mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

CONSULTATION SCOPING REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT AND/OR BULK SAMPLING ACTIVITIES INCLUDING TRENCHING IN CASES OF ALLUVIAL DIAMOND PROSPECTING.

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT: South32 SA Coal Holdings Proprietary Limited: Wolvekrans Colliery

TEL NO: 011 376 2705

FAX NO: 011 376 2160

POSTAL ADDRESS: P.O. Box 61820, Marshalltown

PHYSICAL ADDRESS: 39 Melrose Boulevard, Melrose Arch, Johannesburg

FILE REFERENCE NUMBER SAMRAD: MP30/5/1/2/2/379MR

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3) (b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

OBJECTIVE OF THE SCOPING PROCESS

1) The objective of the scoping process is to, through a consultative process—

(a) identify the relevant policies and legislation relevant to the activity;
(b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
(c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
(d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
(e) identify the key issues to be addressed in the assessment phase;
(f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
(g) identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Report No.: JW206/18/G535-09
October 2018

DOCUMENT APPROVAL RECORD

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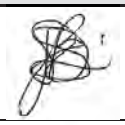
Prepared	Environmental Scientist	J Badenhorst	16 August 2018	
Reviewed	Environmental Scientist	T Hopkins	28 August 2018	
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Abbreviations used in the report:

Abbreviation	Meaning
Al	Aluminium
ASPT	Average score per taxon
BCM	Bank Cubic Metre
BID	Background Information Document
BMC	Blast Management & Consulting
CBA	Critical Biodiversity Area
Cl	Chloride
CO_2	Carbon dioxide
dBA	Descriptor that is used to indicate 10 times a logarithmic ratio of quantities that have the same units, in this case sound pressure that has been A-weighted to simulate human hearing.
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EIS	Ecological Importance and Sensitivity
ELM	eMalahleni Local Municipality
EMPr	Environmental Management Programme
EMPR	Environmental Management Programme Report
ESA	Ecological Support Area
F	Fluoride
Fe	Total Iron
FEPA	Freshwater Ecosystem Priority Area
GDP	Gross Domestic Product
GN	Government Notice
GNR	Government Notice Regulation
HGM	Hydrogeomorphic
I&APs	Interested and Affected Parties
IFC	International Finance Corporation
IHIA	Intermediate Habitat Integrity Assessment

Abbreviation	Meaning
IUCN	International Union for Conservation of Nature
IWULA	Integrated Water Use Licence Application
J&W	Jones & Wagener Engineering and Environmental Consultants
K	Hydraulic conductivity
L_{Aeq}	The A-weighted equivalent sound pressure level, where T indicates the time over which the noise is averaged (calculated or measured) (in dBA)
LoM	Life of mine
m	metre
mamsl	metres above mean sea level
m/s	metre per second
mbs	metre below surface
mg/ℓ	milligram per litre
$mg/m^2/day$	milligram per square metre per day
mm	millimetre
mm/a	millimetre per annum
Mn	Total Manganese
mS/m	milliSiemens per metre
MAE	Mean Annual Evaporation
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MPRDA	Mineral and Petroleum Resources Development Act
MBSP	Mpumalanga Biodiversity Sector Plan
Na	Sodium
No	Number
NDCR	National Dust Control Regulations
NDM	Nkangala District Municipality
NEMA	National Environmental Management Act
NEM:AQA	National Environmental Management Air Quality Act
NEM:BA	National Environmental Management Biodiversity Act
NEM:WA	National Environmental Management Waste Act
NHRA	National Heritage Resources Act
NO_3	Nitrate as N
NOx	Nitrogen oxides
PA	Protected Area
PCD	Pollution control dam

Abbreviation	Meaning
PES	Present Ecological State
PHD	Pulles, Howard and De Lange
PM	Particulate matter
PO_4	Phosphate
RMF	Regional Maximum Flood
RWQ	Resource Water Quality
SAEC	South32 SA Coal Holdings (Pty) Limited
SAHRIS	South African Heritage Resources Information System
SANS	South African National Standards
SASS5	South African Scoring System Version 5
SAWS	South African Weather Service
S&EIR	Scoping and Environmental Impact Report
SCC	Species of conservation concern
SKS	Steenkoolspruit
SO_2	Sulphur dioxide
SO_4	Sulphate
SS	Suspended Solids
T	Transmissivity
TALK	Total Alkalinity
TBC	The Biodiversity Company
TDS	Total Dissolved Solids
TWQR	Target water quality range
µg/ℓ	microgram per litre
VDDC	Vandyksdrift Central
VDDN	Vandyksdrift North
WMLA	Waste management licence application
WUL	Water Use Licence

CONSULTATION SCOPING REPORT

1. INTRODUCTION

South32 SA Coal Holdings (Pty) Ltd (SAEC), is the holder of an amended mining right for coal, granted by the Minister of Mineral Resources, in terms of the Mineral and Petroleum Resources Development Act (MPRDA) and notarially executed on the 21st of May 2015 under Department of Mineral Resources (DMR) reference MP30/5/1/2/2/379MR, in respect of its Wolvekrans Colliery.

Wolvekrans Colliery comprises of the following sections:

- Wolvekrans North Section (now referred to as Ifalethu Colliery) consisting of the Hartbeestfontein, Bankfontein (mining now ceased), Goedehoop, Klipfontein sections and the North Processing Plant. This was previously known as Middelburg Colliery; and
- Wolvekrans South Section (now referred to as Wolvekrans Colliery[1]) consisting of the Wolvekrans, Vlaklaagte (mining ceased), Driefontein, Boschmanskrans, Vandyksdrift, Albion, Steenkoolspruit sections and South Processing Plants (Eskom and Export). This was previously known as Douglas Colliery.

The Vandyksdrift Central (VDDC) area falls within the footprint of historic underground mining operations at the old Douglas Colliery. In 2007, an amendment of the Environmental Management Programme Report (EMPR) for the Douglas Colliery operations was approved, to allow the opencast mining of the remaining No. 5, No. 4, No. 2 and No. 1 seams. The opencast mining operations include the extraction of the remaining pillars, as well as roof and floor extraction (Jaco-K Consulting, 2016(a)). Authorisation of the VDDC mining project included the following:

- Opencast operation on the farm Kleinkopje 15 IS;
- Opencast operation on the farm Steenkoolspruit 18 IS;
- Pillar extraction operation on the farm Vandyksdrift 19 IS;
- Reclamation of existing slurry ponds; and
- Rewashing of existing discard dumps (PHD, 2006).

The water uses associated with the opencast mining has been authorised in terms of water use licence (WUL) number 24084535 dated 10 October 2008.

The No. 2 seam workings are flooded with water and has to be dewatered to enable the open pit development to proceed. A dewatering strategy has therefore been developed and an application for Environmental Authorisation (EA) of the dewatering activities has been submitted to the Department of Mineral Resources (DMR) (Jaco-K Consulting, 2016(a)). The water use activities associated with the dewatering strategy have been authorised by WUL number 06/B11F/GCIJ/7943 dated 19 July 2018.

The 2007 approved EMPR Amendment did not include any additional infrastructure in support of the opencast mining operations as it was assumed at that stage that existing infrastructure will be used. In addition, the applications for authorisation of the activities associated with the dewatering strategy, were limited to the infrastructure to facilitate

[1] Note: For the purpose of this report, Wolvekrans Colliery refers to the entire mining area within MP30/5/1/2/2/379MR, i.e. Wolvekrans North/Ifalethu Colliery and Wolvekrans South/Wolvekrans Colliery

dewatering (i.e. dewatering boreholes, pumps, pipelines, storage tanks, mechanical evaporators, roads and power lines).

A pre-feasibility investigation has since been conducted, and the need has been identified to develop additional infrastructure to support the proposed opencast mining. The departure was to use existing facilities as far as possible, since this is a brownfield development.

Jones & Wagener Engineering and Environmental Consultants (Pty) Ltd (J&W) has been appointed by SAEC as an independent Environmental Assessment Practitioner (EAP) to undertake an Integrated Regulatory Process to obtain the required approvals/authorisations for the required infrastructure development to enable SAEC to continue with opencast mining at VDDC.

2. CONTACT PERSON AND CORRESPONDENCE ADDRESS

2.1 Details of the EAP who prepared the report

Name of the Practitioner:	Tolmay Hopkins / Jessica Badenhorst
Tel No:	011 519 0200
Fax No:	011 519 0201
e-mail address:	tolmay@jaws.co.za / jessica@jaws.co.za

2.2 Expertise of the EAP

2.2.1 The qualifications of the EAP

(With evidence attached as Appendix 1)

Tolmay Hopkins:

- MSc (Agric) Microbiology (University of Pretoria)
- Registered Professional Natural Scientist (Pr.Sci.Nat.) 400322/14
- Member of Institute of Waste Management South Africa (IWMSA)
- Member of International Association for Impact Assessment South African Affiliate (IAIAsa).

Jessica Badenhorst:

- MSc Entomology (University of Pretoria)
- Member of International Association for Impact Assessment South African Affiliate (IAIAsa)
- Member of Land Rehabilitation Society of South Africa (LaRSSA).

2.2.2 Summary of the EAP's past experience

(Attach the EAP's curriculum vitae as Appendix 1)

Tolmay Hopkins has over 16 years' experience in the field of environmental management, in both the regulatory and the consulting field. While at the then called Department of Water Affairs and Forestry, she was responsible for the review of

numerous impact assessments and applications. She has been involved in the authorisation and regulation of waste disposal sites and was responsible for the authorisation of four hazardous and 23 general waste disposal sites. She was involved in the assessment of water use licence applications for the impeding, altering, diverting and changing of the characteristics of a watercourse, as well as for stream flow reduction activities (afforestation) in the Mpumalanga Province in terms of the National Water Act, 1998 (Act 36 of 1998).

In her capacity as consulting environmental scientist, she has been involved in the compilation of more than 20 applications for authorisations in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and its Regulations, the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) and the National Water Act, 1998 (Act 36 of 1998) and its Regulations.

Jessica Badenhorst has approximately one-year experience in environmental management, mostly being involved in mine closure planning in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) Financial Provision Regulations (GNR 1147 and proposed regulations GNR 1228), as well as environmental- and water use licence auditing.

3. DESCRIPTION OF THE PROPERTY

Table 3-1: Property details

Farm Name:	Kleinkopje 15 IS, Steenkoolspruit 18 IS, Vandyksdrift 19 IS and Wolvekrans 17 IS
Application area (Ha)	Approximately 1 400 ha
Magisterial district:	eMalahleni Local Municipality within Nkangala District Municipality
Distance and direction from nearest town	28 km south-east of eMalahleni
21 digit surveyor General Code for each farm portion	Kleinkopje 15 IS: Ptn 9: T0IS0000000000150009 Ptn 14: T0IS0000000000150014 Ptn 4: T0IS0000000000150004 Steenkoolspruit 18 IS: Ptn 2: T0IS0000000000180002 Ptn 5: T0IS0000000000180005 Vandyksdrift 19 IS: RE of Ptn 3: T0IS0000000000190003 Ptn 9: T0IS0000000000190009 Ptn 10: T0IS0000000000190010 Ptn 11: T0IS0000000000190011 Wolvekrans 17 IS: Ptn 6: T0IS0000000000170006 Ptn 10: T0IS0000000000170010 Remaining Extent: T0IS0000000000170000 Ptn 35: T0IS0000000000170035

Further details on properties and property ownership is provided in Section 3.2.

3.1 Locality map

(Show nearest town, scale not smaller than 1:250000 attached as **Appendix 3**)

Wolvekrans Colliery is located approximately 28 km south-east of the town of eMalahleni, within the Nkangala District Municipality. A locality map is provided in **Figure 3-1,** with a large-scale map provided in **Appendix 3**.

3.2 Property and property ownership

Detail of the properties affected by the proposed development is provided in **Table 3-2**, and illustrated on **Figure 3-2**.

Table 3-2: Details of properties affected by proposed development

Farm name	Portion	Property owner	Title deed number
Kleinkopje 15 IS	Ptn 9	Anglo Operations (Pty) Limited	T35745/1974
	Ptn 14	Anglo Operations (Pty) Limited	T27780/1977
	Ptn 4	Ingwe Surface Holdings Ltd	T76581/1999
Steenkoolspruit 18 IS	Ptn 2	Ingwe Surface Holdings Ltd	T76581/1999
	Ptn 5	Ingwe Surface Holdings Ltd	T76581/1999
Vandyksdrift 19 IS	RE of Ptn 3	Ingwe Surface Holdings Ltd	T76548/1999
	Ptn 9	Ingwe Surface Holdings Ltd	T76547/1999
	Ptn 10	Ingwe Surface Holdings Ltd	T76547/1999
	Ptn 11	Ingwe Surface Holdings Ltd	T76547/1999
Wolvekrans 17 IS	Ptn 6	Ingwe Surface Holdings Ltd	T76586/1999
	Ptn 10	Ingwe Surface Holdings Ltd	T76554/1999
	Ptn 35	Ingwe Surface Holdings Ltd	T76587/1999
	RE	Ingwe Surface Holdings Ltd	T76586/1999

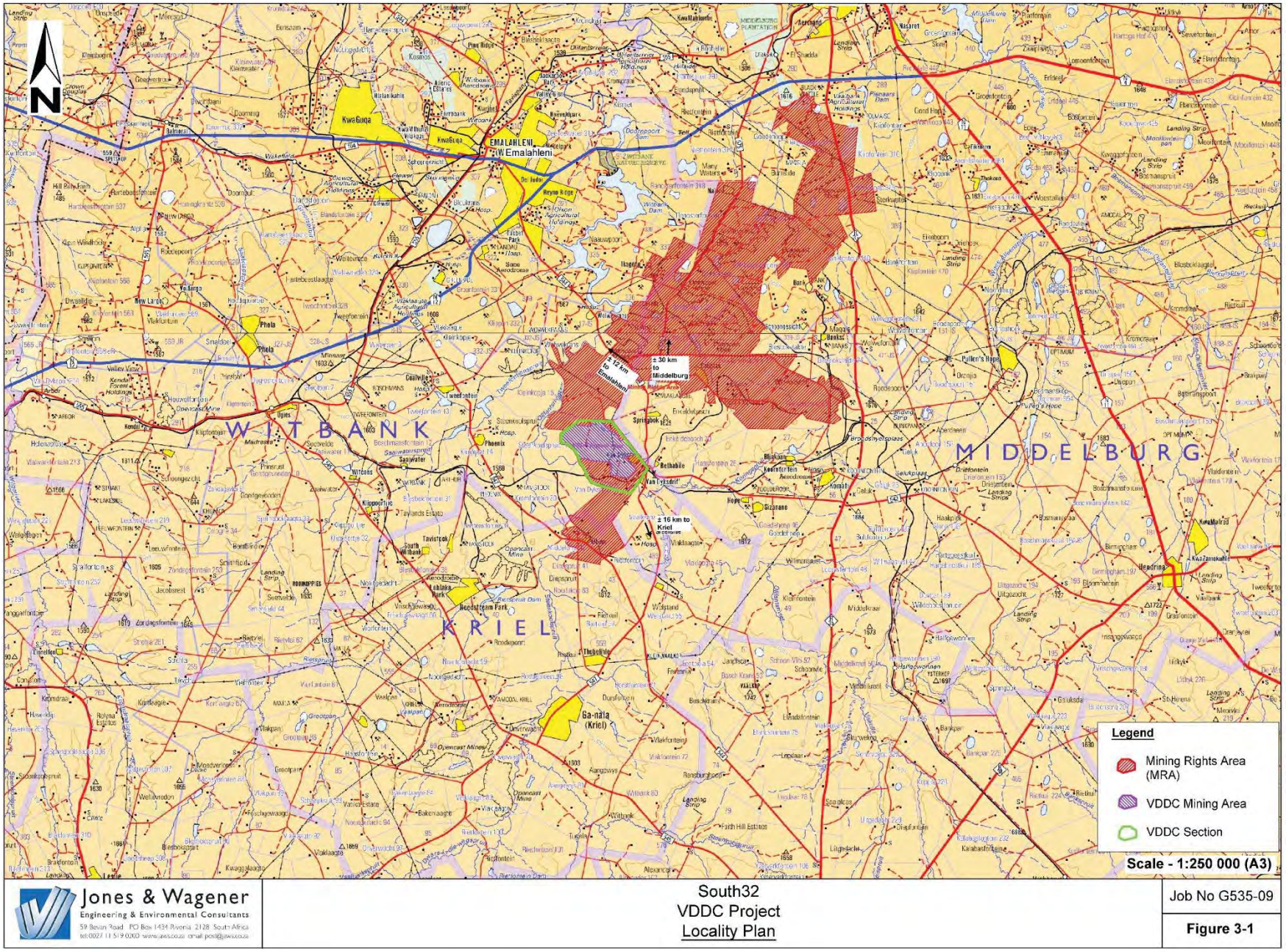


Figure 3-1: Locality map of the VDDC project area

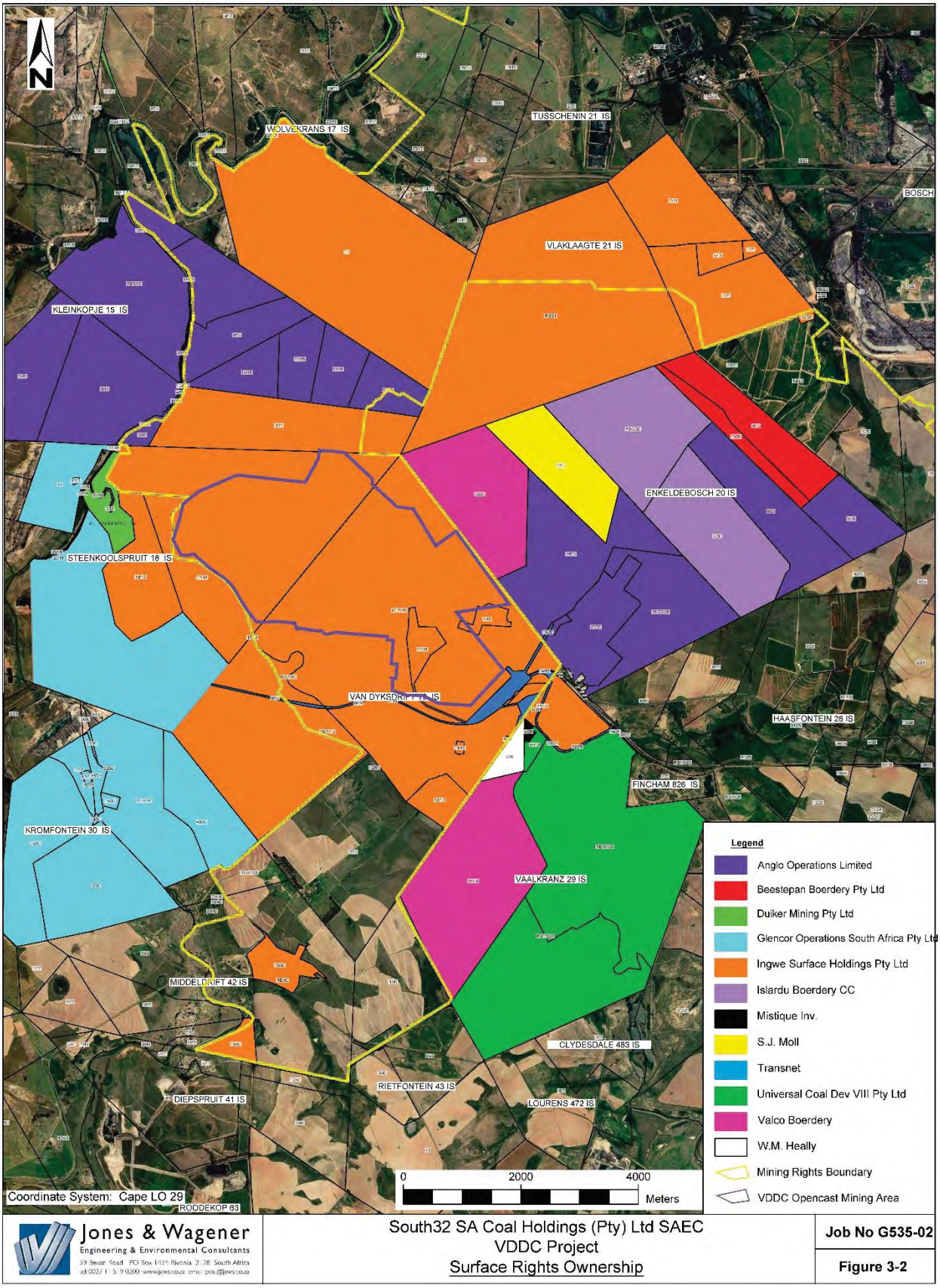


Figure 3-2: **Map showing property ownership of project area and surrounding areas**

4. DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

4.1 Listed and specified activities

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site and attach as Appendix 4

A list of activities to be undertaken as part of the proposed infrastructure development is provided in **Table 4-1** and shown on **Figure 4-3**. A large-scale map is provided in Appendix 4.

Table 4-1: Listed and specified activities

NAME OF ACTIVITY	AERIAL EXTENT OF ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
(All activities including activities not listed) (E.g. excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and Boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	ha or m^2	Mark with an X where applicable or affected	GNR 544, GNR 545 or GNR 546 / NOT LISTED[2]
Clearing of vegetation for the purpose of infrastructure development (including contractors lay-down areas and infrastructure areas)	~ 175 ha	X	GNR 325 of 2017: Activity 15
Infrastructure development in close proximity to watercourses: - New pollution control dam - Explosives magazine - Clean water pipeline	~ 7 ha ~ 1 ha	X	GNR 327 of 2017: Activity 12
Infilling/depositing/excavation/removal or moving of soil of more than 10 m^3 from watercourse as a result of infrastructure development in close proximity to watercourses		X	GNR 327 of 2017: Activity 19
Dirty water pipelines (600 mm diameter) in excess of 1 000 m in length		X	GNR 327 of 2017: Activity 10
Clean water diversion pipeline / canals in excess of 1 000 m in length		X	GNR 327 of 2017: Activity 9
Activities requiring a water use licence:		X	GNR 325 of 2017: Activity 6
• ROM Stockpile	~ 9 ha		
• Temporary ROM stockpile	~ 8 ha		
• Dust suppression using mine impacted water	Within the extent of the mining area		

[2] GNR544 to GNR 546 has been superseded by GNR 326 to GNR 328

NAME OF ACTIVITY	AERIAL EXTENT OF ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
• Pollution control dam	~ 9 ha		
• Boxcut spoils dumps	~ 55 ha		
• Overburden Dump 1	~ 22 ha		
• Overburden Dump 2	~ 55 ha		
• Overburden Dump at SKS Void	~ 110 ha		
• Slurry paddocks and day area with associated return water dam	~ 27 ha		
New haul roads and service roads		X	GNR 327 of 2017: Activity 24(ii)
Upgrade of existing roads		X	GNR 325 of 2017: Activity 56
Topsoil stockpiles	~ 55 ha		
Mechanical evaporators at Steenkoolspruit Pit as part of dirty water management measures			

4.2 Description of the activities to be undertaken

(Describe Methodology or technology to be employed, and for a linear activity, a description of the route of the activity)

4.2.1 Historical activities and activities already authorised

The VDDC area falls within the footprint of historic underground mining operations known as Douglas Colliery. Mining activities at the Douglas Colliery was described in detail in an EMPR compiled by Jasper Muller and Associates in 2000, and subsequently approved by the (then) Department of Minerals and Energy in 2003. The 2003 EMPR included the past and (at that stage) current mining operations and associated infrastructure, including the Vandyksdrift Plant, PSS and LAC discard dumps, slurry dams; coal stockpile, a number of pollution control dams (PCDs), as well as workshops, maintenance and engineering buildings.

In 2007, an amendment of the Environmental Management Programme Report (EMPR) for the Douglas Colliery operations was approved in 2007, to allow the opencast mining of the remaining No. 5, No. 4, No. 2 and No. 1 seams. Authorisation of the VDDC mining project included the following:

- Opencast operation on the farm Kleinkopje 15 IS;
- Opencast operation on the farm Steenkoolspruit 18 IS;
- Pillar extraction operation on the farm Vandyksdrift 19 IS;
- Reclamation of existing slurry ponds; and
- Rewashing of existing discard dumps (PHD, 2006).

The area included in the approved EMPR and EMPR Amendment is indicated in **Figure 4-1**. This includes the mining areas as well as infrastructure such as clean and dirty water management systems, haul roads and conveyors.

The majority of the historical underground No. 2 seam workings is flooded because of water ingress from both surface and underground aquifers. In order to mine the VDDC reserve, the water contained in the mined out underground workings must be removed prior to mining. This will be achieved by drilling a number of boreholes into the old underground workings and to abstract the water via these boreholes.

Water will be pumped from the boreholes accessing different underground compartments and will be transferred via borehole connector pipelines to a number of water storage/transfer tanks. From there, the water will be transferred via the main connector pipelines to the Vleishaft Dam and/or directly to the evaporation tanks that will be located at the evaporation sites where water will be evaporated using mechanical evaporators. Three evaporators sites have been identified (5 Seam void, Vleishaft Dam and Vlaklaagte Void). In addition, some water will be pumped and stored in the Steenkoolspruit Pit void once the pit is mined out (Jaco-K Consulting, 2016).

The No. 2 Seam dewatering infrastructure lay-out is shown on **Figure 4-2**. An application for the EA of the dewatering activities has been submitted to the DMR and their final decision is awaited.

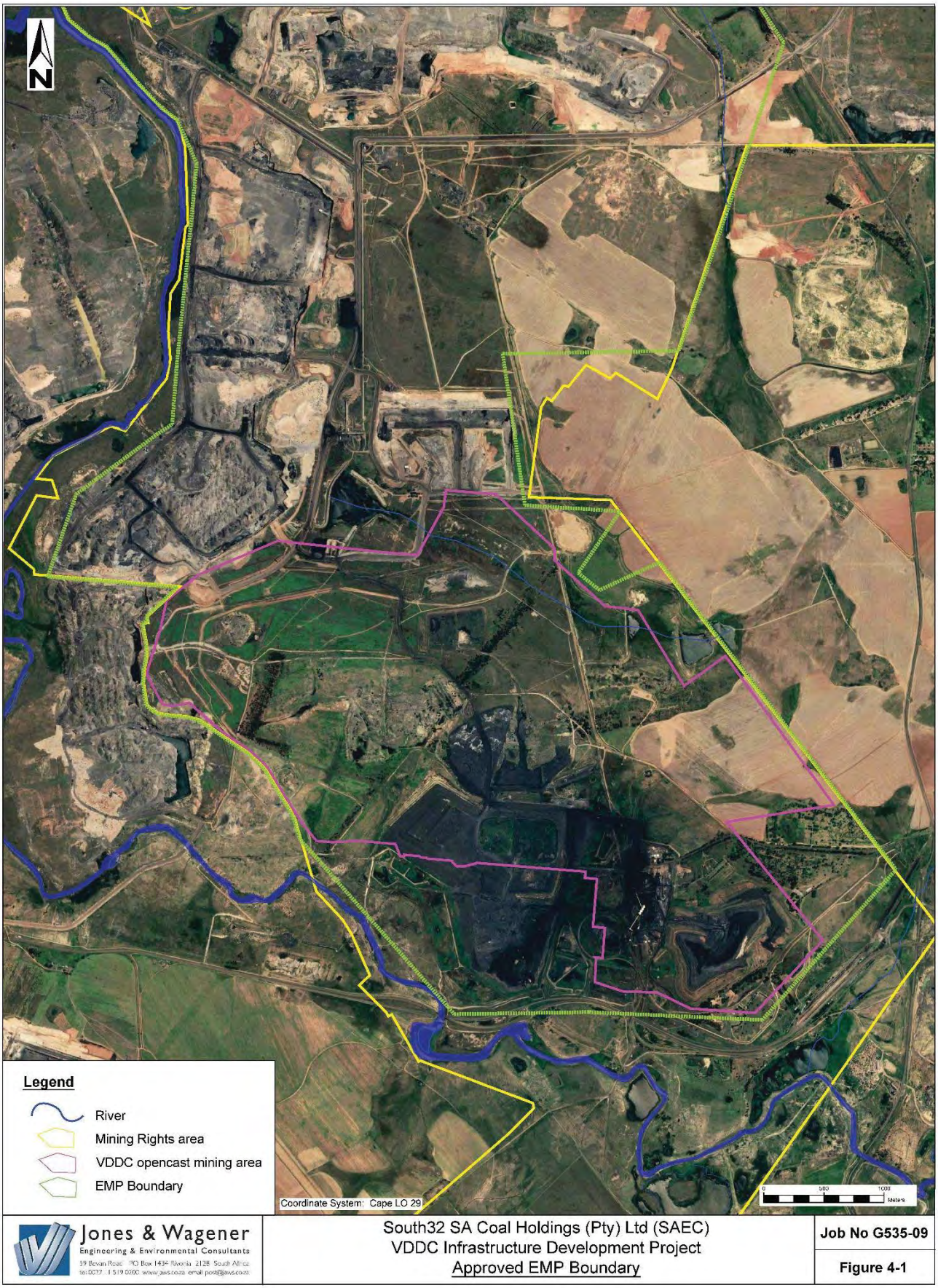


Figure 4-1: Map showing approved EMP boundary

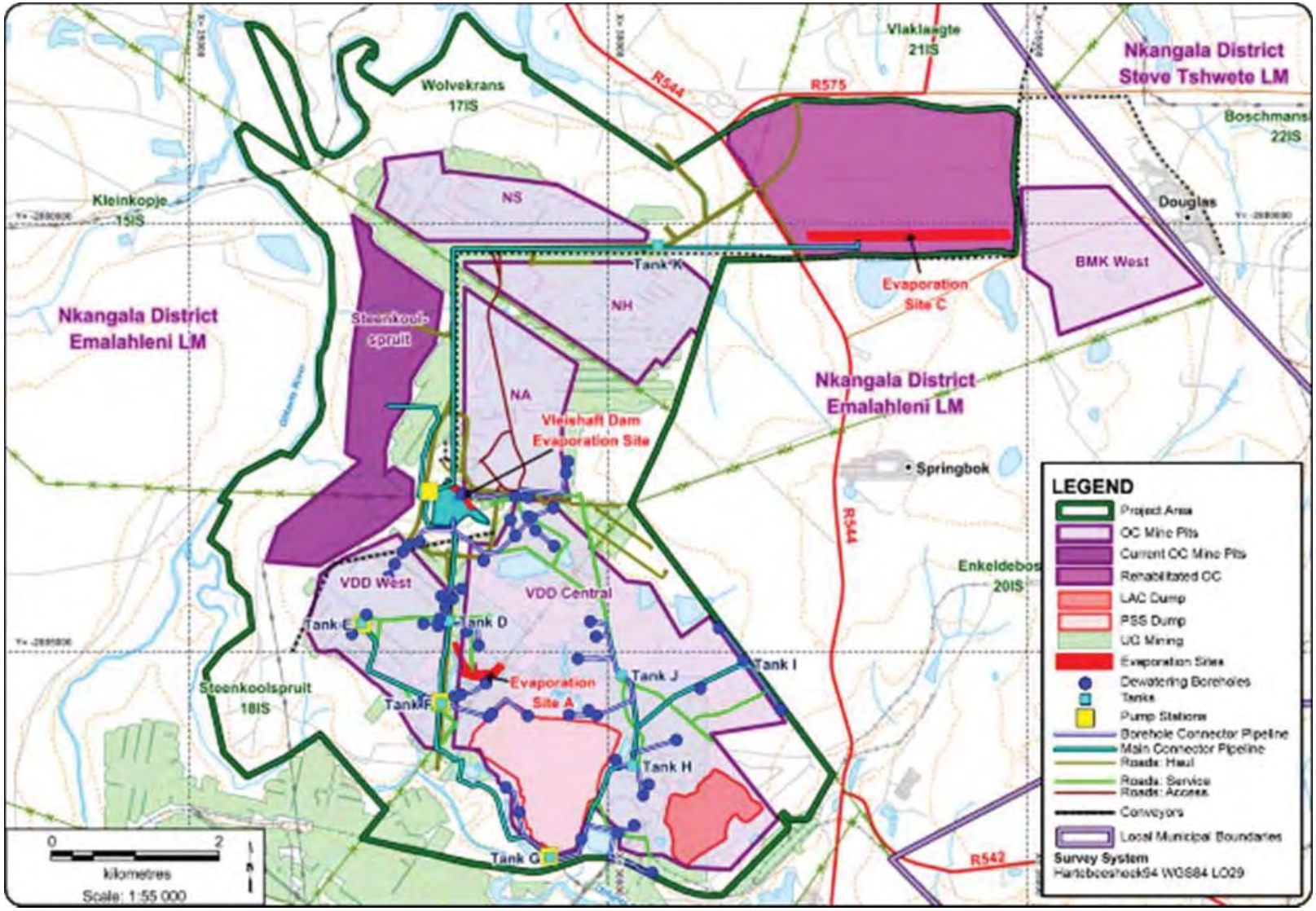


Figure 4-2: No. 2 Seam Dewatering Infrastructure Layout (Jaco-K Consulting, 2016)

4.2.2 Project description (proposed activities)

A description of the infrastructure required in support of the VDDC opencast mining is provided below and shown on **Figure 4-3**. A large-scale map is provided in **Appendix 4**.

4.2.2.1. Topsoil dumps

The topsoil excavated from the box cut areas and areas cleared for the development of infrastructure will be relocated within a topsoil stockpile to be located adjacent to the existing topsoil stockpile area in the east of the project area.

The box cut topsoil will be stockpiled due to the lack of direct placement option at the start of the opencast mining operations. The expected volume of topsoil for the box cut area is 1 469 984 Bank Cubic Metre (BCM) (SAEC, 2017a).

4.2.2.2. Overburden dumps

It is estimated that a volume of 847 million BCM of topsoil and overburden will be excavated over the life of mine. Initial stockpiling of the waste material will be necessary.

The boxcut will be done using a combination of dragline and truck and shovel. Overburden from the boxcut will be placed on four overburden dumps located in between the proposed ramps.

Provision has been made for three overburden dumps. The new Waste Rock Dumps 1 and 2 will be developed and the existing overburden dump at the SKS pit will also be used.

Upon steady state mining being achieved, rehabilitation activities can commence safely behind the active dynamic window of operations and the in-pit backfilling of overburden can advance. As the mine pits expand, there will be more opportunity to excavate overburden and apply it directly to re-contoured areas, thus avoiding stockpiling. It has been assumed that overburden stockpiling will be done for the first two years of the life of mine and that direct placement will commence from 2021 when sufficient placement areas are available (SAEC, 2017a).

4.2.2.3. Final rejects dump

Final rejects will be placed on the southern portion of the existing PSS dump. Coal reserves in this area will therefore be sterilised.

4.2.2.4. Slurry ponds and day area

An area of the underground No. 2 Seam was historically used for placement of slurry from the processing plant. It is believed to be contained in the southeast portion of the deposit by underground seals and barrier pillars. The expected slurry footprint is indicated in **Figure 4-4**.

Initially, the slurry will be mined with the ROM coal and the blended coal and slurry will be transferred to the processing plant. If this is not effective, slurry pumped from the underground workings will be stockpiled in new slurry ponds to be developed to the north of the boxcut. The slurry will be allowed to dewater for a period of approximately 20 days, before it is removed to the SKS tip. Water will be collected in a return water dam, from where it will be conveyed to the Vleishaft Dam or the SKS pit.

Processing of the slurry at the existing South Plant may require changes to the processing plant. This, however, falls outside of this application process. Options for the potential re-sale of the dewatered slurry will also be investigated.

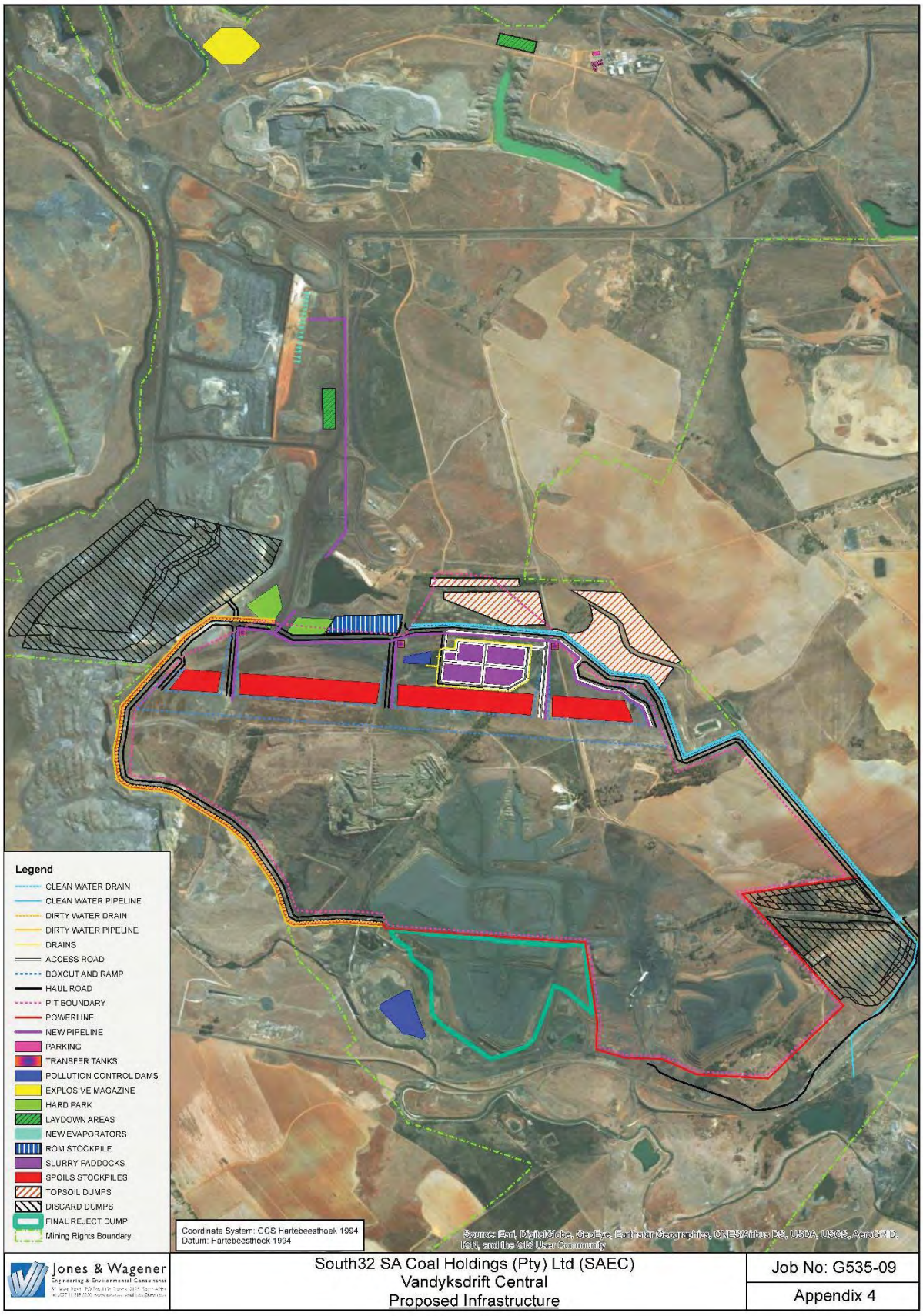


Figure 4-3: Proposed infrastructure

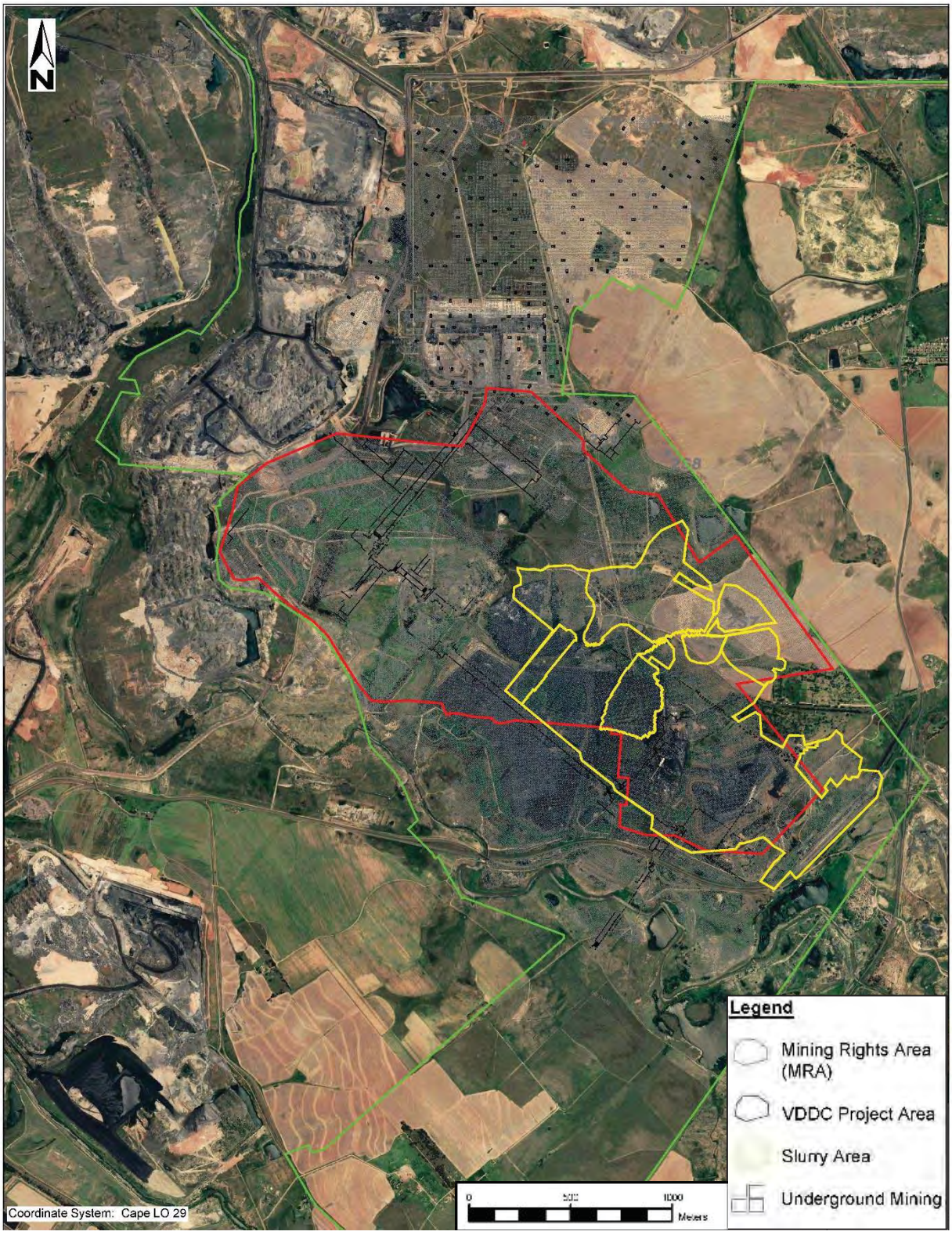


Figure 4-4: Expected slurry footprint area (SAEC, 2017a)

4.2.2.5. ROM stockpile

An existing Run of Mine (ROM) coal stockpile to the south of the existing Vleishaft Dam will be extended further east to accommodate ROM coal.

Coal from the No. 5 Seam will not be transported to the processing plant and approximately 1.5 million tons of ROM coal will require stockpiling. A temporary coal stockpile (unlined) will be developed on the area to be opencast mined for this purpose.

4.2.2.6. Power supply and reticulation

The VDDC section is supplied from Eskom's Klein 132 kV Substation, which feeds the DMO Klein Olifant 132 kV Substation. The voltage is stepped down to 22 kV via two 20 MVA power transformers feeding the 22 kV switchgear located in the Klein Olifant Substation (SAEC, 2017b).

Currently there is spare capacity available at Klein Olifant Substation for future developments. This spare capacity is, however, not sufficient to accommodate the Dewatering Project and the VDDC project and upgrades will be required to accommodate future loads. This may include a new feeder and an interconnection between the two existing feeders (SAEC, 2017b).

4.2.2.7. Water consumption requirements

The water consumption requirements for the VDDC mining project is as follows:

- Potable water for human consumption or use in restrooms will be adequately catered for by the existing potable water supply existing at the SKS complex;
- Wash water for wash-down, either of vehicles, workshops or conveyor bunds. The water make from the upfront No. 2 Seam dewatering makes this a water positive operation. Therefore, the required volumes of process water and service water are adequately catered for. Wash water reticulation will be required to the new workshops at the SKS Complex and wash water will be provided from the existing pollution control dam at the complex;
- Water for dust suppression on bulk materials handling systems will be sourced from mine impacted water, i.e. the Vleishaft Dam;
- Water for dust suppression on haul roads will be sourced from pit water;
- Fire water supplies are required at the extensions to the existing workshops at the SKS complex and will be taken from the existing fire water network;
- Sewerage reticulation will be required at the extensions to the existing workshops at the SKS complex and will tie into the existing network (SAEC, 2017b).

4.2.2.8. Management of mine impacted water

The proposed mining operations require the management of mine impacted water. Areas that have been identified and included in the water management strategy are:

- Proposed pit;
- Slurry ponds and day area;
- Overburden dumps;
- Proposed Earth Moving Equipment (EME) hardstand and wash bay;

- Extension to workshops at SKS Complex.

In-pit pumping

In order to manage the inflow of water into the mining operations, sumps will be constructed in the pit floor where the water will be collected at the bottom of the pit (at lowest points) and pumped out of the pit. These temporary sumps are to be situated at the bottom of each access ramp and the piping is to be routed in a berm servitude on the side of the access ramp, up to transfer tanks situated at the top of the ramp. Once the water reaches the transfer tanks, it will join the polluted water management system.

Water will be pumped from the pit with self-priming diesel driven pumps mounted on trailers or skids to allow for easy movement (SAEC, 2017a).

Pollution Control Dam

Options under consideration for the management of mine impacted water include the development of a new PCD. The dam will be located to the southwest between the existing PSS dump and the Olifants River, with an estimated capacity of 200 000 m^3, and will be equipped with a Class C liner. Water will be pumped from the PCD to the Vleishaft Dam (SAEC, 2017b).

Due to the proximity of the PCD to the Olifants River and the cost associated with its development, the following alternatives under investigation include:

- Convey mine impacted water to the SKS void, without the need for a PCD. The SKS void has an estimated capacity of approximately 8.8 million m^3, with the required capacity for the storage of water from the dewatering project at approximately 6.3 million m^3;
- Upgrade the existing Bob Henry dam to a lined PCD, which will feed into the existing dirty water management system.

Slurry ponds and day area

Mine impacted water from the slurry ponds and day area, will be collected in a return water dam, from where water will be pumped to the Vleishaft Dam, or re-used.

Pipelines and pump stations

If a main PCD is developed, polluted water pipelines are required to convey polluted water from the transfer dams to the PCD. A single 600 mm diameter collecting pipeline from the dams to the inlet of the PCD has been provided. A further 600 mm diameter pipeline will convey water from the PCD to the SKS void.

Pump stations (enclosed buildings) will be developed at all the transfer dams and at the PCD to enable the pumping of water to and from these facilities.

Drains

Pollution control drains are required at the day area and at the additional workshops at SKS complex for the management of polluted water runoff. Pollution control drains will be concrete lined (SAEC, 2017b).

Oil traps

Reinforced concrete oil traps are to be constructed downstream from the workshops and vehicle wash bays, where spilled oil from maintenance operations are washed from workshop floors, or at the refuelling and fuel storage areas, as well as areas where lubricants are stored, or regularly applied and possibly spilled.

The oil traps are combined with an oil skimmer and lamella-type oil separator and oil will be collected in drums positioned alongside the separators for safe disposal (SAEC, 2017b).

Mechanical evaporation

An evaporation station consisting of 18 mechanical evaporators, 12 of which would have been used for the Dewatering Project, with an expected throughput of 36 m^3/day is included in the proposed project for the management of excess water on the mine. This will be done at the SKS void (SAEC, 2017b).

4.2.2.9. Dust Suppression

Dust on haul roads will be controlled using water bowsers. Bowsers will fill up at filling stations that will be located in close proximity to VDDC pit.

4.2.2.10. Clean water management

Clean run-off water from the farm land to the east of the VDDC mining area will be diverted away from the mining areas so that it will not become contaminated by the mining operations.

A clean water diversion pipeline (450 mm diameter) is required from the existing clean water diversion dam to the Olifants River.

A pump station will be developed for the pumping of clean water from the existing storm water diversion dam to the Olifants River. The pump station is an enclosed building to curb the theft of cabling and equipment.

Sections of concrete lined drains will be established where high water velocities are expected in clean water drains. Unlined drains will be established for the diversion of surface water runoff from the site to various natural watercourses (SAEC, 2017b).

4.2.2.11. New roads

New roads required for the VDDC project include:

- Temporary high wall roads and dragline walkways which will be re-established as mining progresses;
- Earth Moving Equipment (EME) haul roads (40 m width) from the bottom of box cut ramps to the existing haul roads;
- Re-instatement of the underpass below the R545 road;

- Additional maintenance/service and access roads within the VDDC project area from the existing infrastructure to the box-cut (SAEC, 2017b).

4.2.2.12. Brake Test Ramp

A brake test ramp is provided for EME traffic. The brake test ramp is positioned such that all vehicles will need to traverse the ramp before entering the pit areas (or existing hard-park areas). The ramp has been designed to enable the longest expected vehicle entering the mining areas to stop on the inclined sections, with both axles or all wheels. The incline sections are to the steepest recommended grade of these vehicles or to the incline of the ramps to the pits.

A recovery ramp is the preferred means of depleting kinetic energy in out-of-control vehicles that were shown to have defective brakes, as this allows the vehicles to be quickly and easily recovered and allows the use of the brake test facility to be resumed in the shortest possible time.

In-pit vehicle ramps are of similar construction to the remainder of the haul roads including safety berms. Side embankments to the brake test ramp will be grassed (SAEC, 2017b).

4.2.2.13. EME Hard park areas

The construction of the hard park terrace may require in-situ improvement of sub-soil conditions by the importation of rock fill to facilitate suitable founding for the layer works.

The hard-park includes concrete lined perimeter drains that convey polluted water runoff (primarily polluted with silt) to a pollution control dam (SAEC, 2017b).

4.2.2.14. Other supporting infrastructure

The remainder of the supporting infrastructure is mostly catered for by the existing SKS complex facilities. Existing change houses, stores facilities, office facilities, tracked vehicle workshops, LDV workshops will be used. Changes are limited to the extension of the existing EME workshop and the addition of a new 793 workshop to cater for the greater number of equipment associated with the proposed opencast mining operation (see below).

No additional fuel or lube storage area, servicing bays or tyre bays are required.

The existing FLAC station at VDDN will be refurbished (i.e. steelwork and sheeting to be replaced) and equipped with a fuel bowser refilling slab (not roofed) outside of the existing structure. The slab includes for bund walls and silt and oil separation facilities. Drains will tie in with the existing drainage system (SAEC, 2017b).

793 Workshop

A new, four bays 793 workshop will be established south of the existing EME workshop at the SKS complex. It consists of an industrial building of approximately 1 100 m² with an adjoining facilities area in brick construction, with overhead traveling crane access. The offices and facilities area comprises toilets, stores, and various rooms for offices and meeting purposes. Outside aprons are extended to enable a further eight vehicles to be partially parked on the apron for maintenance activities.

“Megadoor” flexible curtain doors have been allowed at all large openings to the building.

The construction of the workshop terrace may require in-situ improvement of foundations by the importation of rock fill to facilitate suitable founding of this structure so as to avoid

undue settlement of the loaded foundations. The terrace includes concrete lined perimeter drains that convey polluted water runoff (primarily polluted with silt) to the existing pollution control drainage system and pollution control dam at SKS Complex (SAEC, 2017b).

EME Workshop

A new two bays EME workshop is to be established alongside the existing EME workshop at the SKS complex essentially extending (or enlarging) this facility. It consists of an industrial building of approximately 550 m² with an adjoining facilities area in brick construction, with overhead traveling crane access. The offices and facilities area comprises toilets, stores, and various rooms for offices and meeting purposes. Outside aprons are extended to enable a further four vehicles to be partially parked on the apron for maintenance activities.

"Megadoor" flexible curtain doors have been allowed at all large openings to the building.

Terrace construction for this workshop is the same as for the 793 workshop (SAEC, 2017b).

EME Wash Bay

A new EME wash bay facility will be constructed to the north of the pit, in the vicinity of the VDDN FLAC station.

The wash bay will be a drive through facility with wind covers on the sides. The wash bay also includes steel elevated walkways to enable the washing of higher vehicles. These elevated walkways will be equipped with rail mounted water guns. Water supplies for the wash bay includes high pressure pump systems and water recycling equipment and the top-up supply will be taken from the nearby VDDN supplies.

The wash bay has a dedicated silt and oil trap and water overflowing from the oil trap will be conveyed to the pollution control dam. A lamella oil separator will be provided at the oil trap facility where the water will be pumped from the trap to the separator. Post desilting and oil separation, the water will be pumped to the water recycling equipment. Overflow water from this facility will be pumped to the nearest pollution control drain (SAEC, 2017b).

4.2.2.15. Access control and security fencing

Access control will be provided for the larger mining area. A security trench will be provided on the perimeter, which will be 1.5 m wide and 3 m deep.

Critical areas will be provided with a security fence (flat wrap and diamond mesh fences) such as dams, hard parks and storage areas in the mine infrastructure area.

Triple security fencing will be provided at the contractor laydown areas, the substation buildings and the explosives magazine. Triple fencing includes a triple barrier of 2.4 m high clear mesh, electric and normal security fencing. Electric fencing is connected to the local security system (SAEC, 2017b).

4.2.2.16. Temporary facilities

Minimal temporary facilities are required for the execution of the VDDC construction activities and provision has been made for two contractor laydown areas.

The construction contractors will be executing the following work from these sites namely:

- Site clearance;
- Demolitions (which include existing offices, a small water treatment facility and an explosives magazine);
- Power line relocations;
- Laydown areas;
- Fencing
    - Site security fencing;
    - Safety fencing;
- Temporary roads, power and water;
- Site communications;
- Construction Sundries
    - Construction Security & Access Control;
    - Weather Station;
    - Fire Breaks;
    - Waste and Sewage Management;
    - Borrow Pits;
    - Demarcation and Signage;
    - Blast Monitoring.

During mining operations, mining will progress through areas where currently operating processing infrastructure is established. It has been assumed that these facilities will be decommissioned and demolished as part of those operations' closing plan.

4.2.3 Project phases

The project phases associated with the proposed VDDC infrastructure development project, are described below.

Planning Phase

During the planning phase, the proposed project options are conceptualised. This includes undertaking preliminary/conceptual and detail designs of the proposed infrastructure development, environmental screening, specialist environmental baseline investigations and the application for the required Environmental Authorisation and WUL.

Construction Phase

Once the relevant authorisations have been received, construction activities will commence. This involves the establishment of the facilities and infrastructure as specified in **Table 4-1**. Activities to be undertaken that may impact the baseline environment include general construction activities such as civil works, movement of materials and equipment; and servicing of construction vehicles and equipment.

Rehabilitation of any surrounding areas impacted by the construction of infrastructure components must occur immediately after the construction thereof.

Operational Phase

The infrastructure will be utilised during this phase when mining commences. Topsoil stripping will be conducted, and topsoil stockpiles will be placed separately for use during rehabilitation. Boxcut spoils dumps will be established, and overburden will be stripped and stockpiled following blasting. Coal will be extracted and transported to the ROM stockpile. Mine-affected water will be collected and managed as described above.

The operational phase ends when the last reserves have been extracted.

Decommissioning Phase

The period directly after cessation of operational activities (i.e. when the last mineral reserve has been extracted). It includes the removal of all operation-related equipment that has no beneficial re-use potential, as well as reclamation, rehabilitation and/or restoration of any final remaining areas (e.g. backfilling of final ramps and voids, landform shaping, topsoiling and seeding.

Closure Phase

The point in time when all decommissioning and rehabilitation activities have ceased, monitoring has been completed and the mine applies for a closure certificate.

5. POLICY AND LEGISLATIVE CONTEXT

The environmental applications foreseen include:

- Application for Environmental Authorisation through a Scoping and Environmental Impact Reporting (S&EIR) process and the compilation of an Environmental Management Programme (EMPr) in terms of the National Environmental Management Act, 1998 (Act 107 of 1998; NEMA) and its Regulations;
- Waste Management Licence Application (WMLA) in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008; NEM:WA); and
- Integrated Water Use Licence Application (IWULA) in terms of the National Water Act, 1998 (Act 36 of 1998; NWA), including an Integrated Water and Waste Management Plan (IWWMP).

The first two requirements outlined above, will be addressed in an Integrated Environmental Authorisation as allowed for in Section 24L of NEMA and Section 25(3) of GNR 326.

A Phase 1 Heritage Impact Assessment in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999, NHRA) will also be undertaken.

Details on the legislation applicable to the proposed infrastructure development, as well as policies and guidelines used, is summarised in **Table 5-1**.

Table 5-1: Applicable legislation

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	REFERENCE WHERE APPLIED
LEGISLATION	
National Environmental Management Act (No. 107 of 1998)	10.1.1
Government Notice Regulation (GNR) 324 to 327 dated 7 April 2017: Environmental Impact Assessment Regulations 2014	4.1
The National Heritage Resources Act (No. 25 of 1999)	10.1.1.15
National Environmental Management: Air Quality Act (Act No.39 of 2004)	10.1.1.14
GNR 827 dated 1 November 2013: National Dust Control Regulations	10.1.1.14
National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) (NEM:BA)	10.1.1.6, 10.1.1.9, 10.1.1.10, and 10.1.1.7
National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003) (NEM:PAA)	10.1.1.10
Environmental Conservation Act, 1989 (Act no. 73 of 1989) (ECA)	10.1.1.9 and 10.1.1.10
National Water Act, 1998 (Act 36 of 1998)	10.1.1.5, 10.1.1.6, and 0
GNR 704 dated June 1999 in terms of the NWA: Regulations on Use of Water for Mining and Related Activities Aimed at the Protection of Water Resources	10.1.1.5, 10.1.1.6, and 0
GN466 dated 22 April 2016: Classes and Resource Quality Objectives of Water Resources for the Olifants Catchment	10.1.1.5
National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA) and amendments	
Government Notice (GN) 921 dated 29 November 2013: List of Waste Management Activities that have, or are likely to have a detrimental Effect on the Environment	
GN 926 date 29 November 2013: National Norms and Standards for the Storage of Waste	
GNR 633 dated 24 July 2015: Amendment to the List of Waste Management Activities that have, or are likely to have a detrimental Effect on the Environment	
GNR 634 dated 23 August 2013: Waste Classification and Management Regulations	
GNR 635 dated 23 August 2013: National Norms and Standards for the Assessment of Waste for Landfill Disposal	
GNR 636 dated 23 August 2013: National Norms and Standards for Disposal of Waste to landfill	
GNR 632 dated 24 July 2015: Regulations regarding planning & management of residue stockpiles and residue deposits	
GNR 1147 dated 20 November 2015: Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations	

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)	REFERENCE WHERE APPLIED
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) (NEM:AQA) and amendments	10.1.1.14
GN 1210 dated 24 December 2009: National Ambient Air Quality Standards	10.1.1.14
GN 486 dated 29 June 2012: National Ambient Air Quality Standard for Particulate Matter with Aerodynamic Diameter less than 2.5 Micron Metres (PM2.5)	10.1.1.14
GNR 827 dated 1 November 2013: National Dust Control Regulations	10.1.1.14
GNR 533 dated 11 July 2014: Regulations Regarding Air Dispersion Modelling	10.1.1.14
GN 144 dated 2 March 2012: Highveld Priority Area Air Quality Management Plan	10.1.1.14
GNR 283 dated 2 April 2015: National Atmospheric Emission Reporting Regulations	10.1.1.14
GN 275 dated 3 April 2017: National Greenhouse Gas Emission Reporting Regulations	18.4
Explosives Act 26 of 1956 and its amendments	10.1.1.15
GNR 1604 dated 8 September 1972, as amended	10.1.1.15
Mine Health and Safety Act 29 of 1996 and amendments	10.1.1.15
GNR 584 dated 10 July 2015: Regulations Relating to Explosives	10.1.1.15
GUIDELINES/POLICIES/STANDARDS/PLANS/TOOLS	
Guideline: National Freshwater Ecosystem Priority Areas (NFEPA)	10.1.1.7
Mpumalanga Biodiversity Sector Plan (MBSP)	10.1.1.10
DWA Best Practice Guidelines, dated 2007	19
United States Bureau of Mines Guidelines for safe blasting	10.1.1.15
South African Water Quality Guidelines Volume 7: Aquatic Ecosystems, dated 1996	10.1.1.7
SANS 10103:2008 The measurement and rating of environmental noise with respect to annoyance and to speech communication	10.1.1.13
IFC General EHS Guidelines on Environmental Noise Management	10.1.1.13
SANS 241-1:2015 Drinking water Part 1 – Microbiological, physical, aesthetic and chemical determinants	10.1.1.4 10.1.1.8

6. NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location.

Wolvekrans Colliery employs 914 people and operates as an export mine. Opencast mining at VDDC has been identified as the area that is most likely to replace the operations at SKS and therefore to sustain the fulfilment of the mine's existing export entitlement allocation.

In 2007, opencast mining was approved in the amended EMPR; however, the EMPR did not account for additional infrastructure that would be required to proceed with mining in the VDDC area. A pre-feasibility investigation indicated that additional infrastructure would be required, along with utilising existing infrastructure. The location for the proposed infrastructure development is within a brownfield site, indicating that disturbance has already taken place in the area. The development of the proposed infrastructure is therefore unlikely to significantly alter ecological integrity. The proposed pollution control dam is likely to be developed in close proximity to a watercourse, the Olifants River, and alternatives with regard to the containment and management of dirty water make in under investigation. Control mechanisms in the form of berms and canals will be in place to separate dirty- and clean water.

The proposed infrastructure will assist in waste management generated by the opencast mining in the form of a pollution control dam, overburden dumps, slurry paddocks and the management of mine-affected water by means of mechanical evaporators.

The proposed infrastructure development will assist in opencast mining of the VDDC area, which will support the local economy. Although it is unlikely that new work opportunities will be available for locals, a temporary increase in work opportunities is anticipated during the construction phase of the project.

The impact of the proposed infrastructure on the biophysical- and socio-economic environment will be determined during the EIA phase.

Mining is the most prominent employment sector in the eMalahleni Local Municipality (ELM), within which the mine is located, with a contribution of 23%. The average annual economic growth rate for eMalahleni was at 2.4% over the period 1996 to 2015. The forecasted average annual gross domestic product (GDP) growth for eMalahleni for 2015-2020 is anticipated to be approximately 2% per annum, in line with national and provincial growth expectations. ELM experienced population growth rates higher than their economic growth rates, which has significant negative implications from a GDP per capita and an infrastructure-, service delivery-, and job creation point of view. Should the project not continue, authorised opencast mining will not be able to continue and the coal reserves left in the old underground workings will not be accessible and coal will have to be sources from elsewhere. This will result in job losses for the current employees of the mine and will have implications for electricity generation, as well as for the local economy. The infrastructure development is required to ensure the life of mine of the Wolvekrans Colliery to continue until 2046 and to ensure that the contractual obligations are met.

7. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The proposed infrastructure development at VDDC will be in support of the opencast mining that has already been approved. Infrastructure will be required until 2046, when the Life of Mine (LoM) is reached.

8. DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED SITE

NB!! – This section is not about the impact assessment itself; It is about the determination of the specific site layout having taken into consideration (1) the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result.

8.1 Details of all alternatives considered

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

8.1.1 The property on which, or location where it is proposed to undertake the activity

The proposed infrastructure development is displayed in **Appendix 4**. The position of the proposed infrastructure is limited in the sense that it is associated with the approved opencast mining at VDDC, as well as with existing infrastructure that will be used.

Alternatives were considered for the position of the pollution control dam and topsoil dump.

8.1.1.1. Pollution control dam alternative

The preferred location of the PCD is to the west of the existing PSS dump. This is in close proximity to the Olifants River, and a section of the proposed PCD is located within the 1:100 year floodline. An alternative considered for the location of the PCD include extending the existing Bob Henry dam to accommodate the additional mine-affected water that would be associated with the opencast mining.

8.1.1.2. Topsoil dump alternative

An alternative location was considered for the topsoil dump associated with the approved opencast mining, located to the south of the existing LAC discard dump. It is anticipated that the preferred location, which is an extension of the existing topsoil dump, would impact the Olifants River to a lesser extent as opposed to the alternative topsoil dump location. The alternative topsoil locations are indicated on **Figure 8-1**.

8.1.2 The type of activity to be undertaken

Opencast mining has already been approved in the 2007 through the amendment of the EMPR. The 2007aproved EMPR, however, did not include any additional infrastructure in support of the opencast mining operations as it was assumed at that stage that existing infrastructure will be used. Following a pre-feasibility investigation, the need for additional infrastructure was identified in conjunction with using existing infrastructure on the brownfield development.

8.1.3 The design or layout of the activity

The layout and design of the proposed infrastructure development is limited in terms of its necessity to be in close proximity to the approved opencast mining. The final layout will be determined by evaluating the alternatives and the most feasible option will be

selected from a mining and environmental sustainability perspective. The outcome of this evaluation will be discussed in the EIA phase.

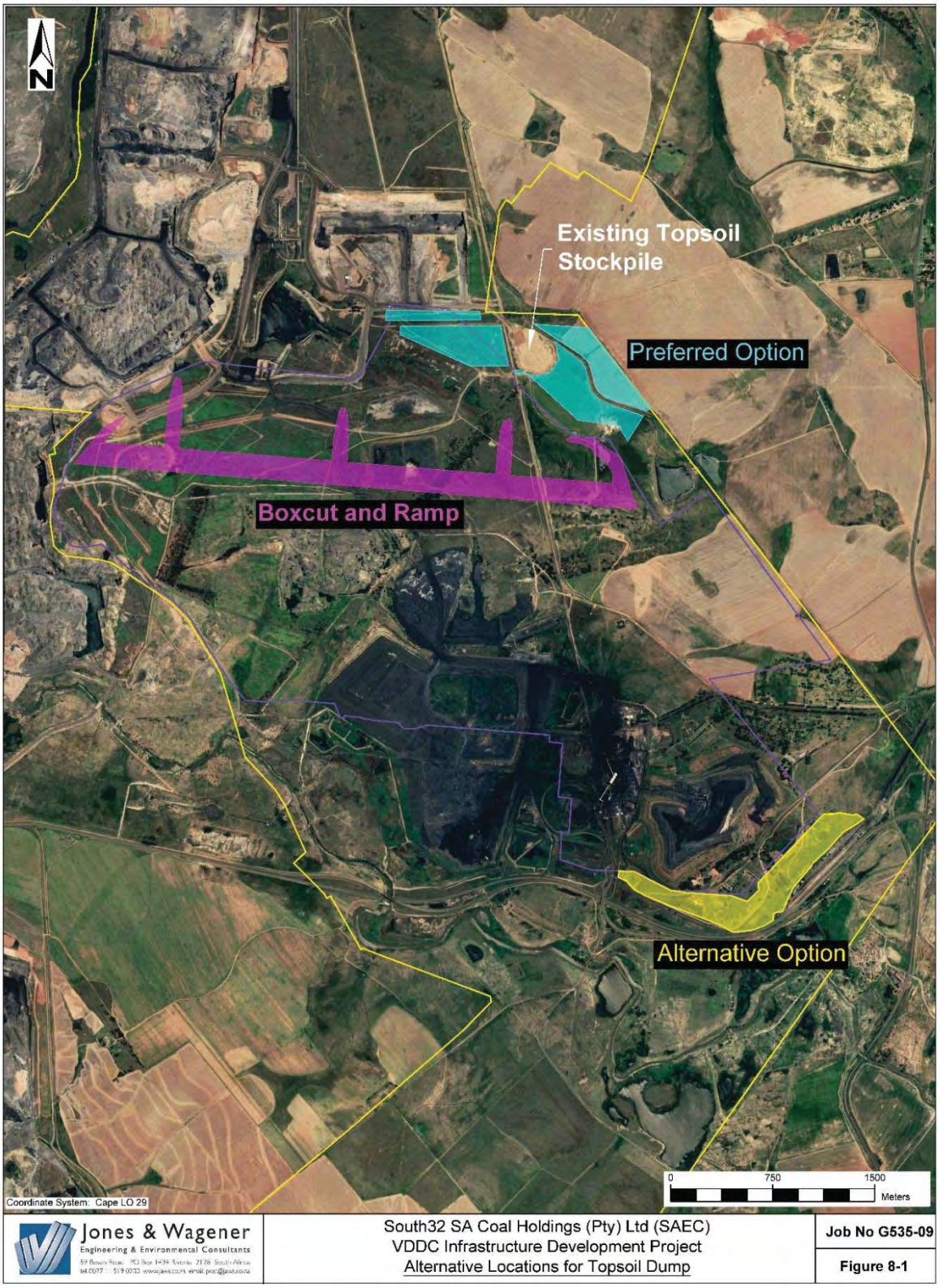


Figure 8-1: Alternative locations for topsoil dump

8.1.4 The technology to be used in the activity

Alternative considered that are relevant to the proposed infrastructure development are mostly related to mine water treatment. Mechanical evaporators will be used to treat mine-affected water. As an alternative, mine-affected water can be stored in evaporation dams or in the SKS void.

Slurry pumped from the underground storage area will be allowed to dewater before it is processed at the existing South Plant. This may, however, require changes to the processing plant and the required changes still has to be determine and therefore falls outside of this application process. As an alternative, options for the re-sale of the dewatered slurry will also be investigated.

8.1.5 The operational aspects of the activity

The proposed infrastructure will be in use until the LoM is reached in 2046. The technological alternatives which will be applicable during operations are discussed above in 8.1.4.

8.1.6 The option of not implementing the activity

Following a pre-feasibility investigation, it was identified that additional infrastructure is required to proceed with opencast mining. The alternative to not proceed with the proposed infrastructure development implies that opencast mining would not take place at VDDC. This will have a detrimental effect on the LoM of Wolvekrans Colliery, since mining of the VDDC area forms part of the LoM asset of the mine. The mine's contractual obligations will not be met and more than 900 employees will lose their income. This will also have implications for the local economy.

9. DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land

9.1 Public participation process followed

The public participation process entails the following:

Announcement of the project and notification of availability of Consultation Scoping Report for Public Review

The existing stakeholder database used by the mine will be reviewed, updated and maintained throughout the project. The identification of stakeholders and community representatives is important and will be done in collaboration with SAEC, the local municipality and other organisations in and around the study area. All comments and contributions from stakeholders are recorded and kept for the duration of the project and submitted together with the final reports to the DMR and the Department of Water and Sanitation (DWS).

Stakeholders who would be captured on the database for the project will include the following:

The owners or persons in control of the land where the proposed mining is to be undertaken (if different than applicant);

- The occupiers of the property where the development is to be undertaken;
- The owners and occupiers of land adjacent to the mining area;
- Provincial and local government (relevant local and district municipalities);
- Organs of state, other than the authorising authority, such as the Department of Agriculture, Forestry and Fisheries, (DAFF) or Department of Roads, having jurisdiction in respect of any aspect of the proposed project;
- Relevant residents' associations, rates payers' organisations, community based organisations and NGOs;
- Environmental and water bodies, forums, groups and associations; and
- Private sector (business, industries) in the vicinity.

The project and the availability of the Consultation Scoping Report was announced to the public by means of the following:

- Advertisements in the Witbank News newspaper on 5 October2018;
- Distribution of Background Information Documents from 4 October 2018;
- Placement of site notices on and around the site;
- Telephonic notification to key stakeholders and landowners;
- Notification to landowners via registered mail; and
- Loading of notification documents on the J&W website.

The I&APs comments on the Consultation Scoping Report will be captured in a Comments and Response Report (CRR), which will be integrated into the Final Scoping Report.

Notification of availability of Final Scoping Report

Once the Final Scoping Report has been compiled, it will be made available to the public. This will be done by means of:

- Emails will be sent to all I&APs registered on the stakeholder database; and
- The report will be loaded on the J&W website.

Public Review of Consultation Environmental Impact Report (EIR) and Environmental Management Programme (EMPr), as well as Draft Integrated Water Use Licence Application (IWULA)

The Consultation EIR/EMPr and Draft IWULA will be made available for public comment by following the same procedure as for the Consultation Scoping Report. A public meeting will be held during the public review period to discuss impacts and mitigation measures.

Notification of availability of Final EIR/EMPr

Once the Final EIR/EMPr has been compiled, it will be made available to the public at the same time that it is submitted to the DMR for approval. This will be done by means of:

- Emails will be sent to all I&APs registered on the stakeholder database; and
- The report will be loaded on the J&W website.

Announcement of the authority's decision

Once a decision is reached by the Competent Authority, I&APs will be notified of the decision and the appeal process to be followed.

Refer to **Appendix 6** for more details on the public participation process, including copies of the BID, site notices and advertisement.

9.2 Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses)

The list of I&APs consulted to date is provided in **Table 9-1**. At the time of concluding this Consultation Scoping Report, no comments have been received. Issues and comments will be captured in future versions of the Scoping Report.

Table 9-1: Summary of issues and responses

***Note*: No comments were received at the time of finalisation of the Consultation Scoping Report. Issues and comments will be captured in future versions of the Scoping Report**

Interested and Affected Parties		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status
List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.					(Consensus / dispute, not / finalised, etc.)
AFFECTED PARTIES					
Landowner/s					
Ingwe Surface Holdings (Pty) Ltd					
Anglo Operations Pty Ltd					
Lawful occupier/s of the land					
Landowners or lawful occupiers on adjacent properties					
Valco Boerdery					
Municipal councillor					
Municipality					
Nkangala District Municipality					
eMalahleni Local Municipality					
Organs of state (Responsible for infrastructure that may be affected by Roads Department, Eskom, Telkom, DWS etc)					
Eskom					

Interested and Affected Parties List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus / dispute, not / finalised, etc.)
Communities					
Dept. Land Affairs					
Traditional Leaders					
Dept. Environmental Affairs					
Mpumalanga Department of Agriculture, rural Development, Land and Environmental Affairs (MDARDLEA)					
Other Competent Authorities affected					
Mpumalanga Department of Public Works, Roads and Transport (PWRT)					
Department of Agriculture Forestry and Fisheries (DAFF) Directorate: Land Use and Soil Management					
Department of Water and Sanitation					
Department of Environmental Affairs (DEA)					
South African Heritage Resources Agency (SAHRA)					
Mpumalanga Tourism and Parks Agency (MTPA)					

Interested and Affected Parties List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status (Consensus / dispute, not / finalised, etc.)
OTHER AFFECTED PARTIES				
INTERESTED PARTIES				
Mpumalanga AgriSA				
Mpumalanga Landbou/Agriculture Union				
Transvaal Agricultural Union of SA				
Wildlife and Environmental Society of SA (WESSA)				
Olifants River Forum				
National Union of Mine Workers				
ITT Water and Wastewater				

10. ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE SITE

10.1 Baseline Environment

10.1.1 Type of environment affected by the proposed activity

(Its current geographical, physical, biological, socio- economic, and cultural character)

10.1.1.1. Topography and drainage

The VDDC Section is largely a brownfields area where the natural topography has been dramatically disturbed by mining related activities. The greater study area is characterised by a flat, slightly undulating topography at an elevation of between 1 625 and 1 505 mamsl. The study area tends to slope from east to west at an angle of between 1% and 2%.

The VDDC project is situated within the catchment area of the Olifants River. This catchment makes up part of the Witbank and Loskop Dam catchment. The proposed infrastructure development project is situated within quaternary sub-catchment B11F, B11G and B11B of the Limpopo-Olifants primary drainage region.

The area drains towards the Olifants River. Prior to mining that took place in 2004, the drainage of the northern portion of the proposed infrastructure development area drained via the Vleishaft tributary (now mined through, with the Vleishaft Dam being used as a pollution control dam (PCD) which flowed through the mine's property.

Downstream of the mine, the river flows to the Witbank Dam, then to the Loskop Dam and through the central part of the Kruger National Park to Mozambique. It joins the Limpopo River and discharges into the Indian Ocean on the east African coastline.

10.1.1.2. Climate

The VDDC infrastructure development project is in the Mpumalanga Highveld region where the climate is characterised as generally dry. Frost and mist are frequently experienced during the winter months on the Mpumalanga Highveld.

Temperature and evaporation

Summers are warm to hot with an average daily high temperature of approximately 27°C (with occasional extremes up to 35°C). Winters range from mild to cold with an average daily high of approximately 15°C (with occasional extreme minima as low as -10°C).

The annual evaporation rates range between 1 211 mm to 1 879 mm with a mean annual evaporation (MAE) of 1 476 mm. Average monthly evaporation rates range between 65 mm (June) to 164 mm (January and December) (J&W, 2018b).

Precipitation

The average rainfall per year at the Vandyksdrift rainfall station (0478546 W) varies between a 988 mm and 368mm, with the mean annual precipitation (MAP) being 705 mm. The higher rainfall months occur from October to March (summer) (J&W, 2018b).

Wind

The co-dominant wind directions, during the five-year period (2012 to 2017) under investigation, were east and north with a combined frequency of occurrence of approximately 26%. Winds from the south-south-east occurred for almost 8% of the period. Relatively infrequently winds occur from the northeast and southwest. Calm conditions (wind speeds <1 m/s) occur 8.9% of the time. Calm wind conditions (i.e. wind speeds <1 m/s) varied between 4.2% (2017) and 12.1% (2013).

Seasonal wind directions are illustrated in **Figure 10-1**. During summer months, winds from the east became more frequent; nearly 20%. The predominant wind directions in spring were from the north (20%) and east (13%). There is an increase in the frequency of calm periods during the autumn (12%) and winter months (12%). During spring-time, winds are more likely to exceed 6.0 m/s, with calm conditions only 4.6% of the time (Airshed, 2018a).

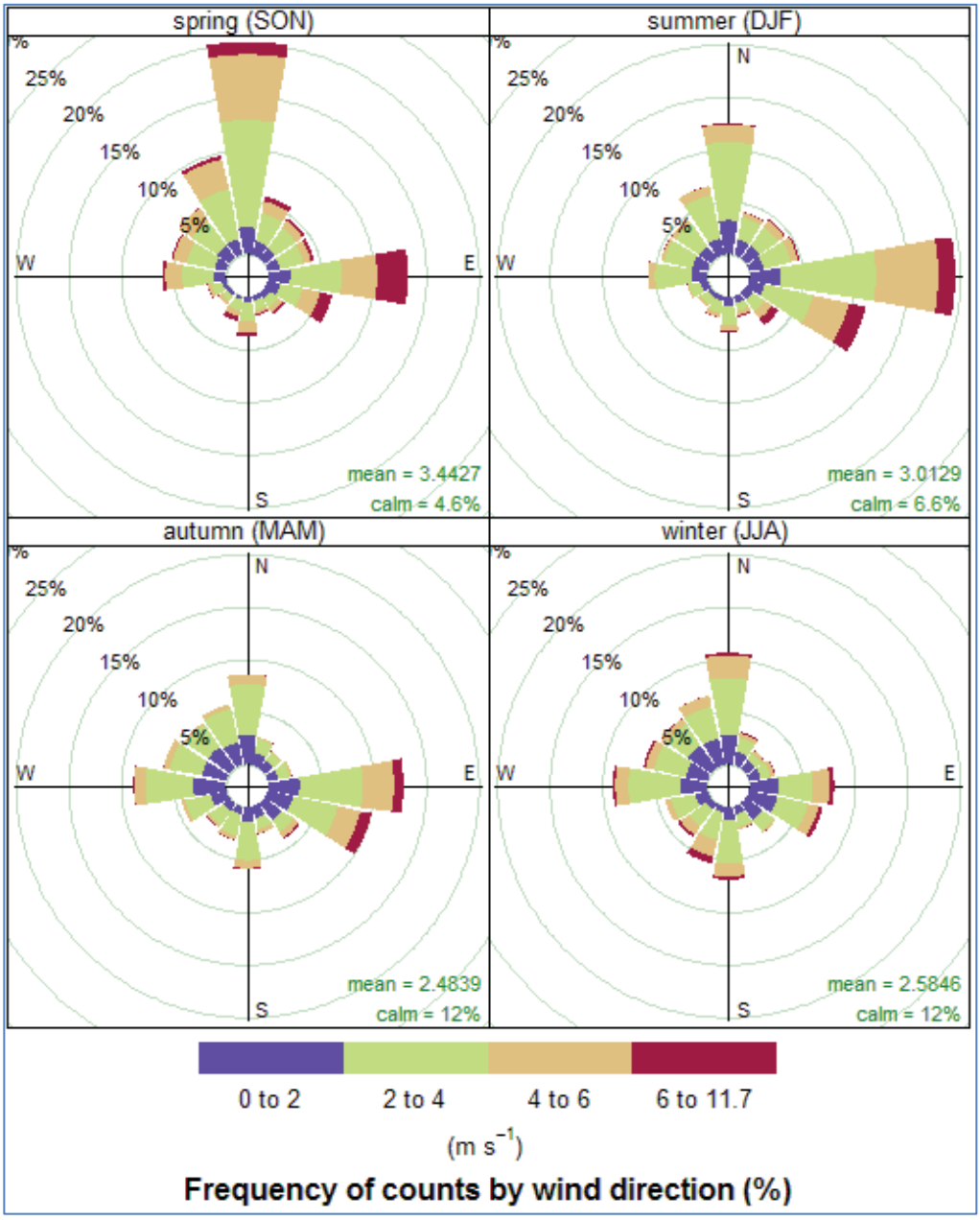


Figure 10-1: Seasonal wind roses for eMalahleni SAWS data from 2012 – 2017 (Airshed, 2018a)

10.1.1.3. Geology

Regional geology

The VDDC project area is situated in the Great Karoo Basin in South Africa, consisting of the Karoo Supergroup. Geologically, the Karoo Supergroup is the largest stratigraphic unit in southern Africa covering almost two thirds of the land surface. The basin hosts all the South African coal deposits and was formed in the great Gondwana basin which comprised parts of Southern Africa, India, Antarctica, Australia and South America.

The Karoo Supergroup comprises a sedimentary succession of sandstones, siltstones, shales and coal stratigraphic units. These stratigraphic units (from oldest to youngest) consist of the following:

- Dwyka Group – glacial marine deposit (comprising of diamictites and tillites) in the Carboniferous period;
- Ecca Group – fluvial deposition in the Permian period;
- Beaufort Group (terrestrial); and
- Stormberg Group (including basalts).

The majority of the coal deposits in South Africa are contained in the Vryheid Formation (part of the Ecca Group) of the main basin and are restricted to the north eastern area of terrestrial deposition on a gently subsiding shelf platform. The strata, mostly shale, sandstone and coal seams, formed in fluvial environments (J&W, 2018b). A 1:250 000 regional geological map indicating the location of the project area is shown in **Figure 10-2**.

Local geology

Locally, the study area falls within the Witbank Coalfield, which consists of sedimentary rocks of the coal-bearing Vryheid Formation of the Ecca Group. The Karoo sediments are underlain by diamictites and tillites of the Dwyka formation that form the basement of the Karoo Supergroup. Dolerite intrusions are common throughout the Karoo formation, the most significant in the study area being the Ogies Dyke which is a near vertical, west-east striking dyke situated to the north of the study area. Based on literature, this dyke is approximately 15 m thick. Coal on either side of the dyke has been devolitised.

There are five coal seams which underlie the weathered Karoo rocks in the study area, namely the No.1 to No.5 coal seams. The No.2 coal seam is the most prominent of the five coal seams and has widely been mined using bord-and-pillar methods. The interburden between the coal seams consist mainly of sandstones and mudstones with carbonaceous shale being present closer to the coal seams. The No.1 seam is also well developed in the study area. It is understood that the No.2 seam will continue to be mined via opencast mining operations.

The No.5 coal seam has largely been removed by weathering and is mostly present in the topographically higher eastern sections of the mining area. The No.4 seam is split into different upper and lower bands of which only the No.4 L is of economic importance. The No.3 seam, although of high quality, is thin and very irregular (J&W, 2018b). **Figure 10-3** illustrates the geological cross section of the study area.

Figure 10-2: Regional geology of the VDDC project area (J&W, 2018b)

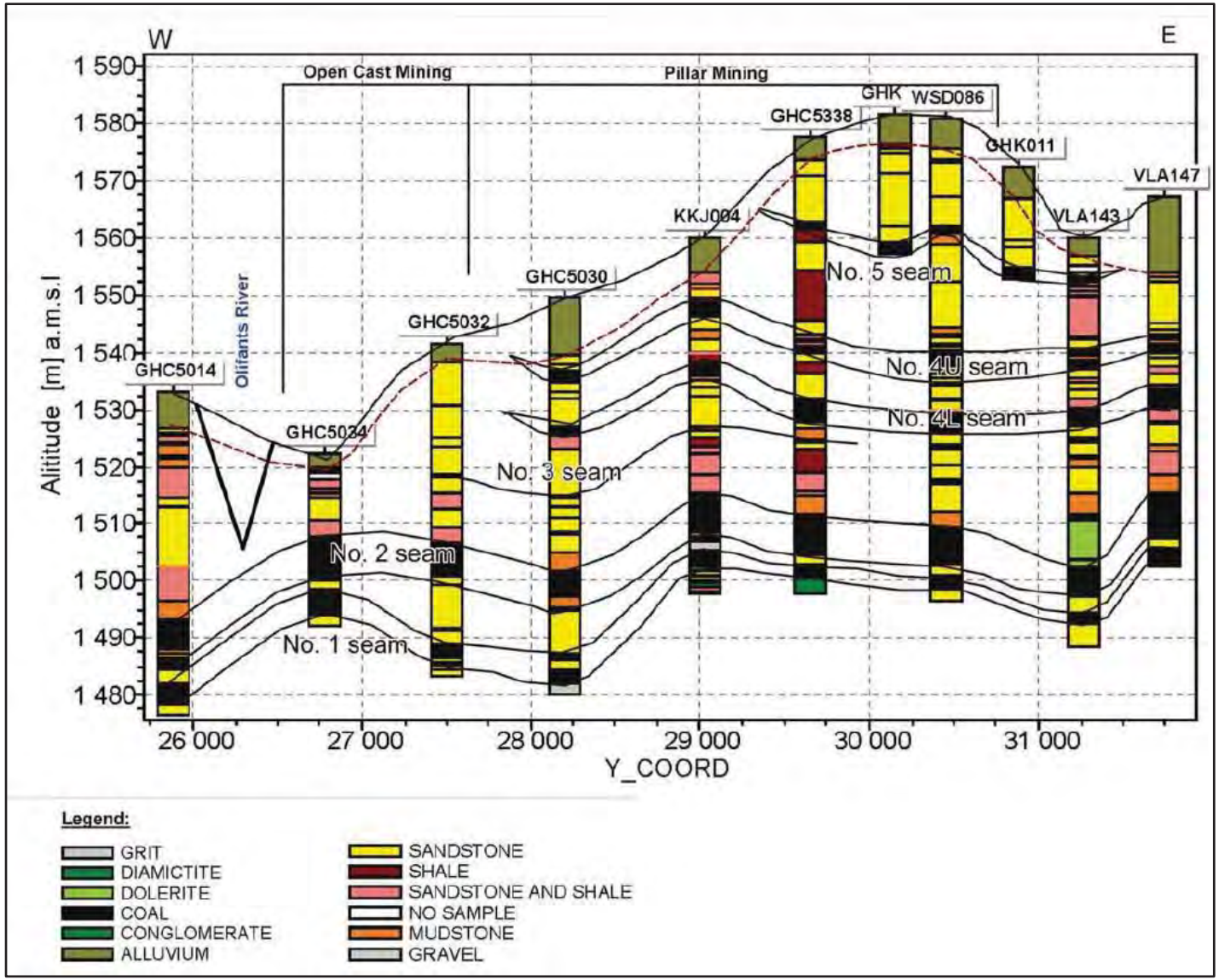


Figure 10-3: Geological cross section (west – east) across the study area (J&W, 2018b)

10.1.1.4. Soils, land use and land capability

The baseline assessment is based on the 2006 Douglas EMP Amendment by Pulles, Howard & De Lange Incorporated (PHD) and the 2013 Baseline Soil Specialist Study by Earth Science Solutions.

Soils

A soil forms in the study area are mapped in **Figure 10-4.**

The deeper and more sandy loam soils are considered High Potential materials and are distinguished by the better than average depth of relatively free draining soil to a greater depth (> 1 200 mm). The resultant land capability is rated as moderate intensity grazing and/or arable depending on their production potential. These soils are generally much lower in clay than the associated wet based soils and more structured colluvial derived materials, have a distinctly weaker structure and are deeper and better drained. The ability for water to move through these profiles is significantly better. The sandier texture of this soil group renders them more easily worked and of a lower sensitivity (depth >750 mm).

In contrast, the shallower and more structured materials are more sensitive and will require greater management if disturbed. This group of shallower and more sensitive soils (< 500 mm) are associated almost exclusively with the sub outcropping of the parent materials (Karoo Sediments) at surface or with a ferricrete (ouklip) layer, constituting a relatively large percentage of the overall study area. These materials play an important function in the sustainability of the overall biodiversity of the area.

The third group of soils comprises those that are associated with the hard pan ferricrete layer and perched soil water. This group of soils has a set of distinctive characteristics and nature that is separated out due to its inherently much more difficult management characteristics. These soils are characterised by relatively much higher clay contents (often of a swelling nature), poor intake rates, poor drainage, generally poor liberation of soil water and a restricted depth. No perched aquifers are reported, albeit a significant area of well-developed ferricrete was mapped within the vadose zone (J&W, 2018d).

Land capability

As per the Chamber of Mines' Mine Closure Guidelines, the land capability of the study area (**Figure 10-5**) comprises of:

- Arable land (54.8%)
- Grazing land (9.3%)
- Wilderness land (16.1%)
- Wetland (16.6%)
- Rehabilitated land (3.2%).

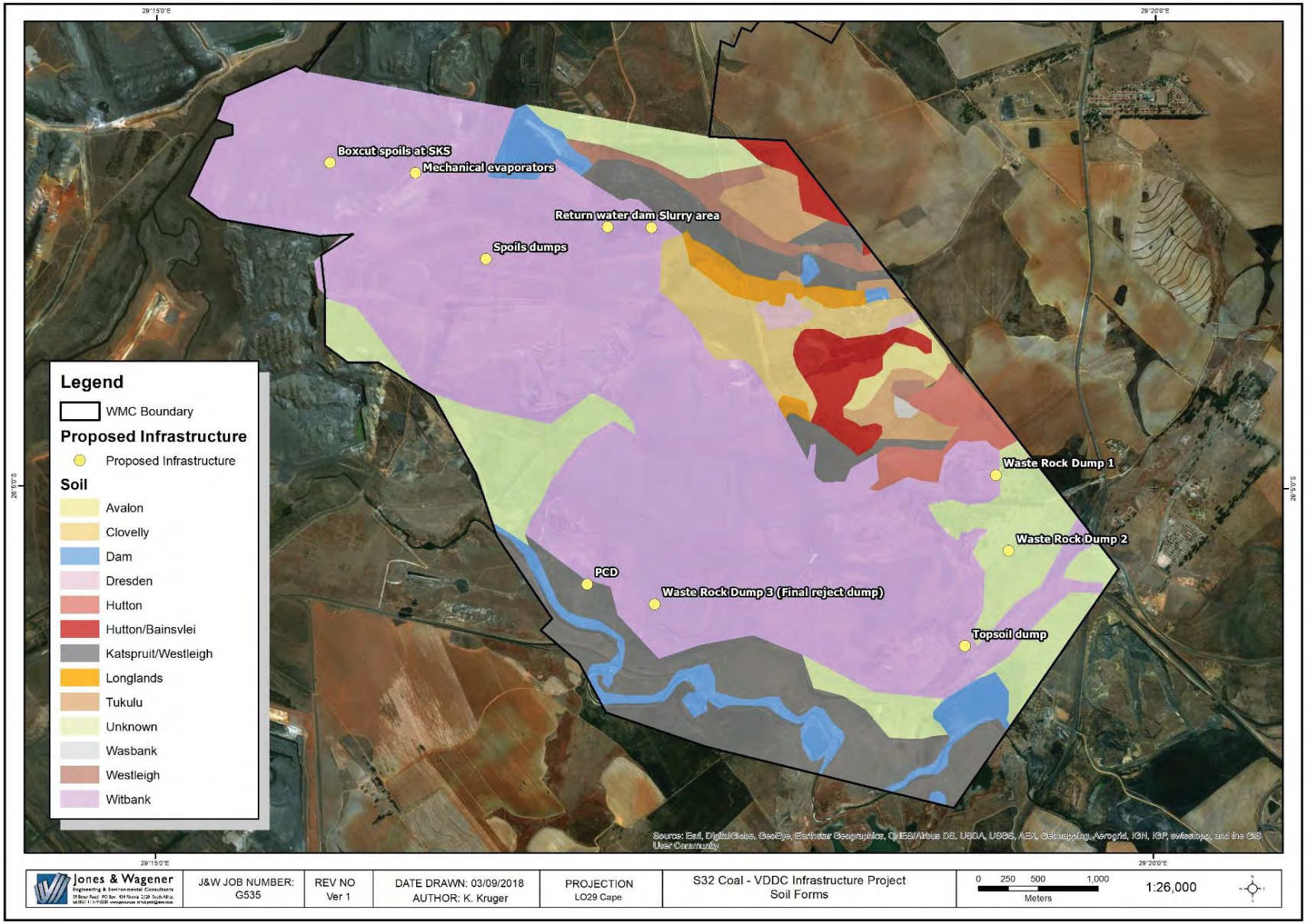


Figure 10-4: Soil groups identified in the VDDC study area 2006 (J&W, 2018d)

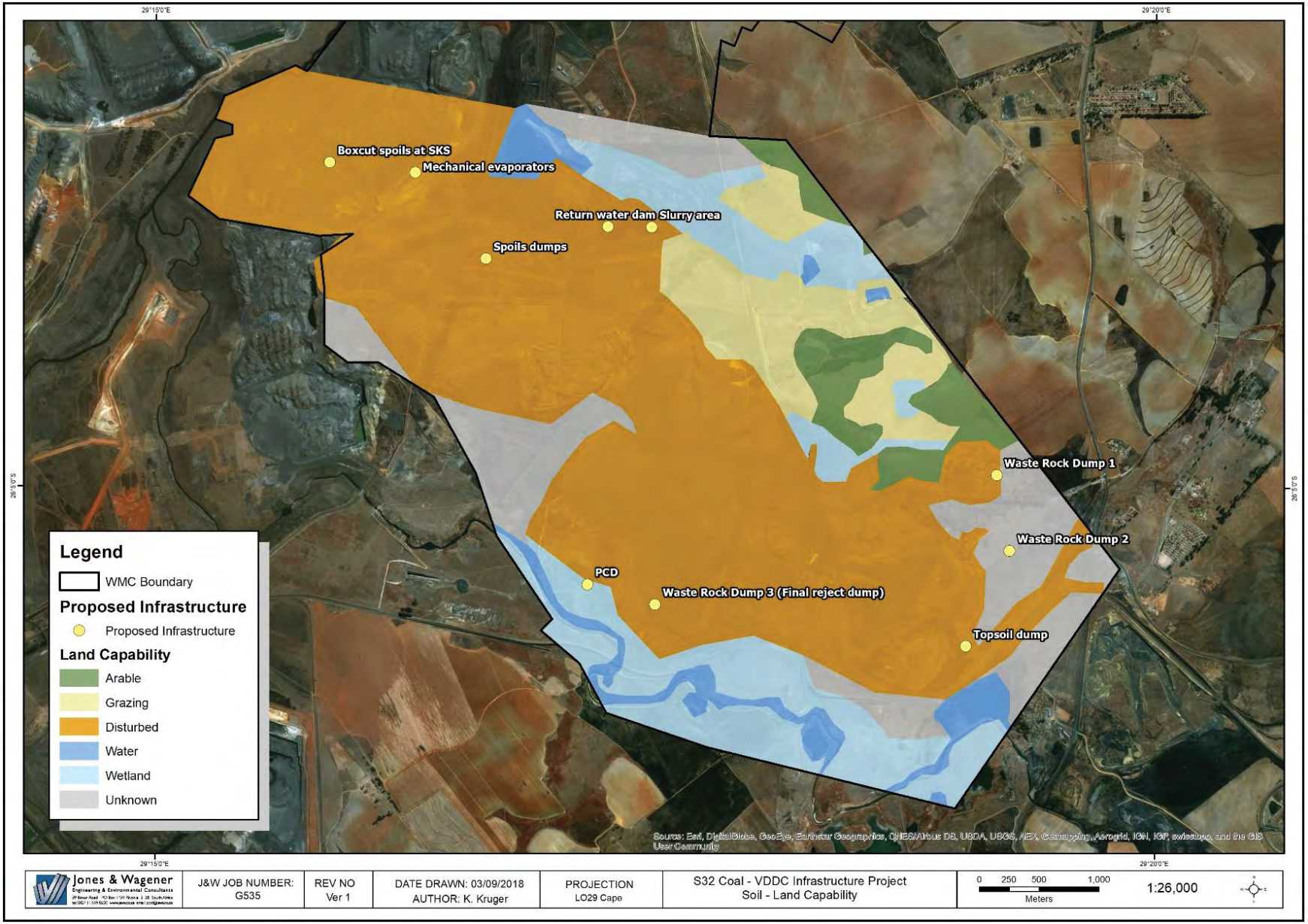


Figure 10-5: Current land capability for the VDDC area (J&W, 2018d)

Land use

The land use of the VDDC area is shown in **Figure 10-6** and listed in **Table 10-1**. The dominant land uses on site are mining and open grasslands. These are followed by wetlands, cultivation, bush and urban development. The minor land uses include water, shrubland, plantations, bare ground and mine buildings.

Table 10-1: Land use (updated from 2006 EMPR (J&W, 2018d)

Land Use	Ha	%
Water Seasonal	2.34	0.05%
Water permanent	6.93	0.14%
Wetlands	272.61	5.56%
Bush	150.12	3.06%
Grassland	1341.09	27.37%
Shrubland	20.97	0.43%
Cultivation	338.49	6.91%
Plantations	27.09	0.55%
Mining	2520.18	51.43%
Mine Water	61.74	1.26%
Mine Buildings	17.46	0.36%
Bare Ground	33.12	0.68%
Urban	108.09	2.21%
Total	4900.23	100%

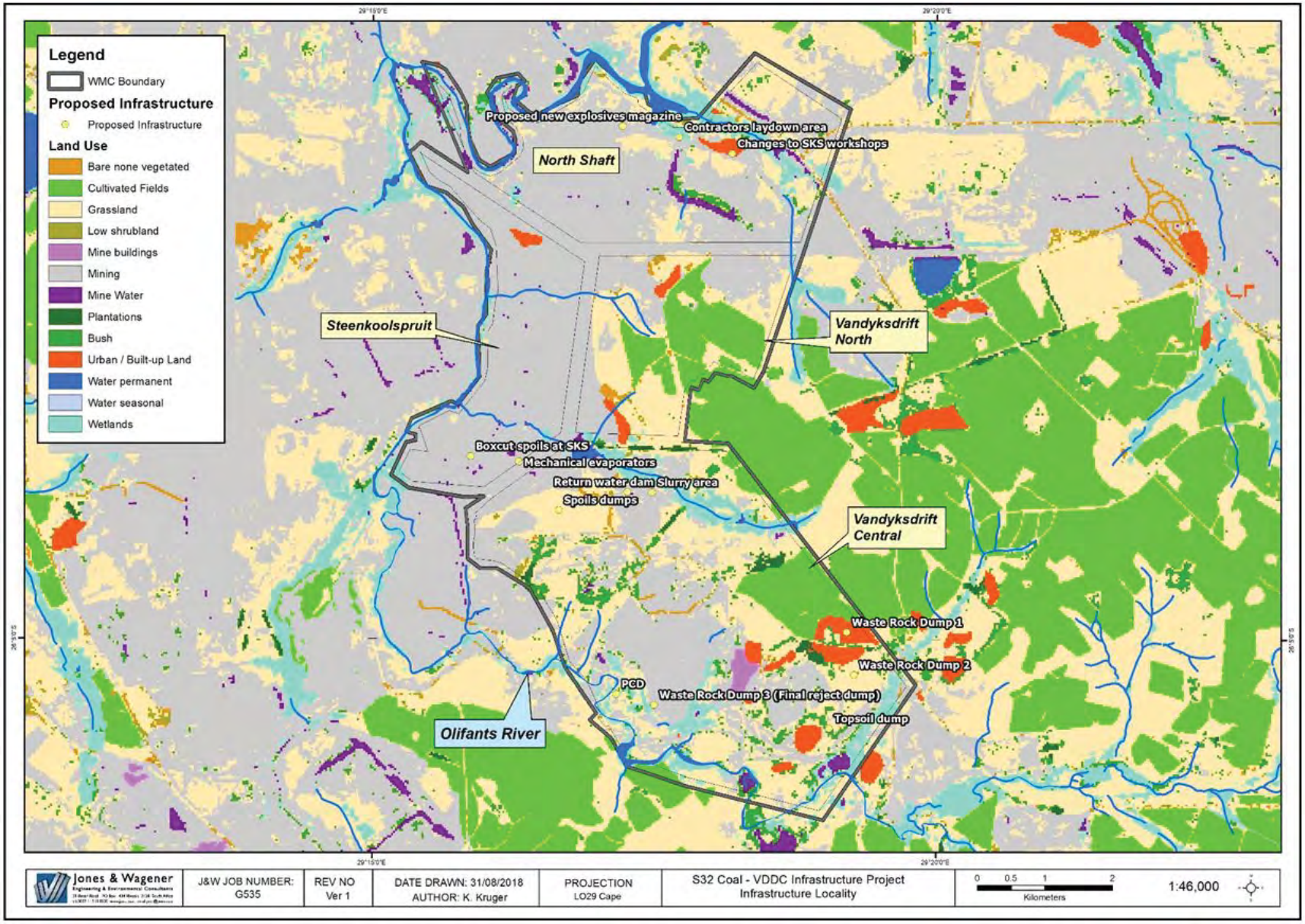


Figure 10-6: Land use for the VDDC area (J&W, 2018d)

10.1.1.5. Surface water

Water management area and catchments

The VDDC infrastructure development project is situated within the catchment area of the Olifants River. This catchment makes up part of the Witbank and Loskop Dam catchment. The proposed VDDC infrastructure development project is largely situated within quaternary sub-catchment B11F and B11B, with some infrastructure components located within B11G of the Limpopo-Olifants primary drainage region. The VDDC infrastructure development project in relation to the catchments are shown in **Figure 10-7.**

Mean annual runoff

The receiving water body for the VDDC project is the Loskop Dam. Beyond Loskop Dam, the potential impact of the mine becomes extremely small due to the water volumes in the catchment and dilution effects. By the time the water reaches Loskop Dam, it is required to be suitable for use for all of the expected uses (drinking water, agricultural, industrial and aquatic ecosystems). Thus, by achieving compliance in terms of these, no additional impacts are expected downstream of Loskop Dam. The receiving water body is relevant only in so far as it defines the aerial extent of the catchment to be considered in the impact assessment and described in the baseline study.

The mean annual runoff (MAR) for Loskop Dam is some 384 x 10^6 m^3, while the MAR for the proposed mining area is estimated at 0.40 x 10^6 m^3. Simulated monthly flow records were generated for which the MAR is displayed in **Table 10-2**.

Table 10-2: Computed Mean Annual Runoff (J&W, 2018c)

River	Measured at	MAR ($x10^6m^3$)	Percentage of MAR at Witbank Dam
Olifants River	Entrance to mine	59.5	46
Steenkoolspruit	Immediately before confluence with Olifants River	52.0	40
Olifants River	Exit from mine property	188.1	99
Witbank Dam	At dam	190	100

Note: Varying values on the MAR for Witbank Dam were found in the literature. This value of 190 x 10^6 m^3 is derived from the runoff values given for various measuring points in the Surface Water Resources of South Africa – 1990

Surface water use

The VDDC Project area is situated in a farming district, where water from the Olifants River and the Steenkoolspruit is used for irrigation, formal and informal domestic usage, as well as livestock watering. Other uses include domestic supply to villages and other amenities in the area. The aquatic ecosystem is also present as a downstream user.

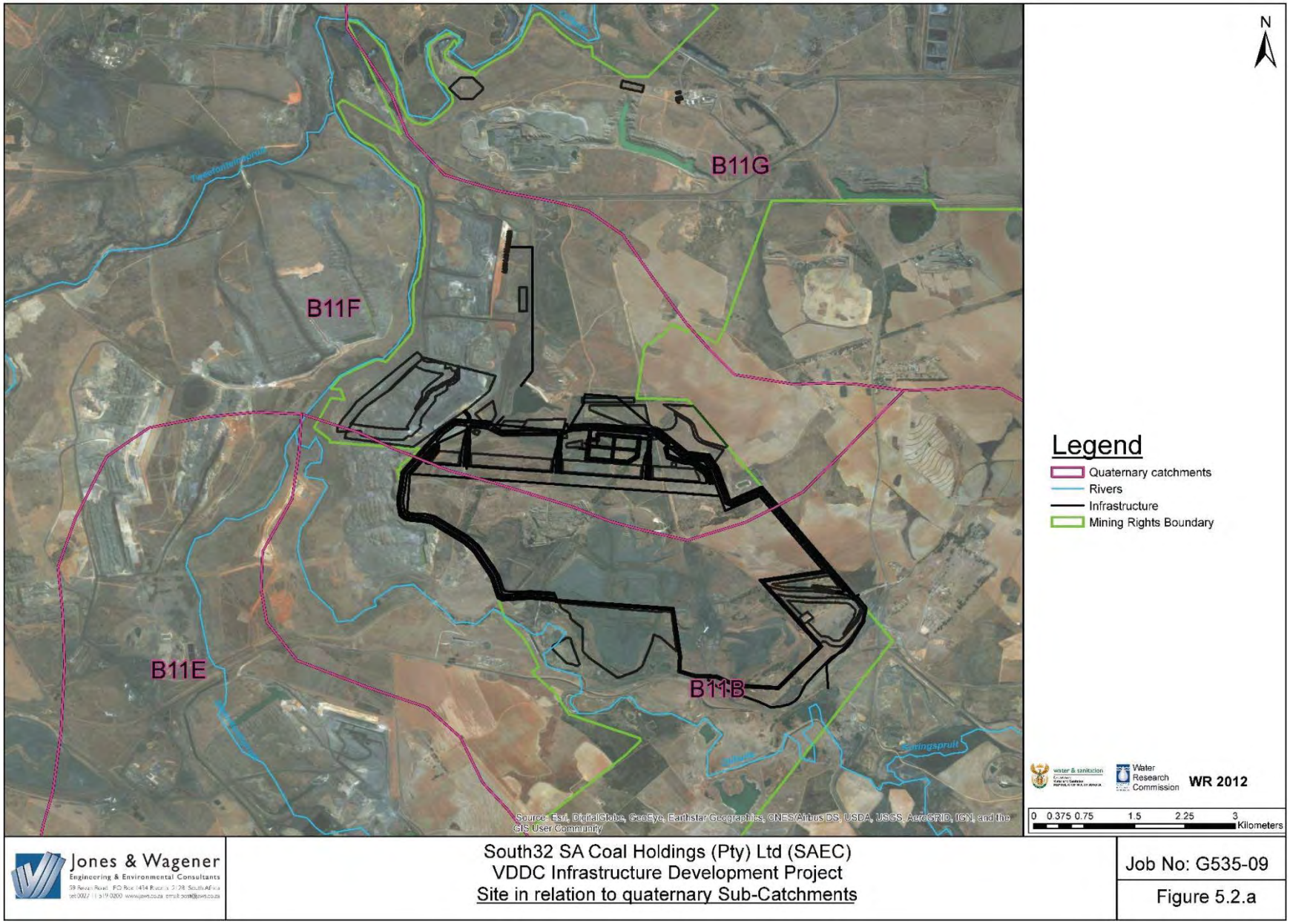


Figure 10-7: Proposed infrastructure in relation to quarternary catchments

Surface water quantity

The catchment areas upstream and downstream of the project area are given in **Table 10-3**.

Table 10-3: Catchment areas (J&W, 2018c)

River	Measured at	Catchment (km^2)
Olifants River	Upstream of Vandyksdrift (Entrance of mine property)	1 350
Olifants River	Downstream of mine property	3 309

Dry Weather Flow

A simulated stream flow record was generated at the downstream boundary of the mine. A flow-duration curve was then constructed for the simulated stream flow record. Based on the criterion that the dry weather flow is the flow in the stream that is equalled or exceeded 70% of the time, this flow was computed and corresponds to the flow during the winter months, shown for key points in **Table 10-4**.

Table 10-4: Dry weather flows (J&W, 2018c)

River	Measured at	Dry weather flow (m^3/s)	Nature of stream flow
Olifants River	Entrance to mine property	0.3	Perennial
Steenkoolspruit	Immediately before confluence with Olifants River	0.34	Perennial
Olifants River	Exit from mine property	0.71	Perennial

Flood Peaks and Volumes

The flood peaks for the 1:20, 1:50 and 1:100 year recurrence intervals were computed using the Rational Method (DWA implementation and Alternative implementation), Unit Hydrograph techniques, and the Regional Maximum Flood.

The volumes of the floods were based on the simplified hydrograph proposed by Kovacs, and the relationship between the Regional Maximum Flood and Mean Annual Runoff as derived from the measurement of various extreme flood events across South Africa documented in various Department of Water Affairs and Forestry (DWAF) publications.

Table 10-5 lists these flood peaks and the Regional Maximum Flood together with the corresponding flood volumes on the Olifants River and Steenkoolspruit.

Table 10-5: Computed flood peaks and volumes in the Olifants River, Steenkoolspruit and their tributaries affected by mining at VDDC

River	Measured at	Recurrence Interval	Flood Peak (m^3/s)	Flood Volume ($x10^6m^3$)
Olifants River	Entrance to mine property	20 year 50 year 100 year RMF	480 760 1150 350	26 41 58 196
Olifants River	Immediately before confluence with Steenkoolspruit	20 year 50 year 100 year RMF	490 780 1200 240	27 3 60 203
Steenkoolspruit	Immediately before confluence with Olifants River	20 year 50 year 100 year RMF	515 810 1250 2402	26 42 58 199
Olifants River	Exit from mine property	20 year 50 year 100 year RMF	823 1292 1837 3810	51 80 112 380

Floodlines

The 1:100 year recurrence interval pre-mining floodlines are shown in **Figure 10-8.**

Surface water quality

VDDC is part of an existing mine and has a monitoring programme in place; therefore, the available surface water quality data were used. Water quality data for several locations around the site, extending from September to October 2012, July 2015 to November 2017 and January to February 2018, were received from SAEC.

The surface water monitoring locations are illustrated in **Figure 10-9** and the water quality monitoring results are summarised in **Table 10-6** as the average, maximum and minimum concentrations, together with the coefficient of variation.

The water quality results are compared to the Resource Quality Objectives (RQO) for the Olifants River as published in GN 466 on 22 April 2016. VDDC is located within Resource Unit 11 of Integrated Unit of Analysis 1, the Upper Olifants River catchment. It is important to note that the 2016 RQO do not provide limits for all constituents and therefore the SANS 241 Drinking Water Guidelines were used in such cases. However, there are certain constituents for which no limitations are specified.

For **Table 10-6**, values highlighted in **red** indicate where the RQO for the Olifants River catchments is exceeded, **or** for constituents for which there is not an RQO, the SANS 241 guidelines are exceeded.

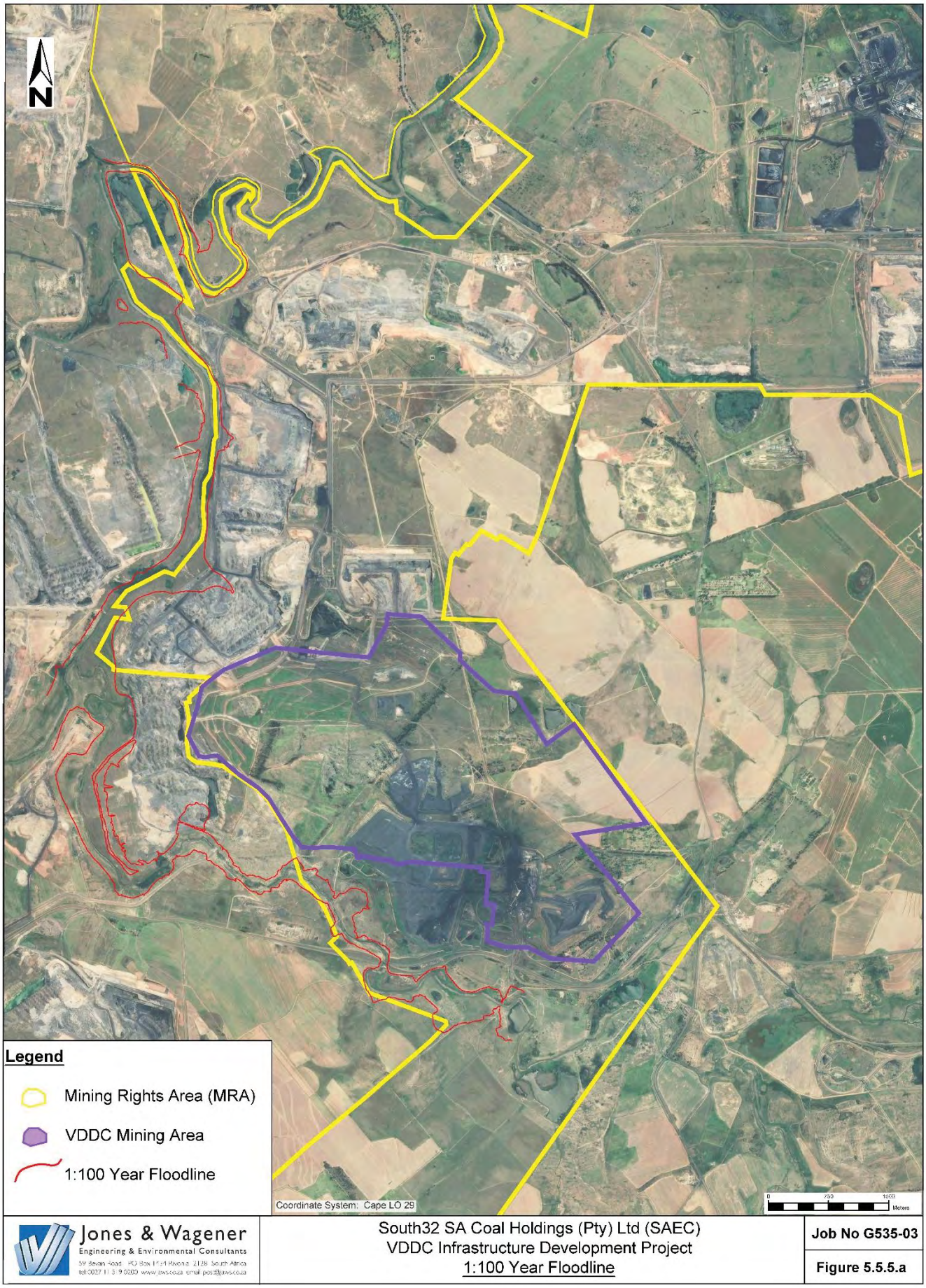


Figure 10-8: Delineated 1:100 year floodlines of the VDDC infrastructure development project (J&W, 2018c)

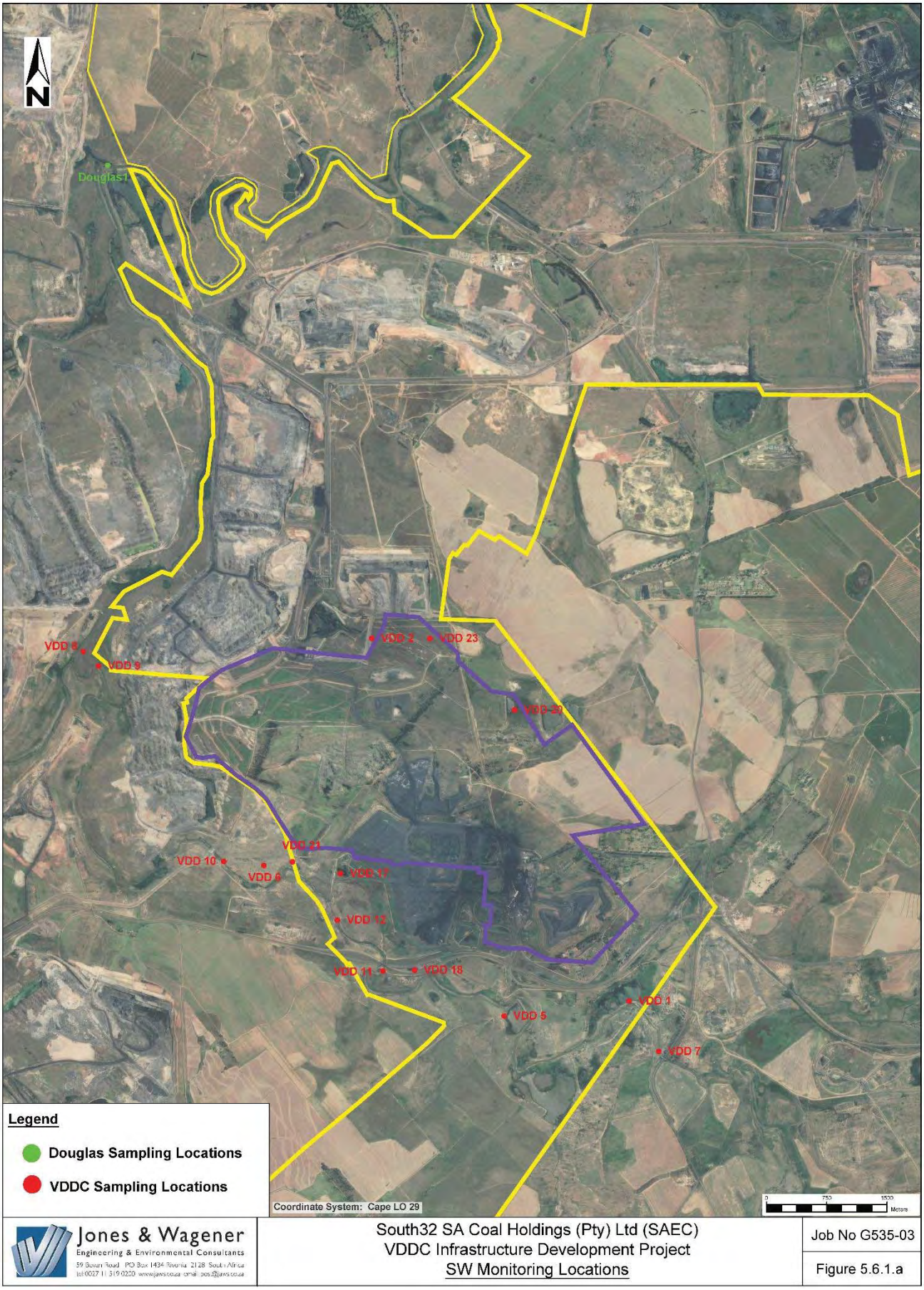


Figure 10-9: Surface water monitoring locations (J&W, 2018c)

Table 10-6: Surface water quality results for measurements taken in September to October 2012, July 2015 to November 2017, and January to February 2018 (J&W, 2018c)

Mine	Sample Location		pH	EC mS/m	TDS mg/ℓ	SS mg/ℓ	Fe mg/ℓ	TALK	Ca mg/ℓ	Cl mg/ℓ	Mg mg/ℓ	NO_3 mg/ℓ	PO_4 mg/ℓ	K mg/ℓ	Na mg/ℓ	SO_4 mg/ℓ	Al mg/ℓ	F mg/ℓ	Mn mg/ℓ
		SANS 241 2015	5-9.7	170	1200	-	2	-	-	300	-	11	-	-	200	500	-	1.5	0.4
		RQO for RU11		111	-	-	-	-	-	-	-	4	0.125	-	-	500			
VDDC	VDD1	Average	7.71	121.59	999.33	24.61	0.08	87.50	108.02	23.11	85.78	0.16	0.00	9.43	49.27	581.80	0.08	0.91	0.25
		Maximum	8.80	268.00	2444.00	252.00	0.37	142.00	269.00	61.00	210.00	0.42	0.00	14.40	176.00	1481.00	0.20	1.37	1.43
		Minimum	6.05	42.40	326.00	3.60	0.01	17.00	39.00	8.13	25.50	0.00	0.00	6.15	15.90	187.00	0.02	0.60	0.01
		Coeff of Variation %	8.66	34.96	39.74	188.37	102.87	47.86	38.61	41.59	42.05	64.26		17.00	57.94	40.12	63.94	27.60	160.89
	VDD2	Average	7.71	325.45	3069.52	380.10	0.20	172.14	302.41	27.61	194.93	0.85		10.76	299.55	1900.83	0.09	0.61	1.17
		Maximum	8.23	523.00	5088.00	7900.00	1.86	316.00	516.00	53.50	340.00	5.68	0.00	31.00	542.00	3172.00	0.19	0.94	9.54
		Minimum	7.02	189.00	1548.00	4.00	0.02	57.00	150.00	3.50	87.10	0.10	0.00	1.85	112.00	895.00	0.01	0.34	0.01
		Coeff of Variation%	4.41	24.64	29.24	382.37	189.14	36.70	29.16	37.60	29.38	214.94		47.50	31.26	32.11	58.54	26.14	174.18
	VDD5	Average	8.05	90.21	674.87	26.84	0.08	115.53	72.38	24.51	50.39	0.15	0.10	9.12	54.92	342.48	0.13	0.69	0.04
		Maximum	8.74	175.00	1524.00	91.20	0.21	155.00	149.00	50.50	139.00	0.24	0.10	13.00	110.00	863.00	0.50	1.10	0.20
		Minimum	6.99	39.60	280.00	0.40	0.01	60.00	28.90	12.50	16.80	0.10	0.10	6.11	24.50	95.90	0.01	0.49	0.01
		Coeff of Variation%	4.61	39.71	46.26	74.25	71.79	22.35	44.61	37.26	59.82	40.77		18.88	39.15	57.17	96.43	22.63	112.14
	VDD6	Average	7.47	132.66	1097.11	754.44	0.31	137.33	122.56	42.48	82.91	0.25	0.32	23.29	65.15	581.52	0.19	0.63	1.84
		Maximum	8.31	295.00	2506.00	10450.00	1.31	297.00	266.00	136.00	221.00	0.88	0.38	186.00	147.00	1439.00	1.13	1.36	11.80
		Minimum	6.48	26.60	182.00	1.60	0.01	32.00	18.20	9.66	9.30	0.10	0.23	4.88	10.60	63.80	0.01	0.47	0.01
		Coeff of Variation%	6.45	59.85	65.54	330.16	107.64	49.81	57.81	79.31	74.48	94.59	25.19	187.13	65.47	70.80	141.59	30.74	161.30
	VDD7	Average	7.90	209.01	2070.13	22.67	0.23	120.07	215.58	25.53	177.13	1.93		14.47	97.61	1288.03	0.52	0.66	2.63
		Maximum	8.44	478.00	5406.00	64.40	1.04	163.00	569.00	38.80	504.00	5.24	0.00	43.70	241.00	3480.00	9.08	0.96	14.10
		Minimum	7.43	32.60	230.00	2.80	0.01	69.00	23.40	11.80	13.40	0.17	0.00	5.35	21.40	60.00	0.01	0.43	0.01
		Coeff of Variation%	3.31	80.55	93.56	76.77	104.45	23.41	89.12	32.85	100.94	78.60		67.06	68.30	100.98	319.32	25.45	154.23
	VDD8	Average	7.85	51.76	373.10	43.78	0.29	99.00	39.27	20.07	25.63	0.93	0.14	6.88	33.97	152.21	0.41	0.41	0.10
		Maximum	8.90	113.40	842.00	82.00	1.42	149.00	99.20	37.60	64.50	3.18	0.21	10.30	62.10	436.00	2.32	0.63	0.51
		Minimum	7.32	31.10	208.00	14.40	0.02	68.00	20.40	14.10	13.10	0.10	0.10	5.06	22.80	59.10	0.02	0.25	0.01
		Coeff of Variation%	3.85	41.54	46.72	45.78	101.19	19.80	51.00	28.04	59.79	85.19	43.45	21.61	32.44	70.37	118.22	24.37	131.86
	VDD9	Average	7.96	74.41	565.20	24.97	0.25	110.90	60.62	22.75	40.87	0.46		8.06	45.95	269.03	0.29	0.51	0.05
		Maximum	8.53	158.00	1410.00	54.40	0.93	158.00	150.00	46.20	115.00	1.06	0.00	13.60	98.70	780.00	1.63	0.74	0.26
		Minimum	7.35	30.30	240.00	1.60	0.02	61.00	25.30	12.40	14.50	0.20	0.00	5.74	21.60	90.00	0.01	0.32	0.01
		Coeff of Variation%	3.49	41.88	49.35	67.18	100.47	21.24	51.81	32.04	59.89	48.01		21.80	39.03	62.06	121.21	17.12	140.19
	VDD10	Average	7.87	96.47	761.40	33.74	0.23	115.20	81.99	24.31	59.98	0.25		9.80	52.21	400.72	0.21	0.67	0.14
		Maximum	8.58	248.00	2232.00	537.00	0.73	179.00	217.00	72.00	206.00	0.41	0.00	17.00	165.00	1284.00	0.77	1.12	0.98
		Minimum	6.53	31.30	248.00	0.80	0.01	60.00	25.40	9.76	14.80	0.10	0.00	5.71	12.00	80.10	0.01	0.39	0.01
		Coeff of Variation%	6.53	56.70	65.31	285.22	100.97	31.65	59.11	50.76	77.87	49.49		28.55	61.04	75.02	117.26	29.94	180.85
	VDD11	Average	7.87	107.67	873.72	13.30	0.23	121.69	92.54	26.92	64.28	1.05		9.63	66.07	457.89	0.24	0.59	0.33
		Maximum	8.50	231.00	2058.00	41.20	0.92	175.00	223.00	61.70	167.00	8.50	0.00	15.90	146.00	1210.00	1.31	0.83	3.88
		Minimum	6.78	31.20	244.00	0.80	0.01	63.00	24.50	12.80	14.20	0.00	0.00	5.68	22.40	76.10	0.01	0.42	0.01
		Coeff of Variation%	4.78	51.73	59.03	86.29	110.38	25.88	57.87	46.23	64.31	250.95		26.62	54.28	67.34	135.13	18.36	266.42
	VDD12	Average	8.14	101.19	797.33	25.55	0.33	112.04	78.44	26.67	60.93	0.24	8.96	10.85	71.85	412.65	0.18	0.65	0.10
		Maximum	9.04	195.40	1590.00	246.00	3.00	182.00	132.00	44.50	143.00	0.57	8.96	34.30	246.00	939.00	0.64	0.92	0.36
		Minimum	7.12	31.10	248.00	1.20	0.01	63.00	25.10	13.20	14.40	0.10	8.96	5.76	21.60	0.05	0.01	0.41	0.01
		Coeff of Variation%	5.97	47.80	52.78	186.92	186.54	25.13	46.74	39.02	61.42	68.01		50.28	65.81	65.37	107.70	23.34	109.48
	VDD18	Average	6.60	35.63	271.52	72.07	1.25	33.67	25.49	9.53	16.48	0.34		6.73	22.57	148.45	0.16	0.58	0.66
		Maximum	8.50	168.00	1456.00	320.00	4.90	222.00	145.00	35.10	126.00	0.90	0.00	20.60	82.70	881.00	1.16	2.34	3.83
		Minimum	4.69	5.57	36.00	2.80	0.02	5.00	2.57	1.90	1.17	0.10	0.00	1.17	1.11	14.50	0.02	0.23	0.01
		Coeff of Variation%	15.24	99.60	113.15	138.68	128.39	159.38	123.68	104.05	159.08	89.73		70.81	91.08	128.55	158.85	80.53	171.40

Mine	Sample Location		pH	EC mS/m	TDS mg/ℓ	SS	Fe mg/ℓ	TALK	Ca mg/ℓ	Cl mg/ℓ	Mg mg/ℓ	NO_3 mg/ℓ	PO_4 mg/ℓ	K mg/ℓ	Na mg/ℓ	SO_4 mg/ℓ	Al mg/ℓ	F mg/ℓ	Mn mg/ℓ
		SANS 241 2015	5-9.7	170	1200	-	2	-	-	300	-	11	-	-	200	500	-	1.5	0.4
		RQO for RU11		111	-	-	-	-	-	-	-	4	0.125	-	-	500			
VDDC	VDD20	Average	6.60	35.63	271.52	72.07	1.25	33.67	25.49	9.53	16.48	0.34		6.73	22.57	148.45	0.16	0.58	0.66
		Maximum	8.50	168.00	1456.00	320.00	4.90	222.00	145.00	35.10	126.00	0.90	0.00	20.60	82.70	881.00	1.16	2.34	3.83
		Minimum	4.69	5.57	36.00	2.80	0.02	5.00	2.57	1.90	1.17	0.10	0.00	1.17	1.11	14.50	0.02	0.23	0.01
		Coeff of Variation%	15.24	99.60	113.15	138.68	128.39	159.38	123.68	104.05	159.08	89.73		70.81	91.08	128.55	158.85	80.53	171.40
	VDD21	Average	8.05	261.64	2370.00	74.46	0.15	112.57	248.21	93.71	204.29	0.17		14.39	173.10	1500.71	0.08	0.56	0.17
		Maximum	8.59	552.00	4840.00	590.00	0.55	202.00	503.00	338.00	559.00	0.31	0.00	53.80	644.00	4118.00	0.54	1.36	1.28
		Minimum	7.06	168.00	1322.00	3.20	0.01	16.00	145.00	31.50	101.00	0.00	0.00	7.85	72.60	762.00	0.02	0.31	0.01
		Coeff of Variation%	5.14	36.89	38.16	205.82	118.56	46.71	38.49	79.70	56.89	76.39		81.74	82.26	54.47	165.44	47.92	230.24
	VDD22	Average	7.26	59.70	496.50	976.90	0.21	46.75	48.53	16.57	39.80			4.57	31.60	286.45	0.12	0.73	0.65
		Maximum	8.31	168.00	1456.00	3685.00	0.39	119.00	145.00	31.50	126.00	0.00	0.00	11.50	72.60	881.00	0.27	1.36	2.21
		Minimum	6.57	20.40	150.00	4.80	0.07	11.00	15.60	9.20	9.89	0.00	0.00	1.30	11.60	60.00	0.05	0.39	0.01
		Coeff of Variation%	10.24	121.00	128.89	185.07	77.96	104.62	132.55	62.95	144.42			105.09	87.95	138.55	87.73	59.94	162.41
	VDD23	Average	7.44	182.67	1654.56	126.02	0.20	155.56	167.32	23.87	94.80	0.33	0.26	12.17	166.74	942.44	0.09	0.89	1.03
		Maximum	8.34	433.00	4482.00	1245.00	1.07	381.00	516.00	48.90	293.00	0.98	0.35	53.40	418.00	2839.00	0.33	1.94	8.00
		Minimum	6.20	35.40	256.00	10.80	0.02	10.00	30.60	5.56	17.50	0.11	0.12	0.30	23.60	70.20	0.01	0.33	0.01
		Coeff of Variation%	6.28	80.06	89.35	209.30	129.45	56.12	87.60	53.72	87.50	77.42	38.22	92.64	89.02	101.80	84.58	37.63	228.71
	Douglas 1	Average	7.80	47.01	340.13	42.19	0.36	85.63	34.04	18.13	21.77	0.64	0.00	6.62	31.74	140.74	0.31	0.45	0.06
		Maximum	8.23	69.80	526.00	178.00	1.35	113.00	45.60	23.80	32.70	1.22	0.00	8.83	61.90	229.00	1.65	0.60	0.43
		Minimum	7.49	28.30	224.00	4.80	0.02	65.00	22.90	13.20	13.70	0.21	0.00	5.24	22.10	75.90	0.03	0.29	0.01
		Coeff of Variation%	2.70	22.01	23.55	107.37	131.92	13.72	21.72	14.71	26.72	45.93		14.93	30.33	32.94	137.12	18.52	223.21

Interpretations of the surface water quality monitoring results summarised in **Table 10-6** are discussed below:

pH

On average, all the monitoring points are within the required pH range of 5 to 9.7, as illustrated in **Figure 10-10**.

Minimum recorded pH levels which fell out of the required pH range, and lower than the required 5.9 was recorded at monitoring point VDD20 - 2603 Attenuation dam1. A decrease in the pH level may be due to mining activities.

Sulphate (SO_4)

Sulphate is a key indicator of water affected by coal mining and the average SO4 concentrations exceed the acceptable limit at a number of monitoring points as indicated in **Table 10-6** and **Figure 10-11**. This is attributed to mining activities in the area.

Electrical Conductivity (EC)

Electrical conductivity is a measure of salinity or total salt content of water. Accumulation of salts can influence the potential to use the water downstream by water users, such as irrigation for agriculture, as well as livestock watering. In **Table 10-6** and **Figure 10-12**, elevated EC levels were noted for monitoring points VDD1 (2538 V01 Springbokspruit @ entrance to mine property), VDD2 (2542 U/s of vlei shaft & V7 con. Belt), VDD6 (2551 V16 Olifants D/S of PSS discard dump), VDD7 (V 22 Douglas Upstream Bethal Bridge), VDD21 (2604 Outlet of the Southern Canal) and VDD23 (Attenuation Berm 2).

Elevated EC is attributed by the existing mining activities, as well as the farming activities in the area.

Aluminium (Al)

The concentration of dissolved aluminium in unpolluted water at neutral pH is typically 0.005 mg/ℓ or less. In water with a low pH, or where soluble aluminium complexes are present, the dissolved aluminium concentration can increase.

On average, elevated aluminium concentrations were noted at the following monitoring locations:

- VDD1 - 2538 V01 Springbokspruit @ entrance to mine property
- VDD2 - 2542 U/s of vlei shaft & V7 con. belt
- VDD5 - 2545 V09 Oxbow 9 ponded water
- VDD21 - 2604 Outlet of the Southern Canal
- VDD22 - 2606 Exit of the Northern canal
- VDD23 - Attenuation Berm 2

Elevated aluminium concentrations may be due to agricultural activities and mining activities in the surrounding area.

Manganese (Mn)

On average, elevated manganese concentrations were noted at the following monitoring locations:

- VDD2 - 2542 U/s of vlei shaft & V7 con. belt
- VDD6 - 2551 V16 Olifants D/S of PSS discard dump

- VDD7 - V22 Douglas Upstream Betal Bridge
- VDD18 - 2569 VW Olifant tributary from PSS dump pollution control dam
- VDD20 - 2603 Attenuation dam1
- VDD22 - 2606 Exit of the Northern canal
- VDD23 - Attenuation Berm 2

Elevated manganese concentrations may be due to agricultural activities and mining activities in the surrounding area.

Other constituents

Analysis of other constituents in **Table 10-6** indicates the following:

- On average, sodium (Na) concentrations at the majority of locations was within range when compared to the SANS241 guidelines, except for VDD2 - 2542 U/s of vlei shaft & V7 con. belt, which can be attributed to mining in the area;
- The maximum recorded Nitrate (NO_3) concentrations were elevated at monitoring points VDD2 (2542 U/s of vlei shaft & V7 con. Belt), VDD7 (V 22 Douglas Upstream Bethal Bridge), and VDD11 (2558 V40 Plant water u/g railway boreholes @ small bridge), when compared to the RQOs, which may be attributed mining activities in the area;
- Phosphate (PO_4) concentrations on average, as well as maximum recorded, at monitoring points VDD6 (2551 V16 Olifants D/S of PSS discard dump), VDD8 (2555 V30 Olifants D/S of confluence with Steenkoolspruit), VDD12 (2547 V11 Olifants @ DWAF Weir U/S PSS discard dump) and VDD23 (Attenuation Berm 2) was elevated when compared to the RQOs, which may be attributed to farming activities in the area;
- Although there are no guideline limitations provided for suspended solids, several points show on average elevated suspended solids and highly elevated suspended solids for the maximum recorded at the monitoring points VDD2, VDD6, VDD22 and VDD23. These are all within the mining area and therefore may be attributed to mining in the area.

Therefore, in terms of surface water quality within the study area there are visible impacts associated with mining activities.

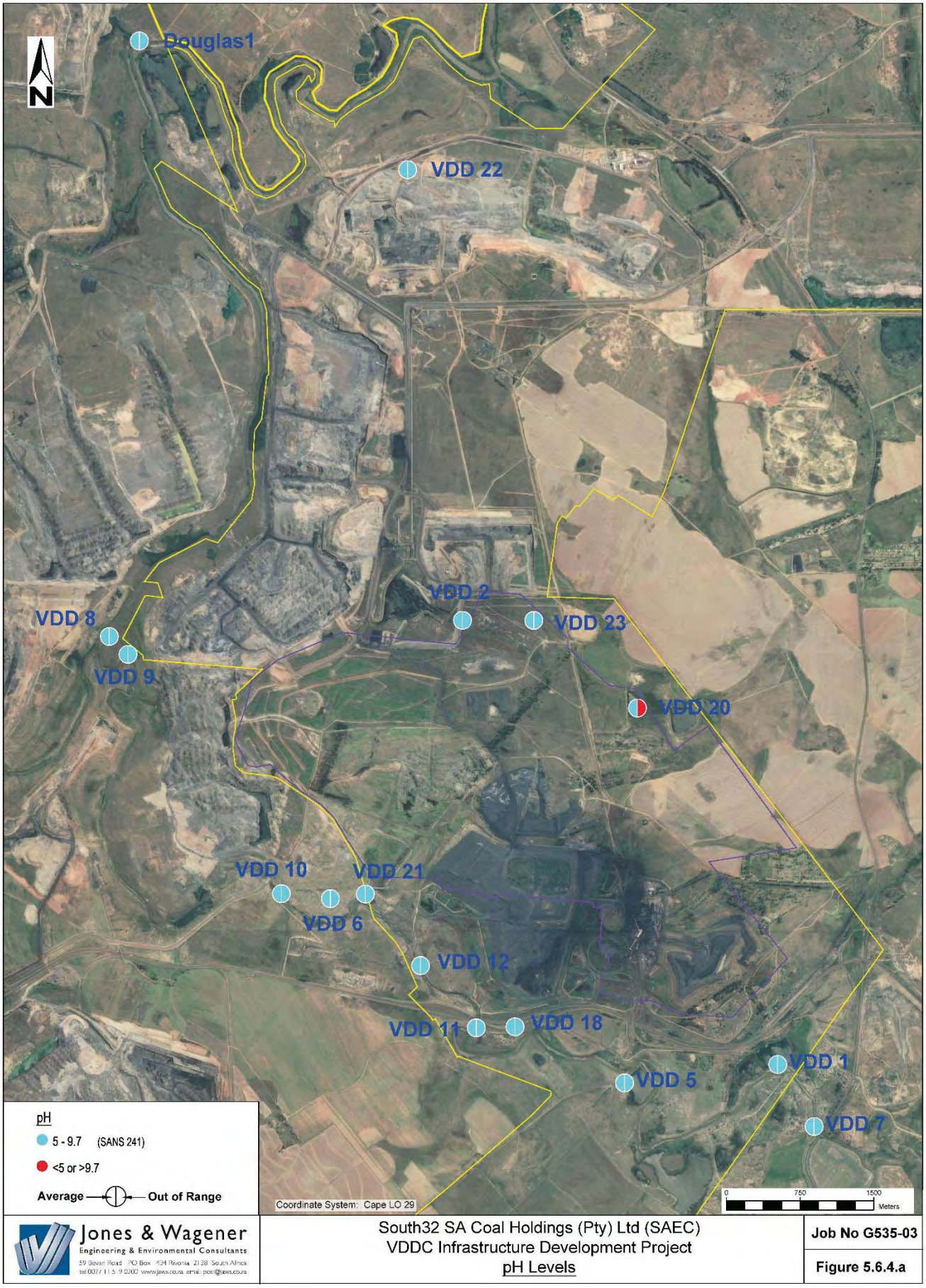


Figure 10-10: pH levels measured at surface water monitoring locations (J&W, 2018c)

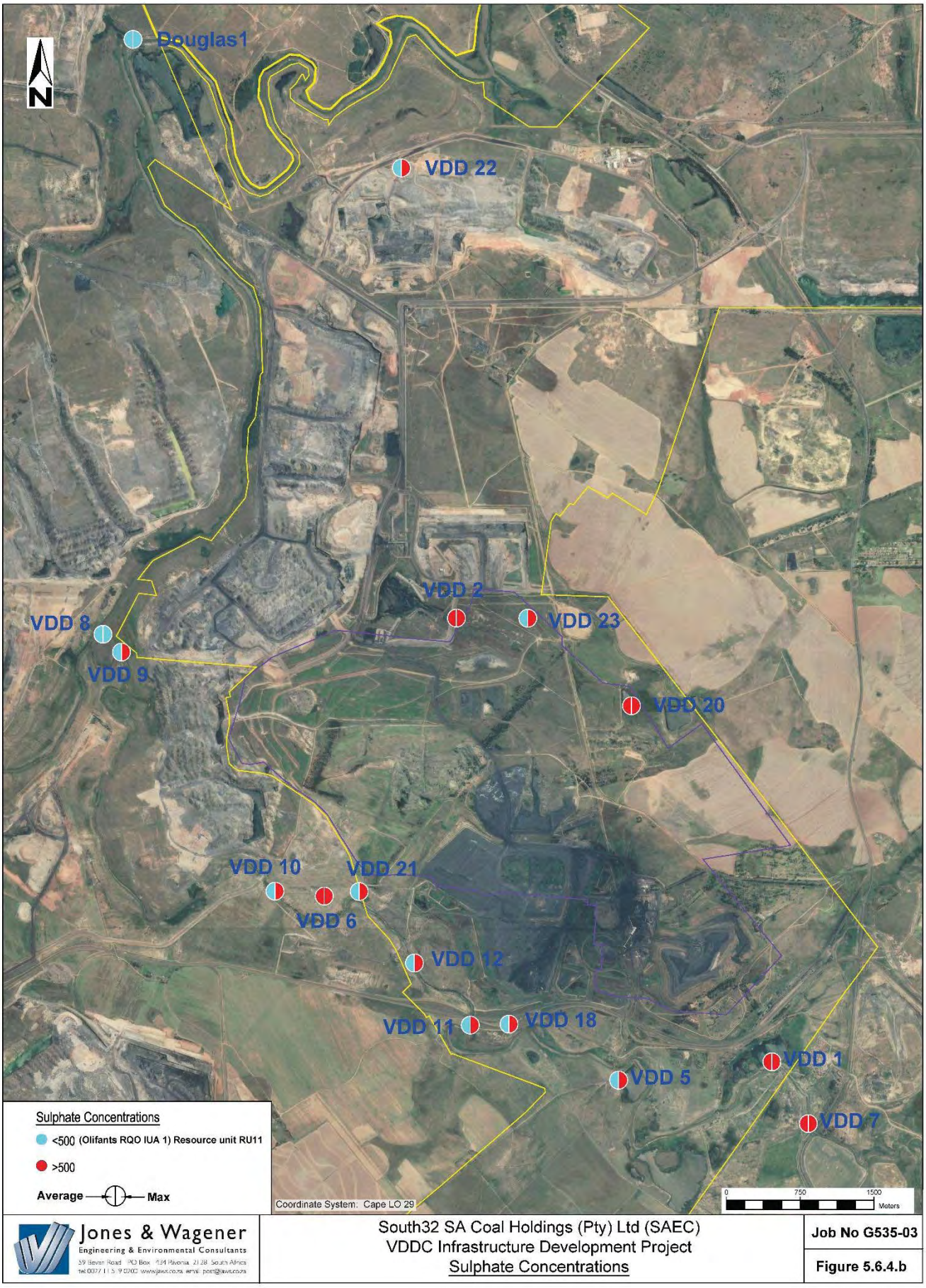


Figure 10-11: Sulphate (SO_4) concentrations measured at surface water monitoring locations (J&W, 2018c)

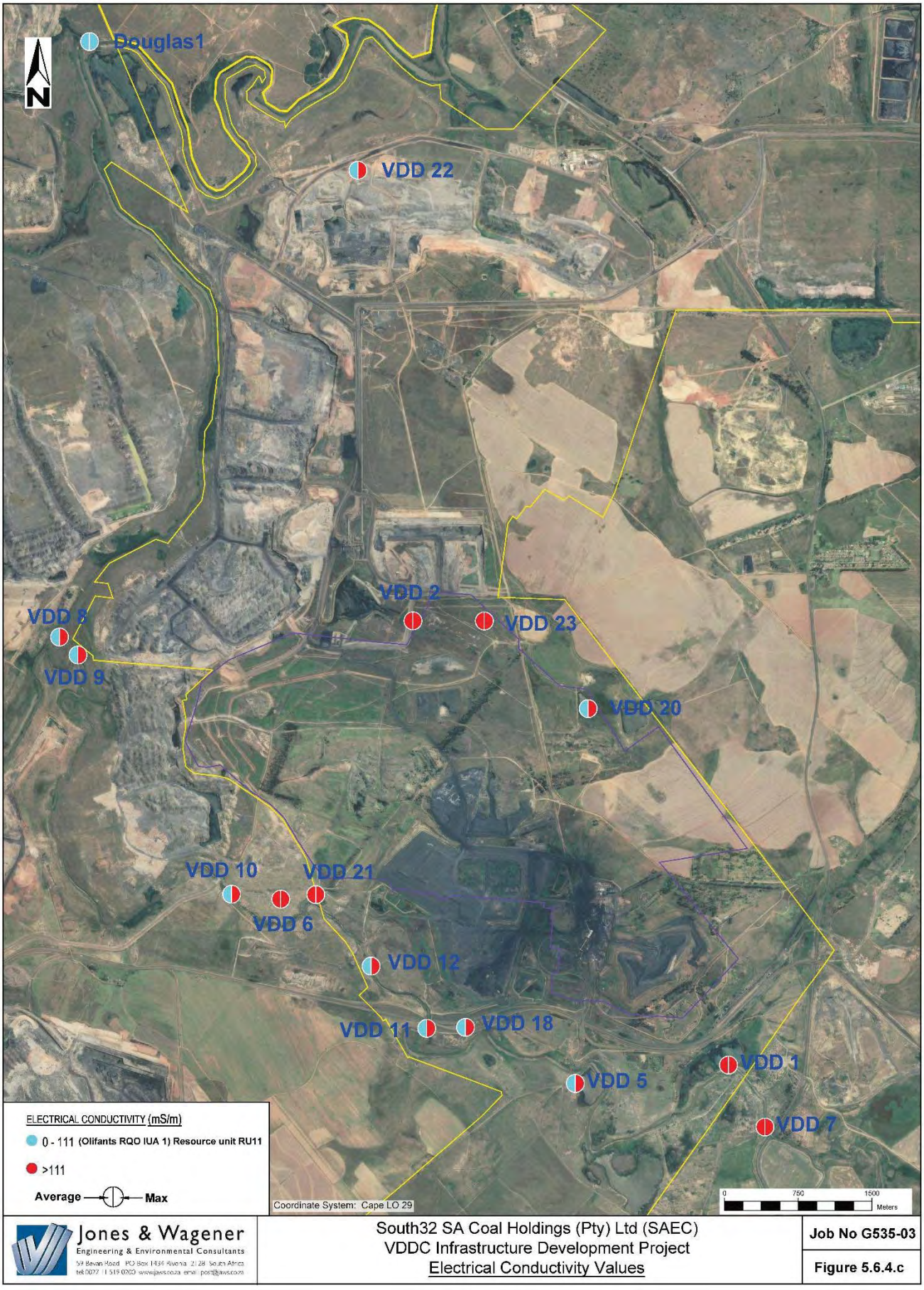


Figure 10-12: Electrical conductivity (EC) levels measured at surface water monitoring locations (J&W, 2018c)

10.1.1.6. Wetlands

Delineated wetlands

The extent of delineated wetlands is indicated on **Figure 10-13**. The following wetland hydrogeomorphic (HGM) units have been identified on site:

- Riparian area
- Channelled Valley Bottom;
- Unchannelled Valley Bottom;
- Hillslope Seep;
- Depression (Pan).

An ecological assessment was done by The Biodiversity Company (TBC) for the wetland systems that will either be directly impacted on by the proposed project, or are at risk due to the systems being downslope of the project area[3].

Wetland Present Ecological State (PES)

The wetlands have all been impacted on by the historical and current (predominantly) mining operations in the area, with local agricultural activities also impacting on the systems, specifically the systems associated with the Olifants River. The mining operations have altered the topography of the landscape, resulting in altered flow dynamics of the catchment areas. To manage water for these areas, watercourses have been diverted, trenches dug to intercept flows, and dams constructed to attenuate flows, all having an impact on the hydrology of these systems. The development of the catchment area and the altered hydrology have modified the geomorphology of these systems. These modifications include encroachment of wetland, reducing the system extent, and increased wetland area extent due to storm water inputs. Vegetation has also been altered, largely due to vegetation being cleared and the establishment of alien vegetation in the area.

A summary of key aspects that have contributed to the impacted state of the wetlands includes the following:

- The operation, decommissioning and rehabilitation of mining areas within the Project area;
- Agricultural cultivation on the periphery of the project area, and south of the Olifants River;
- Development of the catchment area, including roads, dams and crossings;
- The management of water within the project area, including diversions, storm water management and control dams; and
- The establishment of alien vegetation (TBC, 2018).

The PES ratings are indicated in **Table 10-7** and shown on **Figure 10-14**. The PES of wetlands that may be impacted as a result of the proposed infrastructure development is rated as category C (moderately modified) to category D (largely modified).

[3] The riparian area has been delineated for the project, and an ecological assessment of the Olifants River included in the aquatic assessment component of the project.

Table 10-7: Wetland PES for the assessed systems (TBC, 2018)

Wetland	Hydrology		Geomorphology		Vegetation	
	Rating	Score	Rating	Score	Rating	Score
Channelled Valley Bottom	C: Moderately Modified	3.5	C: Moderately Modified	3.0	C: Moderately Modified	3.8
Overall PES Score	3.4		Overall PES Class		C: Moderately Modified	
Unchannelled Valley Bottom	D: Largely Modified	4.7	D: Largely Modified	5.2	C: Moderately Modified	3.5
Overall PES Score	4.5		Overall PES Class		D: Largely Modified	
Hillslope Seep	E: Seriously Modified	7.8	D: Largely Modified	4.4	D: Largely Modified	4.2
Overall PES Score	5.8		Overall PES Class		D: Largely Modified	
Depression (Pan)	C: Moderately Modified	3.5	C: Moderately Modified	2.5	C: Moderately Modified	3.5
Overall PES Score	3.2				C: Moderately Modified	

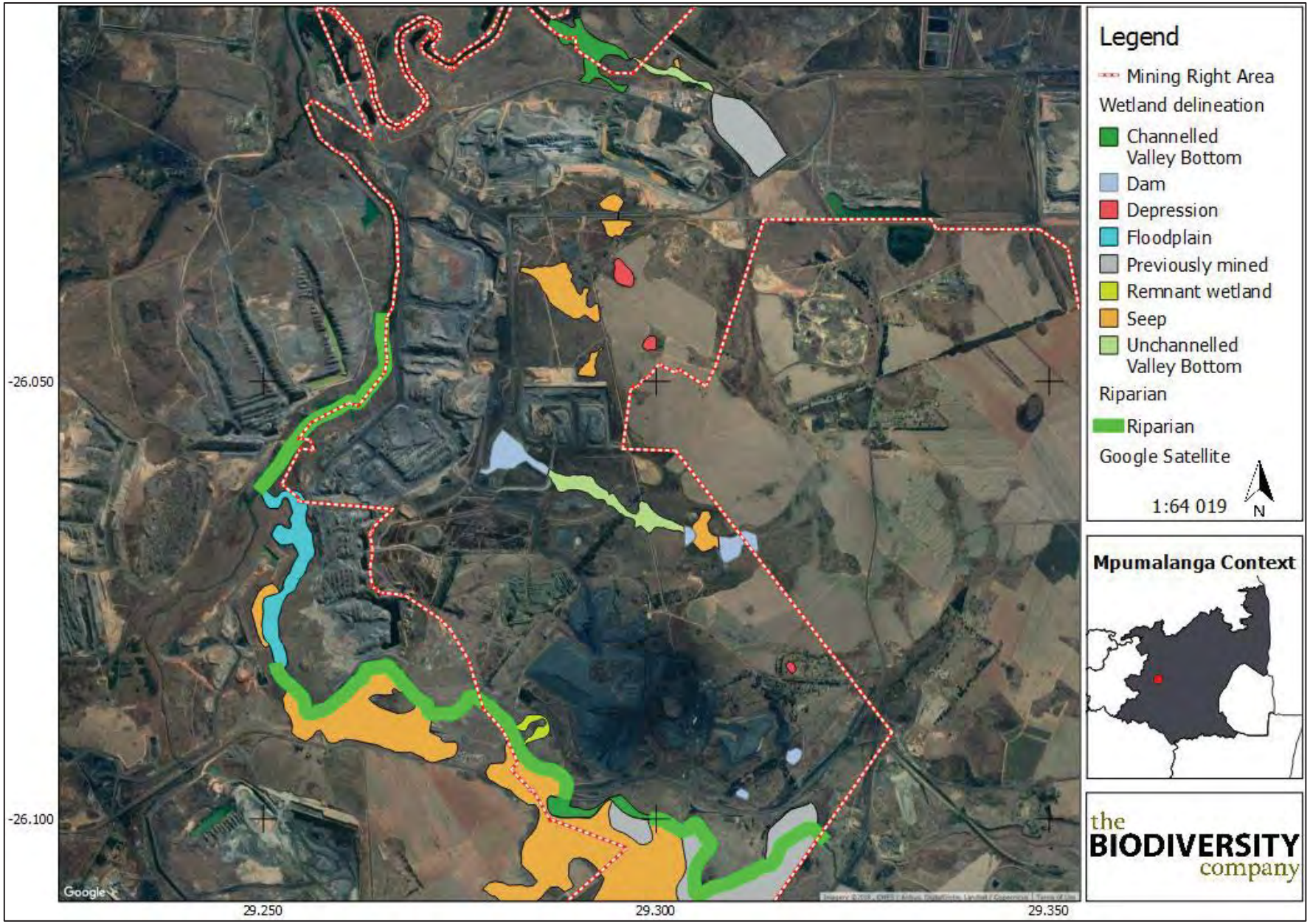


Figure 10-13: Delineated wetlands (TBC, 2018)

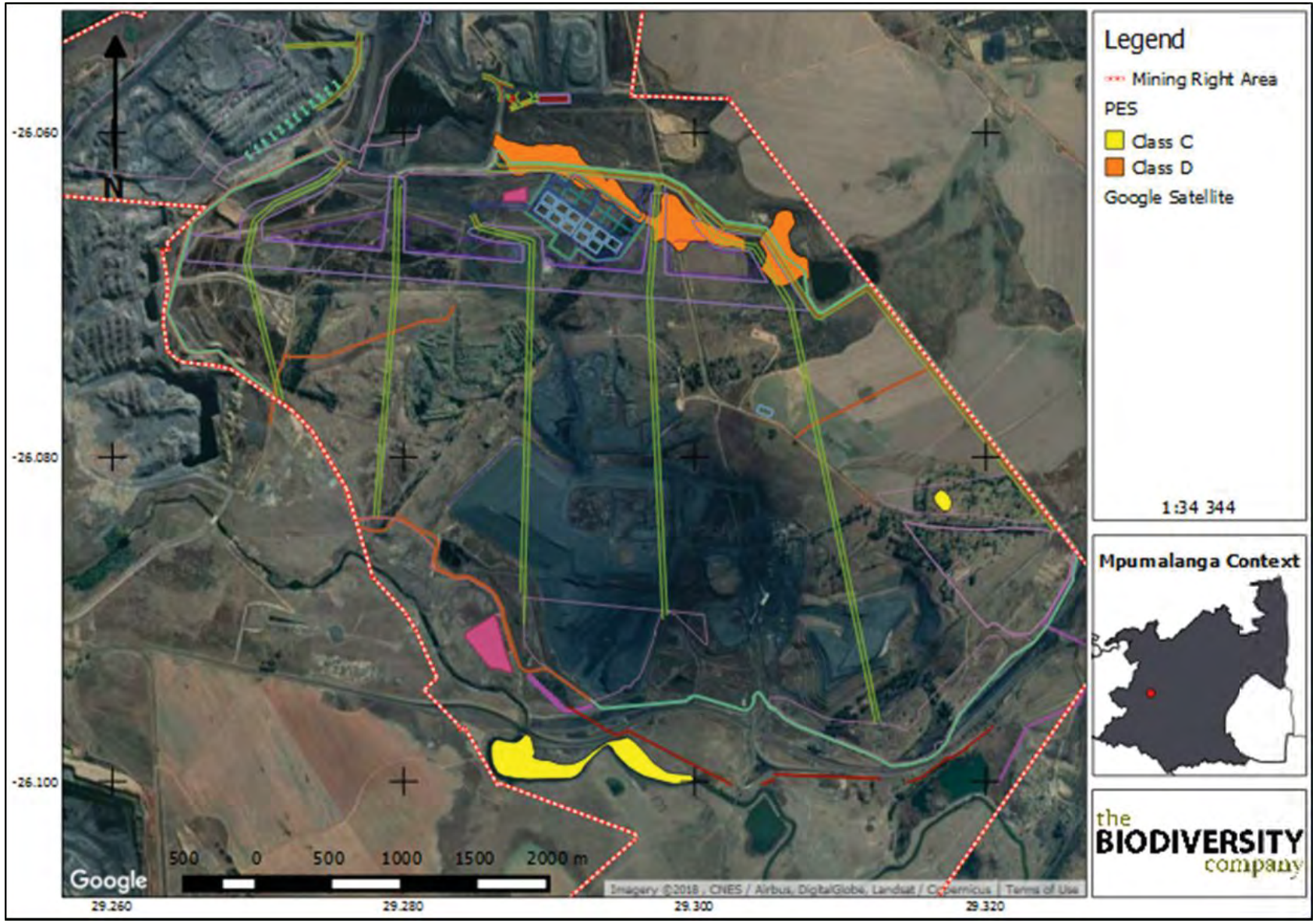


Figure 10-14: Present Ecological State (PES) of wetlands (TBC, 2018)

Wetland Ecosystem Services

The channelled valley bottom wetland and the depression were the only two HGM units that had an overall intermediate service rating, with the unchanneled valley bottom system and the seepage area having an overall moderately low service rating. Two services considered to provide a moderately high level of benefit are the attenuation of floods and streamflow regulation, with these service ratings only associated with the two valley bottom wetlands. No services provided by the wetlands provide a high level of benefit, as can be seen in **Table 10-8**.

Table 10-8: Level of ecosystem benefits provided by the assessed wetland units

Wetland Unit					Channelled Valley Bottom	Unchannelled Valley Bottom	Hillslope Seep	Depression (Pan)
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits	Flood attenuation		1.7	2.1	1.2	1.4
			Streamflow regulation		2.1	2.2	1.3	1.3
			Water Quality enhancement benefits	Sediment trapping	1.5	1.8	1.2	1.4
				Phosphate assimilation	1.3	1.7	1.1	1.8
				Nitrate assimilation	1.3	1.7	1.0	1.7
				Toxicant assimilation	1.4	1.6	1.1	1.8
				Erosion control	1.1	1.6	1.3	1.4
			Carbon storage		1.5	1.3	1.2	1.6
	Direct Benefits	Biodiversity maintenance			1.2	1.1	1.3	2.0
		Provisioning benefits	Provisioning of water for human use		1.8	0.6	0.7	0.8
			Provisioning of harvestable resources		1.1	0.2	0.2	1.0
			Provisioning of cultivated foods		1.5	0.0	0.0	0.2
		Cultural benefits	Cultural heritage		1.1	0.0	0.0	0.0
			Tourism and recreation		1.6	0.0	0.0	0.8
			Education and research		1.7	0.0	0.0	1.1
Overall					21.9	15.9	11.5	20.2
Average					1.5	1.1	0.8	1.3

Ecological Importance and Sensitivity

The Ecological Importance and Sensitivity (EIS) assessment was applied to the wetland units in order to assess the levels of sensitivity and ecological importance of the systems. The results of the assessment are shown in **Table 10-9** and **Figure 10-15**. The EIS for all of the wetland units, with the exception of the two valley bottom system was rated as moderate. The EIS of the two valley bottom wetland systems was rated as high. This "high" rating is partially attributed to the location of the project area within the Olifants River catchment. The catchment is under stress due to mining, power stations, urbanization and agriculture, and the ability of these systems to contribute towards water

quality enhancement and regulation, a high importance and conservation value is placed on these systems (TBC, 2018).

Table 10-9: EIS for the assessed wetland units (TBC, 2018)

Wetland Importance and Sensitivity	Channelled Valley Bottom	Unchannelled Valley Bottom	Hillslope Seep	Depression (Pan)
Ecological Importance & Sensitivity	2.2	2.3	1.2	1.6
Hydrological / Functional Importance	1.5	1.8	1.2	1.6
Direct Human Benefits	1.4	1.6	1.2	1.6

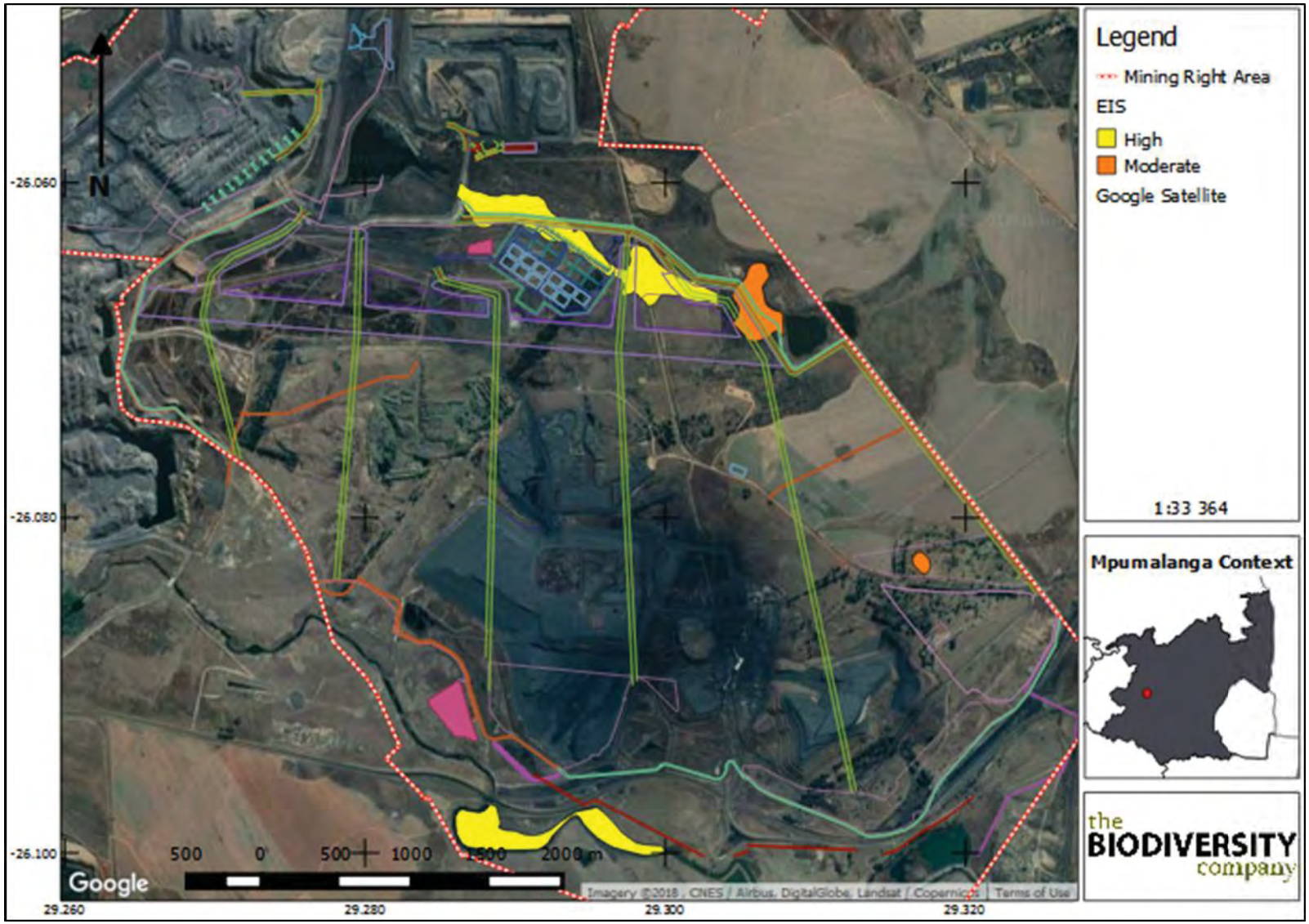


Figure 10-15: Ecological Importance and Sensitivity (EIS) of wetlands (TBC, 2018)

10.1.1.7. Aquatic Ecosystems

In-situ water quality

In situ water quality analysis results from the August 2018 survey are provided in **Table 10-10.** The sampling sites selected were located upstream (O1) to downstream (O5) of VDDC on the Olifants River and are shown in **Figure 10-16.**

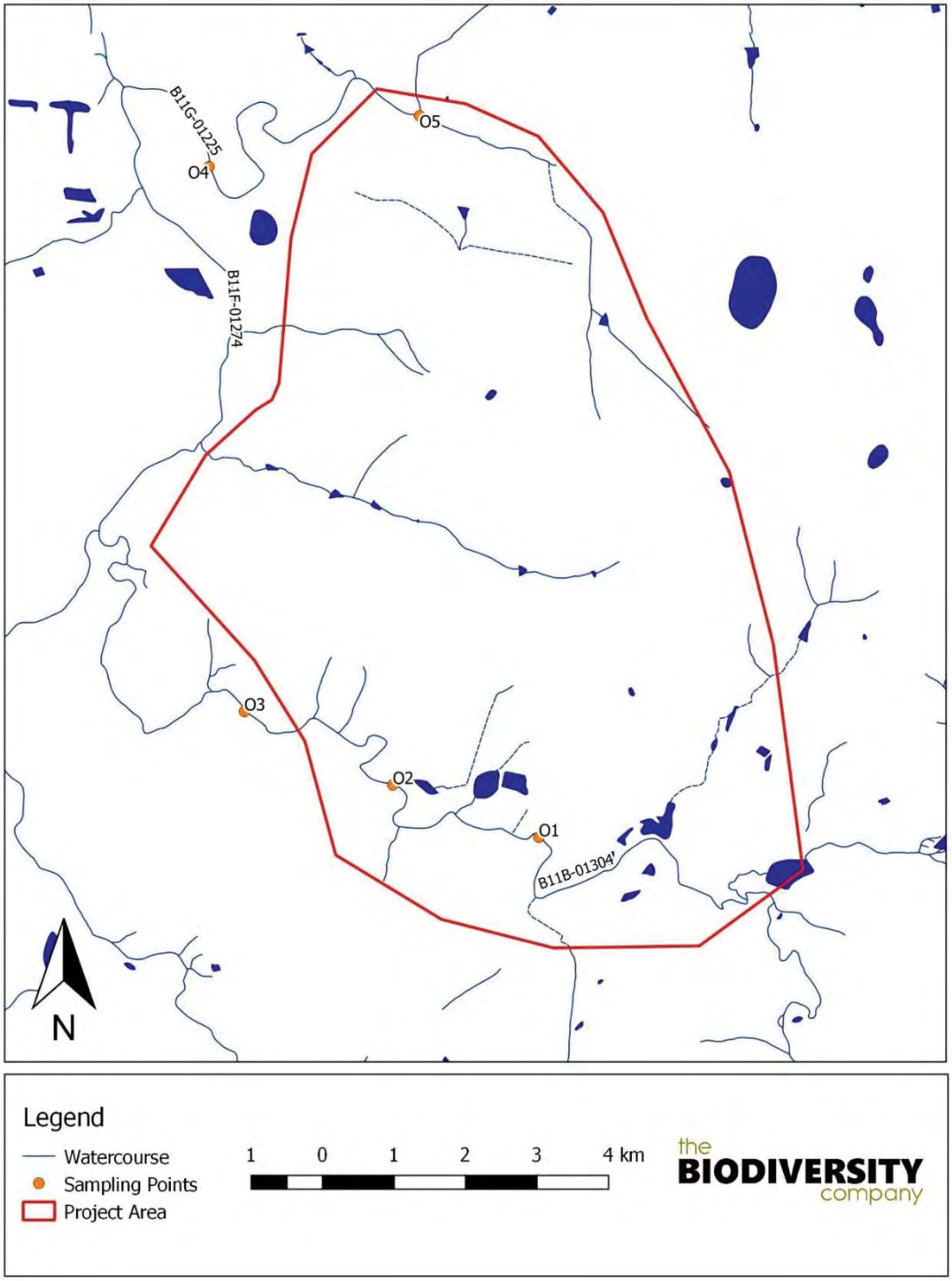


Figure 10-16: Layout of the selected aquatic sampling points (TBC, 2018)

Table 10-10: In situ Water Quality Results of August 2018 sampling (TBC, 2018)

Site		pH	EC (mS/m)	Dissolved Oxygen (mg/ℓ)	Temperature (°C)
TWQR*		6.5-9.0	N/A	>5.00	5-30
O1	On Olifants River, upstream	7.8	97	5.6	15
O2	On Olifants River	7.9	90	6.4	15
O3	On Olifants River	8.0	113	6.8	14
O4	On Olifants River, adjacent/downstream	8.3	76	6.1	18
O5	On Olifants River, downstream	7.4	79	6.4	17
*TWQR – Target Water Quality Range for Aquatic Ecosystems					

The results of the in situ water quality assessment indicated pH ranges from 7.4 at O5 to 8.3 at O4. The levels of pH were within the recommended guidelines values for aquatic ecosystems of between 6.5-9.0 (DWAF, 1996). These guideline values were selected considering their direct applicability to local aquatic ecology. The levels of conductivity were recorded to range from 76 mS/m at O4 to 113 mS/m O3 indicating the level of dissolved solids. Although no limits have been prescribed for the concentration of dissolved solids and their effect on aquatic ecology, elevated concentrations of dissolved solids are indicative of catchment landuse modification. The alteration of landuse in the catchment exposes soils and various minerals to increased weathering which typically results in an increase in dissolved solid concentrations in watercourses. Based on the geomorphological layout of the considered watercourse and the extensive coal mining and power generation activities within the catchment area, the levels of dissolved solids would be considered to be in excessive concentration. The spatial trends of dissolved solids indicated a decrease downstream of the confluence with the Steenkoolspruit (B11F-1273) at the monitoring point O4. The decrease can be attributed to a water transfer scheme from an unknown origin. The levels of dissolved oxygen were found to range from 5.6 mg/l at O1 to 6.8 mg/l at O3. The levels of dissolved oxygen would not present an adverse condition to aquatic ecology. The water temperatures were found to range from 14 °C at O3 to 18 °C at O4. The water temperatures observed during this study would not negatively impact on local aquatic ecology (TBC, 2018).

Intermediate Habitat Integrity Assessment

The results of the Intermediate Habitat Integrity Assessment (IHIA) for the Olifants River indicated seriously modified (class E) instream habitat. The degree of modification can be attributed to several factors including flow, bed and channel modification. The modification of the various components of the instream habitat can be attributed to historical activities such as river diversions for open pits and incline shafts adjacent to the river channel. Riparian habitats in the Olifants River reach were found to be largely modified (class D). Stands of alien invasive *Populus alba* (Poplar) were observed in several areas in proximity to the river reach. In addition, stands of alien invasive *Myriophyllum aquaticum* (Parrots feather) were also observed in the marginal zones of the Olifants River (TBC, 2018). Results for the instream intermediate habitat integrity assessment are indicated in **Table 10-11.**

Table 10-11: Instream Intermediate Habitat Integrity Assessment for the Olifants River (TBC, 2018)

Criterion	Average Score	Score
Instream		
Water abstraction	5.00	2.80
Flow modification	21.67	11.27
Bed modification	20.00	10.40
Channel modification	21.67	11.27
Water quality	15.00	8.40
Inundation	20.00	8.00
Exotic macrophytes	13.33	4.80
Exotic fauna	10.00	3.20
Solid waste disposal	5.00	1.20
Total Instream Score		38
Instream Category		class E
Riparian		
Indigenous vegetation removal	13.33	6.93
Exotic vegetation encroachment	15.00	7.20
Bank erosion	11.67	6.53
Channel modification	18.33	8.80
Water abstraction	5.00	2.60
Inundation	16.67	7.33
Flow modification	16.67	8.00
Water quality	15.00	7.80
Total Riparian Score		44
Riparian Category		class D

Macroinvertebrate Community Assessment

The results of the macroinvertebrate assessment using the South African Scoring System Version 5 (SASS5) for the sites located in the Olifants River are presented in **Table 10-12**. The results indicated SASS5 scores which ranged from 55 at site O5, to 103 at site O3. The number of taxa obtained at the sites ranged from 13 at site O5, to 22 at site O3. The average score per taxon (ASPT) values obtained at the sites ranged from 4.2 at sites O2 and O4, to 4.6 at site O3. The ecological classes were found to range from class D (largely modified) at sites O1, O4 and O5, to class B at site O3 (TBC, 2018).

Table 10-12: Macroinvertebrate Assessment Results Recorded in the Olifants River (TBC, 2018)

Site	SASS5	Taxa	ASPT	*Class (Dallas, 2007)
O1	61	14	4.3	class D*
O2	76	18	4.2	class C
O3	103	22	4.6	class B
O4	64	15	4.2	class D*
O5	55	13	4.3	class D*
*Highveld Lower Ecoregion **SASS5 Interpretation Not Applicable due to Impoundment Conditions				

Fish community

No listed fish species are expected in the considered river reach. Of the thirteen expected indigenous fish species in the river reach, eight have been captured in the river reach since 2001 (TBC, 2018).

Overall Present Ecological Status of the Olifants River

The results of the PES assessment derived seriously modified (class E) conditions in the Olifants River reach considered in this assessment. Instream habitat modification has resulted in modified biological responses. Instream habitat modification can be attributed to extensive coal mining and power generation activities in the Olifants River catchment compounded by diffuse agricultural and urban runoff. The results of the PES assessment for the Olifants River are provided in **Table 10-13.**

Table 10-13: Present Ecological Status of the Olifants River assessed in the August 2018 survey (TBC, 2018)

Aspect Assessed	Ecological Category
Instream Ecological Category	38
Riparian Ecological Category	44
Aquatic Invertebrate Ecological Category	39
Ecostatus	class E

National Freshwater Ecosystem Priority Area (NFEPA) Status

In an attempt to better conserve aquatic ecosystems, South Africa has recently categorised its river systems according to set ecological criteria (i.e. ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act (NEM:BA) biodiversity goals.

Figure 10-17 shows the location of the VDDC project area in relation to wetland and river FEPAs. It can be seen that the project area overlaps with extensive wetland areas in the northern-, central- and southern portions. The southern portion of the VDDC project area, and specifically the infrastructure footprint area, is situated adjacent to two

perennial rivers – the Olifants and the Koringspruit. However, these rivers are classified as non-NFEPA rivers. Some FEPA rivers do occur to the east and north-east of the overall mining right area (TBC, 2018).

Mpumalanga Biodiversity Sector Plan Freshwater Assessment

The Mpumalanga Biodiversity Sector Plan (MBSP) Freshwater Assessment outlines priority areas for freshwater biodiversity in Mpumalanga. The resulting features are predominantly derived from the NFEPA products, layers include CBA Rivers (based on FEPA and free-flowing rivers), CBA Wetlands (based on FEPA wetlands), CBA Aquatic species (Odonata & crab taxa of conservation concern only), ESA Wetland Clusters (FEPA wetland clusters), and ESA Wetlands (all other non-FEPA wetlands).

The VDDC Project area in relation to the MBSP Freshwater Assessment overlaps with the following areas: Ecological Support Areas: Wetlands (ESAs), Heavily Modified Areas (HMAs), Other Natural Areas (ONAs), various small Dams and a Wetland Cluster in the central and northern portions of the mining right area as indicated **Figure 10-18**.

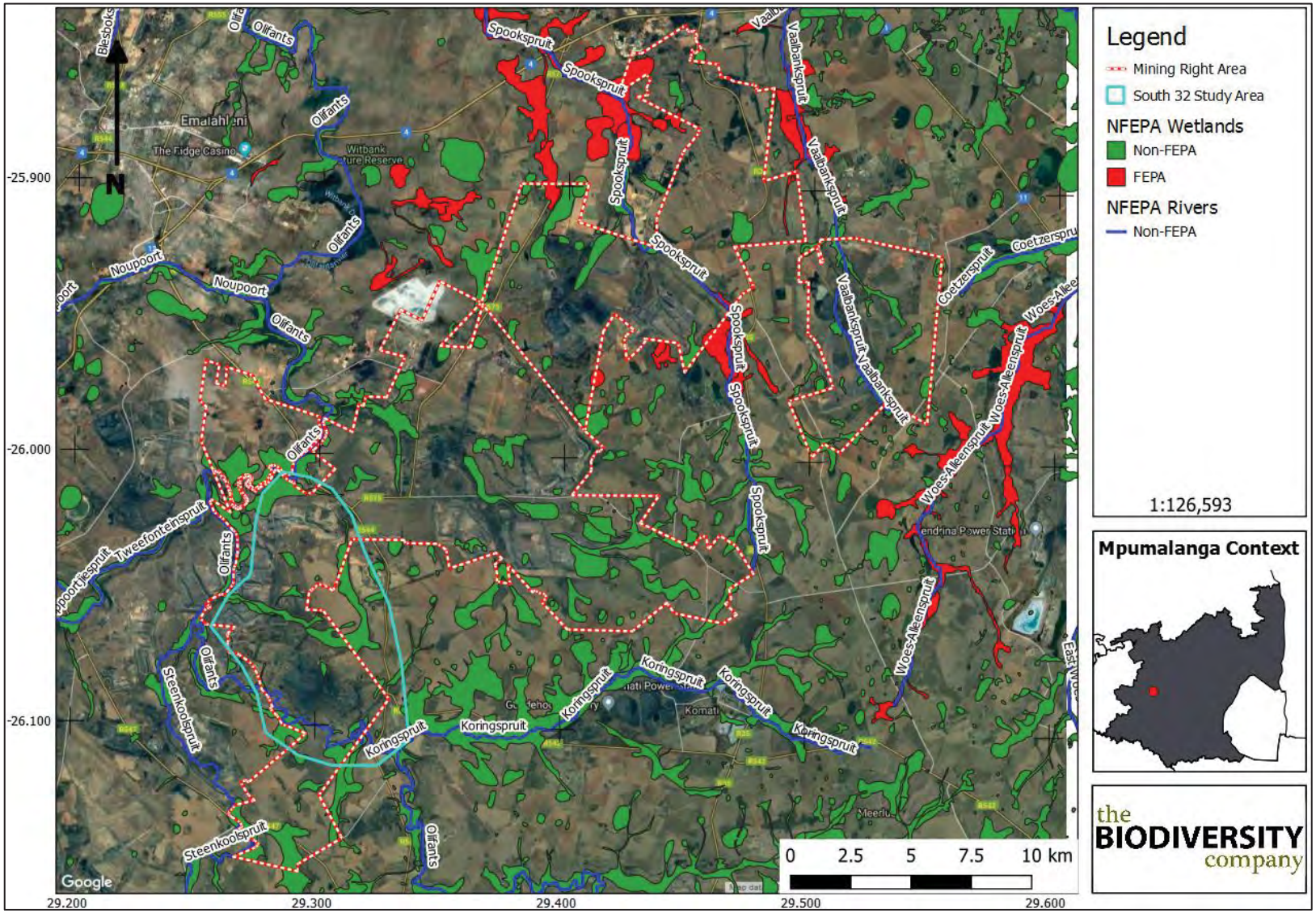


Figure 10-17: VDDC project area in relation to the National Freshwater Ecosystem Priority Areas (2011)

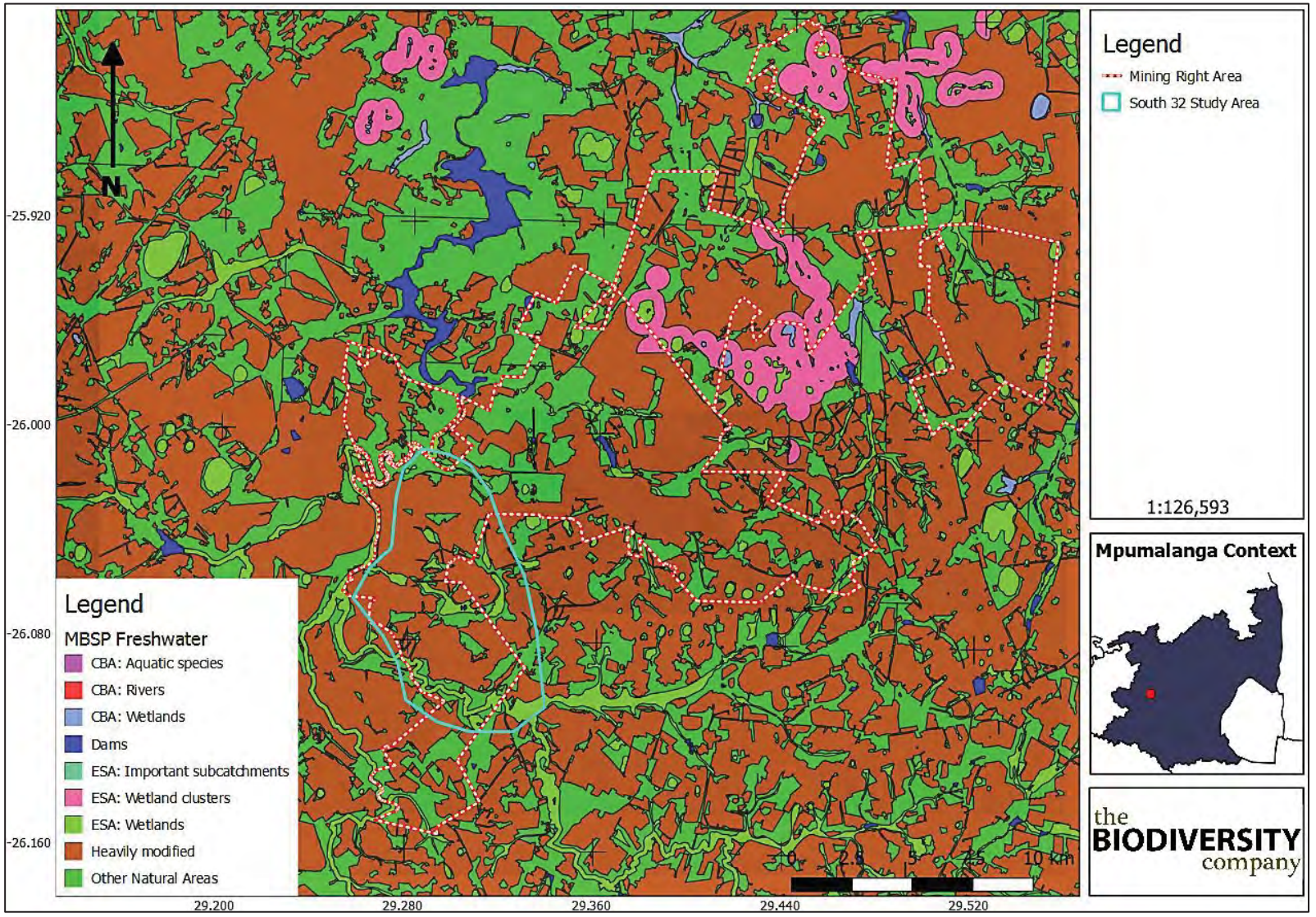


Figure 10-18: VDDC Project area in relation to the MBSP Freshwater Assessment (TBC, 2018)

10.1.1.8. Groundwater

Aquifer types

Three aquifers typically underlie the project area. These are:

- A shallow perched aquifer in the lower lying areas or depressions where a low, permeable, clayey ferricrete layer is overlain by alluvium and transported hillwash material. Wetlands commonly occur in these areas;
- A weathered aquifer, which extends to depths of approximately 20 metres below surface (mbs), depending on the depth of weathering. In the study area, this aquifer is expected to be clay-rich, with comparatively low aquifer parameters. This aquifer is therefore not considered to be a major aquifer, although it does play a role in recharge to the deeper hard-rock aquifer; and
- A deeper fractured rock aquifer, which is characterised by fractures, faults and contact zones with dolerite intrusions in the Karoo sediments. This aquifer underlies the weathered aquifer and extends down to the bottom of the No.2 coal seam (J&W, 2018b).

Aquifer classification

Based on information collected during the hydrocensus it can be concluded that the aquifer system in the study area can be classified as a "Minor Aquifer System", as the local population is not dependent on groundwater.

Aquifer parameters

The calculated mean aquifer parameters for the boreholes tested are presented in **Table** 10-14**.** Transmissivity values of less than 1.0 m^2/day are typical of Karoo rocks. Within these aquifers, the groundwater can either be found in fractures or it can exist as inter-granular groundwater.

Table 10-14: Mean aquifer parameters measured for boreholes in 2016 (J&W, 2018b)

Estimated Mean Parameter	Transmissivity (T)	Hydraulic Conductivity (K)	Storativity
	(m^2/day)	(m/day)	-
Weathered Aquifer			
Geometric Mean (2015)	1.0	0.080	N/A
Harmonic Mean (2015)	0.65	0.050	N/A
Calculated J&W Mean	0.83	0.070	N/A
JMA Slug Tests (2011)	-	0.040	-
Fractured Aquifer			
Geometric Mean (2015)	1.1	0.030	N/A
Harmonic Mean (2015)	0.73	0.020	N/A
Calculated Mean	0.92	0.030	N/A
JMA Slug Tests (2011)	-	0.0040	-

Groundwater vulnerability

Aquifer vulnerability indicates the likelihood for contamination to reach a specified position in the groundwater system after introduction at a location above the uppermost aquifer. The groundwater vulnerability was calculated to be 53%, which is considered a medium vulnerability (natural factors provide some protection to shield groundwater from contamination at the land surface, but mitigation measures will be required to prevent any surface contamination from reaching the groundwater table).

Aquifer protection

A Groundwater Quality Management Index of 4 was estimated for the study area from the ratings for the Aquifer System Management Classification. A medium-level groundwater protection is required for the aquifer. Reasonable and sound groundwater protection measures based on the modelling will therefore be recommended to ensure that no cumulative pollution affects the aquifer, even in the long term.

Groundwater levels

As groundwater levels follow topography, it can be assumed that groundwater flow takes place under unconfined to semi-confined conditions. Locally, and in general, groundwater flows from east to west towards the topographically low Olifants River at 1 505 mamsl.

Groundwater flow

Groundwater levels generally follow topography; therefore, it can be assumed that groundwater flow takes place under unconfined to semi-confined conditions. Locally, and in general, groundwater flows from east to west towards the topographically low Olifants River at 1 505 mamsl as indicated on **Figure 10-19**.

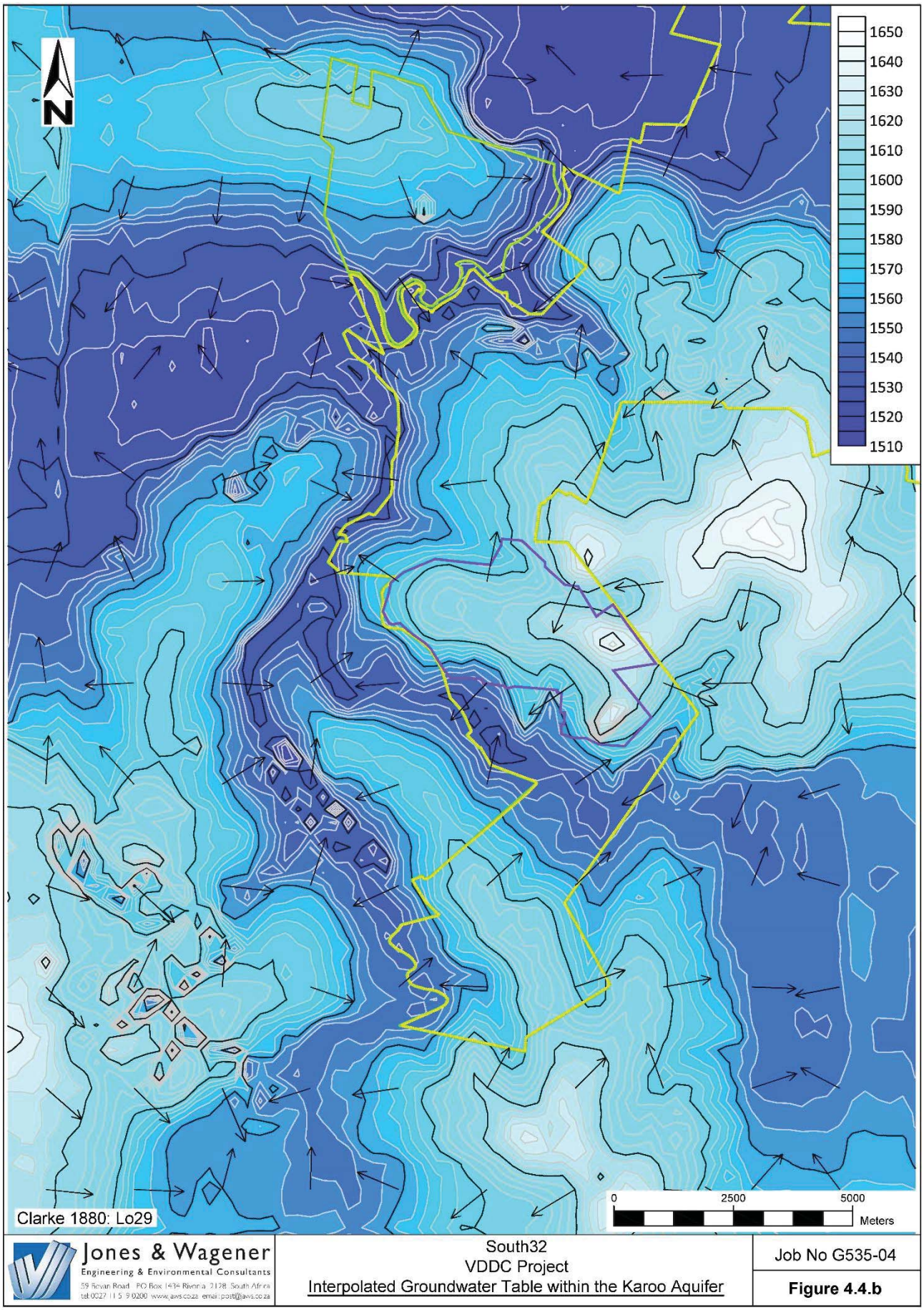


Figure 10-19: Interpolated groundwater table within the Karoo Aquifer (J&W, 2018b)

Groundwater recharge

The recharge in Karoo aquifers is generally in the range of between 2.0 – 5.0 % of the mean annual precipitation, which is approximately 705 mm/a in the VDDC project area. The groundwater recharge in the study area is estimated to be 3.5 % of the MAP, which is equal to 25 mm/a.

Groundwater quality

The more recent (January 2018) groundwater quality results are displayed in **Table 10-15** and **Table 10-16**. According to these results, elevated sulphate concentrations in boreholes SKS BH1 and NDB 6, as well as low pH in SKS BH 1 were recorded. The position of the monitoring boreholes is indicated in **Figure 10-21**.

The Piper diagram (refer to **Figure 10-20**) indicates that most samples have been affected by mining activities which is illustrated by the samples plotting in the top quadrant of the quadrilateral diamond. Samples unaffected by mining activities but plotting in the bottom and right quadrants of the quadrilateral diamond indicate water that is older and has undergone ion-exchange within the aquifer.

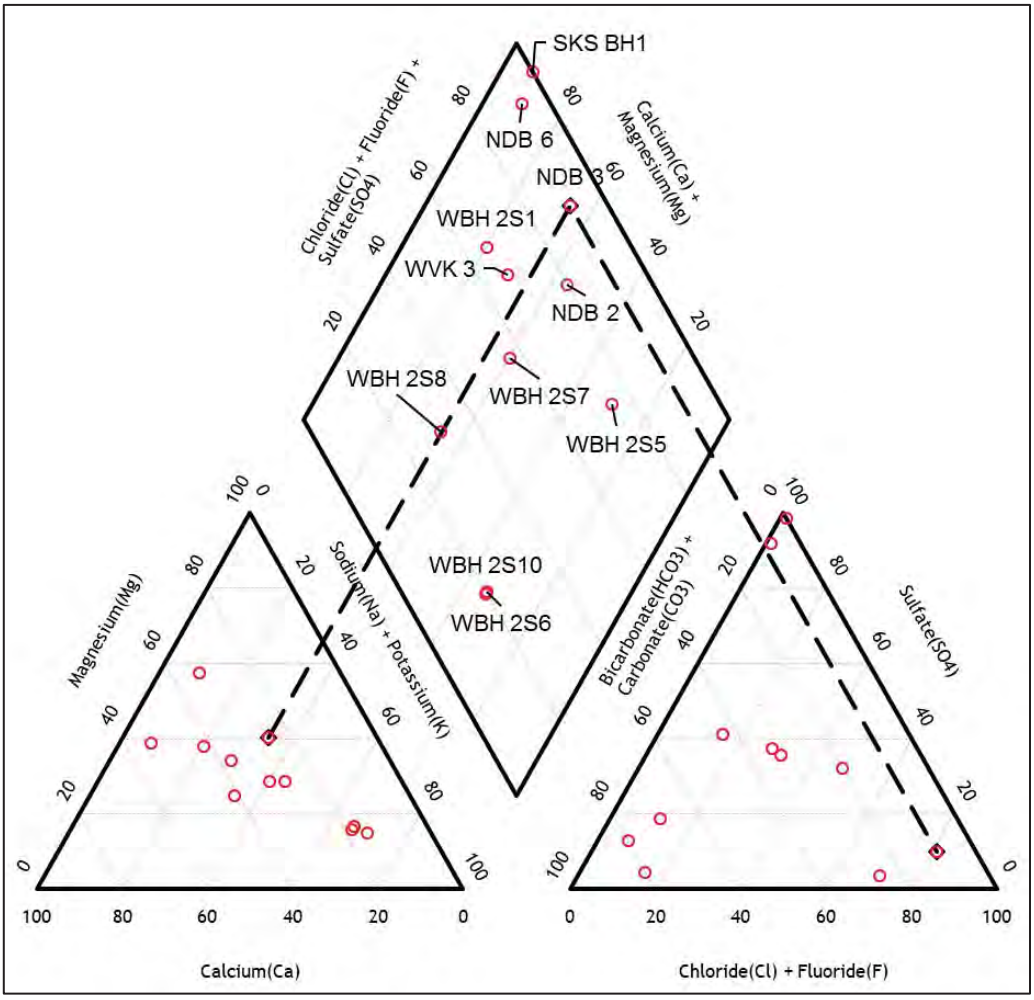


Figure 10-20: Piper diagram constructed using groundwater sample chemistry (J&W, 2018b)

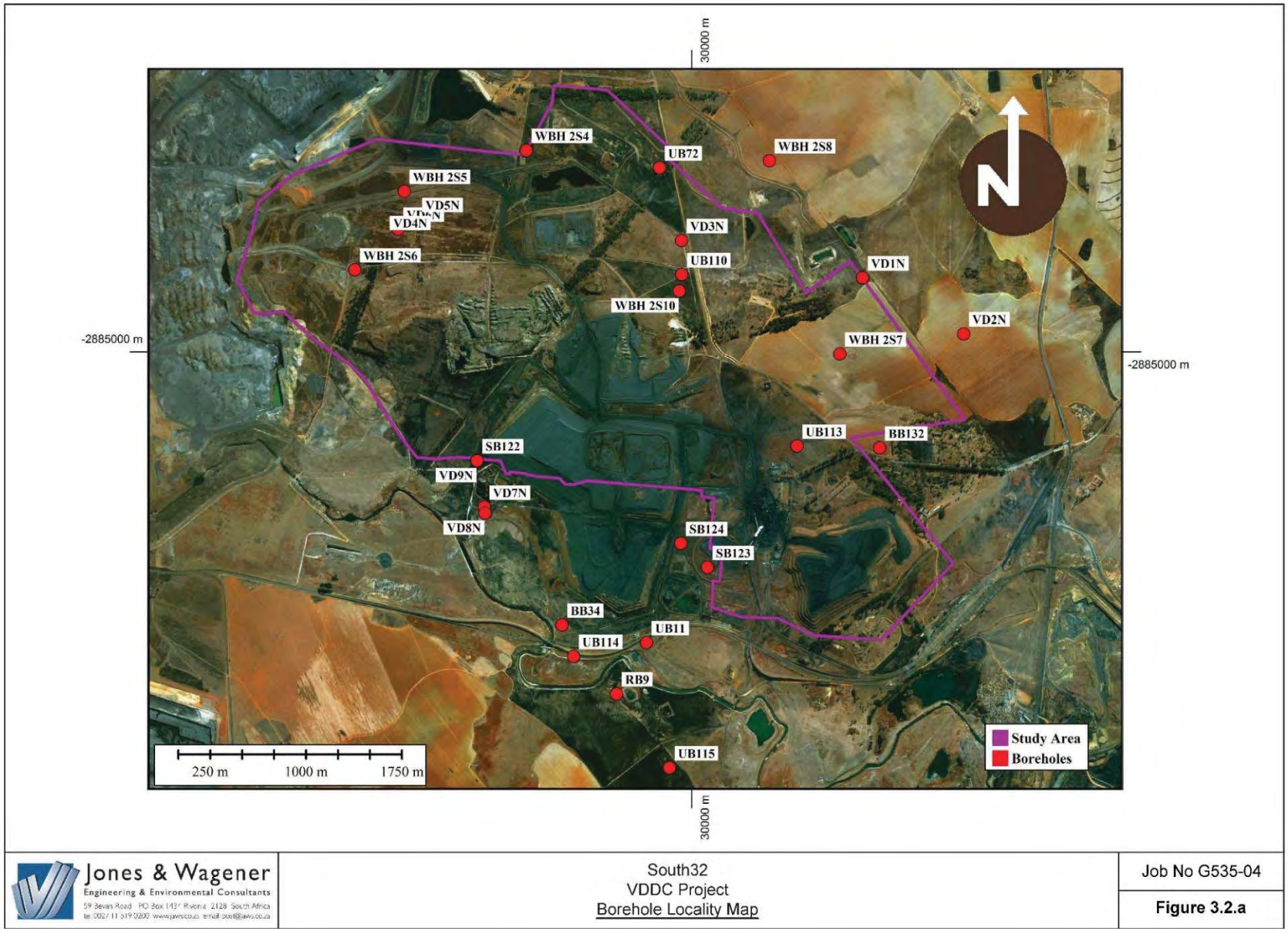


Figure 10-21: Position of monitoring boreholes used in baseline assessment (J&W, 2018b)

Table 10-15: Groundwater qualities compared to SANS 241-1:2015 guidelines for human consumption (dataset 1) (J&W, 2018b)

Parameter		Unit	SANS 241: 2015 Recommended Limits	Risk	Results					
					WBH 2S1	WBH 2S5	WBH 2S6	WBH 2S7	WBH 2S8	WBH 2S10
Physical & Aesthetic Determinants										
Electrical conductivity at 25C	EC	mS/m	≤ 170	Aesthetic	39.7	22.4	45.5	64.8	18.9	15.1
Total Dissolved Solids	TDS	mg/ℓ	≤ 1200	Aesthetic	252	116	278	424	104	82
pH at 25C		pH units	≥ 5 to ≤9.7	Aesthetic	7.04	6.88	7.78	7.58	7.35	7.31
Chemical Determinants - Macro Determinants										
Nitrate as N	NO_3	mg/ℓ	≤ 11	Acute Health	20.2	0.46	0.93	6.48	0.58	0.97
Sulphate	SO_4	mg/ℓ	Acute Health ≤500; Aesthetic ≤250	Acute Health/Aesthetic	36.1	3.26	28.8	125	15.5	2.69
Fluoride	F	µg/ℓ	≤1500	Chronic Health	0	0	1 290	420	0	340
Chloride	Cl	mg/ℓ	≤ 300	Aesthetic	20.1	46.6	11.7	33.8	7.34	7.02
Sodium	Na	mg/ℓ	≤ 200	Aesthetic	13.5	27.2	66.4	53.9	11.7	18.3
Total Iron	Fe	mg/ℓ	Acute Health ≤ 2; Aesthetic ≤0.3	Acute/Aesthetic	0	0	0.01	0.04	0	0.01
Total manganese	Mn	mg/ℓ	Acute Health ≤0.4; Aesthetic ≤0.1	Acute/Aesthetic	0	0	0	0.01	0	0
Aluminium	Al	µg/ℓ	≤ 300	Operational	10	0	20	10	30	50
Concentration deemed to present at an unacceptable health risk for lifetime consumption.										

Table 10-16: Groundwater qualities compared to SANS 241-1:2015 guidelines for human consumption (dataset 2) (J&W, 2018b)

Parameter		Unit	SANS 241: 2015 Recommended Limits	Risk	Results				
					SKS BH1	WVK 3	NDB 2	NDB 3	NDB 6
Physical & Aesthetic Determinants									
Electrical conductivity at 25C	EC	mS/m	≤ 170	Aesthetic	140	22.7	9.73	42.2	430
Total Dissolved Solids	TDS	mg/ℓ	≤ 1200	Aesthetic	956	148	64	286	4206
pH at 25C		pH units	≥ 5 to ≤9.7	Aesthetic	3.19	6.55	5.81	6.08	7.1
Chemical Determinants - Macro Determinants									
Nitrate as N	NO_3	mg/ℓ	≤ 11	Acute Health	2	13.8	2.14	30.8	1.67
Sulphate	SO_4	mg/ℓ	Acute Health ≤500; Aesthetic ≤250	Acute Health/Aesthetic	652	17.7	12.2	7.48	2778
Fluoride	F	µg/ℓ	≤1500	Chronic Health	0	0	0	0	430
Chloride	Cl	mg/ℓ	≤ 300	Aesthetic	6.9	11.6	13.4	44.7	25.4
Sodium	Na	mg/ℓ	≤ 200	Aesthetic	16.5	10.8	7.34	19.8	127
Total Iron	Fe	mg/ℓ	Acute Health ≤ 2; Aesthetic ≤0.3	Acute/Aesthetic	2.06	0	0.31	0.01	0
Total manganese	Mn	mg/ℓ	Acute Health ≤0.4; Aesthetic ≤0.1	Acute/Aesthetic	1.42	0.02	0.06	0.1	8.62
Aluminium	Al	µg/ ℓ	≤ 300	Operational	6260	30	440	40	20
Concentration deemed to at present an unacceptable health risk for lifetime consumption.									

10.1.1.9. Terrestrial Floral Biodiversity

The VDDC Project area is situated within the grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes. The grassland biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees (TBC, 2018).

Vegetation types

The grassland biome comprises many different vegetation types. The Project area is situated predominantly within one vegetation type; namely the Eastern Highveld Grassland. This vegetation type occurs on slightly to moderately undulating planes, including some low hills and pan depressions. The vegetation is a short dense grass land dominated by the usual highveld grass composition (*Aristida, Digitaria, Eragrostis, Themeda, Tristachya* etc.) with small scattered rocky outcrops with, wiry sour grasses and some woody species. Some 44% transformed primarily by cultivation, plantations, mines, urbanisation and by building of dams.

Conservation status

This vegetation type is classified as Endangered. The national target for conservation protection for both these vegetation types is 24%, but only a few patches are statutorily conserved in Nooitgedacht Dam and Jericho Dam Nature Reserves and in private reserves (Holkranse, Kransbank, Morgenstond).

Some 44% of this vegetation type has already been transformed primarily by cultivation, plantations, mines, urbanisation and by building of dams. Cultivation may have had a more extensive impact, indicated by land-cover data. No serious alien invasions are reported, but *Acacia mearnsii* can become dominant in disturbed sites. Erosion is very low. (TBC, 2018)

Plant species of conservation concern

Based on the Plants of Southern Africa (BODATSA-POSA, 2016) database, 233 plant species are expected to occur in the area. Of these, three species are listed as being Species of Conservation Concern (SCC). Although care was taken to traverse as much of the suitable habitat during the fieldwork in search for these SCC, the effort failed to record any of these species. The fieldwork did however, reveal the disturbed nature of most of the habitats on the Project area, largely due to existing mining activities in the area. Also, the time of year (dry season) presented sub-optimal conditions for identification of floral species.

According to a previous assessment by Scientific Aquatic Services conducted in 2013, four habitat units were observed during their wet season survey, the habitats were identified as transformed habitat, wetland and riparian habitat, rocky ridges and less disturbed habitat. Majority of the project area was covered by transformed habitat, while

the wetland and riparian habitat comprised of two wetlands, a partially artificial wetland and the Olifants river. The grassland habitat as well as the rocky ridge is found adjacent to the river. Dominant plant species found in the project area during the study include *Pinus* spp., *Populus alba, P. canescens, Quercus robur, Eucalyptus camaldulensis, Celtis Africana, Searsia lancea. Typha capensis, Phragmites australis, Cyperus marginatus, C. esculentis and C. ruprestis, Imperata cylindrica, Eragrostis gummiflua, Juncus effusus* and *Leersia hexandra* (TBC, 2018).

Habitat types

The main habitat types identified across the project area were initially identified largely based on aerial imagery. These main habitat types were visited during the field survey in the dry season to confirm and identify the species compositions of these areas. The habitat types identified are shown in **Figure 10-22**.

Emphasis was placed on limited timed meander searches within the areas regarded as most natural and therefore habitats with a higher potential of hosting species of conservation concern (SCC). The remaining habitats were surveyed briefly, and time was mostly spent looking for obvious variation and/or areas of interest within these habitats, such as wetland areas. Each of the habitats identified are discussed in the sub-sections below.

The list of plant species recorded to date is therefore by no means comprehensive, and repeated surveys during phenological periods not covered, may likely yield up to 40% additional flora species for the project area (TBC, 2018).

Moist Grassland and Wetlands

This habitat type is found mostly in areas that have not been mined and in many cases, are also linked to aquatic habitats (i.e. wetlands and open water) found within the VDDC area. These habitats range from being disturbed, to entirely intact (natural). This habitat type is regarded as primary grassland in many areas and therefore natural, but slightly disturbed due to grazing by livestock, but in most cases, is disturbed due to the current mining activities.

Although care was taken to cover as much of this habitat during the timed meanders as possible, none of the expected IUCN-listed species were recorded within this habitat.

Due to its limited distribution in the landscape, this habitat is regarded as having a high sensitivity due to its role as being the only remaining habitat, foraging source and migratory corridor for various faunal species present.

Disturbed Grassland

The condition of these grasslands ranges from heavily disturbed (largely due to previous and current mining activities) to moderately disturbed grassland. These areas are considered to have a low-medium sensitivity due to the fact that these areas are being used as a migration corridor and in many cases, form a barrier between the moist grassland and the current mining activities.

Mining Areas

This habitat units represent the current coal mining portions (predominantly open-cast) which are present across the VDDC Project area. Due to the extremely altered nature of this habitat, it is regarded as having a very low sensitivity.

This habitat type represents all areas of mining and the existing infrastructure and includes houses, parking, camps, roads etc. (TBC, 2018).

10.1.1.10. Terrestrial Faunal Biodiversity

Terrestrial fauna that are likely to occupy the area are associated with the habitat in which they occur. Many fauna identified during the survey are typically found in wetland ecosystems, as well as the grassland biome.

Avifauna

Ninety-one (91) bird species were recorded in the VDDC project area during the August 2018 survey based on either direct observations, or the presence of visual tracks and signs. None of the birds were species of conservation concern. Based on the various wetland habitats encountered in the VDDC area, the likelihood that bird SCC occur there is rated as moderate to high. Some roosting and nesting sites were noted during the survey around wetland and marsh areas (TBC, 2018).

Mammals

Overall, mammal diversity in the VDDC Project area was moderate to high, with eight (8) mammal species being recorded during the August 2018 survey based on either direct observation, camera trap photographs or the presence of visual tracks and signs.

Two (2) mammal SCC were recorded in the project area. There appears to be healthy populations of Cape Clawless Otters (*Aonyx capensis*) in a tributary of the Olifants River. A serval (*Leptailurus serval*) was also recorded in the VDDC area (TBC, 2018).

Herpetofauna (Reptiles and amphibians)

Three (3) reptile species were recorded in the VDDC area during the August 2018 survey and this is considered to be low, attributed partly due to current disturbances (mining activities) and also the time of year that the survey was conducted.

One (1) amphibian species was recorded in the VDDC area during the August 2018 survey based on visual observations. Due to the surveys being conducted towards the end of the dry season, it is expected that more species should occur in this area, especially considering the extent of the rivers and wet areas (TBC, 2018).

Mpumalanga Biodiversity Sector Plan

The approved mining area for which the infrastructure is required overlaps with critical biodiversity areas (CBAs), heavily or moderately modified areas (HMAs), and other natural areas (ONAs). Most of the project area is classified as HMAs or ONAs (**Figure 10-23**). Some CBAs are present across the north-western corner of the mining right area, and a protected area (PA) occurs across the northern portion of the mining right area in the Hartbeesfontein section (although this area was declared as a private nature reserve in the 1980's and is therefore reflected as a PA on the MBSP, it has not been managed as such).

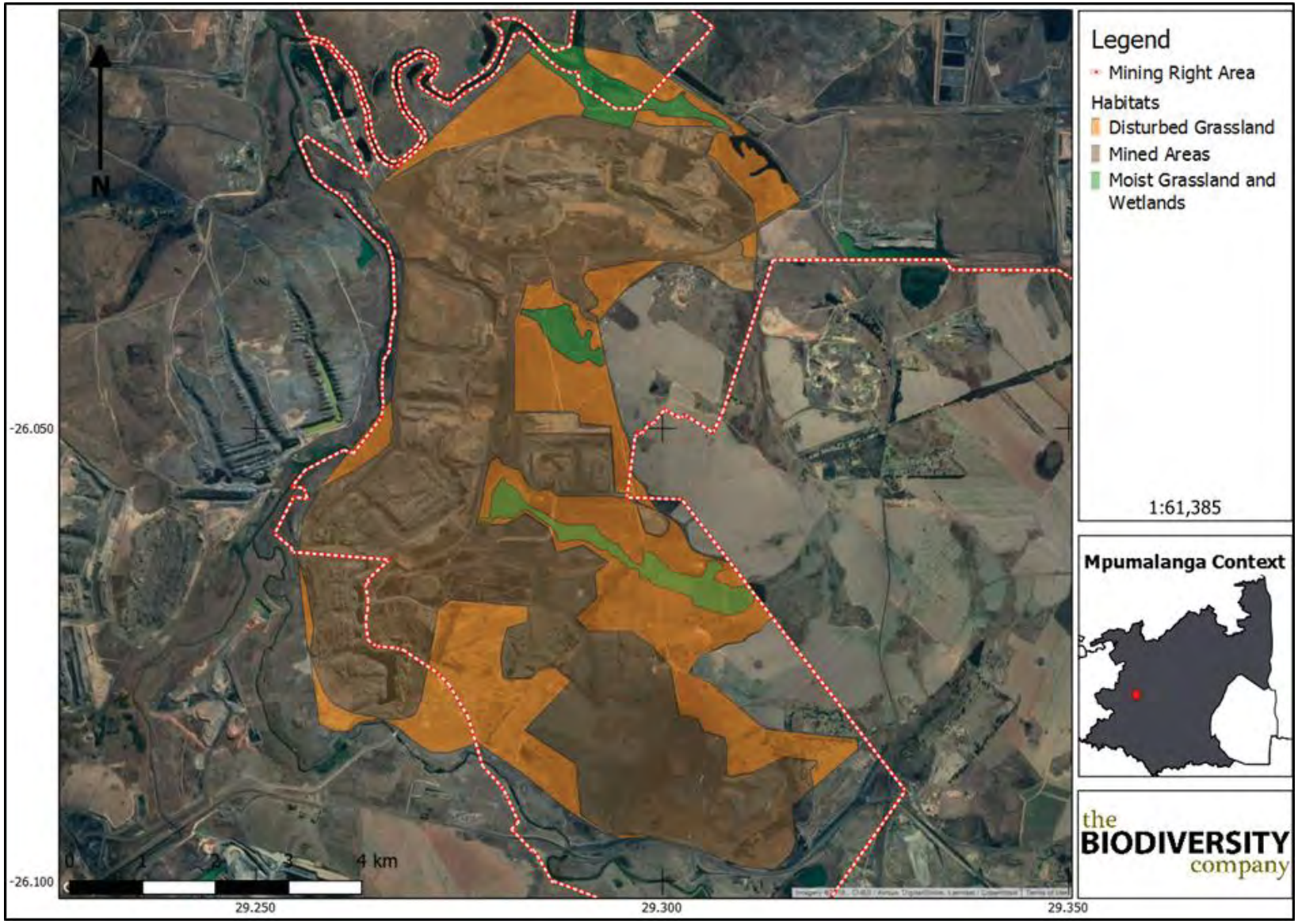


Figure 10-22: Main habitat types identified (TBC, 2018)

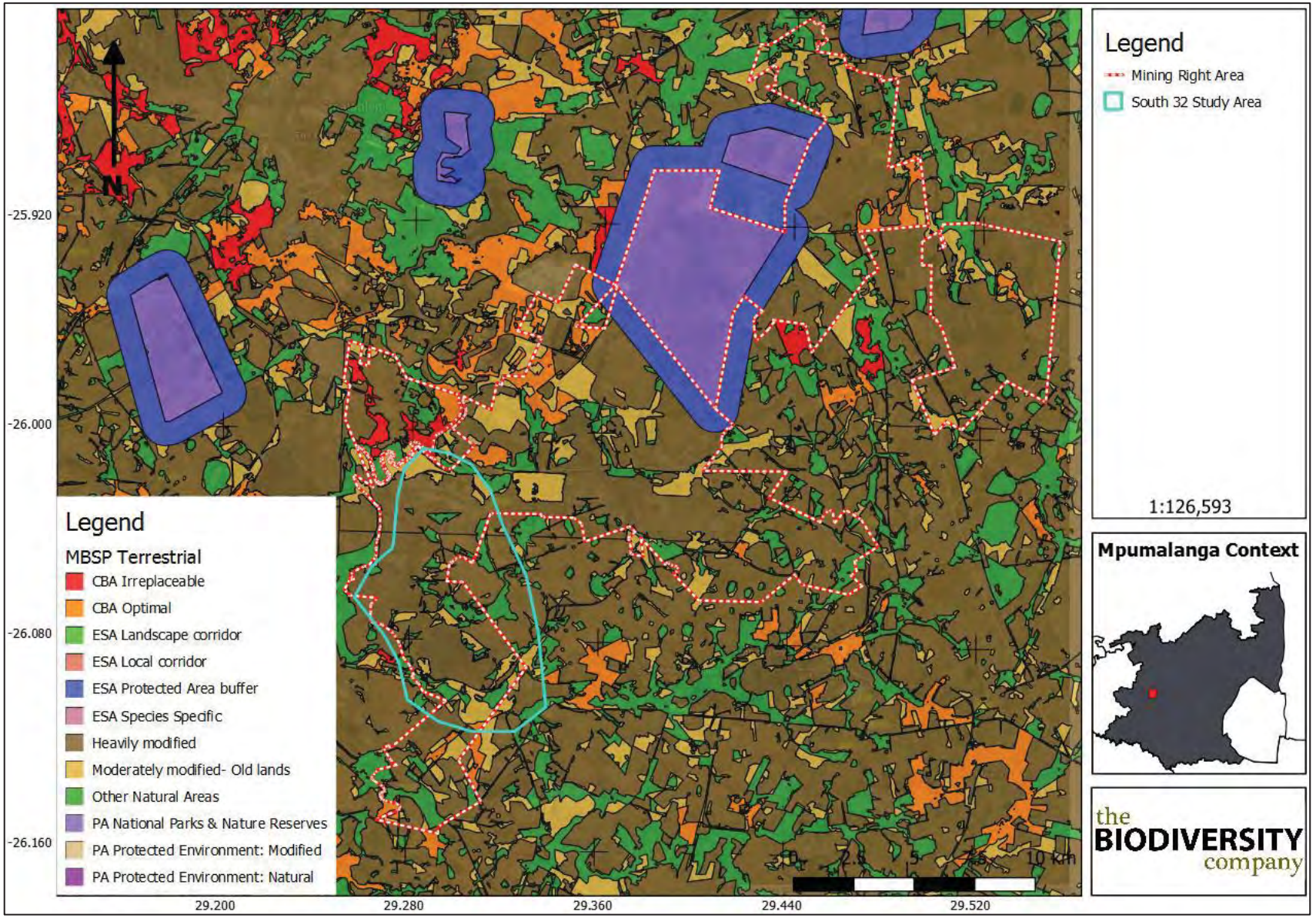


Figure 10-23: VDDC project area superimposed on the MBSP Terrestrial Critical Biodiversity Areas (CBA) map (TBC, 2018)

10.1.1.11. Social setting

The Mpumalanga Province is divided into three district municipalities, which are comprised of 20 local municipalities. The VDDC area falls within the eMalahleni Local Municipality (ELM) which falls within the Nkangala District Municipality (NDM).

The ELM has a mining and industrial history and is thus the most industrialised municipal area in the NDM. Mining also remains the most prominent sector in terms of its employment contribution with 23%, followed by the trade sector which provides 18% of the employment in the ELM area.

According to the draft Integrated Development Plan (2017), the eMalahleni municipal population is expected to increase to 516 399 individuals in 2020 and to 646 708 individuals in 2030. The age structure of the ELM indicates a young population, with 25.2% of the local population under the age of 14. Those within the working age (15-64) form 71.2% of the local population.

The average annual economic growth rate for eMalahleni was at 2.4% over the period 1996 to 2015. The forecasted average annual gross domestic product (GDP) growth for eMalahleni for 2015-2020 is anticipated to be approximately 2% per annum, in line with national and provincial growth expectations. ELM experienced population growth rates higher than their economic growth rates, which has significant negative implications from a GDP per capita and an infrastructure-, service delivery-, and job creation point of view (Batho Earth, 2018).

10.1.1.12. Visual Aesthetics

The grassland found within the study area is very short with intermittent trees close to farmsteads and settlements. In the eastern parts of the site maize is planted and harvested annually, resulting in open fields without cover during the winter months. The vegetation therefore provides little visual cover for structures.

Some visual screening has been planted at the Steenkoolspruit (SKS) workshops to the north of the VDDC mining area. The screening is effective for a section of the road, but does not eliminate the visual impact.

Most of the infrastructure present in the greater study area stems from mining activities (South32 Wolwekrans, Glencore Impunzi and Anglo Goedehoop Collieries). Some other industrial development is concentrated around the towns of eMalahleni and Middelburg. The main road in the area is the N12/N4 Highway, connecting Gauteng with Mpumalanga. In addition, the Duvha and Komati power stations provide further industrial impact. These activities have an industrial visual character and result in a more pronounced impact on the natural character of the landscape. Additionally, prominent Eskom powerlines cross the landscape to and from the two power stations.

Visually there are no sensitive features or no-go areas on the site itself. In the surrounding area the following are considered to be visually sensitive:

- Topographic Features
  - None
- Surrounding homesteads
  - The area around the site has several settlements overlooking the proposed mining area as well as along the infrastructure routes.

- Towns/urban areas
  - The towns of eMalahleni and Middelburg are located to the north of the project area.
  - The proposed infrastructure should not affect any towns/urban areas.
- Roads
  - The proposed project will be located west of the R544 from eMalahleni.

The viewshed from the proposed infrastructures extends some 10 – 12 km to the north and south. The elevated views from the Ogies dyke in the north is offset by the flat terrain around the Olifants River floodplain, where the site is located. Views to the east and west are somewhat blocked due to topography, with a few isolated exceptions (J&W, 2018a).

10.1.1.13. Noise

According to South African National Standards (SANS 0328 – 2001) *Methods for Environmental Noise Impact Assessments*, the development of a mine or industry within 1 000 m of a Noise Sensitive Area may have acoustical implications. Noise control regulations state that no person may make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof. Disturbing noise is defined as a noise level which exceeds the acceptable zone level, or if no zone level has been declared, a noise level exceeding the residual sounds level by 7 dBA or more. For this noise zone (rural), noise levels of 45 dBA during the day (06h00 to 22h00) and 35 dBA during the night (22h00 to 06h00) is not to be exceeded.

A noise survey was completed by Airshed Planning Professionals (Airshed) on 3 and 4 July 2018. The sampling locations can be summarised as indicated in **Table 10-17** and the positions are shown on **Figure 10-24**.

Table 10-17: Description of locations surveyed for noise impacts during July 2018 (Airshed, 2018b)

Site	Description	Observations	
		Day-time	Night-time
Site 2	Small village	Traffic audible	Traffic and mining audible
Site 3	In an open field near a road and petrol station	Traffic audible	Traffic audible
Site 4	Small village	Community activity	Community activity
Site 5	Open, uncultivated field	Birds, traffic, aeroplanes	Traffic audible
Site 6	Open land next to main road	Traffic from road audible	Traffic and mining audible

Figure 10-24: Baseline noise survey sites (Airshed, 2018b)

During the noise survey, the following was observed:

- Day-time baseline noise levels: The highest day-time noise levels were measured at Site 2, comparative to industrial areas according to SANS 10103. L_{Aeq}'s for Site 4 and Site 5 were quiet and considered typical of rural areas according to SANS 10103 with higher noise levels at Site 3 and Site 6, typical of urban areas. Recorded L_{Aeq}'s during the day were within the International Finance Corporation (IFC) guidelines for residential, institutional and educational receptors (55 dBA) at Site 4 and Site 5.
- Night-time baseline noise levels: Measurements indicate night-time ambient noise levels at Site 4 and Site 5 are quiet. Mining activities are clearly audible at Site 2 and Site 6 during the night. On-site L_{Aeq}'s ranged between 30 dBA and 52 dBA which is considered typical of rural to urban areas according to SANS 10103. Recorded L_{Aeq}'s during the night were within IFC guidelines for residential, institutional and educational receptors (45 dBA) at Site 2, Site 4 and Site 5 (Airshed, 2018b).

10.1.1.14. Air quality

Sources of air pollution

The current land uses contribute to the baseline pollutant concentrations via vehicle tailpipe emissions, household fuel combustion, biomass burning and various fugitive dust sources. The main sources of air pollutants include:

- Power generation;
- Primary and secondary metallurgical operations;
- Mining operations;
- Domestic fuel combustion;
- Vehicle tailpipe emissions;
- Biomass burning;
- Agricultural activities; and
- Other fugitive dust sources – unpaved and paved roads, and wind erosion of open exposed areas.

Fugitive emissions from opencast mining operations are the main contributing sources of air pollution in the project area, and originate from land clearing operations, materials handling operations, vehicle entrainment from haul roads, wind erosion from open areas, drilling and blasting. The main emissions from power generation operations in the area (Duvha, Komati, and Kendal) are carbon dioxide (CO_2), SO_2, NOx and ash (Airshed, 2018).

Sensitive receptors

Air pollution is likely to have the most significant impact confined to a radius of approximately 5 km from the project area. The sensitive receptors identified by Airshed Planning Professionals include individual homesteads and small residential areas, as indicated in **Figure 10-25**.

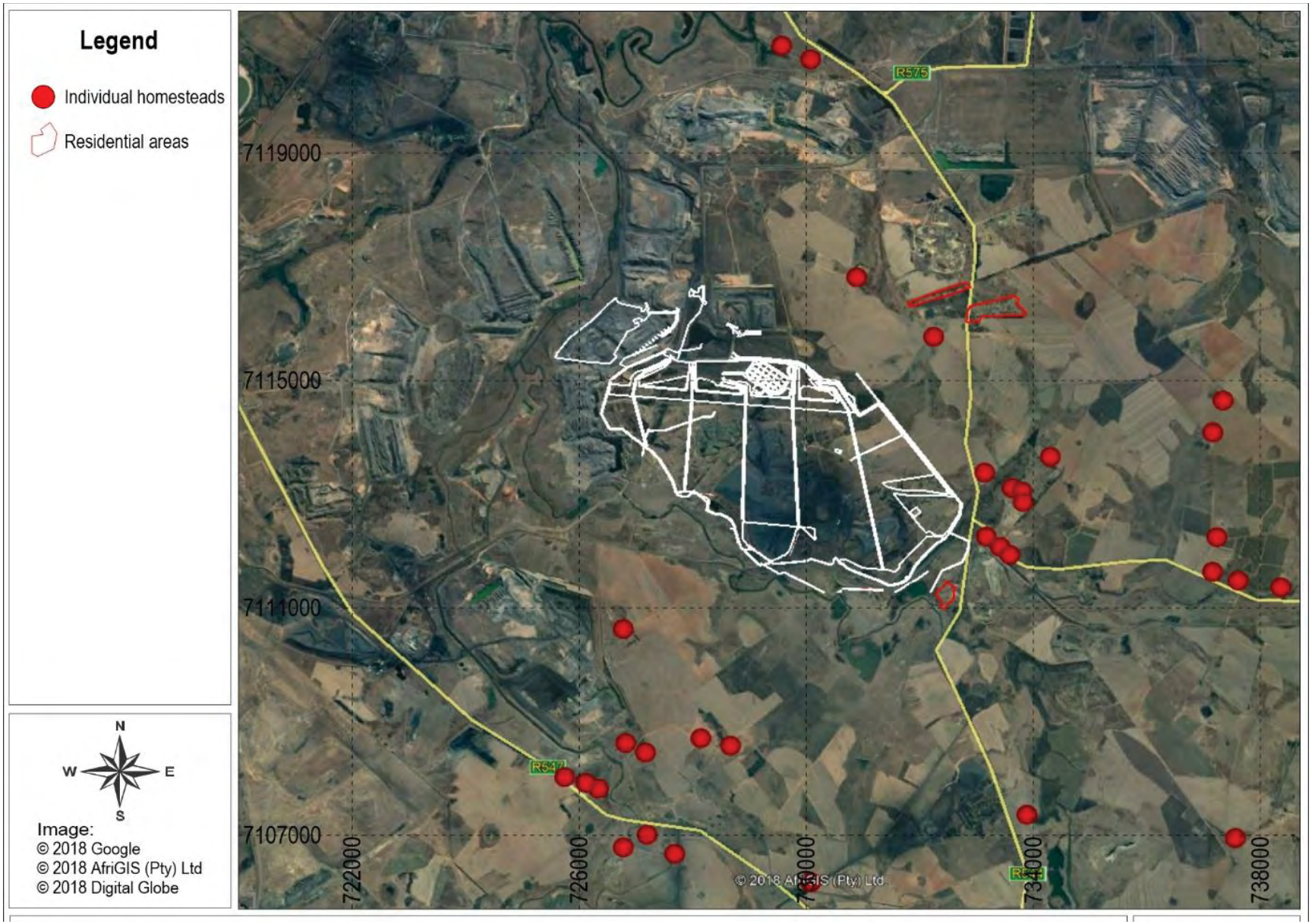


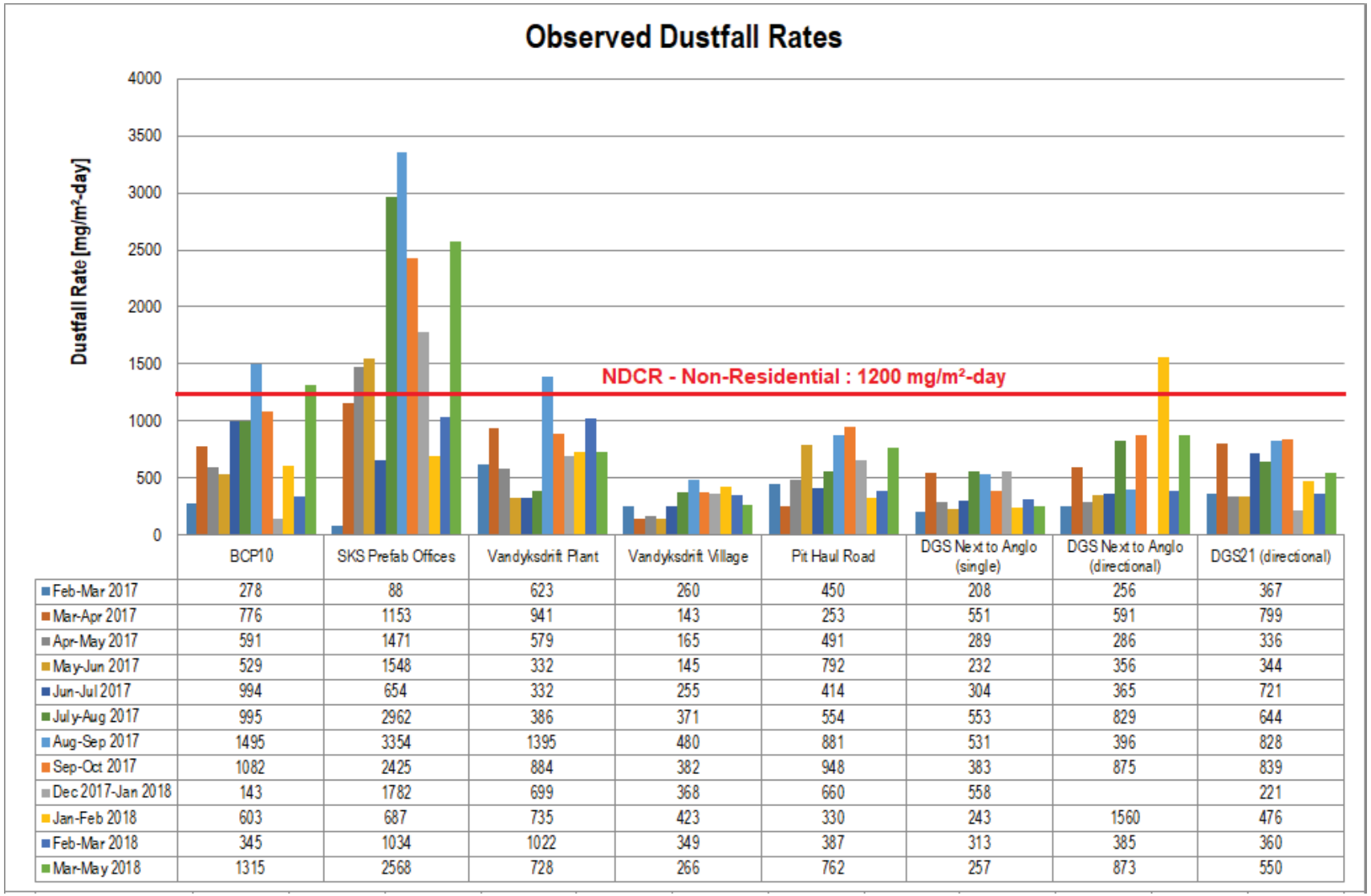
Figure 10-25: Sensitive receptors in the VDDC project area (Airshed, 2018b)

Air quality

A network of 36 dustfall monitoring units (buckets) are managed by SAEC in the greater vicinity of the VDDC project area, as shown in **Figure 10-26**. The points closest to the VDDC project area were selected to establish the nuisance dust levels in the study area. These included six (6) single bucket and two (2) locations with directional buckets. A single and directional bucket sampler is collocated at the location marked "DGS Next to Anglo". The directional bucket sampling location consists of four buckets, one each in the four main cardinal wind directions. These directional buckets are not according to the NDCR and should not be compared to the standard. Nonetheless, the dustfall rates of the two locations were included with the reported values representing the maximum result of the four buckets, since this method resulted on the closest comparison at the collocated position "DGS Next to Anglo". All the sampling locations are considered to be non-residential and hence the National Dust Control Regulations (NDCR) of 1 200 mg/m^2/day limit rate applies.

Dustfall rates for the previous 12 months are illustrated in **Figure 10-27**. The sample taken at the SKS Prefab Offices recorded the next highest dustfall rate, with an average of 1 644 mg/m²-day and exceeding the NDCR limit value on 7 months of the year. The sampler located at BWD15 observed 5 months' exceedances of the limit value and recorded an average of 1 272 mg/m²-day. At BCP10 (located on the farm Kleinkopje 18IS) and Vandyksdrift Plant, each exceeded the limit for one month. The lowest dustfall rates were recorded at Vandyksdrift Village (300 mg/m²-day), followed by DHS next to Anglo (368 mg/m²-day) and Pit Haul Road (577 mg/m²-day). Whilst not quite correct to compare with the NDCR, the directional dust buckets located at DGS21 had an average of the maximum bucket dustfall rate of 540 g/m²/day (Airshed, 2018a).

Figure 10-26: Location of dust-fall monitoring units (Airshed, 2018a)



	BCP10	SKS Prefab Offices	Vandyksdrift Plant	Vandyksdrift Village	Pit Haul Road	DGS Next to Anglo (single)	DGS Next to Anglo (directional)	DGS21 (directional)
Feb-Mar 2017	278	88	623	260	450	208	256	367
Mar-Apr 2017	776	1153	941	143	253	551	591	799
Apr-May 2017	591	1471	579	165	491	289	286	336
May-Jun 2017	529	1548	332	145	792	232	356	344
Jun-Jul 2017	994	654	332	255	414	304	365	721
July-Aug 2017	995	2962	386	371	554	553	829	644
Aug-Sep 2017	1495	3354	1395	480	881	531	396	828
Sep-Oct 2017	1082	2425	884	382	948	383	875	839
Dec 2017-Jan 2018	143	1782	699	368	660	558		221
Jan-Feb 2018	603	687	735	423	330	243	1560	476
Feb-Mar 2018	345	1034	1022	349	387	313	385	360
Mar-May 2018	1315	2568	728	266	762	257	873	550

Figure 10-27: Dustfall rates for the previous 12 months at 12 locations near the VDDC project area (Airshed, 2018a)

10.1.1.15. Blasting and Vibrations

Source and receiving environment

The source environment of possible blasting and vibration impacts is the opencast mining operations, whereas the receiving environment is the area adjacent to the VDDC project area and specifically the area adjacent to the Pit area. The area of influence is not expected to exceed a distance range of 3 500 m radius around the Pit Area.

Anticipated impacts

Blasting operations' primary objective is producing rock for crushing to be used in construction. The blasting operation has the potential to yield secondary effects such as ground vibration, air blast, fly rock and fumes. These aspects may have a negative impact on the surrounding areas depending on the levels generated. The potential impacts considered can be described as follows:

- Ground vibration: Levels greater than recommended limits may be damaging to structures and different structures will have different permitted levels. Ground vibration may cause damage if levels exceed the structure's safe limit. People may also experience ground vibration as perceptible at very low levels and normally react negatively to the experience of ground vibration.
- Air blast: The effect of air blast is usually underestimated. High levels of air blast could damage windows. Levels lower than required to induce damage may rattle windows and large roof surfaces. These effects are generally mistaken as ground vibration effect and lead to complaints. Rattling of doors and roofs causes concern and causes people to be concerned.
- Fly rock: Fly rock can be mitigated but may not be eliminated. Fly rock can be managed properly with relative ease. Control on fly rock will also control the effects of air blast. Wild fly rock could cause damage to structures and installations but also be lethal to people and animals.

To outline the expected environmental effects that blasting operations could have on the surrounding environment, the receiving environment is classed into three areas, namely:

- High Sensitivity Area (0 to 500 m): Considered the most critical areas, this area is classified as the unsafe zone and is normally cleared of all people and animals when blasting is conducted in a mining environment.
- Medium Sensitivity Area (500 to 1500 m): This area is less affected by blasting operations but would still require active monitoring.
- Low Sensitivity Area (1500 to 3500 m): In this area, blasting is likely to cause negligible damage to structures but may still cause distress.

Figure 10-28 indicates the different sensitivity areas and possible receptors as identified by Blast Management and Consulting (BMC).

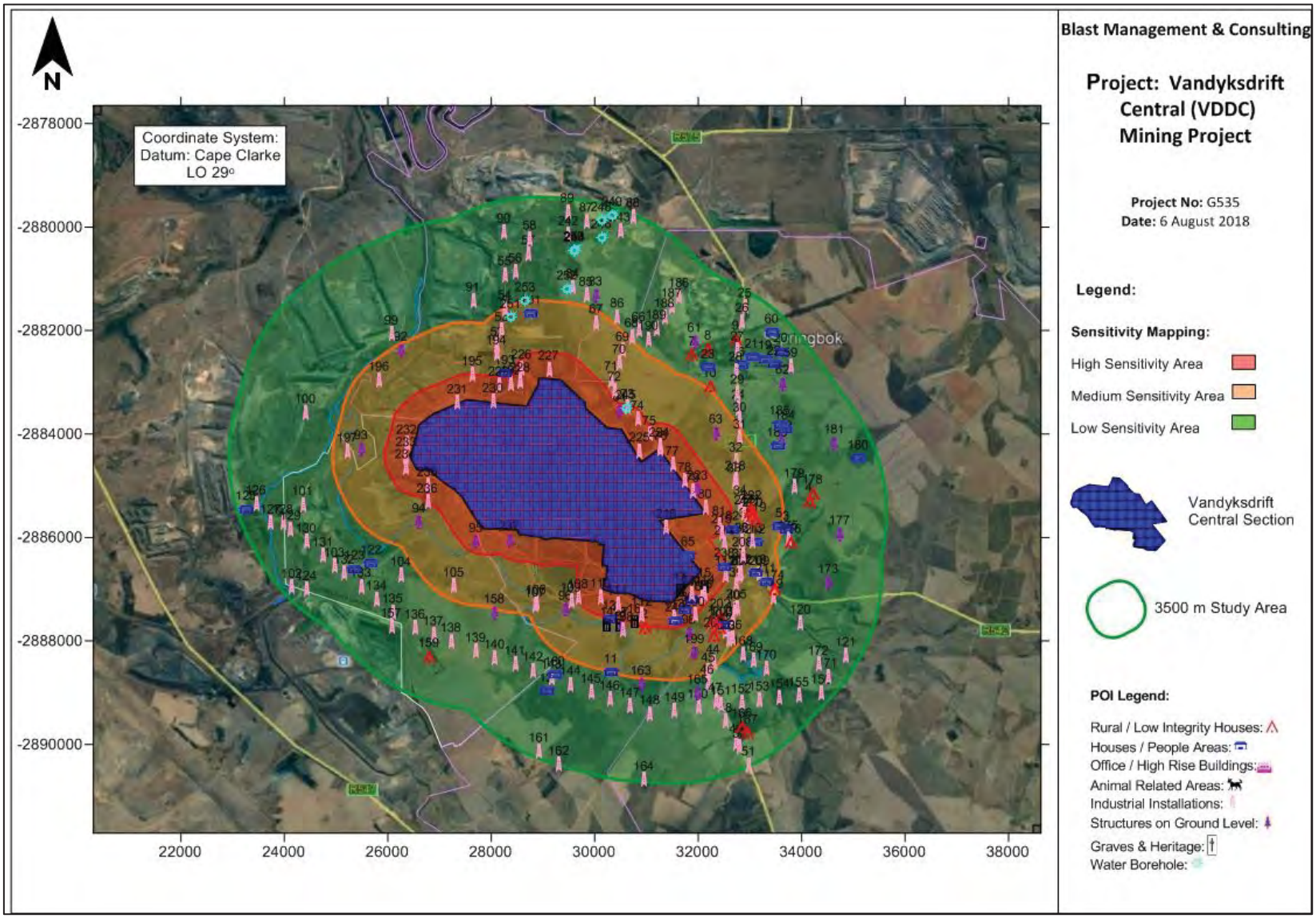


Figure 10-28: VDDC study area indicating points of interest (POI) in terms of blasting and vibration impacts (BMC, 2018)

10.1.1.16. Heritage and Paleontological setting

Heritage resources

The Phase 1 heritage impact assessment study for the VDDC project area by Dr Julius Pistorius, revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) (NHRA), namely:

- Historical structures; and
- Informal graveyards.

The position of these heritage resources is indicated on **Figure 10-29**. During the field survey, photographs were taken of the relevant heritage- and historical remains and are shown in **Figure 10-30**.

The significance of the heritage resources must be determined to establish the significance of the impact on any of these remains and will determine whether mitigation measures may be required for heritage resources which may be negatively affected by the VDDC project.

The historical structures comprise remains which are older than sixty years or which are approaching this age and are therefore protected by the NHRA.

The historical remains are rated as of medium significance. This rating is based on the use of two rating (grading) schemes, namely:

- A scheme of criteria which outlines places and objects as part of the national estate as they have cultural-historical significance or other special value (outlined in Section 3 of the NHRA.
- A field rating scheme according to which heritage resources are graded in three tiers (levels) of significance based on the regional occurrence of heritage resources (Section 7 of the NHRA.

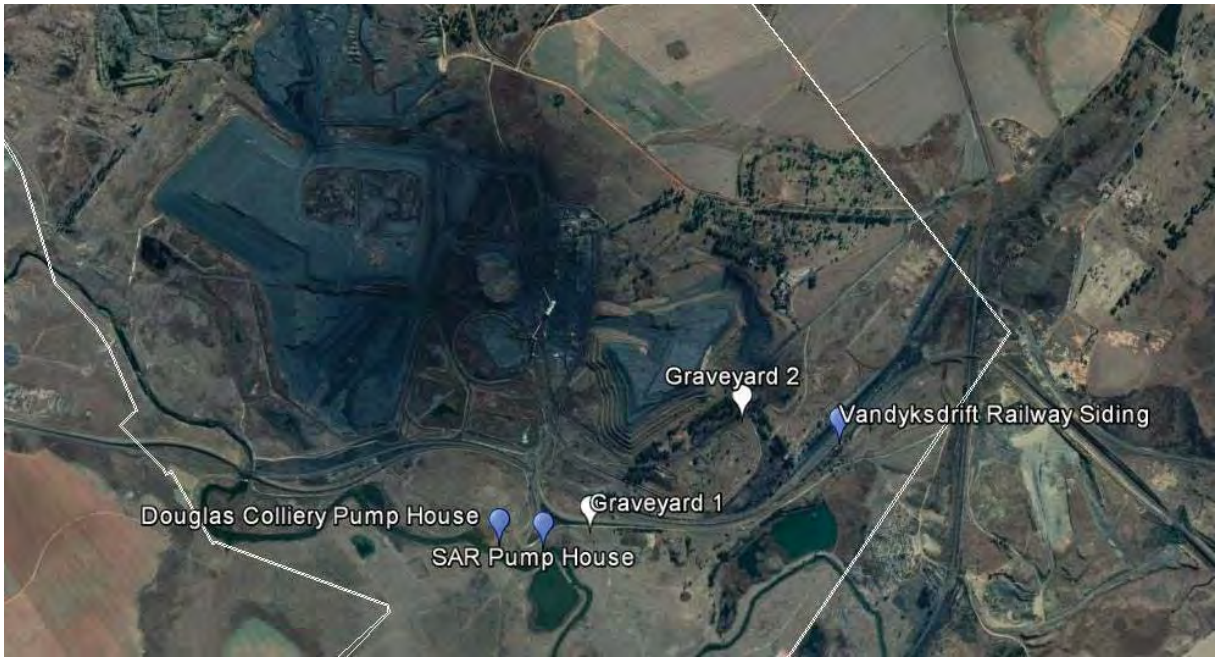


Figure 10-29: Position of heritage resources identified

A –Douglas Colliery pump station

B –South African Railway station pump station

C –Vandyksdrift Railway Station / siding

D – Graveyard 1

E – Graveyard 2

Figure 10-30: Historical structures and graves on the VDDC area (Pistorius, 2018)

Palaeontology

The whole mining area falls in palaeontologically sensitive sediments (shales, mudstones and coal) of the early Permian Vryheid Formation in the Witbank coalfield. Coals seams are between 15-110 m below the land surface. It is very unlikely that any fossils would be impacted upon by the excavations for the proposed infrastructure because the fossils would occur in the shales associated with the coal seams and the fossils are rare and sporadic (Bamford, 2018).

10.1.2 Description of the current land uses

The proposed infrastructure development location is on a brownfield site, indicating that the grassland area has already been altered considerably, mostly due to mining. Current land uses include mining, as well as cultivated fields to the east of the VDDC area. Refer to **Figure 10-6** for the current land uses in the area.

10.1.3 Description of specific environmental features and infrastructure on the site

A detailed description of the existing environmental features based on the baseline assessment was described in section 10.1.1.

The following infrastructure is currently present at VDDC:

- Existing haul roads and service roads;
- Railway and powerlines;
- Existing 132/22kV Olifants and Klein Olifants Substations;
- An overland conveyor system to the South Export Plant;
- Topsoil dump on the north-eastern boundary of the VDDC section;
- Various stormwater diversion berms and canals, as well as the Vleishaft Dam which is the main PCD in the area;
- There are four structures upstream of the Vleishaft Dam for the diversion of clean storm water, namely:
    - Attenuation Dam;
    - Attenuation Berm 2;
    - Attenuation Berm 1; and
    - A Farm Dam.
- Bob Henry dam, which is the PCD for the Fraser's Plant;
- Mine residue disposal sites, i.e. the PSS and LAC dumps. These dumps are in the process of being reclaimed. It is expected that 40% of the material will be recovered;
- Run-of-mine (ROM) coal is stockpiled on an existing ROM coal pad located to the south of the Vleishaft Dam, from where it is taken to the South Export Processing Plant Warehouse, change houses, workshops, wash bays, laydown areas and fuelling facilities
- Facilities at SKS facilities are in use by Vandyksdrift North (VDDN): contractors' offices, laydown areas and FLAC (fuel, lube, air and coolant) station.

10.1.4 Environmental and current land use map

(Show all environmental, and current land use features)

Land use in the project area is mainly mining. The environmental sensitivities are shown in **Figure 10-31**.

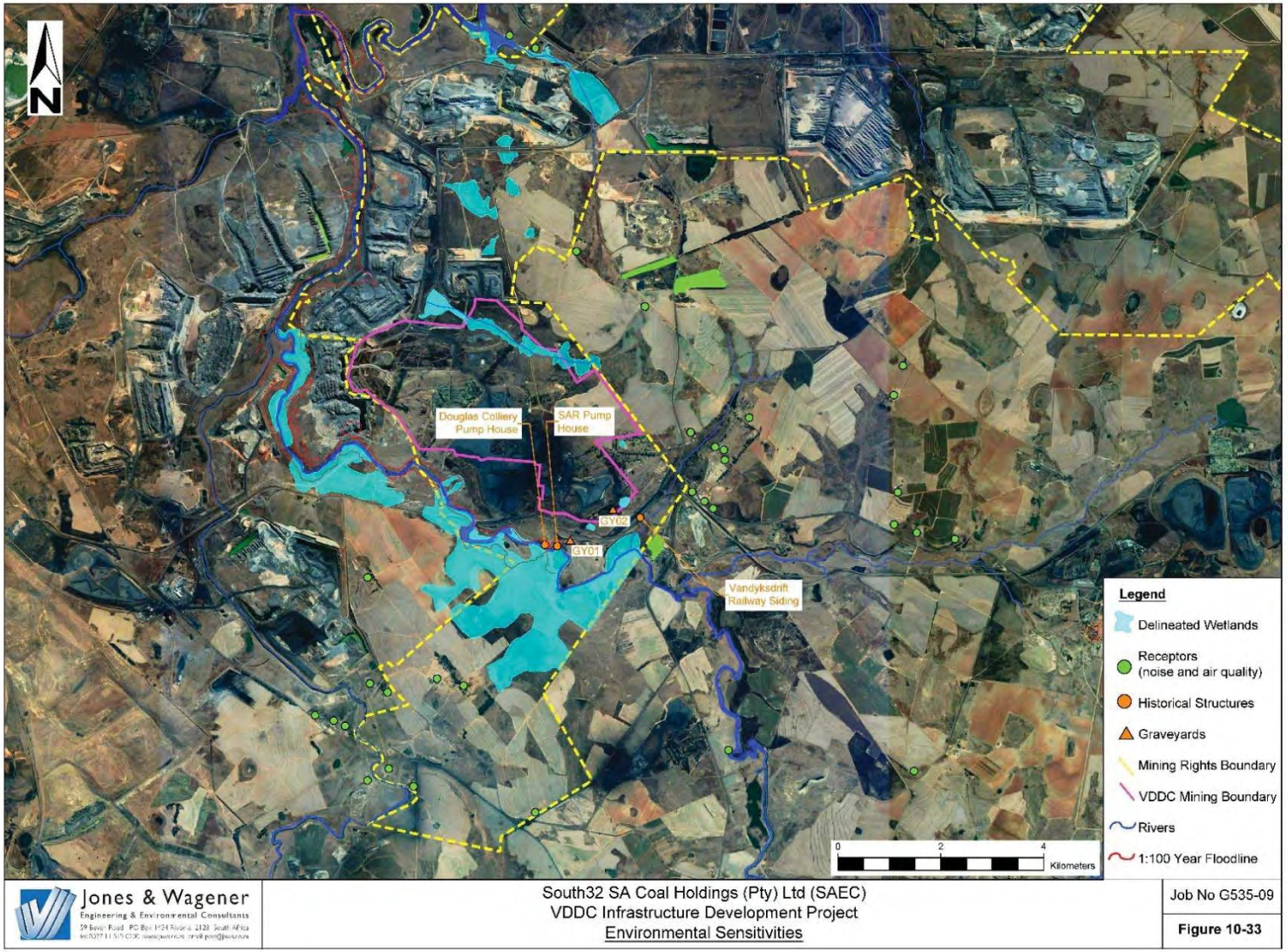


Figure 10-31: Environmental sensitivities

11. IMPACTS IDENTIFIED

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability and duration of the impacts.)

The proposed infrastructure development is anticipated to impact on various biophysical aspects, and to a lesser extent on socio-economic aspects. The potential impacts identified during the Scoping Phase are summarised in **Table 11-1**. These impacts will be further investigated during the Impact Assessment Phase of the project.

Table 11-1: Potential environmental impacts to be investigated in the impact assessment phase

Environmental aspect	Potential environmental impact
Topography and land use	• The proposed infrastructure development may alter the topography and land use of the project area.
Soil and land capability	• The soils and land capability may be impacted by the proposed infrastructure development due to topsoil stripping, soil stockpiling, and increased soil compaction because of the movement of heavy machinery. • Hydrocarbon spills from the mine vehicles may occur during construction and operation, as well as from the maintenance of these vehicles.
Air quality	• Construction activities may result in increased dust generation • Blasting may contribute to dust generation • Dust may be generated due to the utilisation of haul roads • Stripping, loading, and dumping activities may generate dust
Flora	• Construction of infrastructure may result in vegetation clearing. • Alien invasive species may establish due to soil disturbance
Fauna	• Construction may result in destruction of habitat • An increase in activity in the area and the resultant noise, traffic and dust generation, may disturb daily activities, nesting sites / breeding grounds, and interrupt the migration routes of fauna.
Surface water and wetlands	• The proposed infrastructure (some located near a watercourse) may negatively influence the surface water run-off regime, wetland functioning, ecological status and sensitivities. • Water quality may be negatively affected due to contaminants entering surface resources.
Geohydrology	• Water quality may be negatively affected due to contaminants entering groundwater resources. • Groundwater flow and groundwater levels may be altered as a result of pit dewatering.
Heritage resources and palaeontological findings	• Existing heritage resources (such as graves), palaeontological findings, engravings, rock art and historic buildings near the proposed project may be damaged or destroyed.

Environmental aspect	Potential environmental impact
Socio-economic	• Some portions of land used for agricultural activities may be disturbed for the development of the proposed infrastructure, impacting on agricultural production. • Construction activities may negatively impact the ambient noise levels with reference to sensitive receptors. • Development of infrastructure may result in further visual disturbance in the area. • Employment opportunities may only exist during the construction of the infrastructure. This may have a negative impact on the expectations of local jobseekers and may result in environmental degradation and/or community unrest. • Ambiguous and insufficient consultation with communities and land owners may generate false expectations and negative sentiments towards the infrastructure development project that could persist past the construction phase. • Blasting may cause result in ground vibration, air blast, fly rock and fumes, with an impact on nearby infrastructure and sensitive receptors.

12. METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF ENVIRONMENTAL IMPACTS

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision)

In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology will be used to describe the impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in **Table 12-1**.

Table 12-1: Quantitative rating and equivalent descriptors for the impact assessment criteria

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	Isolated corridor / proposed corridor	Incidental
2	LOW	Study area	Short-term
3	MODERATE	Local	Medium-term
4	HIGH	Regional / Provincial	Long-term
5	VERY HIGH	Global / National	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

Significance Assessment

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e. the size) of the area affected by atmospheric pollution may be extremely large (1 000 km^2) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table 12-2** below.

Table 12-2: Description of the significance rating scale

RATING		DESCRIPTION
5	VERY HIGH	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	HIGH	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	MODERATE	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	VERY LOW	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity is needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	NO IMPACT	There is no impact at all - not even a very low impact on a party or system.

Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 12-3**.

Table 12-3: Description of the spatial scale

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible and will be felt at a regional scale (District Municipality to Provincial Level). The impact will affect an area up to 50km from the proposed site / corridor.
3	Local	The impact will affect an area up to 5km from the proposed route corridor / site.
2	Study Area	The impact will affect a route corridor not exceeding the boundary of the corridor / site.
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the corridor / site.

Temporal Scale

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in **Table 12-4**.

Table 12-4: Description of the temporal rating scale

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium term	The environmental impact identified will operate for the duration of life of the project.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

Degree of Probability

The probability or likelihood of an impact occurring will be described, as shown in **Table 12-5** below.

Table 12-5: Description of the degree of probability of an impact occurring

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen / has occurred

Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus, the total value of the impact is described as the function of significance, spatial and temporal scale as described below.

$$\textit{Impact Risk} = \frac{(\text{SIGNIFICANCE} + \textit{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

An example of how this rating scale is applied is shown in **Table 12-6**.

Table 12-6: Example of Rating Scale

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	LOW	Local	Medium Term	Could Happen	
Impact to air	2	3	3	3	1.6

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2.67. The probability (3) is divided by 5 to give a probability rating of 0.6. The criteria rating of 2.67 is then multiplied by the probability rating (0.6) to give the final rating of 1.6. The impact risk is then classified according to 5 classes as described in **Table 12-7**.

Table 12-7: Impact Risk Classes

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

Therefore, with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

13. THE POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED ACTIVITY (IN TERMS OF THE INITIAL SITE LAYOUT) AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY THAT MAY BE AFFECTED

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

Alternative layouts are considered for the PCD and topsoil stockpile:

Pollution control dam

The preferred location of the PCD is to the west of the existing PSS dump. This is, however, in close proximity to the Olifants River. An alternative considered for the

location of the PCD includes extending the existing Bob Henry dam to accommodate the additional mine-affected water that would be associated with the opencast mining.

From an environmental perspective, upgrading of the Bob Henry dam may be more favourable since it is an existing facility (currently unlined) and located further away from the Olifants River. Concern however, exists regarding the available capacity and whether this will be sufficient for the expected dirty water runoff

Investigations are still ongoing and will be determined by the water balance for the area, as well as any comments received from the I&APs.

Topsoil stockpile

An alternative location was considered for the topsoil dump associated with the approved opencast mining, located to the south of the existing LAC discard dump (refer to Figure 8-1). The preferred location is an extension of the existing topsoil dump, would impact the Olifants River to a lesser extent as opposed to the alternative topsoil dump location.

Comments received from I&APs regarding the location of the topsoil stockpile will be considered during the EIA Phase.

14. THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered)

This section will be finalised with comments and contributions from I&APs when the public participation process has commenced.

15. THE OUTCOME OF THE SITE SELECTION MATRIX. FINAL SITE LAYOUT PLAN

(Provide a final site layout plan as informed by the process of consultation with interested and affected parties)

This section will be finalised with comments and contributions from I&APs when the public participation process has commenced.

16. MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED

Not applicable. Alternatives were considered.

17. STATEMENT MOTIVATING THE PREFERRED SITE

(Provide a statement motivation the final site layout that is proposed)

The proposed infrastructure development is limited in terms of its necessity to be in close proximity to the approved opencast mining. The preferred location of the infrastructure

is determined on its potential impact on environmental, social and economic aspects, as well as its operational and financial implications.

18. PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

18.1 Description of alternatives to be considered including the option of not going ahead with the activity

Please refer to Section 8.1 for details regarding the alternatives considered, as well as the consideration of the No-Go option.

18.2 Description of the aspects to be assessed as part of the environmental impact assessment process

(The EAP must undertake to assess the aspects affected by each individual mining activity whether listed or not, including activities such as blasting, Loading, hauling and transport, and mining activities such as Excavations, stockpiles, discard dumps or dams, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)

The aspects to be assessed include:

- Soils, land use and land capability;
- Biodiversity (including fauna, flora and aquatic ecosystems);
- Wetlands
- Surface water (quality and quantity);
- Groundwater (including geochemistry and geohydrology);
- Waste classification;
- Air quality;
- Noise;
- Visual impacts;
- Blasting and vibration;
- Heritage and cultural resources;
- Socio-economic;
- Reserve Determination (if required);
- Update of mine closure and liability reports.

18.3 Description of aspects to be assessed by specialists

The above-mentioned aspects will be assessed by independent specialists and the terms of references for the assessments are contained in the following section.

18.4 Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

The Scoping Phase investigations have identified several potential environmental impacts associated with the proposed infrastructure development. From the assessment,

which was informed by existing studies, I&APs and various professionals, a shortlist of potentially significant environmental impacts was identified for specialist investigations during the Impact Assessment Phase.

The specialist investigations to be conducted during the Impact Assessment Phase of this project will consist of the following studies:

- Soils, Land Use and Land Capability Investigation;
- Terrestrial Ecological Assessment;
- Wetlands and Aquatic Ecosystem Assessment;
- Surface Water Impact Assessment;
- Geohydrological Impact Assessment;
- Air Quality Impact Assessment;
- Noise Impact Assessment;
- Visual Impact Assessment;
- Blasting and Vibrations Impact Study;
- Heritage Impact Assessment;
- Socio-economic Impact Assessment; and
- Closure and Rehabilitation Plan.

The findings from these investigations will be reflected in the EIR/EMPr. The proposed Terms of References (ToR) for all these specialist studies are indicated in **Table 18-1** below.

Table 18-1: Proposed terms of References for the specialist studies

Specialist investigations	Terms of References
Soils, Land Use and Land Capability Investigation	*Phase 1 – Baseline assessment* • Provide a consolidated baseline assessment for the entire VDDC site in terms of soils, land capability and land use. *Phase 2 – Impact assessment* • Assess the potential impact from the propose mining operations, shaft complexes and associated infrastructure on the baseline soil, land capability and land uses; • Where relevant, suggest mitigation measures or alternatives that reduce potential significant impacts to acceptable levels; and • Provide a concise report that captures the findings and recommendations mentioned above.
Terrestrial Ecological Assessment	*Phase 1 – Baseline assessment* • Literature review of previous specialist studies; • Baseline surveys of terrestrial flora and fauna; and • Compile baseline report. *Phase 2 – Impact assessment* • Assess the significance of potential impacts on the above-mentioned aspects; and • Identify suitable and practical mitigation measures and reassess impacts post-mitigation.

Specialist investigations	Terms of References
	Phase 3 – Biodiversity Management Plan • Develop a framework for the protection and enhancement of biodiversity associated with VDDC section of the Wolvekrans Colliery; and • Monitor the effectiveness of the biodiversity management measures.
Wetlands and Aquatic Ecosystem Assessment	*Phase 1 – Baseline assessment* • Literature review of previous specialist studies; • Baseline surveys of wetlands and aquatic ecosystems; and • Compile baseline report. *Phase 2 – Impact assessment* • Assess the significance of potential impacts on the above-mentioned aspects; and • Identify suitable and practical mitigation measures, and reassess impacts post-mitigation. *Phase 3 – Biodiversity Management Plan* • Develop a framework for the protection and enhancement of biodiversity associated with VDDC section of the Wolvekrans Colliery; and • Monitor the effectiveness of the biodiversity management measures.
Surface Water Impact Assessment	*Phase 1 – Baseline assessment* • Review existing specialist studies relating to surface water; and • Characterise the surface water regime at the site and the catchments in terms of surface water quantity and quality. • Site water management: Compile a conceptual surface water management plan that includes mitigation measures for identified impacts; and • Develop a surface water monitoring protocol. • Mine water balance: Compile a site water balance in GoldSim and design water flow diagrams. *Phase 2 – Impact assessment* • Assess the impact of the proposed project on surface water quality and quantity; and • Formulate mitigation measures for significant impacts and identify monitoring requirements for the proposed mitigation measures.
Geohydrological Impact Assessment	*Phase 1 – Baseline assessment* • Site visit and review of available information relating to surface- and groundwater quality, monitoring data, as well as previous specialist reports; and • Borehole survey and borehole profiling. *Phase 2 – Impact assessment* • The groundwater impact assessment will follow a risk-based approach; • Develop a numerical groundwater flow and transport model with the latest mine plans, groundwater level and quality data, and infrastructure layout plans; and • Compile a final specialist report that will include remedial options and recommendations for identified potential impacts.
Air Quality Impact Assessment	*Phase 1 – Baseline assessment* • Review available data including existing meteorological data, monitoring data; • Conduct a site visit and inspection; and

Specialist investigations	Terms of References
	• Conduct a desktop study of local atmospheric dispersion potential. *Phase 2 – Impact assessment* • Development of comprehensive atmospheric source and emissions inventory; • Atmospheric dispersion simulations; • Human health, nuisance and environmental impact screening; • A qualitative cumulative air quality assessment; • Development of an air quality management, mitigation, and monitoring plan; • A Tier 1 (if required Tier 2) greenhouse gas inventory and qualitative discussion on climate change impacts; and • A specialist air quality impact report.
Noise Impact Assessment	*Phase 1 – Baseline assessment* • A short-term baseline noise survey; • Describing the receiving acoustic environment in terms of baseline noise survey results, identifying sensitive receptors, and noise attenuation potential; and • A baseline environmental noise report. *Phase 2 – Impact assessment* • The establishment of a comprehensive noise source inventory; • Noise propagation simulations; • A compliance and impact assessment; • The identification of suitable noise management, mitigation and monitoring measures; and • A comprehensive environmental noise impact assessment report.
Visual Impact Assessment	*Phase 1 – Baseline assessment* • Provide a consolidated baseline assessment for the entire VDDC site in terms of visual impact. *Phase 2 – Impact assessment* • Assess the potential impact from the propose mining operations, shaft complexes and associated infrastructure on the baseline visual environment; • Where relevant, suggest mitigation measures or alternatives that reduce potential significant impacts to acceptable levels; and • Provide a concise report that captures the findings and recommendations mentioned above.
Blasting and Vibrations Impact Study	*Phase 1 – Baseline assessment* • Site review and information capture of existing structures; • Identify the source and receiving environment, as well as anticipated impacts; and • Identify requirements to complete the EIA. *Phase 2 – Impact assessment* • Modelling (air blast and fly-rock) and EIA report; • Identify and address environmental- and social impacts; • Compile a report indicating mitigation measures and recommendations; and • Final feedback, public meeting and report review where necessary.

Specialist investigations	Terms of References
Heritage Impact Assessment	*Phase 1 – Baseline assessment* • Conduct a Phase I HIA study; • Establish if any of the types and ranges of heritage resources as outlined in Section 38 of the National Heritage Resources Act (No 25 of 1999) occur in the project area; and • Produce a map indicating the locations of heritage resources, graves, etc. *Phase 2 – Impact assessment* • Determine the significance of the heritage resources in the project area and the level of significance of any possible impact on any of these heritage resources; and • Propose mitigation measures for those types and ranges of heritage resources that may be affected by the proposed VDDC Project.
Socio-economic Impact Assessment	*Phase 1 – Baseline assessment* • Provide an overview of the current socio-economic status of the area and the social characteristic of the receiving environment; • Review and update existing baseline studies; • Indicate the anticipated core impact categories and impact areas; • Identify anticipated positive socio-economic impacts of the proposed project; • Identify and highlight negative social impacts of the proposed project; • Identify gaps and no-go options; • Compile a report indicating the findings, recommendations and conclusions; • Identify issues to be considered during the EIA phase; and • Determine the need of future social studies. *Phase 2 – Impact assessment* • Review relevant additional literature; • Consult with stakeholders and affected parties; • Assess anticipated impacts of the project using significance criteria; • Compile a report indicating the impact ratings, mitigation measures, recommendations and conclusions; and • Compile a Social Management Plan.
Closure and Rehabilitation Plan	Develop a Closure and Rehabilitation Plan for the proposed infrastructure development, will include the following: • Description of closure objectives; • A summary of the regulatory requirements and conditions; • Proposed final post-mining land use; • A summary of the results of the environmental risk report and details of identified residual and latent impacts; • A summary of the results of progressive rehabilitation undertaken; • Methods to decommission each proposed infrastructure and mitigation / management strategies to avoid, minimise and manage residual or latent impacts; • Design principles used in the development of the closure plan; • Proposed closure actions; • Schedule of actions for final rehabilitation, decommissioning and closure; • Monitoring, auditing and reporting requirements;

Specialist investigations	Terms of References
	• Details of the closure cost estimate and financial provisioning; • Record of consultation of interested and affected persons; The Closure Plan will comply with the minimum content of a final rehabilitation, decommissioning and mine closure as contained in Appendix 4 of GNR 1147, the Financial Provisioning Regulation dated 20 November 2015; and An annual rehabilitation plan and environmental risk assessment report will be included in the EIR/EMPr as per GNR 1147.

18.5 The proposed method of assessing duration significance

The impact assessment methodology to be utilised in the project is discussed in detail in Section 12, including the duration scale.

18.6 The stages at which the competent authority will be consulted

A pre-application consultation meeting was held with the DMR on 1 August 2018. Further meetings will be held as required.

18.7 Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

18.7.1 Steps to be taken to notify interested and affected parties

Please refer to Section 9 for details regarding the public participation process.

18.7.2 Details of the engagement process to be followed

Please refer to Section 9 for details regarding the public participation process.

18.7.3 Description of the information to be provided to Interested and Affected Parties

Please refer to Appendix 6 for a copy of the Background Information Document and other documents provided to I&APs as part of the public participation process.

18.8 Description of the tasks that will be undertaken during the environmental impact assessment process

The following tasks will be undertaken

Application and Scoping

Once the project commences, an environmental authorisation application form will be compiled for submission to the DMR. A Consultation Scoping Report will be compiled and made available to all commenting authorities, as well as I&APs. Following comments and issues received by I&APs, the Final Scoping Report will be submitted to the DMR. A decision on the acceptance or refusal of the application will be issued by the DMR.

Compilation of EIR and EMPr

The Consultation EIR and EMPr will be prepared with information and issues identified during the Scoping Phase activities, comments from I&APs, commenting authorities and the findings from the specialist studies.

The Impact Assessment Phase comprises of:

- The completion of the specialist studies and reports;
- The finalisation of the impact assessment;
- The compilation of the Consultation EIR and EMPr;
- The public review of the Consultation EIR and EMPr and possible extended public review period, at the discretion of the competent authority (DMR);
- The compilation of the Final EIR and EMPr; and
- The submission of the Final EIR and EMPr.

The Consultation EIR and EMPr includes:

- The details of the EAP who prepared the report;
- A detailed description of the proposed development and alternatives;
- A description of the environment that may be affected by the activity and the way physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed development;
- A description of the methodology of the stakeholder engagement process;
- The comments and response report and stakeholder database;
- A description of the need and desirability of the proposed development and the identified potential alternatives to the proposed activities;
- A summary of the methodology used in determining the significance of potential impacts;
- A description and comparative assessment of all alternatives identified during the EIA process;
- A summary of the findings of the specialist studies;
- A detailed assessment of all identified potential impacts;
- A list of the assumptions, uncertainties and gaps in knowledge;
- An opinion by the consultant as to whether the development is suitable for approval.
- Once the Consultation EIR and EMPr have been placed on public review, comments received from stakeholders will be documented and considered in the Final EIR and EMPr which will be placed on public review and simultaneously submitted to the DMR for approval.

19. MEASURES TO AVOID, REVERSE, MITIGATE, OR MANAGE IDENTIFIED IMPACTS AND TO DETERMINE THE EXTENT OF THE RESIDUAL RISKS THAT NEED TO BE MANAGED AND MONITORED

A summary is provided of the potential impacts and preliminary mitigation measures to address the impacts in **Table 19-1**.

Table 19-1: Preliminary list of mitigation measures

ACTIVITY whether listed or not listed (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	POTENTIAL FOR RESIDUAL RISK
Clearing of vegetation	• Loss of habitat; • Dust generation; • Increased suspended solids to surface water resources	• Control by limiting the area to be as small as possible; • Control by diverting clean water around construction areas; and • Control erosion and implement dust control measures.	Low
Infrastructure development in close proximity to watercourses	• Surface water contamination; • Loss of habitat; • Loss of natural soil structure through compaction.	• Control by limiting the area to be as small as possible; • Control by demarcating watercourses and no-go areas; • Control by diverting clean water around areas and managing clean and dirty water separately, as well as containing and treating dirty water to an acceptable standard; • Control erosion and implement dust control measures; • Control by constructing infrastructure in the dry season, if possible.	Low
Infilling/depositing/excavation/removal or moving of soil of more than 10 m^3 from watercourse as a result of infrastructure development in close proximity to watercourses	• Surface water contamination; • Change in characteristics and functioning of watercourse		Moderate
Dirty water pipelines (600 mm diameter) in excess of 1 000 m in length	• Surface and groundwater contamination; • Loss of habitat.	• Control by limiting surface disturbance and vegetation clearing; • Control by ensuring an effective route and site were selected during the planning phase; • Control by ensuring the proper design and construction and maintenance of the infrastructure.	Low

ACTIVITY whether listed or not listed	POTENTIAL IMPACT	MITIGATION TYPE	POTENTIAL FOR RESIDUAL RISK
Clean water diversion pipeline / canals in excess of 1 000 m in length	Loss of habitat.	Control by limiting surface disturbance and vegetation clearing.	Low
Boxcut spoils dumps Overburden Dumps Final rejects dump	• Surface and groundwater contamination; • Air pollution.	• Control by providing barrier systems using a risk-based approach; • Control by separating clean and dirty storm water, as well as collecting and containing dirty runoff and seepage; • Control by implementing dust control measures.	Moderate
Slurry paddocks and day area with return water dam	Surface and groundwater contamination	• Control by providing barrier systems as required; • Control by collecting and containing dirty runoff and seepage	Low
ROM stockpiles	Soil, surface and groundwater contamination.	• Control by ensuring that all facilities with the potential to generate dirty storm water runoff, effluent or washdown water are located within the designated dirty water area; • Control by diverting clean runoff around the designated dirty areas by means of cut-off canals, sized to accommodate at least the 1:50 year peak flow event.	Low
New haul roads and service roads. Upgrade of existing roads	• Loss of habitat; and • Dust generation	• Control by limiting the area of disturbance; • Remediate by removing and storing all utilisable soil; • Remediate by protecting the area from erosion, compaction and contamination; • Control by implementing dust control measures.	Low
Pollution control dam	Surface and groundwater contamination through seepage.	• Control by providing barrier systems as required; • Control by providing facility with adequate size; and • Control by operating with sufficient freeboard.	Low
Pit dewatering	• Surface and groundwater contamination through	• Control by containing mine-impacted water abstracted from the pit, and treating and re-using the affected water;	Low

ACTIVITY whether listed or not listed	POTENTIAL IMPACT	MITIGATION TYPE	POTENTIAL FOR RESIDUAL RISK
	spillages; • Habitat disturbance through spillages; and • Potential reduction of catchment yield of aquifers.	• Control by maintaining the pumping system; • Control by regularly monitoring groundwater levels as per geohydrological specialist's recommendations.	
Dust suppression using mine impacted water	Surface and groundwater contamination	• Control by only using mine-impacted water in dirty water management areas with appropriate dirty water management measures; • Control by limiting dust suppression to a minimum to prevent excessive runoff.	Low
Mechanical evaporators at Steenkoolspruit Pit as part of dirty water management measures	Salinisation / contamination of the environment through spray drift.	• Control by only using mechanical evaporators in dirty water management areas with appropriate dirty water management measures; and • Control spray drift by only using mechanical evaporators on windless days.	Low
Topsoil stockpile	• Dust generation • Loss of soil potential	• Control erosion by implementing erosion control measures; • Control by implementing recommendations by soil specialist with regarding to height and management of stockpile.	Low

20. OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

Compliance with the provisions of sections 24(4) (a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the:-

20.1 Impact on the socio-economic conditions of any directly affected person

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix 2 and confirm that the applicable mitigation is reflected herein)

Since mining activities are already undertaken in the area and that the proposed infrastructure development will be situated within the Wolvekrans Colliery Mining Rights area, the proposed infrastructure development is not perceived to constitute a separate activity. It could rather be perceived as development associated with an existing activity.

Loss of land is not perceived to have any negative socio-economic impacts, as the proposed infrastructure would be developed within a brownfields area, where the land forms part of the Wolvekrans Colliery mining rights area. It is anticipated that the development of the proposed infrastructure would result in limited additional employment opportunities during the construction phase. Limited new opportunities for locals are thus foreseen.

The anticipated socio-economic impacts will be assessed during the EIA Phase to determine the required mitigation measures. The detailed outcome of socio-economic impact assessment will be provided in the EIR.

20.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2) (i) (vi) and (vii) of that Act, attach the investigation report as Appendix 2 and confirm that the applicable mitigation is reflected herein)

The baseline heritage assessment has identified heritage resources in the area, as discussed in Section 10.1.1.16. The expected impact of the proposed infrastructure development on these resources are very low and the detailed outcomes of the heritage impact assessment will be provided in the EIR.

20.3 Other matters required in terms of sections 24(4) (a) and (b) of the Act.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix 5)

Investigations were conducted for the alternatives related to the proposed project and no motivations are required for no reasonable or feasible alternatives.

21. UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I, Tolmay Hopkins, herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties have been correctly recorded in the report.

Signature of the EAP

DATE: 2018-10-03

22. UNDERTAKING REGARDING LEVEL OF AGREEMENT

I, Tolmay Hopkins, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

Signature of the EAP

DATE: 2018-10-03

23. REFERENCES

Airshed Planning Professionals (Pty) Ltd (August 2018a). Vandyksdrift Central (VDDC) Infrastructure: Baseline Air Quality Report. Report No: 17JAW07AQa

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Pistorius, J.C.C. (August 2018). A Phase I Heritage Impact Assessment (HIA) Study for the Proposed Vandyksdrift Central (VDDC) Mining Infrastructural Development in the Mpumalanga Province.

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Schulz, R. and Peall, S.K. (2001). Effectiveness of a constructed wetland for retention of nonpoint-source pesticide pollution in the Lourens River catchment, South Africa. *Environmental Science and Technology*, 35, 422-426.

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3 October 2018

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APPENDIX 1

QUALIFICATION AND CV OF EAP

APPENDIX 1 - Table of Contents

Jones & Wagener
Engineering & Environmental Consultants
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CURRICULUM VITAE

28 February 2018
hopkinsgeneralcv_feb2018

TOLMAY HOPKINS

Profession	Environmental Scientist
Date of Birth	1973-01-22
Position in firm	Project Manager / Senior Environmental Scientist
Years with the firm	10
Nationality	South African
Education / Qualifications	MSc (Agric) Microbiology (University of Pretoria)
Languages	English, Afrikaans

Employers

2011 - current	Jones & Wagener Engineering and Environmental Consultants
2009 - 2010	Golder Associates (Consultant – Integrated Waste Solutions Division)
2006 - 2009	Department of Water Affairs and Forestry (Assistant Director - Water Sector Regulation and Use: Strategic Environmental Assessment)
2004 – 2006	Jones & Wagener Consulting Civil Engineers (Environmental Scientist – Waste and Tailings Division)
1999 – 2004	Department of Water Affairs and Forestry (Principle Water Pollution Control Officer – Waste Management: Waste Discharge and Disposal)
1995 – 1998	Postgraduate Student - University of Pretoria

Areas of Expertise

- Environmental Management,
- Environmental Law,
- Integrated Water Resource Management: Water Quality Management, Wetland Management, Authorisation of Water Uses.
- Waste Management: Authorisation, Legal requirements, monitoring, auditing.
- Authority Liaison and legal requirements.
- Project co-ordination.

Professional Affiliations

Registered Professional Natural Scientist (Pr.Sci.Nat.) 400322/14

Member of International Association for Impact Assessment (South African Affiliate)

Member of Institute of Waste Management South Africa (IWMSA)

Relevant Experience

Integrated Regulatory Applications

Application for Environmental Authorisation and a Water Use Licence Limited for the Proposed Expansion of Wolvekrans Colliery's North Section (Middelburg Mines) – Middelburg – South32 SA Coal Holdings (Pty) – 2016.

Authorisation (permitting/licencing) of waste management activities

Waste management licence application report for the Middelburg Water Reclamation Project – Middelburg – Douglas Tavistock Joint Venture – 2011.

Application for permit amendment for the solid waste disposal site – Enstra, Springs - Sappi Paper and Paper Packaging: Enstra Mill – 2011.

Permit application for the Closure of the Pappas Quarry Waste Disposal Facility – Nelspruit - Manganese Metal Company – 2009.

Waste Management Licence Application for the Extension of the Macrodump at the Sappi Ngodwana Mill – Nelspruit – Sappi Manufacturing – 2010.

Application for Variation of the Waste Management Licence for the New Calcine and Slimes Waste Disposal Facility in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) - Emalahleni - Vanchem Vanadium Products – 2010.

Interim Phase for the Application for the Amendment of Waste Permit for the Kingston Vale Residue Management Facility – Nelspruit - Manganese Metal Company – 2010.

Permit Application and Scoping Report for the upgrade and permitting of the Rosslyn Landfill – Rosslyn – Enviroserv.

Permitting and regulation of hazardous waste disposal sites: permitting of four hazardous sites and the review and amendment of two hazardous waste site permits (while at the Department of Water Affairs).

Processing of permit applications for general waste disposal sites: permitting of 23 general sites and the review and amendment of six general waste site permits (while at the Department of Water Affairs).

Feasibility studies for waste disposal sites

Pre-feasibility of Kingston Vale Residue Management Facility Phase 3: Site Selection Report – Nelspruit – Manganese Metal Company – 2015.

Feasibility Investigation for a New Landfill Site to Serve the Northern Areas of the City of Johannesburg - Johannesburg – Pikitup – 2006.

Closure and Remediation of waste management facilities

Application for Waste Management License in terms of NEM: WA for the Closure of the Asbestos Disposal Facility at Camden Power Station – Ermelo – Eskom Camden Power Station – 2017.

Application for Waste Management License in terms of NEM: WA for the Closure of the Asbestos Disposal

Facility at Komati Power Station – Middelburg – Eskom Komati Power Station – 2017.

Waste Ash Site: Remediation Objectives – Secunda – Sasol .

Environmental Scoping and Closure Report, Everite Disposal Site – Everite.

Other: waste management

Waste Trade-off Study: Vandyksdrift Central Project Water Treatment Plant – Middelburg – BHP Billiton Energy Coal South Africa (Pty) Ltd – 2014.

Feasibility Study: Phase II Development of Kingston Vale Hazardous Residue Management Facility: Assessment of Legal Requirements – Nelspruit – Manganese Metal Company – 2013.

Waste Management Philosophy for the Proposed Waste Management Facility in the Eastern Cape.

Financial viability for the Proposed Waste Management Facility in The Eastern Cape.

Integrated Waste Management Plans

Sasol Chemical Industries: Integrated Waste Management Plan: Remediation Objectives

Authorisation in terms of the National Water Act, 1998 (Act 36 of 1998)

Water Use Licence Application for the Undermining of Watercourses at the Goedehoop Colliery North – Middelburg – Anglo Operations (Pty Ltd) – 2017

Water Use Licence Application for the Undermining of Watercourses at the Goedehoop Colliery South – Middelburg – Anglo Operations (Pty Ltd) – 2016

Water Use Licence Application for the Greenway Farms Bokpoort Operations – Mookgophong – Greenway Farms – 2016

Integrated Water Use Licence Application for the Proposed Elders Colliery – Bethal – SRK Consulting on behalf of Anglo Operations Limited – 2016.

Application for renewal of the Water Use Licence at Goedehoop Colliery Block 20 – Middelburg – Anglo Operations Limited – 2016.

Risk Assessment: S21(c)&(i) Water Uses Associated with the Geotechnical and Surface Directional Drilling at the proposed Elders Colliery– Bethal – SRK Consulting on behalf of Anglo Operations Limited – 2016.

GNR704 Exemption Application and Risk Assessment for S21(c)&(i) Water Uses Associated with the Surface Directional Drilling and Geotechnical, Geohydrological, Geological and Metallurgical Investigations at the proposed Goedehoop Colliery Hope 4 Seam Project – Middelburg – SRK Consulting on behalf of Anglo Operations Limited – 2016.

Integrated Water Use Licence Application for the Proposed Mining and Infrastructure Expansion at Tweefontein South Complex – Ogies – Glencore South Africa (Pty) Ltd – 2014.

Integrated Water Use Licence Application for Elders Colliery (Draft) - Bethal – SRK Consulting – 2014.

Application for amendment of the water use licence for the Phola – Kusile Coal Conveyor System – Ogies – Synergistics Environmental Services – 2014.

Risk Assessment: S21(c)&(i) Water Uses Associated with the Geotechnical, Geohydrological and Geological Investigations – Bethal – SRK Consulting – 2013.

Motivation for General Authorisation of S21(c)&(i) Water Uses Associated with the Geotechnical Investigation – KiPower Independent Power Plant – Delmas – KiPower (Pty) Ltd – 2013.

Workshop on Technical Requirements of Integrated Water Use Licence Applications – Anglo American

Thermal Coal – 2013.

Integrated Water Use Licence Application for the New Largo Colliery – Ogies – Synergistics Environmental Services – 2012.

Integrated Water Use Licence Application for the R545 Provincial Road Re-alignment – Ogies – Synergistics Environmental Services – 2012.

Integrated Water Use Licence Application for the Boschmanskrans and Vlaklaagte South Sections of the Wolvekrans Colliery – Middelburg – BHP Billiton Energy Coal South Africa (Pty)Ltd – 2012.

Application for Amendment of the Water Use License for the Twistdraai Colliery: Thubelisha Shaft – Secunda – Sasol Mining – 2012.

Motivation for Authorisation of the Temporary Diversion of the Gladdespruit in terms of the General Authorisations – Nelspruit – Manganese Metal Company – 2012.

Motivation to Dispense with the Requirements of a Water Use Licence for the New Calcine and Slimes Waste Disposal Facility in terms of the National Water Act, 1998 (Act 36 of 1998) – Emalaheni - Vanchem Vanadium Products – 2010.

Sasol One and Sasol Midlands Waste Sites: Water Use Licence Application – Sasol Chemical Industries.

Water Use Licence Application for the Fine Coal and Discard Facility at the Twistdraai Export Plant – Sasol Mining.

Assessment of applications for authorisations for the impeding, altering, diverting and changing of the characteristics of a watercourse in terms of the National Water Act, 1998 (Act 36 of 1998). Handling of all queries related to these water uses (while at the Department of Water Affairs).

Assessment of applications for authorisations for stream flow reduction activities (afforestation) in terms of the National Water Act, 1998 (Act 36 of 1998). Handling of all queries related to this water use (while at the Department of Water Affairs).

Chairperson of Mpumalanga Stream Flow Reduction Activity Licence Assessment Advisory Committee (February 2007 – July 2009).

<u>Integrated Water and Waste Management Plans</u>

Integrated Water and Waste Management Plans for Harmony Gold Free State Operations: One Plant, Tshepong Shaft, Phoenix project (Saaiplaas and St Helena), Central Plant, Bambanani Mine (consisting of the East and West Shafts), Unisel Shaft, Joel Shaft, Joel Plant, Target 1, 2 and 3 Shafts, Masimong Mine (consisting of Masimong 4 Shaft and Masimong 5 Shaft); Phakisa Mine (consisting of Phakisa and Nyala Shafts).

Amendment of Integrated Water and Waste Management Plan for Goedehoop Colliery North – Middelburg – Anglo Operations (Pty Ltd) – 2017.

Amendment of Integrated Water and Waste Management Plan for Goedehoop Colliery South – Middelburg – Anglo Operations (Pty Ltd) – 2016.

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Integrated Water and Waste Management Plan for Delmas Coal – Delmas – Kuyasa Mining (Pty)Ltd – 2014.

Integrated Water and Waste Management Plan for Elders Colliery (Draft) – Bethal – SRK Consulting – 2014.

Integrated Water and Waste Management Plan for Tweefontein North Complex – Ogies – Xstrata South Africa – 2013.

Integrated Water and Waste Management Plan for Twistdraai Colliery Thubelisha Shaft – Secunda- Sasol Mining – 2013.

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Integrated Water and Waste Management Plan: Gap Analysis and Risk Assessment – Meyerton – Metalloys – 2010.

Environmental Management Programmes

Amendment of the Environmental Management Programme Report for Delmas Coal – Kyasa Mining – Delmas – 2016.

Environmental Authorisations / Environmental Impact Assessments

Application to Amendment timeframe of the Environmental Authorisation for the KiPower Water Supply Pipeline – KiPower (Pty)Ltd – Delmas – 2017.

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Sigma Colliery Closure Report: Phase 1 Closure Risk Assessment: Legal Framework – Sasol Mining – 2015.

Surface water quality monitoring

Surface water quality monitoring and bio-monitoring for the New Largo Project – Ogies – Anglo American Inyosi Coal – 2013 and 2014.

Surface Water Specialist Reports

Surface Water Specialist Report for Tweefontein North Complex – Ogies – Clean Stream Environmental Services – 2013.

Surface Water Specialist Report for the New Largo Colliery – Ogies – Synergistics Environmental Services – 2012.

Landfill Gas Clean Development Mechanism (CDM) projects

Chloorkop GLB⁻ Landfill Site: Project Identification Note and request for Letter of No Objection for the EnviroServ Chloorkop Landfill Gas Recovery Project (requirement to register project as a CDM project in terms of the Kyoto Protocol) – Chloorkop – Enviroserv – 2006.

Chloorkop GLB– Landfill Site: Draft Project Design Document for the purposes of project validation (part of requirement to register as a CDM project in terms of the Kyoto Protocol) - Chloorkop – Enviroserv – 2006.

Auditing

Annual External Audit of the Residue Inerting Plant and Greenfill Usage – Nelspruit – Delta EMD – 2014.

Annual External Audit of the Sappi Ngodwana Composting Facility – Ngodwana – Sappi Southern Africa Limited - 2014

Annual External Audit of the Residue Inerting Plant and Greenfill Usage – Nelspruit – Delta EMD – 2013.

Annual External Audit of the Asbestos Waste Disposal Site at the Camden Power Station – Camden – Eskom – 2013.

Annual External Audit of the Residue Inerting Plant and Greenfill Usage – Nelspruit – Delta EMD – 2012.

Annual External Audit of the Asbestos Waste Disposal Site at the Camden Power Station – Camden – Eskom – 2012.

External Audit of the Integrated Water Use License for the Agnes Mine – Barberton – Synergistics Environmental Services – 2012.

Annual External Audit of the Residue Inerting Plant and Greenfill Usage – Nelspruit – Delta EMD – 2011.

Annual External Audit of the Camden Power Station H:H Asbestos Disposal Site – Camden – Eskom Generation – 2011.

Audit of Environmental Management Programme of the Northam Platinum Mine – Northam – Northam Platinum Mine – 2010.

Auditing general waste disposal sites regulated by Regional Offices of the Department (while at the Department of Water Affairs).

Training

Presenter at the Centre for Environmental Management, University of Northwest in Potchefstroom:

Course: Greener Governance

Module: Sustainable waste disposal on land: duties and responsibilities of Local Government as “Regulator” and “Regulated”

Course: Introduction to Sustainable Environmental Management. An overview of Principles, Tools and Issues

Modules: Introduction to Integrated Waste Management & Sustainable Waste Disposal on Land

Course: Technical aspects of sustainable land-based waste management for environmental managers

Module: Duties, liabilities, reasonable measures and emergency incidents

Course: Integrated Waste Management

Module: Auditing and Environmental Monitoring

Course: Waste Law

Module: Waste Disposal and Discharge in terms of the National Water Act, 1998 (Act 36 of 1998)

Provide Departmental training on waste management, permitting and waste classification – 2002 – 2003 (at the Department of Water Affairs).

Summary of other Experience / Publications

Other experience

Chairperson of Mpumalanga Wetland Forum (February 2007 – October 2008).

Chairperson of the Organising Committee for the National Wetlands Indaba 2008.

Specialist input to other sections on applications regarding wetland issues – 2006 - 2008

Regional representative on the DWAF Wetlands Task Group - 2006 - 2008

Presentation to the Parliamentary Portfolio Committee for the Environment on Healthcare Waste on behalf of the Department of Water Affairs and Forestry - 2000

Declaration

I confirm that the above CV is an accurate description of my experience and qualifications.

18 February 2018

Signature of Staff Member Date

Jones & Wagener
Engineering & Environmental Consultants
59 Bevan Road PO Box 1434 Rivonia 2128 South Africa
tel: 00 27 11 519 0200 www.jaws.co.za email: post@jaws.co.za

CURRICULUM VITAE

Jessica Badenhorst

03 October 2018
badenhorstj_generalcv_oct2018

Profession	Environmental Scientist
Date of Birth	04 March 1993
Position in firm	Junior Environmental Scientist
Years with the firm	1 year
Nationality	South African
Education / Qualifications	MSc Entomology
	BSc (Hons) Zoology
	BSc Zoology
Languages	English, Afrikaans

Employers

Nov 2017 – to date	Jones & Wagener Engineering and Environmental Consultants
Nov 2014 – Nov 2017	Coaltech Research Association
Jan 2014 – Dec 2014	Forestry and Agricultural Biotechnology Institute (FABI)
Dec 2013 – June 2014	Conservation Ecology Research Unit (CERU)

Areas of Expertise

Ms Badenhorst has been conducting academic *research* for three years relating to different disciplines including entomology, zoology, soil science and botany. She is skilled in *statistical analysis* and using statistical programs Statistica, R and SPSS.

Publications

Journal of Applied Soil Ecology 2018

Badenhorst, J; Dabrowski, J; Scholtz, C.H. & Truter, W.F. Dung beetle activity improves herbaceous plant growth and soil properties on plots simulating reclaimed mined land.

Water Research Commission 2018

T Mabhaudhi; G Simpson; J Badenhorst; M Mohammed; T Motongera; A Senzanje and A Jewitt. Assessing the State of the Water-Energy-Food (WEF) Nexus in South Africa. WRC Report No KV 365/18

Frontiers Environmental Science Submitted

GB Simpson; J Badenhorst; M Berchner; G Jewitt; E Davies. Mpumalanga Province, South Africa: The need for Water-Energy-Food Nexus Science and Data to influence Integrated Public Policy.

Professional Affiliations

Golden Key International honour society (2013 –)

Land Rehabilitation Society of Southern Africa (2014 –) 0409

International Association for Impact Assessment South Africa 5973

Relevant Experience

Auditing

Delmas Coal Second Quarterly Environmental Audit – Delmas – Kuyasa Mining (2018)

Review of Delmas Coal Annual Water Use License Audit – Delmas – Kuyasa Mining (2018)

Research

Conduct research on the Water-Energy-Food Nexus and compile report – Water Research Commission (2018)

Conduct research on rehabilitated coal mines in eMalahleni, specifically soil and vegetation measurements as well as invertebrate abundance and richness. (2014 – 2017)

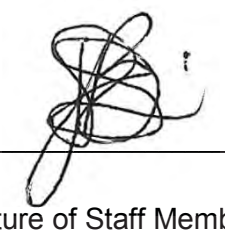
Conduct research on rehabilitated mines in Richard's Bay, looking at local avian diversity based on visual and audible identification. (6 months)

Laboratory Assistant

Microscopic identification and classification of insects occurring on *Acacia* species. Pinning and labelling insect species. (2014)

Declaration

I confirm that the above CV is an accurate description of my experience and qualifications.



Signature of Staff Member

03 October 2018

Date

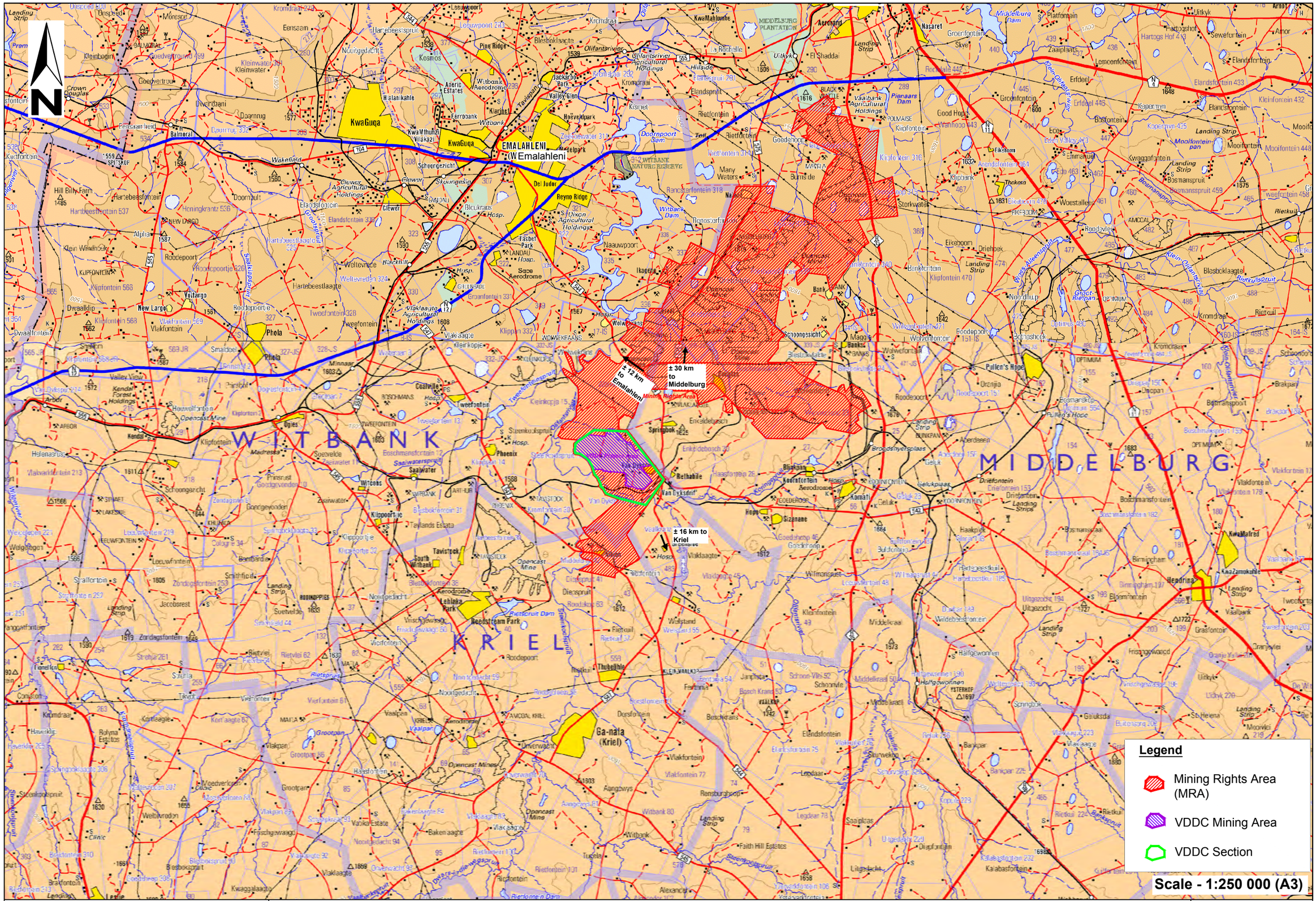
APPENDIX 2

SOCIO-ECONOMIC CONDITIONS OF DIRECTLY AFFECTED PERSON(S) AND HERITAGE ASSESSMENT

To be included in the Environmental Impact Report

APPENDIX 3

LOCALITY MAP (LARGE SCALE)



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South32
VDDC Project
Locality Plan

Job No G535-09

Figure 3-1

APPENDIX 4

MAP OF LISTED AND SPECIFIED ACTIVITIES (LARGE SCALE)

Legend

- CLEAN WATER DRAIN
- CLEAN WATER PIPELINE
- DIRTY WATER DRAIN
- DIRTY WATER PIPELINE
- DRAINS
- ACCESS ROAD
- BOXCUT AND RAMP
- HAUL ROAD
- PIT BOUNDARY
- POWERLINE
- PARKING
- EXPLOSIVE MAGAZINE
- HARD PARK
- LAYDOWN AREAS
- NEW EVAPORATORS
- POLLUTION CONTROL DAMS
- ROM STOCKPILE
- SLURRY PADDOCKS
- SPOILS STOCKPILES
- TOPSOIL DUMPS
- WASTE ROCK DUMP
- Mining Rights Boundary

Coordinate System: GCS Hartebeesthoek 1994
Datum: Hartebeesthoek 1994

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Engineering & Environmental Consultants
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tel: 0027 11 519 0200 www.jaws.co.za email:post@jaws.co.za

South32 SA Coal Holdings (Pty) Ltd (SAEC)
Vandyksdrift Central
Proposed Infrastructure

Job No: G535-09

Appendix 4

APPENDIX 5

MOTIVATION FOR NOT CONSIDERING ALTERNATIVES

Not applicable. Alternatives were considered.

APPENDIX 6

PUBLIC PARTICIPATION

APPENDIX 6 - Table of Contents

Appendix 6.1

List of I&APs

Title	Last name	First name	Organisation	Position	Postal / Physical Address	City	Postal Code	Tel/ Cell	Email
Landowners and lawful occupiers									
Ms	Bopape	Goodness	SAEC	Van Dyksdrift 19 IS 2				011 376 2974	Goodness.Bopape@south32.net
Mr	Patrick	Ndlovu	SAEC	Van Dyksdrift 19 IS 2					Patrick.Ndlovu2@south32.net
Landowners and lawful occupiers of adjacent properties									
Mr	Van Dyk	Jaco	Valco Boerdery	Enkeldebosch 20 IS portion 23				086 111 3797	'valco.bdy@gmail.com'
Ms	Moshokwa	Kgaowelo	Anglo Operations Pty Ltd	Enkeldebosch 20 IS portion 24 and 27					'kgaowelo.moshokwa@angloamerican.com'
Ms	Meyer	Wilda	Anglo Operations Pty Ltd					082 529 5188	wilda.meyer@angloamerican.com
Mr	Zama	Marcus	Anglo Operations Pty Ltd						marcus.zama@angloamerican.com
Mr	Matlonya	Elias	Anglo Operations Pty Ltd						elias.matlonya@angloamerican.com
Ms	Bargiacchi	Ansie	Anglo Operations Pty Ltd						ansie.bargiacchi@angloamerican.com
Ms	Mabuza	Marcia	Anglo Operations Pty Ltd						marcia.t.mabuza@angloamerican.com
Mr	Langanani	Nemugavhini	Anglo Operations Pty Ltd						langanani.nemugavhini@angloamerican.com
Ms	Tshehla	Daphney	Anglo Operations Pty Ltd						Daphney.Tshehla@angloamerican.com
Mr	Martin	John	Anglo Operations Pty Ltd						john.martin1@angloamerican.com
Mr	Wessels	Wessel	Anglo Operations Pty Ltd						wessel.h.wessels@angloamerican.com
Ms	Van Wyk	Leonore	Anglo Operations Pty Ltd					011 638 3596 / 076 822 0399	Leonore.vanWyk@angloamerican.com
Mr	Fourie	Johan	Anglo Operations Pty Ltd						johan.f.fourie@angloamerican.com
Authorities									
Ms	Fakude	Okwethu	Mpumalanga Department of Agriculture, rural Development, Land and Environmental Affairs (MDARDLEA)		No 7 Government Boulevanrd, Building 6, 2nd Floor, Riverside Park, Extension 2, Neslpruit	Nelspruit	1200	013 766 6067 / 8	oqfakude@mpg.gov.za

Title	Last name	First name	Organisation	Position	Postal / Physical Address	City	Postal Code	Tel/ Cell	Email
Mr	Pillay	Russel	Mpumalanga Department of Public Works, Roads and Transport (PWRT)		16 Hope Street	Nelspruit	1200	013 766 8517 / 013 283 7011	Rpillay@mpg.gov.za;mosesvusimuzi@yahoo.com; skgomo@mpg.gov.za; oluwaseun@moteno.co.za
Mr	Eksteen	Johan	Mpumalanga Tourism and Parks Agency (MTPA)	Manager Scientific Services	Hal's Gateway on N4 National Highway	Nelspruit	1200	013 759 5300	Johan.Eksteen@mtpa.co.za;Komilla.Knarasoo@mtpa.co.za;franskrige@telkomsa.net;khumbelomakhuvha940@gmail.com
Ms	Sithole	Doreen	Department of Agriculture Forestry and Fisheries (DAFF) Directorate: Land Use and Soil Management		27 Brown Street, Permanent Building, 2nd Floor, Office B4	Nelspruit	1200	013 754 0701 / 0732 or 072 196 1473	DoreenS@daff.gov.za;MaryM@daff.gov.za;EllyT@daff.gov.za
Ms	Khumalo	Nokukhanya	South African Heritage Resources Agency (SAHRA)		SAHRIS - website				nkhumalo@sahra.org.za; phine@sahra.org.za
Mr	Mahlangu	Lucas	Department of Environmental Affairs (DEA)		Environment House, 473 Steve Biko Road, Arcadia	Pretoria	0083	012 399 9791 or 084 694 6115	lmahlangu@environment.gov.za
Ms	Kobe	Motlatso	Department of Mineral Resources (DMR) Head Office		Trevenna Campus, 70 Meintjies Street, Sunnyside	Pretoria	0001	082 306 2817	motlatso.kobe@dmr.gov.za
Mr	Tshivhandekano	A	Department of Mineral Resources (DMR)	Regional Manager	Saveways Crescent Centre, Cnr Nelson Mandela and OR Tambo Street	Emalahleni	1035	013 653 0500 / 30	Aubrey.Tshivhandekano@dmr.gov.za
Ms	Ratsela	Matshilele	Department of Mineral Resources (DMR)		Saveways Crescent Centre, Cnr Nelson Mandela and OR Tambo Street	Emalahleni	1035	071 475 8354	matshilele.ratsela@dmr.gov.za
Mr	Macevele	Stanford	Department of Water and Sanitation		22 Rooth Street	Bronkhorstspruit	1020	013 932 2061	maceveles@dws.gov.za
Ms	Khuthadzo	Radzilani	Department of Water and Sanitation		474 Carl Street	Pretoria West	0183	012 318 0512	RadzilaniK@dws.gov.za
Mr	Isaac	Tlagadi	Department of Water and Sanitation		22 Rooth Street	Bronkhorstspruit	1020	013 932 2061	TlagadiI@dws.gov.za

Title	Last name	First name	Organisation	Position	Postal / Physical Address	City	Postal Code	Tel/ Cell	Email
Mr	Skosana	M	Nkangala District Municipality	Nkangala District Manager	2A Walter Sisulu Street	Middelburg	1050	013 249 2000	skosanamm@nkangaladm.gov.za;matoaneT@nkangaladm.gov.za;nkosinm@nkangaladm.gov.za
Cllr	Nkwanya	AB	Nkangala District Municipality	Speaker	PO Box 437	Middelburg	1050	013 249-2006	silandasn@nkangaladm.gov.za
Ms	Silinda	Susan	Nkangala District Municipality	PA to the Speaker	PO Box 438	Middelburg	1050	013 249 2010	silandasn@nkangaladm.gov.za
Mr	Mahlangu	Vusi	Nkangala District Municipality	Environmental Manager	PO Box 437	Middelburg	1050	013 249 2135	mahlangumv@nkangaladm.gov.za
Mr	Risimate	Ntekele	Nkangala District Municipality	Water Management	PO Box 437	Middelburg	1050		ntekelefr@nkangaladm.gov.za
Mr	Zimbwa	AG	Nkangala District Municipality	Manager:Technical Services	PO Box 437	Middelburg	1050	013 249 2004	technical services@nkangaladm.gov.za
Mr	Gulube	TP	eMalahleni Local Municipality	Ward Councillor: Ward 19				060 376 8021	
	Venter	M	eMalahleni Local Municipality	Ward Councillor: Ward 24				082 921 6027	
Mr	Mayisela	HS	eMalahleni Local Municipality	Municipal Manager	29 Mandela Street	eMalahleni	1035	013 690 6911	officeofmm@emalahleni.gov.za
Ms	Maseko	SF	eMalahleni Local Municipality	Executive Director: Environment and Waste	29 Mandela Street	eMalahleni	1035	013 692 4021/2	environmental@emalahleni.gov.za
NGOs/ CBOs/ Parastatals									
Mr	Bosman	N.L.	Mpumalanga AgriSA		P O Box 619	Ermelo	2350	017 819 1295	mlunie@mweb.co.za
Mr	Robert	Davel	Mpumalanga Landbou/Agriculture Union						robert.mpl@mweb.co.za
Mr	Kemp	Piet	Transvaal Agricultural Union of SA	Regional Manager	PO Box 2601	Ermelo	2350	017 819 4387/ 082 807 9278	tlu@axxess.co.za
Mr	de Klerk	Jan	Eskom	Acting Manager, Portfolio Land Management				011 8002264/ 072 806 6435	jan.dklerk@eskom.co.za
Mr	Suttill	Malcolm	Wildlife and Environmental Society of SA (WESSA)	Branch Chairman	32 Amaryllis Street	Witbank	1034	083 225 1878	malcolms@lantic.net
Ms	Nieuwoudt	Marianna	Olifants River Forum	Communications Officer	P O Box 2189	Secunda	2302	0824591021/ '017 634 7208	matrixpr@ananzi.co.za
Mr	Senong	James	National Union of Mine Workers	Coordinator				013 656 2045/ 082 954 4569	james.senong@bhpbilliton.com

Title	Last name	First name	Organisation	Position	Postal / Physical Address	City	Postal Code	Tel/ Cell	Email
Ms	de Lange	Marie	ITT Water and Wastewater	Project Administrator				011 966 9339	marie.delange@itt.com
Libraries									
Ms	Rozmiarek	J	Witbank Public Library	Head Librarian	Cnr Elizabeth & Hofmeyer Streets	Witbank	1035	(013) 699 1057	
Ms	Xulu	Shirley	Middelburg (Gerard Sekoto) Public Library	Librarian	Wanderers Avenue	Middelburg	1050	013 249 7314	sxulu@stevetshwetelm.gov.za
Media									
Mr	van den Berg	Tobi	Middelburg Observer	Editor	PO Box 36	Middelburg	1050	013 754 1600	tobie@mobserver.co.za
Mr	Khan	Zaheeb	Middelburg Herald	Editor	P O Box 1517	Middelburg	1020	013 282-0103	theherald@telkomsa.net
Mr	Hlatshwayo	Bongani	Mpumalanga News	Editor	PO Box 246	Nelspruit	1200	013 754 1600	bongani@mpmirror.co.za
Ms	Botha	Amanda	Witbank News	Editor	P O Box 36	Witbank	1035	(013) 656 2490	wtbnews@mweb.co.za

Appendix 6.2

BID, reply sheet, stakeholder notification

Notice of an Integrated Regulatory Process for Environmental Authorisation, a Waste Management Licence and an Integrated Water Use Licence for proposed infrastructure development at Vandyksdrift Central (VDDC) in eMalahleni Local Municipality

BACKGROUND INFORMATION DOCUMENT

AUGUST 2018

CONTENT AND PURPOSE OF THIS DOCUMENT

This document provides background information regarding the proposed infrastructure development project which South32 SA Coal Holdings (Pty) Limited (SAEC) proposes to undertake at the Vandyksdrift Central (VDDC) section of the Wolvekrans Colliery.

SAEC proposes to develop additional infrastructure to support proposed opencast mining at their VDDC operation. SAEC has appointed Jones & Wagener (J&W) (Pty) Ltd Engineering and Environmental consultants as the independent Environmental Assessment Practitioner (EAP) to undertake the required applications.

The Department of Mineral Resources (DMR) is the competent authority in terms of the required environmental authorisation, as well as the Waste Management Licence (WML), and the Department of Water and Sanitation (DWS) will review the application for an Integrated Water Use Licence (IWUL).

The purpose of this document is to announce the proposed project so as to assist stakeholders to:

- Register as Interested and Affected Parties (I&AP) in order to be kept informed about further opportunities to participate in the proposed project; and
- Raise any concerns they may have regarding the proposed project.

REGISTRATION AS AN I&AP

As an I&AP, you will be included in the stakeholder database and receive further documents for comment. Your comments will ensure that all relevant issues are incorporated. Please complete and submit the enclosed registration/comment sheet, write a letter, call or email J&W if you wish to raise any concerns regarding the proposed project. All documents will be available on the internet at www.jaws.co.za.

YOUR OPPORTUNITY TO REVIEW THE CONSULTATION SCOPING REPORTS

The Consultation Scoping Report (CSR) will be available for your review from 8 October to 7 November 2018 at public places (see page 5) or on the website – www.jaws.co.za.

PUBLIC PARTICIPATION ENQUIRIES

Anelle Lötter / Tolmay Hopkins
Jones & Wagener Engineering and Environmental Consultants,
P O Box 1434, Rivonia, 2128, Tel: 012 667 4860, Fax: 012 667 6128.
Email: anelle@jaws.co.za / tolmay@jaws.co.za

Jones & Wagener
Engineering & Environmental Consultants

LOCALITY

The VDDC infrastructure development project is a brownfields project within the greater Wolvekrans Colliery mining rights area. Wolvekrans Colliery is located between the towns of eMalahleni and Kriel, within the jurisdictional area of the eMalahleni Local Municipality (ELM) and the Nkangala District Municipality (NDM) of the Mpumalanga Province. The mine is situated approximately 28 km south-east of the town of eMalahleni, in close proximity to the Duvha Power Station (refer to Figure 1)

VDDC is located on the western boundary of Wolvekrans Colliery. The Olifants River determines the southern boundary. The proposed infrastructure development will take place on the farms Kleinkopje 15 IS, Vandyksdrift 19 IS, Wolvekrans 17 IS and Steenkoolspruit 18 IS. The surface rights of the areas where the construction of additional infrastructure is required, is owned by Ingwe Surface Holding Ltd.

PROJECT BACKGROUND AND DESCRIPTION

Limited opencast mining was done at VDDC (then referred to as Douglas Colliery) before 1990 in the top shallower No. 5 seam. The No. 2, coal seam was exploited in the past by means of underground mining. All underground operations were terminated during October 2008. SAEC received authorisation in 2007 to allow opencast mining of the remaining No. 5, No. 4, No.2 and No. 1 recoverable coal seams at VDDC. The opencast mining operations include the extraction of the remaining No. 2 Seam pillars, as well as roof and floor extraction. However, the 2007 authorisation did not include any additional infrastructure in support of the opencast mining operations as it was assumed at that stage that existing infrastructure will be used.

A pre-feasibility investigation has since been conducted, and the need has been identified to develop additional infrastructure to support the proposed opencast mining. The additional infrastructure includes the following:

- Storm water management structures, pollution control berms, canals;
- Overburden dumps;
- New pollution control dam;
- Slurry management area and associated return water dam;
- Topsoil stockpile area;
- Pipelines for the conveyance of water;
- Powerlines;
- Haul roads and service roads; and
- Changes to existing infrastructure such as workshops and substations.

Detail of the additional infrastructure will be described in the Consultation Scoping Report which will be available from 8 October 2018 for stakeholder review.

It is proposed that the construction of the additional infrastructure will commence in January 2020. The construction period is expected to be 18 – 24 months. Construction may however not commence without the required authorisations and licences. The mining operation establishment is also expected to commence January 2020. Coal produced will be mainly exported through the Richards Bay coal terminal.

As a result of the previous mining of the No. 2 Seam horizon by bord and pillar means, the following occurred:

- The majority of the underground No. 2 seam workings are flooded due to water ingress from both surface and underground aquifers. A dewatering programme will be implemented before opencast mining operations commence and the required applications for the implementation of the dewatering strategy has been submitted to the relevant authorities.
- An area of the No. 2 Seam was used for placement of slurry from the processing plant. It is believed to be contained in the southeast portion of the deposit by underground seals and barrier pillars. This slurry will have to be removed before opencast mining can commence, hence the need for a slurry management area as part of the proposed infrastructure.

LEGAL REQUIREMENTS

For SAEC to continue with their proposal to construct additional infrastructure to mine at VDDC, it requires the following applications to obtain authorisations and licences as part of the integrated regulatory process:

- Application for Environmental Authorisation through a Scoping and Environmental Impact Assessment Report (S&EIAR) process and the compilation of an Environmental Management Programme (EMPr) in terms of the National Environmental Management Act, 1998 (Act 107 of 1998; NEMA) and its Regulations;
- Waste Management Licence Application (WMLA) in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008; NEM: WA); and
- Integrated Water Use Licence Application (IWULA) in terms of the National Water Act, 1998 (Act 36 of 1998; NWA), including an Integrated Water and Waste Management Plan (IWWMP).

A Heritage Impact Assessment in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999, NHRA) will also be undertaken.

Environmental Authorisation (EA) application: The proposed additional infrastructure will likely trigger the activities below which are listed in the Environmental Impact Assessment Listing Notices published under Government Notice 327 of 7 April 2017. This will be confirmed prior to submission of the application, as the final specifications are currently being determined. The EA Application will be submitted for in terms of NEMA, for the listed activities below:

Activity	Description of Activity	Comment
Listing Notice 1 of 2014, as amended (GNR 327 dated 7 April 2017)		
9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or stormwater — (i) with an internal diameter of 0,36 metres or more	Pipelines for conveyance of water will be 600 mm in diameter
10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more	Pipelines for conveyance of mine impacted water will be 600 mm in diameter
12	The development of — (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs — (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	New proposed PCD and explosives magazine, will be located within close proximity to watercourses Other infrastructure and its position in relation to watercourses will be confirmed
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse	May be relevant, as a result of close proximity of some infrastructure (e.g. PCD) to watercourses.

Activity	Description of Activity	Comment
24	The development of a road — (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	New haul roads will be 40 m wide.
56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre	May be relevant to upgrading of existing haul road and underpass below R575.
Listing Notice 2 of 2014, as amended (GNR 325 dated 7 April 2017)		
6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent	An application for a water use licence will be lodged with the Department of Water and Sanitation.
15	The clearance of an area of 20 hectares or more of indigenous vegetation	The total area to be cleared to develop the infrastructure will be more than 20 hectares.

The EA application for the additional infrastructure entails a Scoping and Environmental Impact Assessment Report (S&EIAR) process. During scoping, issues for investigation during the EIA phase are identified. This information is compiled into a Consultation Scoping Report (CSR) which will be made available for public comment from 8 October 2018. The Final Scoping Reports will be submitted to the DMR Mpumalanga Regional Office for approval in order to continue with the EIA phase.

During the EIA phase, potential impacts are determined, and management measures are proposed to mitigate negative impacts and enhance positive impacts. The consultation EIA report, including an Environmental Management Programme (EMPr), together with the draft WMLA Report and draft IWULA Report will be made available for public comment, and submitted to the DMR and the DWS for decision making.

The EIA will also contain the results of a number of specialist assessments, including studies on:

- Socio-economic conditions
- Biodiversity (fauna, flora and aquatics)
- Cultural heritage
- Visual impact
- Soil, land use and land capability
- Closure liability assessment and closure plans
- Waste classification and Geochemical assessment
- Surface water (including floodlines and water balance assessment)
- Wetland assessment
- Groundwater assessment
- Noise
- Air Quality
- Blasting Risk Assessment.

The information obtained through the specialist assessments will be used as a basis for the EA application, the WML application and IWUL application.

The WML application will be submitted in terms of NEM: WA, GN 921 dated 29 November 2013, as amended in GNR 322 dated 2 May 2014 and GNR 633 dated 24 July 2015 for the listed activities below:

Activity	Description of Activity	Comment
Category B, Activity 4(10):	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity)	• Construction of mine residue facilities referred to below
Category B, Activity 4(11):	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002)	• Boxcut spoils dumps • Overburden dumps • Slurry paddocks and day area

The IWUL application will be submitted in terms of the NWA, Section 21 for the listed water uses as stipulated below:

Water use		Description of Activity
21 (c) and/or (i)	Impeding or diverting the flow of water in a watercourse and/or Altering the bed, banks, course or characteristics of a watercourse	• *Development of infrastructure within watercourses, or within 500 m from watercourses*
21(g)	Disposing of waste in a manner which may detrimentally impact on a water resource	• *Pollution Control Dam* • *Slurry ponds and day area, with associated return water dam* • *Overburden dumps* • *Dust suppression using mine impacted water*
21(j)	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people	*Dewatering of the pit as mining proceeds.*

STAKEHOLDER ENGAGEMENT

The public participation process, which will form part of the integrated regulatory process, is conducted in terms of Chapter 6 of NEMA, which provides clear guidelines for stakeholder engagement. The stakeholder engagement process offers stakeholders the opportunity to be informed about the additional infrastructure proposed for VDDC, to raise issues of concern, and to make suggestions for enhanced project benefits. The project team will consider relevant issues and suggestions during the integrated regulatory process.

How can you become involved?

Stakeholders are invited to contact Jones & Wagener to register as an interested and affected party (I&AP) for the integrated EA, WML application and IWUL process and to comment on any of the reports that will be produced as part thereof. Your comments made during the process will be recorded in a Comments and Responses Report, which will form part of the reports that will be submitted to the authorities. The contributions made by stakeholders from all sectors of society will ensure informed decision-making. You are invited to participate freely and to submit any comments or information you feel may be useful to the process in writing. To ensure that you are registered as an I&AP and that you receive updated project information please complete the attached registration and comment form.

Availability of the Consultation Scoping Reports for your review

The Consultation Scoping report is available for public review for a period of 30 days, from 8 October to 7 November 2018 at the public places listed below.

Printed Copies
eMalahleni Library, Ms J Rozmairek, Tel: (013) 699 1057
Electronic Copies
www.jaws.co.za

You are encouraged to comment on the Consultation Scoping Report by sending an email, fax or contact the public participation practitioner by telephone.

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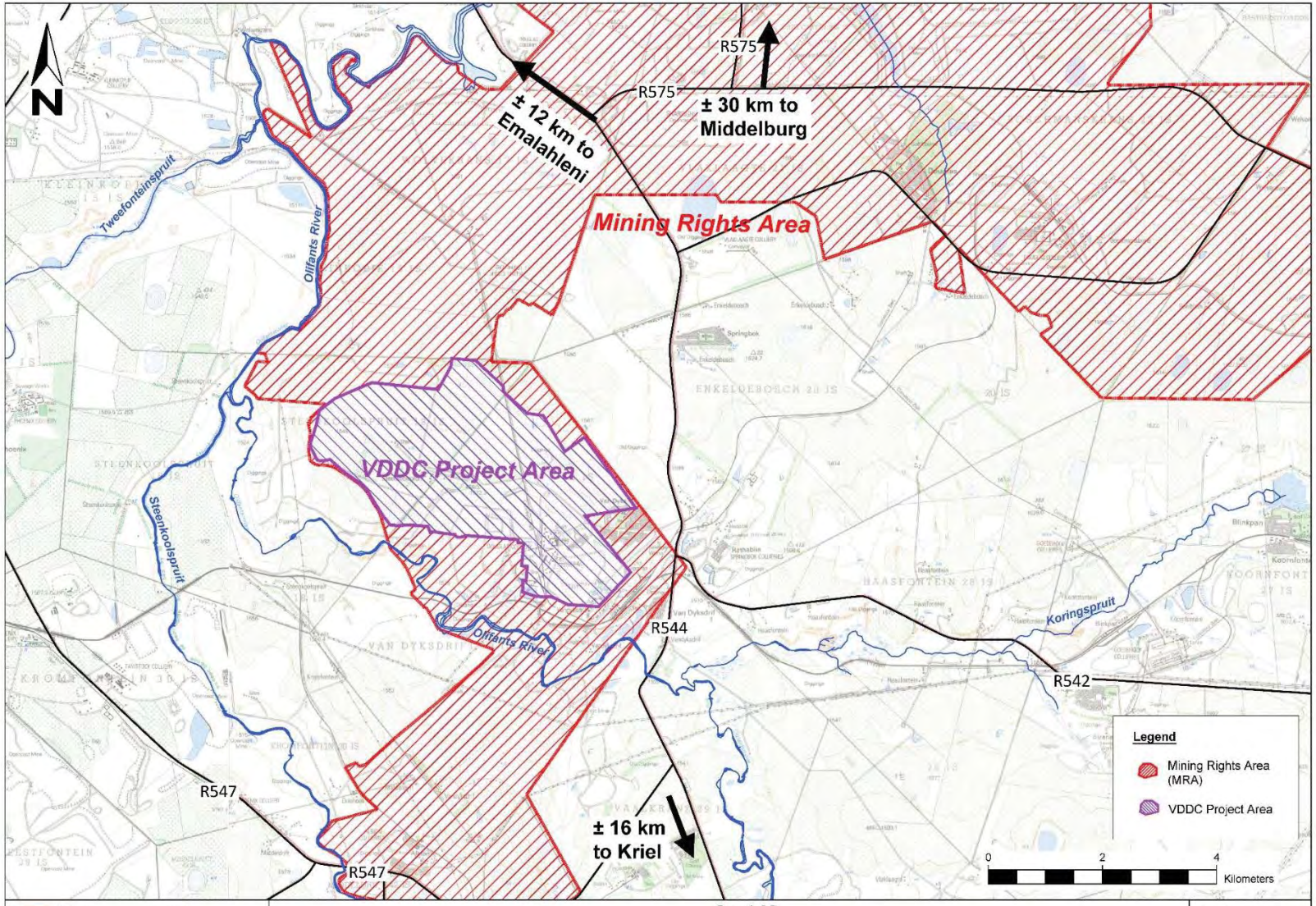
Notice of an Integrated Regulatory Process for Environmental Authorisation, a Waste Management Licence and an Integrated Water Use Licence for proposed infrastructure development at Vandyksdrift Central (VDDC) in eMalahleni Local Municipality

REGISTRATION AND COMMENT FORM

Please complete this form and return it to Jones & Wagener by 7 November 2018 to ensure that you are registered as an Interested and Affected Party. By answering the questions below you will help us to develop a better understanding of your information requirements and concerns regarding the proposed project. Additional pages may be attached to the form.

Personal information		
First Name and Surname:		
Please indicate whether you are registering as a Community / Organisation / Farm or Business and provide the name:		
Physical address:		
Telephone:	Cell:	
Email:		
General interest in the project		
Do you have any specific comments regarding the proposed project to construct additional infrastructure at VDDC?		
If you know of anyone who should be informed about the project, please provide their contact details:		
First Name and Surname:		
Community / Organisation / Farm:		
Address:		
	Telephone:	
	Fax:	
	Cell:	
	Email:	
Please record the following comments I have on the Consultation Scoping Report:		

Kindly complete this form and return to: Kindly complete this form and return to: Anelle Lötter, Jones & Wagener Pty) Ltd Engineering & Environmental Consultants, P O Box 1434, Rivonia, 2128, Tel: (012) 667 4860, Email: anelle@jaws.co.za



Jones & Wagener
Engineering & Environmental Consultants
59 Sovereign Road PO Box 1434 Rivonia 2128 South Africa
tel 012 / 11 2 9200 www.jaws.co.za email post@jaws.co.za

South32
VDDC Project
Locality Plan

Job No G535-09

Figure 1

Appendix 6.3

Advertisement

Copy of tear sheet to be included in Final Scoping Report

Notice of an Integrated Regulatory Process for Environmental Authorisation, a Waste Management Licence and an Integrated Water Use Licence for proposed infrastructure development at Vandyksdrift Central (VDDC) for South32 SA Coal Holdings (Pty) Limited in eMalahleni Local Municipality

Management Licence Application (WMLA) and an Integrated Water Use Licence Application (IWULA) will be conducted for the development of infrastructure at Vandyksdrift Central (VDDC) which is part of the Wolvekrans Colliery. The following activities will be applied for:

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

Activity	Description of Activity	Comment
Listing Notice 1 of 2014, as amended (GNR 327 dated 7 April 2017)		
9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or stormwater — (i) with an internal diameter of 0,36 metres or more	Pipelines for conveyance of water will be 600 mm in diameter
10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more	Pipelines for conveyance of mine impacted water will be 600 mm in diameter
12	The development of — (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs — (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	• New proposed pollution control dam and explosives magazine will be located within close proximity to watercourses • Other infrastructure and its position in relation to watercourses will be confirmed
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse	May be relevant, as a result of close proximity of some infrastructure (e.g. pollution control dam) to watercourses.
24	The development of a road — (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	New haul roads will be 40 m wide.
56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre	May be relevant to upgrading of existing haul road and underpass below the R575 provincial road.
Listing Notice 2 of 2014, as amended (GNR 325 dated 7 April 2017)		
6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent	An application for a water use licence will be lodged with the Department of Water and Sanitation.
15	The clearance of an area of 20 hectares or more of indigenous vegetation	Total area to be cleared to develop the infrastructure will be more than 20 ha.

National Environmental Management: Waste Act (NEM: WA) (Act 50 of 2008)

Activity	Description of Activity	Comment
Category B, Activity 4(10):	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity)	• Construction of mine residue facilities referred to below
Category B, Activity 4(11):	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002)	• Boxcut spoils dumps • Overburden dumps • Slurry paddocks and day area

National Water Act (NWA) (Act 36 of 1998)

Water use		Description of Activity
21 (c) and/or (i)	Impeding or diverting the flow of water in a watercourse and/or Altering the bed, banks, course or characteristics of a watercourse	*Development of infrastructure within watercourses, or within 500 m from watercourses*

Water use		Description of Activity
21(g)	Disposing of waste in a manner which may detrimentally impact on a water resource	• *Pollution Control Dam* • *Slurry ponds and day area, with associated return water dam* • *Overburden dumps* • *Dust suppression using mine impacted water*
21(j)	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people	*Dewatering of the pit as mining proceeds.*

CONSULTATION SCOPING REPORT (CSR) IS AVAILABLE FOR PUBLIC COMMENT FROM 8 OCTOBER TO 7 NOVEMBER 2018

The Consultation Scoping Report is available for public review as follows:

Person	Location	Contact
Printed Copies		
Ms J Rozmairek	eMalahleni Library	Tel: (013) 699 1057
Electronic Copies		
	www.jaws.co.za	
Anelle Lötter	Phone and request a CD copy	Tel: (012) 667 4860

Interested and Affected Parties (I&APs) are invited to participate by providing comments and raising issues of concern regarding the proposed project. To register as an I&AP and to receive copies of documents please contact: Jones & Wagener Engineering & Environmental Consultants
Anelle Lötter / Tolmay Hopkins, Tel: (012) 667 4860, Email: anelle@jaws.co.za / tolmay@jaws.co.za
P O Box 1434, Rivonia, 2128

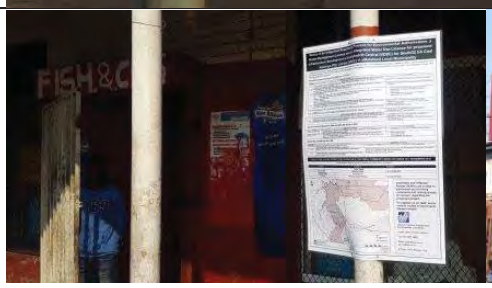
Appendix 6.4

Site notice board

Integrated Regulatory Process for Environmental Authorisation, a Waste Management Licence and an Integrated Water Use Licence for proposed infrastructure development at Vandyksdrift Central (VDDC) for South32 SA Coal Holdings (Pty) Limited in eMalahleni Local Municipality

Placement of site notices

28 September 2018

	Description	Photo
1.	At the entrance to the Steenkoolspruit section of the Wolvekrans Colliery at the T-junction with the R544 (Bethal/Witbank Road) 26° 0'45.33"S 29°18'9.44"E	
2.	Kayo Bazaar Supermarket (Lucky 7) on the R544	 
3.	On the R544 at the old Anglo village entrance	 
4.	At the entrance of the Vandyksdrift mine on the R544	

	Description	Photo
5.	At the T-junction of the R544 and the R542, close to the Caltex garage	
6.	At the Ideal Supermarket on the R544	
7.	At the T-junction on the R544 – Botha / Ogies Road. 26° 7'15.26"S 29°19'39.50"E	 

	Description	Photo
8.	At the Lomar Supermarket on the R544	 
9.	Just off the R544, close to the cell phone/Telkom tower	
10.	At the T-junction with the R575 and the R544