



Sibanye-Stillwater

Western Platinum Mine (Pty) Ltd: K4 Shaft Pollution Control Dam and associated infrastructure

Draft Environmental Impact Assessment and Environmental Management Programme Report

October 2023

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**Sibanye – Stillwater: Western Platinum (Pty) Ltd - K4 Shaft
Pollution Control Dam and associated infrastructure
Final Environmental Impact Assessment and Environmental
Management Programme Report**

October 2023

DMRE Reference: NW30/5/1/2/2/106 MR

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT ACTIVITIES

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)

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DMRE Reference No: **NW30/5/1/2/2/106 MR**

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 a 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 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process: -

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) describe 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 the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) determine the—
 - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - (ii) degree to which these impacts—
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources, and
 - (cc) can be avoided, managed or mitigated;
- (e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (g) identify suitable measures to manage, avoid or mitigate identified impacts; and
- (h) identify residual risks that need to be managed and monitored.

Executive Summary

Introduction

Sibanye-Stillwater (SS) produces Platinum Group Metals (PGMs) such as platinum (Pt), palladium (Pd), rhodium (Rh), iridium (Ir), ruthenium (Ru), osmium (Os) and gold (Au). The South African (SA) Platinum Group Metals (PGM) operations comprise the Rustenburg, Kroondal and Marikana operations, respectively, located in the northwest province of South Africa.

The Marikana operations (Western Platinum (Pty) Ltd (WPL) and Eastern Platinum (Pty) Ltd (EPL)) are located in the Marikana district, 40km to the east of the town of Rustenburg in the North West province of the Republic of South Africa. The lease area covers approximately 214 km² and is in excess of 30km from east to west and 15km from north to south. The Marikana Operations were acquired by SS following the acquisition of Lonmin in June 2019. K4 Shaft forms part of Western Platinum (Pty) Ltd, which is the applicant.

K4 Shaft was placed under care and maintenance for a period of 6 years, but will be ramped up to be fully operational in the year 2024, extending the Life of Mine (LOM) with approximately 30 years.

The current Waste Rock Dump (WRD) is located on the farm Rooikoppies Portion 36, 37, 38, 39 and 147, all owned by SS. The WRD was established and initiated by the previous owner (Lonmin Plc). The existing authorised footprint for the WRD will be used to place additional waste rock.

WPL has the following approvals:

- Water use Licence: Licence number, 01/A21K/ABCEFGHJ/4620 (dated 22 February 2022); and
- Environmental Management Programme: Reference NW30/5/1/2/3/2/2/105 EM (dated November 2012).

Project Description

WPL is planning to extend K4 Shaft's Life of Mine (LOM) with approximately 30 years and in support of complying with GN704 Regulations, must implement measures to contain dirty water runoff from the WRD. The additional infrastructure that needs to be implemented includes the construction of a V-drain catchment berm around the approved footprint of the WRD, the construction of a Pollution Control Dam (PCD), a pipeline from the PCD to the K4 shaft as well as an emergency spillway.

Authorisation Requirements

Before WPL may commence with the development of the proposed development and construction of associated infrastructure the following authorisations are required:

- A Full Scoping and Environmental Impact Assessment Environmental Authorisation in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA). The competent authority for this process is the North-West Department of Mineral Resources and Energy (DMRE). (A Full S&EIA process is illustrated in Figure 3).
- A Water Use Licence Application (WULA) in terms of the National Water Act (Act 36 of 1998). (NWA). The competent authority for this process is the North West Department of Water and Sanitation (DWS).

Identified Environmental Impacts (relating to the proposed PCD and associated infrastructure)

The following impacts were identified as summarised in the table overleaf.

Aspect	Impact	Significance before mitigation	Significance after mitigation
Construction phase			
Topography	Altered natural topography (landscape and land use capability)	Medium (-)	Medium(-)
Soils	The loss of future soil utilisation potential	Low (-)	Low (-)
Terrestrial Biodiversity	Destruction, further loss and fragmentation of the habitats, ecosystems and vegetation community	Low (-)	Low (-)
	Introduction of alien and invasive species, especially plants	Low (-)	Low (-)
	Displacement of the indigenous faunal community (including possible SCC) due to habitat loss, direct mortalities, and disturbance (road collisions, noise, dust, light, vibration, and poaching).	Low (-)	Low (-)
Surface water	Surface water deterioration	Low (-)	Low (-)
Wetlands	Increased risk of erosion and sedimentation	Low (-)	Low (-)
	Water quality deterioration	Low (-)	Low (-)
Air quality	Increased Air Emissions and fugitive dust	Low (-)	Low (-)
Noise	Increase in ambient noise levels Construction of PCD and associated infrastructure	Medium (-)	Low (-)
	Traffic and vehicular movement	Medium (-)	Low (-)
Visual	Impact on Landscape Character and Sense of Place	Medium High (-)	Medium (-)
Heritage	Impact on Heritage resources	Medium (-)	Low (-)
Social	Creation of local employment and business opportunities due to the development/operation of new mining related infrastructure (projects), surface infrastructure, services and linear activities.	Low (+)	Low (-)
Operational Phase			
Topography	Altered Natural topography	Low (-)	Low (-)
Soils	Loss of future soil utilisation	Low (-)	Low (-)
Terrestrial biodiversity	Continued fragmentation and degradation of habitat ecosystems	Medium (-)	Low (-)
	Spread of alien and/or invasive species	Low (-)	Low (-)
	Ongoing displacement and direct mortalities of the faunal community (including possible SCC) due to continued disturbance (road collisions, noise, light, dust, vibration, poaching, erosion, etc.).	Low (-)	Low (-)
Surface water	Surface water deterioration	Low (-)	Low (-)
Wetlands	Increased risk of erosion and sedimentation	Low (-)	Low (-)
	Water quality deterioration	Medium (-)	Low (-)
Air Quality	Increased Air Emissions and fugitive dust	Medium (-)	Low (-)

Aspect	Impact	Significance before mitigation	Significance after mitigation
Noise	Increase in ambient noise levels Construction of PCD and associated infrastructure	Medium (-)	Low (-)
	Traffic and vehicular movement	Medium (-)	Low (-)
Visual	Visual disturbance to surrounding area	Medium-high (-)	Medium (-)
Social	Creation of local employment and business opportunities due to the development/operation of new mining related infrastructure (projects), surface infrastructure, services and linear activities.	Low (+)	Low (-)
Traffic	Increased road traffic/congestion. Increased risk to road and pedestrian safety.	Medium (-)	Low (-)
Decommissioning and Closure			
Soils	Soil erosion	Medium-high (-)	Medium (-)
	Soil Compaction	Medium (-)	Low (-)
	Soil Contamination	Low (-)	Low (-)
Terrestrial biodiversity and Wetlands	Alien and Invasive Plant Colonisation	Medium (-)	Low (-)
	Uncontrolled veld fires	Low (-)	Low (-)
	Wetland degradation due to sedimentation and water quality and quantity impacts	Medium-high (-)	Low (-)
	Poaching	Low (-)	Low (-)
Surface water	Siltation of surface water resource - transportation of disturbed soils.	Medium (-)	Low (-)
	Hydrocarbon Contamination - Spillages / leaks of oil, grease, diesels etc	Medium (-)	Low (-)
	Surface water contamination by solids and mineral solids	Low (-)	Low (-)
	Poor general and hazardous waste management practices.	Medium (-)	Low (-)
Groundwater	Contamination of groundwater due to waste management, sewage management and chemical spills onto the soils.	Medium (-)	Low (-)
Air quality	Increased fugitive dust due to vehicular movement	Low (-)	Low (-)
	Increased emissions - Generation of greenhouse gasses caused by construction machinery and vehicles.	Low (-)	Low (-)
Noise	Noise caused by the construction activities, site clearance activities, stripping and stockpiling, civil works and haulage of building materials, operational activities and decommissioning and closure activities	Medium (-)	Low (-)
Visual	Generation of dust during construction, operation and closure activities.	Low (-)	Low (-)
Heritage	Impact on graves and archaeological structures	Medium (-)	Low (-)
Traffic	Increased traffic volumes and increased road safety risks	Medium (-)	Low (-)

Aspect	Impact	Significance before mitigation	Significance after mitigation
Social	Job losses due to rehabilitation and closure at end of operation	Medium (-)	Medium (-)
	Community health and safety (Anti-Social Behaviour)	Medium (-)	Low (-)

Stakeholder Engagement

Pre-application phase

During the pre-application phase, the following stakeholder engagement activities were undertaken:

- Updating the existing stakeholder database by identifying competent authorities, adjacent landowners and ward councillors for the proposed project;
- Pre-application meeting with the DMRE;
- Project announcement:
 - Placing of site notices around the proposed K4 Shaft PCD and WRD project area;
 - Distribution of a Background Information Document (BID) to identified stakeholders inviting them to register as Interested and Affected Parties (I&APs).

Scoping phase

During the Scoping Phase, the following stakeholder engagement activities was undertaken:

- Distribution of notification letters to stakeholders, informing them of the availability of the Draft Scoping Report for Comment and requesting comments on the proposed project and Draft Scoping Report
- Placement of an advertisement in the Platinum Weekly newspaper to announce the availability of the Draft Scoping Report for public comment;
 - The Draft Scoping Report was made available for public comment for a period of 30 days (**7 July 2023 – 5 August 2023**)
- Compilation of the Final Scoping Report with comments received during the public comment period.

Impact Assessment Phase

During the Impact Assessment Phase, the following stakeholder engagement activities were undertaken:

- Distribution of notification letter to stakeholders, informing them of the availability of the Draft EIA/EMPr for comment and requesting comments on the proposed project and Draft EIA/EMPr; and
- Making the Draft EIA/EMPr available for public comment for a period of 30 days (12 October to 10 November 2023);

Comments raised by stakeholders during the pre-application, scoping phase and impact assessment phase are captured in the Comment and Response Table (Table 9-2).

Conclusion

This Draft EIA/EMPr Report sets out the scope of the EIA that is currently being undertaken for WPL's K4 Shaft to include and comply with GN704 requirements for the WRD. This draft Impact Assessment Report includes the alternatives assessed, project description, the key environmental impacts and issues that must be addressed, as well as the specialist studies that were undertaken with the qualifications and experience of the study team.

Table of Contents

Executive Summary	v
PART A: SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT.....	21
1 Introduction and scope of report	21
1.1 Introduction	21
1.2 Authorisations required	21
1.3 Structure of the report.....	24
1.4 Details of Project Applicant and Environmental Assessment Practitioner	26
2 Description of the Property	29
2.1 K4 Shaft Mining Right.....	29
2.2 Description of the property.....	29
3 Locality map.....	30
4 Description of the scope of the proposed overall activity.....	33
4.1 Background	33
4.2 Description of the current authorised activities undertaken at K4 Shaft	34
4.3 New Proposed Infrastructure.....	47
4.4 Description of the proposed activities for the K4 Shaft PCD Project	48
4.5 Listed and specified activities.....	51
4.6 Future Water Uses to be applied for as part of the new proposed infrastructure.....	52
5 Policy and legislative context.....	54
5.1 The Constitution of the Republic of South Africa (Act 108 of 1996)	54
5.2 The Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) as amended on 21 April 2009	54
5.3 National Environmental Management Act (Act 107 of 1998) (NEMA)	55
5.4 National Water Act, 1998 (Act 36 of 1998) (NWA)	55
5.5 Existing Lawful Water Uses	56
5.6 Regulations on the use of water for Mining and related activities aimed at the protection of water resources - GN704 dated 4 June 1999	57
5.7 National Environmental Management Air Quality Act, 2008 (Act 39 of 2004) as amended (AQA)	58
5.8 National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA)	58
5.9 Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)	59
5.10 National Environmental Management: Biodiversity Act, 2008 (Act No 10 of 2004)	60
6 Need and desirability of the proposed activities	62
7 Description of the process followed to reach the preferred site	62
8 Details of Alternatives considered.....	63

8.1	Property or location alternatives	63
8.2	Type of activity	63
8.3	The design or layout of the activity.....	63
8.4	Operational aspects of the activity	66
8.5	Option of not implementing the activity.....	66
8.6	Statement motivating the preferred site	66
9	Details of the Public Participation Process followed	66
9.1	Objectives of public participation	66
9.2	Public Participation Process	66
9.3	Summary of comments received by I&APs	68
10	The environmental attributes associated with the K4 Shaft PCD site	79
10.1	Geology	79
10.2	Climate	79
10.3	Soils	81
10.4	Vegetation.....	84
10.5	Fauna.....	88
10.6	Flora	91
10.7	Surface water	92
10.8	Aquatic	94
10.9	Wetlands	94
10.10	Groundwater.....	98
10.11	Air Quality	100
10.12	Noise	102
10.13	Visual.....	103
10.14	Protected areas and conservation planning	103
10.15	Heritage.....	106
10.16	Social	109
11	Description of the current land uses	111
12	Description of the specific environmental features and infrastructure on site	112
13	Environmental and current land use map	112
14	Impacts and Risks Identified	114
14.1	Impacts and risks associated with the K4 Shaft PCD project	114
15	Methodology used in determining the significance of the environmental impacts	130
15.1	Impact assessment methodology used for the K4 Shaft PCD project.....	130

15.2	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	132
15.3	The possible mitigation measures that could be applied and the level of risk	132
15.4	Motivation where no alternative sites were considered	132
15.5	The Final Site Layout Plan	132
16	Full description of the process undertaken to identify , assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plant) through the life of the activity	133
17	Assessment of each identified potentially significant impact and risk.....	133
18	Summary of specialist reports	133
19	Environmental Impact Statement	136
19.1	Summary of the key findings of the environmental impact assessment	136
19.2	Final site map	138
19.3	Summary of the positive and negative implication and risks of the proposed activity and identified alternatives.....	138
20	Proposed impact management outcomes for inclusion into the EMPr	140
21	Final proposed alternatives	141
22	Aspects for inclusion as conditions of the authorisation.....	141
23	Description of any assumptions, uncertainties and gaps in knowledge.....	141
24	Reasoned opinion as to whether the proposed activity should or should not be authorised	143
24.1	Reasons why the activity should be authorised or not	143
24.2	Specific conditions to be included into the compilation and approval of the EMPr.....	143
24.3	Rehabilitation requirements	143
25	Period for which the authorisation is required	143
26	Undertaking.....	144
27	Financial provision.....	144
27.1	Financial provision for the K4 Shaft PCD and associated infrastructure	144
27.2	Confirm that this amount can be provided for from operating expenditure	144
28	Deviations from the approved scoping report and plan of study	145
28.1	Deviations from the Methodology used in determining the significance of potential environmental impacts and risks	145
28.2	Motivation for the deviation.....	145
29	Other information required by the competent authority	145
29.1	Compliance with the provisions of section 24(4)(a) and (b) read with section 24(3)(a) and (7) of the National Environmental Management Act 107 of 1998	145
30	Other matters required in terms of Sections 24(4)(a) and (b) of the Act.....	145
PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT		146

1	Details of the EAP	146
2	Description of the aspects of the activity	146
3	Composite map.....	146
4	Description of impact management objectives including management statements.....	146
4.1	Determination of closure objectives.....	146
4.2	The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.....	146
4.3	Volumes and rate of water required for the mining, trenching or bulk sampling operation	146
4.4	Water Use Licence.....	147
4.5	Impacts to be mitigated in their respective phases	147
5	Impact Management Actions	147
6	Financial Provision	147
6.1	Describe the closure objectives and the extent to which they have been aligned with the baseline environment	147
6.2	Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and Interested and Affected Parties	148
6.3	Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure	148
6.4	Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline	149
6.5	Confirm that the financial provision will be provided as determined	150
7	Mechanisms for monitoring compliance with and performance assessment against the environmental management programme.....	150
8	Indicate the frequency of the submission of the performance assessment report	153
9	Environmental Awareness Plan	153
9.1	Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work	153
9.2	Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment	153
10	Specific information required by the Competent Authority	155
11	Undertaking regarding correctness of information.....	156
12	Undertaking regarding level of agreement	156
13	References	157
	Appendices	159

Tables

Table 1-1: Draft EIS/EMPr requirements (GN 982).....	24
Table 1-2: Contact details of the applicant.....	27
Table 1-3: Details of the EAP	27
Table 1-4: Qualifications of the EAP	27
Table 2-1: Surface right information and title deed numbers	29
Table 2-2: Description of associated properties	29
Table 4-1: The K4 Shaft Waste Rock Dump Area that is approved in the 2012 EMP (SEF, 2012)	33
Table 4-2: Existing waste rock dump approved in the Marikana WUL (Water Use Licence No.; 01/A21K/ABCEFGI/HJ/4620, dated 22 February 2022	33
Table 4-3: Photographs showing some of the infrastructure and facilities at K4 Shaft	36
Table 4-4: Section 21(a) licenced water use activities associated with the K4 Shaft (WUL, 2015)	39
Table 4-5: Section 21(j) licenced dewatering activities (WUL, 2015)	39
Table 4-6: Section 21(g) licenced process water management facilities (WPL WUL, 2022).....	39
Table 4-7: Section 21(f) licenced water use activities (WUL, 2015)	40
Table 4-8: Clean catchment characteristics and peak flow rates for the 1:50 year flood event (Highlands Hydrology, 2012)	42
Table 4-9: Dirty Catchment Characteristics and Peak Flow Rates for 1:50 year flood event (Highlands Hydrology, 2012).....	42
Table 4-10: Clean Water Containment facility volume requirements for 1:50 year flood event (Highlands Hydrology, 2012)	43
Table 4-11: Dirty Water Containment facility volume requirements for 1:50 year flood event (Highlands Hydrology 2012)	43
Table 4-12: Waste Monitoring Activities (IWWMP – AVDE, 2022).....	45
Table 4-13: Proposed infrastructure for the K4 Shaft PCD project.....	49
Table 4-14: Listed and identified activities	51
Table 4-15: Anticipated S21 Water Uses	53
Table 5-1: K4 Shaft existing water uses	57
Table 5-2: GN704 Exemption Requirements	57
Table 7-1: Alternatives as provided through the NEMA.....	62
Table 8-1: Alternatives considered through the location of the PCD.	64
Table 9-1: Summary of the Public Participation Process	67
Table 9-2: Comments raised to date by I&APs during the stakeholder engagement process	69
Table 10-1: Average midday and nighttime temperatures in °C (World Weather Online, 2023)	79
Table 10-2: Average monthly precipitation and rainy days for Rustenburg (World Weather Online; 2023).	80
Table 10-3: Evaporation Data for Rustenburg region for the period of Jan 22 until Dec 22	81

Table 10-4: Average wind data for Rustenburg for Jan 22 until Dec 22 (worldweatheronline).....	81
Table 10-5: Important species within the Marikana Thornveld vegetation type (TBC2, 2023).....	85
Table 10-6: Description of the broad vegetation units observed in the assessment area	86
Table 10-7: Site Ecological Importance assessment summary of the habitat types delineated within the POAI	87
Table 10-8: Invasive plant species observed (Agreenco, 2022).....	87
Table 10-9: Threatened mammal species expected to occur within he project area (TBC2, 2023).....	88
Table 10-10: Mammal species observed and its conservation status (TBC2, 2023).....	89
Table 10-11: Threatened avifauna species that are expected to occur within project area (TBC2, 2023).....	89
Table 10-12: Avifauna species recorded within PAOI (TBC2, 2023)	90
Table 10-13: Threatened reptile species expected to occur within the project area (TBC2, 2023)	91
Table 10-14: Threatened frog species expected to occur within the project area (TBC2, 2023)	91
Table 10-15: Plant species of conservation concern expected to occur within the project area (TBC2, 2023) ...	92
Table 10-16: Mean annual precipitation, run-off, and potential evaporation per quaternary catchment (WCS, 2023).....	92
Table 10-17: Surface water monitoring locality details (WUL, 2022; HEES, 2023)).....	93
Table 10-18: Biomonitoring point near K4 Shaft	94
Table 10-19: Summary of the Presence Ecological State (“PES”), and impacts on the Sterkstroom River (DWS, 2014).....	97
Table 10-20: Habitat Integrity Assessment Classes (WCS, 2023)	97
Table 10-21: Selected input data to the aquatic impact buffer determination and the buffer requirement outcome (WCS, 2023).....	97
Table 10-22: Groundwater quality monitoring points (WUL, 2022; HEES, 2023).....	99
Table 10-23: Groundwater monitoring variables and frequency (WUL, 2022)	99
Table 10-24: Sources of Pollutants in the North West Province and Rustenburg (SEF,2012)	101
Table 10-25: Locality and coordinates of the dust fall monitoring points (Aquatico, 2023)	102
Table 10-26: Dust fall monitoring results	102
Table 10-27: Acceptable dust fall rates	102
Table 10-28: Description of the heritage resource findings (Beyond Heritage, 2023)	107
Table 14-1: Assessment of identified impacts of proposed K4 Shaft and associated infrastructure project during the construction phase.....	118
Table 14-2: Assessment of identified potential impacts of the proposed K4 Shaft and associated infrastructure project during the operational phase.....	121
Table 14-3: Assessment of identified potential impacts of the proposed K4 Shaft and associated infrastructure project during the decommissioning and closure phase.....	125
Table 15-1: Scale utilised for the evaluation of the Environmental Risk Ratings	130
Table 15-2: Scale used for the evaluation of the Environmental Significance Ratings.....	131
Table 18-1: Recommendations made by specialists – K4 Shaft PCD and associated infrastructure	134

Table 19-1: Summary of significance of the potential impacts of the proposed PCD and associated infrastructure project	136
Table 20-1: Impact management objectives and the impact management outcomes	140
Table 23-1: Assumptions and limitations relating to the proposed K4 Shaft PCD and associated infrastructure project	141
Table 25-1: Period for which the Environmental Authorization is required.....	144
Table 27-1: Summary of Financial Provisioning for K4 Shaft PCD and associated infrastructure	144
Table 6-1: Summary of Financial Provisioning for K4 Shaft PCD and associated infrastructure.....	150
Table 7-1: Environmental monitoring and reporting periods (SEF, 2012)	151
Table 10-1: Monitoring information required by the competent authority.....	155

Figures

Figure 1-1: Scoping and Environmental Impact Reporting process.....	22
Figure 1-2: Water Use Licence application process	23
Figure 3-1: Locality map	31
Figure 3-2: Project Layout Map	32
Figure 4-1: Process and Sustainability Flow Chart	35
Figure 4-2: Typical Concentrator Process flow	38
Figure 4-3: Clean and dirty water catchment areas (Highlands Hydrology, 2012)	40
Figure 4-4: Existing Stormwater Infrastructure at K4 Shaft (Image obtained from Storm Water Solutions, 2013)	41
Figure 4-5: Example of a typical cross-section through clean stormwater diversion (SEF, 2012).	43
Figure 4-6: K4 Shaft Annual proposed Development in tonnes.	47
Figure 10-1: Average midday and Nigh time temperatures for Rustenburg (World Weather Online; 2023).	80
Figure 10-2: Average monthly precipitation and rainy days for Rustenburg (World Weather Online; 2023).....	81
Figure 10-3: Soil forms found within the proposed project area (TBC1, 2023)	82
Figure 10-4: General landscape of the project area with associated soil forms (TBC1, 2023)	83
Figure 10-5: Dominant soil forms distribution identified in the project area (TBC1, 2023)	83
Figure 10-6: Location of the assessment area relative to cities, towns, and the original remaining extent of the natural dominant vegetation type – Marikana Thornveld (Agreenco, 2022).....	84
Figure 10-7: Map illustrating the vegetation type associated with the project area of investigation	86
Figure 10-8: Map depicting the Study area in relation to the quaternary catchments (WCS, 2023)	93
Figure 10-9: Map showing the surface water monitoring localities (HEES, 2023)	93
Figure 10-10: Map of delineated and classified riparian habitat within the study area (WCS, 2023)	95
Figure 10-11: Map showing the results of the PES assessment (WCS, 2023).....	96
Figure 10-12: Delineated riparian habitat and the determined aquatic impact buffer (WCS, 2023)	98

Figure 10-13: Groundwater monitoring points (HEES, 2023)	99
Figure 10-14: Locality of LMN45 Dust fall monitoring point	101
Figure 10-15: K4 Shaft proposed infrastructure in relation to ecosystem threat status (WCS, 2023)	103
Figure 10-16: Ecosystem projection level in relation to PAOI (TBC2, 2023)	104
Figure 10-17: CBA and ESA related to the project	105
Figure 10-18: The PAOI in relation to the National Protected Area Expansion Strategy (TBC2, 2023)	106
Figure 10-19: Location of heritage sightings in relation to project area (Beyond Heritage 2023)	108
Figure 10-20: Palaeontological sensitivity for the K4 Shaft Project (SAHRIS, 2023)	109
Figure 13-1: Current Land Use Map.....	113
Figure 19-1: Final Site Layout Map Superimposed on a Sensitivity Layer.	139

Abbreviations

AEL	Atmospheric Emission Licence
AIA	Archaeological Impact Assessment
ARI	Average Recurrence Interval
Au	Gold
AvDE	Alta van Dyk Environmental Consultants
BID	Background Information Document
BMR	Base Metal Refinery
BODATSO-POSA	Botanical Database of Southern Africa
C ₆ H ₆	Benzene
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CH ₄	Methane
CV	Curriculum Vitae
DMRE	Department of Mineral Resources and Energy
DSR	Draft Scoping Report
DWS	Department of Human Settlement, Water and Sanitation
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	ecological Sensitivity
ELU	Existing Lawful Water Use
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
ESA	Ecological Support Area
FSR	Final Scoping Report
GN	Government Notice
Ha	Hectares
HIA	Heritage Impact Assessment
HRC	Heritage Resource Council
HSWS	Human Settlement Wayer 7 Sanitation
I&APs	Interested and Affected Parties
IHI	Index of habitat Integrity
Ir	Iridium
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resource Management
IWULA	Integrated Water Use Licence Application
IWWMP	Integrated Mine Water and Waste Management Plan
LOM	Life of Mine
m	Metres
m ²	Square metres
m ³	Cubic Metres
MAP	Mean Annual Precipitation
MAPE	Mean Annual Evapotranspiration
MES	Minimum Emission Standard
Mm ³	Million cubic metres
MPRDA	Mineral and Petroleum Resources Development Act
MRA	Mining Right Areas
MT	Marikana Thornveld
NEM:AQA	National Environmental Management: Air Quality Act 39 of 2004
NEM:BA	National Environmental Management Biodiversity Act (Act no 10 of 2004))
NEMA	National Environmental Management Act
NEMPAA	National Environmental Management Protected Areas Act
NEMWA	National Environmental Management: Waste Act 59 of 2008

NHRA	National Heritage Resources Act 25 of 1999
Ni	Nickel
NO ₂	Nitrogen Dioxide
NWA	National Water Act 36 of 1998
O ₃	Ozone
Os	Osmium
PAOI	Project Area of Investigation
Pb	Lead
PCD	Pollution Control Dam
Pd	Palladium
PES	Present Ecological State
PGMs	Platinum Group Metals
PIA	Palaeontological Impact Assessment
PM	Particulate matter
PMR	Precious Metal Refinery
Pt	Platinum
Rh	Rhodium
RoD	Record of Decision
Ru	Rubidium
S&EIR	Scoping and Environmental Impact Report
SA	South Africa
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SO ₂	Sulphur Dioxide
SPLUMA	Spatial Planning & Land Use Management Act (Act No 16 of 2013)
SS	Sibanye-Stillwater
SVcb6	Marikana Thornveld Type
SWMP	Stormwater Management Plan
SWS	Storm Water Solutions
tpm	Tonnes per month
TSP	Fallout dust
UG2	Upper Group 2
WMA	Water Management Area
WRD	Waste Rock Dump
WULA	Water Use Licence Application

GLOSSARY AND TERMINOLOGY

“alternative” a possible course of action, in place of another, that would meet the same purpose and need (of the proposal). Alternatives can refer to any of the following but are not limited to alternative sites for development, alternative projects for a particular site, alternative site layouts, alternative designs, alternative processes and alternative materials.

“construction” means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

“environment” The surroundings within which humans exist and that are made up of:

- i. the land, water and atmosphere of the earth;
- ii. micro-organisms, plant and animal life;
- iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being. This includes the economic, social, cultural, historical and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.

“environmental impact assessment (EIA)” An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of any proposed project, plan, programme or policy which requires authorisation of permission by law, and which may significantly affect the environment. The EIA includes an evaluation of alternatives. As well as recommendations for appropriate mitigation measures for minimising or avoiding negative impacts, measures enhancing the positive aspects of the proposal and environmental management and monitoring measures.

“environmental management plan (EMP)” An environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced.

“footprint” Refers to the surface area of land directly affected by a development or activity; and is directly related to the physical extent and size of the development or activity.

“interested and affected parties” Individuals, communities, or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by the proposal or activity and/ or who are concerned with a proposal or activity and its consequences.

“life of mine (LoM)” number of years that the operation is planning to mine and treat ore, as taken from the current mine plan.

“mining” The making of any excavation for the purpose of winning a mineral. The term covers reconnaissance, prospecting, mining, or retention operations in relation to a prospecting or mining right, permit or license.

“mining related activities” Activities directly related to mining, which are required for mine construction, operation and/or rehabilitation. Such activities serve no purpose other than to support the construction, operation and/or rehabilitation of the mine, and will be ceased, removed and/or rehabilitated at the end of the life of the mine, unless they can be utilized as part of the end-use requirement of the mine and to the benefit of the local community and environment.

“mitigate” The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

“monitoring” The repetitive and continued observation, measurement, and evaluation of environmental data, to enable the detection of changes over a time period to assess the efficiency of control, management and/or mitigation measures.

“present Ecological State (PES)” means the current health or integrity of various biological attributes of the resource, compared to the natural or close to natural reference conditions.

“public participation process” A process of involving the public in order to identify issues and concerns and obtain feedback on options and impacts associated with a proposed project, programme or development. Public Participation Process in terms of NEMA refers to: a process in which potential interested and affected parties are given an opportunity to comment on or raise issues relevant to specific matters.

“residue deposits” means any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right.

“residue stockpile” means any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and Storage facility created before the implementation of this Act.

“resource” The calculated amount of material in a mineral deposit, based on limited drill information.

“Scoping Report” - A scoping report is a report whose purpose is to describe the methodology and range of activities of the appraisal work to be done in order to begin the process of collating information on relevant plans and programmes and is Finalized in accordance to regulation R 982 dated 4 December 2014.

“shaft” A vertical or inclined excavation in rock for the purpose of providing access to an orebody. Usually equipped with a hoist at the top, which lowers and raises a conveyance for handling workers and materials.

“stockpile” Broken ore heaped on surface, pending treatment or shipment.

“waste” Includes any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered.

“waste classification” Means establishing:

- i. whether a waste is hazardous based on the nature of its physical, health and environmental hazardous properties (hazard classes), and
- ii. the degree or severity of hazard posed (hazard categories).

PART A: SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1 Introduction and scope of report

1.1 Introduction

Sibanye-Stillwater (SS) produces Platinum Group Metals (PGMs) such as platinum (Pt), palladium (Pd), rhodium (Rh), iridium (Ir), ruthenium (Ru), osmium (Os) and gold (Au). The South African (SA) Platinum Group Metals (PGM) operations comprise the Rustenburg, Kroondal and Marikana operations, respectively, located in the northwest province of South Africa.

The Marikana operations (Western Platinum (Pty) Ltd (WPL) and Eastern Platinum (Pty) Ltd (EPL)) are located in the Marikana district, 40km to the east of the town of Rustenburg in the North West province of the Republic of South Africa. The lease area covers approximately 214 km² and is in excess of 30km from east to west and 15km from north to south. The Marikana Operations were acquired by SS following the acquisition of Lonmin in June 2019. K4 Shaft forms part of Western Platinum (Pty) Ltd, which is the applicant.

K4 shaft was placed under care and maintenance for a period of 6 years but will be ramped up to be fully operational in the year 2024 extending the Life of Mine (LOM) with approximately 30 years.

The current Waste Rock Dump (WRD) is located on the farm Rooikoppies Portion 36, 37, 38, 39 and 147 is owned by SS has been established and initiated by the previous owner (Lonmin Plc). The existing authorised footprint for the WRD will be used to place the waste rock.

WPL has the following approvals:

- Water Use Licence: Licence number, 01/A21K/ABCEFGIHIJ/4620
- Environmental Management Programme: Reference NW30/5/1/2/3/2/2/105 EM

1.2 Authorisations required

Before WPL can commence with the construction of the proposed infrastructure of the K4 Shaft project, the following environmental authorisations are required:

- A Scoping and Environmental Impact Reporting (S&EIR) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) and the Environmental Impact Assessment (EIA) Regulations (2014, as amended). The competent authority for this process is the North-West Department of Mineral Resources and Energy (DMRE);
- A Water Use Licence Application (WULA) in terms of the National Water Act (Act 36 of 1998). The competent authority for this process is the Department of Water and Sanitation (DWS).

Alta van Dyk Environmental Consultants Pty Ltd (AvDE) have been appointed as the independent Environmental Assessment Practitioners (EAP) for this project to undertake the environmental; -related authorisations and associated public participation processes.

The S&EIR process is illustrated in Figure 1-1 and the WULA process is illustrated in Figure 1-2



Scoping and Environmental Impact Reporting Process

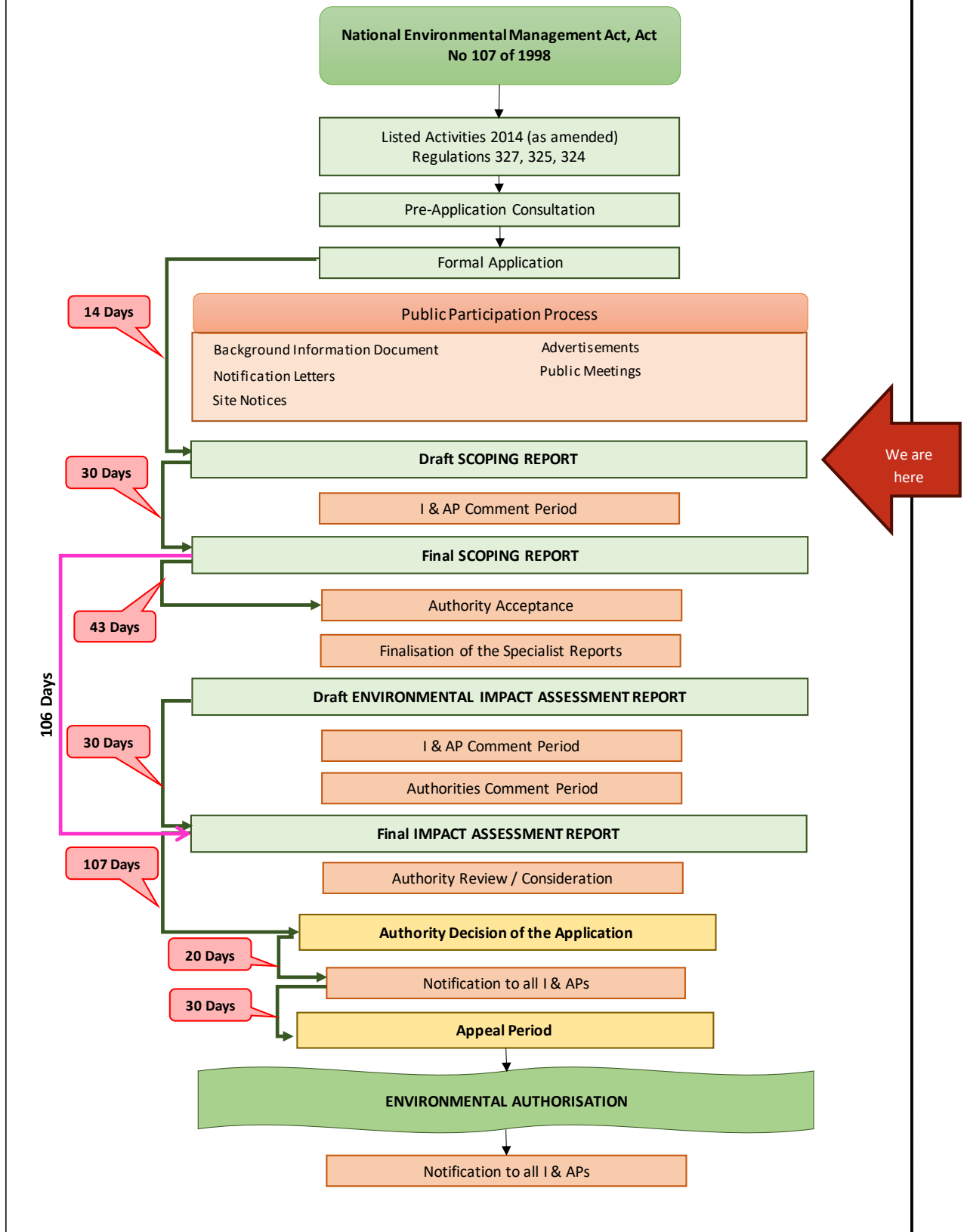


Figure 1-1: Scoping and Environmental Impact Reporting process



Water Use Licence / General Authorisation Application Process - e-WULAAS

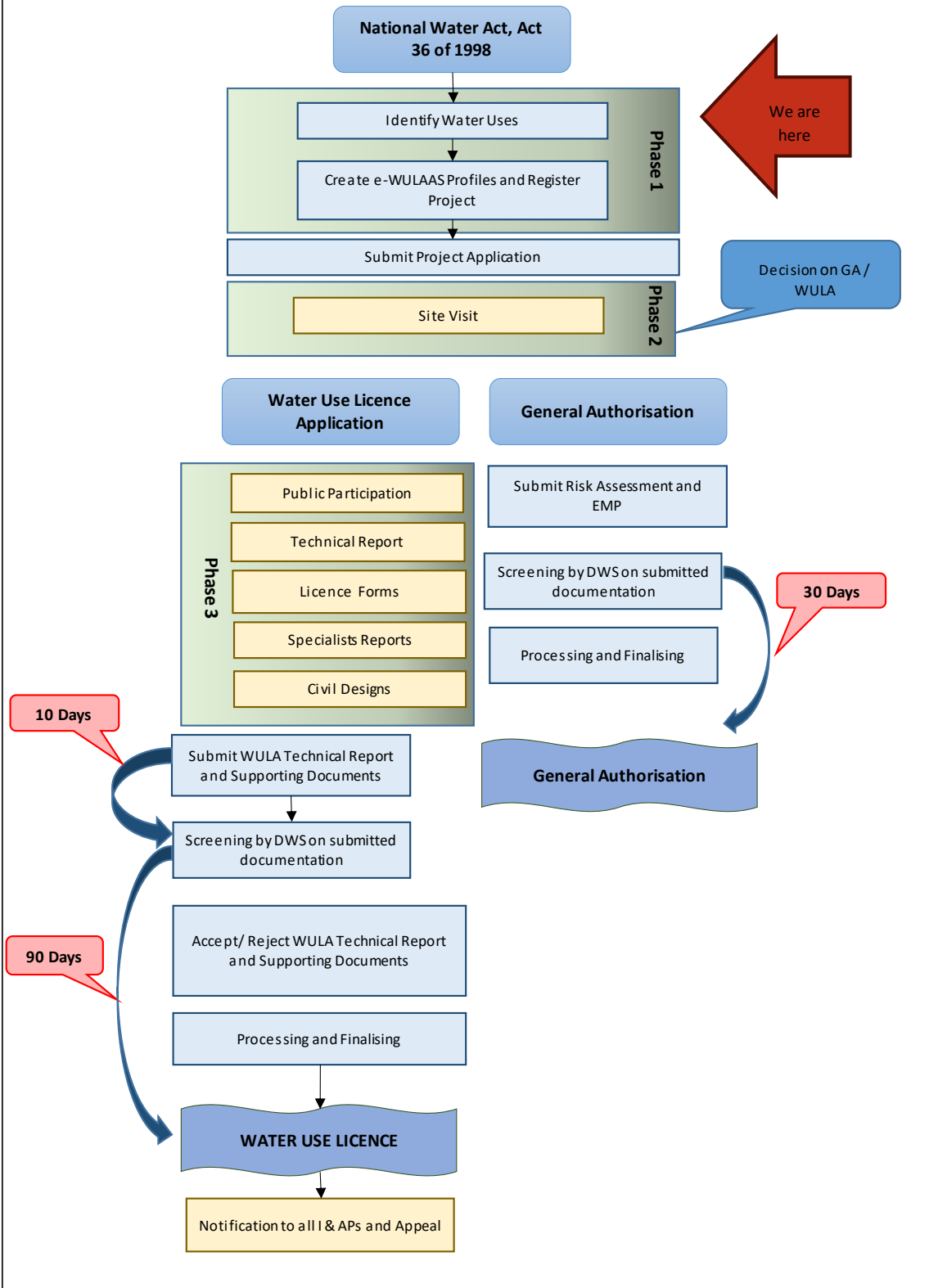


Figure 1-2: Water Use Licence application process

1.3 Structure of the report

The Draft EIA/EMPr Report has been compiled in accordance with the requirements of Government Notice R982 dated 4 December 2014 (as amended), Table 1-1 indicates the structure of the report.

Table 1-1: Draft EIS/EMPr requirements (GN 982)

No	Description	Reference
2(1)	An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include:	
a)	Details of-	
	(i) The EAP who prepared the report; and	Section 1.4
	(ii) The expertise of the EAP, including a curriculum vitae;	Section 1.4 appendix A
b)	The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including; -	
	(i) The 21-digit Surveyor General code of each cadastral land parcel;	Section 2.4
	(ii) Where available, the physical address and farm name;	Section 2.4
	(iii) Where required information in terms (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	N/A
c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale, or if it is	
	(i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken	Section 3
	(ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken;	N/A
d)	A description of the scope of the proposed activity, including –	
	(i) All listed and specific activities triggers;	Section 4.1
	(ii) A description of all the activities to be undertaken, including associated structures and infrastructure.	Section 4.4
e)	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context; Section 5	
f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location; development footprint within the approved site as contemplated in the accepted scoping report; Section 6	
g)	A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report; Section 7	
h)	A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report including Section 7	
	(i) Details of the development footprint alternatives considered;	Section 8
	(ii) Details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 9
	(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not incorporating them;	Section 9.3
	(iv) The environmental attributes associated with the development footprint alternatives focussing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 10
	(v) The impact and risks identified including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts –	Section 14

No	Description	Reference
	(aa) can be reversed, (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed, or mitigated;	
	(vi) The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.	Section 15
	(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 15.2
	(viii) The possible mitigation measures that could be applied and level of residue risk:	Section 14
	(ix) If no alternative development footprints for the activity were investigated, the motivation for not considering such; and	Section 15.4 and Section 8
	(x) A concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	
(i)	A Full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including: -	
	(i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 16 and 15.1
	(ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 16 and 15.1
(j)	An assessment of each identified potentially significant impact and risk, including – Section 17 and 14	
	(i) Cumulative impacts	Section 17 and 14
	(ii) The nature, significance and consequences of the impact and risk	Section 17 and 14
	(iii) The extent and duration of the impact and risk	Section 17 and 14
	(iv) The probability of the impact and risk occurring	Section 17 and 14
	(v) The degree to which the impact and risk can be revised	Section 17 and 14
	(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and	Section 17 and 14
	(vii) The degree to which the impact and risk can be mitigated	Section 17 and 14
(k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report	Section 18
L)	An environmental impact statement which contains:	
	(i) a summary of the key findings of the environmental impact assessment:	Section 19.1
	(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and	Section 19.2 and Section 3

No	Description	Reference
	(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives:	Section 19.3 and Section 8
m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisations; Section 20	
n)	The final proposed alternatives which respond to the impact management measures, avoidance and mitigation measures identified through the assessment; Section 21	
o)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation; Section 22	
p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed; Section 23	
q)	A reasoned opinion as to whether the proposed activity should or should not be authorised and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation; Section 24	
r)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Section 25
s)	An undertaking under oath of affirmation by the EA in relation to the	Part B Section 12
	(i) correctness of the information provided in the reports;	Part B Section 12
	(ii) the inclusion of comments and inputs from stakeholders and I&APs	Section 9.3
	(iii) The inclusion of inputs and recommendations from the specialist reports where relevant"	Section 16
	(iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by I&APs	Section 9.3
t)	Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Section 27
u)	An indication of any deviation from the approved scoping report, including the plan of study, including -	Section 28
	(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks, and	Section 28.1
	A motivation for the deviation;	Section 28.2
v)	Any specific information that may be required by the competent authority; and Section 29	
w)	Anu other matters required in terms of section 24(4) (a) and (b) of the Act; Section 30	
2)	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirements to be applied to an environmental impact assessment report the requirements as indicated in such notice will apply.	

1.4 Details of Project Applicant and Environmental Assessment Practitioner

1.4.1 Details of the project applicant

The applicant for this project is Sibanye-Stillwater, Western Platinum (Pty) Ltd. The details of the applicant are shown in Table 1-2.

Table 1-2: Contact details of the applicant

Applicant	Western Platinum (Pty) Ltd
Company Registration	1993/003589/07
Postal Address	Private Bag X508, Marikana North West Province, 0284
Responsible person	Yolande Janse van Rensburg
Telephone number	+27 14 495 1010
Responsible person	Phillip Ramphisa
Telephone number	+27 14 495 1010
E-mail	phillip.ramphisa@sibanyestillwater.com

1.4.2 Details of the Environmental Assessment Practitioner who prepared the report

Alta van Dyk Environmental Consultants (Pty) Ltd (AvDE) is appointed as independent EAP's to undertake the environmental authorisation and associated public participation process.

AvDE assigned Lenaldi Görgens as the lead Candidate EAP to undertake the environmental authorisation process, under the supervision of a senior EAP, Suzanne van Rooy. The details of the EAP's are listed in Table 1-3.

Table 1-3: Details of the EAP

EAP Name	Contact Number	Fax Number	Email
Lenaldi Görgens	012 940 9457	086 634 3967	lenaldi@avde.co.za
Suzanne van Rooy	012 940 9457	086 634 3967	suzanne@avde.co.za

1.4.3 Qualifications of the EAP

The qualifications and professional registrations held by the EAP's are shown in Table 1-4. Refer to Appendix A for copies of the qualifications and Curriculum Vitae (CV) of the EAP's

Table 1-4: Qualifications of the EAP

EAP name	Qualifications	Professional registration
Lenaldi Görgens	BSc Honours in Environmental Science with biodiversity and conservation ecology. (North West University)	EAPASA: Registered Candidate EAP (Ref 2022/5188)
Suzanne van Rooy	MPhil Environmental Management (University of Stellenbosch)	Pr.Sci.Nat (Reg nr. 400378/11) EAPASA Registered EAP (Ref 2019/1079)

1.4.4 Summary of the EAP's past experience

Lenaldi Görgens

Lenaldi holds an Honours degree in environmental Science from the North-West University and has one (1) year experience in the environmental field. Lenaldi is responsible for project delivery and will be assisting the project team in the gathering of information, documenting information, and feedback. In terms of professional affiliation, Lenaldi is registered as a Registered Candidate EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (Ref: 2022/5188). Lenaldi's experience in the Environmental Science field focussed on conducting public participation processes, assisting in the gathering of information, documenting information and feedback from stakeholders and assist in the overall report compilation and public participation.

Lenaldi Görgens meets the requirements for independence as she do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the EIA Regulations, 2017, and has no vested interest in the proposed activity proceeding, and also has no, and will not engage in, conflicting interests in the undertaking of the activity.

Suzanne van Rooy

Suzanne van Rooy holds a Master's Degree in Environmental Management from the University of Stellenbosch. In terms of professional affiliations, Suzanne is registered with the South African Council for Natural Science Professions (SACNASP - 400378/11) in Environmental Science field of practice. Suzanne's expertise is in the mining industry sector, focusing on Environmental Impact Assessments, Water Use Licence Applications, environmental performance assessments, water use licence audits, public participation, and closure cost assessments. Her involvement in such projects varies from project management and co-ordination to the compilation and review of technical and environmental documents and reports. She has been involved in environmental authorisations for both underground and open cast mining operations, as well as the associated activities such as waste disposal facilities, conveyor routes, access roads, pollution control and other dams, undermining of wetlands and river crossings. She has also conducted various environmental feasibility reporting for potential mining projects.

Suzanne van Rooy meets the requirements for independence as she do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the EIA Regulations, 2017, and has no vested interest in the proposed activity proceeding, and also has no, and will not engage in, conflicting interests in the undertaking of the activity.

2 Description of the Property

2.1 K4 Shaft Mining Right

K4 shaft is located approximately 23 kilometres East of Rustenburg, and 7 km northeast of Marikana, North West Province. The shaft is one the access points to the Mining Right Area (NW30/5/1/2/2/106MR), and the surface right information and title deeds are provided in Table 2-1.

Table 2-1: Surface right information and title deed numbers

Farm name	Farm Portions	Title deed no	Property size	Surface right owners
Zwartkoppies 296 JQ	Remaining extent 32	B5445/2016	13,0949	Western Platinum Limited
	Portion 33	B5445/2016	38.00	Western Platinum Limited
	Portion 34	T84742/1991	11,6061 ha	Western Platinum limited
	Portion 115	T59890/2001	83,655	Western Platinum Limited
Rooikoppies 297 JQ	Portion 35	T84986/2000	11,2420	Western Platinum Limited
	Portion 36	T86278/2000	8,9664	Western Platinum Limited
	Portion 37	T102095/2000	9,1963	Western Platinum Limited
	Portion 38	T84735/1991	8,4083	Western Platinum Limited
	Portion 39	T116750/2000	8,4654	Western Platinum Limited
	Portion 40	T92053/2000	4,8660	Western Platinum Limited
	Portion 41	T92636/2000	10,5454 ha	Western Platinum Limited
	Portion 48	T92053/2000	1,0150 ha	Western Platinum Limited
	Portion 54	T102095/2000	6,813	Western Platinum Limited
	Portion 147	T107641/2000	5225	Western Platinum Limited
	Portion 153	T102095/2000	30,6251	Western Platinum Limited
	Portion 164	T84738/1991	31,62	Western Platinum Limited
Portion 222	T102095/2000	6,8161	Western Platinum Limited	

2.2 Description of the property

The location and property descriptions of the affected properties are shown in Table 2-2

Table 2-2: Description of associated properties

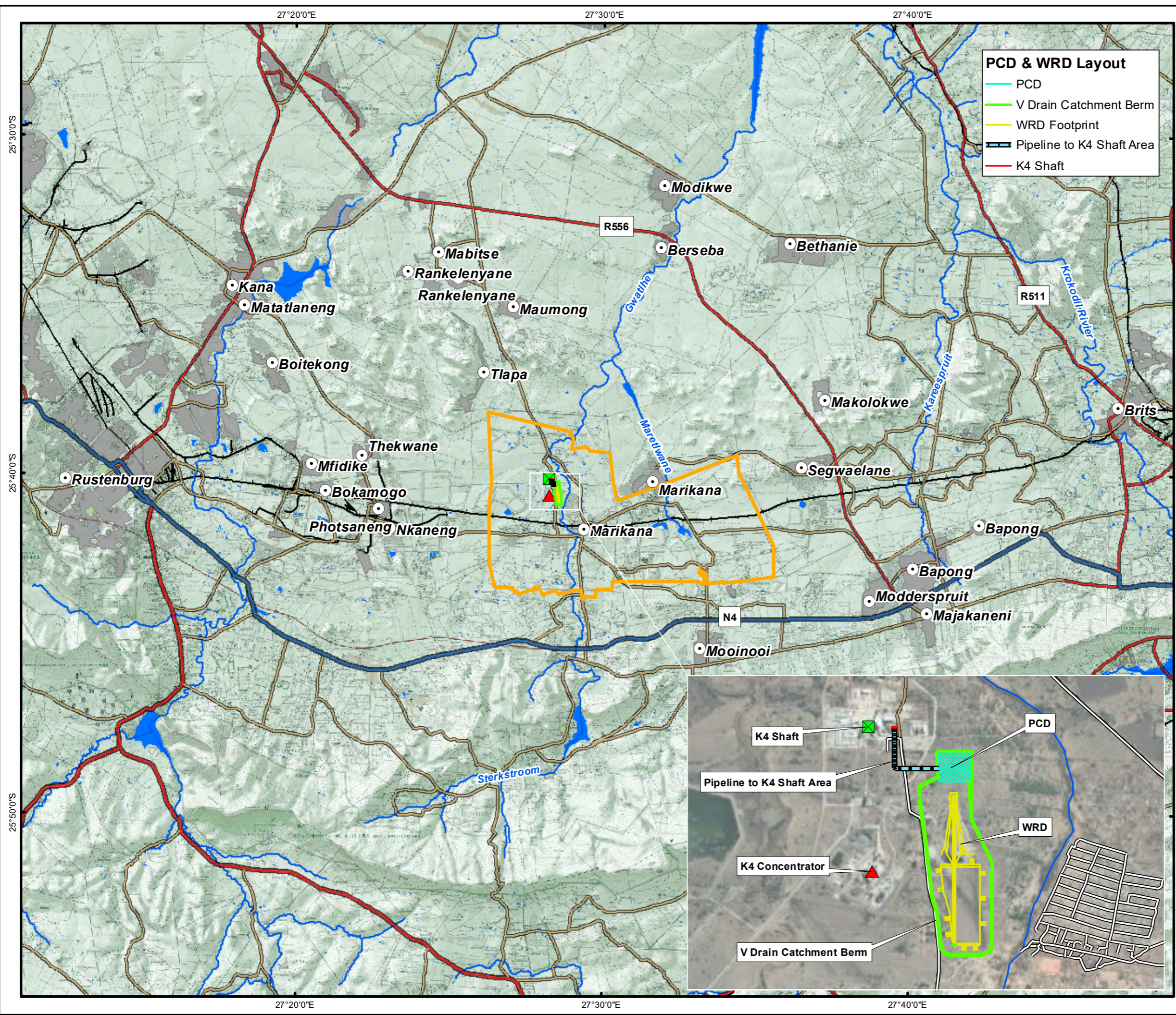
Farm name	Various portions of the Farm Zwartkoppies 296 JQ and various portions of the Farm Rooikoppies 297 JQ. RE 32, 33, 34, and 115, of the Farm Zwartkoppies 296 JQ, and Portion 35, 36, 37, 38, 39, 40, 41, 48, 54, 147, 153, 157, 164 and 222 of the farm Rooikoppies 297 JQ.
Application area (ha)	Affected areas: ~13 ha
Magisterial district	Bojanala Platinum District Municipality Rustenburg Local Municipality
Distance and direction from nearest town	Approximately 7 km Northwest from the town of Marikana

	23 Km East of the town of Rustenburg
21-digit Surveyor General code for each farm portion.	TOJQ000000002960032
	TOJQ000000002960033
	TOJQ000000002960034
	TOJQ0000000029600115
	TOJQ000000002970035
	TOJQ000000002970036
	TOJQ000000002970037
	TOJQ000000002970038
	TOJQ000000002970039
	TOJQ000000002970040
	TOJQ000000002970041
	TOJQ000000002970048
	TOJQ000000002970054
	TOJQ0000000029700147
	TOJQ0000000029700153
	TOJQ0000000029700157
	TOJQ0000000029700164
	TOJQ0000000029700222

3 *Locality map*

The following maps indicate the locality of WPL, its mining right areas and location of the K4 Shaft PCD and associated infrastructure project.

- Figure 3-1: Locality map
- Figure 3-2: Project Layout Ma

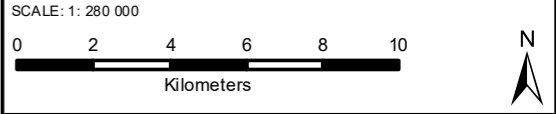
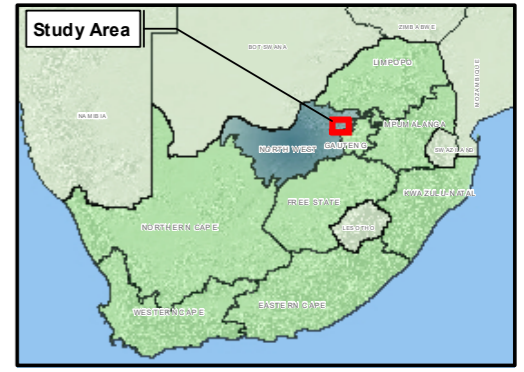


PCD & WRD Layout

- PCD
- V Drain Catchment Berm
- WRD Footprint
- Pipeline to K4 Shaft Area
- K4 Shaft

Legend

- MR106 (mining right area)
- ▲ K4 Concentrator
- K4 Shaft
- Towns
- Buildings/Ruins
- National Freeway Route
- Arterial Route
- Main Road
- Secondary Road
- Railway
- Contours
- Rivers
- Cadastral Farms
- Built Up Areas
- Open Areas
- Water Area



TITLE:
 Locality map of K4 Shaft Pollution control dam and Waste Rock Dump GN704

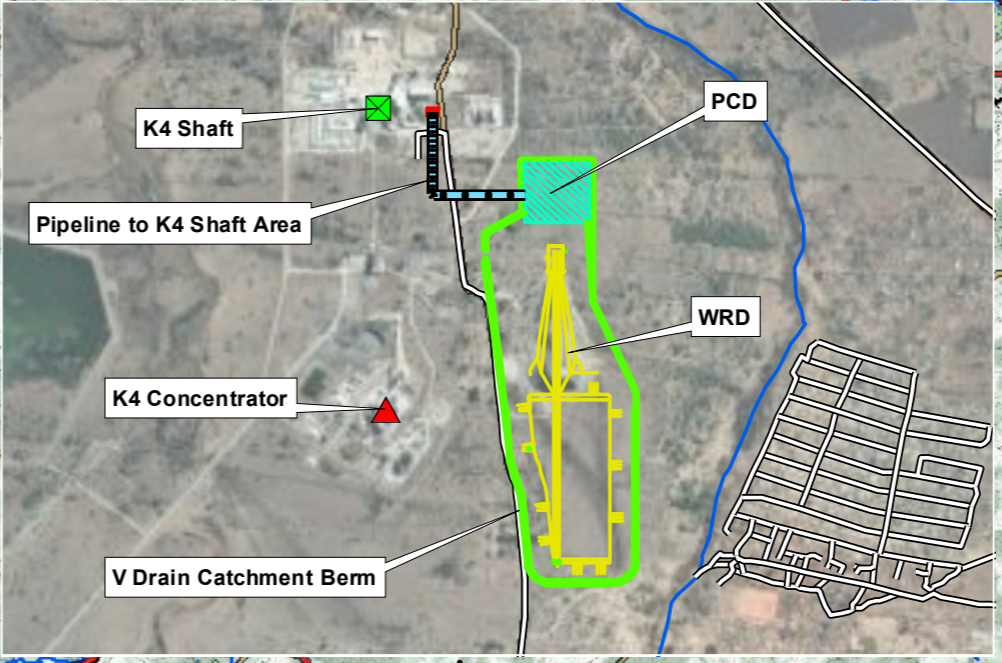
CLIENT:
Sibanye-Stillwater

DATE: May 2023	PROJECT: K4_SHAFT_PA
DRAWN: THURLOW MAPPING	APPROVED: LG
MAP K4_SHAFT_PCD_WRD_LOCALITY.mxd	REV: 0

Alta van Dyk Environmental Consultants cc (2011/059764/23)
 VAT No: 4630259952
 Tel: 012 940 9457
 Fax: 086 634 3967
 Cell: 082 782 4005

Projection: Transverse Mercator CM: 27 Datum: WGS 84
 Source: Chief Directorate National Geo-Spatial Information, NGI_TOPO50_Mosaic_latest_Editions_Jan-2017.ecw
 DWA - NGA Geosites Inset: ESRI Data and Maps

SIZE:
A4



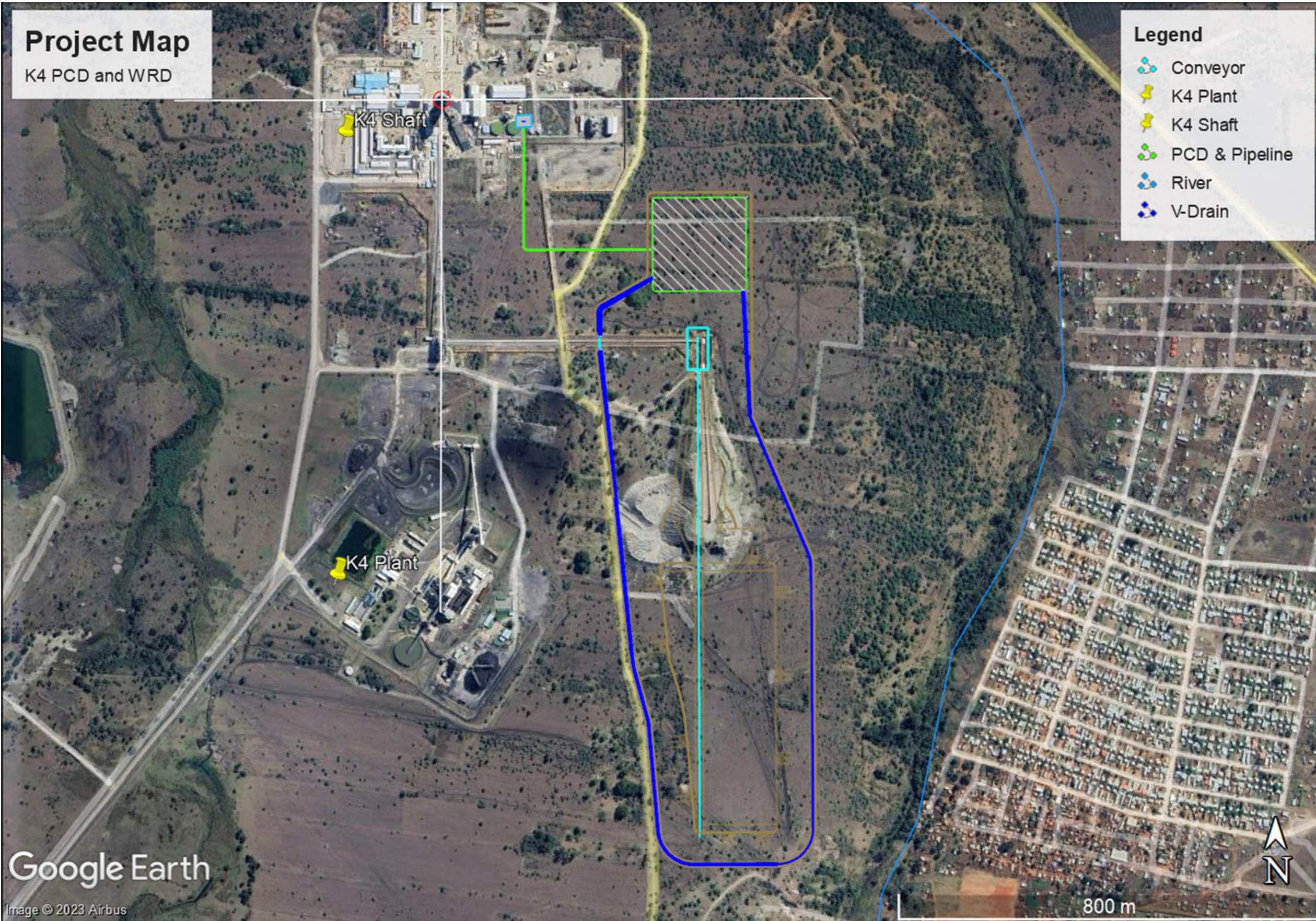


Figure 3-2: Project Layout Map

4 Description of the scope of the proposed overall activity

4.1 Background

K4 Shaft is located 7 km north west of Marikana Town, within Rustenburg Local Municipality in the North West Province (refer to Figure 3-1). K4 Shaft at WPL is a largely pre-developed and equipped, high return project, which will access both the Merensky and UG2 reefs to produce on average, approximately 250,000 4Eoz per annum at a steady state over a 50-year life. Ore will be processed at the K4 Concentrator which is already fully operational with a nameplate capacity of approximately 130,000tpm (tonnes per month) of UG2 and Merensky reef.

Excess waste rock from underground mining works is deposited on waste rock dumps at WPL. The waste rock is transported to the waste rock dumps via an underground loco transport to the shafts where it is brought up to the surface. It is then taken to the various waste rock dumps via a spreader belt. Waste rock material from K4 Shaft will be stored onto the existing approved K4 WRD.

The approved WRD is indicated in Table 4-1.

Table 4-1: The K4 Shaft Waste Rock Dump Area that is approved in the 2012 EMP (SEF, 2012)

Name	Final Footprint Area (ha)	Design Final height (m)	Deposition Rates	Anticipated decommissioning date
K4 Shaft Waste Rock Dump	30	33	44 000 tpm	2030

As per the EMP, waste rock is used in local construction and building, but demand and/or usage is not considered significant enough to level the waste rock dumps. Levelling of this storage areas will thus be required in the long term unless other uses can be identified and applied before mine closure.

As part of underground mining and based on tonnages of waste rock currently being generated, most of the waste rock dumps will have to be extended to accommodate the continuous increase in stockpile.

The existing WRD area has been approved as part of the Marikana Water Use Licence and is indicated in Table 4-2.

Table 4-2: Existing waste rock dump approved in the Marikana WUL (Water Use Licence No.; 01/A21K/ABCEFGIHI/4620, dated 22 February 2022)

Name	Capacity
K4 Shaft Waste Rock Dump	540 000 tonnes per annum

Stormwater run-off from the WRD area needs to be contained in accordance with the requirements of GN704. GN704 requires:

- The effective separation of clean and dirty water on site – therefore all contaminated run-off from the waste rock disposal area needs to be captured (berm and V-drain);
- Containment of dirty water run-off – a dedicated stormwater management facility will be constructed for the containment of the dirty water run-off and the use thereof in process.
- Capacity Requirement – the containment facility will need to be able to manage the run-off generated during a 1:50 year 24-hour storm event above its normal operating capacity whilst still maintaining the 0,8m freeboard – the PCD has been designed with a storage capacity of 35 203 m³.

4.2 Description of the current authorised activities undertaken at K4 Shaft

Information for this section was obtained from Western Platinum Mine Final Environmental Management Programme(SEF, 2012).

4.2.1 Minerals mined

The minerals mined at the Marikana operations (Including K4 Shaft) includes the exploitation of the Merensky Reef as well as the UG2 Reef the PGM's mined from the two reefs are indicated separately in the table below:

Merensky Reef	UG2 Chromitite
<ul style="list-style-type: none"> • Sperrylite • Platinum Iron (Pt-Fe) • Alloy and Merensyite • Kolulskite • Moncheite • Cooperite • Braggite 	<ul style="list-style-type: none"> • Cooperite • Laurite • Braggite • Pt-Te alloy • Sperrylite

4.2.2 Description of the main mining activities and processes

Exploration:

The Merensky reserves and the UG2 Chromitite reserves are determined and demarcated for mining within the western region of the Bushveld complex. Exploration boreholes are drilled to determine the reserves resent (SEF, 2012).

Mining:

WPL uses both underground and opencast mining methods. The method used during underground mining varies between breast mining, up-dip mining, down-dip mining, conventional as well as mechanised mining. The ore is broken and transported via the shafts to the surface (consisting of both vertical as well as incline-oriented shafts), where the waste rock is then transported to the associated waste rock dumps.

Concentration:

The ore resulting from the mining process is then transported to any of the concentrators where the ore will be processed via milling, crushing and flotation processes.

Smelting and Base metal Extraction

Additional to the concentrate produced via the flotation process, the concentrate is exposed to high temperatures at the smelter and the Base Metal Refinery (BMR) where converter matte is generated to be treated to produce nickel sulphates crystals, copper cathodes and PGM concentrate.

Refining

The final PGM product produced at the Smelter /BMR is air lifted to the Western Platinum Refinery situated in the Gauteng Province near Brakpan where it will be further refined to the finished PGM metals for market purposes.

There are also numerous infrastructural and service elements associated with the mining and processing areas including landfill sites, sewage plants, workshops and stores, hostels, road networks and other service and maintenance infrastructural networks. The process and sustainability cycle are represented below.

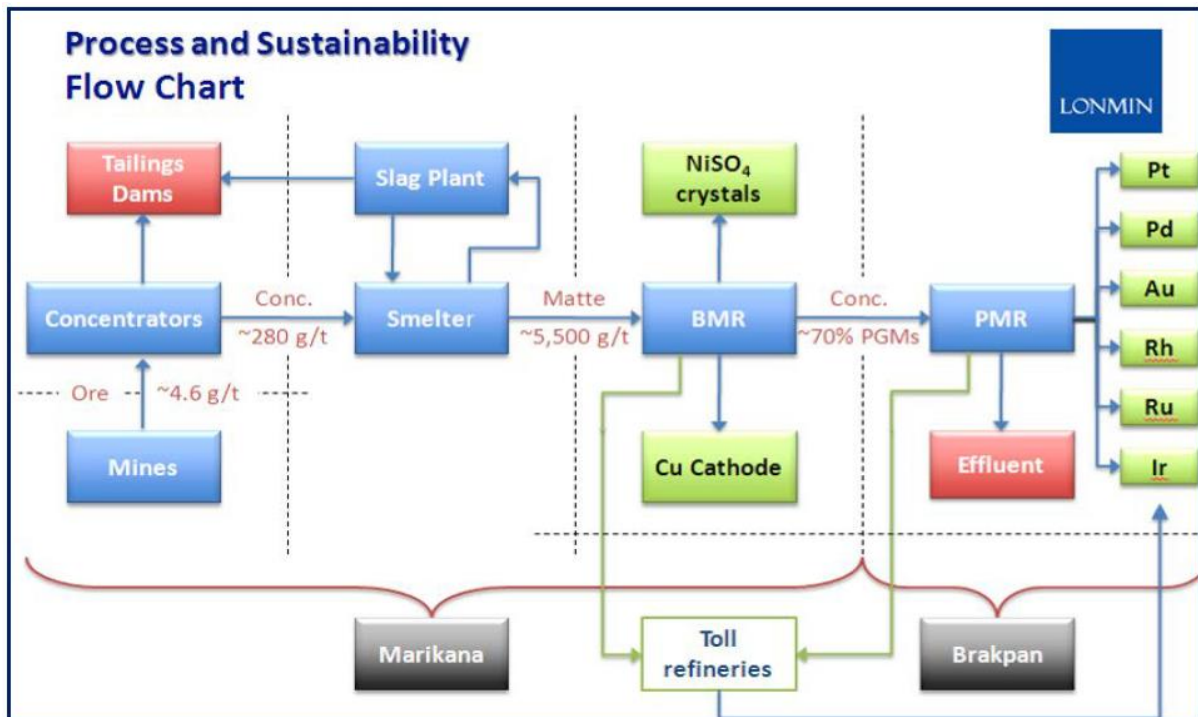


Figure 4-1: Process and Sustainability Flow Chart

4.2.2.1 Current infrastructure and activities

Current infrastructure and activities at K4 Shaft:

- Shaft headgear,
- Winder rooms,
- Change house facilities,
- Stores,
- Offices,
- Waste sorting and storage facilities,
- Settling dams (for water pumped from underground and
- Storage dams for water to be sent underground as mine service water).
- Diesel, oils, chemicals, and facilities for storing and
- Separating waste streams
- Conveyor belt
- WRD



Current and proposed (authorised) WPL infrastructure, areas, and activities:

- Underground mining and associated activities including the following:¹
 - Marking, drilling, and blasting of holes;
 - Provision of support (underground);
 - Engineering activities (underground);
 - Shafts and Ventilation Shafts
- Buildings and parking areas;
- Conveyor systems;
- Waste Rock Dump (WRD)

- Security buildings;
- Workshops;
- Change houses;
- Explosives magazine areas;
- Sub-stations and transformers;
- Roads;
- Powerlines;
- Telephone lines;
- Monitoring boreholes;
- Water metres;
- Fences;
- Shaft headgear,
- Winder rooms,
- Offices,
- Settling ponds
- Concrete storage dams
- Clean and dirty water separation facilities
- Diesel storage tanks and refuelling areas;
- Water and mine waste management infrastructure and facilities, including:
 - Silt traps, sumps, and trenches;
 - Storage of water pumped from borehole(s)
 - Other potable water tanks / dams;

Table 4-3 indicates some of the existing infrastructure at the K4 Shaft.

Table 4-3: Photographs showing some of the infrastructure and facilities at K4 Shaft

K4 Shaft	
 <p style="text-align: center;">Shaft</p>	 <p style="text-align: center;">Plant and conveyor system</p>

K4 Shaft



Conveyor System



Current Waste Rock Dump

4.2.2.2 Mining Method

The mining method currently used at the K4 Shaft included underground mining methods. The underground mining works are accessed from the surface by means of vertical and/or incline shaft. Mechanised mining is being phased out but Breast mining, up-dip and down-dip mining, as well as conventional mining methods are being undertaken. The underground mining works range between a few hundred e-mails up to 1.2 kilometres deep as the reefs are continuously drilled, blasted and support structures installed to support the hanging wall. Ore material is removed from slopes by means of scrapers that are attached to winches. The ore material is then transported to the bottom of the shaft where it is then brought up to the surface.

After the ore reaches the surface, it is transported to the relevant or associated concentrator via haul roads. Water is then pumped from underground, and the storm water drains into associated settling dams that are located at each shaft, where the water is then re-used as process water.

4.2.2.3 Ore processing

Once the ore reached the concentrator, a process of milling, crushing and flotation is employed which produces a flotation concentrate for smelting which is transported vis haul roads to the Smelter.

The concentrator process and associated infrastructure must be managed carefully due to the potential impacts on the environment which may derive from the stockpiling of ore, the separation of clean and dirty water, storage and handling of hazardous material and pollution control dams. Chemicals which assist in the milling and flotation process include copper-sulphate, Xanthate (classified as a dangerous substance), Gempolym M49 and Dowforth 200.

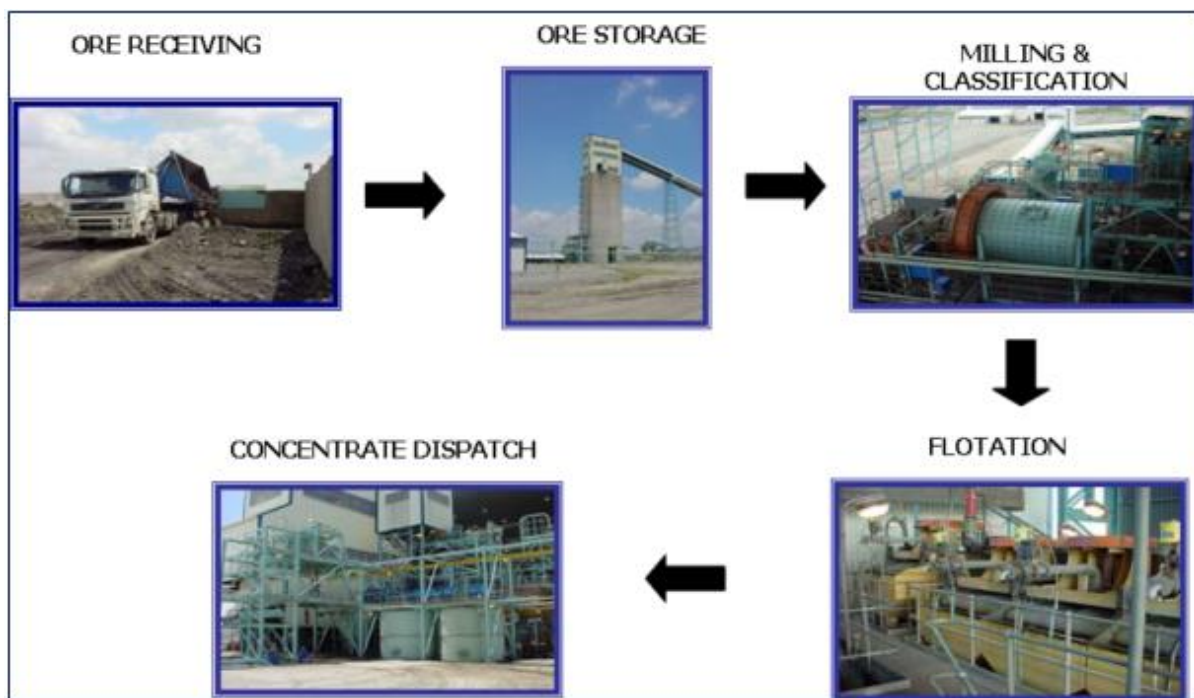


Figure 4-2: Typical Concentrator Process flow

4.2.2.4 Transport and conveyance

General

The Rustenburg / Pretoria tarred provincial road (N4) is situated approximately 9 km south of the project area and the Marikana Road is used with other tarred roads to access the K4 Shaft.

Although Sibanye-Stillwater makes use of railway transport to transport ore, no railway lines are present on the project site. Employees are responsible for their own transport to and from the site.

Mineral transport on site

Excess waste rock from underground mining works is deposited on waste rock dumps at WPL. The waste rock is transported to the waste rock dumps via an underground loco transport to the shafts where it is brought up to the surface. It is then taken to the various waste rock dumps via a spreader belt. Waste rock material from K4 Shaft will be stored onto the existing approved K4 WRD.

Mineral transport off-site

Ore is transported to the concentrator(s) (off-site) via truck using road transport.

4.2.2.5 Water Management

WPL has an existing Water Use Licence (WUL) (Licence Number 01/A21K/ABCEFGIHIJ/4620, issued by the Department of Water and Sanitation on 22 February 2022).

Water supply and use

Information for this section was obtained from Western Platinum Mine Final Environmental Management Programme(SEF, 2012).

WPL utilises surface water supplied by Rand Water which is distributed wide for domestic as well as for industrial and mining uses. Potable water is supplied via a pipe network to bulk water reservoirs t strategic locations in the WPL MRA. Containment dams are used for storage and re-distribution of recycled water. Through this recycling process and re-use of water, the demand on the Rand Water supply is slowly decreasing. Water which drains

from the Tailings Disposal Facilities (TDF's) complexes and surplus water is stored in large earth lined dams (known as Return Water Dams) from where it is circulated back into the processing operation (WPL/EMPr, SEF 2012).

Table 4-4 to Table 4-5 indicates the S21(a) and S21(j) water uses associated with the K4 Shaft as licenced in the existing Water Use Licence reference number; 01/A21K/ABCEFGIHIJ/4620 dated 22 February 2022.

Table 4-4: Section 21(a) licenced water use activities associated with the K4 Shaft (WUL, 2015)

Description	Source	Properties	Coordinates	Volume
Taking Water from K4 Shaft Removing Groundwater	Groundwater	Zwartkoppies 296 JQ	25°40'6.54" S 27°28'13.80" E	2 9000 000 m ³ /a

Table 4-5: Section 21(j) licenced dewatering activities (WUL, 2015)

Description	Properties	Coordinates	Volume
Removing Groundwater from K4 Shaft for mining activities and safety of people.	Portion 33 Zwartkoppies 296 JQ	25°40'6.54" S 27°28'13.80" E	2 9000 000 m ³ /a

Process water management facilities

WPL K4 Shaft is authorised (as per its Water Use Licence dated 22 February 2022) to dispose a maximum quantity (in m³/annum) into the waste and / or water management facilities, as listed in Table 4-6.

Table 4-6: Section 21(g) licenced process water management facilities (WPL WUL, 2022)

Facility	Location	Coordinates	Volume / Capacity	Description
Containment facility for water management	Rooikoppies 297 JQ, Portion 42, 44, and 134	25°40'34.54" S 27°28'07.25" E	8 000 m ³	Disposal and storage of water in the K4 Concentrator Stormwater dam used for containment of varying sources. Water is re-used in the Sibanye Operations
For disposal (storage) or re-use	Rooikoppies 297 JQ Portion RE36, 37, 38, 47, and RE39.	25°40'16.5" S 27°28'32.2" E	450 000 tons/a	Disposal of waste. Waste rock from the operations onto the K4 Shaft Waste Rock Dump
Containment facility for water management. Silt is removed. Water is reused in the operations	Zwartkoppies 296 JQ Portion 115	25°39'56.96" S 27°28'07.05" E	4 800 m ³	Disposal from inflows from the shaft and other areas into the K4 Shaft Settling Dam, 1
K4 Shaft Settling Dam Containment facility for water management. Silt is removed. Water reused in the operations	Zwartkoppies 296 JQ Portion 115	25°39'57.50" S 27°28'08.74" E	9 072 m ³	Disposal of inflows from the shaft and other areas into the K4 Shaft Settling Dam 2

Discharges

WPL K4 Shaft is authorised (as per its Water Use Licence dated 22 February 2023) for the Section 21(f) water use activities listed in Table 4-7.

Table 4-7: Section 21(f) licenced water use activities (WUL, 2015)

Facility	Location	Coordinates	Volume / Capacity	Description
Discharging of treated effluent water only during excessive high rainfall events and/or positive water balance periods	Zwartkoppies 297 JQ Portion RE278	25°39'50.02" S 27°28'9.46" E	219 000 m ³ /a	Final effluent from the K4 Waste Water Treatment Plant. Discharge of treated sewage water into Brakspruit

4.2.2.6 Conceptual Storm Water Management

Existing Infrastructure at K4 Shaft

According to the current Stormwater Management Plan (SWMP) (Highlands Hydrology, 2012) the infrastructure found at the shafts at Sibanye-Stillwater include: Shaft headgear, winder rooms, change house facilities, stores, offices, waste storing facilities, “settling ponds” for water pumped up from underground and concrete storage dams for water to be sent underground as mine service water. Shafts also contain stocks of diesel, oils and chemicals as well as having facilities for separation and storage of different waste streams.

The delineated clean and dirty water catchment areas are shown in Figure 4-3 for the existing SWMP. The Rational Method was used to determine the Flood Peaks for the five catchments affecting the site.

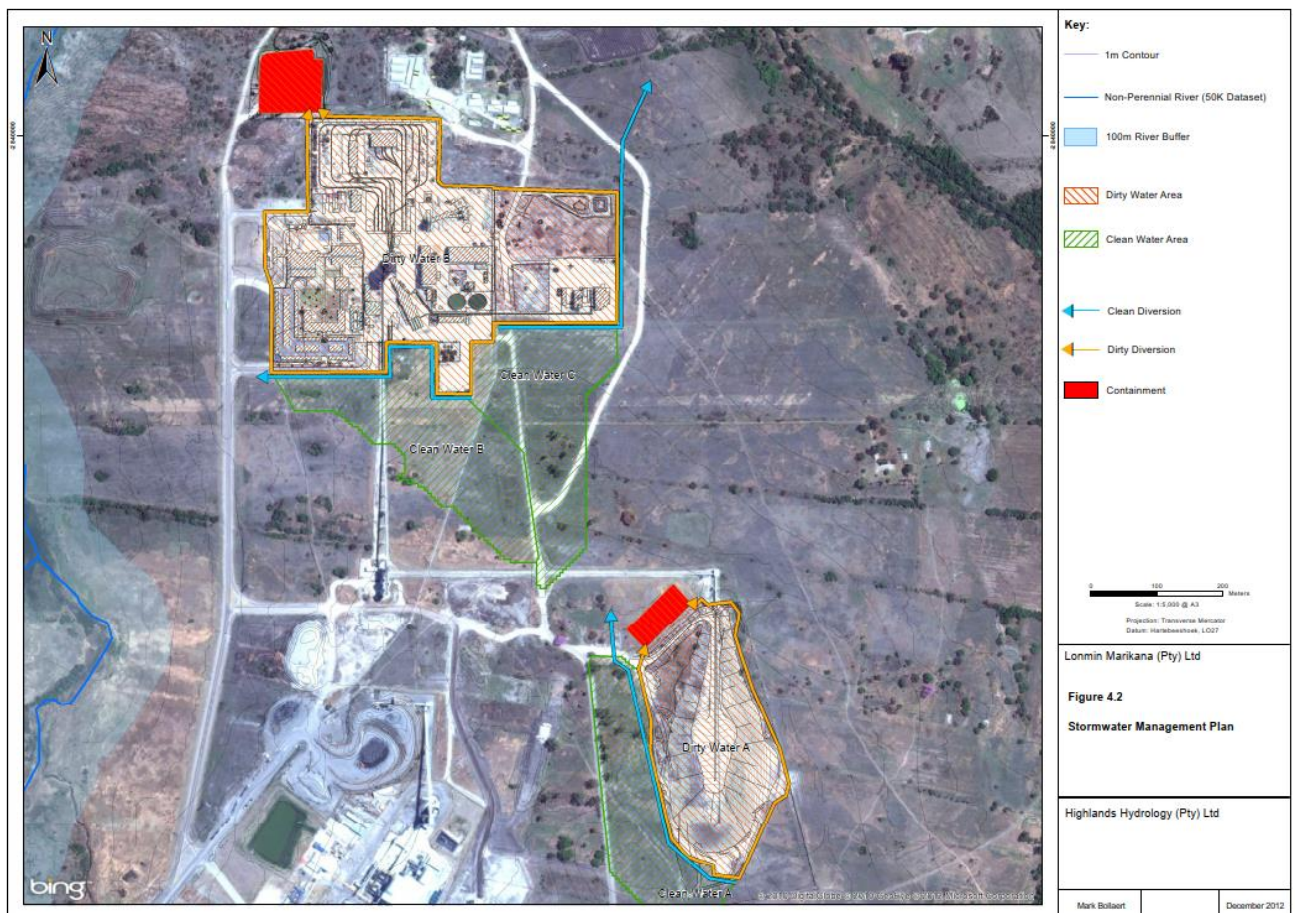


Figure 4-3: Clean and dirty water catchment areas (Highlands Hydrology, 2012)

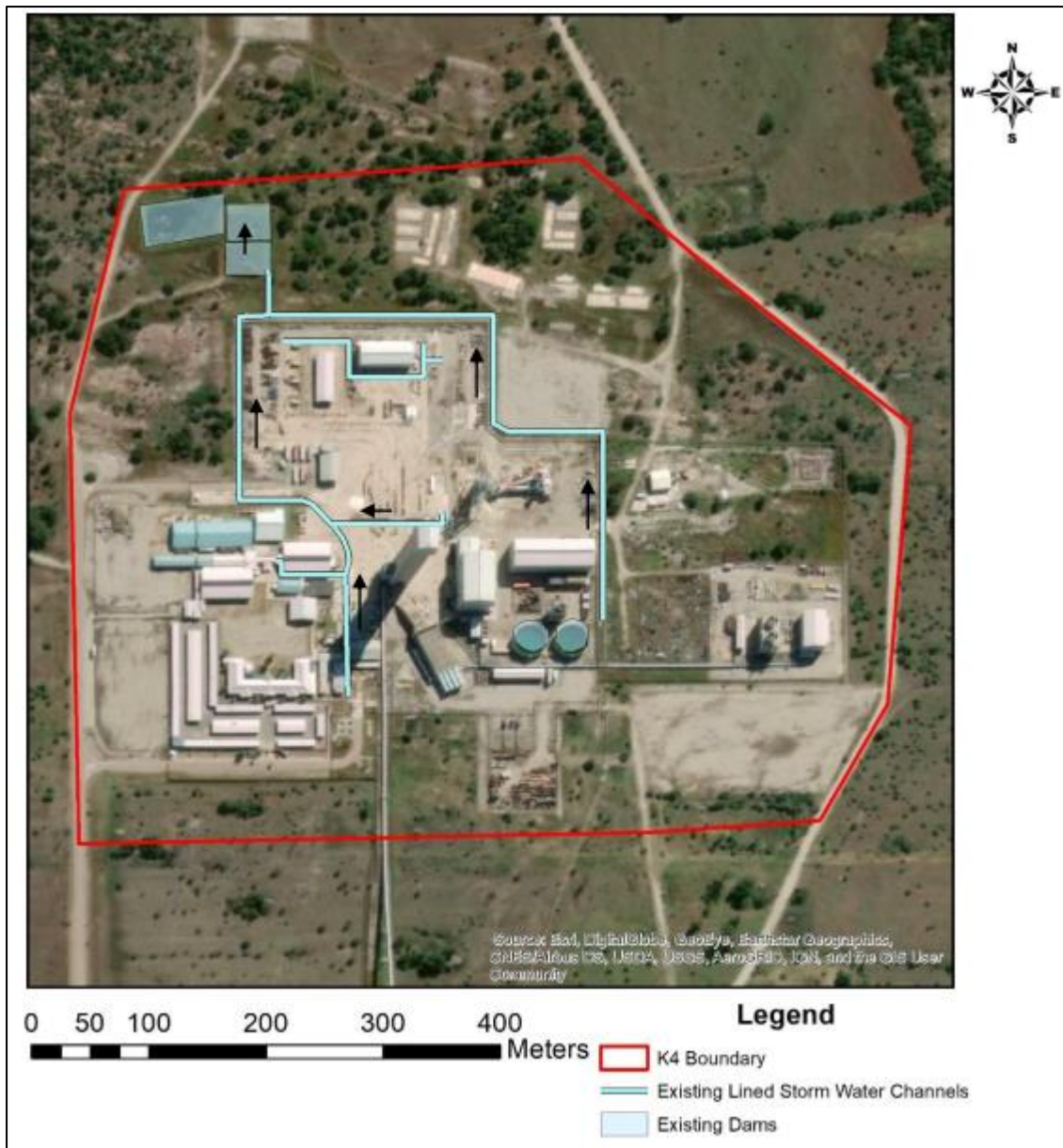


Figure 4-4: Existing Stormwater Infrastructure at K4 Shaft (Image obtained from Storm Water Solutions, 2013)

Clean and Dirty water catchments

This section has been obtained from the Conceptual Stormwater Management Plan for Karee K4 Shaft Prepared by Highlands Hydrology (Pty) Ltd, 2012)

Clean Catchments

Flood peaks for the clean catchments affecting the site were determined using the rational Method selected to be an appropriate method for the site-specific characteristics. The catchment characteristics together with the calculated peak flow rate for the 1:50 year flood is presented in Table 4-8.

Table 4-8: Clean catchment characteristics and peak flow rates for the 1:50 year flood event (Highlands Hydrology, 2012)

Catchment	Area (km ²)	Time of Concentration (minutes)	Peak flow rate (m ³ /s)
Clean Water A	0.041	29	0.4
Cean Water B	0.053	36	0.5
Clean Water C	0.049	32	0.5

Dirty Catchments

Flood Peaks for the two dirty catchments affecting the site were also determined using the Rational Method. The Catchment characteristics together with the calculated peak flow rate for the 1:50 year flood is presented in Table 4-9.

Table 4-9: Dirty Catchment Characteristics and Peak Flow Rates for 1:50 year flood event (Highlands Hydrology, 2012)

Catchment	Area (km ²)	Time of Concentration (minutes)	Peak flow rate (m ³ /s)
Dirty Water A	0.066	28	1.2
Dirty Water B	0.158	38	3.3

Stormwater Management Infrastructure

Stormwater management infrastructure has been conceptually designed in this report as per the requirements of GN 704 and presented in Figure 4-2. The dirty water containment facilities have been indicatively sized and positioned and do not necessarily represent final design sizes and locations. It should also be noted that where average longitudinal slope of channels are negligible, the channel may require appropriate excavation to ensure water is effectively routed towards the containment facility (in the case of dirty water) or effectively routed away from the site (in the case of clean water). This will need to be considered in the detailed design phase. (Highlands Hydrology 2012)

Clean Water Berms/Channels

Figure 4-5 illustrates a typical cross section through a clean stormwater diversion. The aim of the channel section is to divert upstream clean water which would otherwise flow into the dirty area, while the berm section will ensure containment of dirty water within dirty areas. Where possible, the berm component should be constructed from the material excavated from the channel and supplemented by topsoil stockpiling if required. The side slopes for all berms and channels have been kept constant at 1 vertical: 1.5 horizontal. The channel component has been sized using Manning's equation for trapezoidal channels, assuming a roughness coefficient of 0.03. The clean water channel has been sized to enable conveyance of the 1:50 year flood (Highlands Hydrology 2012).

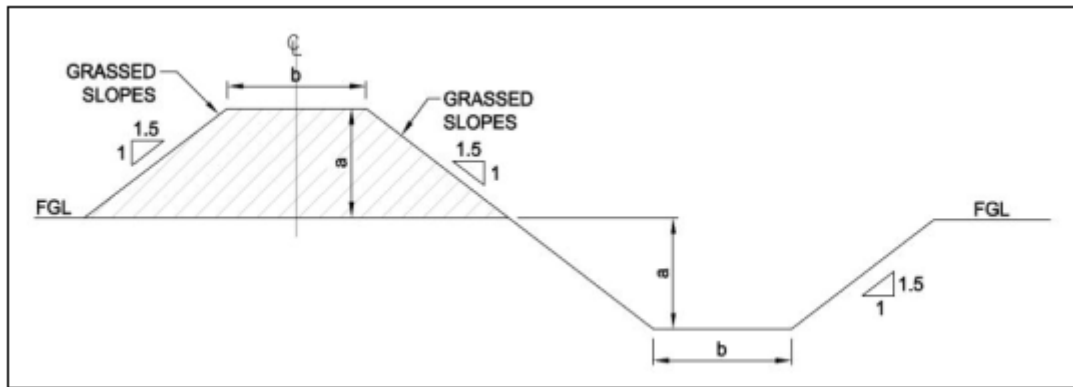


Figure 4-5: Example of a typical cross-section through clean stormwater diversion (SEF, 2012).

Table 4-10 below presents the dimensions of the berm and channel that routes the clean water effectively.

Table 4-10: Clean Water Containment facility volume requirements for 1:50 year flood event (Highlands Hydrology, 2012)

Catchment	a (m)	B (m)	Average Longitudinal Slope
Clean Water A	0.5	1.0	1:287
Clean Water B	0.5	1.0	1:180
Clean Water D	0.5	1.0	1:360

Dirty Water Berms/Channels

Figure 4-5 also illustrates a typical cross section through a dirty stormwater diversion. The aim of the channel section is to ensure dirty water is firstly contained within dirty areas and secondly that it is routed to an appropriate containment facility. The berm section, located on the clean water side will ensure that no upstream clean water can enter the dirty water area. Where possible, the berm component should be constructed from the material excavated from the channel and supplemented by topsoil stockpiling, if required. The side slopes for all berms and channels will be kept constant at 1 vertical: 1.5 horizontal. The channel component has been sized using Manning's equation for trapezoidal channels, assuming a roughness coefficient of 0.015 (concrete lined). The dirty water channel has been sized to enable conveyance of the 1:50 year flood. It is important to note that the channel component of the dirty water diversions may require different lining (based on decision from the DWA) which could significantly affect the routing of stormwater. Flood hydrology calculations and associated diversion characteristics will need to be updated accordingly.

Table 4-11 below indicates the berm and channel dimensions that routes the dirty water effectively.

Table 4-11: Dirty Water Containment facility volume requirements for 1:50 year flood event (Highlands Hydrology 2012)

Catchment	a (m)	B (m)	Average Longitudinal Slope
Clean Water A	0.5	1.2	1:500
Clean Water B	0.7	1.8	1:500

It must be understood that the minimum storage volumes as presented in Table 4-11 are based purely on a single 1:50 year storm event and do not include the storage of any process water, anticipated average rainfall/runoff, spillages, wash water or the like. The stormwater dams will therefore need to be operated empty

to comply with GN 704. It is recommended that additional capacity is considered during the detailed design phase of the project.

Surface water monitoring

Sibanye-Stillwater has an existing surface water monitoring plan in place and the surface monitoring is being undertaken by a subcontractor.

Groundwater monitoring

Sibanye-Stillwater has an existing groundwater monitoring plan in place and the groundwater monitoring is being undertaken by a subcontractor.

Domestic wastewater management

In order to manage waste water at the shaft, K4 shaft has an existing waste water treatment works situated in the northern complex of the shaft and was commissioned in 2001. The treated water is then returned to the K4 Plant and re-used in the concentrating process and therefore no water is discharged from the works.

Site specific water management.

Existing Surface and Groundwater management plans will be used to monitor the water during construction and operational phases of the new proposed development of the PCD and associated infrastructure. Stormwater management will tie into the existing SWMP on site. The construction of the v-drain catchment berm around the current footprint of the approved WRD will manage and contain the dirty water run-off from the WRD to ultimately comply with GN704 regulations in terms of Storm Water Management.

4.2.2.7 Non-mineral waste management

Waste management on-site

Sibanye-Stillwater has a waste management procedure in place that will be utilised. WPL do have permitted landfill sites that have recently been mothballed. The Karee waste disposal site is situated within the WPL MRA and is classified as GSB (a site that accepts general waste not exceeding 150 tons per day and which will not produce any significant leachate). This site has been operational since 1991 with an estimated lifetime of 40 years. The reason the site has been mothballed is to consolidate resources and infrastructure to one landfill site operated by WPL. Only one site was operated by WPL and that includes the Mooinooi landfill site

“In addition to waste monitoring on site, SS operates in line with their Waste Management Procedure with document reference: SS-ZA-PGM’s-PRO-ENV-ALL-0001. The procedure provides for the minimisation of waste generation waste sorting, storage, handling, transportation, reuse, recycling, treatment, and disposal of hazardous and general waste generated from all activities, products and services at Sibanye-Stillwater Platinum Segment. It is also to set a standard of continuous improvement of waste management practices towards sustainable environmental performance. The aim is thus to prevent pollution as a result of incorrect waste disposal practices as well as incorrect storage of waste and to comply with applicable legal and other identified requirements that Sibanye-Stillwater subscribes to.” (IWWMP – AVDE 2022).

Waste Monitoring

The following waste monitoring activities are being undertaken at WPL inclusive of the K4 Shaft and was obtained from the WPWL/EMPr (compiled by SEF, 2012).

The main overall waste management standards adopted by WPL are described below, followed by the specific standards applied for hazardous waste management.

- Strive for zero waste;
- Only permitted landfill sites to be used for the disposal of waste and licensed treatment facilities to be used to treat waste;
- Design and operate waste management facilities according to regulatory and company standards (including placement of skips on concrete floors with bunding and storm-water management);
- Auditing systems are in place to ensure waste management standards are followed;

- Effective recording of waste generated, recycled, reused, and sent off-site takes place and records maintained, with the official metric recording units to be used being tons or kilograms;
- Maintain a register of significant environmental impacts associated with waste;
- Reputable waste management contractors will be used to collect and dispose/treat waste, ensuring that waste manifests and disposal certificates are received from contractors;
- Auditing of contractor waste facilities will take place at least once a year;
- The precautionary principle will be used in cases where waste is unclassified, and this material will thus be seen as highly hazardous and toxic until proven otherwise;
- Each business unit will be set waste reduction targets and indicators used to monitor performance;
- Promotion of cleaner production technologies and establish mechanisms to implement identified waste reduction measures;
- Centralisation of storage and handling facilities prior to external transport;
- Hazardous and general wastes must be segregated to prevent contamination of the latter;
- Prevention of unnecessary waste generation;
- Waste management policies and strategic documentation will be reviewed at least every four years; and
- Facilitation of waste management systems in the Greater Sibanye--Stillwater Community together with municipalities to promote clean, healthy environments.

The main hazardous waste management standards are highlighted as follows

- Fluorescent tubes: all of the business units have standards for this waste as included in their respective waste management procedures which stipulate that fluorescent tubes are to be kept intact and placed in specially designed fluorescent tube drums with crushing caps and crushed in these drums;
- Waste Disposal: the procedures stipulate that hazardous waste will only be disposed of at a registered hazardous waste disposal facility as well as specifying the segregation of hazardous waste into two categories to allow for separate disposal at these to landfill sites;

The following waste monitoring activities (Table 4-12) are being undertaken at WPL inclusive of the K4 Shaft (IWWMP – AVDE, 2022).

Table 4-12: Waste Monitoring Activities (IWWMP – AVDE, 2022)

Indicator	Definition	Period	Unit
Non-hazardous waste to landfill	Refer to applicable legislation for classification of waste as non-hazardous. Total volume of non-hazardous waste material accepted into licensed landfill sites (whether managed by the operation itself or by a third party) designed and operated to contain the wastes and resultant products in a manner compliant with legislation or internationally accepted practice.	Quarterly	Cubic Metres
Soil Hazardous Waste	Refer to applicable legislation for classification of solid waste as hazardous. Total quantity of hazardous waste material accepted into licensed hazardous waste sites designed and operated to contain the wastes and resultant products in a manner compliant with legislation or internationally accepted practice	Quarterly	Cubic Metres
Liquid hazardous Waste	Refer to applicable legislation for classification of liquid waste as hazardous. Total quantity of hazardous waste material (excluding hydrocarbons which is captured under “Used oil/grease sent for recycling” and “Re-used oil/grease”) accepted into licensed hazardous waste sites designed and operated to contain the wastes and resultant products in a manner compliant with legislation or internationally accepted practice	Quarterly	Litres

Indicator	Definition	Period	Unit
Cardboard / Paper sent for recycling	Quantity of paper removed from the operation (whether sold or donated) for use by a third-party paper-recycling enterprise.	Quarterly	Tonnes
Metal Recycling	Quantity of metal removed from the operation (whether sold or donated) for use by a third-party metal-recycling enterprise.	Quarterly	Tonnes
Lead acid batteries sent for recycling/re-use	Quantity of lead-acid batteries removed from the operation (whether sold or returned) for use by a third-party re-use or recycling enterprise.	Quarterly	Number
Industrial Plastic sent for recycling/re-use	Quantity of plastic removed from the operation (whether sold or donated) for use by a third-party plastic re-use or recycling enterprise.	Quarterly	Tonnes
Toner/Ink Cartridges sent for recycling	Number of recycled printer cartridges, irrespective of the type of cartridge, removed from the operation for use by a third-party cartridge re-use or recycling enterprise.	Quarterly	Number
E-waste: Electrical and electronic items sent for recycling/re-use	Quantity of electrical, electronic and computer components removed from the operation for use by a third-party re-use or recycling enterprise.	Quarterly	Tonnes
Used oil sent for recycling	Quantity of used oil removed from the operation (whether sold or donated) for use by a bona fide used-oil recycling enterprise. This excludes oil contaminated by PCBs, which must be disposed of as hazardous waste.	Quarterly	Litre

Waste minimisation and recycling

SS operates in line with their Waste Management Procedure, document reference: SS-ZA-PGM's-PRO-ENV-ALL-0001. The procedure provides for the minimisation of waste generation waste sorting, storage, handling, transportation, reuse, recycling, treatment, and disposal of hazardous and general waste generated from all activities, products and services at Sibanye-Stillwater Platinum Segment. (IWWMP – AVDE, 2022)

4.2.3 Production rate and Life of Mine

SS intends to expand the life of mine for the K4 Shaft with approximately 30 years and the Annual estimated tonnages to be mined within the extended LOF is indicated in Figure 4-6.

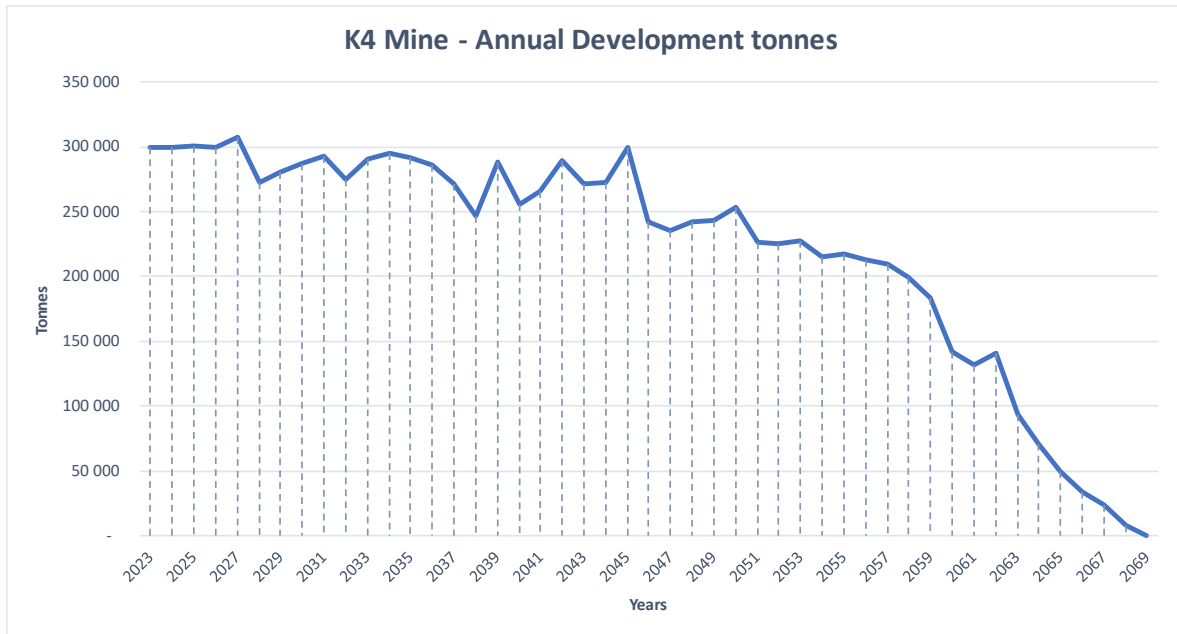


Figure 4-6: K4 Shaft Annual proposed Development in tonnes.

4.3 New Proposed Infrastructure

WPL is in the possession of an approved water use licence as well as an approved EMPr. A stormwater assessment has been undertaken in 2019 to determine the sufficient management of stormwater in and around the K4 Shaft. It was determined that additional stormwater management infrastructure must be constructed and implemented around the current WRD in order to contain the dirty water runoff. It is the intention of WPL to implement the following stormwater management infrastructure:

- Construction of a V-drain catchment berm
- Construction of a PCD
- Construction of a pipeline from the PCD to the Shaft
- Construction of an emergency spillway at the PCD

The proposed infrastructure is described in the sections below.

Waste Rock Dump, berm, and channels:

A V-drain catchment berm will be constructed around the current WRD. The planned total/final WRD footprint will stretch over an area of 203 830 m² (20,38 ha). This WRD footprint area has already been authorised in the WPL EMPr (reference: NW30/5/1/2/3/2/2/105).

The berm will be 1 353 meters in length and 10.83 meters wide with a total catchment area to accommodate the planned final WRD footprint area of 203 830 m². The estimated completion of the work is 10 years – for phase 1 only. The berm length west of the WRD will be 550 m, and the berm length east of the WRD will be 600 m in length with an average width of 10.83 m throughout the entire V-drain channel.

Pollution Control Dam

A Pollution Control Dam (PCD) will be constructed north of the current WRD and will be constructed to have a total capacity of 35 203 m³ with a maximum height of 3 m from the floor of the dam. The PCD will be constructed from 1 m below ground level. Since the function of the PCD is to contain all the dirty water runoff from the WRD, the PCD will be lined with a Class C liner in order to prevent the seepage of the dirty water to the groundwater aquifer.

The V-drain will discharge via 2 legs into the PCD through gravitational flow. The trapezoidal channels at the PCD will have a maximum flow of 6 452 l/s from the east leg. This is to accommodate the 1:100-year storm event and an emergency spillway will be constructed should the PCD overflow. Both channels, where the V-drain discharges into the PCD, will have an estimated flow of 2 500 l/s/ leg.

Pipelines

A Pipeline will be constructed from the PCD to the Shaft area in order to transport the water in the PCD to existing reservoirs on the shaft for re-use. The pipeline will be 500m in length with a total pump capacity of 60m³/hour, and the pipeline will be a 110 OD HDPE line, sized to empty the dam for a 1:20 year Average Recurrence Interval (ARI) over 14 days of continuous operation.

Please see Figure 3-1 for the Locality Map and Figure 3-2 for the project layout.

Specialist assessments

A vegetation assessment was undertaken by Agreenco, and it was determined that approximately 13ha of indigenous vegetation will need to be cleared for the construction of the PCD and continued disposal of waste rock material on the approved WRD footprint area. The proposed channel and berm around the approved WRD and the pipeline from the PCD to the Shaft covers approximately 8.5 and 0.3 ha respectively and are considered linear activities.

In terms of the North West Biodiversity Sector Plan, and the classification of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), the planned disturbance will have the following impacts on indigenous vegetation:

- PCD – 3.6 ha of CBA 2/ESA 1
- PCD Pipeline – 0.85 ha of CBA 2/ESA 1 (linear infrastructure)
- WRD – 8.8 ha of CBA 2/ESA 1 (authorised in current EMPr)
- WRD Channel and berm – 7.72 ha of CBA 2/ESA 1 and 0.78 ha of ESA 2 (linear infrastructure)

Although a total of approximately 21,72 ha of indigenous vegetation will be affected, only ~13 ha needs environmental authorisation. Refer to **Error! Reference source not found.** for a map of the relevant CBA/ESA areas.

Other

Since the current WRD has been initiated by the previous owner, existing roads are used to maintain and manage activities at the WRD. In order to maintain and implement the proposed infrastructure, no new roads will be developed as existing roads will be used around the WRD.

No new powerlines will be constructed as existing powerlines will be utilised should power be required during the construction activities

4.4 Description of the proposed activities for the K4 Shaft PCD Project

4.4.1 Construction phase

The construction phase for the PCD and associated infrastructure will take approximately 18 months to complete. During the construction phase, surface preparations of the project area will be done by vegetation clearing and compaction. A laydown area for the receipt, temporary storage, and assembly of construction equipment and other supplies will be demarcated.

The following infrastructure will be constructed for the K4 Shaft PCD project:

- Fencing

- Construction laydown area
- Pollution control dam
- V-drain catchment berm
- Pipeline from the PCD to the shaft

Table 4-13 details the proposed surface infrastructure to be constructed as part of the K4 Shaft PCD project. The site layout plan is shown in Table 4-13.

Table 4-13: Proposed infrastructure for the K4 Shaft PCD project

Proposed infrastructure	Description
Surface infrastructure	
Roads	No new roads will be constructed as existing roads will be utilised during construction
Power	No new powerlines will be constructed as power necessary for construction will be derived from the shaft as the laydown area is in very close proximity to the shaft.
Pipelines	A Pipeline will be constructed to transport the water contained in the proposed PCD, back to the shaft for re-use in the shaft processes. The pipeline will be 500m in length with a total pump capacity of 60m ³ /hour, and the pipeline will be a 110 OD HDPE line, sized to empty the dam for a 1:20 year ARI over 14 days of continuous operation.
Fencing	The PCD and V-drain berm will be fenced off with warning signs so as to warn people to not enter the premises.
Berms	A V-drain berm will be constructed around the current footprint of the approved WRD. The V-drain will be 1 353 meters in length and 10.83 meters wide with a total catchment area to accommodate the planned final WRD footprint area of 203 830 m ² . The berm length West of the WRD will be 550 m, and the berm Length East of the WRD will be 600 m in length with an average width of 10.83 m throughout the entire V-drain channel
Buildings	<u>Offices</u> Now new offices will be constructed. But a temporary office will be placed in the lay-down area for the contractors conducting the construction activities. This facility will be non-permanent, prefabricated structures and will be placed on hard standing. <u>Workshops</u> No workshops will be required. <u>Wash bays:</u> No wash bay will be required. The current K4 Shaft wash bay will be utilised if required.
Laydown area	A laydown area will be required during the construction phase. The laydown area will not require earthworks, berms, clean and dirty water separation as it will be refurbished structures for offices. The laydown area will be of steel re-enforced concrete for placement of refurbished offices portable ablution facilities
Stockpiles	
Topsoil stockpile	Topsoil will be removed and stockpiled separately from the overburden, and it will be used to rehabilitate the area when closure is taking place.
Waste rock dump	The current footprint of the authorised WRD will be used to stockpile the residue from the mining activities. No new WRD will be constructed.
Waste management facilities	

Proposed infrastructure	Description
General waste	General waste (including domestic waste, paper, plastic, and scrap steel) will be stored in skips to be placed on a concrete bunded area. Skips will be placed in the construction laydown area.
Water pollution management facilities	
Pollution Control Dam (PCD)	A pollution control dam will be constructed with a capacity of approximately 35 203 m ³ with a maximum height of 3 m from the floor of the dam. The PCD will be constructed from 1 m below ground level. Since the function of the PCD is to contain all the dirty water runoff from the WRD, the PCD will be lined with a Class C liner in order to prevent the seepage of the dirt water to the underground. A Water from the PCD will be transported to the Shaft for re-use as to operate the facility as empty.
Sewage treatment plant	No sewage treatment plant will be required.
Ablution facilities	The current facilities at the K4 Shaft will be utilised. Portable ablution facilities will also be used should the facilities at the shaft be out of reach.

4.4.2 Operational phase

The proposed activities include the construction of infrastructure to support stormwater management around the approved footprint of the WRD.

Dirty water runoff from the WRD will collect via natural flow in the v-drain catchment berm where it will be transport via gravitational feed to the PCD situated north of the WRD. The berm will discharge into the PCD via two legs and the water collecting in the PCD will be transported via the pipeline back to the shaft for re-use.

Waste rock from the shaft will be transported via a conveyor belt to the WRD and continuous disposal will occur throughout the operational phase. Figure 4-6 indicates the planned development in tonnes for the planned extended LOM.

Ore will be processed at the K4 concentrator situated west of the project area and south of the shaft.

No new stockpiles will be created or constructed.

4.4.3 Closure phase

At closure or at Life of Mine (LOM), a WRD will unavoidable have been established due to the fact that the material cannot be transported back underground. The WRD will be rehabilitated and vegetated in order to minimise the visual impact of the WRD to the surrounding area.

All infrastructure including the V-drain catchment berm, conveyor belt, PCD, pipeline and emergency spillway will be demolished, and the area rehabilitated by ripping and revegetating the area to be able to deliver an area as close as possible to the natural state. The PCD will be decommissioned and demolished after which rehabilitation will take place to restore the area as far as possible to its original state. The PCD can only be decommissioned once the WRD have been fully rehabilitated.

Closure Plan

Please see **Appendix C5** for a Closure Plan compiled by Hydrological Environmental Engineering Solutions (HEES, 2023). The closure cost currently allows for the decommissioning and demolishing of the PCD and to rehabilitate the area up to its original state. However, al alternative option would be to fence off the farm and donate it for use to the community for stock watering.

4.5 Listed and specified activities

4.5.1 Listed and specified activities associated with the proposed K4 Shaft PCD

The Table below (Table 4-14) provides a description of the triggered listed activities as identified per the Listing Notices in accordance with the National Environmental Management Act (Act 107 of 1998) (NEMA).

In terms of the section 24(5) read with section 44 of the Act, Environmental Impact Assessment Regulations have been published that provides a list of activities that may require either a Basic Assessment (BA) or a full Scoping and Environmental Impact Assessment (EIA) process to be followed.

- Government Notice No. 983 in Gazette No. 38282 on 4 December 2014, as amended on 7 April 2017 in Gazette No. 40772 as Government Notice No. 327 - Listing Notice 1;
- Government Notice No. 984 in Gazette No. 38282 on 4 December 2014, as amended on 7 April 2017 in Gazette No. 40772 as Government Notice No. 325 – Listing Notice 2; and
- Government Notice No. 985 in Gazette No. 38282 on 4 December 2014, as amended on 7 April 2017 in Gazette No. 40772 as Government Notice No. 324 – Listing Notice 3;

Table 4-14: Listed and identified activities

Name of the activity	Aerial extent of the activity	Listed activity	Applicable listing notice	Waste management authorisation.
<p><i>“The development and related operation of infrastructure exceeding 1000m in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge, or slimes-</i></p> <p><i>(ii) with a peak throughput of 120 litres per second or more,”</i></p> <ul style="list-style-type: none"> • The V-drain catchment berm will be 1353 meters in length and 10,83m wide. The V-drain discharges into the PCD with trapezoidal channels with a max flow of 6452 l/s. Both legs will accommodate a max flow of 2 500 l/s for a 1:100 year storm event. 	~8.5 ha	Activity 10	GN 983	N/A
<p><i>“The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance is required for...”</i></p> <ul style="list-style-type: none"> • Approximately 13 ha additional of indigenous vegetation will be cleared to construct the PCD and WRD 	~13 ha	Activity 27	GN983	N/A
<p><i>“The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or</i></p>	~4 ha	Activity 6	GN 984	N/A

Name of the activity	Aerial extent of the activity	Listed activity	Applicable listing notice	Waste management authorisation.
<p><i>licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent,</i></p> <ul style="list-style-type: none"> A S21 (g) Water Use licence is required for the Pollution Control Dam 				
<p><i>“The clearance of an area of more than 300m² or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan”</i></p> <p>North-West</p> <p><i>(i) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority”</i></p> <ul style="list-style-type: none"> Approximately 13 ha additional of indigenous vegetation will be cleared to construct the PCD and WRD 	~13 ha	Activity 12	GN 985	N/A

From the above-mentioned triggered activities, a full Scoping and Environmental Impact Reporting (S&EIR) process will be undertaken to obtain environmental authorisation in terms of the NEMA.

4.6 Future Water Uses to be applied for as part of the new proposed infrastructure

In terms of the National Water Act (Act 36 of 1998) (NWA), Section 21 identifies several consumptive and non-consumptive Water Uses:

- 21(a): Taking water from a water resource.
- 21(b): Storing water
- 21(c): Impeding or diverting the flow of water in a watercourse.
- 21(d): Engaging in a stream flow reduction activity.
- 21(e): Engaging in a controlled activity.
- 21(f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, or other conduit.
- 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource.
- 21(h): Disposing in any manner of water which contains waste from, or which has been heated in any industrial or power generation process.
- 21(i): Altering the bed, banks, course, or characteristics of a watercourse.
- 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.

- 21(k): Using water for recreational purposes.

WPL will be applying for the following Water Uses for the K4 Shaft as set out under Section 21 of the National Water Act (Act 36 36 of 1998) in parallel with the submission of the to the DMRE. Please refer to Table 4-15. The public participation process and specialist studies in support of the Impact Assessment will support the Water Use Licence Application process as well as the environmental authorisation process.

Table 4-15: Anticipated S21 Water Uses

Section 21 Water Use	Activity which requires the Water Use Licence
(c) and (i) Impeding or diverting the flow of alter in a watercourse; And Altering the bed, banks, course, or characteristics of a watercourse	V-drain catchment berm situated within 100m or a regulated area.
(g) Disposing of waste in a manner which may detrimentally impact on a water resource	Construction of a Pollution Control Dam with an estimated capacity of 35 203 m ² .
	Construction of a V-drain catchment berm around the WRD
	Waste Rock Dump

An application will be made for a S21(c) and S21(i) as the project area is situated within the 100 meter regulated zone of the Sterkstroom river east of the project area and hence, requires a S21(c) and S21(i) Water Use. Kindly refer to Appendix C3 for the Wetland Delineation and Assessment undertaken and the recommendations of the specialist.

This application will support the construction of the PCD, pipeline, V-drain catchment berm and emergency spillway that aims to confine all the dirty-water runoff from the WRD. The water will be pumped through the pipeline to the shaft for re-use.

5 Policy and legislative context

An overview of the policy and legislative context applicable to the proposed K4 Shaft PCD and associated infrastructure project is described below.

5.1 The Constitution of the Republic of South Africa (Act 108 of 1996)

The Constitution of South Africa compels all to ensure the rights of South African citizens. Section 24 of the constitution provides: Everyone has the right:

- to an environment that is not harmful to their health or well-being;
- to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that
- prevent pollution and ecological degradation;
- promote conservation; and
- secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

This right is binding on the state and people, both natural and juristic. Sustainable development is the cornerstone of South Africa's environmental law regime.

In fulfilment of its constitutional mandate to take reasonable legislative measures that give effect to section 24 of the Constitution, the government has promulgated several environmental laws since 1994. These laws provide a legal framework that embodies internationally recognized legal principles. The principal act governing activities that affect the environment is the National Environmental Management Act, No 107 of 1998 (NEMA).

5.2 The Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) as amended on 21 April 2009

The fundamental principles of the Act are:

- Mineral resources are non-renewable;
- Mineral resources belong to the nation and the State is the custodian;
- Protection of the environment for present and future generations to ensure sustainable development of the resources by promoting economic and social development;
- The need to promote local and rural development of communities affected by mining;
- Reformation of the industry to bring about equitable access to the resources and eradicating discriminatory practices; and
- Guaranteeing security of tenure.

The purpose of this report is to support the application for the consent of the Minister in terms of Section 22 of the Act as to lawfully proceed with the commencement of mining and mining related activities.

Section 22 of the MPRDA addresses mining rights. This section states:

Rights and obligations of holder of mining right

"25 (1) In addition to the rights referred to in Section 5, the holder of a mining right has, subject to section 21, the exclusive right to apply for and be granted a renewal of the mining right in respect of the mineral and mining area in question

(2) The holder of a mining right must –

(e) comply with the requirements of the approved environmental management programme;"

'38 Th holder of a reconnaissance permission, prospecting right, mining right, mining permit or retention permit,

(c) manage all environmental impacts –

(i) in accordance with his or her environmental management plan or approved environmental management programme, where appropriate”

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

The National Environmental Management Act (NEMA) is the environmental framework legislation promulgated to ensure that the environmental rights contemplated in Section 24 of the constitution of South Africa (Act 108 of 1996) are realized. NEMA sets out:

- The fundamental principles that need to be incorporated in the environmental decision-making process;
- The principles that are necessary to achieve sustainable development;
- Provides for duty of care to prevent control and rehabilitate the effect of significant pollution and environmental degradation;
- It allows for the prosecution of environmental crimes.

In terms of the section 24(5) read with section 44 of the Act, Environmental Impact Assessment Regulations have been published that provides a list of activities that may require either a Basic Assessment (BA) or a full Scoping and Environmental Impact Assessment (EIA) process to be followed.

- Government Notice No. 983 in Gazette No. 38282 on 4 December 2014, as amended on 7 April 2017 in Gazette No. 40772 as Government Notice No. 327 - Listing Notice 1;
- Government Notice No. 984 in Gazette No. 38282 on 4 December 2014, as amended on 7 April 2017 in Gazette No. 40772 as Government Notice No. 325 – Listing Notice 2; and
- Government Notice No. 985 in Gazette No. 38282 on 4 December 2014, as amended on 7 April 2017 in Gazette No. 40772 as Government Notice No. 324 – Listing Notice 3;

The triggered listed activities associated with this project is identified and described in Section 6.

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

The purpose of the National Water Act (Act 36 of 1998) (NWA) is to ensure that the nation’s water resources are protected, used, developed, conserved, managed, and controlled. Use of water for mining and related activities is also regulated through regulations that were updated after the promulgation of the NWA (Government Notice No. GN704 dated 4 June 1999). Sections 40 and 42 of NWA provides for the responsible authority to request public participation and an assessment of the likely effect of the proposed license for the protection, use, development, conservation, management, and control of the water resource.

The following chapters of the NWA are of importance:

- Chapter 3, Part 4 states that anyone who owns, occupies, controls, or uses land is deemed responsible for taking measures to prevent pollution of water resources.
- Chapter 4 deals with water use regulation.
- Chapter 12 deals with water management in terms of dam safety.
- Section 19 deals with water management at mines in terms of pollution prevention and control.
- Section 21 defines the water uses requiring authorization.
- Section 26 (1) provides for the development of regulations requiring monitoring, measurement and recording as well as the effects to be achieved through management practices prior to discharge or disposal.

Section 21 of the NWA defines 11 consumptive and non-consumptive water uses. The possible water uses triggered through the development is further discussed in Section 3

Water uses that are not permissible in terms of Schedule 1 of the NWA need to be authorized under a tiered authorization system as a General Authorization in terms of the General Authorizations as published under section 39 of the NWA or as a water use licence, as provided for in terms of section 21 of the NWA.

The authorization system allows for the “Reserve” and provides for public consultation processes in the establishment of strategies and decision making and guarantees the right to appeal against such decision.

Section 27 of the NWA specifies that the following factors regarding water use authorisation be taken into consideration:

- The efficient and beneficial use of water in the public interest.
- The socio-economic impact of the decision whether to issue a licence.
- Alignment with the catchment management strategy.
- The impact of the water uses, and possible resource directed measures; and.
- Investments made by the applicant in respect of the water use in question.

The NWA introduced the concept of Integrated Water Resource Management (IWRM), comprising all aspects of the water resource, including water quality, water quantity and the aquatic ecosystem quality. The IWRM approach provides for both resources directed, and source directed measures. Resource directed measures aim to protect and manage the receiving environment, whilst source directed measures aim to control the impacts at source.

5.5 Existing Lawful Water Uses

The National Water Act, 1998, defines Existing Lawful Water Use (ELU) as follows:

Section 32 states the following:

- (1) An existing lawful water use means a water use—
 - (a) which has taken place at any time during a period of two years immediately before the date of commencement of this Act, or
 - (b) which has been declared an existing lawful water use under section 33, and which—
 - (c) was authorized by or under any law which was in force immediately before the date of commencement of this Act;
 - (i) is identified as a stream flow reduction activity in section 36(1); or
 - (ii) is identified as a controlled activity in section 37(1).
- (2) the case of—
 - (a) a stream flow reduction activity declared under section 36(1); or
 - (b) a controlled activity declared under section 38.

existing lawful water use means a water use which has taken place at any time during a period of two years immediately before the date of the declaration.

Section 34 of the Act states that a person can continue with an existing lawful water use in terms of the following:

- (1) A person, or that person's successor-in-title, may continue with an existing lawful water use, subject to-
 - (a) any existing conditions or obligations attaching to that use;
 - (b) its replacement by a licence in terms of this Act; or
 - (c) any other limitation or prohibition by or under this Act.

A responsible authority may subject to any regulation made under section 26(1)(c) require the registration of an existing lawful water use.

WPL is the holder of an existing lawful water uses namely:

- Water Use Licence No: 01/A21K/ABCEFGIHIJ/620 dated 22 February 2022 which permits the use of water per annum as well as the disposal of waste on the WRD for the K4 Shaft for mining purposes (Table 5-1).

Table 5-1: K4 Shaft existing water uses

Properties	Description of activity	Purpose	Capacity (m ³)	Co-ordinates
Section 21 (a)				
Zwartkoppies 296 JQ Portion 33	Taking water from K4 Shaft Removing Ground Water	For re-use at the SS operations	2 900 000 m ³ /a	S25°40'6.54" E27°28'13.80"
Section 21 (g)				
Rooikoppies 287 JQ Portion RE36, 37,38,47,RE39	Disposal of waste. Waste rock from the operations onto the K4 Shaft Waste Rock Dump	For disposal (storage) or re-use	540 000 tons/a	S25°40'16.5" E27°27'24.56"

5.6 Regulations on the use of water for Mining and related activities aimed at the protection of water resources - GN704 dated 4 June 1999

The Minister of Human Settlement, Water and Sanitation (HSWS) is responsible for the protection, use, development, conservation, management, and control of the water resources of South Africa on a sustainable basis. The requirements prescribed in terms of the regulations must be seen as minimum requirements to fulfil this goal.

In terms of Regulation 3, the following Exemptions will be required (Table 5-2):

Table 5-2: GN704 Exemption Requirements

GN 704	Condition	Applicability Western Platinum Mine
4 a	Locate or place any residue deposit, dam, reservoir, together with any associated structure within 1:100 year flood-line or within a horizontal distance of 100 m of a watercourse or borehole, excluding boreholes drilled specifically to monitor the pollution of ground water, or on ground likely to become water-logged, undermined, unstable or cracked	Exemption required – V-drain catchment berm is located within 100 m horizontal distance from the origin of the Sterkstroom river and is situated approximately 95 m from the Riparian habitat/zone of the river. Other mining related infrastructure will be located outside the 100m horizontal distance from the Sterkstroom river and outside of the 1:100 year flood line and Riparian Habitat

The K4 Shaft PCD and associated infrastructure is applied for Environmental Authorisation in order to comply with the regulations as stipulated in Section 4.5

5.7 National Environmental Management Air Quality Act, 2008 (Act 39 of 2004) as amended (AQA)

In South Africa ambient air quality is regulated in terms of the National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM: AQA), the Air Quality Amendment Act (Act No. 20 of 2014) and supporting regulations.

Section 21 of the NEM: AQA requires that the Minister publish a list of activities which result in atmospheric emissions which the Minister believes to have or may have a significant detrimental effect on the environment, including health, social conditions, economic, ecological or cultural heritage effects. These activities are deemed “Listed Activities”. Listed Activities and associated Minimum Emission Standards (MES) were published in 2010 in Government Notice 248 (DEA, 2010) and revised in Government Notice 893 (DEA, 2013a), and again in Government Notice 1207 of 31 October 2018 (DEA, 2018a).

The consequence of conducting a “Listed Activity” is described in Section 22 of the NEM: AQA, i.e., that no person may conduct a Listed Activity without a provisional Atmospheric Emission License or an Atmospheric Emission License (AEL). None of the activities applied for required an AEL.

5.8 National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA)

The National Heritage Resources Act (NHRA) controls the protection and management of South Africa’s heritage resources.

Section 38 of the NHRA requires that:

Heritage Impact Assessments (HIA’s) are required for certain kinds of developments such as rezoning of land greater than 10,000 m² in extent or exceeding three or more sub-divisions, or for any activity that will alter the character of a site greater than 5,000 m². The South African Heritage Resources Agency (SAHRA) administers heritage in the province particularly where archaeology and palaeontology are the dominant concerns.

The responsible heritage resources authority must, within 14 days of receipt of such a notification if there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report or notify the person concerned that this section does not apply.

Section 62 of the Act states the following:

- (a) *The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;*
- (b) *the construction of a bridge or similar structure exceeding 50 m in length;*
- (c) *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*
or
 - i. *involving three or more existing erven or subdivisions thereof; or*
 - ii. *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - iii. *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resource authority;*
- (d) *the re-zoning of a site exceeding 10 000 m² in extent; or*
- (e) *any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.*

Burial grounds and graves

A Section 36 permit application is made to the South African Heritage Resources Agency (SAHRA) in cases where burial grounds and graves are to be disturbed/relocated/encroached upon. In addition to this permit, many

other local and national approvals are required, should graves be relocated. SAHRA protects burial grounds and graves that are older than 60 years and must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. SAHRA must also identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the conditions listed below.

Section 36 states the following:

- (1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.
- (2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1) and must maintain such memorials.
- (3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—
 - (a) *Destroy, damage, alter, exhume, or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves.*
 - (b) *destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or*
 - (c) *bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals;*
 - (d) *SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant.*

Archaeology, Palaeontology and Meteorites

According to Section 35 (Archaeology, palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the South African National Heritage Resources Act (SAHRA), Paleontological Heritage Impact Assessments (PIAs) and Archaeological Impact Assessments (AIAs) are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistoric and the historic period.

Depending on the sensitivity of the fossil and archaeological heritage, and the scale of the development concerned, the paleontological, and archaeological impact assessment required may take the form of (a) a stand-alone desktop study, or (b) a field scoping plus desktop study leading to a consolidated report. In some cases, these studies may recommend further paleontological and archaeological mitigation, usually at the construction phase. The responsible heritage management authority endorses the recommendations of the specialist reports.

As part of the EIA, a Heritage Impact Assessment will be submitted to Heritage Resource Council (HRC) to elicit comments. Comments received from HRC will be included in the Comments and Responses Report (Table 9-2).

5.9 Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)

The objects of this Act are to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants

Removal of the alien and weed species encountered in the application area must take place in order to comply with existing legislation (amendments to the regulations under the CARA, 1983 and Section 28 of the NEMA, 1998). Removal of species should take place throughout the construction and operation and closure phases of the project.

The Act categorizes weeds into three categories, with varying degrees of action required for each category of weeds.

5.10 National Environmental Management: Biodiversity Act, 2008 (Act No 10 of 2004)

The National Environmental Management: Biodiversity Act (NEMBA) serves to provide a framework for the management and conservation of South African biodiversity, under the auspices of the NEMA. This legislation promotes the sustainable use of natural biological resources, ensuring equitable access and sharing of benefits arising from the use of biological resources. In terms of Section 56(1) of NEMBA a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7. These threatened and protected species have been listed in terms of GNR.151 of 2007: Publication of lists of critically endangered, endangered, vulnerable, and protected species. A restricted activity in relation to a specimen of a listed threatened or protected species means:

- hunting, catching, capturing or killing any living specimen of a listed threatened or protected species by any means, method or device whatsoever, including searching, pursuing, driving, lying in wait, luring, alluring, discharging a missile or injuring with intent to hunt, catch, capture or kill any such specimen;
- gathering, collecting, or plucking any specimen of a listed threatened or protected species;
- picking parts of, or cutting, chopping off, uprooting, damaging, or destroying, any specimen of a listed threatened or protected species;
- importing into the Republic, including introducing from the sea, any specimen of a listed threatened or protected species;
- exporting from the Republic, including re-exporting from the Republic, any specimen of a listed threatened or protected species;
- having in possession or exercising physical control over any specimen of a listed threatened or protected species;
- growing, breeding or in any other way propagating any specimen of a listed threatened or protected species, or causing it to multiply;
- conveying, moving, or otherwise translocating any specimen of a listed threatened or protected species;
- selling or otherwise trading in, buying, receiving, giving, donating, or accepting as a gift, or in any way acquiring or disposing of any specimen of a listed threatened or protected species; or
- any other prescribed activity which involves a specimen of a listed threatened or protected species.

Should a project result in the loss of biodiversity identified in terms of GN 151 of 2010, a permit application will need to be submitted to the Provincial Department of Environment and Nature Conservation for approval, before proceeding with the activity.

Biological diversity, or biodiversity, is a term which encapsulates the 'variety of life'. According to the formal definition of biodiversity, as captured in the International Convention on Biological Diversity and the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA), this includes the "variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and includes diversity within species, between species and of ecosystems".

Spatial biodiversity planning helps planners identify the most important areas for conserving a representative spread of ecosystems and species, for maintaining ecological processes, and for providing ecosystem services

(SANBI, 2013). There are several possible approaches to biodiversity planning, which are based on three key principles:

- The need to conserve a representative sample of biodiversity pattern, such as species and habitats (the principle of representation).
- The need to conserve ecological and evolutionary processes that allow biodiversity to persist over time (the principal of persistence).
- The need to set quantitative biodiversity targets that tell us how much of each biodiversity feature should be conserved in order to maintain functioning landscapes.

Biodiversity is the source of a wide range of ecosystem goods and services that are of enormous benefit to society. The loss of biodiversity will likely lead to the loss of critical ecosystem services that support the province's economy and others required for human survival. This in turn will have severe cost implications for restoring such ecosystems or implementing artificial methods to perform the same services offered freely by the natural environment. Biodiversity loss also tends to spark a negative spiral of progressive ecosystem deterioration and further biodiversity loss due to the destabilization of ecosystem integrity. Habitat loss, fragmentation, bush encroachment, invasive alien infestations and species losses are all consequences of a reduction in biological variability. Loss of ecosystem integrity determines how the natural system functions and the type and quality of ecosystem services it can provide in future.

A Terrestrial Biodiversity Impact Assessment was undertaken for this project and the specialist identified that there are minimal to no impacts on biodiversity in the vicinity of the project.

6 Need and desirability of the proposed activities

SS continued with mining related activities at the K4 shaft in 2023. The current footprint for the WRD is authorised as 30 ha in the 2012 consolidated EMPr. WPL is planning to extend the life of mine with approximately 30 years. In order to achieve this extended LOM, additional licences and environmental authorisations are required since the current WPL EMP only authorises the footprint of the current WRD but not the implementation of additional stormwater management infrastructure for the containment of dirty water runoff. A stormwater risk assessment was undertaken to determine the hydrological condition of the site. In summary, the findings of this report are described below:

- The existing storm water infrastructure present on site is not sufficient for total water management;
- Although some storm water infrastructure is present on site, it is only partially sufficient for water management at the Shaft.
- Additional proposed stormwater infrastructure is required to fully support stormwater management at the current WRDS. (Storm Water Solutions (SWS); 2019).

Therefore, the construction of the V-drain catchment berm around the current WRD footprint, the PCD, the pipeline and spillway will be to support the current and future dirty water runoff from the WRD. The berm is constructed around the entire/total footprint area for the extended LOM, to accommodate future dirty water runoff from the WRD as the WRD becomes bigger.

Social

K4 Shaft will create significant value for all stakeholders for many decades, providing more than 4,000 direct jobs over its operating life and meaningful opportunities for local businesses, developing small and medium enterprises, as well as ensuring significant local economic development and skills transfer for local communities.

7 Description of the process followed to reach the preferred site

The National Environmental Management Act (Act No. 107 of 1998) NEMA prescribes that every application for Environmental Authorisation (EA) must include, *inter alia*, an investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity (i.e., No-Go Alternative). “Alternatives”, in relation to a proposed activity, are different ways of meeting the general purposes and requirements of the proposed activity, which may include alternatives to:

- the location where it is proposed to undertake the activity;
- the type of activity to be undertaken;
- the technology to be used in the activity; and
- the option of not implementing the activity.

This section presents the various alternatives considered. Table 7-1 describes the alternatives as provided through NEMA.

Table 7-1: Alternatives as provided through the NEMA

Alternative	Definition
Activity	Refers to alternatives in the nature of the proposed activity. Can be defined as project alternatives.
Location	Refers to alternatives in the location of the proposed activity. This can be considered for the entire proposal or for a component of the proposal. A distinction should be drawn between alternative locations that are geographically separate and alternative locations that are site layout alternatives.

Alternative	Definition
Technology	Refers to alternatives in technology and equipment used. The aim of this is to reach the same goal by using different methods or processes.
Site Layout	Refers to alternatives in spatial configuration of an activity on a particular site.
Scale	Refers to activities that can be broken down into smaller units and undertaken at different scales.
Design	Refers to alternatives in design for aesthetic purposes or different construction materials in an attempt to optimise local benefits and sustainability.

8 Details of Alternatives considered

8.1 Property or location alternatives

The property for the preferred location has been selected as it is located within WPL's existing mining right area on property owned by WPL.

The preferred location has also been constrained due to the location of the WRD. Since the current WRD has been established by the previous owner, SS had no influence on the placement of the WRD. The PCD is located on property owned by WPL and is situated downstream of the WRD so water can flow through gravity into the PCD.

8.2 Type of activity

The activities to be undertaken will include the establishment of the associated infrastructure at the current WRD to manage and contain dirty water runoff. The infrastructure includes a V-drain catchment berm, PCD, pipeline and an emergency spillway.

8.3 The design or layout of the activity

The following aspects were taken into consideration for the design/layout of the proposed PCD and WRD project:

- Location of the mining right area;
- Location of the properties owned by Sibanye-Stillwater;
- Location of the current WRD
- Delineated wetlands,
- Rivers
- Critical biodiversity areas
- Proximity to existing K4 Shaft infrastructure (specifically the shaft area since the water in the PCD will be re-used in the shaft.)

The layout of the infrastructure has limited alternatives as it must be implemented around the current existing WRD, and it must be implemented in such a manner to accommodate future dirty water runoff from the facility. The layout was designed to place all new proposed infrastructure outside of wetland areas and outside of the regulated zones as far as possible.

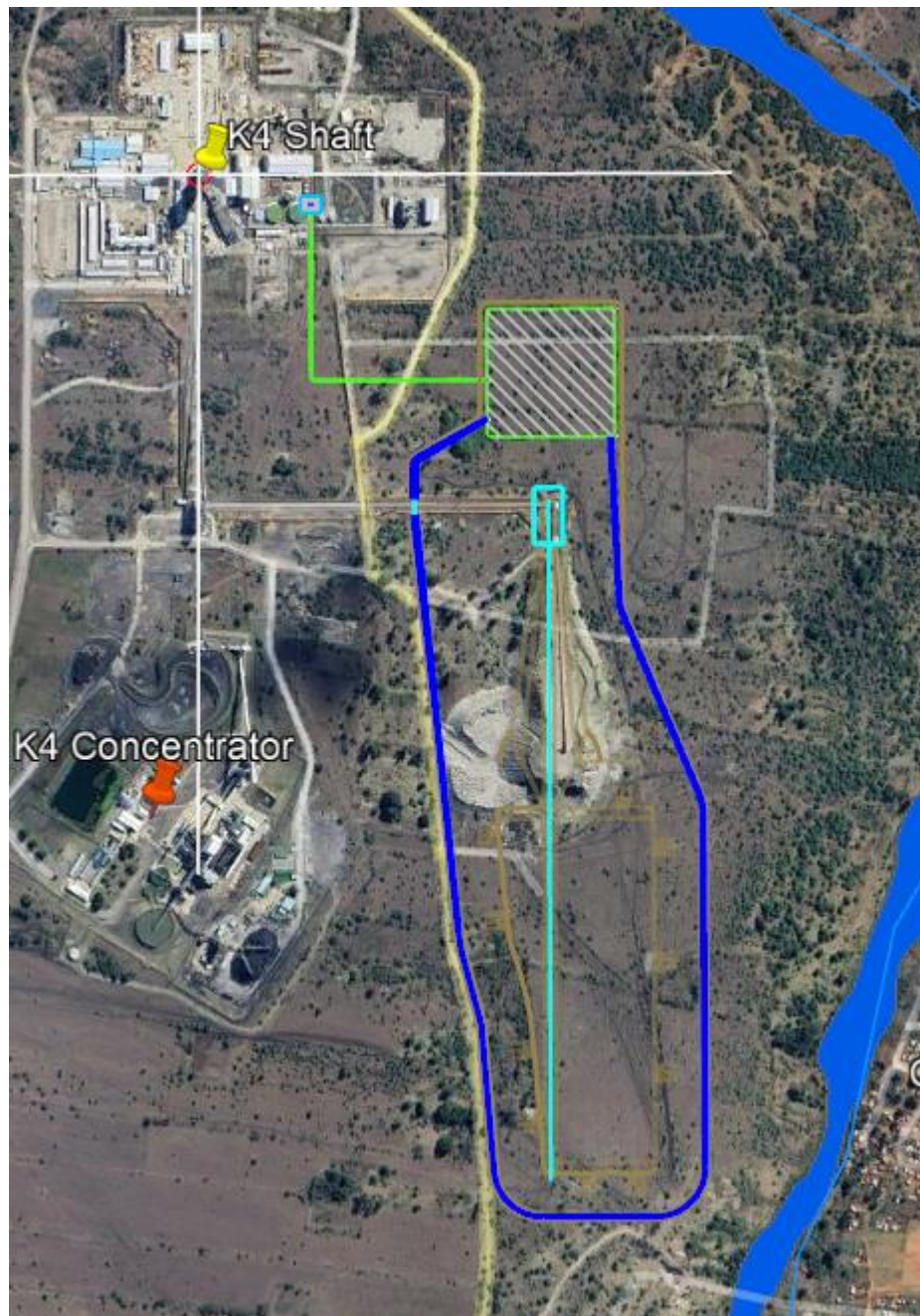
Due to the location of the previously established WRD, limited mitigation could be made to the proposed alteration of Critical Biodiversity Areas as well as the Ecological support areas around the current WRD.

Alternatives considered for the placement of the PCD is described in Table 8-1.

Table 8-1: Alternatives considered through the location of the PCD.

Location of PCD	Alternatives considered	
Alternative 1	<p>Source: ESI, Chitwan, CoEPA, ESI, ESI, Sankhaling, OHSW, Home, DC, DSD, DZ-33, AeroSIS, 1991, and the OLS User Community</p>	
	<p>Advantages</p> <ul style="list-style-type: none"> • Infrastructure situated outside regulated area of a wetland 	<p>Disadvantages</p> <ul style="list-style-type: none"> • Infrastructure does not accommodate dirty water runoff for the expansion of WRD • Deeper excavation and earthworks will be required to have the water flow “upstream” into the PCD. • Longer pipeline required to pump Water from the PCD back into the Shaft for re-use

Alternative 2:
(Preferred alternative)



Advantages

- Infrastructure accommodates dirty water containment for the expansion of the WRD
- Water flows via natural gravitation into the PCD
- Water can be pumped back into the shaft or re-use

Disadvantages

- The V-drain catchment berm will be situated within the 100m regulated zone of a river and required GN704 exemption

8.4 Operational aspects of the activity

The application is for the implementation of contaminated stormwater management infrastructure around the current WRD and the containment thereof for re-use.

The topsoil will be stripped and removed to be placed on a separate stockpile to be used when rehabilitation occurs. The topsoil can be used to construct the berm around the V-drain. For the PCD, as much subsoil material as possible is removed without the use of blasting techniques and this material will be stockpiled separately from the topsoil. The water that collects in the PCD will be pumped to the shaft for re-use in the Shaft operations.

The above operational description is seen as the most effective way of operating as it makes use of existing processing infrastructure and facilities to cause the least possible environmental disturbance.

8.5 Option of not implementing the activity

The purpose of implementing the activities is for the K4 shaft to extend the Life of the Mine by approximately 30 years. Currently the storm water management infrastructure is not sufficient to manage and contain all the dirty water runoff from the WRD and to not implement the proposed infrastructure would mean that more dirty water runoff from the WRD will be disposed of into the surrounding environment and have a detrimental impact on the river situated close by.

The no-go alternative will require a re-evaluation of the Shafts business structure and may result in the total closure of the K4 Shaft.

8.6 Statement motivating the preferred site

The properties associated with the preferred location of the site has been selected as it is located within the mining right area of the mine and these properties are owned by the mine as well. The preferred location has also been constraint due to the location of the existing WRD as well as the K4 Shaft and the K4 Pant. The proposed location of the PCD and WRD infrastructure will allow for the sufficient management of dirty water runoff from the WRD and to sufficiently manage and contain dirty water in the PCD to be re-used in the shaft. This will ultimately ensure that the Environmental Impact of the WRD is lessened.

9 Details of the Public Participation Process followed

9.1 Objectives of public participation

The objectives of the public participation process are as follows:

- To introduce the proposed project to identified stakeholders/Interested and Affected Parties (I&APs) and to inform them of the environmental authorisation process to be followed;
- To provide sufficient and accessible information to identified stakeholders/I&APs; and
- To provide stakeholders/I&APs opportunities to provide comment, raise concerns or provide suggestions for enhanced benefits.

9.2 Public Participation Process

A public participation process has been undertaken in support of the scoping phase and environmental impact assessment of the environmental authorisation application and the water use license application, inclusive of site notices, newspaper advertisements, Background Information Document (BID), notification letters, and making the Draft environmental authorisation documentation available for public comment. A summary of the process followed to date and planned is provided in Table 9-1 below.

Table 9-1: Summary of the Public Participation Process

Activity	Description
Pre-application phase	
Identification of stakeholders	<p>WPL’s existing stakeholder database was utilised to commence with the identification of stakeholders to be communicated with during the public consultation process. The following main stakeholders were identified:</p> <ul style="list-style-type: none"> • Department of Mineral Resources and Energy (DMRE) • Department of Water and Sanitation (DWS) • North West Department of Economic Development, Environment and Tourism (NW DEDECT) • North West Department of Agriculture and Rural Development • South African Heritage Resource agency (SAHRA) • Rustenburg Local Municipality • Bojanala Platinum District Municipality • Landowners and adjacent landowners, • Magaliesberg Biosphere Reserve • Please refer to Appendix B1 for a list of all identified stakeholders.
Pre-application meeting	<p>A Pre-Application meeting with the competent authority (DMRE) was held on the 17th of May 2023. The Minutes of the meeting is attached in Appendix B2.</p>
Site Notices	<p>English site notices were placed around the K4 shaft proposed project area and as well as at nearby communities and at the entrance of the Shaft and the Plant at K4. See Appendix B3 for proof of placement of the site notices.</p> <p>The site notices contain information on the proposed project as well as details on how to register as interested and affected parties.</p>
Background Information Document	<p>A BID was distributed via e-mail to identified stakeholders. A copy of the BID is appended in Appendix B4 and Proof of the distribution of the BID is attached in Appendix B5.</p> <p>The BID includes an introduction to the project, objectives of the public participation, information on the proposed infrastructure and activities to be undertaken, details of the application processes to be followed, details of the public participation process as well as details on how to register as an I&AP.</p>
Scoping Phase	
Newspaper Advertisement	<p>An English newspaper advertisement was placed in the Platinum Weekly newspaper on 7 July 2023. Refer to Appendix B6 for a copy of the advert.</p> <p>The newspaper advertisement contained a brief introduction to the project, the availability of the Draft Scoping Report for public comment, details of public participation process and a request to register as an Interested and Affected Party.</p>
Notification letters	<p>A notification letter was distributed to all registered stakeholders informing them of the availability of the Draft Scoping Report and for public comment.</p> <p>The notification letter is attached as Appendix B7 and proof of the distribution of the notification letter is available in Appendix B8. Stakeholders were encouraged to provide comments to the EAP for inclusion in the Draft EIA/EMP document.</p>
Availability of Draft Scoping Report for public comment	<p>The Draft Scoping Report was made available for public comment for 30 calendar days (7 July 2023 – 5 August 2023).</p> <p>The Draft Scoping Report was made available for public comment at the following locations:</p> <ul style="list-style-type: none"> • WPL; K4 Shaft Offices

Activity	Description
	<ul style="list-style-type: none"> • Rustenburg Public Library; • Offices of Alta van Dyk Environmental Consultants, 9 Mount Sherman Crescent, Midlands Estate, Centurion, Gauteng; • Website: https://www.altavandykenvironmental.co.za/public-documents/
Environmental Impact Assessment Phase	
Notification letters	<p>A notification letter has been distributed to all registered stakeholders informing them of the availability of the Draft EIA/EMPr for public comment. The notification letter is attached in Appendix B9, and proof of distribution is attached in Appendix B10</p> <p>Stakeholders will be encouraged to provide comments to the EAP for inclusion in the Final EIA/EMPr document to be submitted to the DMRE.</p>
Availability of Draft EIA/EMPr for public comment	<p>The Draft EIA/EMP Report will be placed in the public domain for a period of 30 calendar days (12 October to 10 November 2023) and will also be placed at the following public locations:</p> <ul style="list-style-type: none"> • WPL; K4 Shaft Offices • Rustenburg Public Library; • Offices of Alta van Dyk Environmental Consultants, 9 Mount Sherman Crescent, Midlands Estate, Centurion, Gauteng; • Website: https://www.altavandykenvironmental.co.za/public-documents/
Decision making phase	
Notification letter	<p>A Notification letter will be distributed to all registered I&AP's informing them of the decision made by the DMRE. The notification letter will provide details on the appeal process and the associated timeframes, should they wish to appeal the decision.</p>

9.3 Summary of comments received by I&APs

All comments received from I&APs are included in Table 9-2.

Communication with authorities and comments received are available in **Appendix B11**.

Table 9-2: Comments raised to date by I&APs during the stakeholder engagement process

Interested and affected party	Date comments received	Source	Comments raised	EAP's response to comments as mandated by the applicant	Completion status
North-West Department of Mineral Resources and Energy Desmond Makamu	17 May 2023	Pre-Application meeting	This application must be an amendment application	An EMPr amendment application will be submitted to the competent Authority	Completed
Reotshepile Tlhapane Bapo Ba Mogale Tribe	6 July 2023	Telephonic	I am from the Royal Bafokeng and would like to know if the K4 Shaft Project is situated on any properties owned by the Royal Bafokeng?	The properties the K4 Project is situated on are all owned by Sibanye-Stillwater Western Platinum (Pty) Ltd. No properties are owned by the Royal Bafokeng.	Completed
The Regional Land Claims commissioner: North West Keabetswe Mothupi	10 July 2023	E-mail	I don't understand your request, if you are requesting the state of a land claim please indicate the property.	The e-mail sent was to inform stakeholders of the availability of the Draft Scoping Report for public comment for the Sibanye-Stillwater: Western Platinum (Pty) Ltd – K4 Shaft pollution control dam and associated infrastructure. The document is being distributed to all identified stakeholders for comment.	Completed
Rustenburg Local Municipality Kelebogile Mekgoe	19/07/2023	E-mail	I have received the application for the Draft Scoping Report for the proposed development of a pollution control dam and associated infrastructure at Sibanye- Stillwater Western Platinum (Pty) Ltd's K4 Shaft Please can we conduct site visit for the above-mentioned application, I would like to propose a site inspection for next week (24-28 July 2023).	A site inspection was undertaken on Monday 31 July 2023.	Completed
Rustenburg Local Municipality Kelebogile Mekgoe	16/08/2023	E- mail Formal Letter	The directorate of Community Development within the Rustenburg Local Municipality (Unit: Integrated Environmental Management) acknowledges the receipt of the Draft Scoping Report or the proposed	It is noted that the Rustenburg Local Municipality - Unit: Integrated Environmental Management, supports the proposed development of a PCD and associated infrastructure at K4 Shaft.	Completed

Interested and affected party	Date comments received	Source	Comments raised	EAP's response to comments as mandated by the applicant	Completion status
			<p>development of a pollution control dam (PCD) and associated infrastructure for Sibanye-Stillwater Western Platinum Mine (PTY) Ltd K4 Shaft, Rustenburg.</p> <p>K4 Shaft is currently under care and maintenance. Sibanye-Stillwater is planning to ramp up operation in the near future, extending the Life of Mine (LOF) with approximately 30 years. The current Waste Rock Dump (WRD) is located on the farm Rooikoppies, and covers an area of 30 hectares. Excess waste rock is transported to the waste rock dumps via an underground loco transport to the shafts where it is brought up to the surface. Waste rock material from the K4 Shaft will be stored onto the existing approved K4 WRD.</p> <p>The project area of approximately 13 hectares will be cleared for construction of the PCD and continued disposal of waste rock material on the approved WRD footprint area. The proposed channel and berm around the approved WRD and the pipeline from the PCD to the shaft covers approximately 8.5 and 0.3 hectares respectively. The proposed project infrastructure to be constructed are:</p> <ul style="list-style-type: none"> • Waste Rock Dump, berm and channels – A V-drain catchment berm will be constructed around the current WRD • Pollution control dam: A Pollution control dam (PCD) will be constructed north of the current WRD and will be constructed to 		

Interested and affected party	Date comments received	Source	Comments raised	EAP's response to comments as mandated by the applicant	Completion status
			<p>have a total capacity of 35 203m³ with a maximum height of 3m from the floor of the dam. PCD will contain all the dirty water runoff from the WRD, the PCD will be lined with a Class C liner in order to prevent seepage of the dirty water to the underground.</p> <ul style="list-style-type: none"> • Pipelines – a pipeline will be constructed from the PCD to the Shaft area in order to transport the water in the PCD to existing reservoirs on the shaft for re-use. The pipeline will be 500m in length with a total pump capacity of 60m³ per hour. <p>The proposed development is listed in terms of National Environmental Management Act, (NEMA, Act 107 of 1998), 07 April 2017, as amended. The development triggered Regulation GNR. 982, Listing Notice 1(GN 983) Activity 10 and 27 and Listing Notice 1 (GN 983) Activity 10 and 27 and Listing Notice 3 (GN984) Activity 6 and 12.</p> <p>The proposed development is listed in terms of National Environmental Management Act, (NEMA, Act 107 of 1998), 07 April 2017, as amended. The development triggers GN 983: Listing Notice 1, Activity 10: The development and related operation of infrastructure exceeding 100m in length for the bulk transportation of sewage, effluent process water, wastewater, return water, industrial discharge or slimes –</p>		

Interested and affected party	Date comments received	Source	Comments raised	EAP's response to comments as mandated by the applicant	Completion status
			<p>(ii) with a peak throughput of 120 litres per second or more.</p> <p>Listing Notice 1 (GN983) Activity 21: The clearance of an area of 1 hectare or more but less than 20 hectares of indigenous vegetation.</p> <p>Listing Notice 2(GN984) Activity 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.</p> <p>Listing Notice 3 (GN 0984) Activity 12: The clearance of an area of more than 300m² or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposed undertaken in accordance with a maintenance management plan (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.</p> <p>The proposed pollution control dam (PCD) and associated infrastructure will be located within the property of Sibanye-Stillwater, which has already been impacted by mining activities. The proposed infrastructure will also improve the stormwater management measures put in place.</p> <p>In light of the above and the information submitted, please note that the Unit: Integrated Environmental Management support the proposed</p>		

Interested and affected party	Date comments received	Source	Comments raised	EAP's response to comments as mandated by the applicant	Completion status
			development of PCD and associated infrastructure.		
Department of Economic Development, Environment, Conservation and Tourism, North West Provincial Government Portia Krisjan	23/09/01	E-mail Formal Letter	<p>Comments on the draft scoping report for the proposed development of a Pollution Control Dam and associated infrastructure at Sibanye-Stillwater Western Platinum (PTY) Ltd K4 Shaft located near Marikana within the Rustenburg Local Municipality, North West Province.</p> <p>The Draft Scoping Report (DSR) submitted in respect of the above mentioned proposed, received by this department on 06th July 2023 has reference.</p> <p>Following the review of the DRS the department notes that the applicant intends to extend the life of mine of the existing operations through:</p> <ul style="list-style-type: none"> • The expansion of the footprint of the waste rock dump • Implementation of additional storm water management infrastructure for the containment of dirty water. <p>Therefore, having considered all the above this Department finds the plan of study for undertaking the Environmental Impact Assessment process acceptable and recommends you continue with the process as per Regulation 22 of the 2014 Environmental Impact Assessment Regulation of 2014 as amended.</p>	We acknowledge receipt of the formal letter and thanks the Department for showing their support of the process. The process will be continued as per Regulation 22 of the 2014 Environmental Impact Assessment regulations of 2014 as amended.	Completed

Interested and affected party	Date comments received	Source	Comments raised	EAP's response to comments as mandated by the applicant	Completion status
Department of Mineral Resources and Energy (DMRE) Desmond Makamu	19/09/2023	E-mail Formal Letter	Acceptance of the Scoping report and plan of study for Environmental Impact Assessment as required in terms of Regulation 22(a) of the National Environmental Management Act, 1998 (Act No 107 of 1998): Environmental Impact Assessment Regulations, 2014 lodged in terms of regulation 21 of the above-mentioned regulations as read together with section 12 of the Mineral and Petroleum Resources Development Act, 2008) (Act No 49 of 2008) as amended.	We acknowledge receipt of the Acceptance letter of the Scoping Report and plan of study for the Environmental Impact Assessment. The comments will be addressed and included in the EIAR and EMPr..	Completed
			1: The Scoping Report (SR) and Plan of study for Environmental Impact Assessment received by this department on 11 th August 2023 refers. The Department has evaluated the submitted Scoping Report (SR) and Plan of Study for Environmental Impact Assessment. The SR submitted is accepted with conditions as per regulation 22(a) of the Environmental Impact Assessment (EIA) regulations 2014 as amended which are as follows: a) You are required to submit an Environmental Impact Assessment Report (EIAR) and Environmental Management Programme (EMPr) including specialist report (Refer to below), which must have been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received. Furthermore, all comments and recommendations made by all	An EIAR and EMPr inclusive of specialist reports , that have been subjected to a public participation process of at least 30 days, will be submitted to the Department. All comments received from the relevant stakeholders and interested and affected parties as well as comments and recommendations made by the relevant departments will be taken into consideration when preparing the Draft EIAR.	Completed

Interested and affected party	Date comments received	Source	Comments raised	EAP's response to comments as mandated by the applicant	Completion status
			stakeholders including all relevant authorities and interested and affected parties (I&APs) as part of the Scoping Report must be taken into consideration when preparing the EIAr in respect of the proposed amendment mining right.		
			b) In terms of Section 38 of the National Heritage Resources Act, Act No 25 of 1999) the EIAr and EMPr to be submitted must include Phase 1 Heritage Impact Assessment Report. Mitigation measures and recommendations in the specialist studies must be addressed and included in the final EIAr and EMPr. In addition, the specialist must be compiled as per the requirements of appendix 6 of the EIA Regulations, 2014, as amended.	A Phase 1 Heritage Impact Assessment has been commissioned and mitigation measures as well as recommendations from the specialist report will be included in the final EIAr and EMPr.	Completed
			c) "Regional map of the area and the site layout map. The maps must be of acceptable quality as a minimum, the maps must have the following attributes <ul style="list-style-type: none"> • Maps are relatable to one another • Cardinal points • Legible Legend • Indicate alternatives • Latest land cover • Vegetation types of the study area. In addition, the following additional information is required for the EIAr and EMPr:	The maps will be of acceptable quality and will have the attributes as requested where relevant in the Draft and Final EIAr.	

Interested and affected party	Date comments received	Source	Comments raised	EAP's response to comments as mandated by the applicant	Completion status
			<ul style="list-style-type: none"> A Map combining the final layout map superimposed on the environmental sensitivity map. 		
			<p>d) The EIAR and EMPr to be submitted as part of the EIAR must include the following notwithstanding appendixes 3 and 4 of the Environmental Impact Assessment(EIA) Regulations as amended.</p> <ol style="list-style-type: none"> All recommendations and mitigation measures recorded in the EIAR and specialist studies conducted You're requested to provide the quantum for financial provision Attach attendance registers of any held public meeting and clear site notice pictures An alien invasive management plan to be implemented during construction and the actual prospecting. The plan must include mitigation measures to reduce the invasion of alien species and ensure that continuous monitoring and removal of alien species is undertaken. 	<p>All recommendations and mitigation measures from the specialists will be included in the EIAR</p> <p>The financial quantum will be included in the final EIAR and will also be attached as an appendix of the EIAR.</p> <p>Should any public meeting be held, attendance registers will be attached.</p> <p>An alien invasive management will be compiled and implemented during construction and operational phase of the project.</p>	Completed
			<p>3) A detailed and complete EMPr must be submitted with the EIAR. This EMPr must not provide recommendations but must indicate actual remediation activities which will be binding on the applicant. Without this EMPr the</p>	<p>An EMPr will be compiled to indicate actual remediation activities and not only recommendations</p>	Completed

Interested and affected party	Date comments received	Source	Comments raised	EAP's response to comments as mandated by the applicant	Completion status
			documents will be regarded as not meeting the requirements and will be returned to the applicant for correction		
			4) You are required to submit the closure plan in terms of appendix 5 of NEMA regulations which addresses all the aspects.	A closure and rehabilitation plan will be included in the EIAR as well as attached as an appendix.	Completed
			5)Acceptance of your Scoping Report does not grant you right to commence with the prospecting activities.	We understand that acceptance of the scoping report does not grant right to commence with activities. The application does not include any prospecting activities.	Completed
			Take further note that the Environmental assessment report and Environmental Management Programme must be submitted to this Department within 106 days of the acceptance of the scoping report and that in terms of regulation 45 of the said regulation failure to submit the documents as requested and failure to adhere to the timeframes as stipulated shall result in your application being considered as having lapsed. Kindly note that your application has been assigned to Mr Mutali Mulaudzi who could be reached at the following contact details: Tel: (018) 487 4300/4398.	The EIAR and EMPr will be submitted to the Department within 106 days of receipt of the acceptance letter for the SR. The Final EIAR and EMPr submitted will have been subjected to a public participation period of at least 30 days.	Completed.
South African Heritage Resource Agency (SAHRA) Sityhilelo Ngcatsha	06/10/2023	E-mail /Formal Letter	Interim Comment The SAHRA Development Application Unit (DAU) notes the submitted heritage studies along with the	The Draft EIA and EMPr and its appendices will be submitted to SAHRA and will be attached to the development application on SAHRIS	Completed

Interested and affected party	Date comments received	Source	Comments raised	EAP's response to comments as mandated by the applicant	Completion status
			<p>recommendations provided therein. The development application is located in an area of insignificant palaeontological sensitivity according to the SAHRIS PalaeoSensitivity Map, therefore the no palaeontological studies are required.</p> <p>Further comments will be issued once the Draft Environmental Impact Assessment (EIA) document with its appendices have been submitted and attached to the development application on SAHRIS.</p>		

10 The environmental attributes associated with the K4 Shaft PCD site

10.1 Geology

Information for this section was obtained from Western Platinum Mine Final Environmental Management Programme(SEF, 2012).

The Geology of the Rustenburg/ WPL area comprises of the Rustenburg Layers Suite of the Bushveld Complex and is thought to be one of the biggest mafic-ultramafic layered intrusion with an underlying area of 66,000 km² (SEF; 2012). The Bushveld complex has a large resource of platinum and palladium with three different ore bodies mining is taking place from. These ore bodies include the Merensky Reef, the Upper Group 2 (UG2) Chromite Reef; and the Platereef.

The Western Limb of the Bushveld Complex has a collective name;” Rustenburg Layered Suite” and is subdivided into different zones. These zones include the following:

- Marginal Zone
- Lower Zone,
- Critical Zone,
- Main Zone; and
- Upper Zones

These Zones ranges from the base to the top of the Suite and the Critical zone is identified as having a significant importance since it is the main zone that comprises of the Platinum Group Metals (PGM,s). This zone is the area where the Merensky Reef and the UG2 reef is situated with the Merensky Reef situated above the UG2 reef. The UG2 reef is situated approximately between 130 – 210 meters below the Merensky reef and both reefs have an economic layer exhibiting from an east to a west strike.

10.2 Climate

10.2.1 Temperature

The monthly average midday and night temperatures (As seen in Figure 10-1) indicates that the midday temperatures for Rustenburg averages around 20°C during the midday temperatures and 7°C during the night time temperature. Table 10-1 summarises the average midday and night-time temperatures below.

Table 10-1: Average midday and nighttime temperatures in °C (World Weather Online, 2023)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Midday	30	29	28	25	23	20	20	24	28	30	30	29
Night time	18	18	16	14	10	7	6	9	13	16	17	18

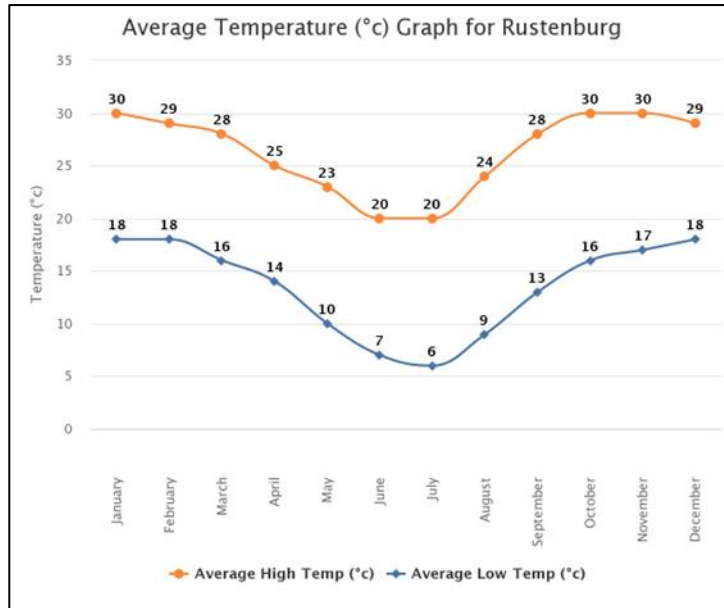


Figure 10-1: Average midday and Nigh time temperatures for Rustenburg (World Weather Online; 2023).

10.2.2 Rainfall

The Mean Annual Precipitation for Rustenburg ranges between 500 and 600 mm per year, with most rainfall occurring in the summer season (see Figure 10-2 below). Table 10-2 below indicated the average precipitation per month in Rustenburg as well as the average number of rainy days.

Table 10-2: Average monthly precipitation and rainy days for Rustenburg (World Weather Online; 2023).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average rainfall	114.9	90.8	68.5	57.2	18.8	9	3.7	2.7	10.9	51.3	76.3	152
Rainy days	10	9	7	5	1	1	0	0	1	5	8	12

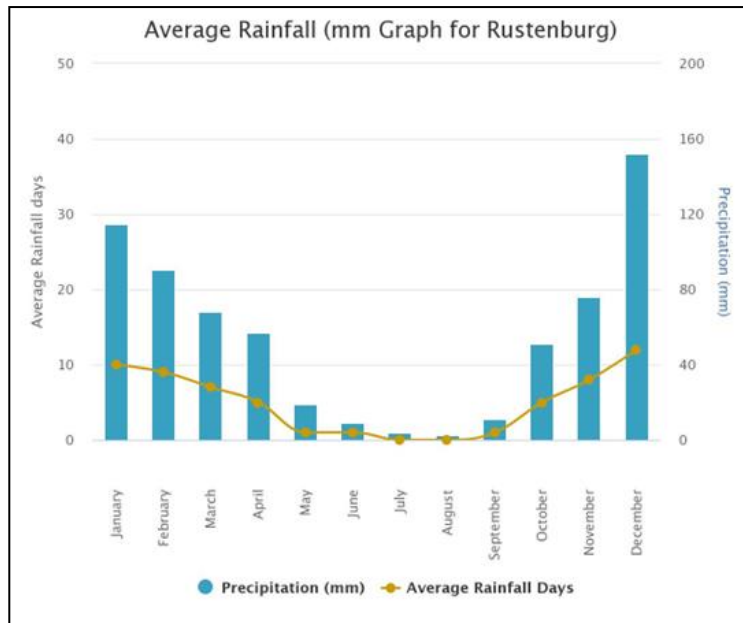


Figure 10-2: Average monthly precipitation and rainy days for Rustenburg (World Weather Online; 2023)

10.2.3 Evaporation

The closest, reliable evaporation station is situated at Kroondal (WB station A2E08). The average monthly values for evaporation are presented in Table 10-3 below. The values show that a net water loss prevails in the region.

Table 10-3: Evaporation Data for Rustenburg region for the period of Jan 22 until Dec 22

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total:
A-pan	225	189	189	148	159	113	123	154	192	215	213	223	2110
S-pan	184	151	149	112	95	80	90	11199	154	175	173	182	1663

A correlation exists between the temperatures and the evaporation rate; therefore, the highest temperatures and evaporation occurs during the summer.

10.2.4 Wind direction and speed

The wind data for Rustenburg shows that the prevailing wind directions are north-east (2.5 m. s-1) for the months January to April, south-west (2.5 m.s-1) for May to September and north-west (2.3 m.s-1) for October to December. See Table 10-4.

Table 10-4: Average wind data for Rustenburg for Jan 22 until Dec 22 (worldweatheronline).

	N	NE	E	SE	S	SW	W	NW
%	0.00	23.0	16.0	4.0	9.0	6.0	10.0	32.0
Speed	0.0	2.5	2.2	2.2	2.4	2.5	2.5	2.3

10.3 Soils

The information for the following section was obtained from the Soils Compliance Statement for the proposed K4 Pollution Control Dam, compiled by The Biodiversity Company. See Appendix C1 for the full report.

The Soils for the assessment area at K4 Shaft is predominantly vertic or melanic clays with dystrophic and/or mesotrophic plinthic catena's, as well as freely drained deep soils. (Agreenco, 2022).

A soils and land capability specialist study were undertaken to determine the soil typed and capability of the project site. The result of this study is appended in **Appendix C1**

10.3.1 Soil analysis

The baseline findings determined that the two most sensitive soil forms were identified in the proposed project area include the Arcadia and Zondereinde soil forms. The Arcadia soil form is comprised of vertic topsoil horizon on top of a lithic horizon below the vertic topsoil horizon. Other associated soils were also identified in the project area, and they include the Rensburg, Rustenburg and Wasbank soil forms. The Soil forms are indicated in the figures below (Figure 10-3 to Figure 10-4).



Figure 10-3: Soil forms found within the proposed project area (TBC1, 2023)

Image A & B represents the Vertic topsoil horizon; image C represents the Wasbank soil form; D represents the soft carbonate subsurface horizon; E represents the Lithic subsurface horizon below vertic topsoil horizon, and F represents the soft carbonate with a gley horizon below.

The general landscape of the project area and associated soil forms are indicated in the Figure below (Figure 10-4). Image A-D represent the different land types and landscapes.

The dominant soil forms are indicated in Figure 10-5.

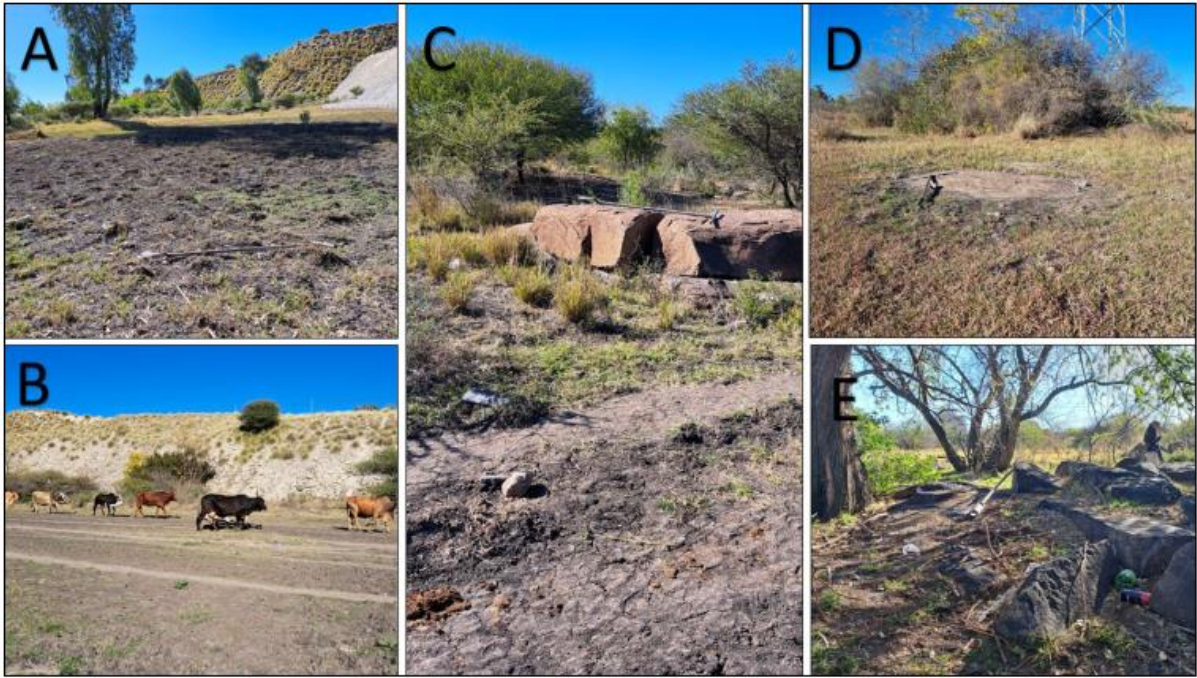


Figure 10-4: General landscape of the project area with associated soil forms (TBC1, 2023)

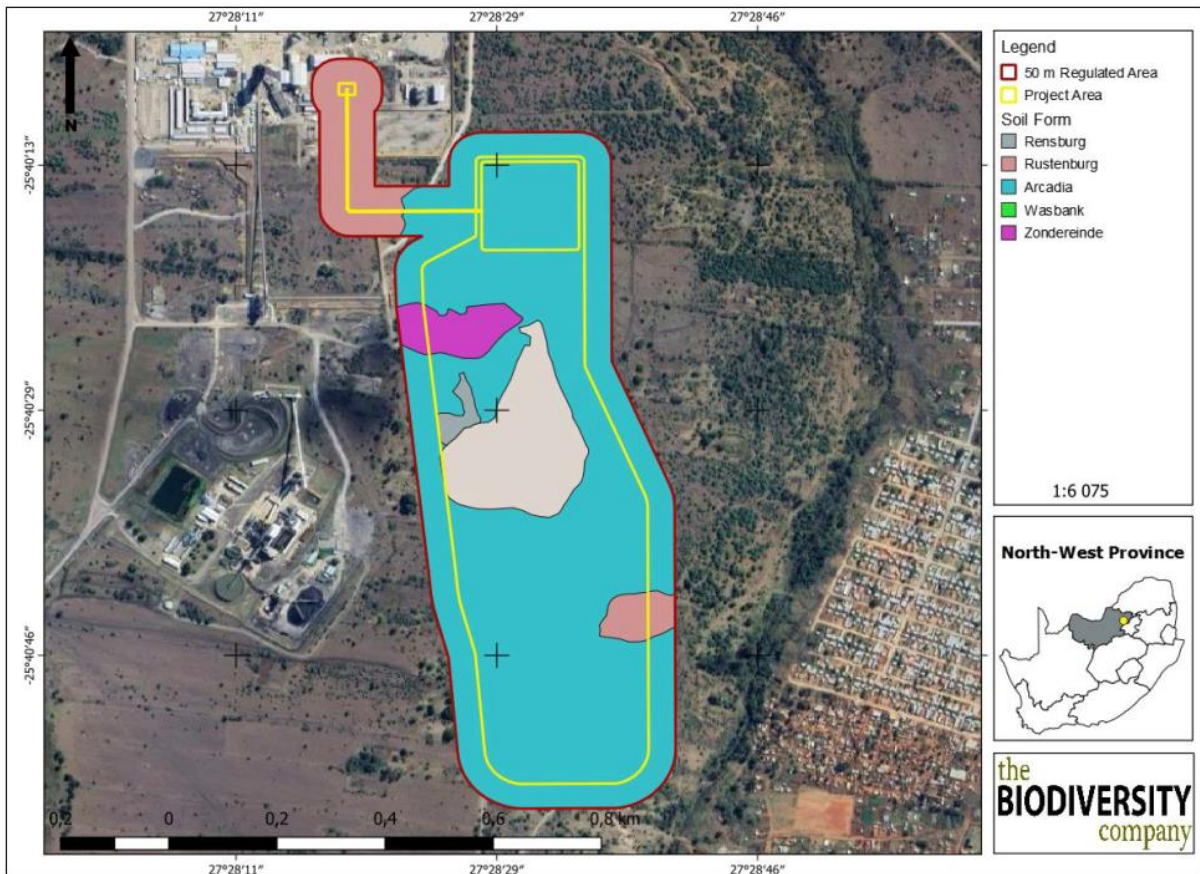


Figure 10-5: Dominant soil forms distribution identified in the project area (TBC1, 2023)

10.3.2 Agricultural potential

There is no segregation of active crop fields or land with a high land potential capability that was identified within the vicinity of the Proposed project area. It is the opinion of the specialist that the proposed project area will have limited impacts on the agricultural potential/production of the land. See **Appendix C1** for the soils report.

10.4 Vegetation

Information on this section was obtained from the Terrestrial Biodiversity Compliance statement for the proposed K4 Pollution Control Dam, compiled by The Biodiversity Company 2023.

The natural vegetation for the K4 Shaft project area is known as the Marikana Thornveld Type (SVcb6) and is illustrated in Figure 10-6: Location of the assessment area relative to cities, towns, and the original remaining extent of the natural dominant vegetation type – Marikana Thornveld (Agreenco, 2022) Figure 10-6. This vegetation type is classified as Vulnerable (Agreenco, 2022) See **Appendix C2** for the Terrestrial Biodiversity Compliance statement.

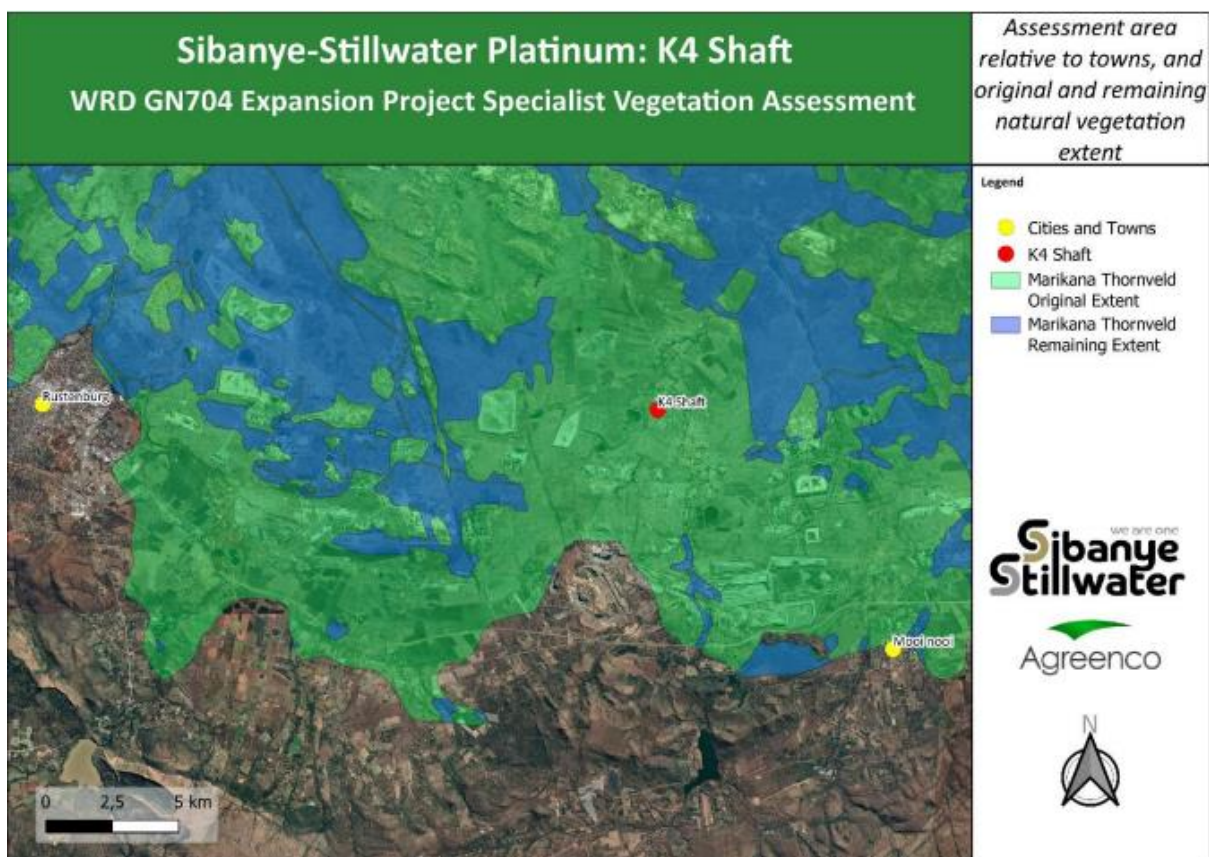


Figure 10-6: Location of the assessment area relative to cities, towns, and the original remaining extent of the natural dominant vegetation type – Marikana Thornveld (Agreenco, 2022)

The following information was obtained from the Terrestrial Biodiversity Compliance Statement for the proposed K4 Pollution Control Dam, compiled by The Biodiversity Company 2023.

10.4.1 Regional vegetation

The desktop vegetation and botanical assessment encompassed an assessment of all the vegetation units and habitat types within the project area. The focus was on an ecological assessment of pre-anthropogenic habitat types as well as the identification of any Red Data and protected species within the known distribution of the project area. The South African National Biodiversity Institute (SANBI) provides an electronic database system, namely the Botanical Database of Southern Africa (BODATSA-POSA). 2019), which was used to access

distribution records on Southern African plants and generate an expected species list. This new database replaces the old Plants of Southern Africa database which provided distribution data of flora at the quarter degree square resolution. The Red List of South African Plants website (SANBI, 2016) was used to provide the most current account of the national conservation status of flora.

The proposed project overlaps with the Marikana Thornveld (MT) vegetation type (Figure 10-7) and mostly consists of open *Vachellia karroo* woodland species found in valleys and in undulating plains where other occur in lowland hills (TBC2, 2023) Table 10-5 below indicates the important species identified within the Marikana Thornveld.

Table 10-5: Important species within the Marikana Thornveld vegetation type (TBC2, 2023).

Type of species	Species identified
Tall Trees	<i>Senegalia burkei</i>
Small Trees	<i>Senegalia caffra</i> , <i>S. gerrardii</i> , <i>V. karroo</i> , <i>Combretum molle</i> , <i>Searsia lancea</i> , <i>Ziziphus mucronata</i> , <i>V. nilotica</i> , <i>V. tortilis</i> subsp. <i>heteracantha</i> , <i>Celtis africana</i> , <i>Dombeya rotundifolia</i> , <i>Pappea capensis</i> , <i>Peltophorum africanum</i> , <i>Terminalia sericea</i>
Tall Shrubs	<i>Euclea crispa</i> subsp. <i>crispa</i> , <i>Olea europaea</i> subsp. <i>africana</i> , <i>Searsia pyroides</i> var. <i>pyroides</i> , <i>Diospyros lycioides</i> subsp. <i>guerkei</i> , <i>Ehretia rigida</i> subsp. <i>rigida</i> , <i>Euclea undulata</i> , <i>Grewia flava</i> , <i>Pavetta gardeniifolia</i>
Low Shrubs	<i>Asparagus cooperi</i> , <i>Rhynchosia nitens</i> , <i>Indigofera zeyheri</i> , <i>Justicia flava</i> .
Woody Climbers	<i>Clematis brachiata</i> , <i>Helinus integrifolius</i>
Herbaceous climbers	<i>Pentarrhinum inspidum</i> , <i>Cyphostemma cirrhosum</i>
Graminoids	<i>Elionurus muticus</i> , <i>Eragrostis lehmanniana</i> , <i>Setaria sphacelata</i> , <i>Themeda triandra</i> , <i>Aristida scabrivalvis</i> subsp. <i>scabrivalvis</i> , <i>Fingerhuthia africana</i> , <i>Heteropogon contortus</i> , <i>Hyperthelia dissoluta</i> , <i>Melinis nerviglumis</i> , <i>Pogonarthria squarrosa</i> .
Herbs	<i>Hermannia depressa</i> , <i>Ipomoea obscura</i> , <i>Barleria macrostegia</i> , <i>Dianthus mooiensis</i> subsp. <i>mooiensis</i> , <i>Ipomoea oblongata</i> , <i>Vernonia oligocephala</i>
Geophytic Herbs	<i>Ledebouria revoluta</i> , <i>Ornithogalum tenuifolium</i> , <i>Sansevieria aethiopica</i>

Figure 10-7 indicates the vegetation type associated with the project area of investigation.

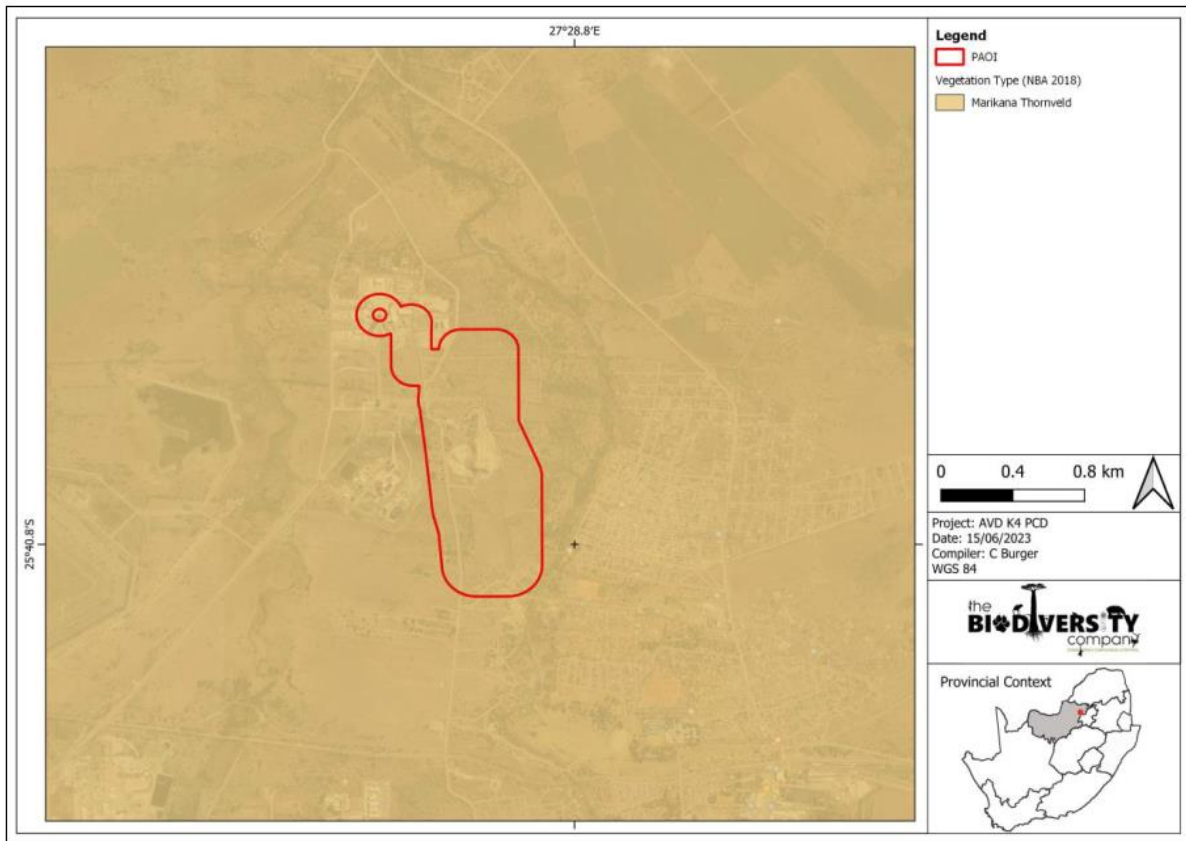


Figure 10-7: Map illustrating the vegetation type associated with the project area of investigation

10.4.2 Site specific

10.4.2.1 Vegetation communities

The project area is situated within the Savanah Biome and this biome represents the southern most extension is the most widespread biome in Africa (Mucina & Rutherford). Most vegetation communities are characterised by an herbaceous layer dominated by grasses and discontinuous to sometimes very open tree layers (Mucina & Rutherford, 2006; TBC2, 2023). At structural level the Savana Biome can be categorised as being fine-leaved (microphyllous) savannas or broad-leaved savanna's. Fine leaves generally occur within the nutrient rich soils dominated by micropyllous woody plants of the Mimosaceae family alongside a generally herbaceous layer, Scholes (TBC2, 2023).

10.4.2.2 Vegetation Units

During a site visit undertaken, two habitat units were identified within the project area and are described in Table 10-6 below. No flora Species of Conservation Concern (SCC) were observed or are expected to occur due to a lack of suitable habitat.

Table 10-6: Description of the broad vegetation units observed in the assessment area

Vegetation Unit	Description
1	Degraded Marikana Thornveld
2	Modified habitat

Degraded Marikana Thornveld

This habitat type is regarded as semi-natural thornveld, but disturbed due to the presence of roads, mismanagement (overgrazing) and also human infringement, as it is located directly adjacent to active mining

operations. This habitat represents open woodland dominated by thorny trees and bushes, such as *Vachellia karroo* and *Vachellia tortilis*, with rocky boulders in certain areas. The current ecological condition of this habitat regarding the main driving forces has been altered to some extent, which is evident in the low diversity of flora and fauna species recorded across the habitat unit. Current human infringement still occurs throughout, especially in areas close to active mining operations. (TBC2, 2023).

The condition difference within this habitat depends on the extent of the disturbance, being more severe in some areas, usually related to one being more overgrazed and exposed to current anthropogenic activities than the other. As a result of the ongoing and historic disturbances the plant community is no longer considered as being fully representative of the reference vegetation (TBC2, 2023).

Modified habitat

This habitat unit represents all areas of roads as well as mining areas associated with the project area. The modified areas have little to no remaining natural vegetation due to land transformation by various mining activities and roads. These habitats exist in a constant disturbed state as it cannot recover to a more natural state unless through human intervention.

The two habitats were refined during the field survey undertaken in 2023. The habitat typed were identified as pre-delineated and has been allocated a sensitivity category or SEI and the breakdown of this category is indicated in Table 10-7 below.

Table 10-7: Site Ecological Importance assessment summary of the habitat types delineated within the POAI

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Degraded Marikana Thornveld	<u>Medium</u> > 50% of receptor contains natural habitat	<u>Medium</u> Only narrow corridors of good habitat connectivity	Medium	<u>Medium</u> Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality	Medium
Modified	<u>Very Low</u> No natural habitat remaining.	<u>Very Low</u> Several major current negative ecological impacts.	Very Low	<u>Very High</u> Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species	Very Low

10.4.2.3 Conservation Important Flora

During the site survey undertaken no threatened flora species were observed within the project area of investigation: (TBC2, 2023)

10.4.2.4 Alien Invasive vegetation

During a site survey undertaken by Agreenco in 2022, a total of 21 invasive plant species were observed and recorded within the assessment area of which only 15 species have a high eradication priority (Agreenco, 2022). Table 10-8 below indicates the identified species along with their NEMBA and CARA class.

Table 10-8: Invasive plant species observed (Agreenco, 2022)

Alien Invasive Species	NEMBA Class	CARA Class
<i>Agave sisalana</i>	2	2

Alien Invasive Species	NEMBA Class	CARA Class
<i>Argemone ochroleuca</i>	1b	1
<i>Callistemon rigidus</i>		3
<i>Cereus jamacaru</i>	1b	3
<i>Cirsium vulgare</i>	1b	1
<i>Eucalyptus camaldulensis</i>		2
<i>Flaveria bidentis</i>	1b	
<i>Grevillea robusta</i>	3	3
<i>Jacaranda mimosifolia</i>	1b	3
<i>Lantana camara</i>	1b	
<i>Melia azedarach</i>	1b	3
<i>Nicotiana glauca</i>	1b	1
<i>Opuntia ficus indica</i>	1b	1
<i>Opuntia microdasys</i>	1b	1
<i>Pennisetum setaceum</i>	1b	1
<i>Tacoma stans</i>	1b	1
<i>Phytolacca dioica</i>	3	3
<i>Tamarix ramosissima</i>	1b	3
<i>Thevetia peruviana</i>	1b	1
<i>Tipuana tipu</i>	3	3
<i>Verbena bonariensis</i>	1b	

10.5 Fauna

Information on this section was obtained from the Terrestrial Biodiversity Compliance statement for the proposed K4 Pollution Control Dam, compiled by The Biodiversity Company 2023.

10.5.1 Mammals

The IUCN Red List Spatial Data lists 93 mammal species that could be expected to occur within the project area. This list excludes large mammal species that are normally restricted to protected areas. The screening tool report list one medium sensitivity species to be expected within the project area. Sixteen (16) of these expected species are regarded as threatened (Table 10-9), thirteen of these have a low likelihood of occurrence based on the lack of suitable habitat and food sources in the project area.

Table 10-9: Threatened mammal species expected to occur within the project area (TBC2, 2023)

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI)	IUCN	
<i>Aonyx capensis</i>	Cape Clawless Otter	NT	NT	Low
<i>Atelerix frontalis</i>	South Africa Hedgehog	NT	LC	Moderate
<i>Cloeotis percivali</i>	Short-eared Trident Bat	EN	LC	Moderate

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI)	IUCN	
<i>Crocidura maquassiensis</i>	Makwassie musk shrew	VU	LC	Low
<i>Crocidura mariquensis</i>	Swamp Musk Shrew	NT	LC	Low
<i>Eidolon helvum</i>	African Straw-colored Fruit Bat	LC	NT	Low
<i>Felis nigripes</i>	Black-footed Cat	VU	VU	Low
<i>Hydrictis maculicollis</i>	Spotted-necked Otter	VU	NT	Low
<i>Leptailurus serval</i>	Serval	NT	LC	Moderate
<i>Mystromys albicaudatus</i>	White-tailed Rat	VU	EN	Low
<i>Ourebia ourebi</i>	Oribi	EN	LC	Low
<i>Panthera pardus</i>	Leopard	VU	VU	Low
<i>Parahyaena brunnea</i>	Brown Hyaena	NT	NT	Low
<i>Pelea capreolus</i>	Grey Rhebok	NT	NT	Low
<i>Poecilogale albinucha</i>	African Striped Weasel	NT	LC	Low
<i>Redunca fulvorufula</i>	Mountain Reedbuck	EN	EN	Low

Only one (1) mammal species was observed during the field survey and the summary of the mammal species recorded is indicated in Table 10-10.

Table 10-10: Mammal species observed and its conservation status (TBC2, 2023)

Species	Common name	Conservation status	
		Regional (SANBI, 2016)	IUCN (2022)
<i>Lepus saxatilis</i>	Scrub Hare	LC	LC

10.5.2 Avifauna

The SABAP2 Data lists approximately 346 fauna species that could be present within the project area of which 15 species are listed as threatened. Twelve of the species have a low likelihood of occurrence due to lack of suitable habitat and food sources in the project area. The likelihood of occurrence is also related to the disturbed nature of the project area. Some of the larger birds might fly over but it is unlikely that they would be residents on site. Table 10-11 indicates the threatened avifauna species that are expected to occur within the project area.

Table 10-11: Threatened avifauna species that are expected to occur within project area (TBC2, 2023)

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI)	IUCN	
<i>Alcedo semitorquata</i>	Kingfisher, Half-collared	NT	LC	Low
<i>Aquila rapax</i>	Eagle, Tawny	EN	VVU	Low
<i>Aquila verreauxii</i>	Eagle, Verreaux's	VU	LC	Low
<i>Calidris ferruginea</i>	Sandpiper, Curlew	LC	NT	Low
<i>Ciconia abdimii</i>	Stork, Abdim's	NT	LC	Low

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI)	IUCN	
<i>Coracias garrulus</i>	Roller, European	NT	LC	Moderate
<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC	High
<i>Falco vespertinus</i>	Falcon, Red-footed	NT	NT	Moderate
<i>Gyps coprotheres</i>	Vulture, Cape	EN	EN	Low
<i>Oxyura maccoa</i>	Duck, Maccoa	NT	VU	Low
<i>Phoeniconaias minor</i>	Flamingo, Lesser	NT	NT	Low
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN	EN	Low
<i>Pterocles gutturalis</i>	Sandgrouse, Yellow-throated	NT	LC	Low
<i>Rostratula benghalensis</i>	Painted-snipe, Greater	NT	LC	Low
<i>Sagittarius serpentarius</i>	Secretarybird	VU	EN	Low

During the field survey a total of twenty-four (24) avifauna species were recorded within the project area and are indicated in Table 10-12 below:

Table 10-12: Avifauna species recorded within PAOI (TBC2, 2023)

Species	Common name	Conservation status	
		Regional (SANBI, 2016)	IUCN (2022)
<i>Bradornis mariquensis</i>	Flycatcher, Marico	Unlisted	LC
<i>Bubulcus ibis</i>	Western Cattle Egret	Unlisted	LC
<i>Cinnyris talatala</i>	White-bellied Sunbird	Unlisted	LC
<i>Corythaixoides concolor</i>	Go-away-bird, Grey	Unlisted	LC
<i>Cossypha caffra</i>	Robin-chat, Cape	Unlisted	LC
<i>Cossypha humeralis</i>	Robin-chat, White-throated	Unlisted	LC
<i>Crithagra flaviventris</i>	Canary, Yellow	Unlisted	LC
<i>Dicrurus adsimilis Drongo,</i>	Fork-tailed	Unlisted	LC
<i>Estrilda erythronotos,</i>	Waxbill Black-faced	Unlisted	LC
<i>Laniarius atrococcineus</i>	Shrike, Crimson-breasted	Unlisted	LC
<i>Merops bullockoides</i>	White-fronted Bee-eater	Unlisted	LC
<i>Plocepasser mahali</i>	White-browed Sparrow-Weaver	Unlisted	LC
<i>Ploceus velatus</i>	Southern Masked Weaver	Unlisted	LC
<i>Prinia flavicans</i>	Black-chested Prinia	Unlisted	LC
<i>Prinia subflava</i>	Tawny-flanked Prinia	Unlisted	LC
<i>Pycnonotus tricolor</i>	Dark-capped Bulbul	Unlisted	Unlisted
<i>Quelea quelea</i>	Red-billed Quelea	Unlisted	LC
<i>Spermestes cucullatus</i>	Mannikin, Bronze	Unlisted	Unlisted
<i>Spilopelia senegalensis</i>	Laughing Dove	Unlisted	LC
<i>Sylvietta rufescens</i>	Long-billed crombec	Unlisted	LC

Species	Common name	Conservation status	
		Regional (SANBI, 2016)	IUCN (2022)
<i>Trachyphonus vaillantii</i>		Unlisted	LC
<i>Uraeginthus angolensis</i> Blue Waxbill	Barbet, Crested	Unlisted	LC
<i>Vanellus armatus</i>	Lapwing, Blacksmith	Unlisted	LC
<i>Vanellus coronatus</i>	Crowned Lapwing	Unlisted	LC

10.5.3 Reptiles

Based on the information obtained from the IUCN red List Spatial data and ReptileMAP approximately 80 reptile species are likely to occur within the project area of which two are regarded as threatened. Table 10-13 indicates the threatened reptile species expected to occur within the project area, from a desktop analysis perspective.

Table 10-13: Threatened reptile species expected to occur within the project area (TBC2, 2023)

Species	Common name	Conservation status		Likelihood of occurrence
		Regional (SANBI,)	IUCN (2022)	
<i>Crocodylus niloticus</i>	Nile Crocodile	VU	VU	Low
<i>Homoroselaps dorsalis</i>	Striped Harlequin Snake	NT	LC	Moderate

During the field survey undertaken no reptile species were observed. It should be noted that some species might still be present within the project area as some species are secretive (TBC2, 2023).

10.5.4 Frogs

Based on the IUCN Red List spatial data for Amphibians approximate twenty-six (26) species are expected to occur within the project area of which one species that is regarded as threatened. Table 10-14 indicates the threatened frog species to occur within the project area.

Table 10-14: Threatened frog species expected to occur within the project area (TBC2, 2023)

Species	Common name	Conservation status		Likelihood of occurrence
		Regional (SANBI,)	IUCN (2022)	
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	NT	LC	Low

During the field survey undertaken no amphibian species were observed. It should be noted that some species might still be present within the project area as some species are secretive (TBC2, 2023).

10.6 Flora

Information on this section was obtained from the Terrestrial Biodiversity Compliance statement for the proposed K4 Pollution Control Dam, compiled by The Biodiversity Company 2023.

Based on the Plants of Southern Africa (BODATSA-POSA, 2019) database, over 351 plant species have the potential to occur within the project area and its surroundings. Of these species, one is listed as being a Species of Conservation Concern (SCC). Table 10-15 outlines the SCC species identified through the desktop assessment.

Table 10-15: Plant species of conservation concern expected to occur within the project area (TBC2, 2023)

Family	Taxon	Author	National Red List (SANBI)	Ecology	Likelihood of occurrence
Crassulaceae	<i>Adromischus umbraticola</i> subsp. <i>umbraticola</i>	C.A.Sm.	NT	Indigenous; Endemic	Moderate

During the field survey undertaken in June 2023, no flora SCC were observed or are expected to occur due to a lack of suitable habitat. A full description of the vegetation can be seen under section 10.4.

10.7 Surface water

Information for this section was obtained from the Wetland and riparian Delineation and assessment compiled by WCS Scientific (Pty) Ltd, 2023, unless otherwise indicated.

10.7.1 Catchment

The study area is situated within primary catchment. A within the quaternary catchment A21K. This catchment is drained by the Sterkstroom River which ultimately drains into the Crocodile River situated north of the Project Area (WCS, 2023). General information for the catchment is listed in Table 10-16 below and the relation of the project area to the catchment is illustrated in Figure 10-8.

Table 10-16: Mean annual precipitation, run-off, and potential evaporation per quaternary catchment (WCS, 2023)

Quaternary Catchment	Catchment Surface Area	Mean Annual Precipitation (MAP) in mm	Mean Annual Run-off (MAR) in mm	MAR as percentage of MAP	Potential Evaporation (PE)	MAP:PE
A21K	864	651	27.4	4.2	1744	0.4

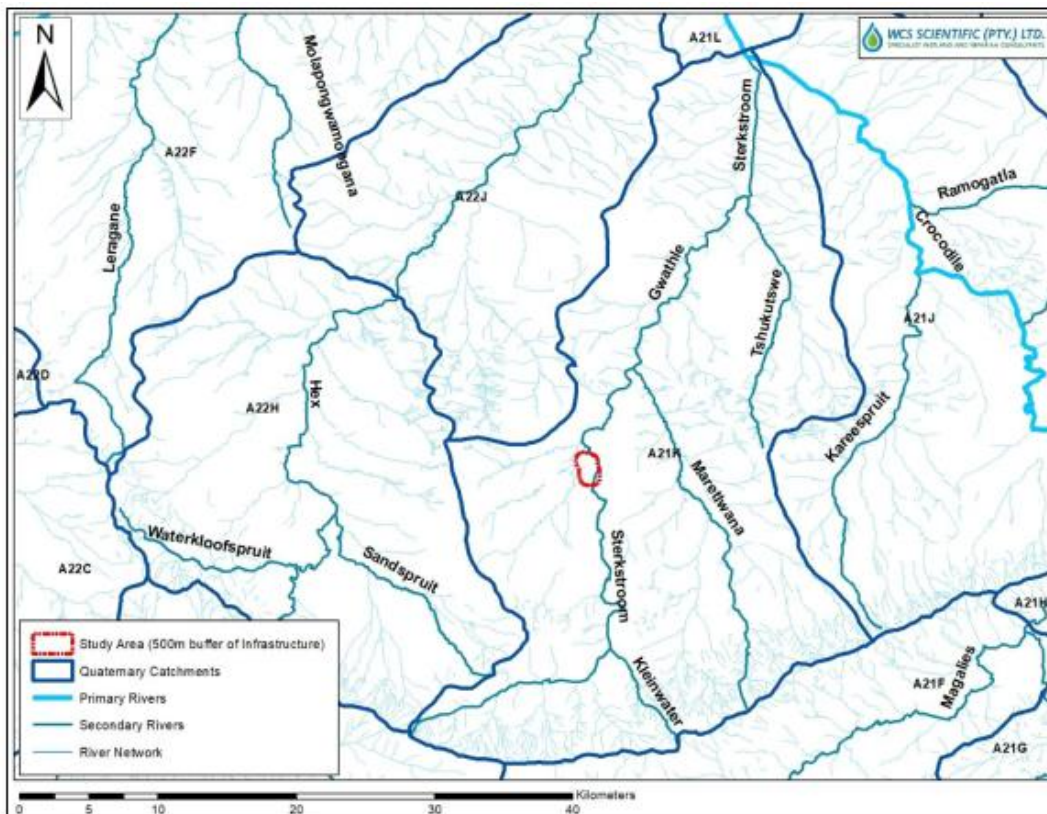


Figure 10-8: Map depicting the Study area in relation to the quaternary catchments (WCS, 2023)

10.7.2 Surface water use

The mean annual runoff (MAR) in the North West Province is reported to be very low. Average MAR as a percentage of the precipitation is 6% for the entire Province, which is below the average of 9% for Southern Africa. WPL is located within the Upper Crocodile sub-catchment (A21J and A21K) within the Crocodile (West) and Marico Water Management Area.

10.7.3 Surface water quality

SS WPL has an existing surface water monitoring programme in place. Surface water quality monitoring is conducted monthly by a subcontractor (HEES, 2023).

10.7.3.1 Surface water quality monitoring localities

Table 10-17 provides the detail of the surface water monitoring localities at K4 Shaft specifically. Refer also to Figure 10-9.

Table 10-17: Surface water monitoring locality details (WUL, 2022; HEES, 2023)

Locality	Description	Coordinates	
		Latitude	Longitude
K4 Shaft Surface Water Monitoring Localities			
KM S 06	Upstream of Stekstroom before Lonmin influence	S25°43'11.99"	E27°29'4.92"
KM S 32	Downstream Point Sterkstroom and Brakspruit with Lonmin Influence	S25°38'56.40"	E27°29'2.50"



Figure 10-9: Map showing the surface water monitoring localities (HEES, 2023)

10.8 Aquatic

Information for this section was obtained from the Wetland and riparian Delineation and assessment compiled by WCS Scientific (Pty) Ltd, 2023

Biomonitoring at WPL is conducted on bi-annual basis as per the conditions of the existing Water Use License: 01/A21K/ABCEFGIHIJ/4620 dated 22 February 2023. A Biomonitoring programme is being implemented by SS and information on this section was obtained from The Sibanye-Stillwater Aquatic Biomonitoring report compiled by The Biodiversity Company in 2022.

A Biomonitoring site is situated to the west of K4 Shaft and is labelled: KM S 21. Details pertaining to this point is indicated in Table 10-18 below and was obtained from the Marikana WUL Reference 01/A21K/ABCEFGIHIJ/4620:

Table 10-18: Biomonitoring point near K4 Shaft

Monitoring site	Alternative name	River/ Stream/ PCD	GPS Coordinates	
			Latitude (South)	Longitude (East)
S – B2	KM S 21	Brakspruit	-25.66.70	27.4643

The results of the 2022 Biomonitoring report (TBC3, 2022) found that the reach of the Sterkstroom river crossing through the study area to be moderately modified with an overall PES category of “C”. The aquatic components assessed to obtain the PES state includes the riparian habitat, macroinvertebrate assemblage and the ichtyofaunal assemblage (WCS, 2023). The current PES identified support the biomonitoring findings as the Sterkstroom river is identified as being moderately modified (WCS, 2023).

10.9 Wetlands

Information for this section was obtained from the Wetland and riparian Delineation and assessment compiled by WCS Scientific (Pty) Ltd, 2023 Appendix C3.

10.9.1 Delineated riparian habitat

Within the study area a single aquatic ecosystem type was identified and delineated, namely riparian habitat associated with the Sterkstroom River. No wetland habitat was found to occur within the study area, though a valley bottom wetland flows to the west, and outside, of the study area. The delineated riparian habitat within the study area is illustrated in Figure 10-10. Riparian habitat delineated is associated with the Sterkstroom river which flows towards the north along the eastern boundary of the study area. This river has clearly defined bed and banks, well-defined riparian vegetation outside of the active channel, consisting of indigenous, woody, riparian species such as *Combretum erythrophyllum*, *Celtis africana*, *Gymnosporia buxifolia*, *Searsia lancea*, and *Vachellia karroo*. Within, and along the margins of the active channel, hydrophytic plant species such as *Phragmites australis*, *Cyperus sexangularis*, *Paspalum urvillei*, and *Schoenoplectus brachyceras* were noted. Several alien, invasive species have colonised the riparian habitat, including *Populus canescens*, *Arundo donax*, *Eucalyptus sp.*, *Lantana camara*, *Dicanthium aristatum*, *Morus alba*, *Phytolacca dioica*, *Salix babylonica*, and *Verbena brasiliensis* (WCS, 2023).

Aside from the natural watercourse identified and delineated within the study area, a number of areas within the study area were noted to be currently supporting hydrophytic plant species (usually indicative of wetland habitat) as a result of artificial impoundment of water. This included flow impoundment between roads and berms, within old infrastructure footprints, and within excavations. Due to the limited permeability of the vertic soils typical of the area, any impediments to surface runoff of catchment flows can result in the accumulation of water, which then supports the establishment of hydrophytic plants. (WCS, 2023)

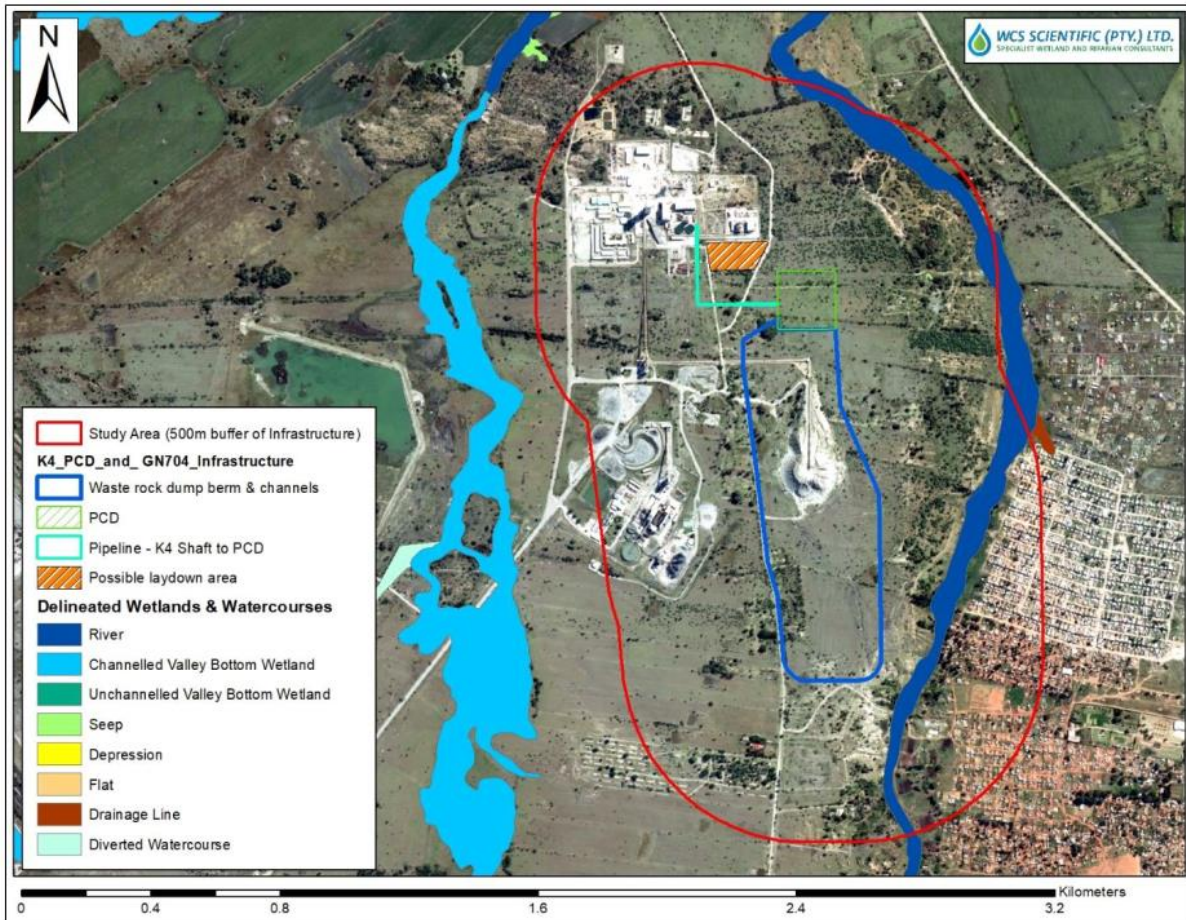


Figure 10-10: Map of delineated and classified riparian habitat within the study area (WCS, 2023)

10.9.2 Riparian Habitat Present Ecological State

The Sterkstroom River is located within a landscape, and a catchment, that has become modified as a result of urban development, and significant mining and mining-related activities. Landuse in the river’s catchment is dominated by mining-related activities and surface infrastructure, limited formal and informal settlements, and even more limited cultivation. Extensive open land remains between mine surface infrastructures but is considered to be semi-natural (WCS, 2023).

The Sterkstroom River is impounded upstream in the large Buffelspoort Dam and several smaller dams. Flow impoundment such as this, as well as abstraction from these dams, reduces flow volumes to the downstream reach, and alters seasonal flow fluctuations. Numerous road crossings over the river result in confinement of flows and can be associated with channel modification, bank erosion and indigenous vegetation removal. The river runs through several settlements, agricultural areas, and mines, all of which are expected to affect water quality, through discharges, and are also associated with indigenous vegetation removal and can act as a source of exotic vegetation. A number of alien, invasive plant species were identified within the riparian habitat of the Sterkstroom River, as mentioned in the previous section. In situ water quality taken at the time of the May 2023 site visit (bank full flow) returned a pH value of 6.78, Electrical Conductivity of 106 $\mu\text{S}/\text{cm}$, total dissolved solids of 53ppm, and temperature of 16.6°C, suggesting relatively good water quality (WCS, 2023).

The above impacts and various landuses within the catchment have resulted in the present ecological state of the river on site departing significantly from the assumed reference condition or un-impacted state. This is reflected in the result of the PES assessment which classes the river (including both the instream and riparian habitat) as being moderately modified (IHIA Class of “C”) (WCS, 2023). Figure 10-11 indicates the results of the PES assessment.



Figure 10-11: Map showing the results of the PES assessment (WCS, 2023).

10.9.3 Ecological state, Importance and Sensitivity of the Sterkstroom River

The Sterkstroom river is situated approximately between 90m and 500m East of the project area and a summary of the PES Ecological Importance (EI), Ecological Sensitivity (ES) and impacts on the Sterkstroom River is presented in Table 10-19 (DWS, 2014). The Sterkstroom River is situated within an area and catchment that has become modified as a result of urban development, as well as mining related activities.

To determine the Index of Habitat Integrity was used to determine the condition of the habitat (WCS, 2023). This approach is based on the assessment of physical habitat disturbance and classified the PES of instream and riparian habitat according to the PES categories provided in Table 10-20 below. The following disturbances were considered to determine the PES of the Sterkstroom River:

- Water abstraction;
- Flow modification
- Bed modification,
- Channel modification,
- Inundation,
- Water quality,
- Exotic macrophytes,
- Solid waste disposal,
- Indigenous vegetation removal,
- Exotic vegetation encroachment and
- Bank erosion.

Although the PES of the DWS report indicated it to be a category C PES, the Specialist identified it to be a D category.

Table 10-19: Summary of the Presence Ecological State (“PES”), and impacts on the Sterkstroom River (DWS, 2014)

Quaternary Catchment	Water Resource	PES	Impacts
A21K	Sterkstroom River	C	SERIOUS: Mining and mining runoff/effluent, water abstraction and inundation. LARGELY: Urban development

Table 10-20: Habitat Integrity Assessment Classes (WCS, 2023)

Class	Description	Score (% of total)
A	Unmodified	100
B	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	80-99
C	Moderately modified. A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.	60-79
D	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions have occurred.	40-59
E	The loss of natural habitat, biota and basic ecosystem functions are extensive.	20-39
F	Modifications have reached a critical level and the lotic system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.	0-19

10.9.4 Riparian buffer Determination

Water resource buffer zones have been shown to perform a wide range of functions, and have therefore been adopted as a standard measure to protect water resources and associated biodiversity (WCS, 2023).

The key functions include:

- Maintaining basic aquatic processes.
- Reducing impacts on water resources from upstream activities and adjoining land uses.
- Providing habitat for aquatic and semi-aquatic species.
- Providing habitat for terrestrial species.
- A range of ancillary societal benefits

The results of the buffer determination are detailed in Table 10-21 and Figure 10-12. Based on the characteristics of the Sterkstroom River in the study area, the proposed development activity, and taking into consideration the likely impacts and mitigation measures that can be applied, a final aquatic impact buffer requirement of 25m from the outer edge of the delineated riparian habitat was determined. Application of the buffer zone, and exclusion of project activities from within the buffer zone, should be seen as part of a suite of mitigation and management tools required to minimise impact to the aquatic environment as a result of proposed development.

Table 10-21: Selected input data to the aquatic impact buffer determination and the buffer requirement outcome (WCS, 2023)

Final aquatic impact buffer requirements	
Level of assessment	Site based
River type	Upper foothills
Present Ecological State	C
Ecological Importance & sensitivity	High

Final aquatic impact buffer requirements	
Management objective	Maintain
Proposed development/activity	Mining – Plant and plant waste from mining operations – moderate risk activities
Construction phase	25 meters
Operational Phase	25 meters
Final aquatic impact buffer requirement	25 meters



Figure 10-12: Delineated riparian habitat and the determined aquatic impact buffer (WCS, 2023)

10.10 Groundwater

Information for this section was obtained from Western Platinum Mine Final Environmental Management Programme(SEF, 2012) unless otherwise indicated.

Groundwater levels resemble that of the local topography flowing in a northerly direction at an average gradient of less than 5%. Groundwater monitoring boreholes indicate that the WPL is underlain by black silty clay layer varying from 1 m to 3 m in thickness. This layer is followed by an eroded norite-gabbro or weather and fractured anthracite which is again followed by hard rock norite-gabbro. It is generally expected that the groundwater flow occurs mostly along the fractures of the underlying geology and entering into surface water bodies such as streams.

10.10.1 Groundwater quality

Groundwater quality is being undertaken on a quarterly basis by a subcontractor. Groundwater monitoring points are shown in Table 10-22 and Figure 10-13.

Table 10-22: Groundwater quality monitoring points (WUL, 2022; HEES, 2023)

Borehole label	Description	Latitude	Longitude
KM BH 17	K3 Shaft	S25°41'41.47"	E27°27'36.08"
KM BH 29	K4 Shaft	S25°39'59.35"	E27°28'5.11"
KM BH 01	Tailings Dam 1,2,3 Upstream	S25°41'13.67"	E27°26'35.94"
KM BH 27	K3 WRD & Concentrator	S25°41'42.71"	E27°26'44.17"
KM BH 33	K4 Concentrator	S25°40'36.02"	E27°28'3.97"



Figure 10-13: Groundwater monitoring points (HEES, 2023)

The Groundwater monitoring variables to be monitored as well as the frequency indicated within the existing WUL is indicated in Table 10-23.

Table 10-23: Groundwater monitoring variables and frequency (WUL, 2022)

Variables	Frequency
pH	Quarterly
EC (Electrical conductivity)	

Variables	Frequency
Sodium (NA)	
Calcium(Ca)	
Magnesium (Mg)	
Chlorine (Cl)	
Sulphate (SO ₄)	
Fluor (F)	
Nitrates (NO ₃ + NO ₂)	
Ammonia (NH ₃)	
Aluminium (AL)	
Cadmium (Cd)	
Chrome (Cr)	
Copper (Cu)	
Mercury (Hg)	
Nickel (Ni)	
Manganese (Mn)	
Lead (Pb)	
Selenium (Se)	
Sink (Zn)	
Potassium (K)	

10.10.2 Groundwater use

Groundwater in the area surrounding the mine is mainly used for domestic supply, watering of gardens and livestock. Groundwater is the sole source of water for many of the surrounding households on farms.

10.11 Air Quality

Information for this section was obtained from Western Platinum Mine Final Environmental Management Programme(SEF, 2012).

Ambient air quality is determined by the cumulative impact of a variety sources and the meteorological conditions prevalent. Meteorological conditions govern the dispersion, transformation, and eventual removal of pollutant from the atmosphere. Ambient concentration levels therefore fluctuate in response to changes in atmospheric stability, variations in the mixing depth, and shifts in the wind field. Spatial variations and diurnal and seasonal changes in the wind field and stability regime are functions of atmospheric processes operating at various temporal and spatial scales. Sources of air pollution for the North West Province and the Rustenburg Local Municipality (RLM) influencing the WPL ambient environment are depicted in Table 10-24.

WPL activities influence the ambient environment in terms of particulate matter (TSP, PM₁₀ and PM_{2.5}) and sulphur dioxide (SO₂) (as the significant pollutants). Sources include mining and associated activities, vehicle entrainment from paved and unpaved roads, materials handling (i.e., loading and unloading), wind erosion from tailings storage facilities, and emission from the processing activities.

Table 10-24 indicates the source of pollutants in the North West Province and Rustenburg.

Table 10-24: Sources of Pollutants in the North West Province and Rustenburg (SEF,2012)

Pollutant	Associated sources
Particulate Matter (PM)	Domestic fuel burning, biomass burning, industrial operations, mining and associated activities, agricultural activities, vehicle entrainment from unpaved roads, informal waste combustion, wind-blown dust from open areas, vehicle tailpipe emissions.
Sulphur dioxide (SO ₂)	Industrial operations, commercial fuel burning appliances, incineration, domestic coal, and wood burning, biomass burning, vehicle tailpipe emissions.
Nitrogen dioxide (NO ₂)	Fossil fuel combustion, vehicle tailpipe emissions, industrial processes, biomass burning.
Carbon monoxide	Vehicle tailpipe emissions, industrial operations, commercial fuel burning appliances, domestic fuel burning, biomass burning.
Ozone (O ₃)	Vehicle tailpipe emissions, domestic fuel burning, biomass burning
Fallout dust (TSP)	Unpaved roads, agricultural activities (seasonal), mining related activities.
Lead (Pb)	Vehicle tailpipe emissions
Benzene (C ₆ H ₆)	Vehicle tailpipe emissions, domestic fuel burning, filling stations,
Methane (CH ₄)	Domestic fuel burning, landfills, biomass burning, wastewater treatment.

Dust fall monitoring is currently taking place at WPL and the closest Dust fall monitoring point to K4 Shaft is labelled LMN45 (Figure 10-14 **Error! Reference source not found.**) as indicated by the Aquatico Monitoring report (Aquatico, 2023).

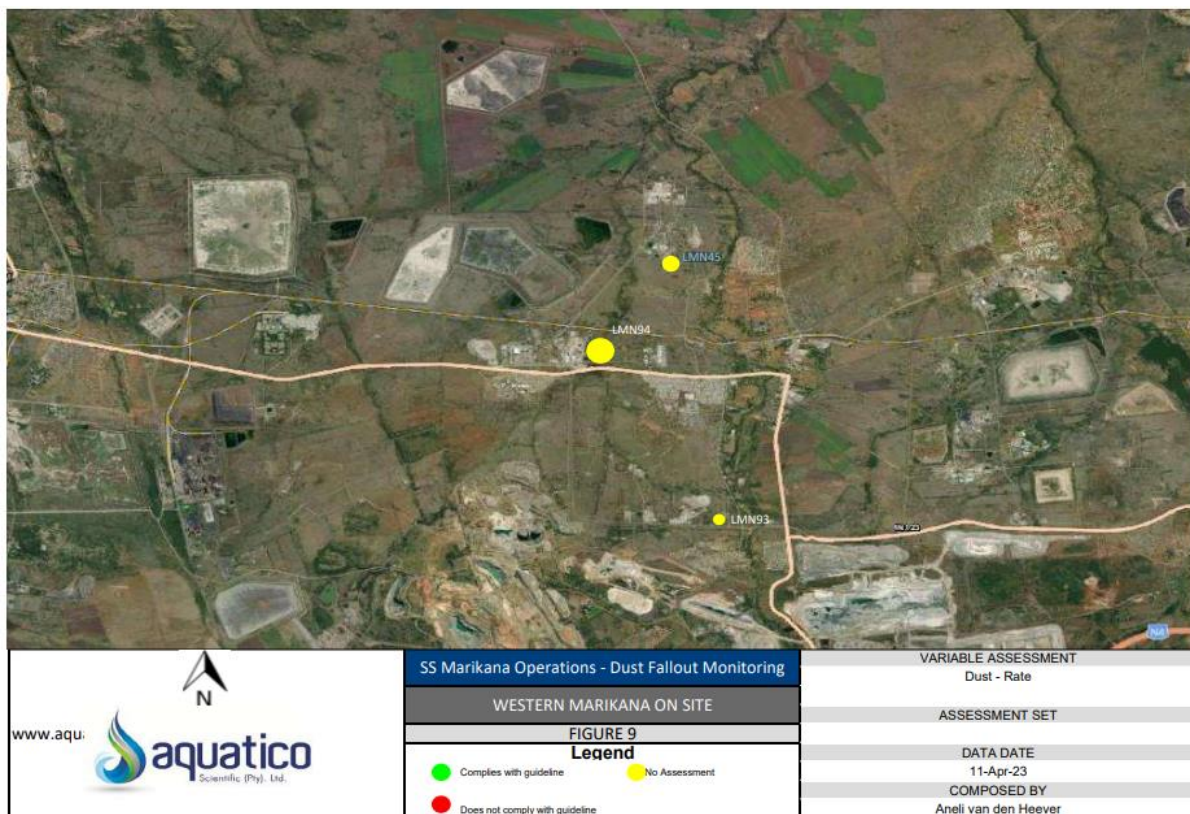


Figure 10-14: Locality of LMN45 Dust fall monitoring point

Table 10-25 indicates the dust fall monitoring points as well as the coordinates of the monitoring point.

Table 10-25: Locality and coordinates of the dust fall monitoring points (Aquatico, 2023)

Western Section Dustfall Monitoring Localities				
Locality Name	Description	Latitude	Longitude	Classification
LMN45	K4 Concentrator	S25.67976	E27.47137	On Site

The results of the dust fall monitoring are indicated in Table 10-26, and is also obtained from the Aquatico Monthly Dust Fall Monitoring Report (2023).

Table 10-26: Dust fall monitoring results

2022-2023	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	April 23	May 23
Dust Fallout Monitoring for LMN45	137	51	73	44	114	202	195	22	324	132	110	210	125

10.11.1 Acceptable dust fallout rates

A standard for the acceptable dust fall rate for residential and non-residential areas is set out in the National Dust Control Regulations under the National Environmental Management: Air Quality Act 39 of 2004. Refer to Table 10-27.

Table 10-27: Acceptable dust fall rates

Restriction Areas	Dust fall Rate (D) (mg/m ² /day, 30-day average)	Permitted frequency of exceeding dust fall rate
Residential Area	D < 600	Two within a year, not sequential months.
Non-Residential Area	600 < D < 1200	Two within a year, not sequential months.

10.12 Noise

Information for this section was obtained from Western Platinum Mine Final Environmental Management Programme(SEF, 2012).

Noise levels within the WPL mining right area expected to range from 40dBA (decibels) to 50dBA in the surrounding agricultural and residential area. In areas where mining-related activities are predominant, the noise level ranges between 60dBA to 70dBA (Egrosaf, 1997). The main sources of noise at WPL include:

- Open pit mining activities;
- Ventilation fans (shafts);
- Main compressor house;
- Air compressors (shafts);
- Ore transfer points (shafts)
- Pumps (water distribution pumps, tailings pumps etc);
- Vehicular traffic;
- Crushing and screening; and
- Concentrator plants.

The affected communities are informal settlements, formal residential areas, construction village and mine hostels. With the general trend of decreasing sound power levels by 6 dBA with every doubling of distance from the noise source, it is expected that there will be a significant decrease in noise with an increase of 50m from the noise source.

10.13 Visual

The current WRD have already been approved in the WPL/EMP and is not easily visible from the surrounding roads. There might be a slight visual impact on the community situated to the eastern region of the WRD, but this impact can be mitigated through rehabilitation. Since the WRD is situated approximately 9 km north of the N4 and considering the fact that there are other tailings facilities and WRD visible in the area, the impact of the expansion of the WRD is considered to be negligible.

10.14 Protected areas and conservation planning

10.14.1 Ecosystem Threat Status

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset, the proposed Project area overlaps with an Endangered (EN) ecosystem (Figure 10-15) (WCS, 2023)

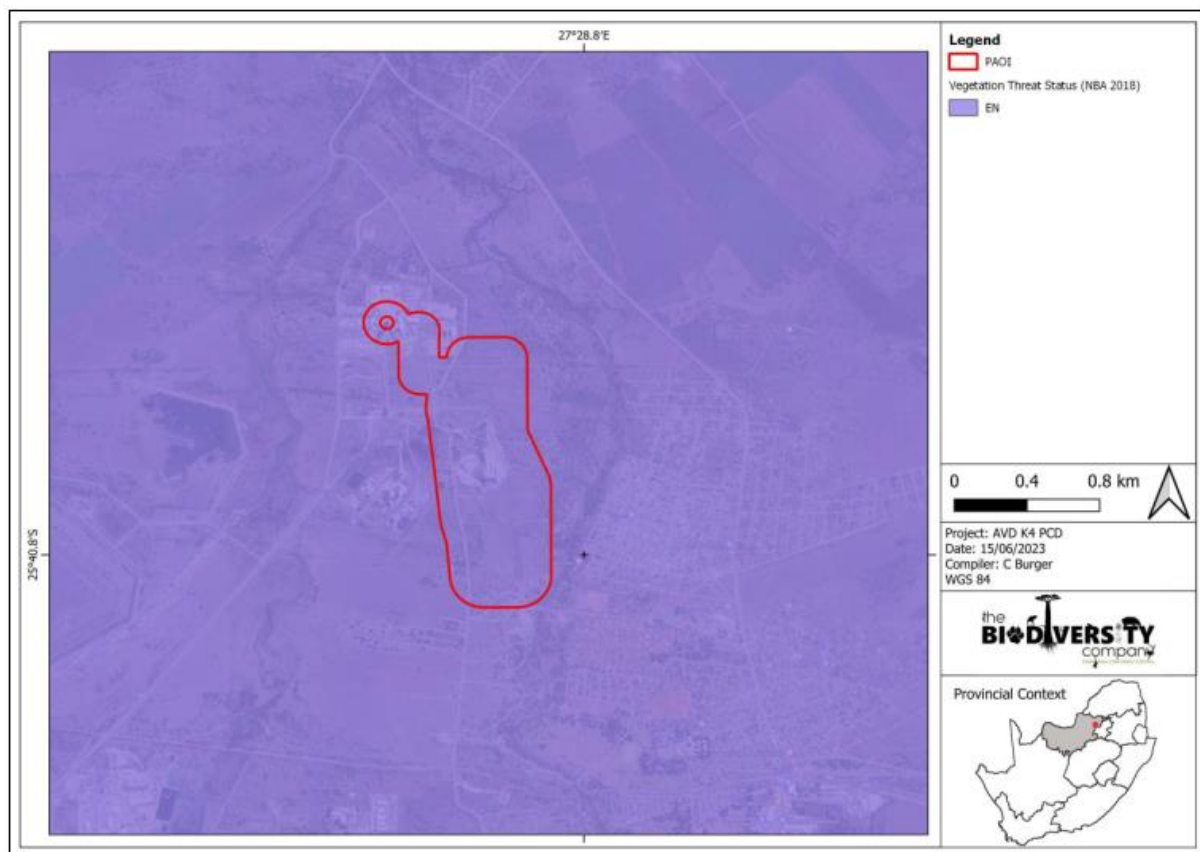


Figure 10-15: K4 Shaft proposed infrastructure in relation to ecosystem threat status (WCS, 2023)

In terms of ecosystem protection level, the project area also overlaps with a Poorly Protected ecosystem as indicated in Figure 10-16. Please see Appendix C2 for the Terrestrial Compliance statement.

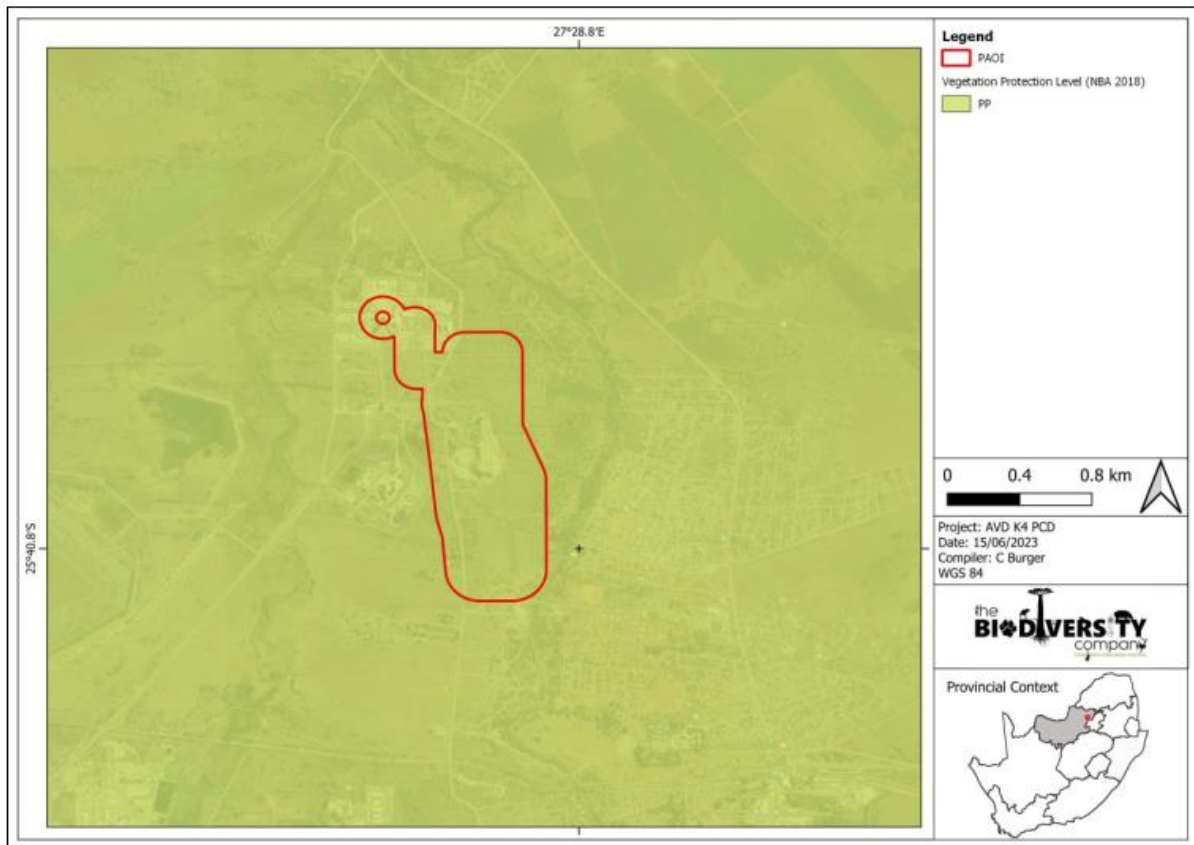
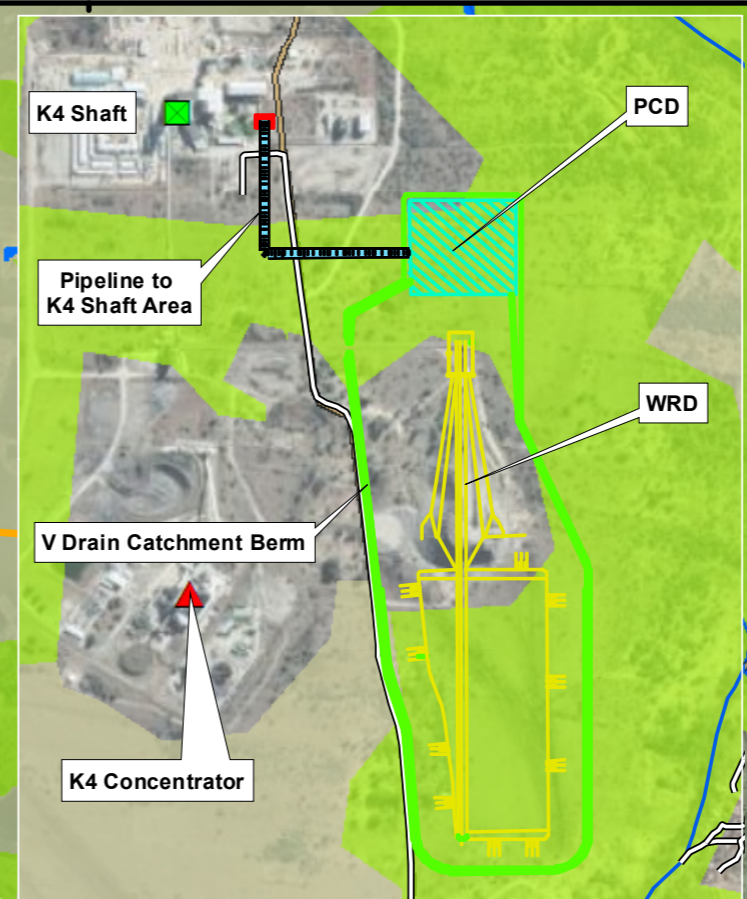
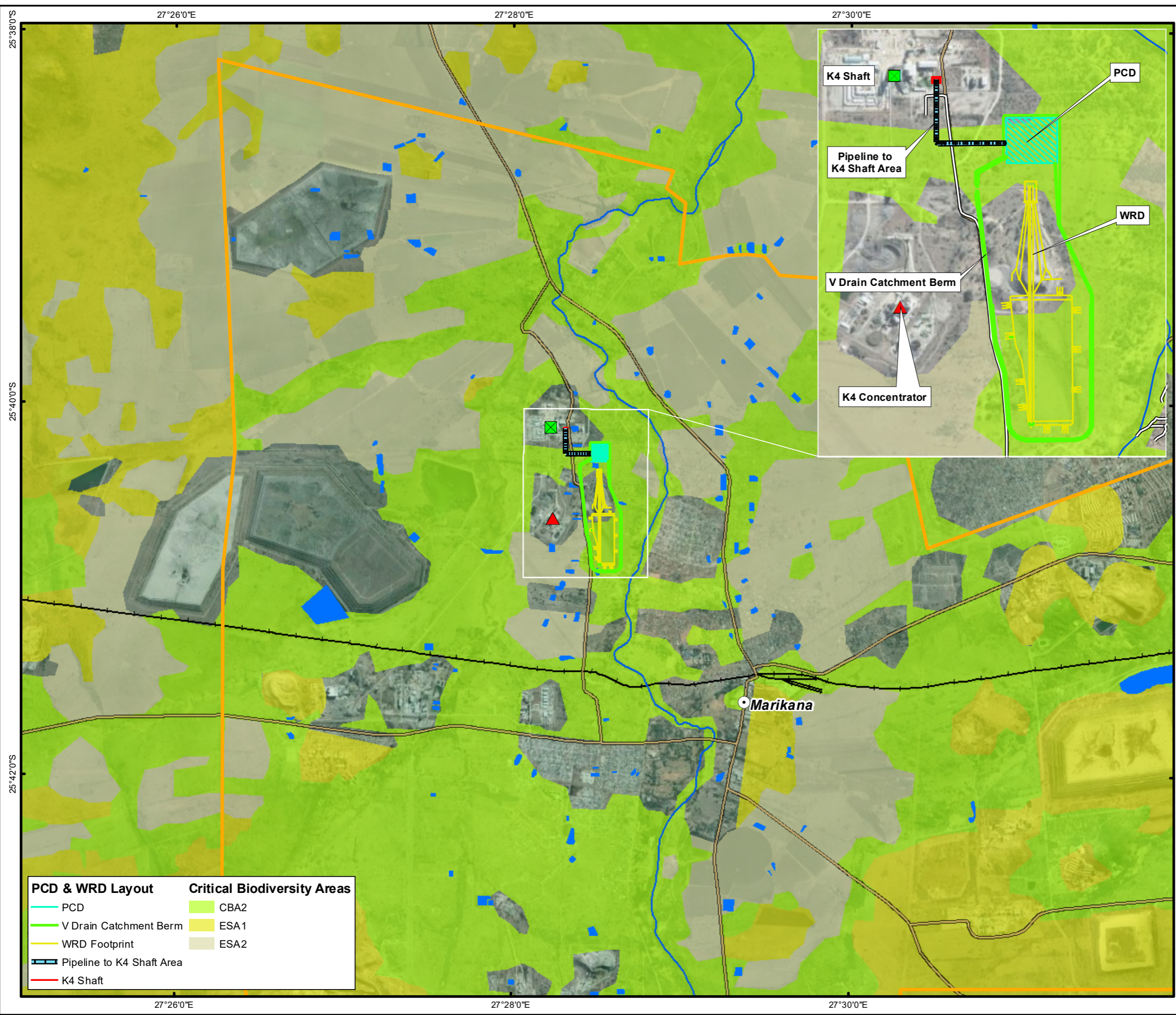


Figure 10-16: Ecosystem projection level in relation to PAOI (TBC2, 2023)

10.14.2 North West Biodiversity Spatial Plan

The North West Conservation Plan (NW: C Plan) is based on a provincial Biodiversity Assessment (Desmet *et al.*, 2009), and provides important guidance for biodiversity conservation and sustainable development in the province. Among other things, the C Plan will be used to inform the development of provincial biodiversity Sector Plans, bioregional plans, Spatial Development Frameworks (SDFs), Environmental Management Frameworks (EMFs), Strategic Environmental Assessments (SEAs) and the Environmental Impact Assessment (EIA) process in the province.

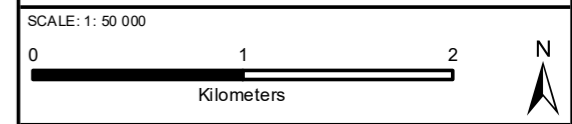
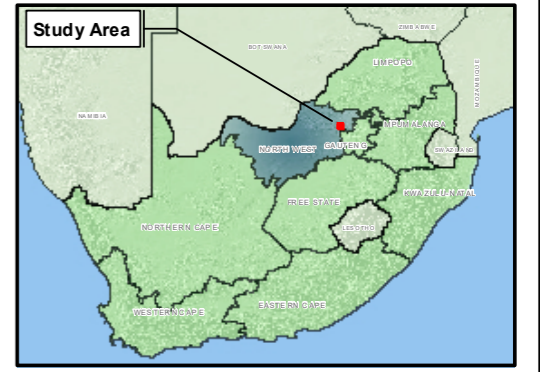
According to the 2014 North West CBA and ESA map dataset the project area overlaps with CBA2 and ESA2 areas as indicated in Figure 10-17.



PCD & WRD Layout		Critical Biodiversity Areas	
	PCD		CBA2
	V Drain Catchment Berm		ESA1
	WRD Footprint		ESA2
	Pipeline to K4 Shaft Area		
	K4 Shaft		

Legend

- MR106 (mining right area)
- K4 Concentrator
- K4 Shaft
- Towns
- Buildings/Ruins
- National Freeway Route
- Arterial Route
- Main Road
- Secondary Road
- Railway
- Contours
- Rivers
- Cadastral Farms
- Water Area



TITLE:
**Critical Biodiversity map of K4 Shaft
 Pollution control dam and Waste Rock
 Dump GN704**

CLIENT:
Sibanye-Stillwater

DATE: May 2023	PROJECT: K4_SHAFT_PA
DRAWN: THURLOW MAPPING	APPROVED: LG
MAP K4_SHAFT_PCD_WRD_CBA.mxd	REV: 0

Alta van Dyk Environmental Consultants cc (2011/059764/23)
 VAT No: 4630259952
 Tel: 012 940 9457
 Fax: 086 634 3967
 Cell: 082 782 4005

Projection: Transverse Mercator CM: 27 Datum:WGS 84
 Source: SANBI - NWBSP2015_Terrestrial_CBA_v1_u35s.shp
 DWA - NGA Geosites Inset: ESRI Data and Maps

SIZE:
A4

10.14.3 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2017 (NPAES) were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints, and opportunities (NPAES, 2017). The project area overlaps with a Priority Focus Area (Figure 10-18).



Figure 10-18: The PAOI in relation to the National Protected Area Expansion Strategy (TBC2, 2023)

10.15 Heritage

The information for this section was obtained from the Phase I Heritage Impact Assessment compiled by Beyond Heritage, 2023. Refer to Appendix C4 for the full report.

The study area was assessed using a desktop level assessment as well as a non-intrusive pedestrian field survey undertaken during the month of June 2023. The Key findings of the assessment include the following (Beyond Heritage, 2023):

- The project area is highly disturbed through mining areas which include sections within the plant and a large mine dump situated in the middle of the Project area. Other areas are disturbed through past agricultural activities dating to the 1960's;
- During the survey, heritage finds were limited to broken down foundations and a series of circular packed stone lines that predate 1968 and are assumed to be older than 60 years;

- The palaeontological sensitivity of the Project area is indicated as insignificant/zero and no palaeontological studies are required.

The impact the proposed development might have on the heritage resources can be mitigated to an acceptable level should the recommendations of the specialist be included or adhered to. A full description of the specialist recommendations can be seen in Section 18.

10.15.1 Heritage observations

During the field survey undertaken the survey findings were limited to broken down foundations as well as a series of stoned packed in a circular form. Photographic evidence as well as GPS locations coordinates were recorded as evidence of the findings. Topographical maps were used to determine the age of the structures and the features observed were constructed before 1968 and could therefore be older than 60 years. However, the features have been demolished to such an extent that their potential to contribute to any historic, aesthetic, and scientific or social aspect are considered to be non-existent, ultimately resulting in a low heritage significance. But due to the age of the structures, they are protected by law. The figure below (Figure 10-19) illustrates the location of the findings in relation to the project area and Table 10-28 provides a description of the sightings.

Table 10-28: Description of the heritage resource findings (Beyond Heritage, 2023)

Label	Description	Longitude	Latitude	Significance/ Field rating
K001	The site is 50 x 50m in size and consists of a series of broken-down foundations situated within a small thicket of trees within the northern sections of the Project area near the mine. These features may possibly have been mining infrastructure that has since been demolished.	27°28'24.09"E	25°40'23.54"S	Low Significance GP C
K002	The site is 10 x 10m in size and consists of a series of circular packed stone foundations. These features could resemble the border around gardens or hut foundations. Some building rubble and a disused water reservoir is located close to these features.	27°28'37.42"E	25°40'53.15"S	Low Significance GP C
K003	The site is 10 x 10m in size and consists of a large broken-down structure or foundation. The feature seems to have been broken down recently. Some built stone features are situated nearby on an outcropping of stone. These seem to have been part of a garden. The surrounding area shows a high amount of surface disturbances.	27°28'29.72"E	25°40'48.98"S	Low Significance GP C

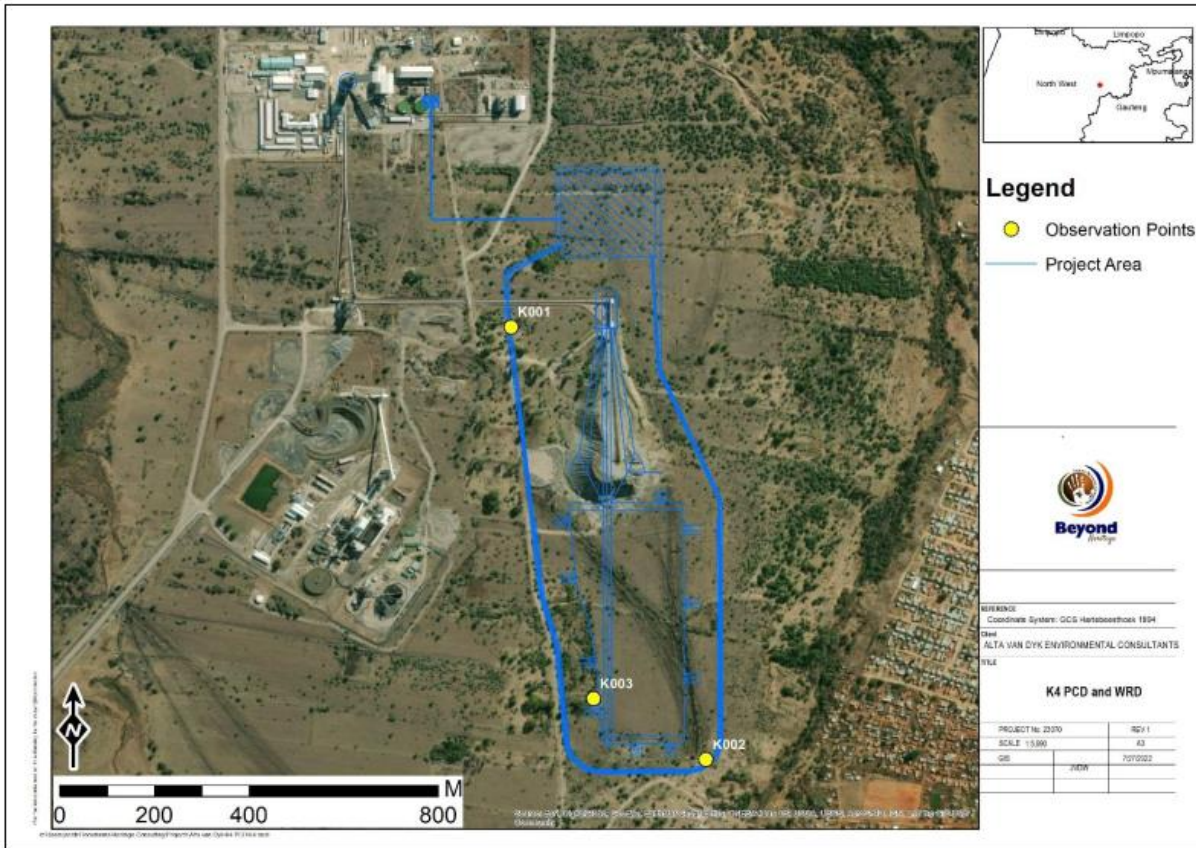


Figure 10-19: Location of heritage sightings in relation to project area (Beyond Heritage 2023)

An application was lodged on SAHRIS (South African Heritage Resource Information System) and a decision from the authority is needed in order to determine whether a destruction permit application should be lodged with the Heritage department before construction activities can commence.

Palaeontology

According to the South African Heritage Resource Agency (SAHRA) Palaeontological map, the project area is of insignificant palaeontological sensitivity, and no further study is required in support of this aspect. The Palaeontological sensitivity for the project area is indicated in Figure 10-20.

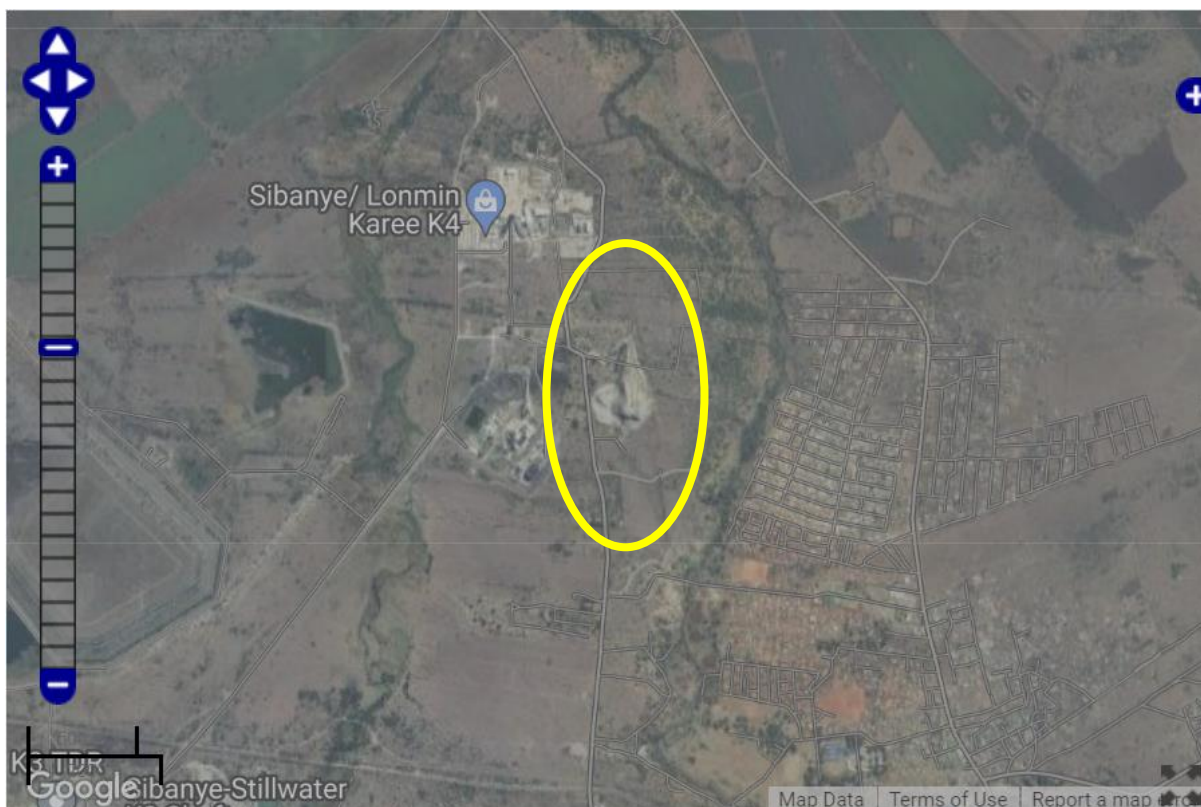


Figure 10-20: Palaeontological sensitivity for the K4 Shaft Project (SAHRIS, 2023)

10.16 Social

Information for this section was obtained from the Rustenburg Local Municipality Integrated Development Plan for 2022/2027.

K4 Shaft falls within the jurisdiction of the Bojanala District Municipality and the Rustenburg Local Municipality. Rustenburg Local Municipality is one of five municipalities within the Bojanala District Municipality in the North West Province and is divided into 38 wards. The significant growth in Rustenburg is largely attributed to the impact of the world’s four largest mines in the immediate vicinity of the town, namely, Anglo American Platinum, Impala Platinum, Xstrata (Glencore) and Sibanye-Stillwater. The mining sector providing around 50% of all formal employment.

10.16.1 Population

With 719 000 people, the Rustenburg Local Municipality (RLM) housed 1.2% of South Africa's total population in 2020. Between 2010 and 2020 the population growth averaged 3.03% per annum which is about double than the growth rate of South Africa as a whole (1.59%). Compared to Bojanala Platinum's average annual growth rate (2.42%), the growth rate in Rustenburg's population at 3.03% was slightly higher than that of the district municipality (RLM IDP, 2022).

In 2020, the Rustenburg Local Municipality's population consisted of 90.32% African (649 000), 7.65% White (55 000), 0.92% Coloured (6 630) and 1.11% Asian (8 000) people. The largest share of population is within the young working age (25-44 years) age category with a total number of 299 000 or 41.6% of the total population. The age category with the second largest number of people is the babies and kids (0-14 years) age category with a total share of 23.4%, followed by the older working age (45-64 years) age category with 122 000 people. The age category with the least number of people is the retired / old age (65 years and older) age category with only 26 700 people (RLM IDP, 2022).

10.16.2 Education

Within Rustenburg Local Municipality, the number of people without any schooling decreased from 2010 to 2020 with an average annual rate of -1.43%, while the number of people within the 'matric only' category, increased from 108,000 to 178,000. The number of people with 'matric and a certificate/diploma' increased with an average annual rate of 5.43%, with the number of people with a 'matric and a Bachelor's' degree increasing with an average annual rate of 5.59%. Overall improvement in the level of education is visible with an increase in the number of people with 'matric' or higher education (RLM IDP, 2022).

10.16.3 Unemployment

In 2020, there were a total number of 94 600 people unemployed in Rustenburg, which is an increase of 43 300 from 51 300 in 2010. The total number of unemployed people within Rustenburg constitutes 38.41% of the total number of unemployed people in Bojanala Platinum District Municipality. The Rustenburg Local Municipality experienced an average annual increase of 6.31% in the number of unemployed people, which is worse than that of the Bojanala Platinum District Municipality which had an average annual increase in unemployment of 5.29% (RLM IDP, 2022).

10.16.4 Household infrastructure

Rustenburg Local Municipality had a total number of 74 400 (30.13% of total households) very formal dwelling units, a total of 109 000 (44.26% of total households) formal dwelling units and a total number of 39 400 (15.95% of total households) informal dwelling units (RLM IDP, 2022).

10.16.5 Sanitation

Rustenburg Local Municipality had a total number of 153 000 flush toilets (61.92% of total households), 29 700 Ventilation Improved Pit (VIP) (12.02% of total households) and 57 900 (23.47%) of total households pit toilets (RLM IDP, 2022).

10.16.6 Access to water

Rustenburg Local Municipality had a total number of 76 800 (or 31.14%) households with piped water inside the dwelling, a total of 130 000 (52.66%) households had piped water inside the yard and a total number of 1 700 (0.69%) households had no formal piped water (RLM IDP, 2022).

10.16.7 Electricity

Rustenburg Local Municipality had a total number of 2 300 (0.93%) households with electricity for lighting only, a total of 212 000 (86.06%) households had electricity for lighting and other purposes and a total number of 32 100 (13.01%) households did not use electricity (RLM IDP, 2022).

10.16.8 Refuse removal

Rustenburg Local Municipality had a total number of 179 000 (72.44%) households which had their refuse removed weekly by the authority, a total of 8 640 (3.50%) households had their refuse removed less often than weekly by the authority and a total number of 19 000 (7.71%) households which had to remove their refuse personally (own dump) (RLM IDP, 2022).

10.16.9 Local Economic Development Opportunities

The following sub-section provides an overview of the opportunities identified within the RLM. The opportunities are identified within their ability to develop the economy of the local municipality and improve the socio-

economic conditions of residents within the municipality. This sub-section covers the following economic sectors:

- Agriculture;
- Mining;
- Manufacturing;
- Utilities;
- Trade;
- Transport, Storage and Communication;
- Finance;
- Community and Personal services;
- General Government Services; and
- Tourism.

11 Description of the current land uses

11.1.1 Land use

The majority of the surrounding land use is mining related and the Marikana town is situated approximately 7 km south-east of the project area.

Some additional land uses on the mining right area includes Sibanye-Stillwater owned land, Tribal owned land, privately owned farms, land owned by different mining companies, State owned land as well as mining housing. The properties on which K4 Shaft and the project area is situated on, is all owned by SS.

Other infrastructure in the vicinity of the project area includes infrastructure related to towns, schools, rivers, small holdings, and farming activities. (SEF; 2012).

11.1.2 Agricultural potential

The baseline findings as well as the land capability sensitivity concur with each other where most areas indicating a Low to Moderate and capability sensitivity. The specialist is of the opinion that some areas identified as Moderate should be revised to be of a Low sensitivity as these soils are characterised to have a restricted potential for cropping activities (TBC1, 2023). The available climate limits crop production and the climatic conditions are associated with a low annual precipitation and high evaporation potential which is not favourable for most cropping practices (TBC1, 2023).

See Appendix C1 for the full report on the soil and agricultural potential impact assessment undertaken by The Biodiversity Company 2023.

11.1.3 Land use options

Since the agricultural potential of the project area is considered to be of Low importance, the only other land use option available is for mining related purposes. The project area is situated on a piece of land already earmarked for mining and the infrastructure will be implemented around a current existing WRD. Therefore, no other land use options are considered.

12 Description of the specific environmental features and infrastructure on site

The major land uses and available features around the project area includes the following:

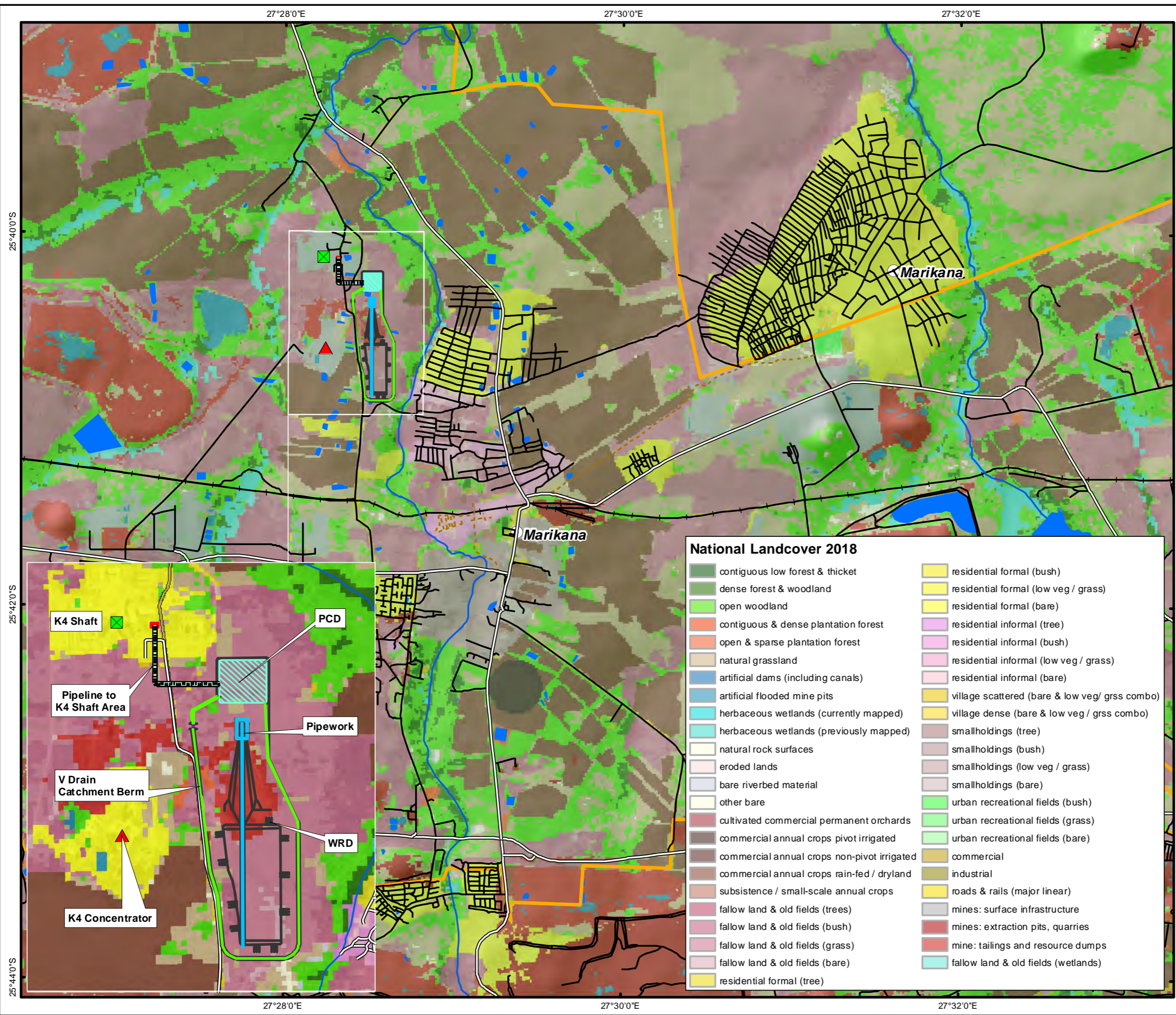
- Sterkstroom River situated to the Eastern side of the project area
- K4 Shaft situated North-Western part of the project area,
- K4 Concentrator situated to the West of the project area,
- Communities situated to the South-western part of the project area.

Existing infrastructure at the K4 Shaft and project area includes the following:

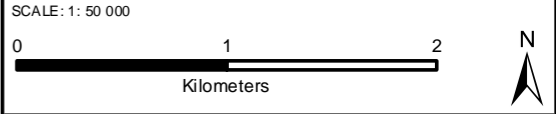
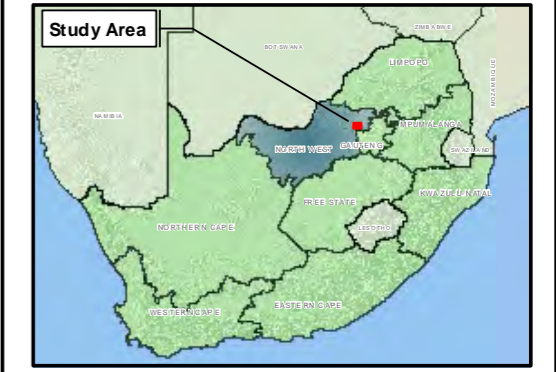
- Shaft head gear
- Winder rooms,
- change house facilities,
- stores,
- offices,
- waste sorting and storage facilities,
- settling ponds and concrete storage dams
- Existing roads around the K4 Shaft for entrance
- Existing roads around the WRD.
- K4 concentrator

13 Environmental and current land use map

The environmental and current land uses around the project area are illustrated in Figure 13-1 below.



- ### Legend
- MR106 (mining right area)
 - ▲ K4 Concentrator
 - K4 Shaft
 - Towns
 - Buildings/Ruins
 - Tertiary Road
 - Street/Road
 - Track
 - Railway
 - Contours
 - Rivers
 - Cadastral Farms
 - Water Area



TITLE:
**Landcover map of K4 Shaft
 Pollution control dam and Waste Rock
 Dump GN704**

CLIENT:
Sibanye-Stillwater

DATE: Oct 2023	PROJECT: K4_SHAFT_PA
DRAWN: THURLOW MAPPING	APPROVED: LG

MAP K4_SHAFT_PCD_WRD_LANDCOVER.mxd	REV: 0
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Alta van Dyk Environmental Consultants cc (2011/059764/23)

VAT No: 4630259952
 Tel: 012 940 9457
 Fax: 086 634 3967
 Cell: 082 782 4005

Projection: Transverse Mercator CM: 27 Datum: WGS 84 Source: SA National Landcover 2018 DWA - NGA Geosites Inset: ESRI Data and Maps	SIZE: A4
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National Landcover 2018

<ul style="list-style-type: none"> contiguous low forest & thicket dense forest & woodland open woodland contiguous & dense plantation forest open & sparse plantation forest natural grassland artificial dams (including canals) artificial flooded mine pits herbaceous wetlands (currently mapped) herbaceous wetlands (previously mapped) natural rock surfaces eroded lands bare riverbed material other bare cultivated commercial permanent orchards commercial annual crops pivot irrigated commercial annual crops non-pivot irrigated commercial annual crops rain-fed / dryland subsistence / small-scale annual crops fallow land & old fields (trees) fallow land & old fields (bush) fallow land & old fields (grass) fallow land & old fields (bare) residential formal (tree) 	<ul style="list-style-type: none"> residential formal (bush) residential formal (low veg / grass) residential formal (bare) residential informal (tree) residential informal (bush) residential informal (low veg / grass) residential informal (bare) village scattered (bare & low veg/ grss combo) village dense (bare & low veg / grss combo) smallholdings (tree) smallholdings (bush) smallholdings (low veg / grass) smallholdings (bare) urban recreational fields (bush) urban recreational fields (grass) urban recreational fields (bare) commercial industrial roads & rails (major linear) mines: surface infrastructure mines: extraction pits, quarries mine: tailings and resource dumps fallow land & old fields (wetlands)
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14 Impacts and Risks Identified

14.1 Impacts and risks associated with the K4 Shaft PCD project

Impact and risks identified during the impact assessment phase and the significance thereof are indicated in in Table 14.1 until table 14.3. The various sections below provide modelling results and a summary of the impacts to be expected.

14.1.1 Soil and land capability

The information in this section was obtained from the Soil Compliance Statement compiled by The Biodiversity Company (2023).

During the site survey undertaken, the most sensitive soil forms identified were the Arcadia and Zondereinde soil forms. Other less sensitive soil forms identified include the Rensburg, Rustenburg and Wasbank soil forms. These soils are usually hard to work with for most activities (TBC1, 2023). The identified soil forms have been determined to have a land capacity class of “III” and “IV” with a climate capacity level of 8 based off the Low Mean Annual Precipitation (MAP) and the high MEAN Annual Potential Evapotranspiration (MAPE) rates. The project area is characterised as non-arable, and it is characterised with a “Low to Medium” sensitivity.

The specialist disputes some areas which have been identified to have a “Moderate” sensitivity to be revised to a “Low” sensitivity as the soil forms have a low potential for cropping activities. It is the specialist’ opinion that that the proposed project will have limited impacts such as soil erosion losses, loss of potential land capability, spillages, and soil compaction on agricultural production ability of the land within the project area (TBC1, 2023)

During construction phase, the topsoil will be cleared for the construction of the PCD, V-drain and, stripped and stockpiled. No new access roads will be constructed as existing roads will be utilised during construction. The contractor and laydown area will not be cleared of vegetation as the construction laydown area will be situated on an area already cleared of vegetation.

14.1.2 Biodiversity (terrestrial fauna and flora)

The information in this section was obtained from the Terrestrial Biodiversity compliance statement compiled by The Biodiversity Company (2023), unless otherwise indicated.

According to TBC2, (2023) historic anthropogenic activities have taken place throughout most of the region in which the project area is situated. Several negative impacts to biodiversity were observed and includes mining activities, historic land modification largely in the form of road and powerline infrastructure, and the associated land clearing and edge effects; livestock grazing, minor and major gravel roads, pipeline infrastructure Invasive Alien plant infestations and fences and associate infrastructure.

During construction and operational phases, the proposed activities are likely to have a negative effect on the following important ecological areas;

- Degraded Critical Biodiversity areas
- Degraded Ecological support Area, and
- Indigenous vegetation

Construction Phase

During construction phase the potential impacts on flora and fauna community within the project area were considered and are expected to have the largest direct impact on the flora and fauna:

- Destruction, further loss and fragmentation of the habitats, ecosystems, and vegetation community;
- Introduction of alien and invasive species, especially plants;

- Displacement of the indigenous fauna community due to habitat loss. Direct mortalities, and disturbance (such as noise, dust, road collisions, light, vibration, and poaching).

Operational Phase

During the operational phase the impact of daily activities is anticipated to further spread the alien invasive species as well as to further deteriorate the habitats due to increase dust and edge effect impacts. Dust reduces the ability of plants to photosynthesize and thus leads to degradation/retrogression of the veld, (TBC2, 2023). Moving maintenance vehicles do not only cause sensory disturbances to fauna that affects their life cycles, but will also lead to displacement and direct faunal mortalities due to collision. The following impacts were considered:

- Continued fragmentation and degradation of habitats and ecosystems;
- Spread of alien and/or invasive species; and
- Ongoing displacement and direct mortalities of the faunal community (including possible SCC) due to continued disturbance (road collisions, noise, light, dust, vibration, poaching, erosion, etc.).

Decommissioning and closure phase

The following impacts were identified to occur during closure phase:

- Alien and invasive plant colonialisation
- Increased habitat degradation (Inclusive of Uncontrolled veld fires, poaching).

14.1.3 Wetlands

The information in this section was obtained from the Wetland delineation assessment compiled by WCS Scientific (Pty) Ltd (2023).

It is expected that the overall proposed project will not infringe directly on the river or associated riparian habitat as all permanent infrastructure will remain approximately 95m from the delineated riparian habitat associated with the Sterkstroom river. In summary the following impacts are expected to occur within the project area:

- Increased risk of erosion of catchments soils and sediment transport into the riparian habitat; and
- Deterioration of water quality

Increased risk of erosion of catchments soils and sediment transport into the riparian habitat

Clearing of vegetation and disturbance of soils within the catchment of the river will expose the bare soils to an increased risk of erosion. Any erosion of catchment soils that does occur will provide a potential sediment source to the adjacent river and riparian habitat should storm events lead to surface runoff during any phase of the project. Increased sediment within the river can lead to burial of riparian and instream vegetation and soils and increased turbidity in the water column, all of which would result in a deterioration of the riparian and instream habitat. Material stockpiles or constructed berms (if composed of easily erodible materials) could also act as sediment sources. However, the proposed infrastructure footprint lies approximately 95m from the edge of riparian habitat, making it unlikely that mobilised sediment in surface runoff would reach the river.

Deterioration of water quality

During both the construction and operation phase, as activities are taking place adjacent to the riparian habitat, there is a possibility that water quality can be impaired. Impairment may occur as a consequence of any sediment transported into the river resulting in an increase in turbidity. Water quality may also be impaired because of accidental spillages and the intentional washing and rinsing of equipment. It is likely that hydrocarbons will be stored and used on site, as well as other potential pollutants, such as cement. Construction activities could lead to an impact on water quality through leaks and spillages from machinery and materials used on site, entering the river.

During operation, the channels will intercept and convey potentially polluted flows from the waste rock dump footprint to the lined PCD, from which collected dirty water will be pumped back to K4 shaft for re-use. Only during exceptionally high flow events, when the volume of the PCD is exceeded, will flows collected within the PCD potentially discharge to the environment via the spillway on its eastern edge. As such, the placement of the proposed infrastructures (channel and berm, lined PCD, and pipeline) will effectively reduce the risk of water quality deterioration in the receiving river during normal operating conditions, as a result of the (already authorised and existing) waste rock dump. In the expectedly infrequent event of overflow from the PCD via the spillway towards the Sterkstroom River, or spills or leakages from the pipeline, an impact to water quality in the river can be expected. The nature of this water quality impact is uncertain, but is expected to align with potentially leachable constituents of the waste rock being stored.

14.1.4 Air Quality

During construction phase, the impacts expected to occur includes the Increase in ambient air quality due to Construction of the channel/berm, PCD and pipeline - overflow from the PCD. SS already has a dust monitoring programme in place and will continue to implement the programme during the construction and operational phase of the proposed project.

14.1.5 Noise

During Construction phase, the potential impact occurring includes the increase in ambient noise levels due to the construction of the PCD and associated infrastructure as well as increase in noise due to vehicular movement and traffic. The potential impacts can be mitigated by implementing a sit specific noise and vibration management plan/procedure as well as implementing a vehicle maintenance plan for the maintenance of vehicle and restrict construction activities to daytime working hours only.

14.1.6 Visual

During the Construction and operational phase, the potential impact in terms of visual perspective includes the visual disturbance to the surrounding area resulting from the expansion of the WRD on its current approved footprint. The mitigation measure proposed for this impact includes the rehabilitation of the WRD to lessen the visual impact on the surrounding area. Another potential impact includes the night glare that might arise from night-time lighting at the mine. The potential mitigation measures proposed for this impact includes the reduction of uplighting by installing light fixtures in a downwards direction.

14.1.7 Heritage

The information in this section was obtained from the Heritage Impact Assessment compiled by Beyond Heritage (2023).

As described in the heritage sections (Section 10.14) above, heritage resource sightings were observed during a site survey in June 2023. The recorded sites are indicated on a Topographic Map dating to 1968 and is assumed to be older than 60 years and therefore protected by the NHRA based on its age. The features have been demolished to the extent that it holds very little if any heritage value and the potential impact is low.

Any additional effects to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure. Mitigation measures as recommended by the specialist should be implemented during all phases of the project. Impacts of the Project on heritage resources is expected to be low during all phases of the development if mitigation measures are followed.

Pre-Construction Phase

It is assumed that the Pre-Construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can be negative and irreversible impact on heritage features if any occur. Impacts include destruction or partial destruction of non-renewable heritage resources.

Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. Potential impacts include destruction or partial destruction of non-renewable heritage resources.

Operational Phase

No impacts are expected during the operational phase

Impact and risks identified during the impact assessment phase and the significance thereof are indicated in in Table 14.1 until table 14.3. The various sections below provide modelling results and a summary of the impacts to be expected.

Table 14-1: Assessment of identified impacts of proposed K4 Shaft and associated infrastructure project during the construction phase

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Topography																					
Construction Phase	Altered natural topography (landscape and land use capability)	Development of the PCD and associated infrastructure	2	4	1	2	1	5	50	50	Medium	Negative	<ul style="list-style-type: none"> Development (if not already in place), update (if in place) and implementation of a site specific "Master Layout Plan/Procedure" aligned with the Life of Asset Mine Plan/Procedure that includes but are not limited to: <ul style="list-style-type: none"> Optimisation of mine related surface infrastructure areas. Minimisation of footprint disturbances. Demarcates laydown areas. Demarcation of construction areas. Demarcation of development areas. Demarcation of stormwater management infrastructure. Demarcation of topsoil stockpiling areas. Aligns with the site-specific Closure and end Land Use Plan/Procedure. Development (if not already in place), update (if in place) and implementation of a site-specific Rehabilitation Plan/Procedure aimed at achieving a Final Rehabilitation and Closure Plan/Procedure aligned with the Life of Asset Mine Plan/Procedure and achievable End Land Use Development Framework. Note all documentation (Plan/Procedure) development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management. 	2	4	2	2	1	4	44	44
Soils and Agricultural potential																					
Construction Phase	Loss of future soil utilisation potential	Development of the PCD and associated infrastructure, earthworks	8	4	1	1	1	2	30	30	Low	Negative	<ul style="list-style-type: none"> Development (if not already in place), update (if in place) and implement a Topsoil Utilisation Management Plan/Procedure, that includes but is not limited to: <ul style="list-style-type: none"> Alignment with the site-specific Biodiversity Management Plan/Procedure, Alien and Invasive Plant Species Management Plan/Procedure and Concurrent Rehabilitation Plan/Procedure aimed at achieving a Final Rehabilitation and Closure Plan/Procedure aimed at the prevention of erosion and loss of soil quality as to promote rehabilitation. Promoting the single handling of topsoil, where practically possible as to protect soil structure. Stripping of topsoil, and other soil layers, inclusive of vegetation cover/organic matter, prior to the development of any infrastructure and the stockpiling/storage thereof in dedicated topsoil stockpile areas located outside the 1:100-year flood line and flood plains of watercourses. Stockpiling utilisable soil (as defined) separately from the soft overburden. 	6	4	1	1	1	2	26	26
Impacts to Biodiversity - Vegetation, Habitats, Fauna																					
Construction Phase	Destruction, further loss and fragmentation of the habitats, ecosystems, and vegetation community	Clearance of vegetation	2	3	2	2	2	3	33	33	Low	Negative	<ul style="list-style-type: none"> Avoid the further disturbance or destruction of areas outside of the development footprint. Rehabilitate areas as soon as they are no longer impacted by construction. The rehabilitated areas must be revegetated with indigenous vegetation. 	2	2	1	0	1	2	12	12
	Introduction of alien and invasive species, especially plants	Clearance of vegetation and movement of construction vehicles	2	4	2	2	3	3	39	39	Low	Negative	<ul style="list-style-type: none"> Compile and implement an alien vegetation management plan from the onset of construction. The plan must identify areas for action (if any) and prescribe the necessary removal methods and frequencies to be applied. 	2	3	1	1	2	2	18	18
	Displacement of the indigenous faunal community (including possible SCC) due to habitat loss, direct mortalities, and disturbance (road collisions, noise, dust, light, vibration, and poaching).	Clearance of vegetation and movement of construction vehicles	4	3	2	2	2	3	39	39	Low	Negative	<ul style="list-style-type: none"> Clearing and/or disturbance activities must be conducted in a progressive linear manner, from the north to the south of the PAOI and over several days, to provide an easy escape route for all small mammals and herpetofauna. 	2	3	1	1	1	2	16	16

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
			M	D	S	I	R	P	TOTAL	SS	M	D				S	I	R	P	TOTAL	SS				
Wetland Delineation and Assessment																									
Construction	Increased risk of erosion and sedimentation	Construction of the channel, berm and PCD - Vegetation clearing and earth works	4	2	2	1	2	3	33	33	Low	Negative	<ul style="list-style-type: none"> Dry season construction preferable, or place sediment barriers downslope of bare areas and material stockpiles to limit sediment transport towards the riparian habitat. No vehicle and foot traffic within the delineated riparian habitat or within the 25m buffer, to avoid rut formation and the development of preferential flow pathways. No vegetation and soil disturbance within the riparian habitat or buffer. Avoid creation of concentrated or diverted flow pathways towards the riparian habitat. Revegetate construction footprint post construction to limit sources of sediment. This should include the outer walls of the PCD and channel berms if these will be composed of, or topped with, sediment that can be eroded easily during rainfall events. Completely remove any material or sediment stockpiles at the end of construction. 	2	2	1	1	1	2	14	14				
	Water quality deterioration	Construction of the channel, berm and PCD - use of potentially polluting materials, equipment, increased turbidity.	4	2	2	1	2	3	33	33	Medium	Negative	<ul style="list-style-type: none"> Dry season construction preferable, or place sediment barriers downslope of bare areas and material stockpiles to limit sediment transport towards the riparian habitat. No vehicle and foot traffic within the delineated riparian habitat or within the 25m buffer, to avoid rut formation and the development of preferential flow pathways. No vegetation and soil disturbance within the riparian habitat or buffer. No storage of equipment, materials, or machinery within the riparian habitat or buffer. Avoid creation of concentrated or diverted flow pathways towards the riparian habitat. Revegetate construction footprint post construction to limit sources of sediment. This should include the outer walls of the PCD and channel berms if these will be composed of, or topped with, sediment that can be eroded easily during rainfall events. Completely remove any material or sediment stockpiles at the end of construction. Provide appropriate ablutions for construction personal outside of the riparian habitat and buffer. No littering on site. 	2	2	1	1	1	2	14	14				
Cultural and Heritage Impact Assessment																									
Operational	Heritage resources	Waste Rock Dump and pollution Control Dam	2	5	3	5	5	2	40	40	Low	Negative	<ul style="list-style-type: none"> Implementation of a chance find procedure for the project 	2	5	3	0	0	2	20	20				
Surface Water																									
Construction	Surface water deterioration	Development of the channel/berm, PCD and pipeline - overflow from the PCD, or accidental seepage, leaks or spills of dirty water from the channel, PCD or pipeline	8	4	2	3	1	2	36	36	Low	Negative	<ul style="list-style-type: none"> Update, implement and maintain site specific Stormwater Management Plan/Procedure. Update, implement and maintain site specific Surface Water Quality Monitoring Programme. Update, implement and maintain site specific Waste (General and Hazardous) Management Plan/Procedure. Update, implement and maintain site specific Chemical & Hydrocarbon Spill Procedure. Update, implement and maintain site specific Water and Salt Balance. Update, implement and maintain site specific Vehicle and Machinery Maintenance and Management Plan/Procedure. Update, implement and maintain site specific Dangerous Goods and Hazardous Substances Storage and Handling Management Plan/Procedure Update, implement and maintain hazard specific Emergency Preparedness and Response Plan. Update, implement and maintain hazard specific Recovery Plan. Note all documentation (Plan/Procedure) development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management. 	4	4	2	1	0	2	22	22				
Noise																									
Construction	Increased ambient noise levels	Construction of the PCD and associated infrastructure	6	4	2	1	2	3	45	45	Medium	Negative	<ul style="list-style-type: none"> Update, implement and maintain site specific Noise and Vibration Management Monitoring Plan/Procedure. Update, implement and maintain site specific Vehicle and Machinery Maintenance and Management Plan/Procedure. Note all documentation (Plan/Procedure) development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management. 	4	4	2	0	2	3	36	36				
	Increased ambient noise levels	Traffic and vehicular movement	6	4	2	1	2	3	45	45	Medium	Negative	<ul style="list-style-type: none"> Update, implement and maintain site specific Noise and Vibration Management Monitoring Plan/Procedure. Update, implement and maintain site specific Vehicle and Machinery Maintenance and Management Plan/Procedure 	4	4	2	0	2	3	36	36				

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION										
			M	D	S	I	R	P	TOTAL	SS	M	D				S	I	R	P	TOTAL	SS					
																<ul style="list-style-type: none"> Note all documentation (Plan/Procedure) development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management. 										
Visual																										
Construction	Visual disturbance to surrounding area	Expansion of current WRD footprint	# #	5	2	3	3	4	92	92	Medium High	Negative	<ul style="list-style-type: none"> All EMP recommended mitigation measures as applicable for Biodiversity Management must be adhered to. All EMP recommended mitigation measures as applicable for Air Quality Management/dust must be adhered to. Where practically possible light fixtures to be strategically placed to avoid/reduce visual intrusion (glare and light trespass) on community facing sides. Where practically possible high light masts and high pole security lighting should be avoided along the periphery of the site. Where practically possible uplighting of mine related surface infrastructure must be avoided/reduced. Where practically possible lighting to be installed at a downwards angle (precise directed illumination). Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	6	4	2	3	3	3	54	54					
Air quality																										
Construction Phase	Increased Air Emissions and fugitive dust	Construction of the channel/berm, PCD and pipeline - overflow from the PCD,	6	4	2	2	3	3	51	51	Medium	Negative	<ul style="list-style-type: none"> Update, implementation and maintain site specific Air Quality Monitoring and Management Plan/Procedure (Emissions and Dust Control Management) Update, implement and maintain site specific Vehicle and Machinery Maintenance and Management Plan/Procedure. 	4	3	2	1	2	3	36	36					
Traffic																										
Construction Phase	Increased road traffic/congestion. Increased risk to road and pedestrian safety.	Construction of the channel/berm, PCD and pipeline - overflow from the PCD,	4	3	2	1	5	3	45	45	Medium	Negative	<ul style="list-style-type: none"> Update, implement and maintain the Traffic Management Plan/Procedure through the operational life cycle of the mine. 	4	3	2	1	4	2	28	28					
Socio-Economic																										
Construction Phase	Creation of local employment and business opportunities due to the development/operation of new mining related infrastructure (projects), surface infrastructure, services, and linear activities.	Creation of socio-economic opportunities and procurement opportunities due to the development/operation of new mining related infrastructure (projects), surface infrastructure, services, and linear activities.	6	2	2	0	3	3	39	39	Medium	Positive	<ul style="list-style-type: none"> Implement and maintain the Social and Labour Plan. Update, implement and maintain the Local Recruitment and Procurement Plan/Procedure Update, implement and maintain the Community Health and Safety Plan/Procedure. Update, implement and maintain the Grievance Register. Update, implement and maintain the Continuous Encroachment Forewarning Mechanism. Implement and maintain a monitoring mechanism to ensure adherence of lease agreement conditions. Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	6	2	2	0	0	3	30	30					

Table 14-2: Assessment of identified potential impacts of the proposed K4 Shaft and associated infrastructure project during the operational phase

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Topography																					
Operational	Altered Natural topography	Maintaining infrastructure inclusive of the PCD, Berm and pipeline	4	4	1	2	3	2	28	28	Low	Negative	<ul style="list-style-type: none"> Update, implement and maintain the Concurrent Rehabilitation Plan/Procedure aimed at achieving a Final Rehabilitation and Closure Plan/Procedure aligned with the Life of Asset Mine Plan/Procedure and achievable End Land Use Development Framework. Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	4	4	1	2	3	2	28	28
Soils and Agricultural potential																					
Operational	Loss of future soil utilisation	Operation of PCD and maintenance of associated infrastructure	4	4	1	1	1	2	22	22	Low	Negative	<ul style="list-style-type: none"> Update and maintain the Topsoil Utilisation Management Plan/Procedure that includes but are not limited to the following: <ul style="list-style-type: none"> Implementation and maintenance of protection measures to protect the topsoil/soil stockpiles from water and wind erosion. Continual alignment with the Master Layout Plan/Procedure which coincides with the Life of Asset Mine Plan/Procedure aimed at the protection of utilisable topsoil. Development (if not already in place), update (if in place) and implement a Concurrent Rehabilitation and Closure Plan/Procedure based on the End Land Use Development Framework aimed at the most suitable utilisation of topsoil. Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	2	1	1	1	0	1	5	5
Impacts to Biodiversity																					
Operational Phase	Continued fragmentation and degradation of habitat ecosystems	Operational activities associated with retreatment	4	3	2	2	2	3	39	39	Low	Negative	<ul style="list-style-type: none"> Avoid the further disturbance or destruction of areas outside of the development footprint. Rehabilitate areas as soon as they are no longer impacted by construction. The rehabilitated areas must be revegetated with indigenous vegetation. 	2	2	1	1	1	2	14	14
	Spread of alien and/or invasive species	Moving Maintenance vehicles	2	3	2	2	2	3	33	33	Low	Negative	<ul style="list-style-type: none"> Implementation of an alien vegetation management plan. Regular monitoring for AIP encroachment during the operation phase to ensure that no alien invasion problems have developed as result of the disturbance. 	2	2	1	1	1	2	14	14
	Ongoing displacement and direct mortalities of the faunal community (including possible SCC) due to continued disturbance (road collisions, noise, light, dust, vibration, poaching, erosion, etc.).	Operational activities and moving maintenance vehicles	4	3	2	2	2	3	39	39	Low	Low	<ul style="list-style-type: none"> Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (yellow) lights should be used wherever possible. 	2	3	1	1	1	2	16	16
Wetland Delineation and Assessment																					

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Operation	Increased risk of erosion and sedimentation	Maintenance of the channel, berm and PCD - vegetation clearing, earthworks	2	3	1	1	2	2	18	18	Low	Negative	<ul style="list-style-type: none"> Schedule maintenance of the infrastructure (specifically PCD and eastern channel/berm) for the dry season or place sediment barriers downslope of bare areas and material stockpiles to limit sediment transport towards the riparian habitat. No vehicle and foot traffic within the delineated riparian habitat or within the 25m buffer, to avoid rut formation and the development of preferential flow pathways. No vegetation and soil disturbance within the riparian habitat or buffer. Avoid creation of concentrated or diverted flow pathways towards the riparian habitat. Revegetate any disturbance footprint post maintenance to limit sources of sediment. This should include the outer walls of The PCD and channel berms if these will be composed of, or topped with, sediment that can be eroded easily during rainfall events. Completely remove any material or sediment stockpiles at the end of work. 	2	3	1	1	1	1	8	8
	Water quality deterioration	Functioning of the channel/berm, PCD and pipeline - overflow from the PCD, or accidental seepage, leaks or spills of dirty water from the channel, PCD or pipeline	6	3	3	1	2	4	60	60	Medium	Negative	<ul style="list-style-type: none"> Place erosion protection structures below PCD spillway outlet to limit the risk of erosion, slow flows and encourage infiltration. Monitor spillway outlet following heavy rainfall events, following any overtopping events from the PCD, and at the end of the wet season to identify any erosion that may have taken place below the spillway. If erosion is noted, corrective actions to be identified and implemented. Ensure all infrastructures remain in a good state of repair to limit the risk of accidental leaks or spills. Implement monitoring plan for the channels/berm, PCD and pipeline to identify issues and apply corrective measures. A detailed spill management and rehabilitation plan (as part of the Standard Operating Procedure – SOP) must be compiled by a suitably qualified specialist or specialist team in advance of the construction and operation phase to deal with possible spill scenarios (from pipelines and PCD). This plan must include a pipe failure response plan and must detail timeframes for response, management, and rehabilitation as well as the responsible persons. The SOP's should preferably be signed off by the relevant environmental authorities. Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	4	3	3	1	1	3	36	36
Surface Water																					
Operational	Surface water deterioration	Functioning of the channel/berm, PCD and pipeline - overflow from the PCD, or accidental seepage, leaks or spills of dirty water from the channel, PCD or pipeline	8	4	2	3	1	2	36	36	Low	Negative	<ul style="list-style-type: none"> Update, implement and maintain site specific Stormwater Management Plan/Procedure. Update, implement and maintain site specific Surface Water Quality Monitoring Programme. Update, implement and maintain site specific Waste (General and Hazardous) Management Plan/Procedure. Update, implement and maintain site specific Chemical & Hydrocarbon Spill Procedure. Update, implement and maintain site specific Water and Salt Balance. Update, implement and maintain site specific Vehicle and Machinery Maintenance and Management Plan/Procedure. Update, implement and maintain site specific Dangerous Goods and Hazardous Substances Storage and Handling Management Plan/Procedure Update, implement and maintain hazard specific Emergency Preparedness and Response Plan. Update, implement and maintain hazard specific Recovery Plan. Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	4	4	2	1	0	2	22	22

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Noise																					
Operational	Increased ambient noise levels	Functioning of the conveyor belt transporting waste rock to the Waste Rock Dump	6	4	2	1	2	3	45	45	Medium	Negative	<ul style="list-style-type: none"> Update, implement and maintain site specific Noise and Vibration Management Monitoring Plan/Procedure. Update, implement and maintain site specific Vehicle and Machinery Maintenance and Management Plan/Procedure. Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	4	4	2	0	2	3	36	36
	Increased ambient noise levels	Traffic and vehicular movement	6	4	2	1	2	3	45	45	Medium	Negative	<ul style="list-style-type: none"> Update, implement and maintain site specific Noise and Vibration Management Monitoring Plan/Procedure. Update, implement and maintain site specific Vehicle and Machinery Maintenance and Management Plan/Procedure Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	4	4	2	0	2	3	36	36
Visual																					
Operational	Visual disturbance to surrounding area	Expansion of current WRD footprint Nighttime Glare as a result of light fixtures	10	5	2	3	3	4	92	92	Medium High	Negative	<ul style="list-style-type: none"> All EMP recommended mitigation measures as applicable for Biodiversity Management must be adhered to. All EMP recommended mitigation measures as applicable for Air Quality Management/dust must be adhered to. Where practically possible light fixtures to be strategically placed to avoid/reduce visual intrusion (glare and light trespass) on community facing sides. Where practically possible high light masts and high pole security lighting should be avoided along the periphery of the site. Where practically possible uplighting of mine related surface infrastructure must be avoided/reduced. Where practically possible lighting to be installed at a downwards angle (precise directed illumination). Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	6	4	2	3	3	3	54	54
Air quality																					
Operational Phase	Increased Air Emissions and fugitive dust	Operation and expansion of WRD	6	4	2	2	3	3	51	51	Medium	Negative	<ul style="list-style-type: none"> Update, implementation and maintain site specific Air Quality Monitoring and Management Plan/Procedure (Emissions and Dust Control Management) Update, implement and maintain site specific Vehicle and Machinery Maintenance and Management Plan/Procedure. Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	4	3	2	1	2	3	36	36

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Traffic																					
Operational Phase	Increased road traffic/congestion. Increased risk to road and pedestrian safety.	Functioning and maintenance of the channel/berm, PCD and pipeline - overflow from the PCD,	4	3	2	1	5	3	45	45	Medium	Negative	<ul style="list-style-type: none"> Update, implement and maintain the Traffic Management Plan/Procedure through the operational life cycle of the mine. Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	4	3	2	1	4	2	28	28
Socio-Economic																					
Operational Phase	Creation of local employment and business opportunities due to the development/operation of new mining related infrastructure (projects), surface infrastructure, services and linear activities.	Creation of socio-economic opportunities and procurement opportunities due to the development/operation of new mining related infrastructure (projects), surface infrastructure, services and linear activities.	6	4	3	0	2	4	60	60	Medium	Positive	<ul style="list-style-type: none"> Implement and maintain the Social and Labour Plan. Update, implement and maintain the Local Recruitment and Procurement Plan/Procedure. Update, implement and maintain the Community Health and Safety Plan/Procedure. Update, implement and maintain the Grievance Register. Update, implement and maintain the Continuous Encroachment Forewarning Mechanism. Implement and maintain a monitoring mechanism to ensure adherence of lease agreement conditions. Note all documentation development must take into consideration the recommendations as made by the most-up-to-date specialist assessments taken in that regard as well as all relevant legislation governing its management from the date of being promulgated. Note all documentation (Plan/Procedure) should be updated when and if required and should take into consideration the inclusion of new developments, changes to existing developments and the most-up-to date relevant specialist studies, guidelines and legislation governing its management. 	6	4	3	0	0	3	39	39

Table 14-3: Assessment of identified potential impacts of the proposed K4 Shaft and associated infrastructure project during the decommissioning and closure phase

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Topography																					
Decommissioning and Closure	Altered Topography	Rehabilitation and alteration of topography	10	3	1	2	2	3	54	54	Medium	Negative	<ul style="list-style-type: none"> Implementation of a Final Rehabilitation and Closure Plan/Procedure aligned with the End Land Use Development Framework, inclusive but not limited to: The contouring of topsoil/soil on rehabilitated areas to prevent erosion through gully formation and ponding of water. The vegetation of rehabilitated area either by natural succession or through a suitable seed mix to protect soils from water and wind erosion. Where required, provide for the loss of nutrients in the soil through addition of organic matter during final rehabilitation placement. 	6	2	1	1	0	2	20	20
Soils, Land Use and land capability (Removed WRD Berms, Pollution Control Dam and Pipeline)																					
Decommissioning and Closure Phase	Soil erosion	Management of surface water run-off and erosion through gully formation	8	3	3	3	2	4	76	76	Medium High	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Topsoil and contour/bench rehabilitated areas as to prevent wind and water erosion. Monitor the impact from erosion after a severe rainfall event and implement repairs immediately. Where appropriate, allow for energy dissipation structures or sedimentation traps to be constructed. Stabilise all open slopes immediately to prevent erosion and gully formation. Ensure that gradients of the slopes are planned in such a way so that the run-off water will not cause wash ways. Allow for the natural succession of indigenous species. Should it seem that indigenous species battle to colonise the areas, consideration should be given to the establishment of vegetation by means of a seed mix. 	4	1	1	2	2	4	40	40
	Soil Compaction	Mechanical foundation compaction from increased vehicular movement.	4	2	2	2	2	4	48	48	Medium	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Minimise catchment hardening as far as possible, and design and implement a rigorous storm water management system for the development area. Restrict vehicular movement to the demarcated areas as to allow for rehabilitation to occur successfully. For rehabilitation purposes, rip the soils to at least 25cm to allow for seed germination and natural plant succession. 	1	5	1	1	1	4	36	36
	Soil contamination	Spills/leaks of minerals and improper waste handling, storage, and disposal.	2	3	1	1	1	4	32	32	Low	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Provide spill containment kits across the operation in suitable locations and train staff how to use these. Maintain and implement an Incident Management and Emergency Procedure/s. Maintain the vehicle and equipment maintenance plan. Vehicles and machinery must be regularly serviced and operated according to manufacturer's specifications. When an emergency breakdown occurs, adequate drip plates shall be used to prevent oils / lubricants / fuels from spilling onto exposed soils. Vehicles only to be services at dedicated areas located outside of the development area. No servicing or repairs to take place on bare soil. Burying of waste to be strictly prohibited. Any general waste that cannot be recycled must be disposed of at an approved landfill site as general waste. Make use of a licensed/permitted waste contractor. Hazardous waste should be placed into hazardous waste skips and should then be removed together with other hazardous waste by a licensed/permitted waste management contractor and disposal of at a licensed hazardous landfill site. Ensure that dirty areas are contained, and oil separators are incorporated as relevant. Development of updated closure plans based on the outcome of the soil and aquifer characterisation studies. 	0	0	0	1	1	1	2	2
Impacts to Biodiversity and Wetland areas																					

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
			M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS	
Decommissioning and Closure Phase	Alien and Invasive Plant Colonisation	Alien and Invasive Plant Colonisation	4	5	1	1	1	5	60	60	Medium	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Recurring invasive species must be controlled and removed (Category 1a and 1b (NEM:BA) and Category 1 and 2 (CARA)). Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment. The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing off-spring, forming seed, regenerating or re-establishing itself in any manner. A programme should be implemented to identify, manage and eradicate alien and invasive species. The use of herbicides and pesticides must be limited as far as possible. Herbicides should only be applied in the concentrations prescribed by the product labels and the safety instructions on the product labels should be followed at all times. Only contractors with a valid pest control operator (PCO) certificate (certified by the Department of Agriculture, for a specific field of pest control) will be permitted to oversee the application of chemicals for the eradication of alien vegetation. Copies of these valid certificates must be kept 	2	1	1	1	1	2	12	12	
	Destruction / alteration of protected species and their habitat	Wetland degradation due to sedimentation and water quality and quantity impacts	Wetland degradation due to sedimentation and water quality and quantity impacts	6	4	1	3	3	5	85	85	Medium High	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Ensure an effective clean and dirty water separation systems as part of the storm water management plan - Ensure through effective implementation that clean water is allowed to leave the site clean and that clean water is not allowed to spill into the dirty water system and vice versa. Implement an effective monitoring programme as per the approved Water Use Licence. Ensure stabilisation of slopes to reduce erosion into the wetlands 	2	1	1	3	3	3	30	30
		Uncontrolled veld fires	Uncontrolled veld fires	2	2	1	1	1	3	21	21	Low	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> No informal fires are allowed within the area as to prevent veld fires. Adequate firefighting equipment should be provided on-site. Correct PPE should be used. 	2	2	1	1	1	3	21	21
		Poaching	Poaching	3	5	1	3	1	2	26	26	Low	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Implement an Anti-Poaching Procedure. No trapping or hunting of any faunal species is to take place within the mining area and should any faunal species be encountered, that may need relocation, these species will be relocated to a suitable habitat. Implement access control to site as to manage the movement of construction workers on and off site. 	3	5	1	3	1	2	26	26
Surface water																						
Decommissioning and Closure Phase	Water Quality	Siltation of surface water resource - transportation of disturbed soils.	2	4	1	3	1	5	55	55	Medium	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Maintain an appropriate stormwater management system throughout the decommissioning and closure phase. Implement rehabilitation and monitor the adequacy of vegetation cover of disturbed areas. Confine any unpolluted water to a clean water system, away from any dirty area. Implement a suitable water monitoring programme as per the requirements of the Water Use Licence. Inspect diversion trenches and berms after a heavy storm event as to ensure the integrity and stability and to address erosion problems immediately. Implementation of energy dissipaters at the appropriate places as to reduce the velocity and speed of surface water run-off and the risk of erosion and sedimentation. 	1	4	1	2	1	3	27	27	

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Groundwater		Hydrocarbon Contamination - Spillages / leaks of oil, grease, diesels etc	3	4	1	1	1	4	40	40	Medium	Negative	Mitigating measures: <ul style="list-style-type: none"> Repairs must take place in designated areas where there are adequate facilities to contain spills and leaks of the hydrocarbon products. Drip trays must be used where spills/leaks are likely to occur. Drip trays must be placed under vehicles/machinery. If spills or leaks do occur, they must be cleaned up immediately. Drainage Systems, Sumps and Separators: <ul style="list-style-type: none"> No dirty or contaminated water must be discharged into the surrounding environment. All channels and drains should be shaped to smooth slopes and integrated into natural drainage patterns. Disposal: <ul style="list-style-type: none"> No oil is to be disposed of in the veld or down any drains. A reputable hazardous waste removal company must collect waste oil for recovery. Hazardous waste contaminated with oil must be correctly disposed of. 	0	0	0	1	1	1	2	2
		Surface water contamination by solids and mineral solids	2	3	1	1	1	4	32	32	Low	Negative	Mitigating measures: <ul style="list-style-type: none"> All spills and leaks of chemical and petrochemical products must be reported as per the Incident and Emergency Response Procedure/s. Allow for drip trays to contain possible spillages/leakages from equipment. The spill must be assessed and addressed in accordance with EMS Procedures. All commitments as provided for under the "Hydrocarbon Management" section. 	2	1	1	1	1	3	18	18
		Poor general and hazardous waste management practices.	5	4	1	1	1	4	48	48	Medium	Negative	<ul style="list-style-type: none"> Ensure compliance with applicable legislation. National Environmental Management Waste Act 59 of 2008 (NEMWA) and all the relevant regulations and Norms and Standards. Respective Municipal by-laws. No person may: <ul style="list-style-type: none"> Dispose of waste, or knowingly or negligently cause or permit waste to be disposed of, in or on any land, water body or at any facility unless the disposal of that waste is authorised by law. Dispose of waste in a manner that is likely to cause pollution of the environment or harm to health and well-being. Dumping or impounding of rubble, litter, garbage, rubbish or discards of any description, whether solid or liquid, must take place only at the site or sites demarcated for such purpose in accordance with the measures stipulated in this document. Where possible and in terms of safety and security, waste receptacles should be provided so as to prevent littering and dumping on site. Illegal disposal, dumping and littering is illegal. All hazardous wastes (non-recyclable) are to be transported directly off site to hazardous waste disposal facilities by Hazardous waste contractor. Implement a suitable water monitoring programme as per the requirements of the Water Use Licence. Spill kits must be available at all areas where hazardous waste is being handled; if spills occur, they must be cleaned up immediately by following the Spill Procedure. Waste may not be burnt. 	0	1	1	1	1	2	8	8
		Reduced catchment yield - containment of water on site.	2	5	1	1	5	5	70	70	Medium	Negative	<ul style="list-style-type: none"> Implement effective clean and dirty water separation systems as part of the storm water management plan - Ensure through effective implementation that clean water is allowed to leave the site clean and that clean water is not allowed to spill into the dirty water system and vice versa. Confine any unpolluted water to a clean water system, away from any dirty areas. 	2	5	1	1	5	5	70	70

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Decommissioning and Closure Phases	Groundwater Pollution / Hydrocarbon Pollution	Contamination of groundwater due to waste management, sewage management and chemical spills onto the soils.	4	3	1	3	1	4	48	48	Medium	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> All management / mitigation measures outlined in the surface water section above must be fully implemented. To prevent groundwater pollution, it is critically important that all spills are collected and treated immediately after the incident occurs, to prevent leaching of contaminants into the groundwater resources. Leaks must be repaired immediately to stop leaching into soils and subsequently into the groundwater resource. Implement suitable barrier (liner) and leachate detection systems where required. A suitable monitoring program is to be implemented as per the approved Water Use Licence. Routine checks should be done on all mechanical instruments for problems such as leaks. 	4	3	2	2	2	3	39	39
Noise																					
Decommissioning and Closure Phases	Elevated noise levels causing disturbance	Noise caused by the construction activities, site clearance activities, stripping and stockpiling, civil works and haulage of building materials, operational activities and decommissioning and closure activities	4	3	2	3	3	3	45	45	Medium	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Implement regular engineering maintenance schedules for construction equipment. Implement a vehicle and equipment maintenance plan. Implement a noise monitoring program. Implement appropriate Personal Protective Equipment in working areas with elevated noise levels. Implement noise grievance procedure. Vehicular speeds should be restricted as to limit noise levels. Regular maintenance schedules, especially for diesel-powered equipment, must include the checking of the functional state of all intake and exhaust noise attenuators, the effectiveness of enclosures or any other noise control measures. <ul style="list-style-type: none"> Decommissioning and closure phase activities to be undertaken during the daytime. Mobile equipment noise: <ul style="list-style-type: none"> Use designated routes. Fit efficient silencers and enclose engine compartments. Damp mechanical vibrations where practicable. Ensure that all machinery and vehicles are well maintained. 	3	3	2	3	3	2	28	28
Visual																					
Decommissioning and Closure Phases	Generation of dust leading to visual intrusion and impacts on the overall landscape character.	Generation of dust during construction, operation and closure activities.	2	2	1	1	1	2	14	14	Low	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Implement all measures as per the Air Quality Section. Implement dust suppression on all dirt roads. Implement speed limits and traffic calming measures where appropriate. Implement dust suppression on overburden stockpiles 	2	2	1	1	1	2	14	14
Air Quality																					
Decommissioning and Closure Phases	Increased fugitive dust.	Vehicular movement.	2	2	1	1	1	2	14	14	Low	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Keep footprint as small as possible. Enforce speed limits on site. Implement a dust monitoring network. Implement dust suppression measures. Dust fallout from unpaved roads is to be mitigated. 	2	2	1	1	1	2	14	14
	Increased emissions.	Generation of greenhouse gasses caused by construction machinery and vehicles.	2	2	1	1	1	2	14	14	Low	Negative	<p>Mitigating measures:</p> <ul style="list-style-type: none"> Implement a vehicle and equipment maintenance plan. Any vehicles (Construction vehicles, fleet vehicles, Ore Transport vehicles, Private vehicles) continuously emitting black smoke must undergo the necessary repairs. Pesticides and Herbicides Spraying of pesticides and herbicides must take place by a registered Pest Control Officer (PCO), certified to apply pesticides and/or herbicides. 	2	2	1	1	1	2	14	14
Archaeological (Heritage/Cultural)																					

DEVELOPMENT PHASE	POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
			M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Decommissioning and Closure Phases	Graves and archaeological structures	Loss and demolition of structures	4	5	1	5	5	2	40	40	Medium	Negative	Mitigating measures: • Ensure all aspects of archaeological recommendations are adhered to	2	1	1	1	1	2	12	12
Traffic																					
Decommissioning and Closure Phases	Increased traffic volumes and increased road safety risks	Impact on existing traffic	4	3	1	1	1	5	50	50	Medium	Negative	Mitigating measures: • All employees, contractors and transporters should be made aware on the safe use of the roads, including adhering to the speed limit and emergency preparedness measures. • Implement traffic calming measures, where required. • Implement a Traffic Management Plan in areas where it may be required to manage vehicle flow. • Conduct alcohol breathalyser testing on all drivers entering and leaving the operation, and where necessary, take relevant action (to be defined in the operation's Fitness for Work procedure). • Ensure that roads are always maintained to an acceptable standard. • Ensure that all vehicles are road worthy.	4	3	1	1	1	2	20	20
Socio-Economic																					
Decommissioning and Closure Phases	Job losses	Rehabilitation and closure at the end of operation may result in job losses	4	5	1	1	1	5	60	60	Medium	Negative	Mitigating measures: • Consideration must be given to measures that will reduce retrenched employees' difficulties in finding work elsewhere and consequent unemployment for long periods. • Ensure that skills transfer programmes are successful. • Ensure that the closure objectives are incorporated into the Closure Plan.	4	1	1	1	1	5	40	40
	Community health and safety.	Anti-social behaviour.	4	3	1	1	1	4	40	40	Medium	Negative	Mitigating measures: • Implement strict access control to the site. • Develop a training and awareness programme addressing the spread and control of communicable diseases and anti-social behaviour. • Ensure safe transportation is available to and from the site. • Undertake alcohol and drug testing if and when required. • Implement a suitable disciplinary procedure.	4	3	1	1	1	2	20	20

15 Methodology used in determining the significance of the environmental impacts

15.1 Impact assessment methodology used for the K4 Shaft PCD project

The significance of the identified impacts will be determined using an accepted methodology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998. As with all impact methodologies, the impact is defined in a semi-quantitative way and will be assessed according to methodology prescribed in the following section.

Table 15-1: Scale utilised for the evaluation of the Environmental Risk Ratings

Evaluation Component	Rating Scale and Description/criteria
MAGNITUDE of negative impact (at the indicated spatial scale)	<p>10 - Very high: Bio-physical and/or social functions and/or processes might be <i>severely</i> altered.</p> <p>8 - High: Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered.</p> <p>6 - Medium: Bio-physical and/or social functions and/or processes might be <i>notably</i> altered.</p> <p>4 - Low : Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered.</p> <p>2 - Very Low: Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered.</p> <p>0 - Zero: Bio-physical and/or social functions and/or processes will remain <i>unaltered</i></p>
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	<p>10 - Very high (positive): Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced.</p> <p>8 - High (positive): Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced.</p> <p>6 - Medium (positive): Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced.</p> <p>4 - Low (positive): Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced.</p> <p>2 - Very Low (positive): Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced.</p> <p>0 - Zero (positive): Bio-physical and/or social functions and/or processes will remain <i>unaltered</i>.</p>
DURATION	<p>5 - Permanent</p> <p>4 - Long term: Impact ceases after operational phase/life of the activity > 20 years.</p> <p>3 - Medium term: Impact might occur during the operational phase/life of the activity – 20 years.</p> <p>2 - Short term: Impact might occur during the construction phase - < 3 years.</p> <p>1 - Immediate</p>
EXTENT (or spatial scale/influence of impact)	<p>5 - International: Beyond National boundaries.</p> <p>4 - National: Beyond Provincial boundaries and within National boundaries.</p> <p>3 - Regional: Beyond 5 km of the proposed development and within Provincial boundaries.</p> <p>2 - Local: Within 5 km of the proposed development.</p> <p>1 - Site-specific: On site or within 100 m of the site boundary.</p> <p>0 - None</p>
IRREPLACEABLE loss of resources	<p>5 – Definite loss of irreplaceable resources.</p> <p>4 – High potential for loss of irreplaceable resources.</p> <p>3 – Moderate potential for loss of irreplaceable resources.</p> <p>2 – Low potential for loss of irreplaceable resources.</p> <p>1 – Very low potential for loss of irreplaceable resources.</p> <p>0 - None</p>

Evaluation Component	Rating Scale and Description/criteria
REVERSIBILITY of impact	<p>5 – Impact cannot be reversed.</p> <p>4 – Low potential that impact might be reversed.</p> <p>3 – Moderate potential that impact might be reversed.</p> <p>2 – High potential that impact might be reversed.</p> <p>1 – Impact will be reversible.</p> <p>0 – No impact.</p>
PROBABILITY (of occurrence)	<p>5 - Definite: >95% chance of the potential impact occurring.</p> <p>4 - High probability: 75% - 95% chance of the potential impact occurring.</p> <p>3 - Medium probability: 25% - 75% chance of the potential impact occurring</p> <p>2 - Low probability: 5% - 25% chance of the potential impact occurring.</p> <p>1 - Improbable: <5% chance of the potential impact occurring.</p>
Evaluation Component	Rating Scale and Description/criteria
CUMULATIVE impacts	<p>High: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p>Medium: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p>Low: The activity is localised and might have a negligible cumulative impact.</p> <p>None: No cumulative impact on the environment.</p>

Once the Environmental Risk Ratings have been evaluated for each potential environmental impact, the Significance Score of each potential environmental impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum Significance Score value is 150.

The Significance Score is then used to rate the Environmental Significance of each potential environmental impact as per Table 15-2. The Environmental Significance rating process is completed for all identified potential environmental impacts both before and after implementation of the recommended mitigation measures.

Table 15-2: Scale used for the evaluation of the Environmental Significance Ratings

Significance Score	Environmental Significance	Description/criteria
125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project

15.2 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

The following provides a summary of the advantages and disadvantages of the proposed K4 Shaft PCD and associated infrastructure project site/layout.

Advantages

- The proposed K4 Shaft PCD project falls within Sibanye-Stillwater' approved Mining Right Area;
- The project will ensure on-going mining and safeguard that WPL K4 Shaft remains operational;
- Limited environmental impacts as the area have already been disturbed by mining related practices;
- Low faunal and floral diversity as the area is within the mining right area and has already been historically impacted by mining related impacts;
- Sibanye-Stillwater will retain current direct employment;
- Sufficient Storm Water Management around the current WRD will ensure dirty water runoff from the WRD is contained.
- Water collected in the PCD can be re-used in the Shaft for processing.

Disadvantages

- Increased noise and dust impact that will require management such as dust suppression;
- Potential long-term impacts on groundwater quality i.e., post closure;
- Visual impacts (i.e., height of overburden stockpiles, night lighting etc);

15.3 The possible mitigation measures that could be applied and the level of risk

The mitigation measures to be implemented and the level of risk of potential impacts have been addressed in Part A Section 14. Comments and concerns raised by stakeholders are included and addressed in Table 9-2.

15.4 Motivation where no alternative sites were considered

Alternatives were considered and are discussed in Part A Section 8 of this Draft EIA/EMPr.

15.5 The Final Site Layout Plan

The final site layout plan for the proposed PCD and associated infrastructure is presented in Figure 3-2.

The properties for the project site location have been selected since it is located within the existing mining right of WPL. A full list of property details is included in Part A Section 2.

No other site location alternatives were considered since the infrastructure to be implemented will be situated around the existing infrastructure including the WRD.

16 Full description of the process undertaken to identify , assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plant) through the life of the activity

All impacts and risks as identified are contained within Section 15.1 (impacts and risks identified). An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures. The methodology applied in assessing and ranking the impacts and risks is described in Section 16.4. The potential impacts and risks of the activities were identified through consultation with the applicant regarding the activities undertaken, as well as by means of GIS data and spatial tools and specialist studies.

A number of specialist studies have been undertaken to establish the baseline status quo of the K4 Shaft PCD project area as well as to identify potential impacts and provide mitigation measures. The following specialist studies were undertaken:

- Soil Compliance Statement – *The Biodiversity Company*
- Terrestrial Compliance Statement - *The Biodiversity Company*
- Wetland and Riparian Delineation assessment – *WCS Scientific (Pty) Ltd*
- Heritage impact assessment- *Beyond Heritage*
- Closure Plan and financial provision - *Hydrological Environmental Engineering Solutions (HEES)*

17 Assessment of each identified potentially significant impact and risk

Refer to the full risk assessment and mitigation measures tables provided in Part A Section 14.

18 Summary of specialist reports

Refer to Table 18-1 for recommendations made by specialists relating to the proposed PCD and associated infrastructure project.

Table 18-1: Recommendations made by specialists – K4 Shaft PCD and associated infrastructure

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section where recommendations have been included
<p>Beyond Heritage, July 2022 <i>Heritage Impact Assessment</i></p>	<ul style="list-style-type: none"> • The following recommendations for Environmental Authorisation apply and the Project may only proceed based after receiving comments from SAHRA: <ul style="list-style-type: none"> ○ The structural remains at K001, K002 and K003 should be recorded and mapped prior to development, after which a destruction permit can be applied for; ○ Through stakeholder engagement the possible presence of graves should be confirmed prior to development; ○ Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage resources (outlined in Section 10.2) in case heritage resources are uncovered during construction. 	<p>An application was lodged to SAHRA, they requested the Final EIA and appendices before they will provide a comment.</p> <p>Awaiting final comment and decision</p> <p>Implement a chance find procedure.</p>	<p>Refer to the Table 14-1 to Table 14-3</p> <p>Refer to Appendix B11 for SAHRA comment</p>
<p>The Biodiversity Company, June 2023 <i>Terrestrial Biodiversity Compliance Statement</i></p>	<ul style="list-style-type: none"> • The portion of land within the PAOI that is classified as having a sensitivity rating of ‘Very Low’, namely the modified habitat is likely to face minimal further impacts from any development activities, and as such the proposed activities may proceed within these areas. • As per the SEI guidelines, only development activities of medium impact followed by appropriate restoration activities will be acceptable within the areas designated as medium sensitivity (Degraded Marikana Bushveld). As such it is imperative that the mitigation measures mentioned in this report be implemented and adhered to. • Considering the above-mentioned information, no fatal flaws are evident for the proposed project. It is the opinion of the specialists that the project may be favourably considered on condition that all prescribed mitigation measures and supporting recommendations are implemented. 	<p>Mitigation measures implemented</p>	<p>Refer to the Table 14-1 to Table 14-3</p>
<p>The Biodiversity Company, June 2023 <i>Soil Compliance report</i></p>	<ul style="list-style-type: none"> • Furthermore, the available climate also limits crop production significantly. The climatic conditions are associated with low annual precipitation and high evapotranspiration potential demands of the area, which might not be favourable for most cropping practices. • There is no segregation of active crop fields or land with a high land potential and capability identified within the proposed area. It is the specialist’s opinion that the proposed project will have limited impacts such 	<p>Mitigation measures implemented</p>	<p>Refer to the Table 14-1 to Table 14-3</p>

List of specialist studies	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section where recommendations have been included
	as soil erosion losses, loss of potential land capability, spillages and soil compaction, on the agricultural production ability of the land, and the proposed project may be favourably considered as have been planned		
Wetland Scientific Solutions July 2023. Wetland Delineation & Assessment	<ul style="list-style-type: none"> • During operation the proposed infrastructure will be placed to intercept and convey potentially polluted water flows from the WRD to the lined PCD. Only during exceptionally high flow events, when the volume of the PCD is exceeded, will flows collected within the PCD potentially discharge to the environment via the spillway on its eastern edge. As such, the placement of the proposed infrastructures will effectively reduce the risk of water quality deterioration in the receiving river during normal operating conditions, as a result of the WRD. • Assuming that construction of the proposed infrastructures is undertaken in an environmentally sensitive manner, and all avoidance, mitigation and rehabilitation measures detailed in this report can be, and are, fully applied during the applicable project phases, indirect disturbance of river and riparian habitat can be limited to acceptable levels. As such the proposed project activities should be considered for authorisation. 	Mitigation measures implemented	Refer to the Table 14-1 to Table 14-3
Hydrological Environmental Engineering Solutions, July 2022 <i>Financial Provisioning and Closure Cost</i>	<ul style="list-style-type: none"> • An Additional R20 340 184 should be earmarked in the overall closure cost in support of the new proposed infrastructure (PCD, Pipeline, V-Drain berm) 	N/A	N/A

19 Environmental Impact Statement

19.1 Summary of the key findings of the environmental impact assessment

A summary of the assessment of the potential environmental impacts associated with the proposed PCD and associated infrastructure is indicated in Table 19-1. The mitigated assessment assumes that technical design controls, as included in the project description, together with mitigation measures included would be implemented when the proposed project is constructed and operated.

Table 19-1: Summary of significance of the potential impacts of the proposed PCD and associated infrastructure project

Aspect	Impact	Significance before mitigation	Significance after mitigation
Construction phase			
Topography	Altered natural topography (landscape and land use capability)	Medium (-)	Medium(-)
Soils	The loss of future soil utilisation potential	Low (-)	Low (-)
Terrestrial Biodiversity	Destruction, further loss and fragmentation of the habitats, ecosystems and vegetation community	Low (-)	Low (-)
	Introduction of alien and invasive species, especially plants	Low (-)	Low (-)
	Displacement of the indigenous faunal community (including possible SCC) due to habitat loss, direct mortalities, and disturbance (road collisions, noise, dust, light, vibration, and poaching).	Low (-)	Low (-)
Surface water	Surface water deterioration	Low (-)	Low (-)
Wetlands	Increased risk of erosion and sedimentation	Low (-)	Low (-)
	Water quality deterioration	Low (-)	Low (-)
Air quality	Increased Air Emissions and fugitive dust	Low (-)	Low (-)
Noise	Increase in ambient noise levels Construction of PCD and associated infrastructure	Medium (-)	Low (-)
	Traffic and vehicular movement	Medium (-)	Low (-)
Visual	Impact on Landscape Character and Sense of Place	Medium High (-)	Medium (-)
Heritage	Impact on Heritage resources	Medium (-)	Low (-)
Social	Creation of local employment and business opportunities due to the development/operation of new mining related infrastructure (projects), surface infrastructure, services and linear activities.	Low (+)	Low (-)
Operational Phase			
Topography	Altered Natural topography	Low (-)	Low (-)
Soils	Loss of future soil utilisation	Low (-)	Low (-)
Terrestrial biodiversity	Continued fragmentation and degradation of habitat ecosystems	Medium (-)	Low (-)

Aspect	Impact	Significance before mitigation	Significance after mitigation
	Spread of alien and/or invasive species	Low (-)	Low (-)
	Ongoing displacement and direct mortalities of the faunal community (including possible SCC) due to continued disturbance (road collisions, noise, light, dust, vibration, poaching, erosion, etc.).	Low (-)	Low (-)
Surface water	Surface water deterioration	Low (-)	Low (-)
Wetlands	Increased risk of erosion and sedimentation	Low (-)	Low (-)
	Water quality deterioration	Medium (-)	Low (-)
Air Quality	Increased Air Emissions and fugitive dust	Medium (-)	Low (-)
Noise	Increase in ambient noise levels - Construction of PCD and associated infrastructure	Medium (-)	Low (-)
	Traffic and vehicular movement	Medium (-)	Low (-)
Visual	Visual disturbance to surrounding area	Medium-high (-)	Medium (-)
Social	Creation of local employment and business opportunities due to the development/operation of new mining related infrastructure (projects), surface infrastructure, services and linear activities.	Low (+)	Low (-)
Traffic	Increased road traffic/congestion. Increased risk to road and pedestrian safety.	Medium (-)	Low (-)
Decommissioning and Closure			
Soils	Soil erosion	Medium-high (-)	Medium (-)
	Soil Compaction	Medium (-)	Low (-)
	Soil Contamination	Low (-)	Low (-)
Terrestrial biodiversity and Wetlands	Alien and Invasive Plant Colonisation	Medium (-)	Low (-)
	Uncontrolled veld fires	Low (-)	Low (-)
	Wetland degradation due to sedimentation and water quality and quantity impacts	Medium-high (-)	Low (-)
	Poaching	Low (-)	Low (-)
Surface water	Siltation of surface water resource - transportation of disturbed soils.	Medium (-)	Low (-)
	Hydrocarbon Contamination - Spillages / leaks of oil, grease, diesels etc	Medium (-)	Low (-)
	Surface water contamination by solids and mineral solids	Low (-)	Low (-)
	Poor general and hazardous waste management practices.	Medium (-)	Low (-)
Groundwater	Contamination of groundwater due to waste management, sewage management and chemical spills onto the soils.	Medium (-)	Low (-)
Air quality	Increased fugitive dust due to vehicular movement	Low (-)	Low (-)

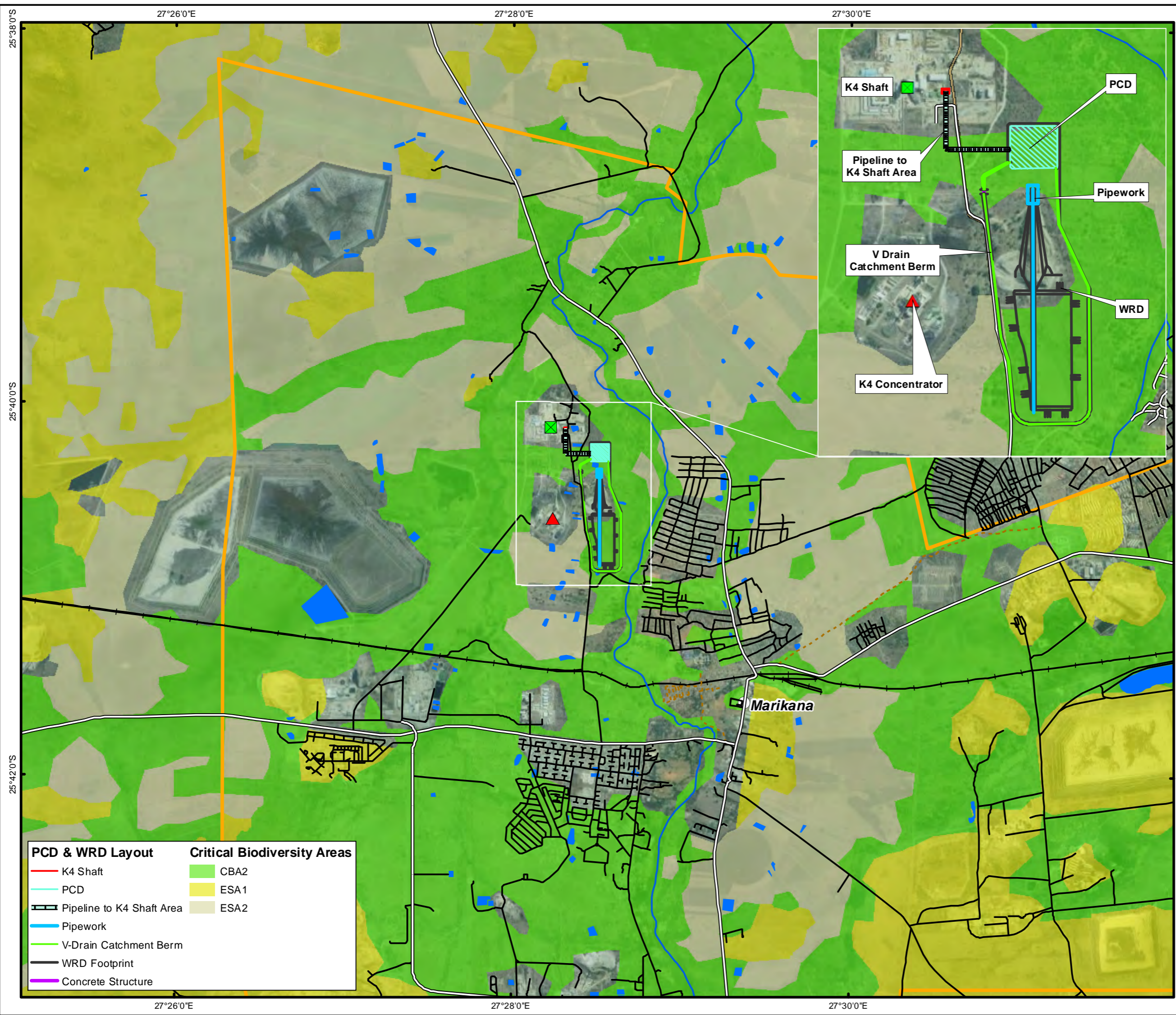
Aspect	Impact	Significance before mitigation	Significance after mitigation
	Increased emissions - Generation of greenhouse gasses caused by construction machinery and vehicles.	Low (-)	Low (-)
Noise	Noise caused by the construction activities, site clearance activities, stripping and stockpiling, civil works and haulage of building materials, operational activities and decommissioning and closure activities	Medium (-)	Low (-)
Visual	Generation of dust during construction, operation and closure activities.	Low (-)	Low (-)
Heritage	Impact on graves and archaeological structures	Medium (-)	Low (-)
Traffic	Increased traffic volumes and increased road safety risks	Medium (-)	Low (-)
Social	Job losses due to rehabilitation and closure at end of operation	Medium (-)	Medium (-)
	Community health and safety (Anti-Social Behaviour	Medium (-)	Low (-)

19.2 Final site map

The Final Site Map superimposed on a Sensitivity Layer is indicated in Figure 19-1.

19.3 Summary of the positive and negative implication and risks of the proposed activity and identified alternatives

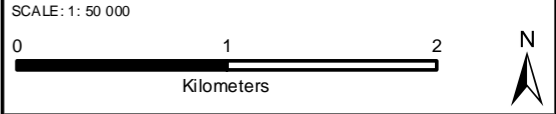
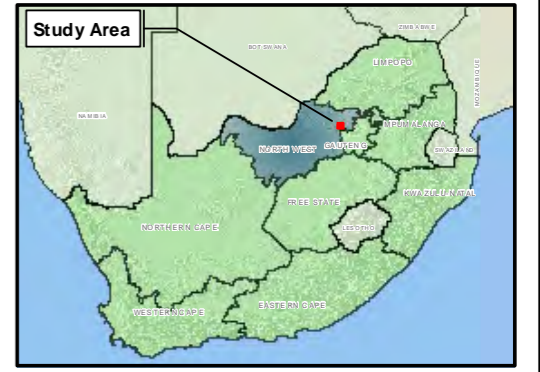
A description of the alternatives considered can be found in Part A Section 8.



PCD & WRD Layout		Critical Biodiversity Areas	
	K4 Shaft		CBA2
	PCD		ESA1
	Pipeline to K4 Shaft Area		ESA2
	Pipework		
	V-Drain Catchment Berm		
	WRD Footprint		
	Concrete Structure		

Legend

- MR106 (mining right area)
- K4 Concentrator
- K4 Shaft
- Towns
- Buildings/Ruins
- Tertiary Road
- Street/Road
- Track
- Railway
- Contours
- Rivers
- Cadastral Farms
- Water Area



TITLE:
**Critical Biodiversity map of K4 Shaft
 Pollution control dam and Waste Rock
 Dump GN704**

CLIENT:
Sibanye-Stillwater

DATE: Oct 2023	PROJECT: K4_SHAFT_PA
DRAWN: THURLOW MAPPING	APPROVED: LG
MAP: K4_SHAFT_PCD_WRD_CBA.mxd	REV: 0

Alta van Dyk Environmental Consultants cc (2011/059764/23)
 VAT No: 4630259952
 Tel: 012 940 9457
 Fax: 086 634 3967
 Cell: 082 782 4005



Projection: Transverse Mercator CM: 27 Datum:WGS 84
 Source: SANBI - NWBSP2015_Terrestrial_CBA_v1_u35s.shp
 DWA - NGA Geosites Inset: ESRI Data and Maps

SIZE:
A4

20 Proposed impact management outcomes for inclusion into the EMPr

Table 20-1 summarises the impact management outcomes for inclusion in the EMPr and consideration in the Environmental Authorisation.

Table 20-1: Impact management objectives and the impact management outcomes

Environmental aspect	Objective	Summary of impact management outcome
Topography	To minimise the extent of alteration of localised topography.	Monitor the mining and related activities in relation to the footprint area of the mine.
Soil	To prevent the loss of soil and soil erosion during the mining and mining activities.	Site inspection and monitoring programmes
Soil erosion	To prevent the loss of soil and soil fertility during decommissioning and rehabilitation activities.	Rehabilitation monitoring programme.
Land use and capability	To restore the land use and land capability to the agreed upon end land use.	Returning the land use of the area to the specifics as agreed upon during the discussions with the DMRE and the municipalities.
Flora	Prevent the destruction of vegetation and subsequent impacts on species of conservation concern and protected species.	Rehabilitation monitoring programme
Fauna	To minimise the destruction of faunal habitat and prevent fragmentation as far as possible.	Site inspection and monitoring programme Implementation of an Alien and Invasive monitoring programme Implementation of a site-specific rehabilitation plan
Surface water	To prevent quality deterioration of surface water quality and prevent impact on catchment yield.	Implementation and upgrading of storm water management programme and infrastructure. Surface water monitoring programme.
Groundwater	To prevent quality deterioration of groundwater resource.	Groundwater monitoring programme.
Sensitive Landscapes	Control and mitigation measures will be implemented to minimise the impact on the Sterkstroom River.	Surface water monitoring programme.
Air quality	Prevent the deterioration of air quality and indirect effects on floral, faunal and human health	Air quality monitoring programme.
Noise	Prevent and mitigate against the effects of noise on sensitive receptors (including employees and surrounding communities and towns).	Noise monitoring programme.
Visual aspects	Prevent visual intrusions on sensitive receptors	Implementation of rehabilitation plan
Sites of cultural importance	Prevent the destruction of National Heritage Resources	If any findings of archaeological importance are made, (other than that identified within the HIA) activities will be stopped immediately with such findings reported to the South African Heritage Resources Agency (SAHRA) Implementation of a chance find procedure
Socio-economic aspects	Enhance the positive impact on the socio-economic aspects.	Sourcing of employees from the local community and surrounding areas.

Environmental aspect	Objective	Summary of impact management outcome
	To mitigate the effects of the influx of job seekers to the area.	Sourcing of employees from the local community and surrounding areas.

21 Final proposed alternatives

Proposed alternatives are detailed in Part A Section 8. The preferred infrastructure option is shown in Table 8-1.

22 Aspects for inclusion as conditions of the authorisation

The following should form part of the conditions of the Environmental Authorisation to ensure compliance with the EMPr:

- The mine should remain in full compliance with the requirements of the EMPr and with all regulatory requirements.
- The EMPr should be implemented by qualified environmental personnel who have the competency and credibility to interpret the requirements of the EIA and the EMPr. Such persons must be issued with a written mandate by Sibanye-Stillwater management to provide guidance and instructions to employees and contractors.
- Stakeholder engagement must be maintained during the phases of the mining operation.

23 Description of any assumptions, uncertainties and gaps in knowledge

In terms of Section 3(p) of Appendix 3 to the EIA Regulations GN 982 (as amended), the EAP must provide a description of any assumptions, uncertainties and gaps in knowledge upon which the impact assessment has been based. Table 23-1 provides the assumptions and limitations applicable to the various specialist assessments.

Table 23-1: Assumptions and limitations relating to the proposed K4 Shaft PCD and associated infrastructure project

Specialist	Assumptions and limitations
General	<ul style="list-style-type: none"> • It is assumed that Alta van Dyk Environmental Consultants Pty Ltd has been provided with all relevant project information and that it was correct and valid at the time it was provided. • There will be no significant changes to the project description or surrounding environment between the completion of the S&EIR process and implementation of the proposed project that could substantially influence findings and recommendations with respect to mitigation and management. • The assessment of the mitigated scenario assumes that the design controls and recommended mitigation would be implemented adequately.
Soils	<ul style="list-style-type: none"> • The handheld GPS used potentially could have inaccuracies up to 5 m. Any and all delineations therefore could be inaccurate within 5 m; and • No heavy metals have been assessed nor fertility been analysed for the relevant classified soils.
Biodiversity	<ul style="list-style-type: none"> • It is assumed that all information received from the client and landowner is accurate • All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes

Specialist	Assumptions and limitations
	<ul style="list-style-type: none"> • The assessment area (PAOI) was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment • The area was only surveyed during a single site visit and therefore this assessment does not consider temporal trends (note: data collected is considered sufficient for a meaningful baseline); • The fieldwork was conducted during the dry season which means that certain flora and fauna would not have been present or observable due to seasonal constraints; • Whilst every effort was made to cover as much of the PAOI as possible, representative sampling is completed, and by its nature it is possible that some plant and animal species that are present within the PAOI were not recorded during the field investigations; and • The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by up to 5 m.
Wetland delineation	<ul style="list-style-type: none"> • This report has been prepared for the particular purpose outlined in Sections 1 and 5 of the report and no responsibility is accepted for the use of this report, in whole or in part, in any other context or for any other purpose. • Wetland and river boundaries reflect the ecological boundary where the interaction between water and plants influences the soils, but more importantly the plant communities. The depth to the water table where this begins to influence plant communities is approximately 50 centimetres. This boundary, based on plant species composition, can vary depending on antecedent rainfall conditions, and can introduce a degree of variability in the wetland boundary between years and/or sampling period. The wetlands systems have been mapped from the most recent aerial imagery available at a scale of between 1:2500 and 1:5000 wherever possible and where the imagery is of sufficient resolution for this purpose. Due to the extent of the area and the mapping scale used, the actual extent of the boundaries of these systems may be underestimated or overestimated in places. This may range from metres to tens of metres but generally is regarded as being of sufficient accuracy for the purposes of this study. While an attempt was made to map all wetlands within the study area, it is likely that some small and/or isolated wetlands may have been missed and not mapped. • The soils across the study area are dominated by vertic clays. As these soils typically have a high pH and base saturation, Iron redox morphology is not readily expressed, with the result that high chroma mottles cannot be used for the identification of wetlands (van der Waals, 2019, WRC Report 2461/3/18). Therefore, vegetation indicators played a primary role in determining the wetland boundaries. However, the temporary to seasonal zones of a number of the valley bottom wetlands were cultivated or transformed on site, precluding or limiting the use of vegetation indicators in determining wetland boundaries in these areas and thus reducing the confidence of the delineation accuracy in those areas where cultivation (past and present) extends into the wetlands or where the natural vegetation has been significantly disturbed or removed. • Reference conditions are unknown. This limits the confidence with which the present ecological category (PES) is assigned. The impact assessment was based on the project description and proposed development and activity descriptions as detailed and illustrated in this report.
Heritage Impact Assessment	<p>The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the subsurface nature of heritage resources, the possibility of discovery of heritage resources during the construction phase cannot be excluded. Some areas within the Project area could not be accessed due to existing mining activities such as the large mine dump. The general archaeological visibility across the landscape was also extremely low due to the past agricultural activities as well as current mining activities that have led to a high level of surface disturbances. These limitations are successfully mitigated with the implementation of a chance find procedure and monitoring of the study area by the ECO. This report only deals with the current layout of the proposed development and consisted of non-intrusive surface</p>

Specialist	Assumptions and limitations
	<p>surveys that focussed on tangible resources. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant.</p> <p>Field data were recorded by handheld GPS and Mobile GPS applications. It must be noted that during the process of converting spatial data to final drawings and maps the accuracy of spatial data may be compromised. Printing or other forms of reproduction might also distort the spatial distribution in maps. Due care has been taken to preserve accuracy. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.</p>

24 Reasoned opinion as to whether the proposed activity should or should not be authorised

24.1 Reasons why the activity should be authorised or not

No fatal flaws in the project have been identified thus far through the impact assessment process. However, several environmental and social impacts are envisaged from construction and operational phase, which require careful mitigation and monitoring. It is the opinion of the EAP that all major impacts have been identified and have been assigned appropriate management measures. Most Medium-high negative impacts with mitigation, are reduced to a MEDIUM or LOW significance, and can be managed accordingly.

It is recommended by the EAP that the proposed K4 Shaft PCD and associated infrastructure project is allowed to proceed, on the assumption that the environmental and social management commitments included in this EIA/EMPr are adhered to, the project description remains as per the description provided in this document.

24.2 Specific conditions to be included into the compilation and approval of the EMPr

Should the DMRE grant authorisation for the proposed K4 Shaft PCD and associated infrastructure project, it should be subject to the following conditions:

- The project should remain in full compliance with the requirements of the EMPr and with all regulatory requirements;
- The EMPr should be implemented by qualified environmental personnel who have the competence and credibility to interpret the requirements of the EIAR and the EMPr. Such persons must be issued with a written mandate by mine management to provide guidance and instructions to employees and contractors; and
- Stakeholder engagement must be maintained during the operational and closure/rehabilitation phases of the project.

24.3 Rehabilitation requirements

Refer to Part B Section 6.3 of this report

25 Period for which the authorisation is required

Since WPL is planning on extending the life of mine with approximately 30 years, the period for which the Environmental Authorisation is required will be applied for as 35 years. This will give the company enough time to commence with the activities within the prescribed timeframe should a positive decision be made towards

the project. This will also provide the mine with the opportunity to commence mining longer than 30 years should the life of mine require extension. Table 25-1

Table 25-1: Period for which the Environmental Authorization is required

Stages of operation	Timeframe (years)
Planning	2
Construction	5
Operational	25
Decommissioning and closure	3
Total period	35

26 Undertaking

The undertaking by the EAP is provided in Part B Section 12 (Environmental Management Programme). This undertaking confirms: the correctness of the information provided in the reports, the inclusion of comments and inputs from stakeholders and I&APs, the inclusion of inputs and recommendations from the specialist reports where relevant and the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

27 Financial provision

27.1 Financial provision for the K4 Shaft PCD and associated infrastructure

Information for this section was obtained from Hydrological Environmental Engineering Solutions' Final rehabilitation plan and financial provisioning (HEES, 2023), available in Appendix C5.

The required and estimated financial provisioning for 2025 final rehabilitation is shown in Table 27-1 (including VAT):

Table 27-1: Summary of Financial Provisioning for K4 Shaft PCD and associated infrastructure

Section	Final rehabilitation
Plant	R 685 867.00
Concrete buildings	R 31 218.00
Surface	R 10 697 704.00
After Care	R376 662
Sub Total:	R11 791 411
P&G	R3 537 423
Contingencies	R2 358 282
Sub Total	R17 687 117
VAT	R2 53 068
Total:	R20 340 184

27.2 Confirm that this amount can be provided for from operating expenditure

This financial provision will be provided for in terms of a bank guarantee.

28 Deviations from the approved scoping report and plan of study

28.1 Deviations from the Methodology used in determining the significance of potential environmental impacts and risks

The methodology to rate the impacts and risks associated with the proposed K4 Shaft PCD project detailed in this EIA/EMPr have not deviated from those described in the Final Scoping Report (approved by the DMRE on 13 January 2023).

28.2 Motivation for the deviation

This section is not applicable.

29 Other information required by the competent authority

29.1 Compliance with the provisions of section 24(4)(a) and (b) read with section 24(3)(a) and (7) of the National Environmental Management Act 107 of 1998

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

Socio-economic impacts are addressed in Part A Section 10.14.

29.1.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act 25 of 1999

During a site survey undertaken in June 2023, the heritage specialist observed three separate heritage resource signings. These include broken down foundations and a series of circular packed stone lines. Since the findings were severely altered and demolished their probability to contribute to historic and or aesthetic significance is considered to be low. However, these structures were found on historical topographic maps and are therefore considered to be older than 60 years which is ultimately protected by the Heritage law. An application was submitted to SAHRA and communication from the department is awaited. According to the South African Heritage Resource Agency (SAHRA) Palaeontological map, the project area is of insignificant palaeontological sensitivity, and no further study is required in support of this aspect.

The impact on heritage resources is considered to be low and the project can be authorised provided that the recommendations in this report are adhered to and based on SAHRA's recommendation and approval.

30 Other matters required in terms of Sections 24(4)(a) and (b) of the Act

This Section is not applicable to this project.

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1 Details of the EAP

The details and expertise of the EAP are detailed in Part A Section 1.4.

2 Description of the aspects of the activity

The details of the aspects of the activity are described in Part A Section 4.4.

3 Composite map

Refer to Figure 3-2.

4 Description of impact management objectives including management statements

4.1 Determination of closure objectives

Refer to the Part B Section 6.1.1 for a description of the closure objectives for the K4 Shaft PCD and associated infrastructure project .

The vision and closure objectives aim to reflect the local environmental and socio-economic context of the project and to represent both the requirements and expectations of the stakeholders. The determination of a realistic post-closure vision for the mining site is based on a good understanding of the ecological, physical, socio-economic and operational characteristics of the area within which the mine is located. Site specific closure objectives are then developed taking into consideration these characteristics inclusive of legal compliance, financial and end-land use goals. Each of these closure objectives as set forth are defined and discussed in further detail below. (HEES, 2023).

4.2 The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity

Refer to section 4.3.2.6 explaining the current Storm Water Management Plan. The activities applied for is in support of complying with GN704 regulations and will tie into existing SWM on site.

4.3 Volumes and rate of water required for the mining, trenching or bulk sampling operation

- This section is not applicable

4.4 Water Use Licence

4.4.1 Western Platinum (Pty) Ltd

SS is in the possession of an existing approved Water Use Licence with a reference number 01/A21K/ABCEFGIHIJ/4620 dated 22 February 2022.

4.4.2 K4 Shaft Project

The proposed K4 Shaft PCD and associated infrastructure activities will require a WULA to authorise water uses in terms of Section 21 of the NWA.

The following water uses are required for authorisation:

- Section 21 (c) – impeding or diverting flow of water in a watercourse;
- Section 21 (g) – disposing of waste or water containing waste in a manner which may detrimentally impact on a water resource;
- Section 21 (i) – altering the bed, banks course or characteristics of a watercourse; and

SS is in the process of submitting a WULA for the proposed K4 Shaft PCD and associated infrastructure project to the DWS.

4.5 Impacts to be mitigated in their respective phases

Refer to the full risk assessment and mitigation measures table provided in Part Section 14.3.

5 Impact Management Actions

Included in Table 14-1 to Table 14-3.

6 Financial Provision

6.1 Describe the closure objectives and the extent to which they have been aligned with the baseline environment

6.1.1 Closure objectives for the K4 Shaft PCD project

The information for this section was obtained from the Financial Provisioning and Closure Cost for K4 PCD and associated infrastructure, compiled by Hydrological Environmental Engineering Solutions (Pty) Ltd. (HEES, 2023) Appendix C5.

The following closure objectives have been developed for the K4 Shaft PCD and associated infrastructure project:

Safety:

To ensure physical safety of the closed mining site over time, any void or pit left after mining activities have ceased will be filled accordingly or fenced as to ensure the safety of human and/or animal and prevent falls from height. For this section, the PCD and pipelines will be removed and therefore if should pose no safety risk at closure.

Physical and ecological stability

To ensure the physical stability and therefore the physical sustainability of the closed mining site over time, physically stable landscapes that are compatible with the intended post-mining land use will be worked towards. This will limit the latent occurrence of environmental degradation by limiting water and wind erosion.

A Physical stable landscape post-mining can be achieved by implementing the following measures:

- Maintain and restore biodiversity levels as to provide appropriate habitats.
- Shape all channels, drains and dams to smooth slopes and integrate into natural drainage patterns or to original topographical levels.
- Remove alien and/or invasive vegetation

Chemical stability

To ensure the prevention of negative effects on the local and adjacent environment quality by chemical contamination arising from mining and mining related activities by ensuring the prevention of soil, surface and groundwater contamination by managing water on the site.

Socio-economic transition

To ensure as far as practically possible a smooth transition in the socio-economic conditions that exist pre-mine closure to that will exist post-mine closure. The socio-economic transition will comprise of a net beneficial socio-economic impact to the affected communities in the region.

Risk Limitation

To ensure a restraint in the number and acceptable level of numerous risks such as safety, environmental, financial, legal and social aspects as to safeguard the execution of closure activities in such a way that it is the most cost-effective and efficient approach for the mine.

Long-Term Care

To ensure the design and implementation of a closure plan that will guarantee the minimization or elimination of the need for long-term post-closure care and maintenance. This is achievable by ensuring physical, ecological, chemical and socio-economic stability that will allow for the relinquishment of the closed site to the appropriate third parties.

6.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and Interested and Affected Parties

As part of the stakeholder engagement process, this Final EIA/EMPr is currently available for public comment for a period of 30 days (12 October to 10 November 2023). Stakeholders are encouraged to comment on this report, including the closure objectives as presented in Part B Section 6.1. Any comments received will be addressed and responded to for inclusion in the Final EIA/EMPr to be submitted to the competent authority, the DMRE.

6.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure

6.3.1 K4 Shaft PCD Project Rehabilitation plan

The information for this section was obtained from the Financial Provisioning and Closure Cost for K4 PCD and associated infrastructure, compiled by Hydrological Environmental Engineering Solutions (Pty) Ltd. (HEES, 2023) Appendix C5.

Rehabilitation plan

6.3.1.1 General Technical solutions

The general rehabilitation plan for the project area:

- All areas should be safeguarded as far as practically possible

- The WRD side slopes will be vegetated as per the approved EMPr. It is accepted that minimal erosion will form with the WRD after rehabilitation and re-vegetation.

6.3.1.2 PCD technical solution

The PCD will be decommissioned:

- The security fence around the Dam will be removed and hauled to the local scrap metal dealer.
- All water will be used to final plant process.
- The barrier system, from the top of the embankment to 1m below the embankment, will be removed and hauled to an approved landfill site,
- The concrete/brick Pollution Control Dam infrastructure will be demolished and used in backfill of the Pollution Control Reservoir.
- The gabion spillway will be demolished, and the wire netting removed to a scrap facility. The rock will be used for backfilling of the reservoir.
- The embankment will be the source of material to fill the reservoir. Additional waste rock or inert material will be required to over fill the reservoir area in order to allow for settlement and shaping of the area to be free draining.
- The access to the penstock will be demolished and hauled to a scrap metal yard.
- The pumps and mechanical equipment will be hauled to a local scrap metal dealer.
- The area will be shaped to be free draining and covered with imported 200mm topsoil and vegetated with local grass species. Soil ameliorants will be added if required.
- Contouring of the area will ensure the minimal erosion of the area.

6.3.1.3 Diversion canals and berms

- The canals with concrete pithed lining will be demolished and the material used in the backfill oof the PCD.
- The diversion berms will be used to shape the affected area to the original topographical; area shape. These berms would have an active seed bed and will vegetate on its own.

6.3.1.4 Pipeline

The pipeline will be:

- Dismantled and hauled to a scrap metal yard or approved landfill site depending on the type of pipeline
- The pedestals will be demolished and used as backfill or as inert material.

6.3.1.5 Culvert

The culvert will be demolished, and the 1050 ND pipes donated to the community. The concrete will be used as backfill in the reservoir basin.

6.4 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline

6.4.1 K4 Shaft PCD

The information for this section was obtained from the Financial Provisioning and Closure Cost for K4 PCD and associated infrastructure, compiled by Hydrological Environmental Engineering Solutions (Pty) Ltd. (HEES, 2023) Appendix C5.

As part of the closure and rehabilitation plan for the K4 Shaft PCD and associated infrastructure project, compiled by HEES, (2023), a financial provision was determined. The financial provision was determined required and estimated financial provisioning for 2025 final rehabilitation is shown in Table 6-1 (including VAT):

Table 6-1: Summary of Financial Provisioning for K4 Shaft PCD and associated infrastructure

Section	Final rehabilitation
Plant	R 685 867.00
Concrete buildings	R 31 218.00
Surface	R 10 697 704.00
After Care	R376 662
Sub Total:	R11 791 411
P&G	R3 537 423
Contingencies	R2 358 282
Sub Total	R17 687 117
VAT	R2 53 068
Total:	R20 340 184

6.5 Confirm that the financial provision will be provided as determined

The financial provision as determined is provided for in the form of a bank guarantee.

7 Mechanisms for monitoring compliance with and performance assessment against the environmental management programme

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including:

- Monitoring of Impact Management Actions;
- Monitoring and reporting frequency;
- Responsible persons;
- Time period for implementing impact management actions; and
- Mechanism for monitoring compliance.

The monitoring and reporting measures for the WPL, as identified per the 2005 EMPr and included in the consolidated 2012 EMPr are indicated in Table 7-1 below.

Table 7-1: Environmental monitoring and reporting periods (SEF, 2012)

Impacts	Monitoring period	Reporting Period	Responsible Government Department
Topography	On-going	Ad hoc	DMR, NW, DEDECT
Soils	On-going	Ad hoc investigations regarding incident spills.	DMR, NW DEDECT, Dept of Agriculture
Land capability	On-going	Ad hoc	DMR, NW DEDECT
Natural vegetation	On-going	Ad hoc	DMR, NW DEDECT
Anima life	On-going	Ad hoc	DMR, NW DEDECT
Visual Aspects	On-going	Only if significant impact is proposed, in which case an environmental assessment may need to be completed.	DMR, NW DEDECT
Archaeological, Historical and cultural sites	On-going	Ad hoc	SAHRA, DMR, DEA, NW DEDECT
Sensitive landscapes	On-going	Only if significant impact is proposed, in which case an environmental assessment may need to be completed	DMR, NW DEDECT
Safety Risks and Hazards	On-going	When required	DMR (Mine Health & Safety)
Noise			
Ambient noise	Ad-hoc in response to complaints.	As required.	DMR
Outside mining area (boundary)	Quarterly	Reported Internally	N/A
Water quality and quantity (Legal compliance reporting in terms of national Water act, 1998)			
Surface water	Monthly	Annually	DWA
Ground water	Quarterly	Annually	DWA
Storm water	Ad hoc Annually DWA	Annually	DWA
Legal compliance reporting regarding Water Quality and Use.	Annual	Annually	DWA
Level 3> incidents.	Annual	Annually	DWA
Air quality (and compliance reporting in terms of NEMAQA, 2004)			
Dust fallout	monthly	Annually	NW DEDECT
Sulphur dioxide (SO2)	Continuous	As per the AEL	NW DEDECT
AEL Reporting requirements	Quarterly or as per the Provincial Air Quality Officer and/or AEL requirements	Quarterly or as per the Provincial Air Quality Officer and/or AEL requirements	NW DEDECT

Impacts	Monitoring period	Reporting Period	Responsible Government Department
Legal compliance reporting in terms of MPRDA (2002)			
Biannual Monitoring and EMPr Performance Assessments for all mining and prospecting rights (every two years)	On-going	Biannual (2012)	DMR
Report on Tailings Dam Emission Management	On-going	6 Monthly	DMR
Annual Financial Provision and Closure Costing Update.	Annual	Annually (September)	DMR
Level 3 > Environmental Incidents	On-going	Ad Hoc	DMR
Environmental Scorecard: Mining Charter	Annual	Annual	DMR
Legal compliance reporting in terms of national Environmental Management Waste Act, 2008.			
Legal compliance and performance with existing waste licenses and permits.	Annual	Annual	DEA
Persistent Organics Pollutants (POP)	Annual	Annual	DEA
Waste information Systems	Annual	Annual	DEA

8 Indicate the frequency of the submission of the performance assessment report

Unless otherwise instructed by the DMRE or as a condition to the authorisation, the Environmental Management Programme performance assessments (environmental audits) will be undertaken in line with NEMA Regulation 34. The subsequent environmental audit reports will be submitted to the DMRE.

9 Environmental Awareness Plan

9.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

Formal training and induction will be provided to all employees regarding the hazards of the duties performed during construction to both their health and the surrounding environment. It is the responsibility of the Mine Manager and the Health and safety officers to ensure that adequate training is provided to all employees. This included the contractors. It is also the responsibility of the relevant Heads of Department to identify the need for further training. As part of the mandatory training provided to all employees and contractors, environmental awareness training must be provided to all employees and sub-contractors.

9.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

Information for this section was obtained from Western Platinum Mine Final Environmental Management Programme(SEF, 2012).

The identification of environmental training and development needs is derived from the analysis of role descriptions. The role description is used to confirm the category of occupation at WPL structure templates. The following general and specific training needs have been identified at WPL:

General training

- Environmental awareness training;
- Awareness of the Sibanye-Stillwater Safety and Sustainability policy;
- Awareness of environmental legislation; and
- Related Sibanye-Stillwater environmental requirements.

Specific training

- Awareness of significant environmental aspects associated with work activities;
- Awareness of environmentally related operational procedures applicable to work activities;
- Awareness of the potential consequences of not following environmentally related operational procedures; and
- Environmental legislative requirements of work activities.

Sibanye-Stillwater has a general environmental awareness plan that is being undertaken as part of induction on an annual basis This includes al contractors who work at WPL or works for longer than one week on site. Induction training includes the Safety and Sustainability policy, standards, charters and visions as well as an introduction to ISO 14001. There is an emphasis on the description of environmental impacts, namely air pollution, waste management, water management, land management and energy conservation, the importance of environmental legislation, key roles and responsibilities in terms of environmental management and the reporting of non-conformances.

Task specific Safety and Sustainability training has been developed for the operational areas based on the significant environmental aspects/impacts. The training program includes on the job training with applicable personnel and encompasses the following training topics:

- Waste prevention and control;
- Waste sorting and handling;
- Resource consumption;
- Storing and handling of petroleum hydrocarbons;
- Storing and handling of chemicals;
- Rehabilitation/housekeeping; and
- Spills prevention/clean up.

Legal training provides senior, middle and key environmental management personnel with information on environmental legal requirements. Consultants or environmental advocates may present and conduct this training.

ISO 14001 training entails training on all software utilised in the system and training required to successfully undertake internal and external audits.

Environmental Awareness training

The following Environmental Awareness Training will be implemented by SS in order to inform employees and contractors of the environmental risk that may result from their work, or the risk of their interaction with the sensitive environment. The training will be conducted as part of the induction process for all new employees (including contractors) that will perform work in terms of the proposed activities. Proof of all training provided must be kept on-site.

The Environmental Awareness Training will, as a minimum cover the following topics :

- Air Quality
 - Activities that may result or mitigate impact on air quality; speeding on roads, covering of haul trucks etc; and
 - Negative impacts on the receiving environment if mitigation measures are not implemented.
- Surface and groundwater
 - Risks to surface and groundwater, e.g., fuel and chemical handling and further risks of erosion or damage to riparian vegetation;
 - How incidents should be reported, and emergency requirements;
 - The importance of storm water control, maintenance of pollution control infrastructure; and
 - The importance to reuse water and to prevent spillages.
- Cultural Heritage
 - To respect all cultures and believes;
 - To remain within working areas and not to enter or interfere with any cultural heritage; and
 - How to report any sightings as identified during operation activities (e.g., fossils).
- Fauna
 - Overview of the fauna found on site and the uniqueness thereof;
 - Mitigation measures that all contractors and employees need to abide by; and
 - No contractor or personnel allowed to catch or kill any species, and how any sightings should be reported if further actions are required (e.g., to catch and release).
- Flora
 - Overview of the flora diversity on site, and the rare and endangered nature thereof;
 - Measures taken by the mine to protect species; and
 - No contractor or personnel allowed to remove, harvest or destroy any flora species unless clearly instructed based on the construction and operational plans.

- Waste management
 - The correct segregation of general and hazardous waste;
 - Waste Management Practices; and
 - Measures to avoid waste generation and to participate in waste minimisation/reduction strategies.
- Traffic
 - Abide by traffic rules, no speeding allowed;
 - To stay on designated roads (and not to drive on areas that are not fit and designed for this purpose); and
 - To be aware of the fauna species and to be on the lookout and avoid collisions.
- Natural Resource Consumption
 - Minimise unnecessary use of energy by making use of energy saving devices, switching off non-essential appliances etc.; and
 - Optimise utilisation of mining and plant equipment, travelling routes etc.
- Emergency Preparedness and Response
 - Designated smoking areas;
 - How to report any emergency or incident; and
 - How to respond when emergency alarm goes off.
- General rules and conduct
 - Respect for the sensitive environment;
 - Do not litter;
 - HIV/AIDS awareness;
 - Respect for each other and for different cultures; and
 - Safety and health requirements.

10 Specific information required by the Competent Authority

The information, as presented in Table 10-1, will be required by the competent authority.

Table 10-1: Monitoring information required by the competent authority

Information	Frequency of submission
Quantum of Financial Provision	Annually
Annual rehabilitation plan	Annually
Environmental Audit Report on approved EIA/EMPr and other environmental authorisations	In line with NEMA Regulation 34.
Legal compliance audit report	Every 5 years
GN704	In line with external and internal WUL audit requirements
Surface water monitoring	Submission as per WUL requirements.
Biomonitoring	Submission as per WUL requirements.
Groundwater quality monitoring	Submission as per WUL requirements.
Groundwater level monitoring	Submission as per WUL requirements.
Fall-out Dust Monitoring and Noise Monitoring	Upon request by the competent authority
Rehabilitation Monitoring Report	Annually (during Decommissioning / Closure Phase)

11 Undertaking regarding correctness of information

I, Lenaldi Görgens, 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 has been correctly recorded in the report.

Signature of the Candidate EAP

DATE:

I, Suzanne van Rooy, 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:

12 Undertaking regarding level of agreement

I, Lenaldi Görgens, 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 Candidate EAP

DATE:

I, Suzanne van Rooy, 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:

13 References

- Agreenco, 2022. Sibanye-Stillwater Platinum: K4 Shaft WRD expansion (Including associated infrastructure) specialist vegetation assessment. Project reference: SSP_K4WRD_221129. November 2022.
- Alta van Dyk Environmental Consultants cc (AVDE), 2022. Sibanye-Stillwater Marikana Operations – Integrated Water and Waste Management Plan. Report Number: No number. June 2022.
- Aquatico Scientific (Pty) Ltd. 2023. Sibanye-Stillwater Marikana Operations – Monthly Dustfall Monitoring Report. Report Number: SIB-MO-05-2023. Report Date: May 2023.
- Beyond Heritage, 2023. Heritage Impact Assessment -For the propose K4 Waste Rock Dump and Pollution Control Dam at the Marikana Operations, Near Marikana, north West Province. Report number: 23070. July 2023.
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Appendices