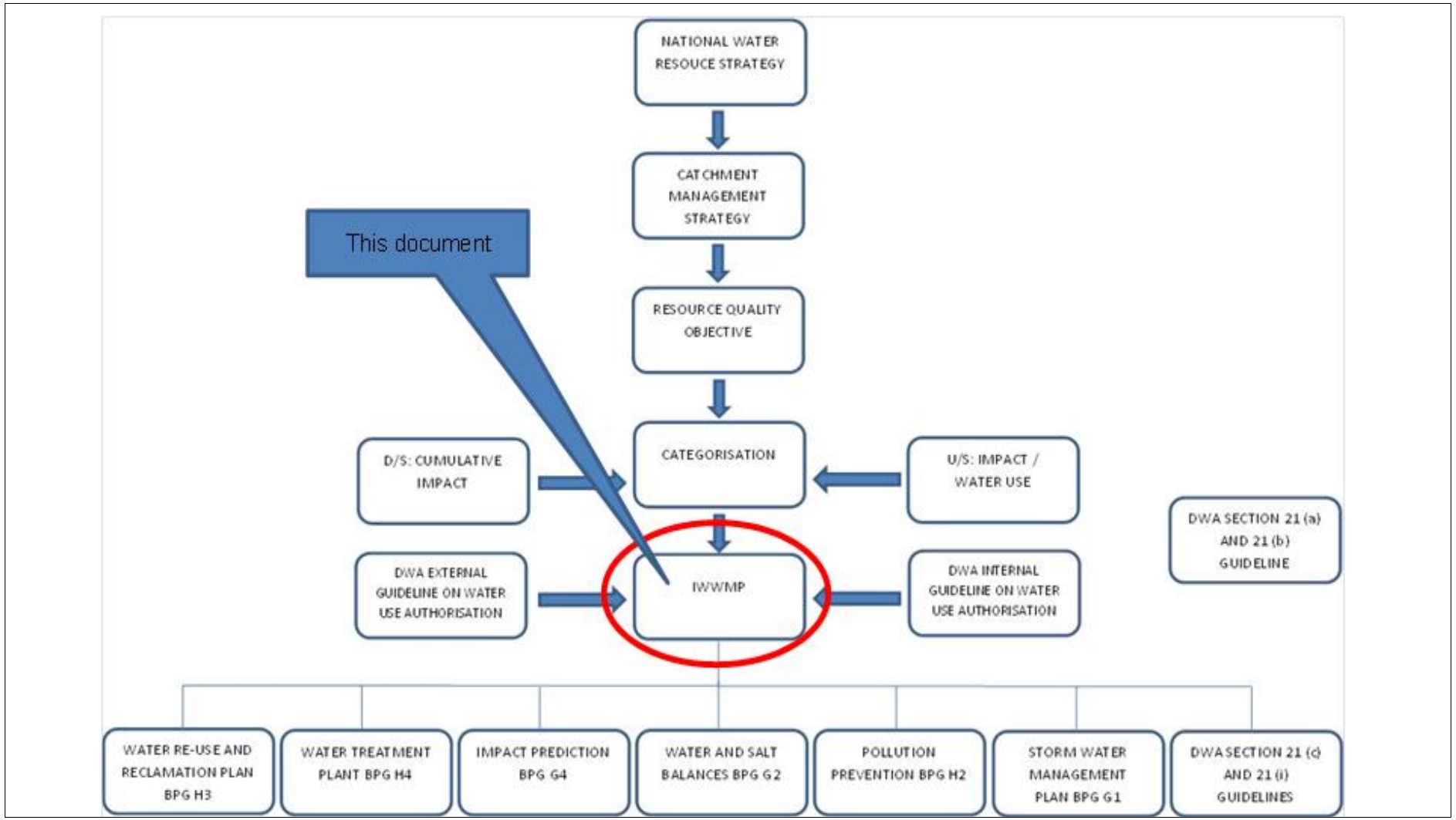


Figure 4: Schematic Layout of the IWWMP Approach

Table 4: Guide to the structure of the IWWMP

Guideline Item	Relevant IWWMP Section
Quantification of the Water Resource Problem	
Quantification of the Water Resource Problem	Section 4 and Section 5.5.
Are the existing water quality data adequate to identify contaminants of concern?	Section 4 and Section 4.3 and Section 4.4.3.
How well have the nature, extent and causes of the water management problems on site been identified?	Section 4.3, Section 4.4, Section 4.5 and Section 4.6.
To what extent has the analysis and characterization of the problems considered current thinking on water resource management?	Section 5.2 and Section 5.5.
Are there any discernible trends?	Section 4.3.3 and Section 4.4.3
Targets, Indicators and Monitoring	
Does the IWWMP define medium and long-term goals towards sustainable management of water resources?	Section 6.3 and Section 6.4
Does the IWWMP make provision for the establishment of indicators of progress and set annual and medium-term targets?	Section 6.4
Are these indicators and targets appropriate and consistent with the policies and strategies considered for implementation of the IWWMP?	Section 6.4 and Section 6.6
Are the proposed monitoring, review and evaluation as well as auditing systems adequate and sustainable?	Section 6.8, Section 5.4.1, Section 5.4.2 and Section 5.4.3.
Priority Actions	
Does the IWWMP describe clear priorities for action, relevant to the goals and targets, feasibility in terms of achieving targets, their estimated costs, available resources, institutional capacities and effectiveness?	Section 6.1 and Section 6.2
Does the water management strategy have an adequate and credible financial provisioning plan to support the implementation of the IWWMP?	Section 6.6

2 CONTEXTUALISATION OF THE PROJECT

The section below provides a detailed project description. The aim of the description is to indicate the activities that are performed at the mine. Furthermore, the detailed project description facilitates the understanding of the activities taking place that will result in impacts on the environment and for which mitigation measures are in place or plans are in place to implement these mitigation measures.

2.1 DESCRIPTION OF THE ACTIVITY

The mine is located in the Emalahleni Local Municipality within the Nkangala District Municipality in the Mpumalanga Province. There are a number of mining operations in the area, such as Anglo Landau, Anglo Greenside Colliery and Evraz Highveld Steel to the immediate north, coupled with agricultural activities scattered across the west, southwest, south and south eastern sections. Additionally, Transalloys is located north east of the operation.

The Elandsfontein Colliery mining operation will focus on simulteneously extracting the No 1 and the No 2 Coal Seams in either open cast or undeground mining methods. In Areas where the No. 1 Seam was previously/historically mined by means of underground board and pillar mining, the No. 1 Seam that is left in the pillars may be mined however the specific mining method has not been determined at this stage. The opencast reserve will be mined by a truck and shovel operation with roll over rehabilitation and the underground reserves as board and pillar mining based on drill and blast sections.

The required infrastructure for the opencast mining at Elandsfontein Colliery is in place. For the underground mining operations existing shafts will be utilised, and where the existing shafts are not adequate new shafts will be constructed from existing opencast pits. The following infrastructure is currently in place:

- Administration, workshops and other buildings;
- Crushing and screening plant;
- Coal washing plant with filter press;
- Run of mine and product stockpiles;
- Pollution Control Dams (PCDs);
- Internal roads and dirty water berms; and
- Weighbridge.

A new clean and dirty storm water management system has been developed as part of this IWWMP (see Figure 7 for the existing and future infrastructure layout at the Colliery). The current mining areas contain various dirty areas which would necessitate a total of 8 new lined PCD's. The mine is currently optimising these dirty areas by removing contaminated materials to a central location. In this way, the total number of PCD's that will be required can be reduced to 5.

2.1.1 MINERAL RESOURCE

A maximum of 82 m of coal measure is present at the mine. This is hosted by the Vryheid Formation and rests on tillite and diamictite of the Dwyka Group. The Dwyka in turn rests unconformably on a basement of Precambrian felsite. Elandsfontein Colliery mine is an existing mine with opencast and underground sections. It produces coal for the local and the export market, at a rate of 500 000 t/annum. Coal has been produced from the No. 1

Seam (underground bord and pillar operation) and an opencast operation on the No. 4 Seam and on the No. 2 Seam.

The quality of the coal dictates that the coal will be used in the power generation sector. The coal will be sold as an export product and a domestic product to Eskom. Elandsfontein Colliery will beneficiate the ROM coal from the underground No. 1 resources to produce coal products with the split between the products being approximately 60 % for the export market and 40% for the domestic market. The underground coal resources from the No. 1 Seam will be washed and the primary product will be for the export market. The secondary product will be blended with the and the coal resources from the No. 2 Seams from the opencast pit that will be crushed and screened and sold as a domestic product to Eskom. Up to now the No. 1 Seam, No. 2 Seam and the No. 4 Seam have been the main target of exploitation. The planned future mining is to be based on the remaining No. 1 Seam (underground operation) and the No. 2 Seam (open-cast operation).

2.1.2 MINING METHOD

The Elandsfontein Colliery mining operation will focus on simulteneously extracting the No 1 and the No 2 Coal Seams in either open cast or undeground mining methods. In Areas where the No. 1 Seam was previously/historically mined by means of underground board and pillar mining, the No. 1 Seam that is left in the pillars may be mined however the method of mining these pillars requires additional investigations and planning. The opencast reserve will be mined by a truck and shovel operation and the underground reserves as board and pillar mining based on drill and blast sections.

2.2 EXTENT OF ACTIVITY

The activity falls within various portions of the farm Elandsfontein 309 JS, located southwest of the Emalahleni town centre in Mpumalanga province. The Colliery mining right area covers approximately 828.52 hectares (ha) in total (314MR: 591.17 ha, 63MR: 237.35 ha).

2.3 KEY ACTIVITIES RELATED PROCESS AND PRODUCTS

The key activities are:

- Site preparation for opencast mining (Vegetation removal, topsoil removal);
- Storage of topsoil in stockpiles;
- Development of pits for opencast mining to remove the coal seams;
- Storage of overburden material;
- Backfilling of mined opencast areas;
- Replacing topsoil and re-vegetation of backfilled opencast areas;
- Washing and screening of the coal resource;
- Storing washed coal in the Product stockpile area;
- Diverting clean storm water around the site;
- Routing and containment of dirty storm water on site using suitable infrastructure;
- Dust suppression;
- Construction and maintenance of Haul roads;
- Transporting material and product on Haul roads;

- Containment and disposal of sewage;
- Use of chemical toilets at opencast mining areas;
- Operational of Offices and Workshops;
- Storage of diesel and oils;

The coal discard is reclaimed by means of a truck and shovel mining method and transported by road from the existing coal discard areas (current discard dump and discard coal that has been stored in old opencast workings) to the plant . The fallout, material that is not suitable to sell to the domestic market, is transported back to the south eastern discard facility by road.

Key products are the Run of Mine (ROM) product to satisfy the Eskom feedstock requirement for either Kendal Power Stations. The crushing and screening process is a dry process and will entail primary and secondary crushing resulting in a raw product with negligible if any generation of discard and or waste.

2.4 ACTIVITY LIFE DESCRIPTION

The assessors investigated the immediate Life of Mine (LoM) and are confident for a 12-year life at the present production rate of 1 200 000t per annum, provided that the recommended additional exploration is done in advance to the mining-faces.

2.4.1 MINE SCHEDULE

The LoM schedule for the open cast operations is presented in Figure 5 and Figure 6 presents the LoM schedule of the underground mining areas. Production is scheduled for 12 years (i.e.: up to the year 2032).

2.4.2 MINERAL PROCESSING

The throughput of the mine's Coal Handling and Preparation Plant (CHPP) is 300 tons per hour. The plant is run at an efficiency of 70 %. The CHPP can be divided into different sections for the ease of discussions. These sections are as follows.

- RoM transfer point and reclaim system;
- RoM crushing system;
- Transfer conveyor to overland conveyor to plant RoM stockpile;
- RoM feed conveyor;
- Dense medium cyclone plant;
- Fines treatment plant;
- Stockpiling of final product and fines spiral plant; and
- Conveying of discard to a bin with overflow facility located at the plant

The RoM feed material is reduced in size to -300mm with a feeder breaker. Thereafter the coal is conveyed to a coal sizing station. The -300mm coal passes through a secondary sizer (roll crusher) and the coal is reduced to a 120mm top size. Only the +50mm to -120mm material is fed to the tertiary sizer. The coal is then reduced to -50mm. The material is then fed into the dense medium separation plants. The material is passed over a de-sliming screen that removes the -1.4mm fraction from the feed. The remainder is then routed to the coarse dense medium cyclones. The -1.4mm fraction reports to the fine coal processing circuit.

The overflow of the de-sliming screen reports to the primary large diameter cyclone. Here waste is removed through high density separation. The underflow reports to the discard bin. The overflow from the primary cyclone is pumped to the secondary large diameter cyclone for further beneficiation. All product and waste streams run over drain- and rinse screens to ensure maximum water and magnetite recovery. The products are placed on product stockpiles and the discard is returned to the mining void.

The 1.4mm material from the de-sliming circuit passes over a sieve bed. The 0.25mm to 1.4mm material reports to the fines reflux classifier. The undersize material (0.25mm) is pumped to a classifying cyclone. The cyclone overflow, the 0.075mm material, reports straight to the thickener. The underflow is pumped to the ultra-fine reflux classifier.

The floats of the fines reflux classifiers are passed through a filter press from where the excess moisture is removed. The sinks are thrown on the rejects belt. The ultra-fines cyclone floats are dewatered and placed on the product stockpile. The filter cake is added to the reject conveyor. All rejects are placed on the rejects conveyor that feeds the reject bin for collection to be discarded in the mining void.

The plant process described above is well-known technology used by many coal operations in South Africa. The plant is based on the premise that the coal can be separated from the waste rock by means of their respective densities.

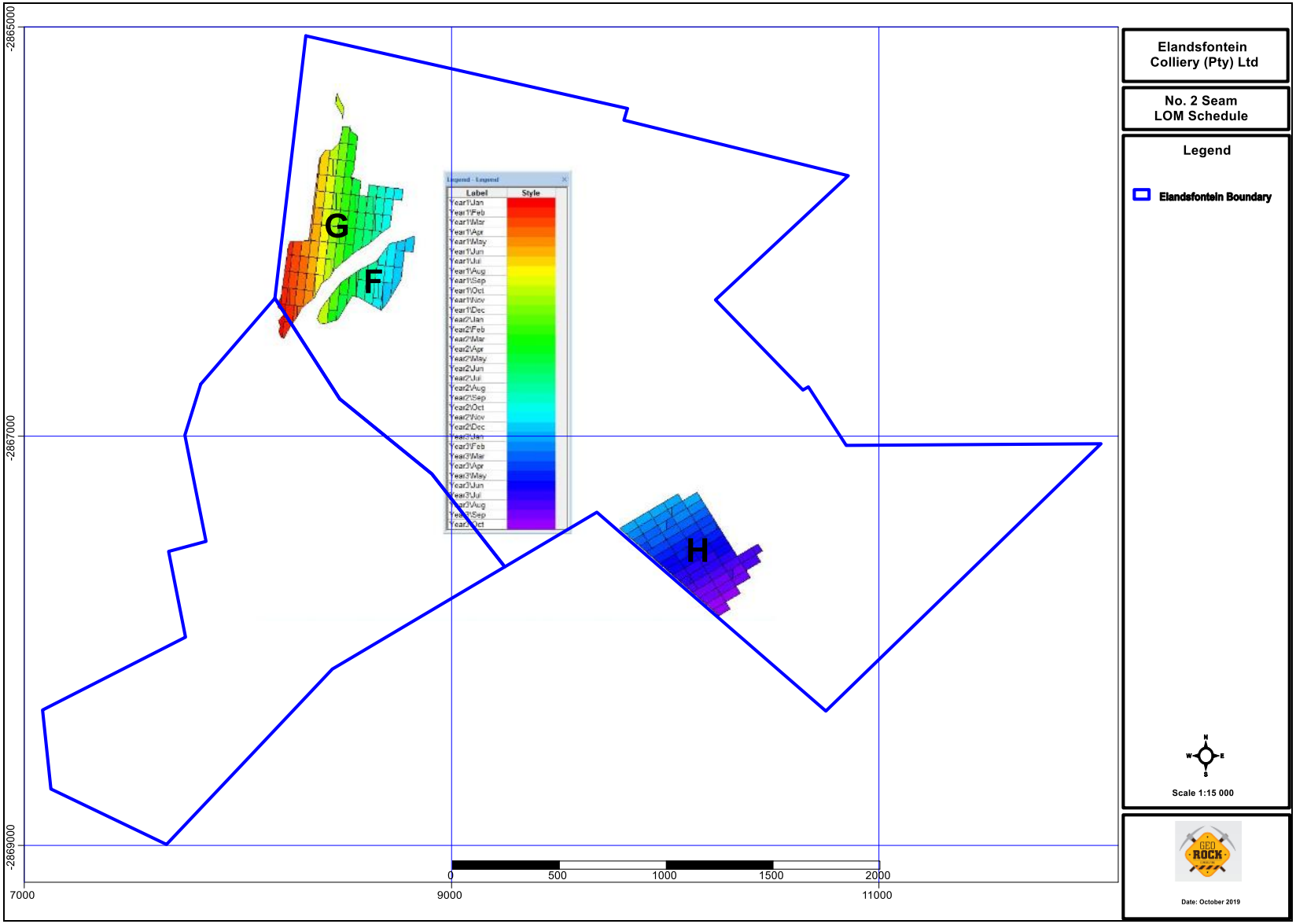


Figure 5: The Life Of Mine for the Open Cast Operations

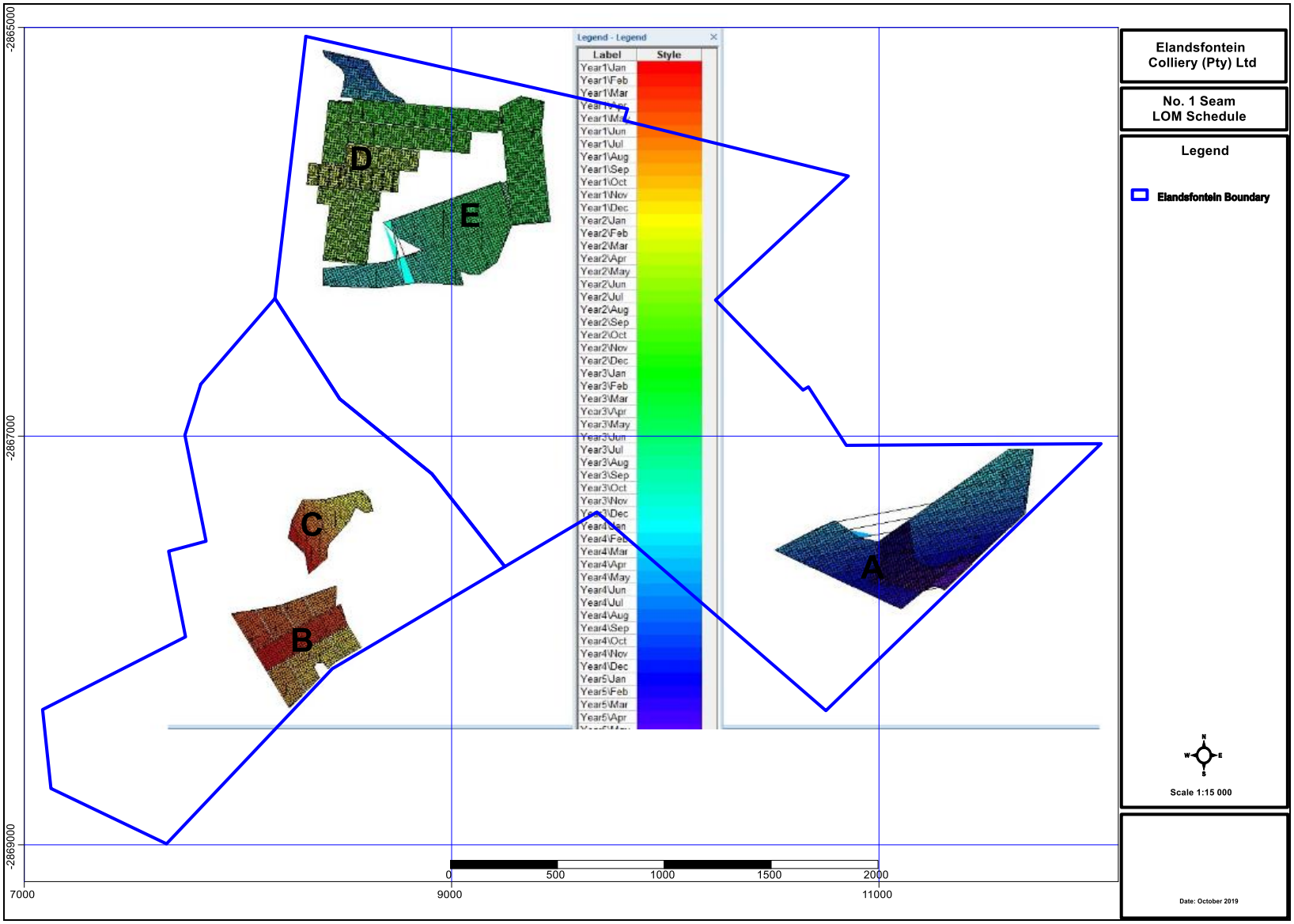


Figure 6: The Life Of Mine for the Underground Operations

2.5 ACTIVITY INFRASTRUCTURE DESCRIPTION

The required infrastructure for the opencast mining at Elandsfontein Colliery is in place. For the underground mining operations existing shafts will be utilised, and where the existing shafts are not adequate new shafts will be constructed. The following infrastructure is currently in place:

- Administration, workshops and other buildings;
- Crashing, Screening and Coal washing plants;
- Filter press;
- Pollution Control Dams (PCDs); and
- Weighbridge.

Waste dumps, new clean water, storm water management and dirty water management systems are currently being developed as part of this IWWMP. The infrastructure layout is shown in Figure 7.

2.5.1 ADMINISTRATION, WORKSHOPS AND OTHER BUILDINGS

The surface infrastructure utilised by the mine is mostly old farmhouse facilities and sheds which were converted into offices and workshops.

2.5.2 POLLUTION CONTROL DAMS

The colliery is currently operational, with one active pit and associated stockpiles, and one operational pollution control dam (PCD 3). There are 2 pollution control dams at the South Eastern corner (PCD 1 and 2) close to the adit area. Additional pits are proposed in a new mining right application. Each of these pits will have associated stockpiles and a pollution control dams with a maximum of 8 PCDs being requried in terms of the SWMP Scenario 1

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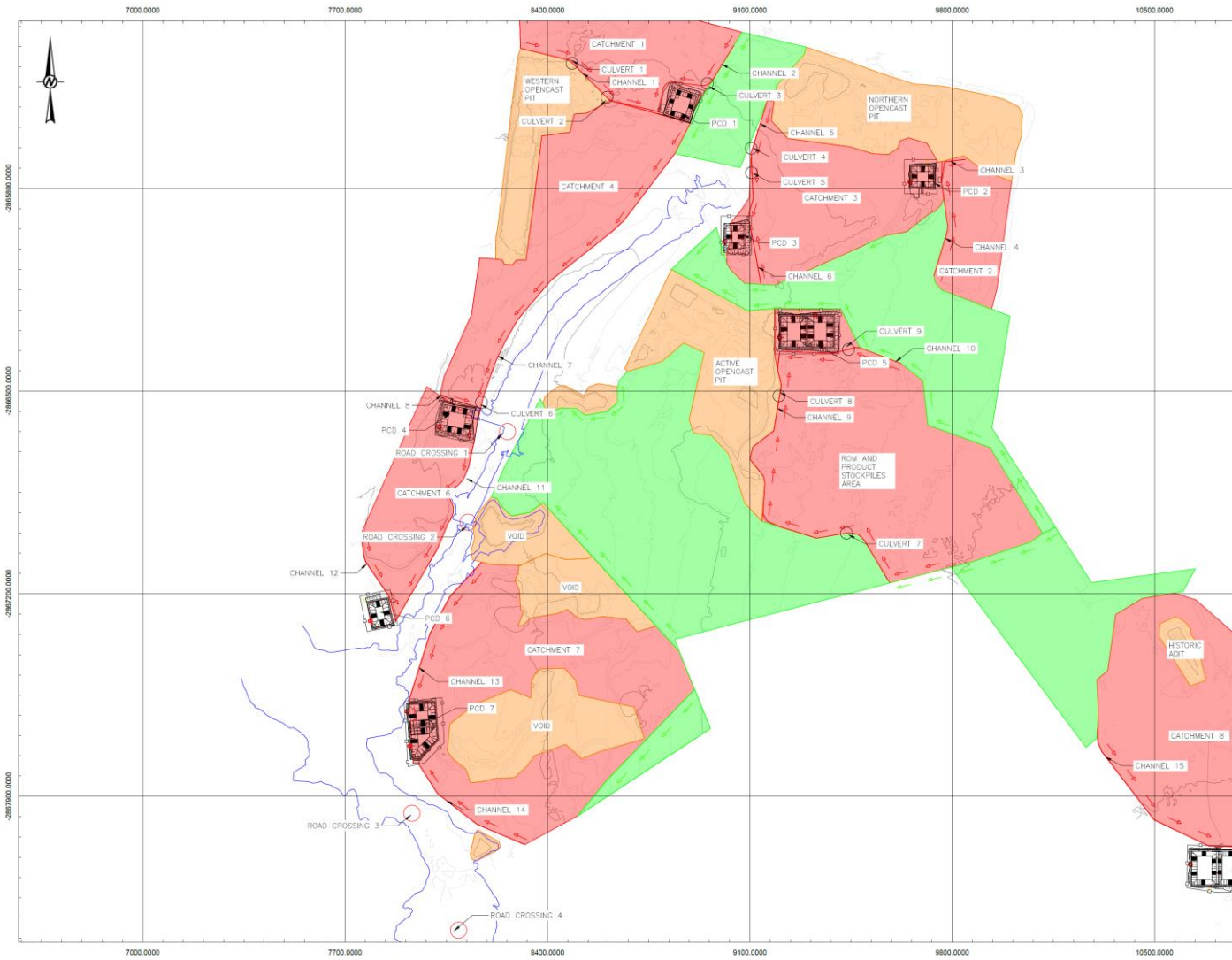

Figure 8) unless the mine cleans / decontaminates some of the "dirty" areas to optimise the clean and dirty footprints in which case a maximum of 5 PCDs will be requried (Figure 9).

2.5.3 HAZARDOUS GOODS STORAGE

Existing diesel storage represents the largest volume of hazardous material on site (>80m^3) and it is adequately bunded according to regulatory requirements. Explosives are currently delivered as and when required from offsite locations. Oils and other lubricants and/or chemicals are also stored in approved bunded areas for use in the maintenance of plant and machinery. The relevant Health and Safety Standards for the handling and storage of these goods will be strictly adhered to.

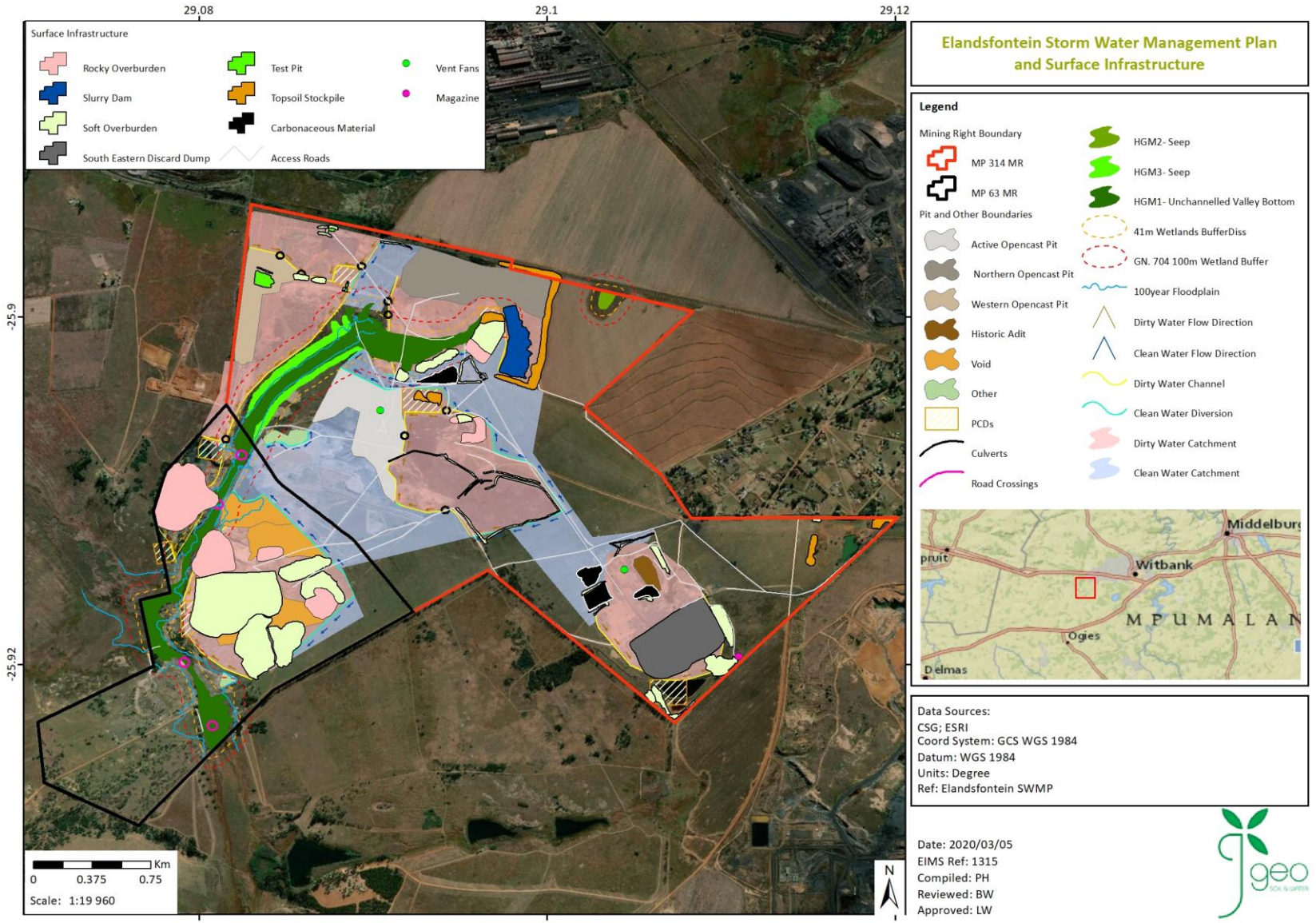

Figure 7: Surface infrastructure layout at the Colliery

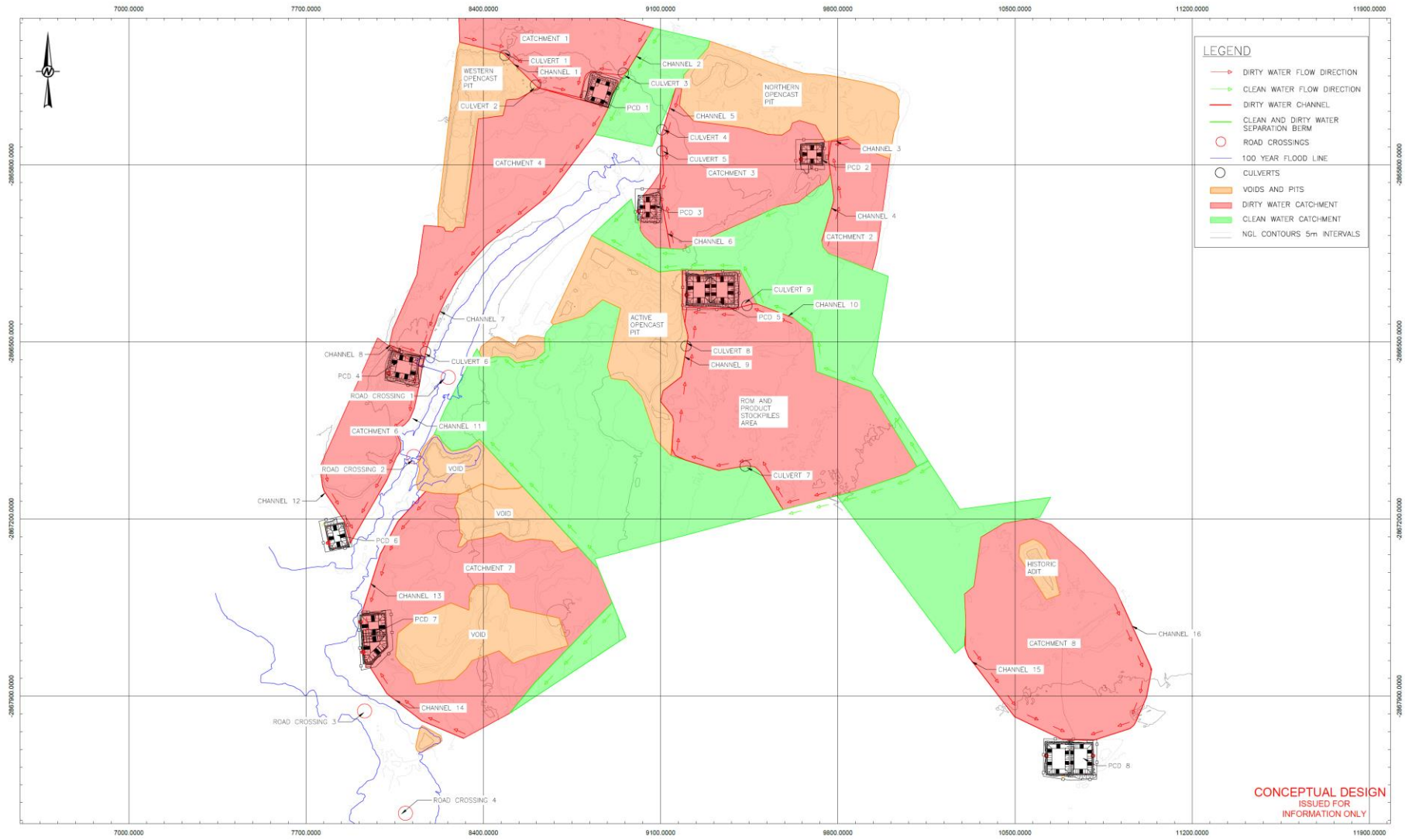

Figure 8: Proposed SMWP Infrastructure - Scenario 1.

Figure 9: Proposed SMWP Infrastructure – Scenario 2

2.5.4 STOCKPILES

2.5.4.1 RUN OF MINE STOCKPILES

The run of mine (ROM) coal is conveyed by haul trucks to the Elandsfontein Colliery RoM tipping point. The RoM is crushed and conveyed by conveyors into the DMS plant where it is beneficiated and the product is placed on the product stockpiles. The product is reclaimed by front end loaders and loaded on haul trucks. It is then transported either to Oosbank siding (for export market) or to the inland customers. The discard is transported by haul trucks to the discard dumps and dumped back into the north.

2.5.4.2 NON-CARBONACEOUS STOCKPILES

Overburden stockpiles comprising of both hards and softs will be stockpiled, mostly on top of backfilled, mined out areas. This stockpiling will continue until the face length comprises the entire resource width and all waste material can be rolled over back into the pit as part of the normal mining operation. Hards will be stockpiled separately.

2.5.4.3 CARBONACEOUS STOCKPILES

Surface carbonaceous stockpiles will be minimised as far as possible, and the aim will be to place such waste directly back into the pit.

2.5.4.4 SOIL STOCKPILES

Stripped soils – topsoil and sub soil will be stockpiled separately until the roll over mining method is in equilibrium. Separation of topsoil and subsoil will ensure that the characteristics of soil stockpiles are suitable for the prevailing landscape and drainage conditions once they are replaced.

2.6 KEY WATER USES AND WASTE STREAMS

2.6.1 KEY WATER USES

Elandsfontein Colliery has an existing Water Use Licence (WUL) (Ref.no.: 04/B20G/CGI/3843) issued on 2015/10/22 and the following water uses are currently authorised.

- Section 21(c): Impeding or diverting the flow of water in a watercourse;
- Section 21(g): Disposing of waste or water containing waste in a manner that may detrimentally impact on a water resource;
- Section 21(i): Altering the bed, banks, course or characteristics of a watercourse.

An approval to amend the co-ordinates of the Western Opencast Pit and wetland buffers in the Colliery was received on 2019/03/23. The current licence expires on the 2020/10/22 and requires renewal. Additional water uses have also been identified that require licencing.

In accordance with the requirements of the NWA, the applicant is required to compile and submit for adjudication, a WULA for the NWA Section 21 water uses as indicated in Table 5. Changes that need to be made to the existing licence are also indicated in Table 5.

Water Uses for the Colliery, including the existing water uses licenced in terms of IWUL Licence no.: 04/B20G/CGI/3843 and changes required to be made to the existing IWUL

Table 5: Water uses that form part of the Colliery application and changes that need to be made to the existing WUL.

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
Section 21 (a)							
S 21 (a) **(New)**	Western opencast pit	Abstraction for use in the plant	40 000m³/month	25°54'36.41"S 29°4'57.48"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	New
Section 21 (c) and Section 21 (i)							
S 21 (c) and 21 (i) **(Existing)**	Mining infrastructure	River crossing 1 (road construction over an unnamed tributary)	Height 1.0 m Width 5.0 m Length 10 m	25°54'7.74"S 29°5'30.012"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	-
S 21 (c) and 21 (i) **(Existing)**	Mining infrastructure	River crossing 2 (road construction over an unnamed tributary)	Height 1.0 m Width 5.0 m Length 10 m	25°54'5.472"S 29°5'21.588"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	-
S 21 (c) and 21 (i) **(Existing)**	Mining infrastructure	River crossing 3 (road across a tributary)	Height 1.0 m Width 5.0 m Length 10 m	25°54'28.548"S 29°4'56.64"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	-

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
S 21 (c) and 21 (i) **(Existing)**	Mining infrastructure	River crossing 4 (road across a tributary)	Height 1.0 m Width 5.0 m Length 10 m	25°54'6.444"S 29°4'51.78"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	-
S 21 (c) and 21 (i) **(Existing)**	Mining infrastructure	PCD 3 located within an unnamed tributary of the Grootsprui	Height 2.0 m Width 3.0 m Length 68 m	25°54'2.304"S 29°5'22.38"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	-
S 21 (c) and 21 (i) **(Existing)**	Opencast Mining	Western Opencast Discard River Diversion	Height 5.0 m Width 5.0 m Length 280 m	Start: 25°54'49.896"S 29°4'45.048"E End: 25°54'56.052"S 29°4'41.268"E	Portion RE/1 Farm Elandsfontein 309 JS	T60885/2003	-
S 21 (c) and 21 (i) **(Existing)**	Western Opencast Pit	Western Opencast Pit	Height 5.0 m Width 30 m Length 330 m	25°54'35.028"S 29°5'0.348"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	-
S 21 (c) and 21 (i	Mining within the	Expansion of mining area		Start:	Portion RE/7 Farm	T14290/920	New

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
New	protective buffer zone of delineated wetland (East)			25°54'28.90"S 29°4'58.48"E End: 25°54'6.24"S 25°54'.6.24"S	Elandsfontein 309 JS		
S 21 (c) and 21 (i New	PCD 1	Pollution Control Dam within the regulated area of a watercourse		25°53'51.626"S 29°5'18.348"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (c) and 21 (i New	PCD 2	Pollution Control Dam within the regulated area of a watercourse		25°54'0.022"S 29°5'48.167"E	Portion RE/7 Farm Elandsfontein 309 JS AND Portion 44 Farm Elandsfontein 309 JS	T14290/920 AND T18520/2014	New
S 21 (c) and 21 (i New	PCD 3	Pollution Control Dam within the regulated area of a watercourse		25°54'6.592"S 29°5'25.249"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (c) and 21 (i New	PCD 4	Pollution Control Dam within the regulated area of a watercourse		25°54'27.522"S 29°4'50.578"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	New
S 21 (c) and 21 (i New	PCD 5	Pollution Control Dam within the regulated area of a		25°54'17.424"S 29°5'34.08"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
		watercourse					
S 21 (c) and 21 (i **New**	PCD 6	Pollution Control Dam within the regulated area of a watercourse		25°54'48.755"S 29°4'40.861"E	Portion RE/8 Farm Elandsfontein 309 JS AND Portion RE/1 Farm Elandsfontein 309 JS	T14671/2010 AND T60885/2003	New
S 21 (c) and 21 (i **New**	PCD 7	Pollution Control Dam within the regulated area of a watercourse		25°55'2.053"S 29°4'46.441"E	Portion RE/1 Farm Elandsfontein 309 JS	T60885/2003	New
S 21 (c) and 21 (i **New**	Culvert 2	Culvert within the regulated area of a watercourse		25°53'51.119"S 29°5'8.452"E"	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (c) and 21 (i **New**	Culvert 3	Culvert within the regulated area of a watercourse		25°53'49.567"S 29°5'20.915"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (c) and 21 (i **New**	Culvert 4	Culvert within the regulated area of a watercourse		25°53'56.839"S 29°5'26.358"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (c) and 21 (i **New**	Culvert 5	Culvert within the regulated area of a watercourse		25°53'59.572"S 29°5'26.405"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
S 21 (c) and 21 (i **New**	Culvert 6	Culvert within the regulated area of a watercourse		25°54'25.351"S 29°4'52.871"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	New
S 21 (c) and 21 (i **New**	Culvert 8	Culvert within the regulated area of a watercourse		25°54'24.61"S 29°5'29.836"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (c) and 21 (i **New**	Culvert 9	Culvert within the regulated area of a watercourse		25°54'19.404"S 29°5'38.472"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (c) and 21 (i **New**	Mining within protective buffer zone of delineated wetland (West)	Expansion of mining area		Start: 25°54'27.11"S 29°4'55.24 End: 25°54'3.98"S 29°5'17.24"E	Portion RE/7 Farm Elandsfontein 309 JS AND Portion RE/8 Farm Elandsfontein 309 JS	T14290/920 AND T14671/2010	New
S 21 (c) and 21 (i **New**	Rehabilitation of wetland area	Flattening spoils, removal of culvert, removal of invasive alien species		Start: 25°54'55.89"S 29°4'42.27"E End: 25°54'42.84"S 29°4'50.92"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
S 21 (c) and 21 (i **New**	Haul Road within protective wetland buffer zone	Transport mining cargo		Start: 25°54'29.00"S292 9°4'57.50"E End: 25°54'6.51"S 29°4'58.45"E	Portion RE/7 Farm Elandsfontein 309 JS AND Portion RE/8 Farm Elandsfontein 309 JS	T14290/920 AND T14671/2010	New
S 21 (c) and 21 (i **New**	River crossing to be used as a haul road	Haulage of coal from another site to the plant		Start: 25°55'8.59"S 29°4'39.35"E End: 25°55'7.32"S 29°4'41.55"E	Portion RE/6 Farm Elandsfontein 309 JS	T18520/2014	New
S 21 (c) and 21 (i **New**	Road Crossing 1	Road crossing over a watercourse		Start: 25°54'28.505"S 29°4'56.179"E End: 25°54'29.693"S 29°4'58.12"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	New

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
S 21 (c) and 21 (i **New**	Road Crossing 2	Road crossing over a watercourse		Start: 25°54'38.876"S 29°4'50.369"E End: 25°54'38.617"S 29°4'52.705"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	New
S 21 (c) and 21 (i **New**	Road Crossing 3	Road crossing over a watercourse		Start: 25°55'11.586"S 29°4'44.915"E End: 25°55'11.071"S 29°4'45.883"E	Portion RE/1 Farm Elandsfontein 309 JS AND Portion RE/6 Farm Elandsfontein 309 JS	T60885/2003 AND T18520/2014	New
S 21 (c) and 21 (i **New**	Road Crossing 4	Road crossing over a watercourse		Start: 25°55'25.82"S 29°4'49.03"E End: 25°55'22.825"S 29°4'54.678"E	Portion RE/1 Farm Elandsfontein 309 JS	T60885/2003	New

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
Section 21 (g)							
S 21 (g) **(Existing)**	Pollution Control Dam 1	Runoff from discard dump contained in Pollution Control Dam 1	44 808 m^3/a	25°55'17.076"S 29°6'27.252"E	Portion 14 Farm Elandsfontein 309 JS	T114486/1996	-
S 21 (g) **(Existing)**	Pollution Control Dam 2	Seepage from discard dump and PCD 1 is contained in Pollution Control Dam 2	25 300 m^3/a	25°55'21.108"S 29°6'26.532"E	Portion 14 Farm Elandsfontein 309 JS	T114486/1996	-
S 21 (g) **(Existing)**	Pollution Control Dam 3	Seepage from Northern dirty water area contained in Pollution Control Dam 3	18 000 m^3/a	25°54'2.304"S 29°5'22.344"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	-
S 21 (g) **New**	PCD 1	Pollution Control Dam within the regulated area of a watercourse	21 518 m^3	25°53'51.626"S 29°5'18.348"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (g) **New**	PCD 2	Pollution Control Dam within the regulated area of a watercourse	15 354 m^3	25°54'0.022"S 29°5'48.167"E	Portion RE/7 Farm Elandsfontein 309 JS AND Portion 44 Farm Elandsfontein 309 JS	T14290/920 AND T18520/2014	New (not required if dirty areas optimised / cleaned up)
S 21 (g) **New**	PCD 3	Pollution Control Dam within the regulated area of a watercourse	13 658 m^3	25°54'6.592"S 29°5'25.249"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
S 21 (g) **New**	PCD 4	Pollution Control Dam within the regulated area of a watercourse	32 036 m³	25°54'27.522"S 29°4'50.578"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	New
S 21 (g) **New**	PCD 5	Pollution Control Dam within the regulated area of a watercourse	71 697 m³	25°54'17.424"S 29°5'34.08"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (g) **New**	PCD 6	Pollution Control Dam within the regulated area of a watercourse	17 068 m³	25°54'48.755"S 29°4'40.861"E	Portion RE/8 Farm Elandsfontein 309 JS AND Portion RE/1 Farm Elandsfontein 309 JS	T14671/2010 AND T60885/2003	New (not required if dirty areas optimised / cleaned up)
S 21 (g) **New**	PCD 7	Pollution Control Dam within the regulated area of a watercourse	52 586 m³	25°55'2.053"S 29°4'46.441"E	Portion RE/1 Farm Elandsfontein 309 JS	T60885/2003	New (not required if dirty areas optimised / cleaned up)
S 21 (g) **New**	PCD 8	Pollution Control Dam within the regulated area of a watercourse	63 340 m³	25°55'17.605"S 29°6'25.164"E	Portion 14 Farm Elandsfontein 309 JS	T114486/1996	New
S 21 (g) **(Existing)**	Discard Dump 1	Discard Dump 1	600 000 m³/a	25°55'8.53"S 29°6'23.908"E	Portion 14 Farm Elandsfontein 309 JS	T114486/1996	-

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
S 21 (g) (Existing)	Northern Opencast Pit 1	Discard Backfilled into Northern Opencast Pit 1	733 333 m^3/a	25°53'51.504"S 29°5'36.672"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	-
S 21 (g) (Existing)	Slurry Pond		35 200 m^3/a	25°53'59.424"S 29°5'52.404"E	Portion 44 Farm Elandsfontein 309 JS	T18520/2014	-
S 21 (g) (Existing)	Slurry disposed of in sealed decline	Slurry disposed of in sealed decline	3 650 m^3/a	25°54'23.112"S 29°5'40.596"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	-
S 21 (g) (Existing)	Western Area overburden		233 111 tons/a	25°55'1.02"S 29°4'59.448"E	Portion RE/1 Farm Elandsfontein 309 JS	T60885/2003	-
S 21 (g) (Existing)	Western area soil stockpile 1		279 000 tons/a	25°54'36"S 29°4'47.064"E	Portion RE/1 Farm Elandsfontein 309 JS	T60885/2003	-
S 21 (g) (Existing)	Western area soil stockpile 2		237 600 tons/a	25°54'41.796"S 29°4'44.544"E	Portion RE/1 Farm Elandsfontein 309 JS	T60885/2003	-
S 21 (g) (Existing)	Collection of dirty water runoff from mine property into western opencast pit area	**REMOVE FROM LICENCE – DIRTY WATER TO GO TO NEW PCD**	381 672 m^3/a	25°54'35.028"S 29°5'0.348"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	**REMOVE FROM LICENCE – DIRTY WATER TO GO TO NEW PCD's**

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
S 21 (g) **(Existing)**	Soil stockpile in the Northern Opencast Pit		300 000 tons/a	25°54'3.024"S 29°5'46.968"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	-
S 21 (g) **(Existing)**	Soil Stockpile 1 in the south-eastern area		9 900 tons/a	25°55'4.652"S 29°6'36.997"E	Portion 14 Farm Elandsfontein 309 JS	T114486/1996	-
S 21 (g) **(Existing)**	Soil Stockpile 2	Soil Stockpile 2 in the south-eastern area	9 840 tons/a	25°55'10.704"S 29°6'33.624"E	Portion 14 Farm Elandsfontein 309 JS	T114486/1996	-
S 21 (g) **New**	Dust Suppression	Dust suppression		25°54'36.281"S 29°5'27.719"E	Entire mining right boundaries		New
S 21 (g) **New**	Storage of water in PCD 3	Dust suppression		25°54'2.05"S 29°5'22.39"E	Portion 7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (g) **New**	Washbay dam 4	Storage of water in Washbay Dam 4		25°54'42.242"S 29°6'32.177"E	Portion 14 Farm Elandsfontein 309 JS	T114486/1996	New
S 21 (g) **New**	Washbay dam 5	Storage of water in Washbay Dam 5		25°54'42.206"S 29°6'31.838"E	Portion 14 Farm Elandsfontein 309 JS	T114486/1996	New
S 21 (g) **New**	Western o/c pit	Backfilling of pit using softs and hards		25°54'36.41"S 29°4'57.48"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	New

Water Use	Name	Purpose	Quantity/capacity/ volume	Co-ordinates	Property	Title Deed	Changes required to IWUL Licence no.: 04/B20G/CGI/3843
S 21 (g) **New**	New stockpile area	Storage of coal stockpiles		25°53'43.17"S 29°5'16.483"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	New
S 21 (g) **New**	Topsoil stockpile Area	Storage of topsoil		25°53'57.58"S 29°5'46.87"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
Section 21 (j)							
S 21 (j) **New**	De-watering of Old voids	Pumpimg water from old void to PCD	TBC from Geohydrology study	25°53'46.33"S 29°5'5.23"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (j) New	De-watering of Northern Pit	Pumping water from Northern pit to PCD	TBC from Geohydrology study	25°53'58.39"S 29°4'59.43"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (j) New	Dewatering of Main pit	Pumping water from Main pit to PCD	TBC from Geohydrology study	25°54'27.35"S 29°5'11.22"E	Portion RE/7 Farm Elandsfontein 309 JS	T14290/920	New
S 21 (j) **(New)**	Western opencast pit	Plant water	40 000m^3/month	25°54'36.41"S 29°4'57.48"E	Portion RE/8 Farm Elandsfontein 309 JS	T14671/2010	New

2.6.2 KEY WASTE STREAMS

Domestic, hazardous, industrial and mining and sewerage waste streams are currently, and will continue to be generated at the Colliery. These waste streams are discussed in more detail in the subsections below:

2.6.2.1 DOMESTIC WASTE STREAMS

Domestic waste generated will be collected and stored onsite in clearly marked skips. All domestic waste skips will be transported offsite by a registered waste removal contractor for final disposal at a registered facility. Waste disposal certificates will be required from contractors to ensure appropriate waste disposal.

2.6.2.2 HAZARDOUS WASTE STREAMS

Hydrocarbon and other dangerous goods and/or contaminated wastes generated (including used oil, diesel, grease, lubricants and explosive emulsions) will be stored in clearly marked skips for solid hazardous waste and containers for liquid waste. Hazardous waste will be stored in bunded areas or on hard, impervious surfaces. When full, the containers will be collected and transported offsite by a registered waste removal contractor for final disposal at a registered facility. Waste disposal certificates will be required from contractors to ensure appropriate waste disposal.

2.6.2.3 INDUSTRIAL AND MINING WASTE STREAMS

Industrial wastes (including metals, rubber, tyres and conveyor belt sheets) will be separated and stored in clearly marked skips. Materials may occasionally be salvaged for re-use but will generally be traded to registered recycling companies who will collect and transport material offsite for re-use or final disposal at a registered facility. Waste disposal certificates will be required from contractors to ensure appropriate waste disposal.

Two general forms of mineralised waste are currently, and will be, generated at the Colliery namely plant discards and coal falling of articulated dump trucks on the way to the RoM stockpile. Coal falling from trucks will be periodically collected and transported to the wash plant. Fines will be channelled to the PCD where water will be recycled, and the fines eventually cleared from a silt trap and transported to in pit disposal.

Mine residue (slurry and discard) is generated at the Wash Plant area. Slurry will be routed to the filter press, where the slurry will be dried to a filter cake before being added to the saleable product or alternatively the filter cake will be disposed of to pit or to residue deposit. Wastewater from the filter press will be channelled back to the PCD for reuse.

2.6.2.4 SEWAGE WASTE

The sewage waste from the main offices is currently connected to the existig municipal sewage system. Portable chemical toilets around the operational areas and washplant workshop are currently being serviced by a registered waste operator and disposed of at a licenced sewerage treatment works.

2.7 ORGANISATIONAL STRUCTURE OF ACTIVITY

The organisational structure of for the Elandsfontein Colliery is indicated in Figure 10.

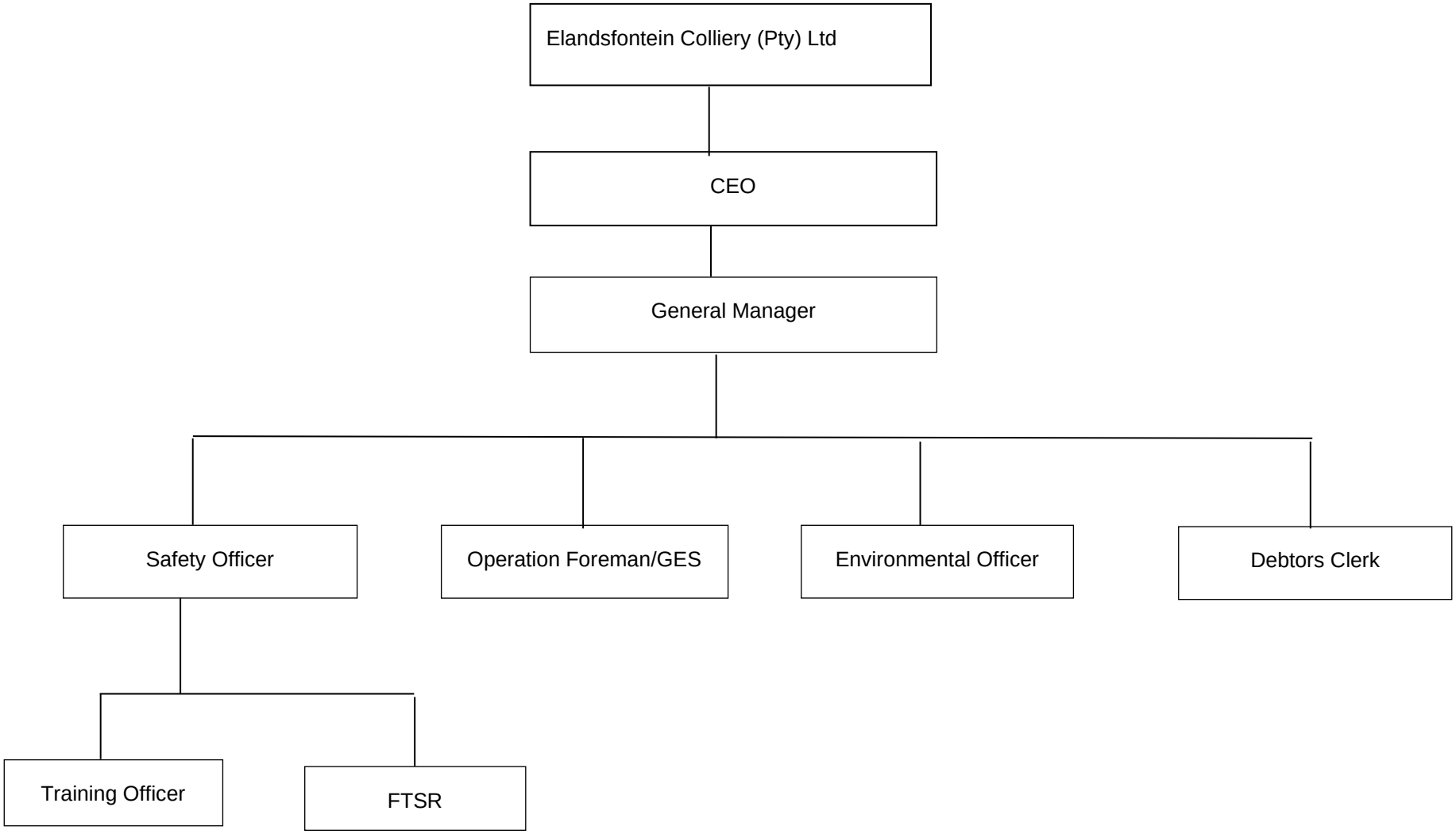

Figure 10: Organogram for the Elandsfontein Colliery

2.8 BUSINESS AND CORPORATE POLICIES

The business and corporate policies have been developed around the internal Safety, Health and Environmental Policy which elaborates on commitments of the company to employees, the environment and resources, and includes constitutional matters such as the right to an environment that is clean and in no way harmful to an individual and sustainability of environmental resources for future generations. Generally the policy has been compiled to ensure that Elandsfontein Colliery:

- Complies with all relevant laws, regulations, and standards regarding safety, health and the environment.
- Continuously monitors and manages the effects of mining in order to prevent pollution, environmental degradation, ill health and damage to property.
- Maintains open communication between all employees and affected parties regarding all aspects of the operation.
- Employs staff competent in their areas of responsibility regarding safety, health and the environment on all the properties.
- Provides staff with the relevant training required to complete their tasks in an environmentally responsible manner through environmental awareness training.
- Ensures proper organisational structure, communication procedures and resources are available to staff to allow them to undertake their tasks in an environmentally responsible manner.
- Compiles environmental emergency procedures and ensures staff is adequately trained in these procedures to ensure a high level of emergency preparedness for potential onsite emergencies

Elandsfontein has implemented an Environmental Management System (EMS) which consists of the following:

- **Recording of Incidents**:

  All environmental incidents/accidents or disasters are reported immediately or during the shift to the responsible manager or immediate supervisor. Contractors and employees are trained in environmental awareness to assist in identifying such events. The immediate action will be to contain/stop the incident/accident or disaster and the next steps will depend on the nature and magnitude of the event. These steps may include:

  - Stop the spill;
  - Investigate the incidents/accident/disaster;
  - Clean contaminated areas;
  - Pump and store affected water;
  - Construct emergency water management structures;
  - Treat contaminated natural resources
  - Rehabilitation of the affected environment; and
  - Notifying the relevant interested and affected parties (including the DWS, DMR).

  All moderate and major impacts must be reported to the DMR and DWS. Low and minor incidents however may have an impact on the natural and physical environment on site and it is therefore required to mitigate and rehabilitate the effect of the incident to reach the objectives set in the

Environmental Management Plan. Notification will be done by the fastest possible means and the following information will be supplied:

- The date and time of the incident;
- A description of the incident;
- The source of the pollution or potential pollution;
- The impact or potential impact on the water resource and the relevant water users; and
- Remedial action taken or to be taken or activity to remedy the effects of the incident

Within 14 days after the date of the incident/accident or disaster a written report will be forwarded to the relevant government department stating what measures will be taken to correct and prevent a recurrence of the event.

- **Environmental Impact Register**

An incident reporting database / impact register exists at the mine and all incidents are entered into a central database by the person reporting the incident or another designated person. These incidents will then also be reported to the DWS and other relevant authorities and parties.

3 REGULATORY WATER AND WASTE MANAGEMENT FRAMEWORK

The Colliery has been in operation for several years and as such a number of licenses and authorisations are held by the mine. The following rights, licenses, authorisations and approvals are currently in place and have been considered in the compilation of this report:

Table 6: Existing rights, licenses and authorisations for Elandsfontein Colliery

Document	Consultant	Applicable Properties	Reference Number
MPRDA EIA and EMPr (2017)	Digby Wells Environmental	Portion 6 (RE), 7 (RE), 14, and Portion 44 of the farm Elandsfontein 309JS	MP30/5/1/2/2/10132MR
IWWMP and Water Use License (2015)	Digby Wells Environmental	Portion 1, 7, 8 and 14 of the farm Elandsfontein 309JS	04/B20G/CGI/3843
Mining Right	Digby Wells Environmental	Portion 1 (RE), 6 (RE) and 8 (RE) of the farm Elandsfontein 309JS	MP 30/5/1/2/2/63MR
Mining Right	Digby Wells Environmental	Portion 7 (RE), 8 (RE), 14 and 44 of the farm Elandsfontein 309JS	MP 30/5/1/2/2/314MR

3.1 SUMMARY OF WATER USES

A summary of all of the water uses is provided in Section 2.6. Below is a discussion of the existing water uses at the Colliery, as well as the relevant exemption and the new and proposed water uses.

3.2 EXISTING LAWFUL USES

The NWA makes provision for Section 21 Water Uses that could be considered to be Existing Lawful Water Uses, if they comply with the requirements of Section 32 of the NWA (1998), although the declaration of any water uses as Existing Lawful Water Uses is still at the discretion of the DWS.

A person may use water, if the use is

- permissible as a continuation of an existing lawful water use;
- permissible in terms of a general authorisation;
- permissible under Schedule 1; or
- authorised by a licence.

The existing water uses, as listed in Section 2.6 are considered an entitlement due to the approved WULA (Licence no.: 04/B20G/CGI/3843) for the Colliery.

3.3 EXEMPTION OF THE REQUIREMENTS OF GN704

GN 704 and Regulation 77 of the NWA (Act 36 of 1998) place restrictions on the mining activities for the protection of water resources. Of relevance to the Applicant is the restrictions placed on locality, which states:

"*No person in control of a mine or activity may;*

(a) locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1:100 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor;

(b) except in relation to a matter contemplated in regulation 10, carry on any underground or opencast mining, prospecting or any other operation or activity under or within the l:50 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest;

(c) place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation; or

(d) use any area or locate any sanitary convenience, fuel depots, reservoir or depots for any substance which causes or is likely to cause pollution of a water resource within the 1:50 year flood-line of any watercourse or estuary."

The following exemptions were applied for in terms of Government Notice (GN) 704:

3.3.1 SCHEDULE 4: RESTRICTION ON LOCALITY

Schedule 4 (a) states: "*locating or placing any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1:100 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked.*"

- The existing pollution control dam (PCD 3) and proposed evaporation dam which are located within the Grootspruit tributary;
- The new pollution control dams (PCD 2, PCD 3, PCD 4, PCD 6 & PCD 7) which are located within 100m of the boundaries of the Grootspruit tributary; and
- Various clean and dirty water diversion berms located within 100m of the boundaries of the Grootspruit tributary.

Schedule 4 (b) states: " *except in relation to a matter contemplated in regulation 10, carry on any underground or opencast mining, prospecting or any other operation or activity under or within the 1:50 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest*."

- The northern opencast pit (backfilled with discard) within the Grootspruit tributary, however this coal discard material will be reclaimed and processed; and
- The western opencast pits on both sides of the Grootspruit tributary.

Schedule 4 (c) states: "*place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation.*"

- The temporary disposal of slurry in the sealed decline area at the coal wash plant, which will be reclaimed and processed through the filter press as part of rehabilitation.
- Disposal of carbonaceous material (discard) into the Northern Opencast Pit.

3.3.2 SCHEDULE 5: RESTRICTION ON MATERIAL USE

Schedule 5 states: " *no material that may cause pollution to a water resource should be used as construction material for the construction of any dam or other impoundment or any embankment, road or railway, or for any other purpose*".

- Coal discard and waste material were used for construction of the haul road from the south-east discard and PCD to the northern mining area.

As only raw product is produced, discard production, if any, is limited. The discard is compacted using a vibratory roller to minimise the ingress of water and oxygen, thereby minimising the potential for acid formation as well as spontaneous combustion. Discard will be placed into the lowest available position in each cut. The height of the discard will be limited to 50% of the height of the high wall, which will allow for the placement of non-contaminating overburden over and around the discard. The potential impact of backfill with discard is therefore anticipated to be low. Potential impacts from backfill with overburden are largely related to production of acid mine drainage. Therefore, an exemption was also required from the requirements of Sections 4 of GN 704 as per Section 3 of GN 704 for the storage of overburden on site.

3.4 GENERAL AUTHORISATION WATER USES

In terms of Section 22 (1) of the NWA, a person may use water without a licence if that water use is permissible in terms of the General Authorisations (GAs) issued under Section 39 of the NWA. All the water uses at the study area and proposed operations were assessed to determine whether they requires authorisation in terms of a GA

and it was found that the water uses do not fall in the specifications of the GAs and can't be generally authorised.

3.5 PROPOSED AMENDMENTS

The proposed amendments to be made to the WUL are summarised in Section 2.6.

3.6 NEW WATER USES TO BE LICENCED

A summary of all new and proposed water uses that will be applied for is indicated in Table 7. The completed Water Use Licence Forms will be submitted to the DWS via the online eWULAAS (online application portal).

Table 7: New and proposed water uses

Water Use	Name	Description/Purpose
S 21 (a)	Western opencast pit	Abstraction for use in the plant
S 21 (c) and 21 (i)	Mining infrastructure	River crossing 1 (road construction over an unnamed tributary)
S 21 (c) and 21 (i)	Mining infrastructure	River crossing 2 (road construction over an unnamed tributary)
S 21 (c) and 21 (i)	Mining infrastructure	River crossing 3 (road across a tributary)
S 21 (c) and 21 (i)	Mining infrastructure	River crossing 4 (road across a tributary)
S 21 (c) and 21 (i)	Mining infrastructure	PCD 3 located within an unnamed tributary of the Grootsprui
S 21 (c) and 21 (i)	Opencast Mining	Western Opencast Discard River Diversion
S 21 (c) and 21 (i)	Western Opencast Pit	Western Opencast Pit
S 21 (c) and 21 (i	Mining within the protective buffer zone of delineated wetland (East)	Expansion of mining area
S 21 (c) and 21 (i	PCD 1	Pollution Control Dam within the regulated area of a watercourse
S 21 (c) and 21 (i	PCD 2	Pollution Control Dam within the regulated area of a watercourse
S 21 (c) and 21 (i	PCD 3	Pollution Control Dam within the regulated area of a

Water Use	Name	Description/Purpose
		watercourse
S 21 (c) and 21 (i	PCD 4	Pollution Control Dam within the regulated area of a watercourse
S 21 (c) and 21 (i	PCD 5	Pollution Control Dam within the regulated area of a watercourse
S 21 (c) and 21 (i	PCD 6	Pollution Control Dam within the regulated area of a watercourse
S 21 (c) and 21 (i	PCD 7	Pollution Control Dam within the regulated area of a watercourse
S 21 (c) and 21 (i	Culvert 2	Culvert within the regulated area of a watercourse
S 21 (c) and 21 (i	Culvert 3	Culvert within the regulated area of a watercourse
S 21 (c) and 21 (i	Culvert 4	Culvert within the regulated area of a watercourse
S 21 (c) and 21 (i	Culvert 5	Culvert within the regulated area of a watercourse
S 21 (c) and 21 (i	Culvert 6	Culvert within the regulated area of a watercourse
S 21 (c) and 21 (i	Culvert 8	Culvert within the regulated area of a watercourse
S 21 (c) and 21 (i	Culvert 9	Culvert within the regulated area of a watercourse
S 21 (c) and 21 (i)	Mining within protective buffer zone of delineated wetland (West)	Expansion of mining area
S 21 (c) and 21 (i)	Rehabilitation of wetland area	Flattening spoils, removal of culvert, removal of invasive alien species
S 21 (c) and 21 (i	Haul Road within protective wetland buffer zone	Transport mining cargo
S 21 (c) and 21 (i	River crossing to be used as a haul road	Haulage of coal from another site to the plant
S 21 (c) and 21 (i	Road Crossing 1	Road crossing over a watercourse

Water Use	Name	Description/Purpose
S 21 (c) and 21 (i	Road Crossing 2	Road crossing over a watercourse
S 21 (c) and 21 (i	Road Crossing 3	Road crossing over a watercourse
S 21 (c) and 21 (i	Road Crossing 4	Road crossing over a watercourse
S 21 (g)	Pollution Control Dam 1	Runoff from discard dump contained in Pollution Control Dam 1
S 21 (g)	Pollution Control Dam 2	Seepage from discard dump and PCD 1 is contained in Pollution Control Dam 2
S 21 (g)	Pollution Control Dam 3	Seepage from Northern dirty water area contained in Pollution Control Dam 3
S 21 (g)	PCD 1	Pollution Control Dam within the regulated area of a watercourse
S 21 (g)	PCD 2	Pollution Control Dam within the regulated area of a watercourse
S 21 (g)	PCD 3	Pollution Control Dam within the regulated area of a watercourse
S 21 (g)	PCD 4	Pollution Control Dam within the regulated area of a watercourse
S 21 (g)	PCD 5	Pollution Control Dam within the regulated area of a watercourse
S 21 (g)	PCD 6	Pollution Control Dam within the regulated area of a watercourse
S 21 (g)	PCD 7	Pollution Control Dam within the regulated area of a watercourse
S 21 (g)	PCD 8	Pollution Control Dam within the regulated area of a watercourse
S 21 (g)	Discard Dump 1	Discard Dump 1

Water Use	Name	Description/Purpose
S 21 (g)	Northern Opencast Pit 1	Discard Backfilled into Northern Opencast Pit 1
S 21 (g)	Slurry Pond	Slurry Pond
S 21 (g)	Slurry disposed of in sealed decline	Slurry disposed of in sealed decline
S 21 (g)	Western Area overburden	Western Area overburden
S 21 (g)	Western area soil stockpile 1	Western area soil stockpile 1
S 21 (g)	Western area soil stockpile 2	Western area soil stockpile 2
S 21 (g)	Soil stockpile in the Northern Opencast Pit	Soil stockpile in the Northern Opencast Pit
S 21 (g)	Soil Stockpile 1 in the south-eastern area	Soil Stockpile 1 in the south-eastern area
S 21 (g)	Soil Stockpile 2	Soil Stockpile 2 in the south-eastern area
S 21 (g)	Dust Suppression	Dust suppression
S 21 (g)	Storage of water in PCD 3	Dust suppression
S 21 (g)	Washbay dam 4	Storage of water in Washbay Dam 4
S 21 (g)	Washbay dam 5	Storage of water in Washbay Dam 5
S 21 (g)	Western o/c pit	Backfilling of pit using softs and hards
S 21 (g)	New stockpile area	Storage of coal stockpiles
S 21 (g)	Topsoil stockpile Area	Storage of topsoil
S 21 (j)	De-watering of Old void	Pumpimg water from osldvoid to PCD 3 and Western pit
S 21 (j)	De-watering of Northern Pit	Pumping water from Northern pit to PCD 3 and western pit
S 21 (j)	Dewatering of Main pit	Pumping water from Main pit to PCD 3 and Western pit

Water Use	Name	Description/Purpose
S 21 (j)	Western opencast pit	Plant water

3.7 WASTE RELATED AUTHORISATIONS

No waste related authorisations are held by Elandsfontein Colliery for the mine for non-mining waste related activities. Domestic waste generated on-site is transported for disposal at their registered disposal site. It should however be noted that the requirements of the National Environmental Management: Waste Act, 2008 (NEMWA) should be taken into consideration by the mine. The NEMWA came into force on 2 June 2014. Waste is accordingly no longer governed by the MPRDA, but is subject to all the provisions of the National Environmental Management: Waste Act, 2008 (NEMWA).

Section 16 of the NEMWA must also be considered which states as follows:

1. *A holder of waste must, within the holders power, take all reasonable measures to-*
    a) *"Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;*
    b) *Reduce, re-use, recycle and recover waste;*
    c) *Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;*
    d) *Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impacts;*
    e) *Prevent any employee or any person under his or her supervision from contravening the Act; and*
    f) *Prevent the waste from being used for unauthorised purposes."*

These general principles of responsible waste management should be considered by the mine.

Waste can be defined as either hazardous or general in accordance to Schedule 3 of the NEMWA (2014) as amended. "Schedule 3: Defined Wastes" has been broken down into two categories – Category A being hazardous waste; and Category B being general waste. Under Category A (hazardous waste), the act makes allowance for, but not limited to, "wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal; Oil wastes and wastes of liquid fuels; and Construction wastes".

In order to attempt to understand the implications of these waste groups, it is important to ensure that the definitions of all the relevant terminologies are defined:

- Hazardous waste: means "any waste that contains organic or inorganic elements or compounds that may, owning to the inherent physical, chemical or toxicological characteristic of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles."
- Residue deposits: means "any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right."

- Residue stockpile: means "any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act."
- General waste: means "waste that does not pose an immediate hazard or threat to health or to the environment, and includes – domestic waste; building and demolition waste; business waste; inert waste; or any waste classified as non-hazardous waste in terms of the regulations made under Section 69."

3.7.1 NEMWA PLANNING AND MANAGEMENT OF RESIDUE STOCKPILES AND RESIDUE DEPOSITS REGULATIONS, 2015 (GN R 632)

The purpose of these Regulations is to regulate the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation. The identification and assessment of environmental impacts arising from residue stockpiles and residue deposits must be done as part of the environmental impact assessment conducted in terms of the NEMA. A risk analysis based on the characteristics and the classification set out in Regulation 4 and 5 must be used to determine the appropriate mitigation and management measures. The pollution control barrier system shall be defined by the:

- National Norms and Standards for the Assessment of Waste for Landfill Disposal, 2013; and
- National Norms and Standards for Disposal of Waste to Landfill, 2013.

The planning, management and reporting of residue stockpiles and residue deposits is shown schematically in Figure 11 below.

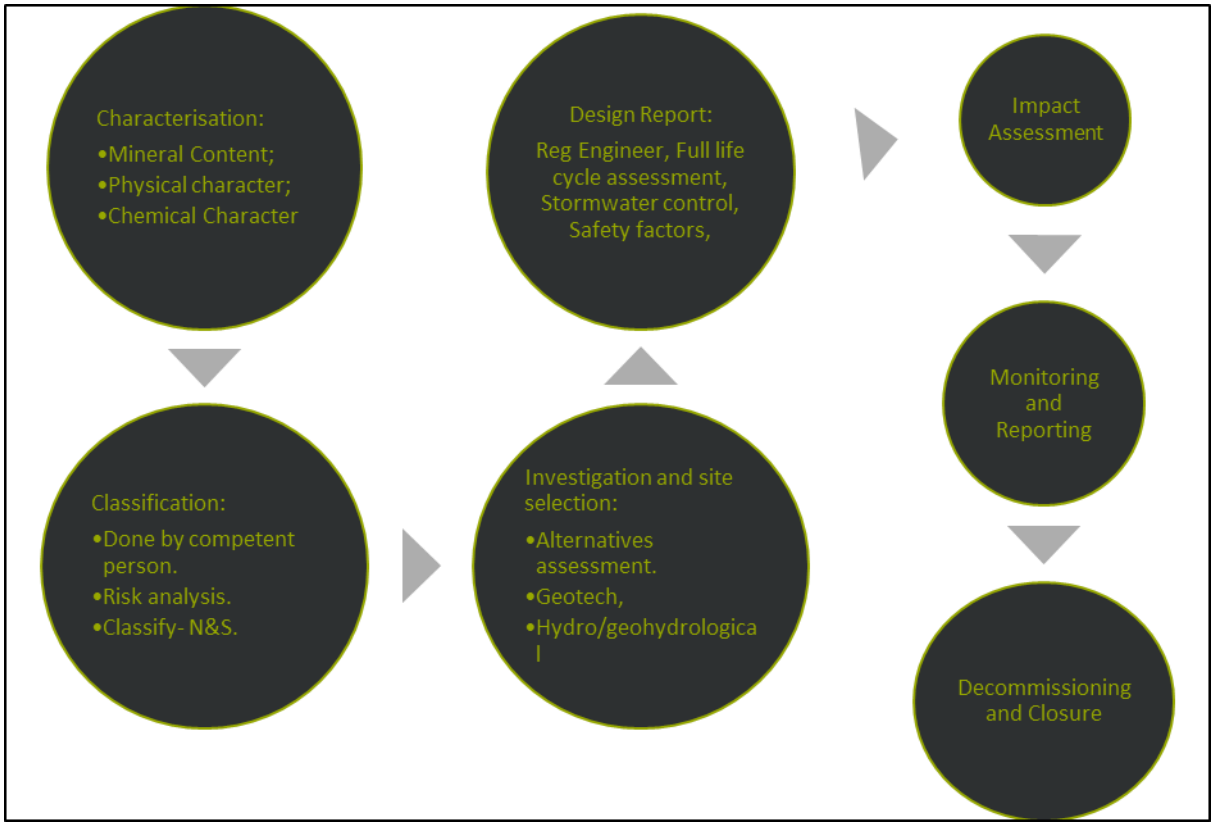

Figure 11: Overview of the planning and management of residue stockpiles and residue deposits regulations

It is anticipated that existing stockpiling areas will continue to be used by the Colliery and, therefore, there will be no requirement to identify new stockpile areas.

3.8 OTHER AUTHORISATIONS

3.8.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The purpose of the MPRDA is "to make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources; and to provide for matters connected therewith." The MPRDA establishes that environmental management principles are relevant and binding to all mining operations. Government Notice R527 of the MPRDA is a comprehensive listing of environmental regulations related to mining. The most relevant Regulations to this project are Regulations 63 and 69, which state that pollution control and waste management principles must be implemented. Where the generation and production of waste at source is not avoidable, it must be disposed of in a responsible and sustainable manner (in compliance with the NEMWA).

Section 37 of the MPRDA confirms that the principles set out in the NEMA apply to all prospecting and mining operations and must be carried out in accordance with the generally accepted principles of sustainable development. Section 38 stipulates that the general objectives of IEM must be applied in accordance with NEMA and this includes the assessment and management of impacts identified as part of the environmental management program process laid out in Section 39.

R527 specifies that the EMPr must include environmental objectives and specific goals for mine closure and must prescribe financial provisions for the rehabilitation or management of negative environmental impacts, which must be reviewed annually (Section 41) R527 also provides principles for mine closure.

The proponent will remain responsible for any environmental liability and the management thereof, until it has been issued with a closure certificate by the DMR (Section 43). R527 allows for four methods of financial provision.

3.8.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The main aim of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA) is to provide for co-operative governance by establishing decision-making principles on matters affecting the environment. In terms of the NEMA EIA Regulations, the applicant is required to appoint an EAP to undertake the EIA process, as well as conduct the public participation process towards an application for EA. In South Africa, EIA's became a legal requirement in 1997 with the promulgation of regulations under the Environment Conservation Act (ECA). Subsequently, NEMA was passed in 1998. Section 24(2) of NEMA empowers the Minister and any MEC, with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed and reported on to the competent authority responsible for granting the relevant EA. On 21 April 2006, the Minister of Environmental Affairs and Tourism (now DEA) promulgated regulations in terms of Chapter 5 of the NEMA. These regulations, in terms of the NEMA, were amended in June 2010 and again in December 2014 as well as April 2017. The 2014 NEMA EIA Regulations (as amended) are applicable for the future LoM and a Scoping and EIA process is currently underway.

The objective of the EIA Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment and reporting of the listed activities that have been identified to be triggered by the proposed development/ mining activity. The purpose of these procedures is to provide the competent authority with adequate information to make decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorised, and that activities which are authorised are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

In accordance with the provisions of Sections 24(5) and Section 44 of the NEMA the Minister has published Regulations (GN R. 982) pertaining to the required process for conducting EIA's in order to apply for, and be considered for, the issuing of an EA. These EIA Regulations provide a detailed description of the EIA process to be followed when applying for EA for any listed activity. The Regulations differentiate between a simpler Basic Assessment Process (required for activities listed in GN R. 983 and GN R. 985) and a more complete EIA process (activities listed in GN R. 984).

3.8.3 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT

The purpose of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008 - NEMWA) is to prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development.

In addition sustainable development requires that the generation of waste is avoided, or where it cannot be avoided, that it is reduced, re-used, recycled or recovered and only as a last resort treated and safely disposed of.

Section 19 of the Act, allows that the Minister may, by notice in the Gazette, publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. Such activities require a waste management licence. The Act aims to address the likely environmental impacts associated with wastes on the cradle to grave basis.

The activities listed include the following categories:

- Storage of waste;
- Reuse, recycling and recovery;
- Treatment of waste;
- Disposal of waste;
- Storage, treatment and processing of animal waste; and
- Construction, expansion or decommissioning of facilities and associated structures and infrastructure.

Each of the listed activities has a threshold which would trigger the need for a waste management licence (WML) (thresholds relate to, inter alia, volumes, time, and throughputs). As from the 2nd of September 2014, WML's are required for all residue stockpiles and deposits relating to prospecting, mining, exploration or production activities.

The Act also addresses contaminated land, and requires that on identification of such land the DEA must be notified and relevant site assessment / contamination assessments undertaken. If contaminated then such land is recorded as contaminated on a national contaminated land register.

It is further important to consider the provision of Section 16 of the Act which requires that:

"A holder of waste must, within the holders' power, take all reasonable measures to-

- *avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;*
- *reduce, re-use, recycle and recover waste;*
- *where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;*
- *manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impacts;*
- *prevent any employee or any person under his or her supervision from contravening the Act; and*
- *prevent the waste from being used for unauthorised purposes."*

4 PRESENT ENVIRONMENTAL ATTRIBUTES

The information in this section has been obtained from various specialist reports and where appropriate the relevant specialist report is included in an appendix of this Report.

4.1 CLIMATE AND RAINFALL

The climate for the Rand Highveld Grassland is characterised by a summer rainfall with a mean annual precipitation of 654mm which is slightly lower in the western parts of this vegetation type (Mucina & Rutherford, 2006). These areas are known to have warm-temperate conditions with dry winters. The likelihood of frost however is greater in the western parts with the incidence of frost ranging from 30 to 40 days compared to the east which has a frost incidence of 10 to 35 days (Mucina & Rutherford, 2006).

The mean annual precipitation of the mining rights area is 706 mm (see Table 8 below for more details and APPENDIX D for the specialist report).

Table 8: Mean Monthly Rainfall, Rain Days and Evaporation data for the mining rights area

Month	Ave Rainfall (mm)	Ave rain days	Ave Evaporation (mm S-Pan)
October	73.6	7.0	182.1
November	119.3	9.6	171.8
December	119.4	9.6	189.2
January	136.1	10.4	185.8
February	95.6	7.3	154.9
March	81.6	6.8	152.9
April	40.6	4.2	117.6
May	17.6	2.0	99.0
June	9.0	0.9	80.4
July	6.4	0.8	88.0
August	8.9	1.1	116.5
September	22.4	2.6	151.0
Mean Annual	**705.8***		**1689**

4.2 EVAPORATION

The mean annual evaporation of the mining rights area is 1 689 mm (S-Pan) (refer to Table 8). The Mpumalanga Highveld has distinct wet and dry seasons. 91% of the mining rights area's mean annual rainfall falls between October and April inclusively. 68% of the area's mean annual evaporation occurs in this period (Midgley et al., 1990).

4.3 SURFACE WATER

Various non-perennial and perennial streams have been identified within the proposed project area by means of the "2529" quarter degree square topographical river line data set. The Mpumalanga Highveld Grassland Wetland Layer indicates an additional wetland within the mining right area, namely a floodplain wetland with various other wetland types located within the mining right surroundings.

4.3.1 WATER MANAGEMENT AREA

The Colliery falls mostly within the Quaternary Catchment B20G, associated with the Grootspruit River in the upper Olifants River Catchment. The Quaternary Catchment B20G has been classified as Largely Modified, with a PES of 'D'. Owing to the cumulative impacts on the Olifants River, as well as its link to important habitats in the Kruger National Park (KNP), the Department of Water and Sanitation (DWS) has recently placed significant emphasis on the importance of conservation of watercourses associated with this catchment. Whilst a small portion of the colliery's boundary falls within Quaternary Catchment B11K, this is irrelevant to this study, since the areas of focus are found within B20G.

4.3.2 SURFACE WATER HYDROLOGY

The mining rights area is located in quaternary catchment B20G. The mining rights area is located just west of Clewer and approximately 15km west, south west of Emalahleni. The colliery is operational with significant development within the mining rights area. A small tributary of the Grootspruit flows in a south westerly direction through the mining rights area. It's confluence with the Grootspruit is just to the west of the mining rights area. The Grootspruit flows from south to north along the western boundary of the mining rights area before turning west to meet the Saalklapspruit, approximately 5 km west of the mining right area.

The Elandsfontein mining operations occur on both sides of this Grootspruit trubutory along most of its length. The upper reaches are dammed with pollution control and water supply dams. The natural tributary has a poorly defined water course but is generally heavily reeded. The lower reaches have been modified and the stream is canalised for roughly half its length.

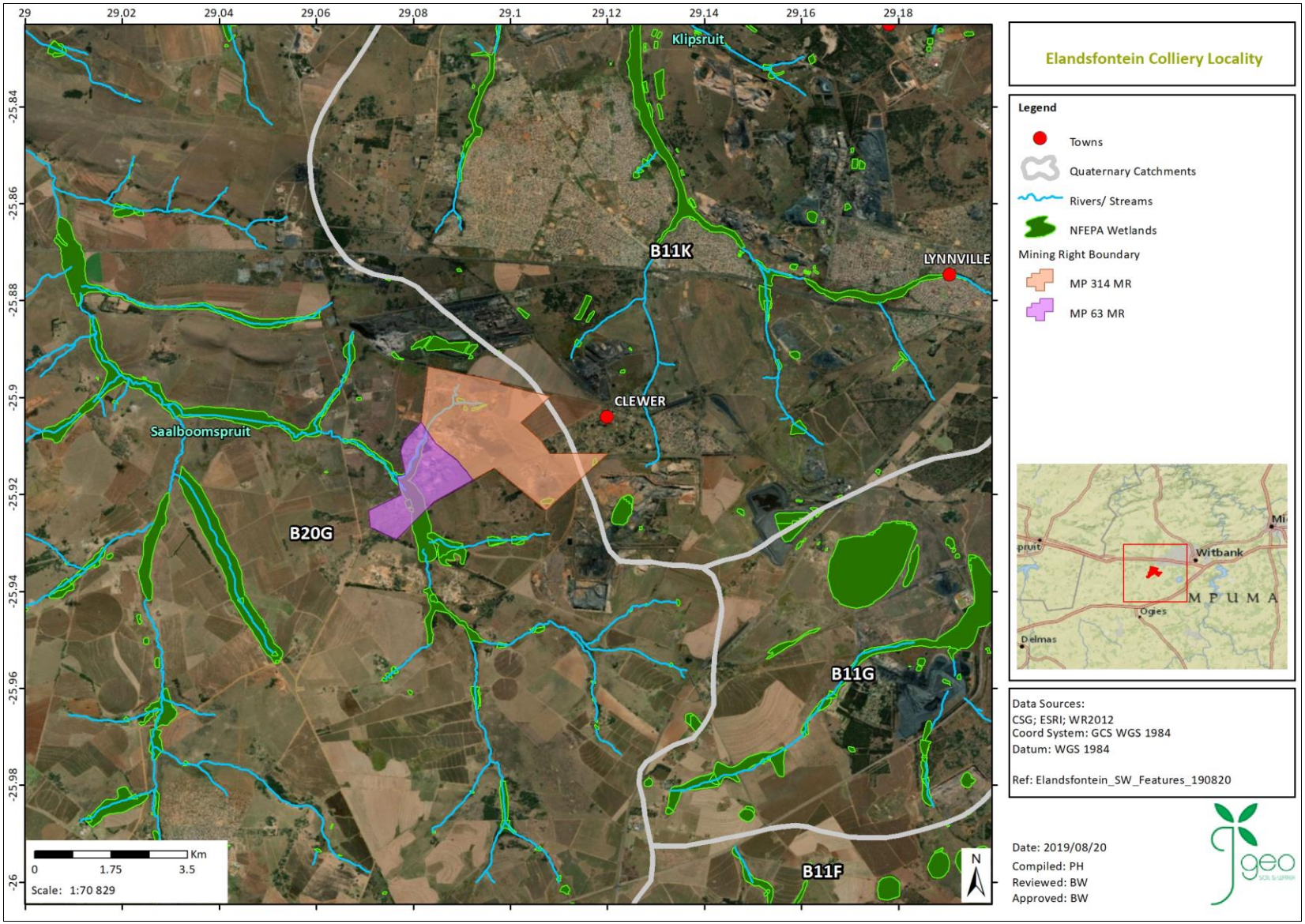

Figure 12: Elandsfontein Colliery surface water features

4.3.3 SURFACE WATER QUALITY

As Elandfontein Colliery is an existing mine, there is an existing IWUL (Licence no. 04/B20G/CGI/3843, dated 22 October 2015. As per the conditions of the IWUL, the colliery is required to conduct monthly surface water monitoring to determine if the chemical water quality and the levels are in line as prescribed in the IWUL. As per the IWUL, there are six (6) surface water monitoring and eight (4) additional surface water monitoring points that are included in the surface water monitoring programme. Refer to Figure 13 for the location of the surface water monitoring points.

Monthly surface water samples are analysed for:

- pH
- Electrical Conductivity (EC) mS/m
- Calcium (Ca) mg/L
- Magnesium (Mg) mg/L
- Sodium (Na) mg/L
- Potassium (K) mg/L
- Fluoride (F) mg/L
- Chloride (Cl) mg/L
- Sulphate (SO_4) mg/L
- Aluminium (Al) mg/L
- Iron (Fe) mg/L
- Manganese (Mn) mg/L
- Nitrate (NO_3) mg/L
- Total Dissolved Salts (TDS) mg/L
- Total Hardness mg/L
- Alkalinity $CaCO_3$/L
- Turbidity

Water qualities are compared to the IWUL Limits and the Resource Quality Objectives for the Olifants River System. The monitoring network provides information for risk-based decision making to Elandsfontein Colliery management with regard to effectiveness of pollution prevention measures and areas requiring management attention. The results for the surface water monitoring are discussed below.

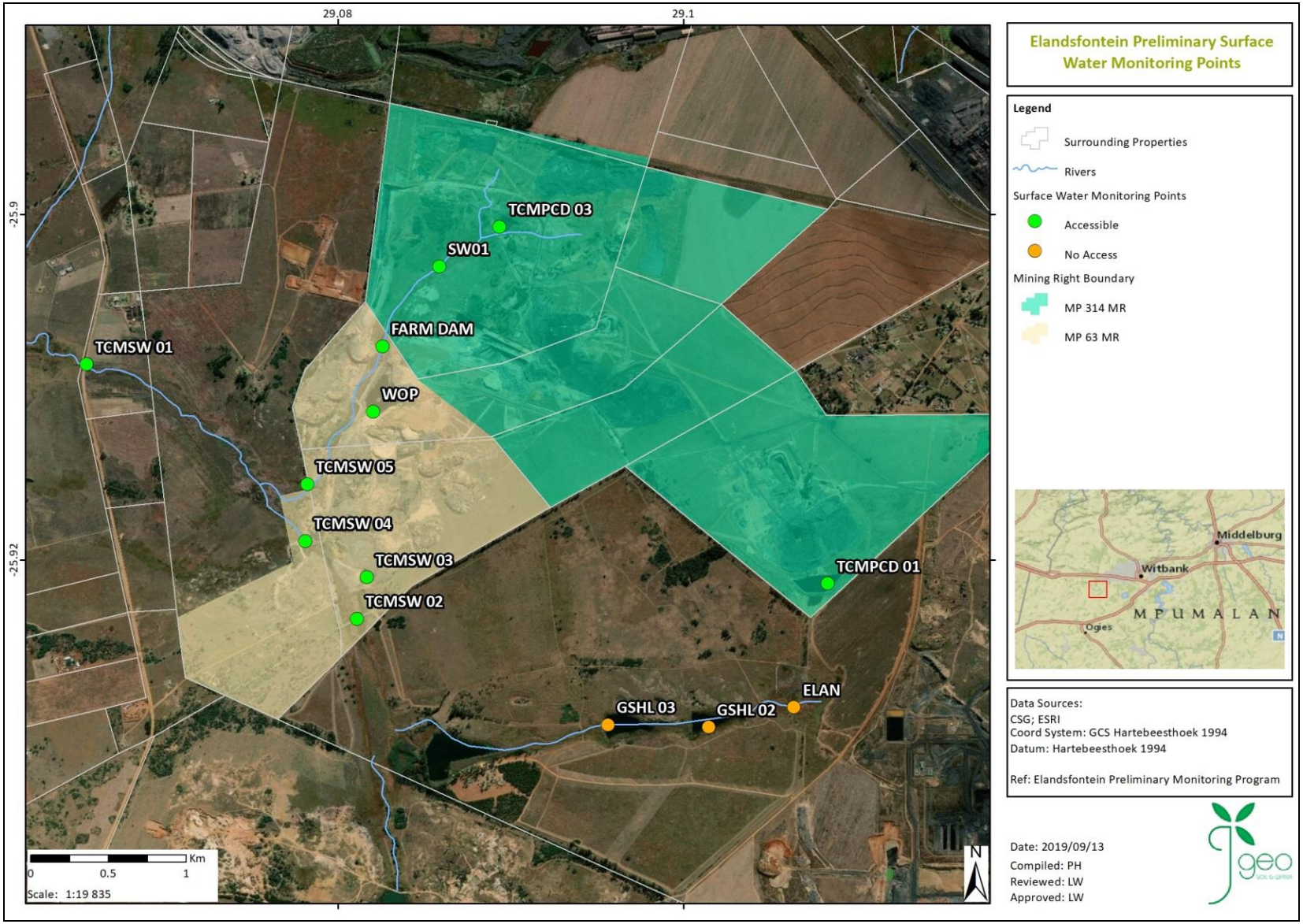

Figure 13: Location of the surface water monitoring points

Table 9: Summary of surface water monitoring points

Locality	Locality Description	Coordinates WGS 84 ddd.ddddd	Monitoring Frequency
SW1	Most upstream monitoring point in northern tributary	S25.903008° E29.085863°	Monthly
TCM PCD1	Pollution control dam south/adjacent of historical partially rehabilitated discard area.	S25.922396° E29.107576°	Monthly
TCM PCD3	Pollution control dam containing decant water, surface water runoff and water from pits.	S25.900712° E29.089354°	Monthly
TCM SW1	Most downstream monitoring point after confluence of northern and southern tributaries. Tributary drains northwest towards Olifants River and Loskop Dam.	S25.908673° E29.065435°	Monthly
TCM SW2	Most upstream monitoring point of southern tributary.	S25.923392° E29.081096°	Monthly
TCM SW3	Open void collecting surface water runoff – in-pit storage.	S25.920989° E29.081663°	Monthly
TCM SW4	Monitoring point in southern tributary downstream of TCM SW2.	S25.918894° E29.078099°	Monthly
TCM SW5	Monitoring point in northern tributary downstream of Farm Dam.	S25.915575° E29.078226°	Monthly
WOP	West Open Pit.	S25.911403° E29.082017°	Monthly
Farm Dam	Instream Dam downstream of SW1 in northern tributary.	S25.907626° E29.082571°	Monthly

The following is a summary of the results from the GSW September 2019 to November 2019 Quartely Water Quality Report:

- **Wastewater :** Water quality from the mine water/pollution control dams recorded acidic pH levels and elevated concentrations of EC, TDS, SO4 (dominant) and metals (Al, Fe and Mn), typically associated with coal washing/mining activities. SO4 is dominant in terms of composition.
- **Storm and Surface Water Runoff:** Upstream and downstream monitoring points recorded elevated concentrations, typically associated with coal washing/mining activities. The upstream monitoring point (TCM-SW02) recorded elevated concentrations, with a deterioration of water quality towards the downstream monitoring point (TCM-SW01), indicating pollution from Elandsfontein

4.3.4 MEAN ANNUAL RUNOFF

The mean annual runoffs for the Grootspruit catchment is 3.57 Million m^3/a while that of the Grootspruit tributary is 0.36 Million m^3/a. The mean annual runoff for the quaternary catchments B20G is 22.87 Million m^3 (Middleton and Bailey, 2009). The mean annual runoff values for the Grootspruit catchment and its tributary were scaled from the quaternary catchment runoff, based on relative catchment size.

4.3.5 RESOURCE CLASS AND RIVER HEALTH RECEIVING WATER QUALITY OBJECTIVES AND RESERVE

Ecological classification refers to the determination and categorisation of the integrity of the various selected biophysical attributes of ecosystems compared to the natural or close to natural reference conditions. Based on the water resources report the overall wetland health for the wetlands varied from Moderately Modified (Class C), Largely Modified (Class D) to Critically Modified (Class E) systems.

4.3.6 SURFACE WATER USER SURVEY

The Grootspruit has an 81.562 km² catchment up to just beyond the mining rights area. The tributary of the Grootspruit has a catchment measuring 8.169 km² up to its confluence with the Grootspruit. The catchment sizes and catchment boundaries are shown in Figure 14.

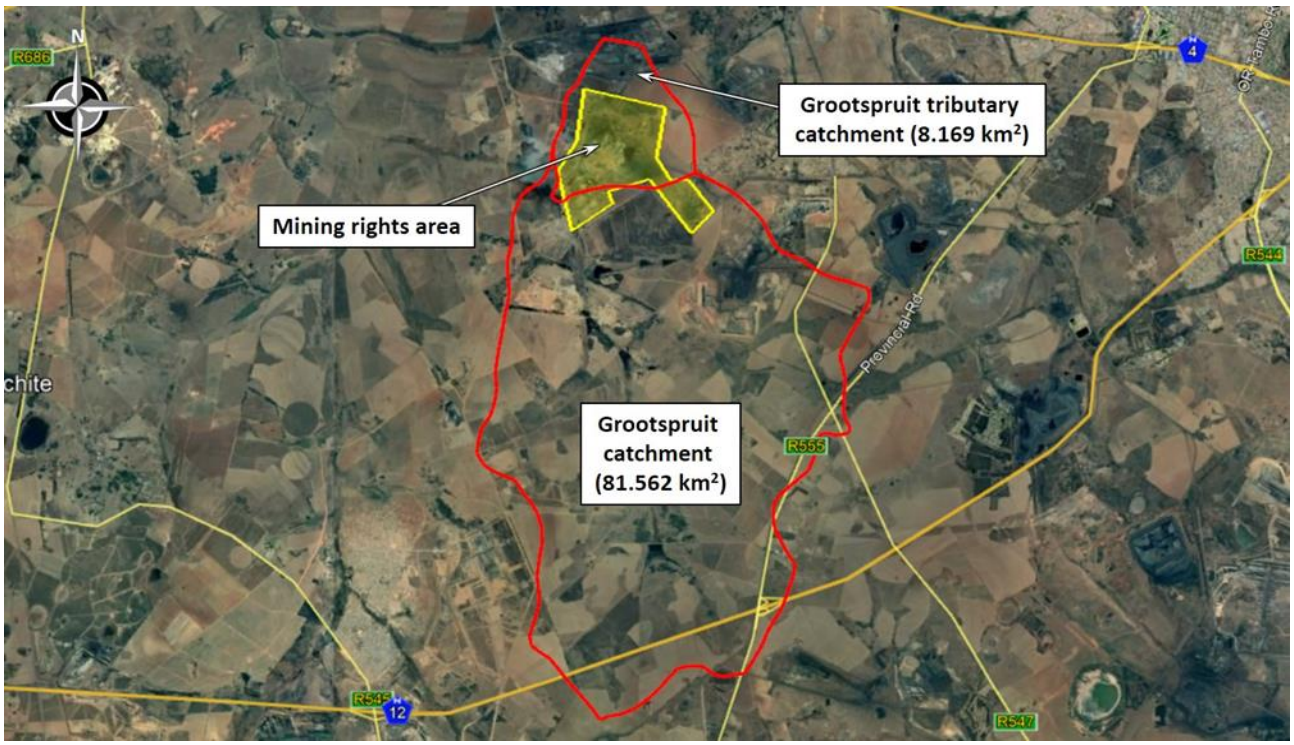

Figure 14: Catchment Delineation

4.3.7 SENSITIVE AREAS SURVEY

A wetland and aquatic ecology study, was conducted for the colliery by the Biodiversity Company in 2019 (refer to APPENDIX D). Sections below present a summary of the finding from these studies.

4.3.8 WETLAND ASSESSMENT

The wetland areas were delineated in accordance with the DWAF (2005) guidelines (see Figure 15). During the field survey, one main unchanneled valley bottom (HGM 1) and two hillslope seeps (HGM 2 and 3) were identified. The unchanneled valley bottom originates from drainage lines, which likely has been modified to channel flow. Various mining components are located within close proximity to HGM 1, which increases modification to the wetland in various ways, including increased inputs from water stored in waste impoundments and evaporation/attenuation ponds.

Significant modification and degradation has resulted in surface and sub-surface flow dynamics being altered with an input of Transported Technosols that according to DWAF (2005) cannot be classified as a hydromorphic soil form. A large portion of the upper reaches of HGM 1 has therefore been determined to be artificial and therefore irrelevant to the wetland assessment (see Figure 16)

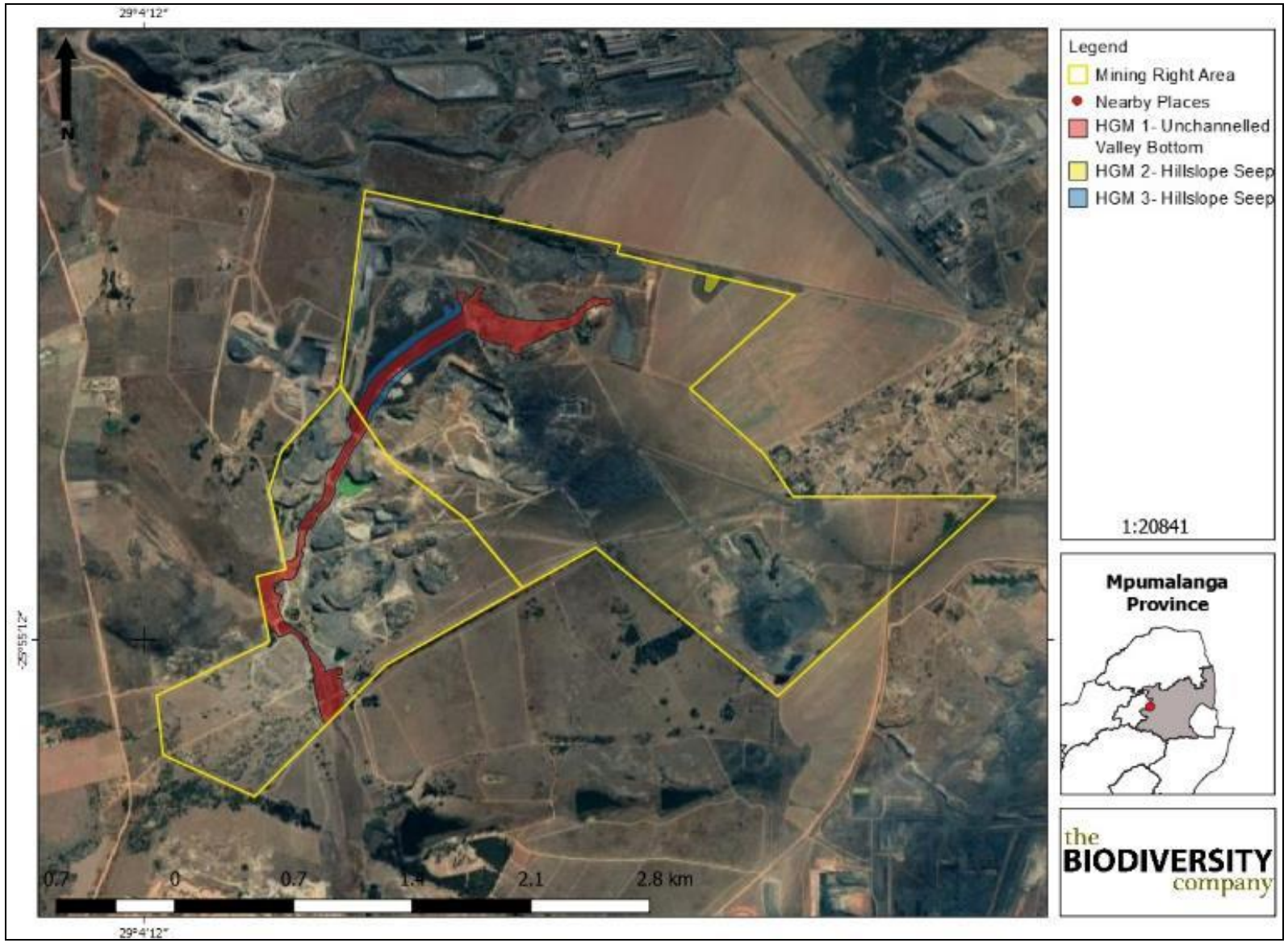

Figure 15: Delineated wetlands within the project

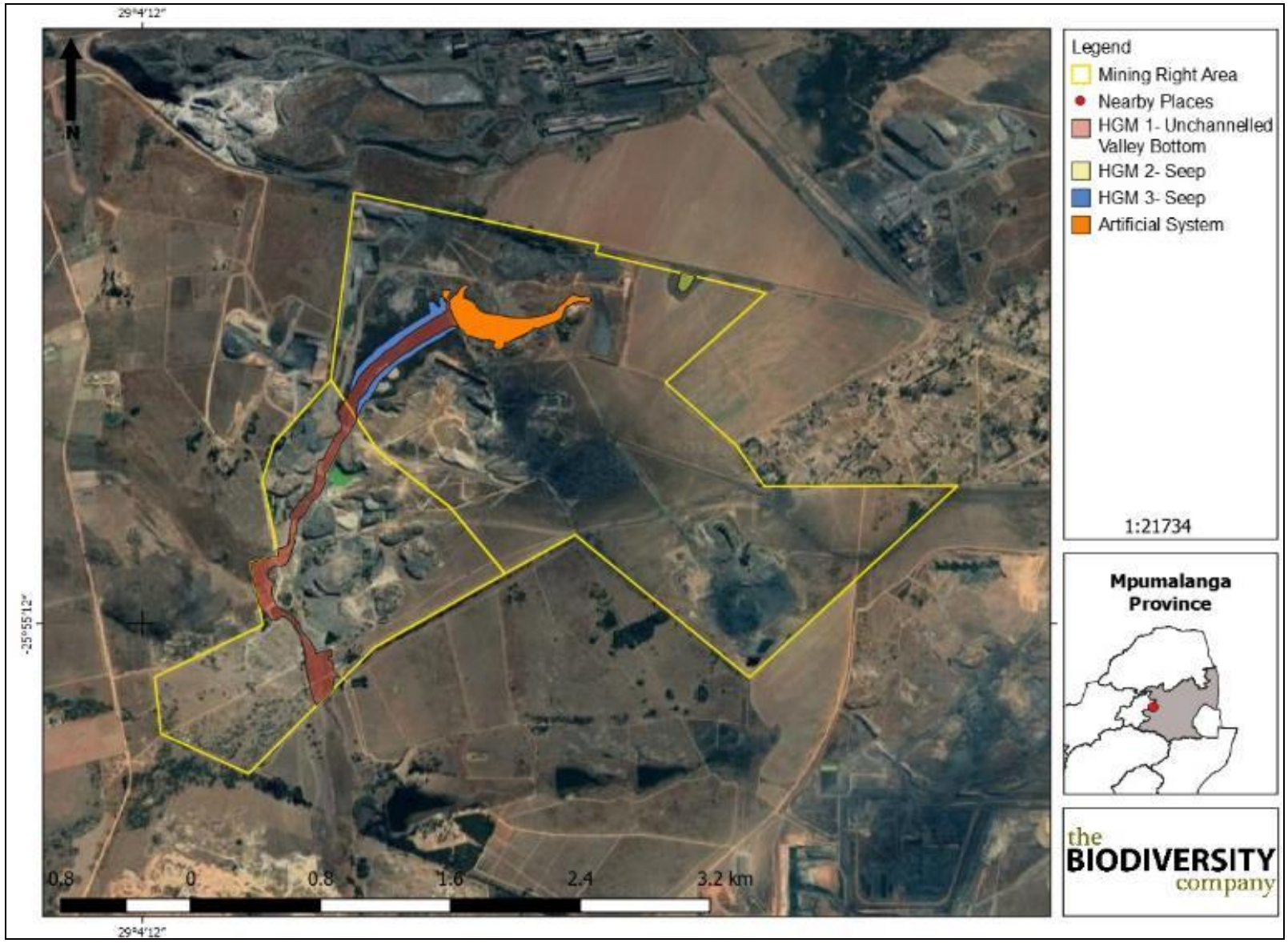

Figure 16: Portion of HGM 1 classified as artificial

The ecosystem services provided by the wetland units identified on site were assessed and rated using the WET-EcoServices method (Kotze *et al.,* 2008). The summarised results for HGM 1, 2 and 3 are shown in Table 10. The average ecosystem services score has been determined to be "Intermediate" for HGM 1 and "Moderately Low" for HGM 2 and 3.

Table 10: The ecosystem services being provided by the HGM types

Wetland Unit					HGM 1	HGM 2	HGM 3
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits	Flood attenuation		2.3	1.9	1.7
			Streamflow regulation		2.1	1.8	1.7
			Water Quality enhancement benefits	Sediment trapping	2.4	2.0	2.1
				Phosphate assimilation	2.6	2.3	2.2
				Nitrate assimilation	2.5	2.2	2.3
				Toxicant assimilation	2.6	2.1	2.0
				Erosion control	2.4	1.9	1.8
			Carbon storage		1.8	1.6	1.6
	Direct Benefits	**Biodiversity maintenance**			1.1	1.4	1.2
		Provisioning benefits	Provisioning of water for human use		0.2	0.3	0.4
			Provisioning of harvestable resources		0.0	0.0	0.0
			Provisioning of cultivated foods		0.0	0.0	0.0
		Cultural benefits	Cultural heritage		0.0	0.0	0.0
			Tourism and recreation		0.0	0.0	0.0
			Education and research		0.6	0.8	1.0
Average Eco Services Score					1.4	1.2	1.2

The "Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries" (Macfarlane et al., 2014) was used to determine the appropriate buffer zone for the proposed activity. The buffer zones calculated for the proposed open cast activities are 106 m with no buffer requirement for underground mining activities. **Figure 17** illustrates the extent of the post-mitigation buffer zones (106 m) relevant to the delineated wetlands for the proposed open cast mining activities.

It is recommended by the specialist that given the "Moderate" and "High" significance ratings determined post-mitigation, minimisation is deemed not to be feasible (the second step according to the mitigation hierarchy (DEA, 2013). In this regard the next step will be to rehabilitate degraded areas. However, it is the specialist's opinion that rehabilitation will not be sufficient given the current state of modification and degradation as well as the fact that the wetland itself is proposed to be mined with its buffer zone impeded into in most cases.

Therefore, it is firstly recommended that the proposed open cast mining areas be amended to adhere to the delineated wetland's buffer zone to ensure avoidance. If the latter mentioned is not feasible, it is recommended that a wetland offset strategy (which according to (DEA, 2013) is the last resort) be compiled for the proposed activities and the relevant delineated wetlands. The wetland offset would then need to be focussed on the extent of the wetland and associated buffer zone that will be lost, as indicated in Figure 18. The wetland offset must incorporate onsite rehabilitation and must be incorporated in the future plans for the mine.

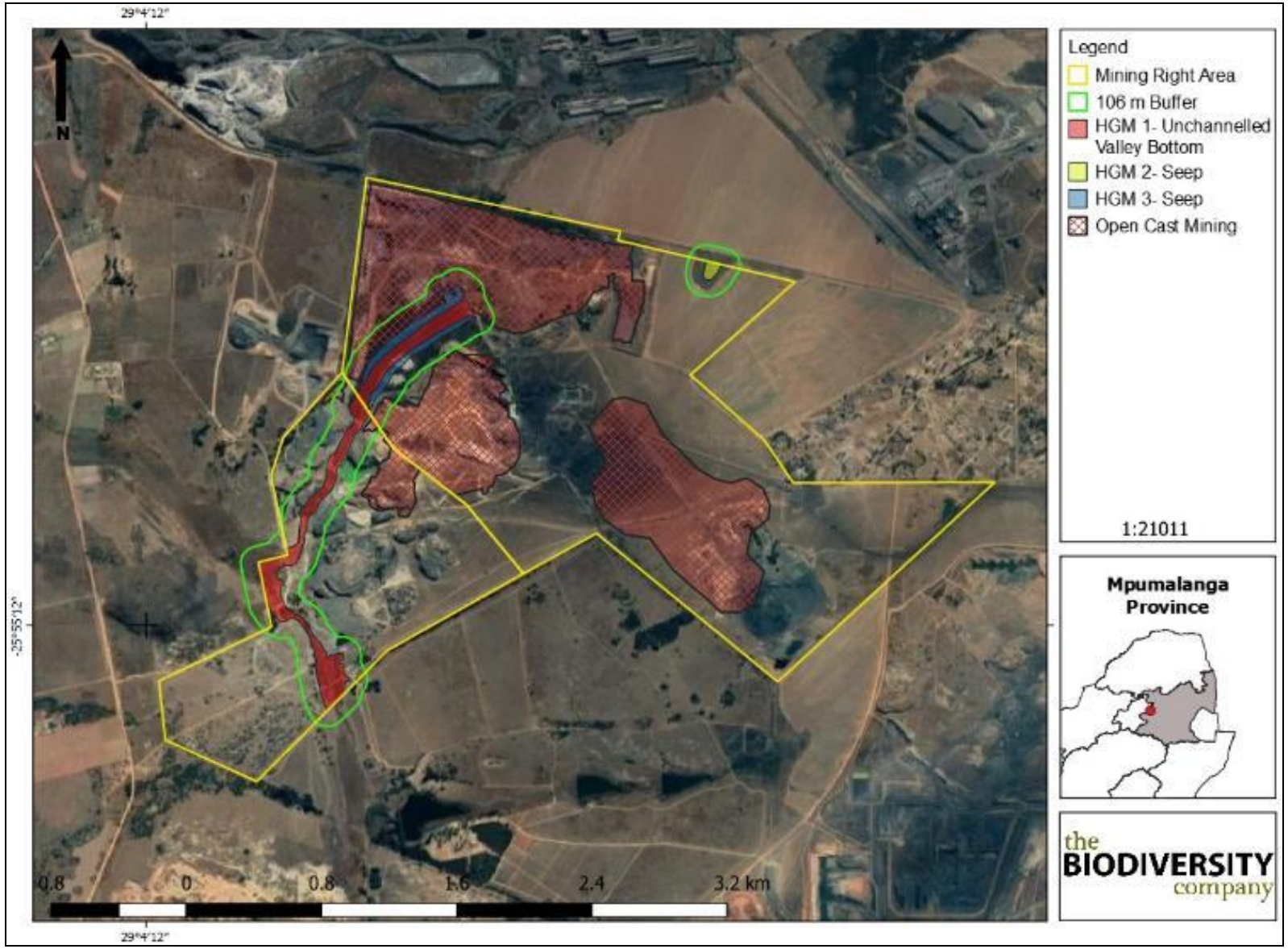

Figure 17: Open cast pit buffer requirement

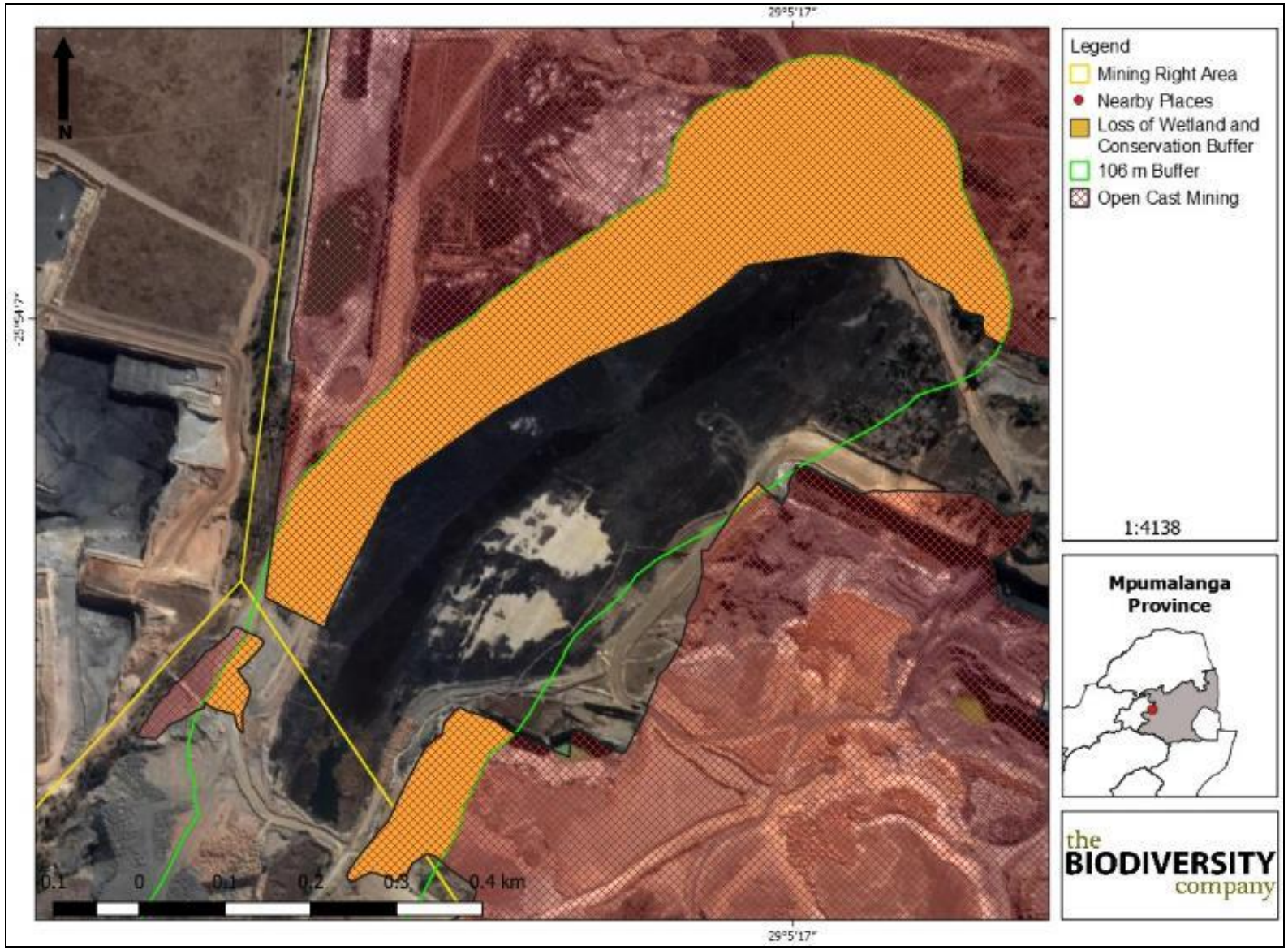

Figure 18: Extent of wetland and associated buffer zone that will be lost

4.4 GROUNDWATER

According to the ground water study conducted (Gradient Consulting, 2020), a distribution of borehole water levels recorded as part of the hydrocensus user survey as well as boreholes forming part of the existing groundwater monitoring network were considered and used to interpolate local groundwater elevation and hydraulic head contours. The groundwater levels available from the hydrocensus survey and monitoring boreholes in and around the mining areas are summarized in Figure 7. The minimum water level was recorded at on-site borehole GW05 (2.85 mbgl), while the deepest water level measured was at borehole locality ELNBH02, 49.69 mbgl[4].

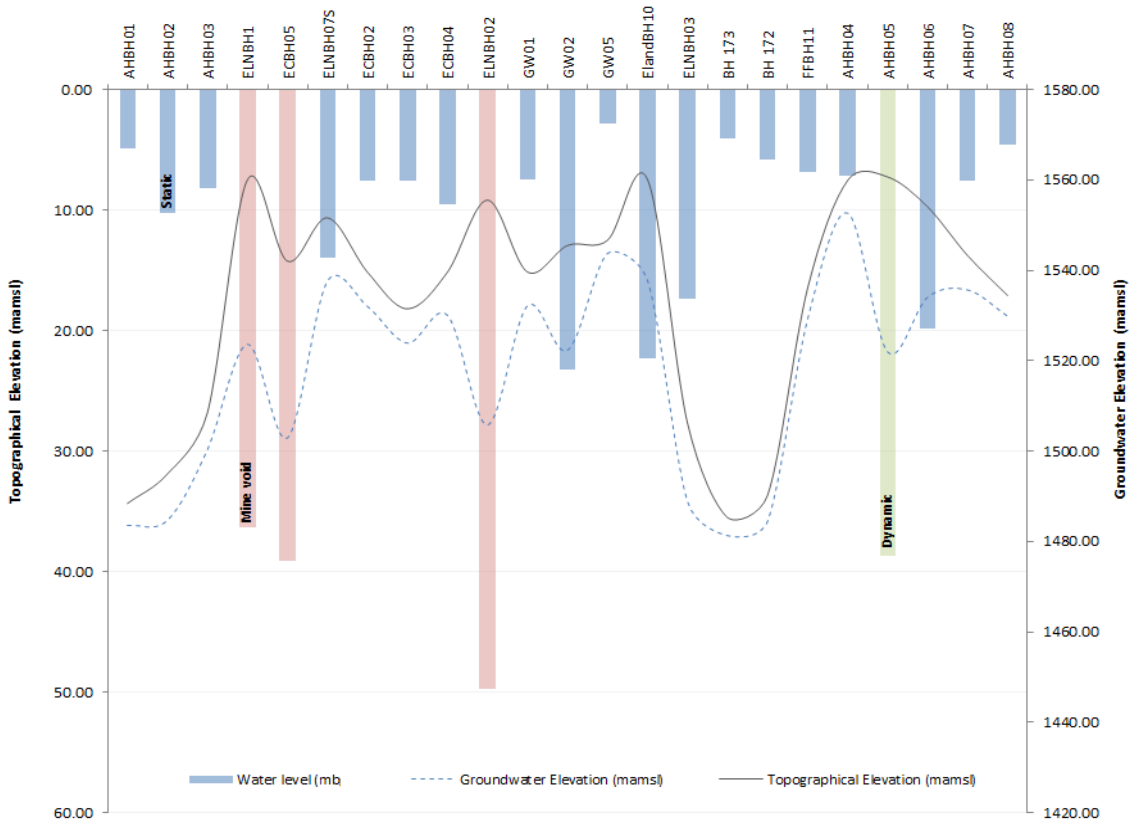

Figure 19: Topographical elevation vs. groundwater elevation correlation graph.

Analysed data indicate that the regional groundwater elevation correlates moderately to the topographical elevation (R2 ~ 0.84) suggesting a dynamic environment. However, water level data for the shallow aquifer indicate that the majority of levels correlate very well to the topographical elevation (R2 > 0.93) (Figure 19). Accordingly, it can be assumed that the regional groundwater flow direction of the shallow aquifer is dictated by topography. Accordingly, the inferred groundwater flow direction of the shallow aquifer will be in a general southwestern direction towards the lower laying drainage system of the Grootspruit transecting the project area from where it will discharge as baseflow (see Figure 20. On-site water levels of the underground mine void do not correlate well to topography and is a function of the coal seam floor contours historically mined.

[4] It should be noted that static water levels in excess of ~35.0 mbgl measured within the mining footprints are assumed to enter historical mine voids. Hydrochemistry analysis also confirm this assumption

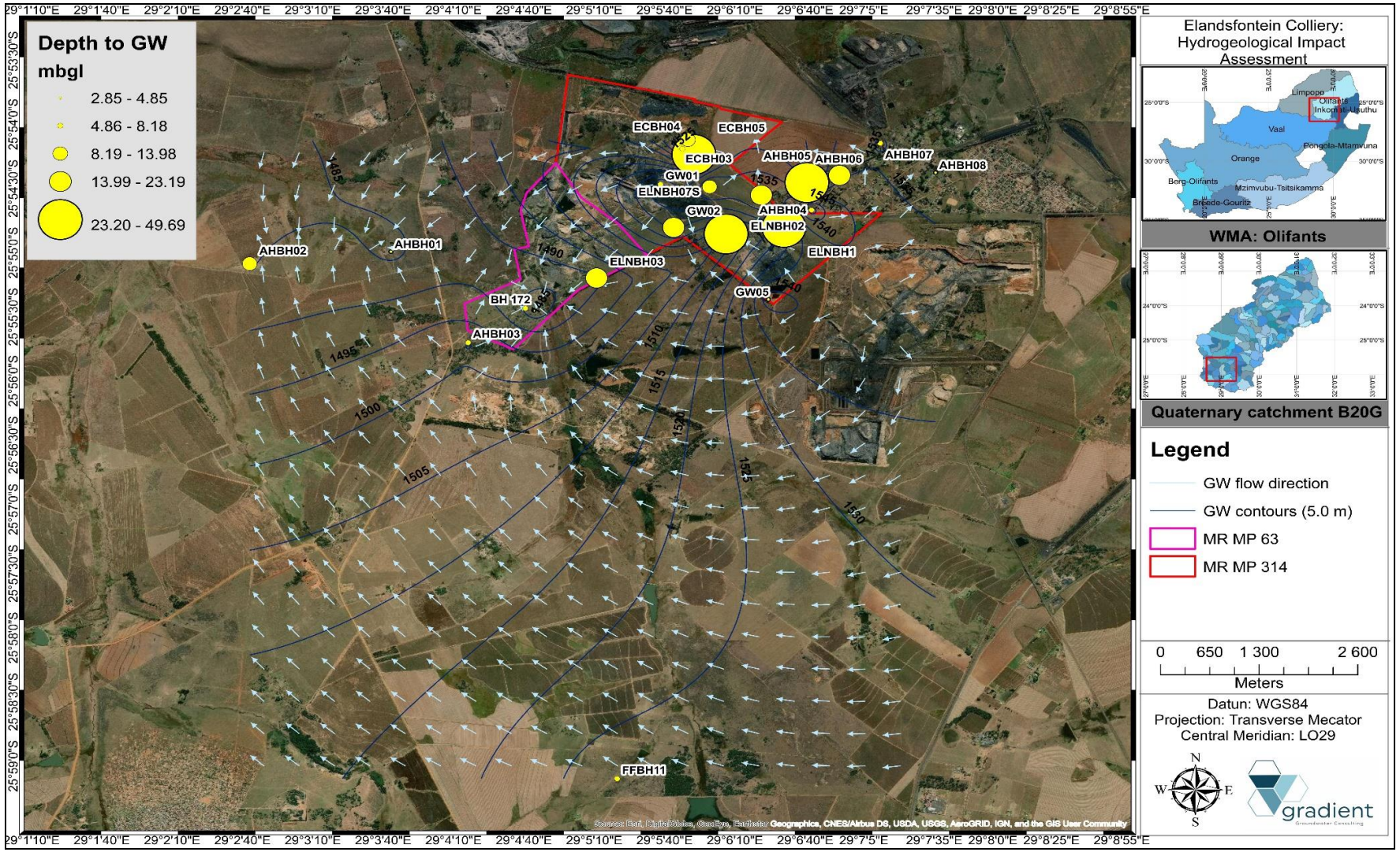

Figure 20: Regional groundwater flow direction and depth to groundwater

4.4.1 AQUIFER CHARACTERISATION

The site is predominantly underlain by an intergranular and fractured aquifer system comprising mostly of fractured and weathered compact sedimentary/ arenaceous rocks. It should be noted that the Ecca Group consists mainly of shales and sandstones that are very dense with permeability usually very low due to poorly sorted matrices.

On a local scale, two aquifer units can be inferred in the saturated zone:

i. A shallow, weathered zone aquifer occurring in the transitional soil and weathered bedrock formations underlain by more consolidated bedrock. Due to higher effective porosity (n) this aquifer is most susceptible to impacts from contaminant sources.

ii. An intermediate/deeper fractured where the underground mine void is situated.

4.4.2 GROUND WATER RECHARGE

An approximation of recharge for the study area is estimated at ~6.21 % of mean annual precipitation (MAP) i.e. ~32.93 mm/a. Groundwater recharge was calculated using the RECHARGE Program1 (van Tonder and Xu, 2000), which includes using qualified guesses as guided by various schematic maps. The following methods/sources were used to estimate the recharge: (i) Chloride Mass Balance (CMB) method (ii) Geology (iii) Vegter Groundwater Recharge Map (iv) Harvest Potential Map; (v) Baseflow as a minimum recharge value (vi) Literature and (vi) Qualified opinion. It should be noted that due to the modified mining environment, recharge values may differ at certain zones i.e. backfilled areas, discard dumps etc.

4.4.3 GROUNDWATER QUALITY

Groundwater monitoring points are sampled on a monthly (level) and quarterly (quality) basis, as prescribed in the IWUL. Three (3) of the additional groundwater monitoring points are sampled biannually. There are eight (8) IWUL and seventeen (17) additional groundwater monitoring points that are included in the monitoring programme. Refer to Figure 21 for the positions of the groundwater monitoring points relative to the colliery and water resources

Groundwater samples are analysed for the following:

- pH
- EC mS/m
- TDS mg/L
- Total Hardness mg/L
- Alkalinity $CaCO_3$/L
- Ca mg/L
- Mg mg/L
- Na mg/L
- K mg/L
- F mg/L
- Cl mg/L
- SO_4 mg/L
- NO_3 mg/L
- Al mg/L
- Fe mg/L
- Mn mg/L
- NH_3 mg/L

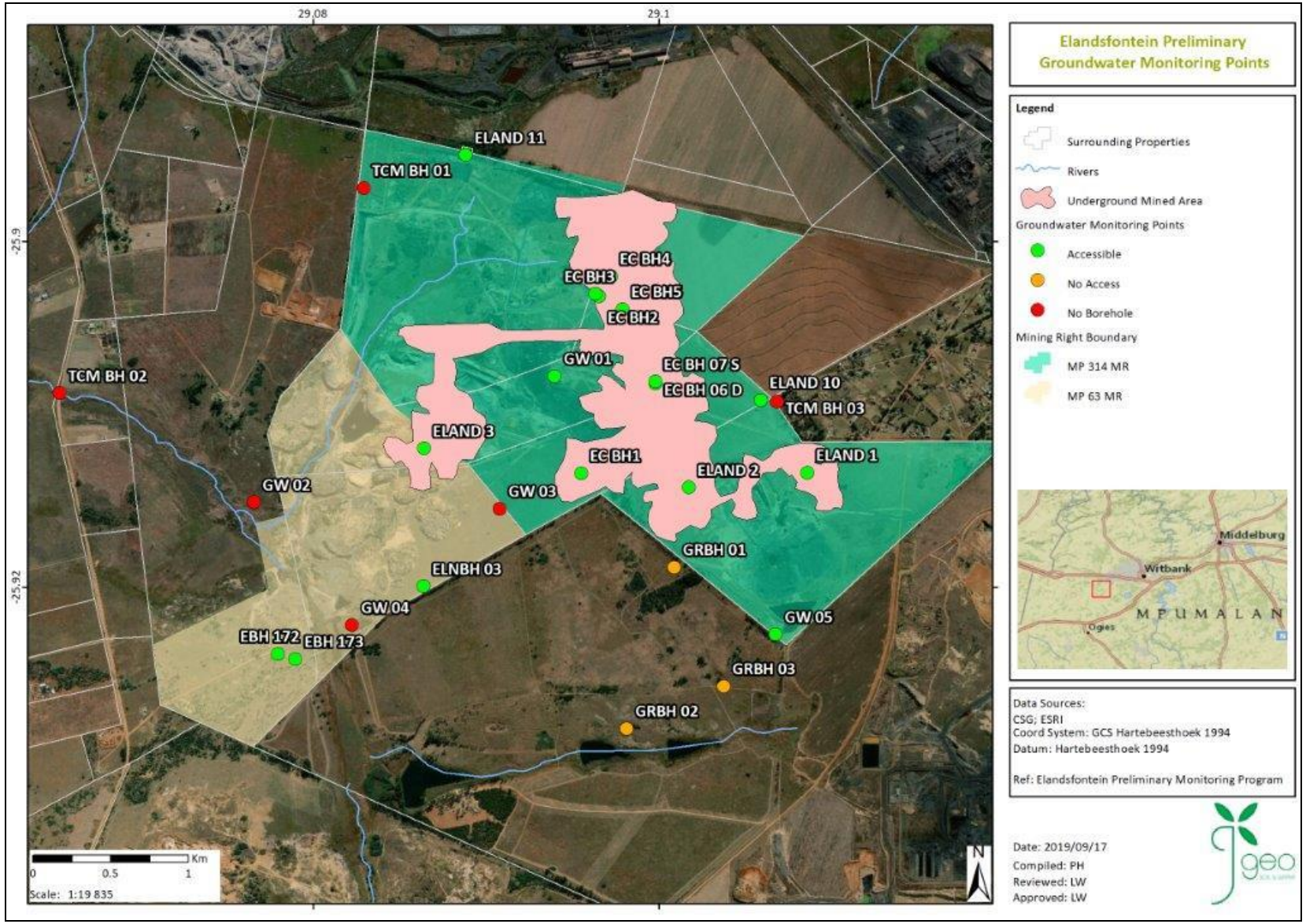

Figure 21: Location of groundwater monitoring points

Table 11 provides a summary of the location of the groundwater monitoring points as per the GSW September 2019 Water Monitoring Report.

Table 11: Summary of groundwater monitoring points.

Locality	Locality Description	Coordinates WGS 84 ddd.ddddd	Monitoring Frequency
EC - BH 1	Monitoring borehole	S25.913399° E29.095491°	Monthly levels Quarterly Quality
EC - BH 2	Monitoring borehole	S25.903175° E29.096534°	Monthly levels Quarterly Quality
EC - BH 3	Monitoring borehole	S25.903025° E29.096296°	Monthly levels Quarterly Quality
EC - BH 4	Monitoring borehole	S25.902017° E29.097221°	Monthly levels Quarterly Quality
EC - BH 5	Monitoring borehole	S25.903924° E29.097892°	Monthly levels Quarterly Quality
EC - BH 7s	Monitoring borehole	S25.908105° E29.099771°	Monthly levels Quarterly Quality
Eland 1	Monitoring borehole	S25.913382° E29.108570°	Monthly levels Quarterly Quality
Eland 2	Monitoring borehole	S25.914236° E29.101716°	Monthly levels Quarterly Quality
Eland 3	Monitoring borehole	S25.911966° E29.086386°	Monthly levels Quarterly Quality
Eland 10	Monitoring borehole	S25.909825° E29.105646°	Monthly levels Quarterly Quality
Eland 11	Monitoring borehole	S25.894988° E29.088822°	Monthly levels Quarterly Quality
GW - 01	Monitoring borehole	S25.907794° E29.093953°	Monthly levels Quarterly Quality
GW - 02	Monitoring borehole - Demolished	S25.915078° E29.076539°	Monthly levels Quarterly Quality
GW 03	Monitoring borehole - Demolished	S25.915462° E29.090777°	Monthly levels Quarterly Quality
GW 04	Monitoring borehole - Demolished	S25.922204° E29.082243°	Monthly levels Quarterly Quality
GW - 05	Monitoring borehole	S25.922730° E29.106740°	Monthly levels Quarterly Quality
TCM BH01	Monitoring borehole - Demolished	S25.896915° E29.082912°	Monthly levels Quarterly Quality
TCM BH02	Monitoring borehole - Demolished	S25.908763°	Monthly levels

Locality	Locality Description	Coordinates WGS 84 ddd.ddddd	Monitoring Frequency
		E29.065314°	Quarterly Quality
TCM BH03	Monitoring borehole - Demolished	S25.909280° E29.106834°	Monthly levels Quarterly Quality
ELN BH03	Monitoring borehole	S25.919940 E29.086370	Monthly levels Quarterly Quality
EBH - 172	Monitoring borehole	S25.923853° E29.077956°	Monthly levels Quarterly Quality
EBH - 173	Monitoring borehole	S25.924159° E29.078951°	Monthly levels Quarterly Quality
AHBH-01	Monitoring borehole	S25.916530 E29.062030	Hydrocensus
AHBH-02	Monitoring borehole	S25.918090 E29.045290	Hydrocensus
AHBH-03	Monitoring borehole	S25.928350 E29.071160	Hydrocensus

The following is a summary of the results from the GSW September 2019 to November 2019 Quartely Water Quality Report:

The following monitoring points recorded elevated concentrations:

- GW-05: Downstream of the partially rehabilitated discard area in the south eastern corner of Elandsfontein;
- ECBH-02, 03, 04 and 05: Northern, partially rehabilitated area;
- Eland 11: Northern boundary with Highveld steel; and
- ELNBH-03: Downstream of the southern, historical mining and rehabilitated area

The remainder of the monitoring boreholes (Eland 1, GW-01, Eland 10, AHBH-01, 02 and 03) recorded relatively good water quality, despite exceeding a few IWUL limits and Olifants River RQO's. These monitoring boreholes are not concentrated to one area but are located in and around the Elandsfontein mining right area.

Groundwater, especially close to pollution sources should be monitored and mitigation measures investigated/recommended.

Groundwater levels - Groundwater levels remained relatively stable, with the exception of ECBH-05. During October 2019, ECHB-05 was connected to a pump and storage tank which possibly influenced the water level

4.4.4 POTENTIAL POLLUTION SOURCE IDENTIFICATION

The main indicator for groundwater contamination is sulphate. During the various stages of geochemical transformation, sulphate will be associated with sodium, calcium and magnesium. TDS or EC, indicates the total salt load. Other contaminant indicators associated with sulphate, are pH levels. When low-pH conditions prevail, increased metals concentrations may manifest, such as iron.

According to the ground water study (APPENDIX D), the local groundwater quality is indicative of an impacted groundwater system and suggest coal mine pollution and acid mine drainage (AMD) conditions present. The latter is characterised by a low pH environment increasing the solubility and concentrations of metals i.e. usually aluminum, iron and manganese.

The overall water quality of the upstream surface water samples (taken during the hudrocensus) is poor due to elevated levels of sulphate as well as heavy metals (Fe, Al and Mn) i.e. coal mine pollution indicators. The downstream water quality is unacceptable due to highly elevated levels of sulphate as well as heavy metals (Fe, Al and Mn) causing high salt loads. There is a definite deterioration of water quality evident in a downstream direction and suggest contaminated water ingress from potentially mine decant and interflow zones or seepage from mine discard dumps.

The majority of regional/ neighbouring boreholes suggest either a recently recharged and unimpacted water environment (Calsium-Bi-carbonate dominance), and/or area of dissolution and mixing, whereas current monitoring boreholes on site indicate a static and disordinate environment (Sulphate dominance suggesting impacts from coal mine pollution).

Furthermore, groundwater sampling localities ECBH03, ELNBH03 correlate well to the hydrochemical signature of surface water sampling locality ASW01 and suggest similar water environments and potential origins (Figure 22).

4.4.5 GROUNDWATER MODEL

The purpose of a groundwater model is to serve as a tool to evaluate various water management options and scenarios. The groundwater modelling is currently in progress and will be available in due course.

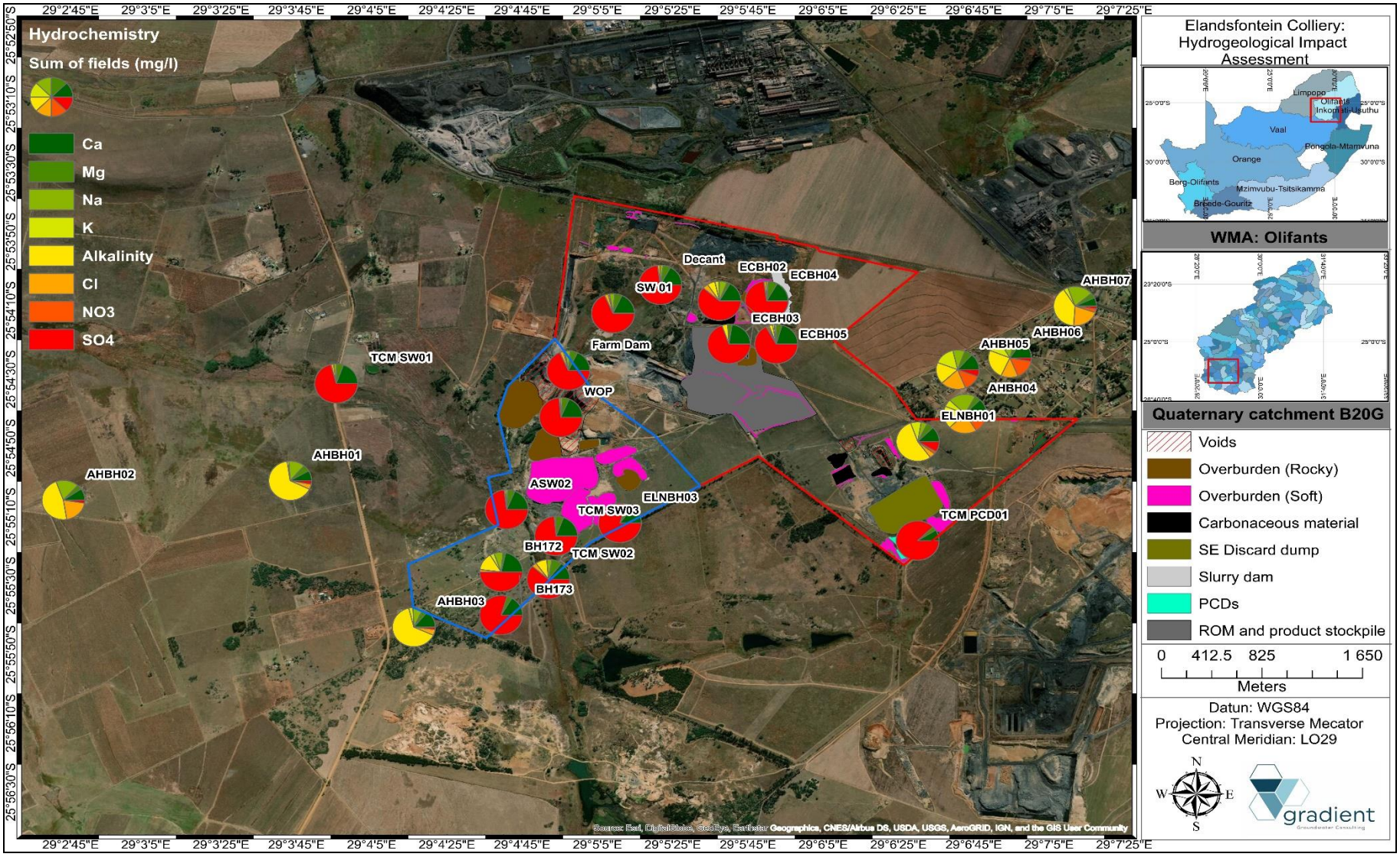

Figure 22: Hydrochemical analysis spatial distribution (mg/l).

4.5 HYDROPEDOLOGY

The information in this section was sourced from a hydropedological assessment which was conducted by The Biodiversity Company in 2019. The hydropedological site assessment was conducted from the 12th to the 16th of August 2019 and a level three hydropedological assessment was undertaken.

The slopes within the project area were assessed during the desktop assessment to identify possible transects that will represent typical terrain and soil distribution patterns. These locations where then altered slightly during the survey depending on the extent of vegetation, slopes, access and any features that will improve the accuracy of data acquired. A total of four transects were identified in which five pits in total have been excavated up to refusal (see Figure 23 and Figure 24). Access could not be gained at Observation 8 and 9. Therefore, three pits have been added ("added pit 1, 2 and 3") to resemble the soil profiles relevant to Observation 8 and 9. These added pits are based on similar land types, topography, slope and vegetation characteristics than Observation 7, 8 and 9 to ensure accuracy.

The report summarised that large portions of the studied area are already impacted upon by current mining activities. These modifications have altered natural flow paths of and complicates hydropedological interpretations in relation to proposed future developments. With this being said, it is worth noting that the recharge soils occupy long sections of the slopes, especially those areas where the proposed pit will be located. Conceptually, the impact of the development on lateral flow paths through the vadose zone will therefore be insignificant. This conceptual understanding was supported by hydrological simulations of one slope which was not yet impacted by development. The simulations indicate that the proposed development will only result in drying of the soils directly below the open cast pit. Approximately 300 m downslope of the pit, differences in soil water contents were not observed. Similarly, there was no difference in the outflow and lateral flux to the stream between the natural and developed state.

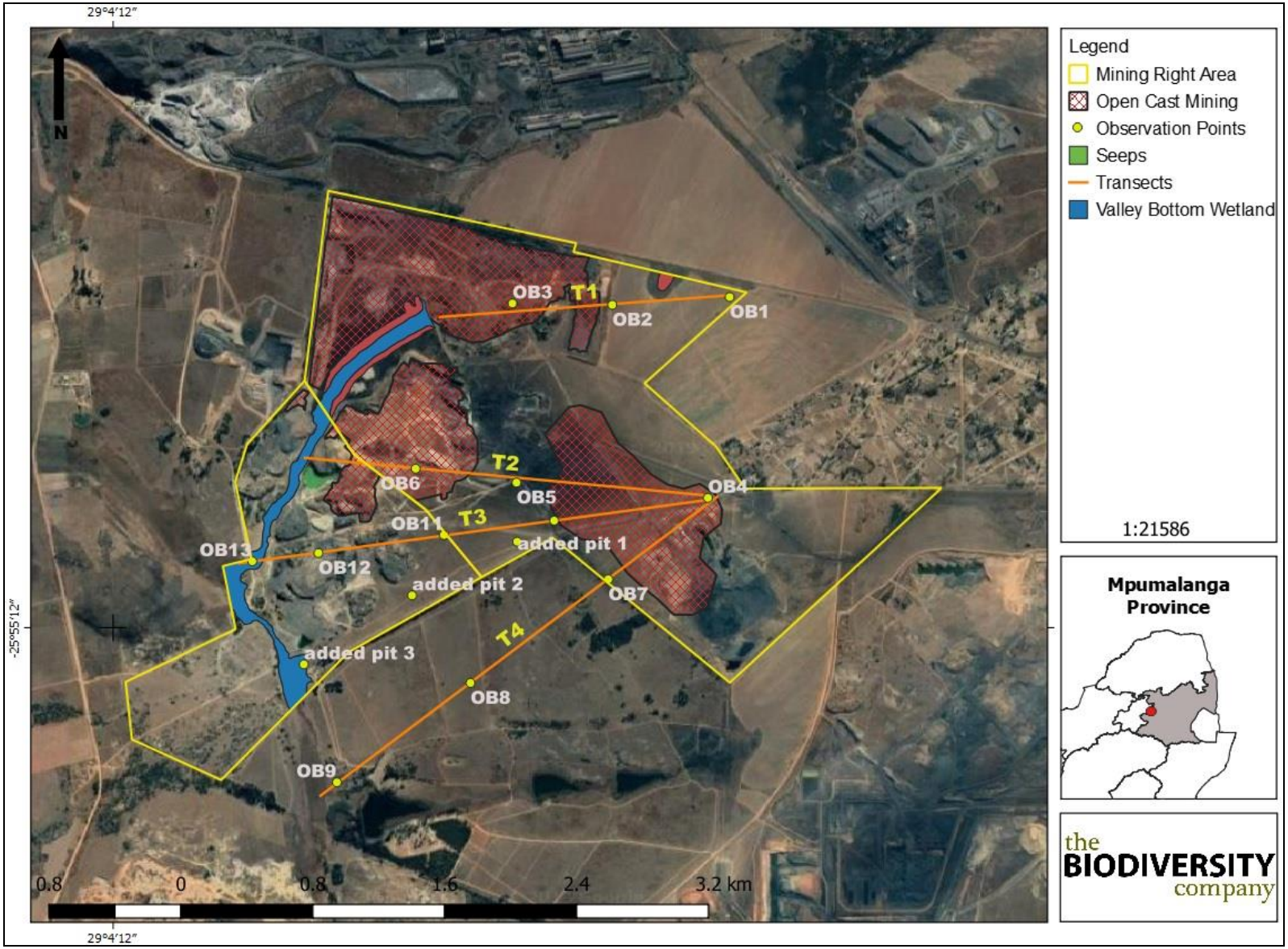

Figure 23: Transects and Sampling Sites relevant to open cast mining areas

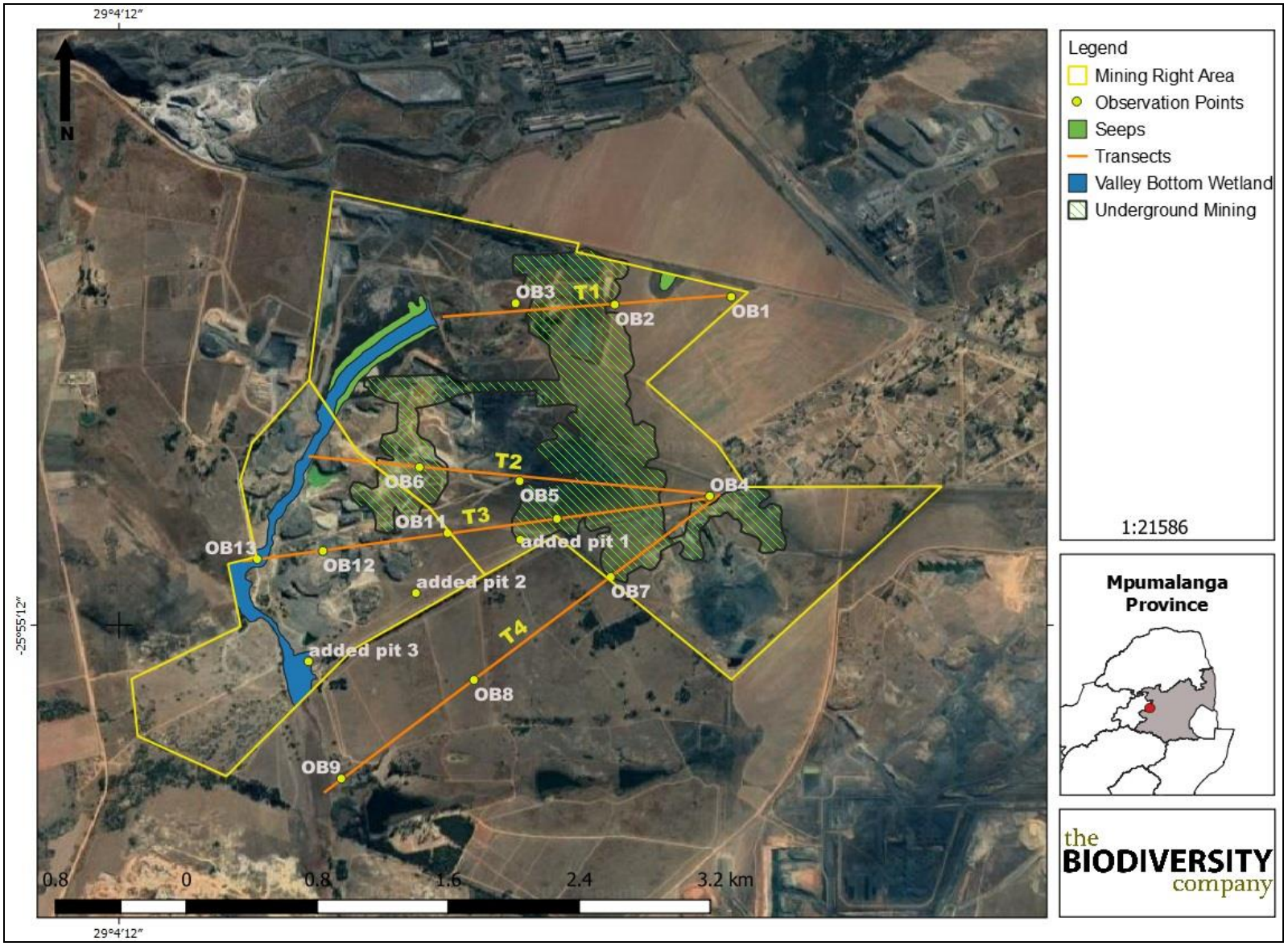

Figure 24: Transects and Sampling Sites relevant to future underground mining areas

4.6 SOCIO-ECONOMIC ENVIRONMENT

The following section provides a summary of the social and economic environment that may be influenced by the proposed project. Information in this section was sourced from Stats SA and the Integrated Development Plans (IDP's) for the Emalahleni Local Municipality as well as the Nkangala District Municipality.

According to the National Environmental Management Act (NEMA, 1998) environment refers to the surroundings in which humans exist. When viewing the environment from a socio-economic perspective the question can be asked what exactly the social environment is. Different definitions for social environment exist, but a clear and comprehensive definition that is widely accepted remains elusive. Barnett & Casper (2001) offers the following definition of human social environment:

> *"Human social environments encompass the immediate physical surroundings, social relationships, and cultural milieus within which defined groups of people function and interact. Components of the social environment include built infrastructure; industrial and occupational structure; labour markets; social and economic processes; wealth; social, human, and health services; power relations; government; race relations; social inequality; cultural practices; the arts; religious institutions and practices; and beliefs about place and community. The social environment subsumes many aspects of the physical environment, given that contemporary landscapes, water resources, and other natural resources have been at least partially configured by human social processes. Embedded within contemporary social environments are historical social and power relations that have become institutionalized over time. Social environments can be experienced at multiple scales, often simultaneously, including households, kin networks, neighbourhoods, towns and cities, and regions. Social environments are dynamic and change over time as the result of both internal and external forces. There are relationships of dependency among the social environments of different local areas, because these areas are connected through larger regional, national, and international social and economic processes and power relations."*

The environment influences and constrains behaviour, but behaviour also leads to changes in the environment. The impacts of a project on people can only be truly understood if their environmental context is understood. The baseline description of the social environment will include a description of the area within a provincial, district and local context that will focus on the identity and history of the area as well as a description of the population of the area based on a number of demographic, social and economic variables.

In 2015, eMalahleni's share of population was below the lower-bound poverty line was the lowest (favourable) among the municipal areas.The number of people below the lower bound poverty line was however relatively high at more than 90 000 people in 2015. According to the 2016 Community Survey of StatSA, the so-called poverty headcount (multi-dimensionally) of Emalahleni deteriorated from 8.0% in 2011 to 10.9% in 2016 and second highest in the Province and the so-called poverty intensity also increased from 43.6% to 45.4% in the same period. The unemployment rate of eMalahleni decreased from 27.3% in 2011 to 23.2% in 2015. eMalahleni's unemployment rate was the 5th lowest among all the municipal areas of Mpumalanga. Unemployment rate for females is 29.8% and that of males is 19.2%. Youth unemployment rate according to the Census figure is 36.0%. The municipal economy is dominated by mining and therefore a high dependence on the mining industry. Other industries in the area are making contribution to the local economy; these include trade and community services. Emalahleni ccontribution to the Mpumalanga economy is the highest in the province at more than 20% and is the largest economy in the province.

5 ANALYSIS AND CHARACTERISATION OF ACTIVITY

The following section describes the activity, its associated processes and infrastructure in more detail.

5.1 SITE DELINEATION FOR CHARACTERISATION

A key requirement for the SWMP is to identify the clean and dirty water areas and to come up with a plan to intercept dirty water and to temporary store the dirty water in a pollution control dam which will meet the Norms and Stadards as set out by the Department of Water affairs.

Based on the field assessment and the topography of the area the, dirty water catchments were delineated (Scenario 1 - refer to

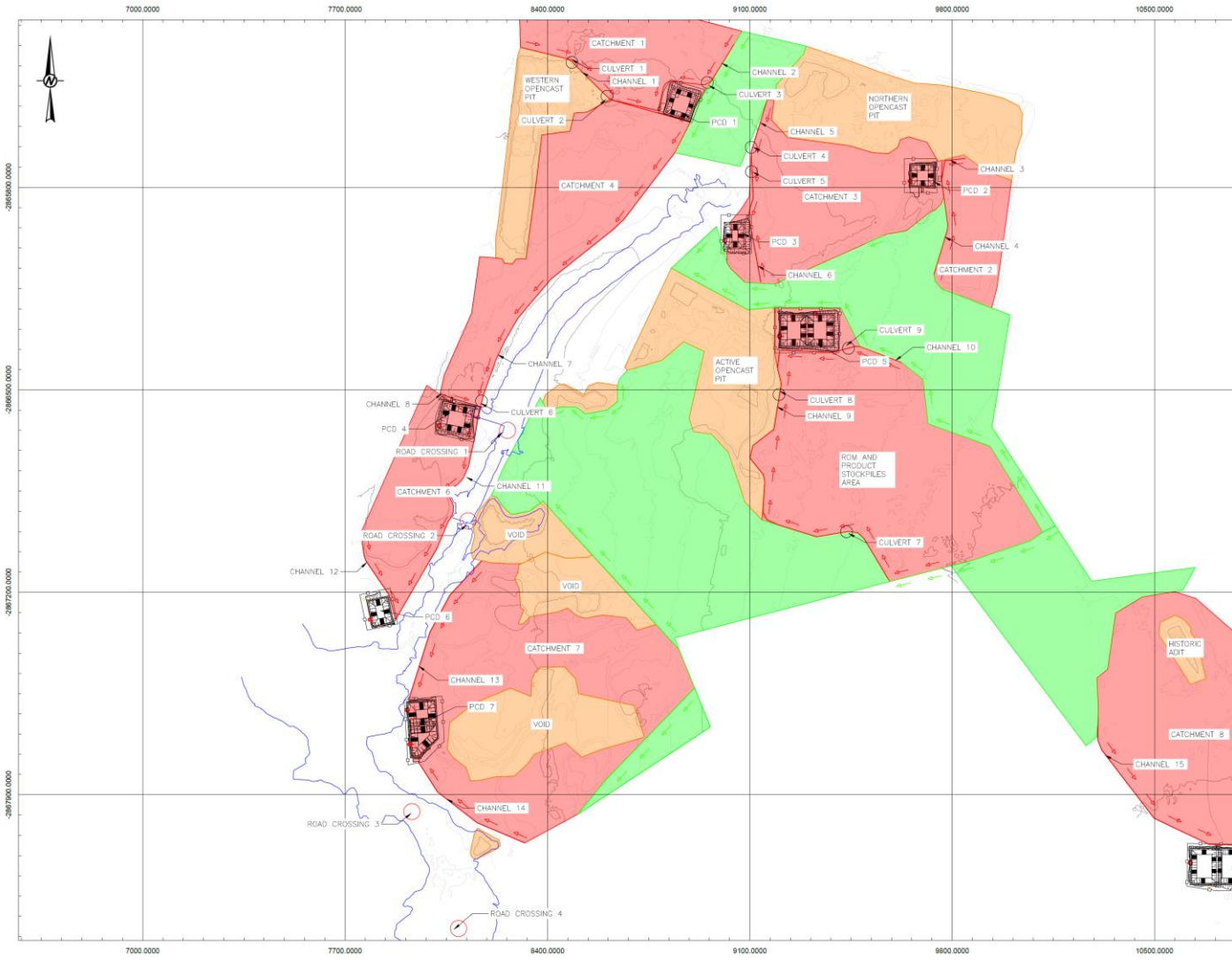

Figure 8). Scenario 1 requires 8 pollution control dams with concrete lined channels which intercepts the dirty storm water run-off and drains it to an associated lined PCD.

On further investigation it could be seen that some dirty areas were contaminated with single loads of contaminated/carbonations material and could therefore be decontaminated (Scenario 2 – refer to Figure 9). This will allow the area to be deemed as a clean area which will reduce total accumulation of dirty water and hence reducing the number of PCD's required.

5.2 WATER AND WASTE MANAGEMENT

The Elandsfontein Colliery will continue to require water in the form of both potable and bulk water for the wash plant and dust suppression

5.2.1 POTABLE WATER SUPPLY

Potable water is obtained the local municipality as well as onsite boreholes.

5.2.2 PROCESS WATER

Process water within the mining operation is obtained from various sources which are shown in the summarised water balance in Figure 25.

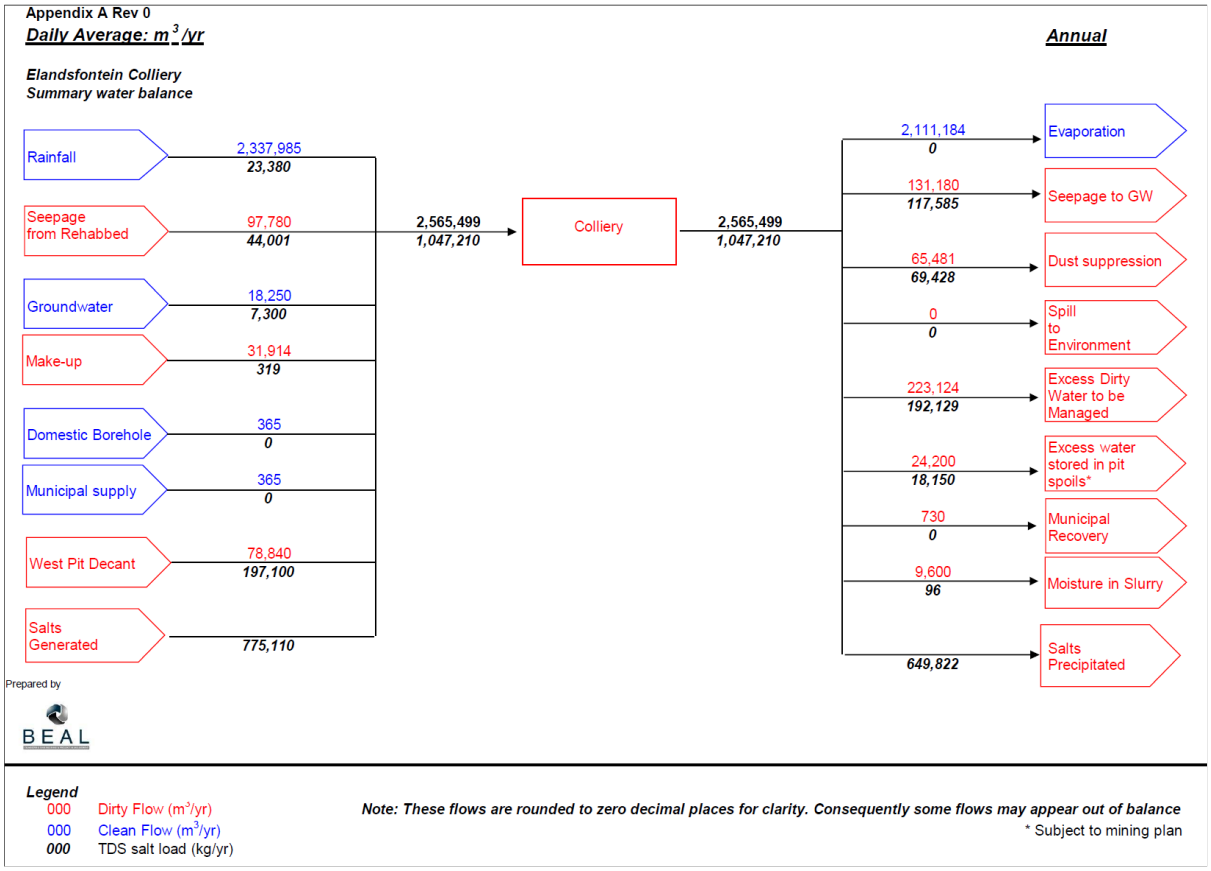

Figure 25: Annual water balance summary.

5.2.3 WATER POLLUTION MANAGEMENT

Clean water diversion berms are in place to divert clean water around the mining operations and back into the natural environment (downstream of the operations). Dirty water diversion berms divert all dirty water towards PCD's for containmnent and future reuse. The PCDs are designed according to Dam Safety Regulations to store a 1:50 year 24 hour storm event and maintain a 0.8m freeboard. APPENDIX J shows the designs for the PCDs. An overview of the SWMP and infrastructure is presented in Figure 7.

5.2.4 STORM WATER

The surface water management for the proposed development and related infrastructure, falls under legislation contained in, amongst others, the NWA, Section 4, dealing with prevention of contamination: The person who owns, controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources. If these measures are not taken, the Catchment Management Agency (CMA) concerned may itself do whatever is necessary to prevent the pollution or to remedy its effects, and to recover all reasonable costs from the persons responsible for the pollution. An overview of the SWMP and infrastructure is presented in Figure 7 and the SWMP is included in APPENDIX F.

5.2.5 GROUNDWATER MANAGEMENT

To prevent repetitions within this report template, refer to Section 4.4, as well as Section 5.4.2 The Hydrogeological Specialist Study is attached in APPENDIX D.

5.2.6 WATER AND SALT BALANCE

The average annual water balances for the Elandsfontein Colliery are provided inAPPENDIX F. A static water balance cannot account for the dynamics of the pit development. A snapshot of the colliery's pit development was used to calculate the water balance. The snapshot comprises the full pit development of the current pit. This represents the condition where the most water is produced by the site. As more pits are opened and rehabilitated, the dirty areas on the mine will be reduced. Up to 8 pollution control dams are required to manage storm water from the colliery's dirty areas.

During the wet season, the Elandsfontein water balance will be a positive water balance with an average wet season excess of 922 m^3/day. During the dry season, the water balance will be a deficit water balance, with an average plant make-up of 87m3/day and a dry season average make-up of 258 m3/day.

The excess water available in the wet season will require some form of active management. This could include selling the water to another user, forced evaporation (one to two evaporation fans), treatment to discharge standards and release to the environment, or some other management intervention. The volumes are too large to be practically evaporated. Any treatment to discharge will need to be licenced and is not currently included in this IWWMP.

5.2.7 WASTE MANAGEMENT

Several waste streams are likely to originate from the activities associated with day to day activities in the workplace. Some of these waste streams may not be hazardous, but the majority may contain a component(s) that may require special treatment. The nature of these waste streams may also vary due to composition and physical form. In order to make informed decisions on determining the appropriate waste management options to handle, treat and dispose of waste, the different waste streams must be identified in terms of hazardous and non-hazardous wastes.

Waste streams at the Mine can be categorised into different streams, based on similar health and environmental concerns namely:

- General Waste:

- Domestic wastes – general waste, plastics, food, organic, non-hazardous, putrescible consisting of, combustible material, cardboard, wood, etc.;
- Paper waste – paper waste recycling initiative; and
- Rubber/plastic Wastes – valves, conveyors and hoses.

On-Site Management: Currently general waste is collected and stored in bins and skips and sorted in the salvage yard for off-site reselling or disposal.

- Industrial Waste:
  - Building rubble;
  - Scrap metal; and
  - Yard cleanings and sweepings.
- Hazardous Wastes – acids, alkalis, heavy metal sludge and solutions, asbestos wastes and other harmful substances as effluent or solids.
- Oily wastes – hydrocarbons, oils, grease, diesel, petrol, paraffin, hydraulic oils, etc.; and o Chemicals.

On-Site Management: Collected by registered waste management contractor for off-site disposal (waste manifests) at a licensed waste disposal site.

5.2.8 SEWAGE

The sewage waste from the main offices is currently connected to the existig municipal sewage system. Portable chemical toilets around the operational areas are currently being serviced by a registered waste operator and disposed of at a licenced sewerage treatment works.

5.2.9 HAZARDOUS WASTE MANAGEMENT

Hazardous waste is covered to protect it from the elements and is stored in a designated area. It is disposed of by an authorised contractor at a registered H:H waste disposal facility. Used oil is collected in either the oil separator at the workshop or collected in a specialised used oil container located at the waste collection area. Used oil is collected by a registered recycling contractor. Fluorescent tubes are crushed in a specialised 210L crushing drum, which is disposed of along with the other hazardous waste. A waste inventory is kept of all waste types and volumes generated and disposed of or recycled.

5.3 OPERATIONAL MANAGEMENT

The operational management of the activities in terms of the water and waste management are detailed in the following sections. This included the organisational structure, competence training and awareness and the internal and external communication.

5.3.1 ORGANISATIONAL STRUCTURE

The organizational structure for the Applicant is presented in Section 2.7 above and the sections below include a discussion of resources and competencies, as well as the internal and external communication processes that are implemented by the Applicant.

5.3.2 RESOURCES AND COMPETENCE

Elandsfontein will ensure that their personnel working as Environmental officers and managers are competent and that there are sufficient employees to meet the requirements of the operation. The environmental management resources at Elandsfontein will include:

- Infrastructure and equipment e.g. pollution control dams, clean-up kits etc.;
- Personnel including an Environmental Control Officer (ECO) and Safety, Health and Environment (SHE) Manager and appointed external contractors and consultants.

5.3.3 EDUCATION AND TRAINING

Training and environmental awareness is an integral part of environmental management of a mine. The mine must ensure that all relevant employees are trained and capable of carrying out their duties in an environmentally responsible and compliant manner and are capable of complying with the relevant environmental requirements. Environmental Awareness at the mine is addressed and conducted by means of two (2) main components namely training and communication.

Environmental awareness training at the mine will be attended to during induction for new employees and in refresher courses for ex-leave employees. Apart from own employees, the operation also makes use of numerous contractors to undertake different components of their mining activities. Each contractor will be responsible for its own environmental awareness training for its employees.

The principles to be adhered to by the mine and the contractors are based on the following:

- Environmental awareness is addressed at top management level;
- Workers receive awareness training on all environmental and SHE procedures;
- Training aids includes the use of photographs, posters and live demonstrations;
- The workers whose jobs have the greatest potential for environmental impact are identified and receive specific training in impact prevention and remediation; and
- Records are kept of environmental awareness training and all new employees receive induction before they are allowed to work on site.

5.3.4 INTERNAL AND EXTERNAL COMMUNICATION

The Public Participation Process (PPP) is a requirement of several pieces of South African Legislation. The aim of public participation is to ensure that all relevant interested and affected parties (I&AP's) are meaningfully notified, consulted and their opinions considered during the course of the project. The methodology applied to the PPP, must be one of openness, transparency and collaboration between the EAP and I&AP's. All documentation

pertaining to the IWWMP will be made available to the public for comment in accordance with the relevant regulations. All comments received will be included in the IWWMP to be submitted to the DWS for adjudication, as well as in the Public Participation Report that will be attached as an Appendix to the IWWMP.

5.3.4.1 INTERNAL COMMUNICATION

Recognised formal and informal communication methods are used internally to ensure effective communication on all significant issues related to the environment. Internal reporting from management to employees and contractors make use of the following.

- Safety Health and Environment (SHE) meetings;
- Telephones;
- E-mails;
- Notice boards / memoranda / letters/ internal post;
- Information sharing sessions (morning meetings/departmental meetings etc.);
- Internal audit reports;
- Management review feedback;
- Formal training and awareness courses; and
- Awareness drives through posters.

Communication from employees and contractors to management will be through any of the following channels.

- Line Management Reporting;
- Daily SHE briefings;
- Incident Reports;
- E-mails / phone calls; and
- Meetings.

Internal communication will be in any of the following three forms:

- Upward communication, from employee and contactor to management level;
- Downward communication, from management level to employee and contractor; and
- Lateral communication, amongst sections and employees at the same level.

5.3.4.2 EXTERNAL COMMUNICATION

Effective communication with all external interested parties is a vital component of maintaining acceptance in the local community and a positive working relationship with regulatory bodies, farmers and other interested and affected groups. External communication includes, but is not limited to, any communication with one or more of the following parties:

- Government Departments;

- Local Authorities;
- Organised forums;
- Public;
- Complainants;
- NGO's; and
- Media representative / reporters.

Elandsfontein also has a set policy with regards to communication and handling of complaints. This policy also covers internal communication and raising awareness. In order to comply with the requirements of the MPRDA (specifically regulation 46(f)) Elandsfontein insures that each employee is informed about the provisions laid out in the mine's SLP as well as progress in achieving the objectives on an annual basis. In order to communicate the information effectively the process as detailed in Table 12 below will be followed.

Table 12: SLP Communication Process Implementation Action Plan

SLP Communication Programme Strategic Action Plan	Responsible Person	Timeframe
Elandsfontein and the Core Contractor will communicate with its employees at the mine separately.	J. Dreyer and B.N Moeketsi	Yearly
Each entity will hold dedicated meetings on an annual basis to provide feedback to its employees on the progress made with implementation of the SLP.	J. Dreyer and B.N Moeketsi	Yearly
The feedback will be presented in an appropriate format to be understood by all employees and may be communicated verbally, face to face and with the help of interpreters.	J. Dreyer and B.N Moeketsi	Yearly
SLP Future Forums will be set up at entity level as a forum to discuss and communicate SLP issues during the life of the mine as well as issues pertaining to downscaling and retrenchment, should these arise.	J. Dreyer and B.N Moeketsi	Yearly
Where appropriate work team leaders may be trained on how to deal with questions that may arise and posters will be used to reinforce the message.	J. Dreyer	Yearly
As expectations with regards to learnerships, skills programmes and socially responsible retrenchments may arise, timeframes will need to be carefully	J. Dreyer and B.N Moeketsi	Yearly

SLP Communication Programme Strategic Action Plan	Responsible Person	Timeframe
considered and shared.		
Environmental communication	Responsibility of the environmental officer (EO) appointed by Elandsfontein with functional responsibilities implemented via the line function managers and	Yearly
I&AP communication	J. Dreyer and B.N Moeketsi	Yearly
Authority communication	J. Dreyer and B.N Moeketsi	Yearly

5.3.5 AWARENESS RAISING

All employees and contractors have to undergo environmental and awareness training, which broadens the base of people that acts as custodians of the environment. The environmental awareness plan aims at:

- Outlining the network of communication used to inform employees of environmental risks;
- Promoting general environmental awareness at the Elandsfontein Colliery;
- Informing all personnel of environmental policies, procedures and programmes applicable to the Elandsfontein Colliery;
- Providing general training on the implementation of environmental management actions;
- Providing job specific environmental training to ensure the protection of the environment; and
- Promoting environmental awareness and communication with surrounding communities.

The mine recognizes the importance of its employees in the achievement of its business objectives and that skills development is the foundation for developing competent and productive employees who can participate in meeting the mine's business objectives. The following objectives have been identified to support the Mine's skills development drive:

- Assess employees' skills and qualities as and when required;
- Provide training that is accessible to all employees;
- Invest in training interventions and assessments that will promote productivity and employability as dictated by economic conditions and within the mine's financial ability;
- Implement an internship programme on different levels of the prevailing National Qualification Framework and to train new entrants to the labour market, as well as those with working experience;
- Establish a mentorship programme designed to address the operation's developmental needs, whilst facilitating the transferral of skills, knowledge and competence to employees;
- Re-skill employees if feasible and economically viable when contemplating retrenchments; and

- Utilise the Work Place Skills Plan as a vehicle to align skills development with both business growth strategies and employment equity plans.

The Skills Development Plan is intended to provide the Mine with the required mechanisms and opportunities for identifying and developing the skills needed by the Mine and thereby ensuring that employees achieve their full growth potential. In addition, the Skills Development Plan will provide employees with the opportunity to further their capacity within the mining industry as well as equipping them with alternative skills in the event of mine closure or retrenchment.

Elandsfontein Colliery will develop Skills Development Plans for their businesses as per the requirements of Section 46 (b)(i) of the MPRDA.

Skills development plans will be in line with the principles of Human Resource Development Programme. There is a commitment to skills development that has an impact beyond the organization and provides a basis for sustained employability through portable skills and development that is linked to the National Qualifications Framework (NQF). The Mine will comply with the requirements of the Skills Development Act of 1998 and will continue to submit the Operation's Workplace Skills Plan (WSP) annually, as required by the MPRDA. Further the Mine will register its mining operation with the relevant Sector Education and Training Authority (SETA), i.e. the Mining Qualifications Authority (MQA), and will continue to contribute towards Skills Development Levies

5.4 MONITORING AND CONTROL

A monitoring programme is essential as a management tool to detect negative impacts as they arise and to ensure that the necessary mitigation measures are implemented. A monitoring program is used as an early detection tool for surface water quality and is used to determine when mitigation must be implemented. Monitoring should be implemented throughout the life of mine. The impacts on water quality will be determined by benchmarking the monitoring data against the Wlge Interim RWQO.

Both surface and ground water monitoring is being conducted and is detailed below. The responsibility of ensuring the monitoring is conducted lies with the Environmental Officer.

5.4.1 SURFACE WATER MONITORING

The design and implementation of the surface water monitoring network will be undertaken in accordance with the Best Practice Guidelines G3: Water Monitoring Systems (DWAF, 2006). The aim of the surface water monitoring network is to assist with overall water management including but not limited to the following:

- Pollution prevention;
- Assess the performance of pollution prevention; and
- Develop a more holistic understanding of current, baseline water quality on site and the changes that result from mining activities.

As discussed in Section 4.3.3 Elandsfontein Colliery has an existing monitoring programme, as per the requirements of the existing WULA (Licence no.: 04/B20G/CGI/3843).

5.4.2 GROUNDWATER MONITORING

As the colliery is an existing coal mine, a groundwater monitoring programme has already been implemented, as per the requirements of the guidelines documented in Best Practice Guideline G3 Water Monitoring Systems (2007) available from the DWS. A monitoring plan is necessary due to the following reasons:

- Accurate and reliable data forms a key component of many environmental management actions; and
- Water monitoring is a legal requirement.

The most common environmental management actions require data and thus the objectives of water monitoring include the following:

- Development of environmental and water management plans based on impact and incident monitoring (facilitate in decision-making, serve as early warning to indicate remedial measures or that actions are required in certain areas) for the mine and region;
- Generation of baseline/background data before project implementation;
- Identification of sources of pollution and extent of pollution (legal implications or liabilities associated with the risks of contamination moving off site);
- Monitoring of water usage by different users (control of cost and maximising of water reuse);
- Calibration and verification of various prediction and assessment models (planning for decommissioning and closure);
- Evaluation and auditing of the success of implemented management actions (ISO 14000, compliance monitoring);
- Assessment of compliance with set standards and legislation (EMPs, water use licenses); and
- Assessment of impact on receiving water environment.

Effective groundwater monitoring systems on a mine consist of the following components:

- Groundwater quality monitoring system;
- Groundwater flow monitoring system; and
- Data and information management system.

When designing the monitoring system, the following issues should also be taken into consideration:

- Potential or actual water use;
- Aquifer or catchment vulnerability;
- Toxicity of chemicals;
- Potential for seepage or releases;
- Quantities and frequency of release to the environment (point and non-point); and
- Management measures in place to minimise risk.

The groundwater monitoring points that were measured in September 2019, as well as the parameters that are currently measured in terms of water quality are indicated in Section 4.4.3.

5.4.3 BIOMONITORING

Biomonitoring is conducted at the Elandsfontein Colliery as per the requirements of the WUL (Refer to APPENDIX G). The biomonitoring is currently conducted at 8 sampling points (see Figure 26 for the location of the points): A low flow survey was conducted in September 2019 by The Biodiversity Company.

The low flow survey established that there are critically modified conditions of aquatic systems within the Elandsfontein project area, and further, the largely modified conditions of the tributary of the Saalboomspruit. The study further indicated that a deterioration of water quality was occurring between the upstream T1 site, and the T2, and T3 sites, as indicated by a decrease in pH, resulting acidic conditions, and elevated dissolved solids. The results further indicated contaminated water stemming from the Elandsfontein tributary, as indicated by results from the upstream E Dam, E1 and E2, and E3 sites, which contributed to the deteriorated water quality conditions of the tributary of the Saalboomspruit, and likely downstream catchments. Further, extensive stands of alien invasive species occur within the Elandsfontein project area, reducing riparian habitat integrity.

It is noted that the report did not have a trent analysis as it was an updated baseline report. In this regard a high flow survey is to be conducted as part of the biomonitoring programme and a comprehensive report with spatial and temporal trends should be prepared. The annual wet and dry season monitoring programme should be maintained until a closure certificate has been issued. It is also of paramount importance to ensure that dirty water management infrastructure is well maintained throughout the life of the mine.

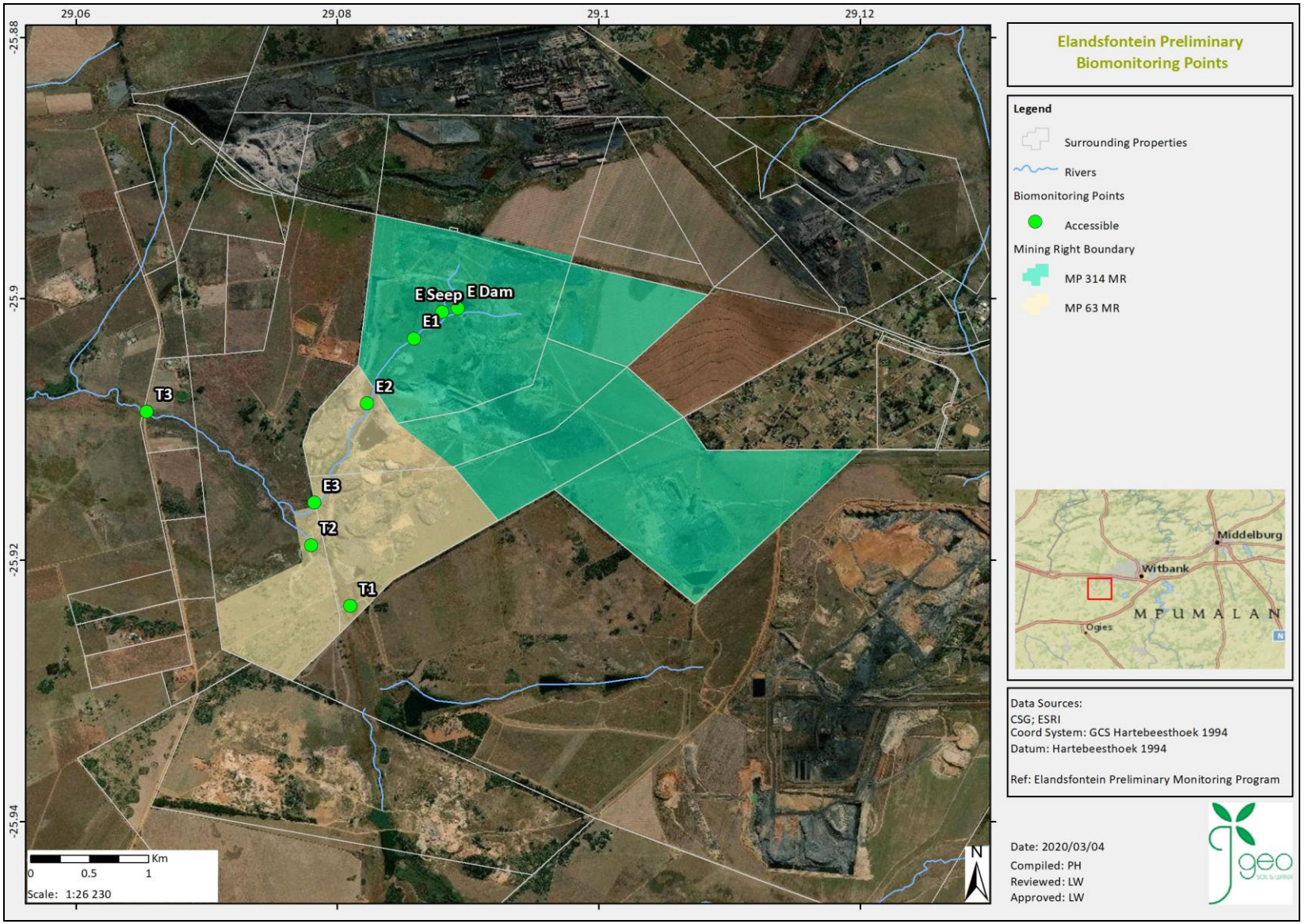

Figure 26: Biomonitoring points as per TBC report

5.4.4 WASTE MONITORING

Elandsfontein Colliery will develop and implement a waste management plan, which complies with the principles of the NEMWA and provides a mechanism for the effective management of waste throughout the LoM. This plan has to ensure the appropriate management of all solid waste, including construction debris (cement bags, wrapping material, timber, cans, wire, nails, etc.), waste and surplus food, food packaging, organic waste, etc. The objectives of a waste monitoring programme are to identify and sufficiently manage waste related impacts through:

- Avoiding and minimising waste;
- Reducing and recycling waste; and
- The prevention of pollution.

Solid waste must be monitored in accordance with the waste management conditions detailed below:

- The Elandsfontein Colliery shall develop and maintain a hazardous substance register for all hazardous materials that shall be kept on site. Material Safety Data Sheets (MSDS) must be available on site at the point of use and readily accessible for all hazardous substances stored;
- All equipment must be inspected regularly (daily) to ensure that it is in good working condition, clean, and free from leaks of oil, petrol, diesel, hydraulic fluid and contaminating compounds;
- Daily inspections shall be carried out to ensure such spill prevention measures are in place and remain effective;
- The Applicant shall maintain a waste register which shall be used to track all waste removed from site. Proof of appropriate waste disposal shall be kept on file at the site for auditing purposes.

5.4.5 STORM WATER MANAGEMENT STRUCTURES

Storm water structures (channels, silt traps, dirty water containment facilities and energy dissipaters) should be monitored every year in September, before the rainy season begins, for any blockages or breaches. They should further be monitored immediately after every storm event during the rainy season. Should blockages or breaches occur, immediate action should be undertaken to remove debris and / or repair breaches. Monitoring should be undertaken by the onsite Environmental Officer (EO) or maintenance manager. Inspections should be recorded and should include the following:

- Date of inspection;
- Rainfall amount received;
- Photographs of blockages and / or breaches witnessed;
- What action were taken to fix issues and amount of time taken to address issues; and
- Photographs post action taken.
- The inspection reports should be presented to the DWS.

5.5 RISK ASSESSMENT / BEST PRACTICE ASSESSMENT

This section deals with the identification of risks/impacts and their mitigation measures. This section focuses only on water related impacts and proposed mitigation measures.

5.5.1 IMPACT/RISK ASSESSMENT

An impact/risk assessment was undertaken by the Wetland and Aquatic Specialist for this IWWMP based on the DWS 2015 publication: Section 21 c and I water use Risk Assessment Protocol (see APPENDIX D for the Specialist Report). Table 13 below list the Aspects and impacts relevant to the proposed activity.

Table 13: Aspects and impacts relevant to the proposed activity

Phase	Activity	Aspect	Impact
Construction	**Open cast Mining**	Removal of vegetation Stripping of topsoil Traffic Ablution facilities Construction of haul roads AMD related pollution Domestic and industrial waste Storage of chemicals, mixes and fuel Spills and leaks Erosion from disturbances within the wetland Siltation of watercourses	• Direct loss of wetlands; • Erosion of wetlands and their catchments; • Loss of vegetation; • Decrease in functionality; • Water quality impairment; • Compaction; • Altering hydromorphic soils; • Drainage patterns change; • Altering overland flow characteristics; • Loss of interflow; • Deposition of dust; • Salinization; and • AMD.
Operational	**Open cast Mining**	Excavating open cast pit Traffic AMD related pollution Domestic and industrial waste Storage of chemicals, mixes and fuel Spills and leaks Erosion from disturbances within the wetland Siltation of watercourses	• Direct loss of wetlands; • Erosion of wetlands and their catchments; • Loss of vegetation; • Decrease in functionality; • Water quality impairment; • Compaction; • Altering hydromorphic soils; • Drainage patterns change; • Altering overland flow characteristics; • Loss of interflow; • Deposition of dust; • Salinization; and • AMD.

Decommissioning and Closure	**Backfilling of voids**	Dust Precipitation	
		Change in topography	
	Shaping/contouring the landscape	Dust Precipitation	
		Change in topography	
	Decant	Acid Mine Drainage	

The impact assessment is available in Table 14 and the mitigation measures recommended detailed in section 5.5.2 below.

Table 14: Impact Assessment (Risk Matrix) for the Elandsfontein Colliery with water impacts

Activity	Aspect	Flow Regime	Physico & Chemical (Water Quality)	Habitat (Geomorph + Vegetation)	Biota	Severity	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	
Construction of open cast mine	Removal of vegetation	2	2	3	3	2,5	2	2	6,5	2	2	1	2	7	45,5	Low	Low
	Stripping of topsoil	5	3	5	4	4,25	2	2	8,25	1	4	5	1	11	90,75	Moderate	Moderate
	Traffic	2	2	2	3	2,25	2	2	6,25	2	2	1	2	7	43,75	Low	Low
	Ablution facilities	2	4	2	3	2,75	2	2	6,75	2	2	1	2	7	47,25	Low	Low
	Construction of haul roads	4	2	3	3	3	2	2	7	2	4	5	2	13	91	Moderate	Moderate
	AMD related pollution	2	3	3	3	2,75	3	5	10,75	2	5	5	2	14	150,5	Moderate	Moderate
	Domestic and industrial waste	2	3	3	3	2,75	2	3	7,75	2	3	1	2	8	62	Moderate	Low
	Storage of chemicals, mixes and fuel	2	3	3	3	2,75	2	2	6,75	2	3	1	3	9	60,75	Moderate	Moderate
	Spills and leaks	1	4	3	3	2,75	3	3	8,75	2	3	1	3	9	78,75	Moderate	Low
	Erosion from disturbances within the wetland	2	3	3	2	2,5	3	2	7,5	3	3	1	2	9	67,5	Moderate	Low
Operation of open cast pits	AMD pollution	1	4	2	3	2,5	4	5	11,5	4	4	5	4	17	195,5	High	Moderate
	Dust pollution	1	3	2	2	2	3	4	9	4	4	1	4	13	117	Moderate	Moderate
	Increased overland flow	3	2	2	2	2,25	2	2	6,25	3	3	1	3	10	62,5	Moderate	Low
Decommissioning	Dust Precipitation (From Backfilling)	1	3	2	2	2	2	2	6	1	2	5	3	11	66	Moderate	Low
	Change in topography (From Backfilling)	2	2	2	2	2	1	2	5	1	2	1	2	6	30	Low	Low
	Dust Precipitation (From Shaping/Contouring)	1	3	2	2	2	2	2	6	1	2	5	3	11	66	Moderate	Low
	Change in topography (From Shaping/Contouring)	3	2	3	3	2,75	1	2	5,75	1	2	1	2	6	34,5	Low	Low
	Acid Mine Drainage	1	5	5	5	4	4	5	13	4	4	5	4	17	221	High	Moderate

In accordance with General Notice 509 "Risk is determined after considering all listed control / mitigation measures. Borderline Low / Moderate risk scores can be manually adapted downwards up to a maximum of 25 points (from a score of 80) subject to listing of additional mitigation measures

5.5.2 MITIGATION MEASURES

The following mitigation measures will be required to ensure the decrease in those significance ratings expected to decrease from "Moderate" to "Low" as stipulated in Section 5.5.1.

5.5.2.1 GENERAL

The following mitigation measures are aimed to conserve wetlands in general;

- The recommended buffer zone has to be respected at all times (except for those sections of the proposed open cast areas and associated haul roads located within the delineated wetlands;
- The contractors used for the construction should have spill kits available prior to construction to ensure that any fuel, oil or hazardous substance spills are cleaned-up and discarded correctly;
- It is deemed important that all wetland areas be demarcated as sensitive areas, and no construction activity, laydown yards, camps or dumping of construction material are to be permitted within the sensitive zones (where possible);
- During construction activities, all rubble generated must be removed from the site;
- Construction vehicles and machinery must make use of existing access routes as much as possible, before adjacent areas are considered for access;
- All chemicals and toxicants to be used for the construction must be stored outside the channel system and in a bunded area;
- All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site;
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping";
- Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation);
- All removed soil and material must not be stockpiled within the wetland system. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;
- Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil;
- No dumping of construction material on-site may take place; and
- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.

5.5.2.2 CONSTRUCTION OF OPEN CAST PIT

The following mitigation measures are aimed to conserve wetlands during the construction of the proposed open cast pit;

- The extent of the proposed open cast pit should not differ from the extent as presented in the provided GIS data (shapefiles) shared with the consultants responsible for this assessment;
- All infrastructure components (i.e. stockpiles, haul roads, buildings etc) associated with the mining activities must be located within the extent of the open cast mining area shared with the consultant; and

- Basic rock cladding must be applied to areas characterised by signs of erosion within and around the relevant wetland

5.5.2.3 OPERATION OF THE OPEN CAST PIT

To ensure that overland flow is not increased during the proposed operational phase of the open cast pit, the following mitigation measures have been recommended;

- Monitor signs of erosion and compaction around the proposed open cast pit within the first week of every month during the rainfall season (November to March) and rip/reseed/apply rock cladding where required;
- The stormwater management plan must incorporate the installation of a pollution control facility to tend to contaminate surface water from precipitation. The water from this system must be reintroduced in a diffuse manner back into the wetland after sanitisation;
- All invasive species must be eradicated from the relevant wetlands annually;
- The surroundings of the proposed pit must be revegetated after construction with indigenous vegetation; and
- Relevant stormwater systems must be installed for the proposed pit and associated infrastructure (including all roads) to ensure that no additional overland flow be channelled to surrounding wetlands

5.6 ISSUES AND RESPONSES FROM PUBLIC CONSULTATION PROCESS

A PPP is being undertaken for the Application. I&AP's will be provided opportunities throughout the process to provide comment and thereby participate in the PPP. I&AP's will be afforded an opportunity to review and comment on the draft IWWMP. The draft IWWMP will be made available to all registered I&AP for a period of 60 days from the 13 March 2020 until 18 May 2020. The Public Participation Report describing the PPP for this WUL application shall be attached as APPENDIX H to this IWWMP on completion of the public review and comment period.

5.7 MATTERS REQUIRING ATTENTION / PROBLEM STATEMENT

The following matters require attention:

- The proposed SWMP needs to be implemented;.
- The groundwater model needs to be updated on an annual basis.
- Annual wet and dry season bio-monitoring must be undertaken.

5.8 ASSESSMENT OF LEVEL OF CONFIDENCE OF INFORMATION

The assessment undertaken by the specialist included the following assumptions and limitations:

5.8.1 WETLANDS AND AQUATIC ASSESSMENT

The assessment undertaken by the specialist included the following assumptions and limitations:

- The wetlands within the MRA were the focus for the study, these systems were ground truthed and further assessed. Wetland areas beyond the MRA but within the 500 m regulated area were largely considered at a desktop level;

- The areas within (and especially surrounding drainage lines) the MRA have significantly been modified. This modification could lead to inaccuracies pertaining to delineations and identification of wetland indicators. The majority of wetland areas were covered in tailing material/silt which renders the dominant soil form in such an instance as a Witbank soil form. The latter mentioned according to (DWAF, 2005) is classified as a terrestrial soil as opposed to hydromorphic soils;
- Some the delineated wetlands are characterised by artificial water inputs, which provides difficulties in identifying hydromorphic soils; and
- The GPS used for water resource delineations is accurate to within five meters. Therefore, the wetland delineation plotted digitally may be offset by at least five meters to either side.

5.8.2 HYDROPEDOLOGY

The assessment undertaken by the specialist included the following assumptions and limitations:

- Only the slopes affected by the proposed mining areas have been assessed;
- No surface impacts (i.e. haul roads, infrastructure, shafts, evaporation ponds etc) have been included into this report;
- Access could not be gained at observation 8 and 9 (i.e. Sampling sites);
- It has been assumed that the mining areas provided to the consultant are correct;
- The GPS used for ground truthing is accurate to within five meters. Therefore, the wetland and the observation site's delineation plotted digitally may be offset by at up to five meters to either side; and
- Geohydrological modelling was not part of the hydropedological assessments.

6 WATER AND WASTE MANAGEMENT

The following section describes water and waste aspects at the Applicants project area, as well as the related operational processes.

6.1 WATER AND WASTE MANAGEMENT PHILOSOPHY

The general principle of water management is the recognition that water is a scarce resource. This in turn leads to the other principles, such as water use minimisation (water conservation) or reuse of water and pollution prevention or the limitation of pollution of water.

Water that exceeds the quality, as set by DWS shall not be released from site, with the exception of emergency conditions, but it must be reused, thus reducing the quantity of intake of clean water. The Applicant will endeavour to:

- Continually seeking ways to improve its performance in terms of consumption, and water related impacts;
- Reduce consumption of clean water;
- Implement pollution prevention at source;
- Maximise, recycling and reuse of dirty storm water and process water;

- Implementation of process water treatment to facilitate reuse; and
- Collect, contain dirty storm water and process water on site for preferential use as process water.

The hierarchical management approach comprises the implementation of best practice measures to minimise water consumption and reduce impacts on water resources, by:

- Implementing measures to ensure compliance with relevant water and waste legislation and with other standards to which the organisation subscribes;
- Proactively identifying and implement actions that are required to achieve the water and waste related objectives;
- Implement these actions in an open and transparent manner;
- Implement on-going water and waste related monitoring to support legal compliance;
- Continually seeking ways to improve the performance of water and waste management systems, process and objectives; and
- Encourage open and transparent communication with regulatory authorities and other interested and affected parties within the context of the National Water Resource Strategy and Local Catchment Management

Elandsfontein Colliery has a policy which provides that there will be zero spillage of contaminated water into the environment. The mine will adhere to quarterly groundwater and monthly surface water monitoring and annual reporting to Department of Water Affairs and Sanitation. Spillages and "Reportable Incidents" must be reported immediately to the authorities.

Reportable Incidents in this instance will include the events, such as flooding, spillages of significance and any other incidents which may have a significant impact on the environment.

6.2 STRATEGIES

6.2.1 SURFACE WATER

The general principle of water management is the recognition that is a scarce resource. This principal is guided by water use minimisation (water conservation) or re-use of water and pollution prevention or the limitation of pollution of water.

The goal of the Applicant is to minimise water consumption, impacts to the environment, running costs and to achieve environmental legal compliance, whilst maintaining adequate water supply as not to compromise the mining operations and supply of coal to industry. The following objectives are, therefore, set for the project:

- Water conservation by minimising water use. Water is reused wherever possible;
- Prevention of water pollution where possible;
- Minimise impacts on water resources and receiving water environment;
- Achieve and maintain legal compliance;
- Continuous mining operation to supply market need; and
- Production of quality coal for industry.

In order to achieve the above objectives, the Applicant is committed to uphold the following broad commitments:

- All water that can remain unpolluted will be kept separate and dirty water areas will be minimised;
- The use of water resources for processing and mining activities will constantly be evaluated to ensure that their use is optimised;
- No water will be discharged unless authorised by the DWS, especially water that exceeds the catchments water quality objectives, as set out by the National Authority, with the exception of emergency conditions if safety should demand so; and
- Dirty water catchments will be minimised and kept separate from clean catchments and all water contained here shall be re-used as far as possible, thus reducing the quality or raw water extracted;
- All the relevant principles contained in DWA's Best Practice Guidelines (BPG) will be utilised to guide mine design and management practices. The Applicant will also ensure compliance with GNR 704 of the NWA and is applying for the relevant exemption indicated in Section 3.3 above.

6.2.2 WETLANDS AND AQUATIC ECOLOGY

Management actions should consider that the main impacts of the development are likely to be to water quality, as well as water quantity (flows) within receiving watercourses. As such, the main objectives for management are:

- To take all reasonable measures to prevent any disturbance, damage or impact to aquatic ecosystems outside of mining footprint;
- Minimise and prevent disturbance to wetlands and watercourses;
- Prevent impacts to water quality;
- Prevent and minimise erosion and sedimentation;
- Prevent flow changes in receiving watercourses;
- Effective bio-monitoring programme be implemented as soon as possible to assess and mitigate negative impacts on aquatic ecosystems;
- Manage biodiversity; and
- On-going rehabilitation.

6.2.3 WETLAND OFFSET STRATEGY

Elandsfontein Colliery acknowledges that the mine impacts on the wetlands found in the project boundaries. Elandsfontein Colliery will appoint a team of specialist consultants to develop an on-site and off-site wetland mitigation strategy for the mine to offset the impacts of opencast mining on wetlands. The wetland mitigation strategy should include (but not limited to) the following options:

- Adopting the remaining (un-impacted) wetlands in the mining area accompanied by a wetland management plan that would be directed at reducing the agricultural impacts currently associated with the existing wetland systems;
- Investigate the opportunity of integrating aspects of wetland functions into a water diversion system designed to bypass mined areas;
- Launching a rescue operation (fauna & flora) prior to mining; and
- Identifying and securing by way of off -site mitigation strategy on the calculated hectare equivalents wetlands that would compensate for the loss of the wetlands through a stewardship/rehabilitation program

Elandsfontein Colliery will meet with the DWS to determine the Department's requirements of the wetlands offset strategy and measures.

6.2.4 GROUNDWATER

In order to prevent repetition in retaining the GNR 267 heading requirements for IWWMP's, kindly refer to Section 5.2.5 and Section 5.4.2.

6.2.5 WASTE

The following waste management strategies will be implemented:

- The waste management plan will ensure the appropriate management of all solid waste, including construction debris (cement bags, wrapping material, timber, cans, wire, nails, etc.), waste and surplus food, food packaging, organic waste etc;
- The Mine and Contractor(s) will comply with the environmental management principles referenced in the NEMA. In respect of waste management, the 'cradle-to-grave' principle in particular must be adhered to so as to ensure accountability for correct waste handling, storage and disposal;
- The waste management system will provide for adequate waste storage (in the form of waste skips and bins with lids), waste separation for recycling, and frequent removal of non-recyclable waste for permanent disposal at an appropriately licensed waste disposal facility. No waste material is to be disposed of on site. Under no circumstances may there be any burial of waste underground or on the site.
- Waste will be separated into reusable, recyclable and non-recyclable waste, and shall be further separated as follows:
    - Hazardous waste, consisting of substances that may be harmful to the receiving environment, and, therefore, require precautionary measures when handled. Examples include (but not limited to) oil, paint, diesel.
    - General waste, consisting of non-hazardous substances and substances that cannot be recycled. Examples include (but are not limited to) construction rubble, excess construction materials that cannot be reused.
    - Recyclable waste, (where volumes are sufficient to make recycling feasible) will preferably be deposited in separate bins. Recyclable material includes paper, tins and glass.
- The mine will implement a waste removal regime that ensures waste containers do not exceed their capacity before being removed from site for disposal.
- Environmental awareness training given to workers on site will include appropriate waste management practices to be implemented on site.
- Particular caution is to be exercised with regards to handling of hazardous waste, to ensure that it does not spill or leak from the waste collection containers. Refuse must also be protected from rain, which may cause pollutants to leach out.
- Littering will be strictly prohibited. The site shall remain in a neat and tidy condition at all times. If required, the Applicant shall make use of regular litter patrols to remove litter and ensure the site remains clean, neat and tidy.
- The mine will maintain a waste register which shall be used to track all waste removed from site. Proof of appropriate waste disposal shall be kept on file at the site for auditing purposes.

6.3 PERFORMANCE OBJECTIVES / GOALS

The Applicant has an Occupational Health, Safety and Environmental Policy in place, which outlines the mine's commitment towards environmental management, and which provides the framework for all environmental activities on the mine. The policy is aimed at achieving excellence and ensuring continual improvement in the mine's endeavour to create a sustainable environment. There is a continual process of reviewing to assess the impacts of the mine's activities on the environment. The performance objectives are summarised in Table 15 below.

Table 15: Performance objective for the Applicant

Item:	Performance objective:
Process Water:	Required water quality standard
	Re-use and recycling of process water
	Accurate water balance (hour meter flows)
Ground Water:	Prevent deterioration of ground water quality
	Prevent aquifer contamination
Storm / Surface Water:	Clean and dirty water separation
	Diversion of clean storm water runoff around the mine area
	Collection and containment of contaminated water
Waste:	Ensure legal proper disposal of waste at registered sites
	Minimize waste generation
	Re-use of recycle if possible
	Ensure proper storage before disposal to prevent pollution of environment

6.4 MEASURES TO ACHIEVE AND SUSTAIN PERFORMANCE OBJECTIVES

The IWWMP action plan identifies measures to achieve the water and waste related objectives. Refer to Section 6.6 below.

6.5 OPTION ANALYSIS AND MOTIVATION FOR IMPLEMENTATION OF PREFERRED OPTIONS

Option analysis was not conducted as part of this report. The mine has an existing EMPR for which alternatives have been considered.

6.6 IWWMP ACTION PLAN

This part of the IWWMP details the actions that will be taken to ensure that the objectives and measures set out in Section 5 and Section 6 above, as well as the commitments made throughout the rest of this document, are achieved. The main purpose of this section of the IWWMP is to identify the direct actions to be taken by the mine, as well as to allocate responsibility for the implementation of these actions and set a target in terms of the timeline(s) within which the actions will be achieved. The action plan included in Table 16 focuses on the measures that will be implemented during the construction, operational and decommissioning phases of the mine.

Table 16: IWWMP action plan

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
STAFF AND MANAGEMENT AWARENESS					
Staff awareness program and training	Risk mitigation	The Applicant must inform its employees of risk associated with their operations and make sure that all employees are trained prior to undertaking any activity associated with their operations. Ensure that the Contractor and key personnel are aware of the relevant provisions of the EMPr, sensitive environmental features and agreements made with individual landowners and/or land users.	Permanent/ Continuous	• Reducing in incidents and identified risks	Management • EMPr
Appoint Contractors Environmental Officer (CEO)	Oversee and enforce EMPr.	The Applicant's management to assign a team that will monitor EMPr implementation and compliance by the employees. Enforcement should be applied to those employees that are not complying.	Permanent/ continuous	• Management satisfied with CEO performance based on EMPr implementation	Management • EMPr • Compliance checklists • Audit reports
SITE OPERATION					
Water for human consumption	Water and soil pollution, health	Water for human consumption shall be available at the site offices and at other convenient locations on site. All drinking water must be from a legal source and comply with recognised standards for potable	Weekly monitoring of waste and effluent	• Adequate quantities of potable water,	Management • EMPr

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
		use. The Applicant shall comply with the provisions of the NWA and its Regulations pertaining to the abstraction of water from rivers and streams and the use thereof. All effluent from the office shall be collected and disposed of properly, (e.g. chemical toilets should be emptied). If this is not feasible (due to the construction duration or other difficulties), all effluent water from the camp / office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans dams etc). Only domestic type wastewater shall be allowed to enter this drain. The effluent system should comply with provisions of the NWA.	removal/ disposal	• Proper effluent disposal	• Compliance checklists
Waste Management	Soil and water pollution; Waste disposal	Where practically possible, general waste on-site must be reused or recycled. Bins and containers must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	Weekly monitoring of waste clean-up	• No waste or litter accumulation on site	Management • EMPr • Compliance checklists
Solid Waste	Soil and water pollution; Waste disposal	A refuse control system shall be established for the collection and removal of refuse. Bins and containers must be available on-site for collection, separation, and storage of waste (such as wood, metals, general refuse etc.). Solid waste shall be stored within a designated area that is covered, utilizing plastic wheelie bins for collection and disposal. Disposal of solid waste shall be at a DWS licensed landfill site	Weekly monitoring	• No waste or litter accumulation on site • Proof of disposal certificates.	Management • EMPr • Compliance checklists

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
		or at a site approved by DWS in the event that an existing operating landfill site is not within reasonable distance from the site. No waste shall be burned or buried at or near the site offices, or anywhere else on the site.		• No burning of waste.	
Wastewater	Soil and water pollution;	The Applicant shall comply with the provisions of the NWA and its Regulations pertaining to the storage and reuse of wastewater collected on site. Wastewater collection ponds should be lined and in compliance with the NEMWA and other legal requirements.	Monthly monitoring	• No ground and water contamination	Management • EMPr • Compliance checklists
Litter	Soil and water pollution; Waste disposal	No littering by construction workers shall be allowed. During the construction and operation period, the facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter. Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work the contractor shall provide litter collection facilities for later safe disposal at approved sites.	Bi weekly monitoring	• No waste or litter accumulation on site • Proof of disposal certificates. • Availability and maintenance of litter / refuse collection facilities. • No burning of waste.	Management • EMPr • Compliance checklists
Hazardous waste	Soil and water pollution	Hazardous waste such oils etc. shall be disposed of in a DWS approved landfill site. Any spillage shall be attended to immediately and	Weekly monitoring	• No spillages or direct disposal. • No waste or litter	Management • EMPr

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
	Waste disposal	affected areas shall be promptly reinstated to the satisfaction of the engineer.		accumulation on site • Proof of disposal certificates. • Proof of reinstatement following any spillages. • No burning of waste.	• Compliance checklists
Control at the workshop	Soil and water pollution; Waste disposal	Management and maintenance of plant and machinery will be strictly monitored according to the subsections below, regardless whether it is serviced on the site (i.e. at the place of construction activity or at a formalised workshop). All maintenance, including washing and refuelling of plant on site shall take place at designated locations at the workshop area. All machinery servicing areas shall be bunded.	Monthly monitoring	• Random visual inspection during site visits.	Management • EMPr • Compliance checklists
Hazardous Material Storage	Soil and water pollution Waste disposal	Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials shall be stored in a secured, appointed area that is fenced and has restricted entry. The Applicant should ensure that they keep proof that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment	Weekly monitoring	• No hazardous waste accumulation on site • Proof of disposal certificates. • No burning of waste. • Suitable and adequate hazardous substance storage areas.	Management • EMPr • Compliance checklists

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
		or storage facilities can be erected the Applicant should ensure that preventative measures are put in place to mitigate against pollution of the surrounding environment from leaks or spillage. The preferred method shall be a concrete floor that is bunded. Any deviation from the method will require proof from the relevant authority that the alternative method proposed is acceptable to that authority. The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.		• Proof of submission and approval from the Employers Environmental Manager/Environmental Officer.	
Fuel and Gas Storage	Soil and water pollution; Waste disposal	Fuel shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. An adequate bund wall, at least 110% of the volume stored, shall be provided for fuel and diesel areas to accommodate any leakage spillage or overflow of these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. Any leakage, spillage or overflow of fuel shall be attended to immediately. Gas welding cylinders and LPG cylinders shall be stored in a secure, well-ventilated area. Storage of hazardous substances must comply with construction regulations under the OHSA.	Weekly monitoring	• Inspect bunded area for leaks / drainage • Proof of disposal certificates. • No burning of waste.	Management • EMPr • Compliance checklists
Oil and Lubricant Waste	Soil and water pollution;	Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and sent back to the supplier. Oils collected in this manner, shall be	Weekly monitoring	• Inspect bunded area for leaks / drainage • Proof of disposal	Management • EMPr

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
	Waste disposal	retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company. All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced. Soils contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials.		certificates. • No burning of waste.	• Compliance checklists
Soil and Stockpile Management	Soil erosion	Topsoil shall be removed from all areas where physical disturbance of the surface will occur and shall be stored and adequately protected. The Applicant will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. Depth may vary at each site. The areas to be cleared of topsoil shall include the storage areas. All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled or windrowed topsoil shall be removed by hand. Soils contaminated by hazardous substances shall be disposed of at an approved DWS waste disposal site. The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere	Monthly monitoring	• Visual inspection of stockpiles	Management • EMPr • Compliance checklists

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
		with the flow of water to cause damming or erosion, or itself be eroded by the action of water. Stockpiles of topsoil shall not exceed a height of 2m, and if they are to be left for longer than 6 months, shall be analysed, and if necessary, fertility improved before replacement. Stockpiles shall be protected against infestation by weeds. The Applicant shall ensure that no topsoil is lost due to erosion – either by wind or water. Areas to be top-soiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns.			
Drainage / Storm water Management	Soil erosion /storm water management	The quality, quantity and flow direction of any surface water runoff shall be established with the aid of a qualified engineer prior to disturbing any area for construction purposes. Cognizance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. No water source shall be polluted in any way due to proposed development. No wastewater may run freely into any of the surrounding environment or neighbouring properties. The contractor shall implement the storm water design in accordance with the approved Storm Water Management Plan. The Applicant and Contractor(s) shall ensure compliance with the	Weekly monitoring	• Visual inspection, no excessive soil erosion or sedimentation.	Management • EMPr • Compliance checklists

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
		requirements of the NWA and GN 704. All areas susceptible to erosion shall be protected by ensuring that there is no undue soil erosion resultant from construction and/or mining activities. Berms shall be constructed where necessary to direct all runoff into the storm water system. Care must be taken to avoid scouring and erosion and suitable measures should be placed in areas where runoff concentrates, in order to detain the sediment load and slow down the runoff. All erosion damage shall be repaired as soon as possible as directed by the Environmental Representative. Consideration shall be given to the placement of silt traps or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The silt traps must be large enough to contain runoff so that they function properly under heavy rain conditions.			
Stockpiles	Soil erosion Visual impact Noise	No construction and operation related activities including stockpiling, temporary storage areas, temporary and permanent access routes, and temporary working areas are to take place within the area beyond the demarcated site boundary. The Applicant shall plan their activities so that materials in so far as possible, can be transported directly to, and placed at, the point where they will be used. The areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan, together with the	Weekly monitoring	• Visual inspection, no excessive dust	Management • EMPr • Compliance checklists

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
		contractor's proposed measures for prevention, containment and rehabilitation against environmental damage. The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the contractor shall at all times ensure that they are: • Positioned and sloped to create the least visual impact; • Structurally sound and present no safety risk; • Constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment; and Kept free from all alien/undesirable vegetation. After construction, any areas no longer required for operation shall be re-instated to its original condition. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained until closure from the Environmental Advisor and the relevant National Authority is received. In all cases, Environmental Advisor shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their clause only when they have been			

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
		satisfactorily rehabilitated.			
Spillages	Soil & water pollution	Watercourses such as streams, rivers, dams, etc. shall be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, wash water, and organic materials. In the event of a spillage, the Applicant should arrange for professional service providers to clear the affected area. All spills must be dealt with as per the Emergency Response Procedure. Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed.	Weekly monitoring	• Visual inspection	Management • EMPr • Compliance checklists
Areas of Specific Importance	• Loss of populations of threatened plant species • Loss of habitat of threatened animal species • Loss of indigenous natural vegetation	Any area, as determined and identified as sensitive or of special interest within the site (e.g. wetlands) shall be treated according to the express instructions contained in these specifications or the approved EMPr. The overriding principle is that such defined areas requiring protection shall not be changed. • No unnecessary vegetation clearing will be allowed in natural vegetation areas. • It is deemed important that all wetland areas be demarcated as sensitive areas,	Weekly monitoring	• No vegetation has been unnecessary removed, (photo graphic evidence)	Management • EMPr • Compliance checklists

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
	(primarily grassland) • Erosion and siltation due to change in runoff and drainage patterns • Establishment and spread of declared weeds and alien invader plants. • Noise impacts on local residents	and no construction activity, laydown yards, camps or dumping of construction material are to be permitted within the sensitive zones (where possible. • The wetland buffer zones have to be respected at all times (except for those sections of the proposed open cast areas and associated haul roads located within the delineated wetlands. • Monitor signs of erosion and compaction around the proposed open cast pit within the first week of every month during the rainfall season (November to March) and rip/reseed/apply rock cladding where required.			
Dust Control	Nuisance pollution	Dust caused by strong winds and operational activities shall be controlled by means of water spray vehicles. Exposed soils and material stockpiles shall be protected against wind erosion. The location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors A dust monitoring system needs to be put in place to ensure that dust falls within the acceptable limits as per the ambient air quality standards	Monthly monitoring	• Routine observation, no complaints from residents	Management • EMPr • Compliance checklists

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
Alien Vegetation	Habitat destruction	The Applicant shall establish an on-going monitoring programme to detect and quantify any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act and Biodiversity Act). The Applicant shall be held responsible for the removal of alien vegetation within the boundary of the site disturbed during construction. This includes, for example, service roads, stockpile areas, and wherever material generated for or from construction has been stored temporarily.	Monthly monitoring	• Visual inspection, vegetation removal record by contractor, no unnecessary vegetation clearing	Management • EMPr • Compliance checklists
DECOMMISSIONING PHASE					
Decommissioning	Decommissioning and rehabilitation	Any additional licensing or permitting requirements must be identified prior to any decommissioning activities commence. Prior to the decommissioning a detailed decommissioning plan must be prepared. This plan should aim to follow the waste management hierarchy (reuse, recycle, reduce and dispose) in order to prevent unnecessary wastes. All waste which require disposal must be disposed of at a suitably licenced facility. An inventory of infrastructure and wastes together with the ultimate destination (e.g. recycler, waste disposal) should be kept for future records. A rehabilitation plan must be prepared by a suitably qualified specialist. The sites must be rehabilitated to the pre-construction condition or alternatively to align with the surrounding land-uses at the time. The rehabilitated	Weekly	• Routine check for EMPr availability and awareness.	Management • EMPr • Compliance checklists

Activity	Environmental Aspect	Mitigation measures	Monitoring frequency and tools	Monitoring Indicators	Responsible party for implementation and Monitoring Tool
		site must be protected from future erosion.			
Decommissioning	Decommissioning and rehabilitation	The area where the site offices are placed will require rehabilitation at the end of the contract. All construction material, including concrete slabs shall be removed from the site on completion of the contract, to the Applicants satisfaction.	Weekly	• Routine check for EMPr availability and awareness.	Management • EMPr • Compliance checklists
Decommissioning	Decommissioning and rehabilitation	Any disturbed areas should be rehabilitated with natural vegetation endemic to the area as soon as possible after decommissioning.	Weekly	• Routine check for EMPr availability and awareness.	Management • EMPr • Compliance checklists

6.7 CONTROL AND MONITORING

In order to determine the impact of the facility on the surface and groundwater regimes, monitoring systems have been implemented, by which data can be continually gathered and analysed, with corrective action being taken as required.

6.8 MONITORING OF CHANGE IN BASELINE INFORMATION

The results of the monitoring plan will be submitted to the relevant DWS directorates, as well as other government departments as required in terms of management objectives, action plan and applicable legislation and other legislative requirements.

6.8.1 SURFACE WATER MONITORING

As detailed in Section 4.3.3 above surface water monitoring is currently undertaken at mine. The Applicant will need to amend the surface water monitoring to ensure that it is in line with any conditions specified in the new/amended WUL.

6.8.2 GROUNDWATER MONITORING

As detailed in Section 4.4.3, groundwater monitoring is currently undertaken at the mine. The Applicant will need to amend the ground water monitoring to ensure that it is in line with any conditions specified in the new/amended WUL.

6.8.3 BIOMONITORING

As detailed in Section 5.4.3 above biomonitoring is currently undertaken at the mine. The Applicant will need to amend the biomonitoring monitoring to ensure that it is in line with any conditions specified in the new/amended WUL.

6.9 AUDIT AND REPORT ON PERFORMANCE MEASURES

The WUL and other applicable authorisations require that regular formal audits be undertaken in order to assess the compliance with, amongst others, the WUL and IWWMP. As such, the applicant will cater for this requirement through regular internal and external audits in line with the frequency required by the WUL (usually on an at least an annual basis) and the other applicable authorisations.

6.10 AUDIT AND REPORT ON RELEVANCE OF IWWMP ACTION PLAN

The existing WULA requires that the efficacy of the measures proposed as part of the action plan be reviewed and updated where required. As such, the IWWMP action plan will be reviewed and updated in line with the frequency required by the WUL and the other applicable authorisations. A copy of the last WUL audit report is attached in APPENDIX K

7 CONCLUSION

7.1 REGULATORY STATUS OF ACTIVITY

Elandsfontein Colliery has an approved WULA (Licence no. 04/B20G/CGI/3843) approved by the DWS. The mine also has two existing mining rights, MP 30/5/1/2/68MR and 30/5/1/3/2/10162MR(314MR) approved by the DMR.

7.2 STATEMENT OF WATER USES REQUIRING AUTHORISATION, DISPENSING WITH LICENCENCING REQUIREMENT AND POSSIBLE EXEMPTION FROM REGULATION

In terms of the NWA, it is an offence to pollute any water resources to render it unfit for the propagation of fish and aquatic life, including rainwater, seawater, and subterranean water. An application for the exemption of the provision of GNR 704 is required for the PCDs as Section 4a of GN 704 will apply. Details of these water uses are presented in Section 3.3

7.3 SECTION 27 MOTIVATION

The subsections below provide contextualisation of the activities with respect to Section 27 of the NWA.

7.3.1 SECTION 27(1)(A) EXISTING LAWFUL WATER USES

As the mine has an existing WUL (Licence no.: 04/B20G/CGI/3843), all the activities licenced in terms of this WUL are considered to be existing lawful water uses.

7.3.2 SECTION 27 (1)(B) THE NEED TO REDRESS THE RESULTS OF PAST RACIAL AND GENDER DISCRIMINATION

One objective of the NWA is to address past racial and gender discrimination and to alleviate poverty in South

Africa; therefore it is of utmost importance to support and stimulate economic development in order to realise the upliftment of previously disadvantaged groups and/or individuals.. The Applicant recognizes the need to address the imbalances of the past and regards BEE to be one of the supporting pillars of the transformation process in South Africa.

Elandsfontein Colliery is highly supportive of the transformation process that has taken place in South Africa and is committed to the on-going development of the communities and employees within its sphere of influence. Elandsfontein Colliery is a subsidiary of Namane Resources (Pty) Ltd which is a Black Empowered Company.

7.3.3 SECTION 27 (1)(C) EFFICIENT AND BENEFICIAL USE OF WATER IN THE PUBLIC INTEREST

The concept of “public interest” is a very complex one. Under the Water Act of 1956, permits were issued to users provided that they used the water beneficially. The use was considered beneficial if the mine was going to

make a profit. Under the NWA, public interest goes much wider. The fact that the mine has to undertake a Public Participation Process (PPP), and the public's opinion is to be elicited, means that, at least, the public opinion can be gauged by the response and the comments and concerns received.

As public trustee of the water resources, the DWS must ensure that the water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all users. The Minister, through the DWS has to ensure that the water is allocated equitably and used beneficially in the public interest, while promoting environmental values.

The beneficial use of the water is derived for the social and economic benefits resulting from the mining activity. Water will be used optimally to ensure minimum wastage. The water use will be undertaken, managed and controlled in such a way to ensure that pollution of the water resources is minimised and avoided. Social and economic development will be facilitated, which will ensure that the use of the water resource will be of benefit to the local communities. Goods and services will be sourced from local businesses as far as possible, to enhance the economic benefits of the Project.

A PPP was/or is being undertaken to inform all stakeholders of the water uses and to take account of any concerns that the communities might have. If approval is granted, Elandsfontein Colliery intends to continue with on-going engagement with the communities to enable stakeholders to raise their views throughout the life cycle of the Project. The concerns raised will continuously be addressed to benefit all I&Aps.

The establishment of the mine is a stimulant to the local, provincial and national economies. The creation of jobs and the purchase of goods and services lead to increased economic activity. Elandsfontein Colliery appoints local (Nkangala District Municipality and eMalahleni Local Municipality) individuals as far as possible. Elandsfontein Colliery also supports local companies by purchasing goods, services and consumables during the life of mine to support local Small Medium and Micro Enterprise (SMME) and Historically Disadvantaged South African Companies. With the challenges associated with the production of electricity, the mine will contribute locally with the mined coal for power generation in the interest of the public.

In addition to the above, the supply of coal to coal fired power stations is beneficial as it allows industries to continue their operations which provide a continued source of income to the employees and assist in Gross Domestic Product (GDP) generation.

7.3.4 SECTION 27 (1)(D) THE SOCIO-ECONOMIC IMPACT OF THE WATER USE OR USES IF AUTHORISED OR OF THE FAILURE TO AUTHORISE THE WATER USE OR USES

The mine is located within the Mpumalanga Province which is considered to be rich in coal. It is predicted that 83% of the total amount of coal produced in South Africa is mined in Mpumalanga (Universal Coal, 2016). South African Mining industry is the largest provider of jobs with around 460 000 employees and a further 400 000 employed by the suppliers of good and services in the industry. The mine has for many year provided coal to both the domestic and international markets though its mining operation as both an underground and open cast mine. As the coal resource availability for this mine has slowly diminished, the mine proposes as part of its rehabilitation efforts to reprocess the discard dump and combine it with the coal extracted from the open cast mining of No. 2 Coal Seam. No processing of this coal is proposed and therefore this coal will be sold as is to Eskom to assist the country with power generation which will indirectly assist in the development of the South African economy.

As a pillar of any Social Labour Plan, Local Economic Development should seek to enable the community, in which mining company operate, to become an economically stronger entity by, and not limited to, increasing (amongst others) business skills, entrepreneurship and income. As part of this project, Elandsfontein Colliery has drafted a SLP which outlines the Local Economic Development (LED) programmes set for the surrounding community. The main priority of the LED programmes is to improve the educational facilities. Elandsfontein Colliery will provide adequate finances for the implementation of the SLP programmes. Elandsfontein Colliery intends to form partnerships with employees, local organisations, government, business, non-governmental organisations and the local communities to ensure that resources are optimally pooled and SLP activities are successfully and sustainably implemented.

It is envisaged that the current project will result in a negative impact on the environment as mining continues to develop. The project involves the change from an underground mine to an open cast mine and therefore it is envisaged that even though the current environmental state has already been altered by historic mining activities the continuation of mining activities will degrade the environment even further.

Elandsfontein Colliery aims at maximizing the mining industry's contribution to the country and communities in which mining activities take place. A good working relationship between the mine and the relevant authorities as well as community structures is maintained. These represent the needs of the municipality where Elandsfontein operation is located as well as the mine's major labour sending area. The mine has a positive socio-economic benefit through employment of locals. In eMalahleni, 23% of the economically active population was employed in mining operations. Elandsfontein created employment opportunities during the construction and operational phases.

Elandsfontein Colliery undertakes the preferential employment of locals during the construction and operational phases of the mine, skills permitting and will use local (Nkangala District Municipality and EMalahleni Local Municipality) registered companies as far as possible in the purchase of goods, services and consumables during the Life of mine (expected to be 16 years) to support local Small Medium and Micro Enterprise (SMME) and HDSA Companies.

7.3.5 SECTION 27 (1)(E) ANY CATCHMENT MANAGEMENT STRATEGY APPLICABLE TO THE RELEVANT WATER RESOURCES

Chapter 2 of the Constitution of the Republic of South Africa, 1996 outlines the Bill of Rights. Each person has the right to natural resources including water. The DWS are the primary custodians of the water resources in the country.

The DWS is responsible for the NWRS for South Africa. The goal of the NWRS describes the methods to protect, use, develop, conserve, manage and control the country's freshwater resources in accordance with the requirements of the legislative frameworks of the country. According to the NWA (1998), a Catchment Management Agency (CMA) should be established for each water management area. The CMA will then be responsible for the Catchment Management Strategy for each water management area.

The sourced water will be used efficiently and sparingly as possible and negative impacts to the water resources will be minimised by implementing monitoring of both surface and groundwater. The groundwater monitoring data will be supplied to DWS for record keeping and to expand the DWS database. All water related

infrastructure will also be constructed in line with best practice guidelines and will be fully compliant with all legislative requirements.

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7.3.6 SECTION 27 (1)(F) THE LIKELY EFFECT OF THE WATER USE TO BE AUTHORISED ON THE WATER RESOURCE AND ON OTHER WATER USERS

The main potential impacts identified include (Refer to Section 5.5 for a detailed description of the potential impacts):

- Wetlands: Loss of wetlands due to mining, decreased water quality and as altered hydrological regime may occur; and
- Groundwater: groundwater quality may be impacted on due to AMD formation and contamination of groundwater, while the groundwater quantity may decrease due to dewatering.

All of these potential impacts will require mitigation, which is further addressed in the IWWMP action plan (Section 6.6 above).

7.3.7 SECTION 27 (1)(G) THE CLASS AND THE RESOURCE QUALITY OBJECTIVES OF THE WATER RESOURCE

The Minister of Water Affairs is required to establish a classification system, and to determine the class and resource quality objectives for all or part of the resources considered to be significant. Until such time, the Minister may make a preliminary determination of the class or resource quality objectives.

These will be used to manage the water quality in the study area. Thus as part of the baseline water quality assessment, the current water quality status will be benchmarked against these objectives and the water quality management will be in line with these objectives.

Water quality monitoring will also be implemented as a management tool in order to detect any negative quality impacts as a result of the Elandsfontein Project. Where impacts are detected, mitigation measures will be implemented to reduce and prevent further impacts.

7.3.8 SECTION 27 (1)(H) INVESTMENT ALREADY MADE AND TO BE MADE BY THE WATER USER IN RESPECT OF THE WATER USE IN QUESTION

Elandsfontein Colliery has invested significantly in their mining and processing activities in terms of coal production with the project initiating financial benefit to both the surrounding areas as well as the existing workers that depend on the mining operations for their livelihood. The mine has also invested in various specialist studies and a public participation process for the WUL Application, as well as the EIA process.

7.3.9 SECTION 27 (1)(I) THE STRATEGIC IMPORTANCE OF THE WATER USE TO BE AUTHORISED

The existing mining activity at Elandsfontein has positive social and economic benefits that are experienced on local, regional, provincial and national scales including:

- Security of employment and subsequent contribution to stabilising the economic activity in the area; and
- Production and supply of a needed resource.

Economic benefits are directly through salaries being paid to employees and the purchasing of equipment and goods locally and indirectly through taxes payable to the Government.

It is proposed that through water management measures to be implemented there would be less negative impacts to the water resources. The strategic importance of the water uses to be authorised also includes:

- Securing jobs and additional job creation in future;
- Contingency of training programmes provided to employees and external learner-ship programmes to improve skills base;
- Support to local economy and national economy with purchasing of services and goods;
- Continued production of gold for the gold industry; and
- Contingency of LED projects in conjunction with local municipality to the benefit and growth of local community.

In terms of the MPRDA, Elandsfontein Colliery must utilise their mineral rights optimally. Failure to do so will mean that they lose custody of these rights and they will be reverted back to the state by the Minister of Mineral Resources.

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

The water quality of the Olifants River system has been documented in the "Development of a Reconciliation Strategy for the Olifants River Water Supply System" (DWA Report No. WMA 04/B50/00/8310/7). The mining and agricultural industry activities in the upper Olifants water management area are the main contributors to poor in-stream and riparian habitat conditions. The water quality in the water management area is generally. considered to be acceptable with a few exceptions. The sulfate levels in the Loskop Dam catchment and Witbank Dam catchment were found to be in an unacceptable range. The high sulphate levels in the area are presumably attributed to the use of ammonium sulphate fertilisers and the mining activities in the area. The electrical conductivity values were also found to be somewhat high, but were still within acceptable levels.

The Olifants WMA is within the Limpopo River Basin which flows from South Africa into Mozambique. Therefore, developments in South Africa impact directly on Mozambique. A Joint Water Commission exists between South Africa and Mozambique facilitates the joint utilisation of the water resources of the Olifants River. International cooperation in terms of use and management of watercourses in the Olifants river basin is currently overseen by the Limpopo Water Course Commission.

Elandsfontein Colliery is committed to sustainable development and has developed a number of policies and plans which informs the environmental management of its operations. Such policies include:

- Hydrocarbon Spillage Response Plan
- Waste Management Plan
- Biodiversity Action Plan.
- Stormwater Management Plan
- Hydrocarbon Management Plan

The execution of these policies through site specific EMPs and monitoring programmes will ensure that any potential contaminates are contained within the boundary of Elandsfontein minimising the impact on the local water resources and environment.

During 2000 a comprehensive ecological Reserve determination was conducted for the Olifants River catchment by IWR Environmental & Afridev Consultants on behalf of the Department of Water Affairs, resulting in resource quality objectives for different segments of the Olifants River (DWA, 2001). Although an ecological Reserve determination includes both in-stream flow assessments, dealing with the quantity of water required, and water quality, only the latter is addressed overleaf for the Witbank Dam catchment.

The Directorate National Water Resource Planning (DNWRP) of the (then) Department of Water Affairs and Forestry (DWAF) developed a water quality management strategy for the Upper and Middle Olifants River catchment, which was published in 2009 (DNWRP, 2009). One of the key elements of this strategy was the development of Resource Water Quality Objectives (RWQO).

Interim RWQO were determined based on the current set of objectives in the Witbank, Klipspruit and Middelburg Dam catchments, which was modified to account for the water quality component of the Ecological Reserve. Where previous objectives were not available, the South African Water Quality Guidelinses together with the present water quality status were used to determine RWQO. The set of RWQO determined are interim objectives that will be reviewed once the water quality component of the Ecological Reserve has been updated (DNWRP, 2009).

There are various standards and objectives in terms of surface water quality, depending on what the end use is to be. Some of these include the Department of Water Affairs (DWA) Domestic Use Guidelines and the SANS 241 Drinking Water specifications. In some cases however there are more specific standards in terms of the catchment itself, as determined by the Catchment Management Agency (CMA).

7.3.11 SECTION 27 (1) (K) THE PROBABLE DURATION OF ANY UNDERTAKING FOR WHICH A WATER USE IS TO BE AUTHORISED

It is anticipated that the project would have a lifespan of 12 years, (2020 to 2032), before it would be decommissioned.

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