Proposed Expansion of Aggeneys, Northern Cape:

Draft Environmental Management Programme

Report Prepared for

Black Mountain Mining (Ltd)

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Report Prepared by

srk consulting

June 2024

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Black Mountain Mining (Ltd)

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Profile and Expertise of EAPs

SRK Consulting (South Africa) Pty Ltd (SRK) has been appointed by ALO Polymers (Pty) Ltd. to undertake the Environmental Impact Assessment (EIA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA).

SRK Consulting was established in 1974 and comprises over 1 400 professional staff worldwide, offering wide-ranging expertise in the natural resources and environmental sectors. SRK's Port Elizabeth environmental department has a proven track record of managing large, complex environmental and engineering projects in the Eastern Cape, Africa and internationally. SRK has rigorous quality assurance standards and is ISO 9001 certified.

As required by NEMA, the qualifications and experience of the key independent Environmental Assessment Practitioners (EAPs) undertaking the EIA are detailed below and Curriculum Vitae provided in Appendix A.

Project Manager and EAP: Clayton Weatherall-Thomas, MSc, Pr Sci Nat, Reg. EAP (EAPASA)
Registered EAP (no. 2019/681)
Clayton Weatherall-Thomas is a Senior Environmental Scientist in the Gqeberha (formerly Port Elizabeth) office. Clayton has been involved in environmental assessment and management for the past 7 years and botanical and ecological specialist work for the past 12. Clayton has environmental compliance auditing experience in the mining industry, and his environmental management experience includes Basic Assessments, Environmental Impact Assessments (EIAs) and Environmental Management Programmes (EMPrs) in a range of projects. Clayton has done botanical, vegetation, ecological and faunal specialist assessments for a wide variety of projects as well.

Project Director and Reviewer: Rob Gardiner, MSc, MBA, Pr Sci Nat, Reg. EAP (EAPASA)
Registered EAP (no. 2020/1390)
Rob Gardiner is a Partner, Principal Environmental Scientist, and head of SRK's Environmental Social and Governance (ESG) department in the Port Elizabeth office. He has more than 30 years of environmental consulting experience covering a broad range of projects, including Environmental Impact Assessments (EIA), Environmental Management Systems (EMS), environmental management plans (EMP), and environmental auditing. His experience in the energy, mining, manufacturing, and public sectors includes projects in South Africa, Angola, Zambia, DRC, and Nigeria.

Box 1: Environmental Assessment Practitioner expertise

Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no beneficial interest in the outcome of the assessment which is capable of affecting its independence.

Disclaimer

The opinions expressed in this report have been based on the information supplied to SRK by BMM. SRK has exercised all due care in reviewing the supplied information, but conclusions from the review are reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

Table of Contents

Appendices

List of Tables

List of Figures

Acronyms and Abbreviations

EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GHG	Greenhouse Gas Emissions
NAAQS	National Ambient Air Quality Standards
NEMA	National Environmental Management Act
PPP	Public Participation Process
SAHRA	South African Heritage Resource Agency
SANS	South African National Standards
SDF	Spatial development Framework
SEZ	Special Economic Zone
SCC	Species of Conservation Concern
ToR	Terms of Reference
WWTW	Wastewater Treatment Works

Glossary

Baseline	Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.
Community	Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area
Construction Phase	The stage of project development comprising site preparation as well as all construction activities associated with the development.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Authorisation	Permission granted by the competent authority for the applicant to undertake listed activities in terms of the NEMA EIA Regulations, 2014.
Environmental Impact Assessment	A process of evaluating the environmental and socio-economic consequences of a proposed course of action or project.
Environmental Impact Assessment Report	The report produced to relay the information gathered and assessments undertaken during the Environmental Impact Assessment.
Environmental Management Programme	A description of the means (the environmental specification) to achieve environmental objectives and targets during all stages of a specific proposed activity.
Fauna	The collective animals of a given region.
Flora	The collective plants of a particular region, habitat or geological period.
Heritage Resources	Refers to something, e.g. a building, an area, a ritual, etc. that forms part of a community's cultural legacy or tradition and is passed down from preceding generations.
Impact	A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
ECO	A person with the appropriate qualifications and experience appointed by the Applicant to audit compliance with this EMPr on behalf of the Applicant.
Integrated Environmental Management	The practice of incorporating environmental management into all stages of a project's life cycle, namely planning, design, implementation, management and review.
Mitigation measures	Design or management measures that are intended to avoid and / or minimise or enhance an impact, depending on the desired effect. These measures are ideally incorporated into a design at an early stage.
Operational Phase	The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.

1 Introduction

1.1 Background

Black Mountain Mining (Pty) Ltd ("BMM"), part of the Vedanta Resources Limited mining group, mines and processes copper, lead, and zinc at the Black Mountain Mine and the open cast Gamsberg Zinc Mine near the town of Aggeneys in the Northern Cape (see Figure 1-1).

The town of Aggeneys was established by BMM on the farm of Aggeneys in 1976 to provide support and accommodation for the nearby underground mines. The town needs to be expanded due to the increasing number of people being attracted to the town as a result of the expansion of mining activities and the associated special economic zone which planned in the area.

The expansion will involve the following:

1. **Town establishment outside current town boundary:** The expansion of the town of Aggeneys to allow for additional residential, recreational, commercial, and retail infrastructure will increase the footprint of the town by approximately 429 hectares. The urban footprint includes:
    a. **Water reticulation infrastructure upgrade:** The existing water supply pipelines will be upgraded and lengthened within the urban area to cater for the increased population. Construction activities will include the construction of an internal water reticulation network over four phases, the construction of several 315 mm and 360 mm diameter feeder pipelines and the upgrading of 315 mm supply pipelines to 400 mm.
    b. **Bulk Sewerage upgrade:** The generation of additional sewage will result in the need for additional bulk sewers to the Wastewater Treatment Works (WWTW).
    c. **Bulk electrical infrastructure upgrade:** The current electrical substation requires expansion to cater for additional transformers. Reticulation of power from the expanded substation will also be required to the expanded town.
    d. **Access road:** A second access to Aggeneys will be required to improve accessibility to the village. The second access road is proposed along the alignment of an existing gravel road that leads from the N14.
    e. **Stormwater infrastructure upgrades:** The current stormwater infrastructure consists of a series 450 mm concrete pipes, stormwater furrows, and stormwater channels. A new 1.5 - 2 m compacted soil berm to protect the town from sheet flow is proposed upgradient of the town stormwater.
    f. **Expansion of Nursery:** it is proposed to double the capacity of the nursery. The same layout and footprint of the nursery will be used to double the nursery to the east of the existing facility.
    g. **Expansion of golf course:** The existing golf course will be expanded from a 9 hole to 18 hole golf course with a maximum additional extent of 29.2 ha.
2. **Waste management facilities**: The current landfill serving Aggeneys is of insufficient capacity to accommodate the projected waste volumes from the expanded town. The expansion of the current landfill to 25 hectares is therefore proposed. Upstream waste management activities will also be implemented, including the separation of recyclable wastes from the waste stream destined for the landfill. The proposed landfill will cater exclusively for general domestic waste and no provision is made for the disposal of mining or industrial wastes.

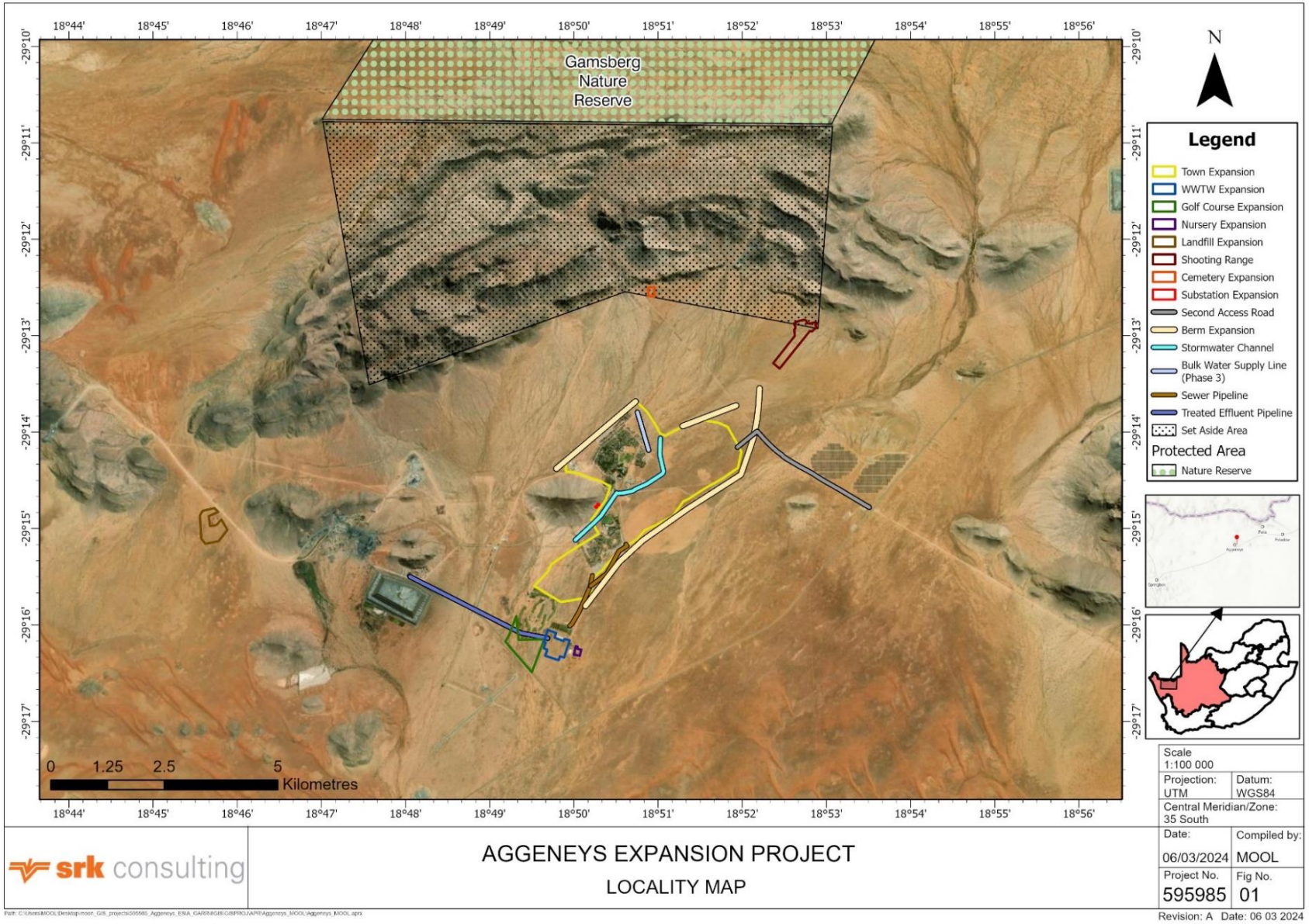

Figure 1-1: Aggeneys locality map.

3. **Wastewater treatment works upgrade:** The capacity of the current wastewater treatment works will need to be expanded to cater for additional sewage flows from the larger population. A 150 mm uPVC pipeline will be constructed to transfer treated effluent to the mine for utilisation as production water, a distance of 3 km.
4. **Cemetery establishment**: There is currently no cemetery at Aggeneys and, with an increased population size, it is proposed to establish a cemetery outside of the town.
5. **Shooting Range:** No current shooting ranges exists within the vicinity of Aggeneys. A proposed shooting range is located within the confines of a disused quarry to accommodate recreational and training activities.

A separate EIA process is underway for the upgrading of the bulk water supply upgrade from the Horseshoe reservoir to the Kokerboom reservoir. That upgrade is primarily motivated by the increased water demand for mining activities but will also cater for the increased population at Aggeneys. An EA (Reference no. NC/EIA/NAM/KHA/AGG/2012 NCP/EIA/0000155/2012) has been granted for the expansion of the nearby Gamsberg Zinc mine and associated infrastructure, including the construction of up to 1000 residential units on 100 ha within the town.

The National Environmental Management Act 107 of 1998 (NEMA) requires that activities listed in the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) (referred to in the remainder of this document as the EIA Regulations) require Environmental Authorisation (EA) from the competent authority. In this case, the competent authority is the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERL). A Scoping and Environmental Impact Reporting (S&EIR, also referred to as a "full" EIA) process is required to support an application for EA. This report is included as the Environmental Management Programme (EMPr).

The location of the expansion of Aggeneys and supporting infrastructure is included in Figure 1-1. A sensitivity map in included in Figure 1-2. Maps of the individual footprints are included in Appendix B.

1.2 Contents of the EMPr

Appendix 4 of the 2014 EIA Regulations, as amended in 2017 (Government Notice (GN) 326 of 07 April 2017) prescribes the required content in an EMPr. These requirements, and the sections of this EMPr in which they are addressed, are summarised in Table 1-1.

Table 1-1: Contents of the EMPr as per Appendix 4 of the 2014 EIA regulations (as amended in 2017)

GN326, Appendix 4	Item	SectionReference
1.(1)(a)(i)	Details of the EAP who prepared the EMPr	Page ii
1.(1)(a)(ii)	The expertise of that EAP to prepare an EMPr, including a curriculum vitae	Page ii
1.(1)(b)	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 2.2
1.(1)(c)	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers	**Error! Reference source not found.**
1.(1)(d)	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including—-	
1.(1)(d)(i)	• planning and design	Section 4 & Table 4-1

GN326, Appendix 4	Item	SectionReference
1.(1)(d)(ii)	• pre-construction activities	Section 4 & Table 4-1
1.(1)(d)(iii)	• construction activities	Section 5 & Table 5-2
1.(1)(d)(iv)	• rehabilitation of the environment after construction and where applicable post closure; and	Section 5 & Table 5-2
1.(1)(d)(v)	• where relevant, operation activities	Section 6 & Table 6-1
1.(1)(e)	- (removed in the 2017 amendment)	-
1.(1)(f)	A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to —	
1.(1)(f)(i)	• avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Table 4-1, Table 5-2, Table 6-1
1.(1)(f)(i)	• comply with any prescribed environmental management standards or practices	Table 4-1, Table 5-2, Table 6-1
1.(1)(f)(i)	• comply with any applicable provisions of the Act regarding closure, where applicable; and	Not applicable
1.(1)(f)(i)	• comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Not applicable
1.(1)(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5.2
1.(1)(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5.2.2
1.(1)(i)	An indication of the persons who will be responsible for the implementation of the impact management actions;	Sections 4.1, 5.1, and 6.1
1.(1)(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented	Table 4-1, Table 5-2, Table 6-1
1.(1)(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Table 4-1, Table 5-2, Table 6-1
1.(1)(l)	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations	Section 5.2.2
1.(1)(m)	An environmental awareness plan describing the manner in which:	
1.(1)(m)(i)	• the applicant intends to inform his or her employees of any environmental risk which may result from their work	Section 10Table 5-2
1.(1)(m)(ii)	• risks must be dealt with in order to avoid pollution or the degradation of the environment	Section 10
1.(1)(n)	Any specific information that may be required by the competent authority	Not applicable
2.	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply	Not applicable

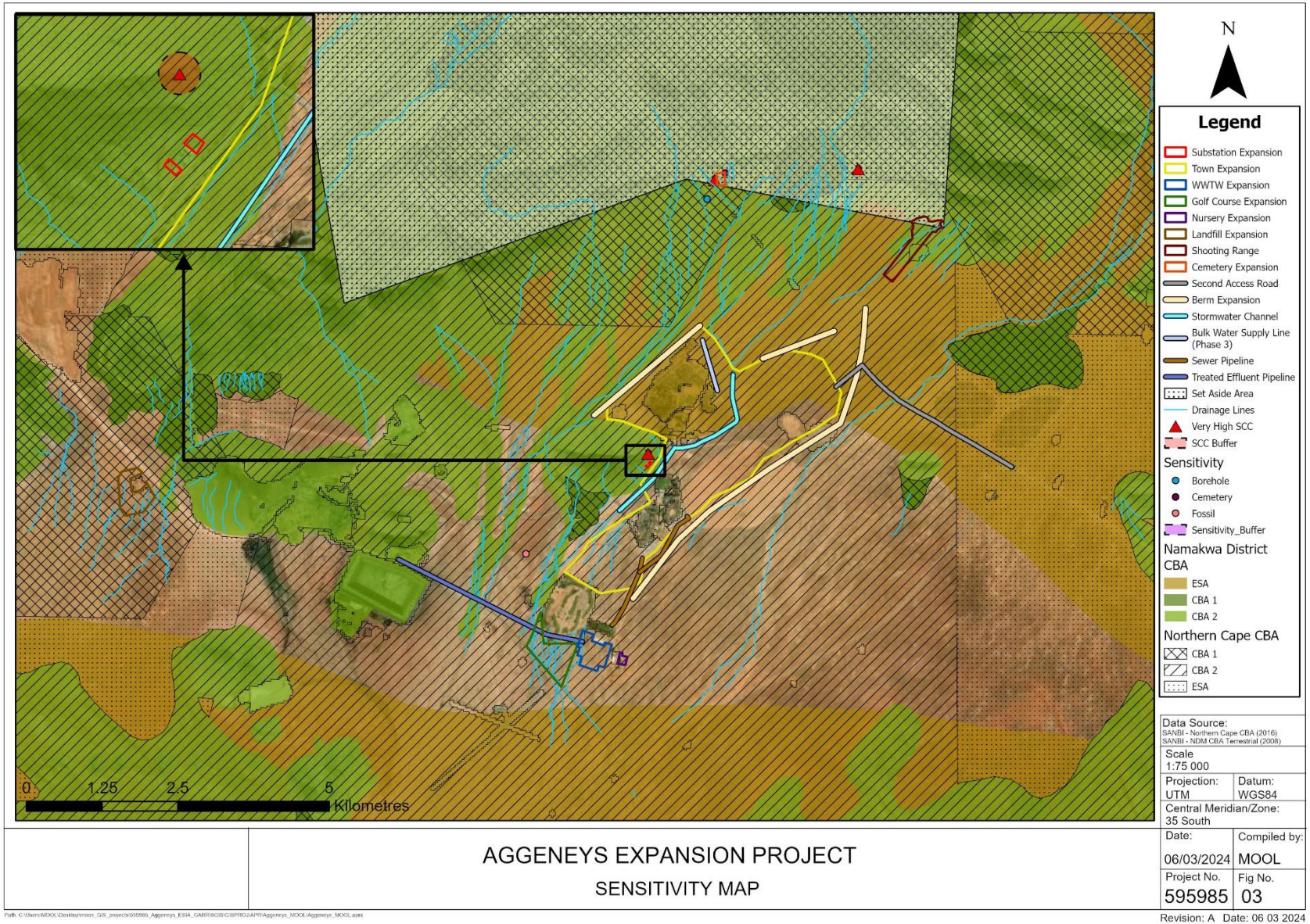

Figure 1-2 Environmental sensitivities in the vicinity of the proposed expansion of the Aggeneys urban area.

2 Description of the Project

This chapter describes the key characteristics of the proposed expansion of the urban area of Aggeneys, including supporting infrastructure, in the Khai Ma Local Municipality, Northern Cape.

2.1 Location and site description of the proposed project

The centre of Aggeneys is located at 29°14'36.31"S 18°50'28.34"E and is situated on land owned by BMM. A map showing the location of the proposed site is included in **Error! Reference source not found.** for reference. The specific property portions and associated activities are listed in Table 2-1.

The expansion of the town, including supporting infrastructure, are located on the Remainder of the farm Aggeneys 56 and Portion 1 the farm Aggeneys 56, both of which are owned by BMM. The town of Aggeneys has been divided into multiple erven that are mostly owned by BMM, although a number are privately owned.

Table 2-1: Property details

Farm Name	SG 21 Digit Code	Address	Coordinates (Property Centre Point)	Activities
The remaining extent of the Farm Aggeneys 56	C05300000000005600000	Aggeneys, Khai Ma Local Municipality, Northern Cape	29°14'36.31"S 18°50'28.34"E	Aggeneys expansion Second access road Shooting range expansion Cemetery expansion g expansion
Portion 1 of the farm Aggeneys 56	C05300000000005600001	Not applicable	29°16'19.41"S 18°48'9.89"E	Aggeneys expansion WWTW expansion Golf course expansion
Portion 1 of the farm Aroams 57	C05300000000005700001	Not applicable	29°11'32.78"S 18°54'17.67"E	Portion of second access road
Portion 1 of the farm Bloemhoek 61	C05300000000006100001	Not applicable	29°14'58.90"S 18°52'57.03"E	Portion of second access road
Portion 4 of the Farm Zuurwater 62	C05300000000006200004	Not applicable	29°13'32.72"S 18°45'45.65"E	Landfill expansion

2.2 Description of Project Activities

2.2.1 Urban Expansion of Aggeneys

Aggeneys currently consists of 938 housing units, including houses, park homes, caravans, single accommodation units and duplex apartments. The population is approximately 3 300 people. The existing town needs to expand to provide housing for the additional 1 500 employees that are currently expected to be employed by surrounding mining and industrial activities (BVI, 2022).

It is expected that Aggeneys will develop over time into a “rural service centre settlement”, with a population of 20 000 -39 999 people, as a result of all proposed industrial developments in its vicinity (BVI, 2022). The development guidelines in the draft Karoo Regional Spatial Development Framework (RSDF) (Anonymous, 2023) for such settlements includes that all new human settlement should occur at urban densities (40 units per hectare and higher) as close as possible to core business area to create a relatively dense settlement. These rural development centres that serve mining areas away

from larger regional development anchor towns would be the most suitable for (1) housing in support of mining activities and (2) provision of technical and business support services required for mines.

Presently, the town comprises mostly of single residential erven, with the majority of erf sizes ranging between 500 m² and 1 200 m², with most of the smaller erven located in the southern part of town. The Aggeneys SDIP (BVI, 2022) proposes two residential typologies, namely (i) single residential (i.e., free-standing houses on individual erven) and (ii) medium density residential (i.e., duplex dwellings or low-rise walkups). These typologies are illustrated in Figure 2-1. The development plan makes provision for approximately 283 hectares of land for residential development (both single and medium density), and in terms of the typology allocation approximately 4018 residential units can be accommodated (using 700 m² for the single residential erven and an average density of 40 dwelling units per hectare for medium density residential development). This will result in a gross density of 14.2 dwelling units per hectare.

Figure 2-1: Illustration of single residential and medium density residential typologies recommended for the expansion of Aggeneys.

Apart from single residential and medium density duplex development, other land uses will be required, including business, light industrial and commercial. The proposed expanded urban area, including the current town, is 602 ha, including areas zoned for residential, business and light industrial. The development of the town is planned to occur in four phases (BVI, 2022). The phases are detailed in Table 2-2. The complete expansion of the town will entail the supply of:

- 2 665 single residential units on 700 m² erven;
- 1 353 medium density residential units or duplexes at a density of 40 duplexes per ha;
- 49 971 m² of land area zoned for business;
- 176 811 m² of total land area zoned for light industrial;
- 28 860 m² of total land area zoned for offices; and
- 140 090 m² of total land area zoned for community facilities.

The Precinct Plan for the expansion of the town of Aggeneys is illustrated in Figure 2-2. The following community facilities are also proposed as part of the urban area expansion:

- A Youth Centre;
- Public braai/picnic areas;
- 24 hour hospital and dentist; and
- Tertiary training facilities.

Table 2-2: Development phases of the expansion of Aggeneys (BVI 2022).

	Total Land Area (m²)	Total Land Area (m²) Minus Internal Roads (22%)	No. of Single Residential Units (700m² Erf Size)	No. of Medium Density Residential Units (40 du/ha)	Business/ Industrial/ Office Floor Area (FAR 0.4)
Phase 1					
Single Residential	441863	344653	492	0	0
Duplex	140470	109567	0	438	0
Business	64066	49971	0	0	19989
Community Facilities	88629	69131	0	0	0
Phase 2					
Single Residential	1008600	786708	1124	0	0
Duplex	293094	228613	0	914	0
Community Facilities	48722	38003	0	0	0
Phase 3					
Single Residential	309913	241732	345	0	0
Light Industrial	226681	176811	0	0	70724
Offices	28860	28860	0	0	11544
Phase 4					
Single Residential	631268	492389	703	0	0
Community Facilities	42252	32957	0	0	0
Total					
Single Residential	2391644	1865482	2665	0	0
Duplex	433564	338180	0	1353	0
Business	64066	49971	0	0	19989
Light Industrial	226681	176811	0	0	70724
Offices	28860	28860	0	0	11544
Community Facilities	179603	140090	0	0	0

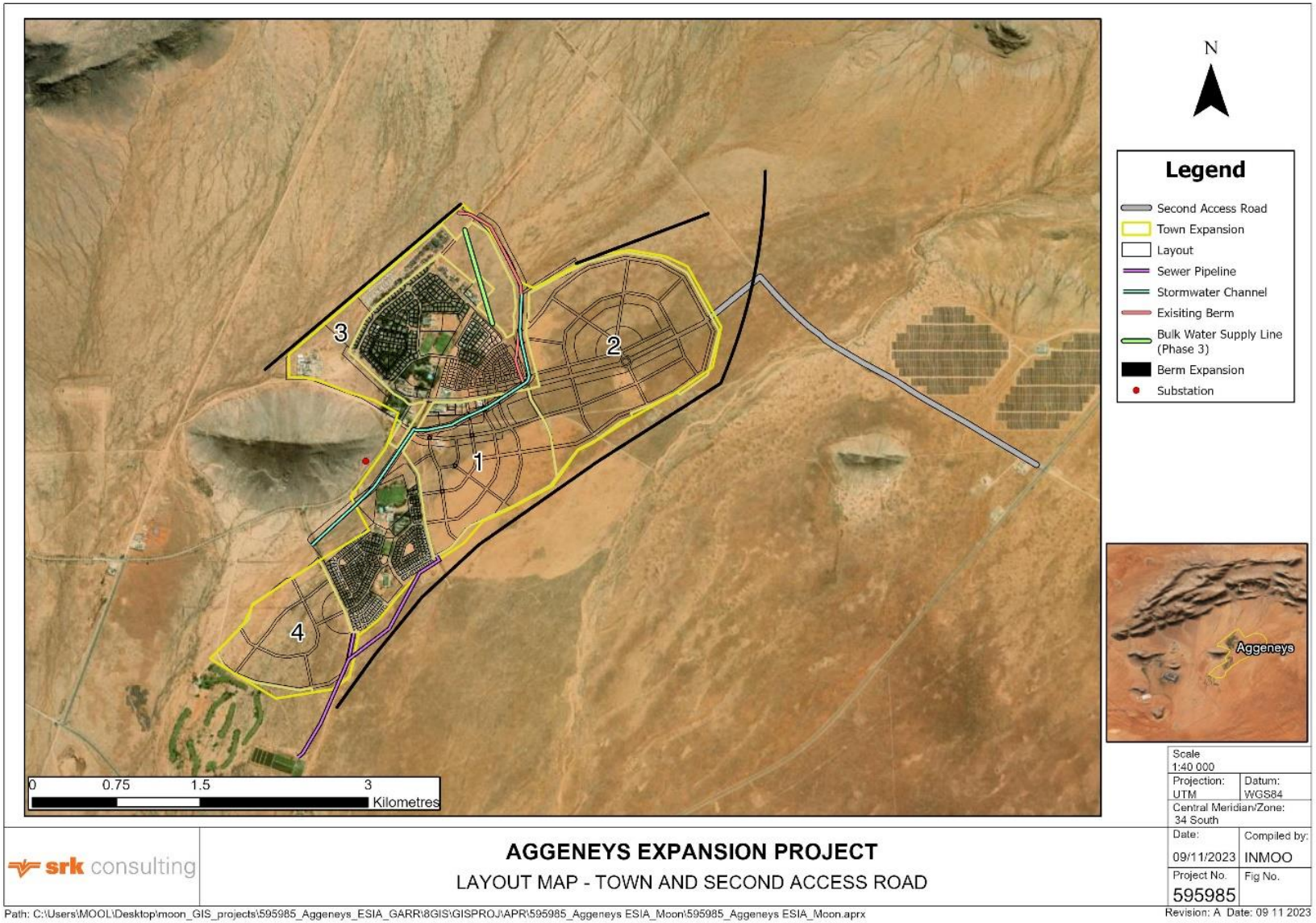

Figure 2-2: Precinct Plan for Aggeneys illustrating the proposed 4 phases of expansion (BVI 2022).

2.2.2 Water Infrastructure

Bulk water supply to Aggeneys is via a 30 km long pipeline from the water purification works at Pella, to the BMM Horseshoe reservoir, and from there to the Kokerboom reservoir. The Kokerboom reservoir is the dedicated storage reservoir for Aggeneys and has a storage capacity of 1.2 ML. The reservoir and pipeline leading to Aggeneys are currently being upgraded and are outside the scope of this assessment.

The internal water network mainly consists of Class 9 (Class "C") AC pipes, with a constant outside diameter ranging from 75 mm to 250 mm. The pipe network was installed in 1980. Water networks for Aggeneys North and South are currently linked with a 150 mm diameter pipe, which will be upgraded to a 315 mm uPVC pipe with the planned upgrades. The water reticulation in both the North and South Town is mainly done through ring networks in order to optimize pressure and water flow to all service points.

The upgrading of the water network for the expansion of Aggeneys involves the expansion of storage reservoirs and the construction of bulk and internal water reticulation network pipelines. These activities are listed in Table 2-3.

Table 2-3: Phased expansion of water infrastructure for Aggeneys (BVI 2022).

Phase	Storage	Pipeline
1	Construction of a 4.6 ML storage reservoir	• Construction of 2 000 m × 315 mm dia. feeder pipeline from existing network (blue) • Construction of internal water reticulation network for Phase 1 Development.
2	Construction of a 6.6 ML storage reservoir	• Construction of internal water reticulation network • Construction of new 600 m x 360 mm dia. supply pipeline (blue) • Construction of new 1 400 m x 400 mm dia. to up-grade existing 315 mm dia. Pipeline (orange)
3	Construction of a 3 ML storage reservoir.	• Construction of internal water reticulation network. • Construction of new 500 m x 315 mm dia. feeder pipeline (blue).
4	-	• Construction of internal water reticulation network. • Construction of new 2 000 m x 315 mm dia. feeder pipeline (blue).

2.2.3 Sewer Infrastructure & Wastewater Treatment Works

The sewer network in Aggeneys has an average slope of 1:110 measured from the most northern part of Aggeneys to the oxidation ponds to which the sewerage is gravitationally fed. There are currently no pumpstations in the town itself and only one sewer pumpstation on the outskirts of town for the security office building and nearby construction camp. This pumpstation pumps into the exiting sewer pipeline in Pella Road. The gravitation system mainly consists of 150 mm AC class 3S pipe, with 100 mm house connections. The 150 mm pipes feed into a 225 mm and 300 mm main sewer pipe, transporting sewer to the wastewater treatment works.

As the 300 mm diameter main sewer line from Aggeneys Town enters the sewerage works it is collected into a collection chamber where it passes through a stainless-steel grid where solids are removed. From there the sewer flows through two grit canals where sand, grit and stones are removed, through a gauging weir where the incoming flow is measured by means of an ultrasonic level sensor. The flow is then discharged into the oxidation pond system.

The upgrading of the sewer network for the expansion of Aggeneys involves the expansion of Wastewater Treatment Works (WWTW) and the construction and upgrading of sewer outfall and internal sewer network pipelines. These activities are listed in Table 2-4.

The locality and layout of the proposed expanded WWTW can be seen in Figure 2-3.

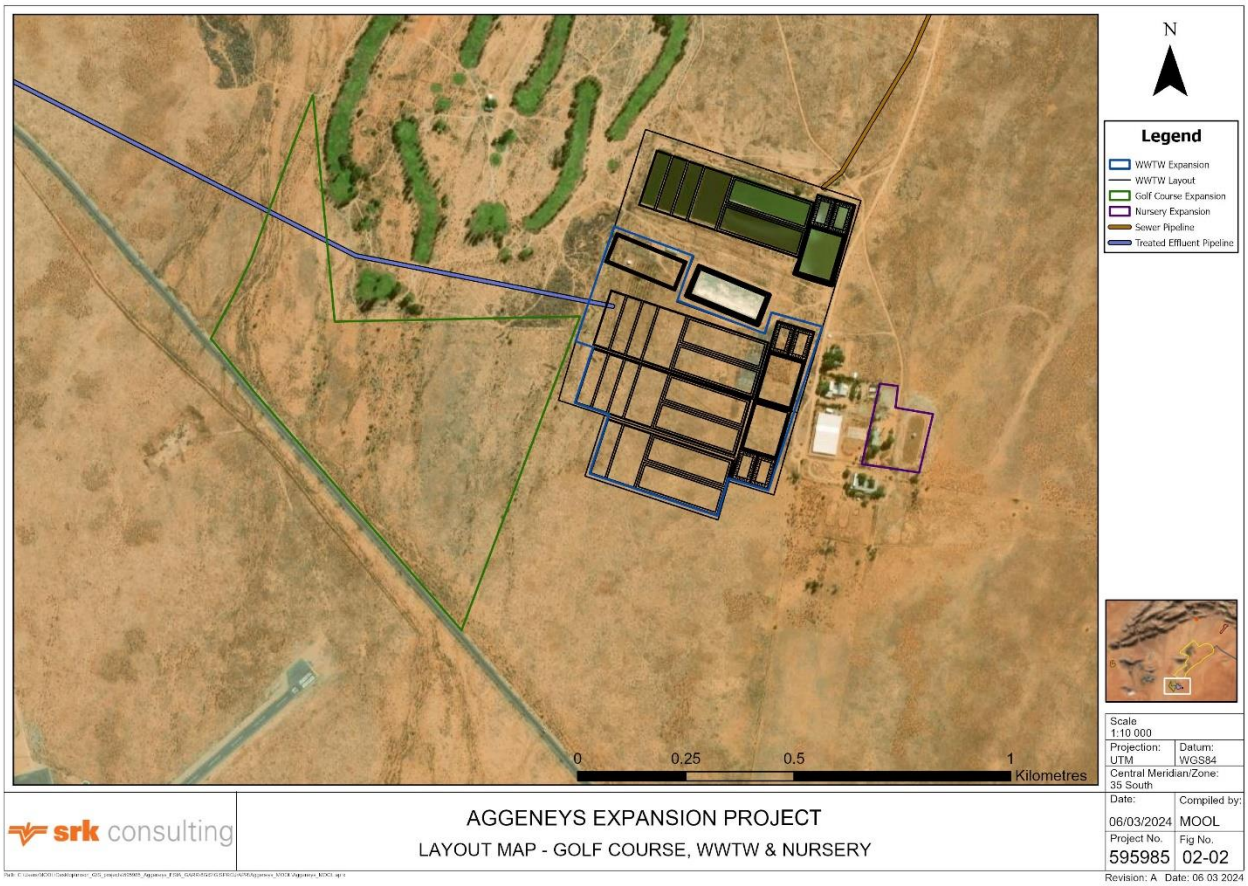

Figure 2-3: Layout of the proposed expanded Wastewater Treatment Works (WWTW), golf course, and nursery.

Table 2-4: Activities regarding the phased upgrading of the sewer infrastructure for Aggeneys (BVI 2022).

Phase	WWTW	Pipeline network
1	Construction of 2 ML/day WWTW	• Upgrading of the existing 315 mm dia. outfall pipeline to a 500 mm dia. sewer pipeline with an approximate length of 1 200 m. • Installation of internal sewer network. • Construction of a new 1 200 m x 315 mm dia. sewer pipeline.
2	Increasing the capacity of the WWTW with an additional 2ML/day.	• Construction of a new 1 600 m x 250 mm dia. sewer pipeline. • Construction of internal sewer network for Phase 2 development.
3	Increasing the capacity of the WWTW with an additional 1ML/day.	• Construction of a new 1 000 m x 160 mm dia. sewer pipeline. • Construction of internal sewer network for Phase 3 development.

Phase	WWTW	Pipeline network
4	-	• Construction of a new 500 m x 160 mm dia. sewer pipe-line. • Construction of the internal sewer network for Phase 4 development.

The existing Wastewater Treatment Works is designed to treat 2 ML/day of domestic sewerage. It consists of two anaerobic ponds, three primary ponds, and four secondary ponds. The capacity of the WWTW was determined in 2018 for a total of 1 276 households and is currently very close to capacity.

The overflow from the WWTW is discharged into an evaporation pond or disposed of by means of irrigation on the nearby golf. The WWTW is dependent on the golf course using 420 m³/day of this treated effluent. Historical data shows that the daily use of water by the golf course is on average 270 m³/day with a minimum of 70 m³/day during certain months (e.g. during periods of high rainfall and/or lower temperatures). To address this shortage of irrigation land, for which a water use licence has already been granted, it is proposed to expand the golf course to 18 holes, effectively doubling the area available for irrigation, and thereby meeting the average demand for the disposal of treated sewerage by irrigation.

To meet the requirements of the expanded population of Aggeneys, the WWTW would need to be expanded to a capacity of 7 ML/day. This will be accomplished by the addition of anaerobic, primary, and secondary ponds. In addition, the ponds of the expanded WWTW will include artificial wetland technology. A preliminary layout of the expanded WWTW is shown in Figure 2-3.

The expansion of the WWTW will result in an additional 5 ML of water that needs to be disposed of. Currently, effluent from the WWTW is used to irrigate the golf course. However, the expanded WWTW will produce excess treated effluent. A 3 km pipeline will be constructed to transfer the effluent to the Black Mountain Mine metallurgical plant. The 150 mm diameter uPVC pipeline will be buried underground as it has to traverse the main Aggeneys access road. An accompanying pumphouse, including a pump designed to handle an effluent discharge of 40 L/s, will also be constructed.

2.2.4 Roads

The town is approximately 15 km from the N14 and accesses the national road with a shared access road to the Black Mountain mining complex. The existing access road to Aggeneys, accommodates heavy traffic and heavy vehicles, and requires regular repairs. It is therefore proposed to establish a second access to Aggeneys for light vehicles, i.e. separating normal domestic traffic from the heavy traffic (mining traffic).

An alternative access road of approximately 5 500 m is proposed to the south-east of the town. The access road will be a dual lane tar road that mostly follows the existing gravel roads. It joins the N14 at an existing four way intersection that has been upgraded to accommodate increased traffic. The route intersects a number of minor and one major watercourse and will require culverts and a 100 m long low-level culvert bridge at these crossings, respectively. The proposed design of the watercourse crossing is shown in Appendix E7.

The road will be constructed using local materials. The alignment of the road is shown in Figure 2-2.

2.2.5 Stormwater Infrastructure

The existing stormwater network mainly consists of 450 mm concrete pipe, with 750 mm sections where discharges culminate. Furrows and channels were also constructed to convey stormwater from problem areas. A 1.5 m to 2 m high stormwater berm protects the town from run-off water from the

Aggeneys mountains to the north. A lay-out of the existing berm, as well as the proposed berm and stormwater channel is shown Figure 2-2.

Stormwater management will be upgraded in the following manner:

Phase 1:

- Formalisation and extension of the existing stormwater berm;
- Construction of a 3 000 m concrete, trapezoidal stormwater channel with a bottom width of 2 m, top width of 5.6 m and a height of 1.8 m; and
- Construction of internal stormwater reticulation network.

Phase 2-4:

- Construction of internal stormwater reticulation networks.

The stormwater berm will be extended to divert stormwater flow to the drainage line to the south of the town.

2.2.6 Electrical Infrastructure

The Eskom transmission substation, outside Aggeneys, feeds the Swartberg Substation, which feeds the 66/6.6 kV Aggeneys township substation via a 66 kV overhead line. This substation has recently been upgraded from a capacity of 4 MVA of which 3.8 MVA is presently utilised, to 12.5 MVA.

There is currently no medium voltage distribution network available in the precinct areas. The electrical infrastructure will be upgraded in a phased approach as described below.

Phase1:

The installed capacity at the Aggeneys Township 66/6.6 kV bulk substation will be increased by 12.5 MVA to have 25 MVA installed capacity. 5 MVA is allocated for existing infrastructure and near future projects; and 7 VA is allocated for Phase 1 loading. The total loading after Phase 1 will be 12 MVA, with 7 MVA spare capacity for 80% loading. The new transformer will be redundant to secure the integrity of the supply.

The two spare 6.6 kV medium voltage switchgears can be utilized for a new ring feeder.

Phase 2:

New 66/11 kV feeder bays will be installed at the bulk substation with 2 x 25 MVA installed capacity, giving a total of 50 MVA installed capacity. 7 MVA of the 11 kV substation is allocated for Phase 2 loading and 16 MVA for Phase 3 loading. The total loading after Phase 2 and Phase 3 will be 23 MVA of the 11 kV substation, with no spare capacity for 92% loading. The second new transformer will be redundant to secure the integrity of the supply. A new 11 kV distribution substation building with eight 11 kV switchgear feeders would need to be installed.

Phase 3:

The spare capacity on the 11 kV distribution substation created during Phase 2 will be utilised.

Phase 4:

The spare capacity at the Aggeneys Township 66/6.6 kV bulk substation will be utilised. The total loading after Phase 4 will be 15 MVA of the 6.6 kV substation, with 5 MVA spare capacity for 80 % loading. Both of the 12.5 MVA transformers must share the load.

Currently, a berm surrounds the current substation footprint and includes the expansion footprint. The proposed locality of the expansion of the Aggeneys township substation can be seen in Figure 2-4.

Figure 2-4: Proposed locality of the expansion of the Aggeneys township substation.

2.2.7 Landfill Expansion

All waste generated within the town is pre-classified and sorted at strategically located waste transfer stations. At these stations, waste undergoes a crucial separation process. It is categorized into two main streams:

- recyclable waste, including paper, cardboard, glass, plastics, and metals that are suitable for recycling. A dedicated recycling company is responsible for collecting and processing these recyclable materials, contributing to sustainable waste management practices and resource conservation; and
- general domestic waste comprising non-recyclable items and general household waste, is collected, and placed in bags for transportation to the landfill site.

A general waste landfill is located at 29°14'54.58"S 18°45'43.74"E, approximately 9 km from the town and has been licenced since 1995 (B33/2/450/12/P146). The site is within the mining area and outside of the area zoned for residential development. It currently receives domestic waste from the town and either buries it in trenches or burns it. It is an old sand quarry.

The landfill is currently running out of airspace and will need to be expanded to accommodate the increased waste volumes from the town. To reduce traffic in the mining area, a waste handling facility will be constructed in the town and only non-recyclable items will be transported via trucks to the proposed landfill.

The extent of the facility (i.e., entire permitted area) is defined by means of a fence line with an overall footprint of 21 hectares.

Technology

The proposed design involves two equally sized square cells to be constructed as the initial stage, and an additional cell added as required. With the proposed design, each typical cell is estimated to measure 60 meters in width and 60 meters in length and approximately 2m deep providing an airspace capacity of approximately 24 000m^3. Within the designated 21 hectares allocated for development, this geometric configuration allows for the accommodation of a total of 38 cells. The approximate airspace available for utilization under this layout is approximately 921 400 m^3.

The landfill will utilise a geosynthetic clay liner (GCL) which is well-suited to the site's geological conditions and aligns with the specified waste classification requirements, providing an effective barrier against leachate migration. A GCL will be utilised for capping as well as the excavated material is lacking in clay. Capping should be done on a daily basis with material sourced from the new cell excavations or existing stockpiled material on the northern and southern sides of the site. The capping process itself involves the application of a layer of topsoil, which is then planted with locally adapted grasses and shrubs. This vegetative layer assists ecological restoration. and ensures proper sealing and stability. This capping process prevents leachate infiltration, controls odours, and promotes the long-term stability of the landfill site.

A leachate management system will be deployed as described below.

- Cell 1 Active (i.e., receiving waste):
    - Leachate is collected in the perforated drainage pipe and leachate collection layers and conveyed to a manhole.
    - This manhole contains a valve that will remain closed until such time as the leachate capacity in Cell 1 is reached – the manhole will then be opened to drain leachate to Cell 2.
    - In addition, an emergency overflow system is included between Cell 1 and Cell 2 to ensure that leachate does not spill to the environment should the manhole's valve not be opened to drain excess leachate.
    - It is envisaged that when Cell 1 is filled to crest level, that the manhole's valve is permanently opened, and Cell 2 will become an active leachate management cell. The valve is then left permanently open to drain residual leachate from Cell1.
- Cell 2 Active (i.e., receiving waste):
    - Leachate is collected in the perforated drainage pipe and leachate collection layers and conveyed to Manhole LM2 also containing valve LM2 and an emergency overflow between Cell 2 and Cell 3.
    - Cell 3 then becomes the leachate management cell should the leachate containment capacity of Cell 2 be reached, and so forth.

An upstream stormwater cut-off trench will be constructed at the site to manage stormwater and to separate clean water areas from dirty water areas. This trench is strategically positioned to intercept and contain surface water flow, often referred to as sheet flow, before it can reach the landfill area. Localized stormwater management dealing with stormwater originating from capped, domed, closed cells, will be incorporated into the final design.

Assuming a cover-to-waste ratio of 1:4, the portion of airspace designated for waste utilization is estimated to be approximately 737 150 m^3. Given an Initial Rate of Deposition (IRD) of 29.96 tonnes per day and a growth rate of 1.2%, this calculation results in an anticipated operational lifespan of approximately 51.5 years for this site.

The layout of the proposed landfill is illustrated in Figure 2-5.

Figure 2-5: Layout of the proposed landfill, illustrating the cell utilised in the leachate management system.

2.2.8 Cemetery

Currently no public cemetery exists in Aggeneys. The closest public cemeteries are in the neighbouring towns of Pella, Pofadder and Springbok. A new cemetery is proposed for the town at a site that neighbours an existing family cemetery.

The area of the proposed cemetery is approximately 1 ha in extent and would cater for 2000 – 2500 graves. No burial rate data is available for Aggeneys and it is therefore not possible to predict the operational lifespan of the cemetery with any accuracy. However, assuming a conservative (worst case) burial rate of 2% per annum, the cemetery will be able to cater for burials for a period of 25 to 30 years.

Construction activities may involve construction of internal (gravel) access roads. Landscaping is not required but might include the planting of trees along the edges of the cemetery. The location of the proposed cemetery is indicated in Figure 2-6.

Burials will be according to normal cemetery procedures. In instances where a grave cannot be excavated by hand, a Tractor-Loader-Backhoe (TLB) or similar machine will be required to excavate the grave.

Access to the cemetery is proposed via an existing track. It is expected that the access road would be upgraded to a gravel road, not exceeding 4 m in width. No further infrastructure is proposed.

A rezoning application as per the Spatial Planning and Land Use Management Act, Act 14 of 2013 (SPLUMA), will be required and falls outside of this EIA process.

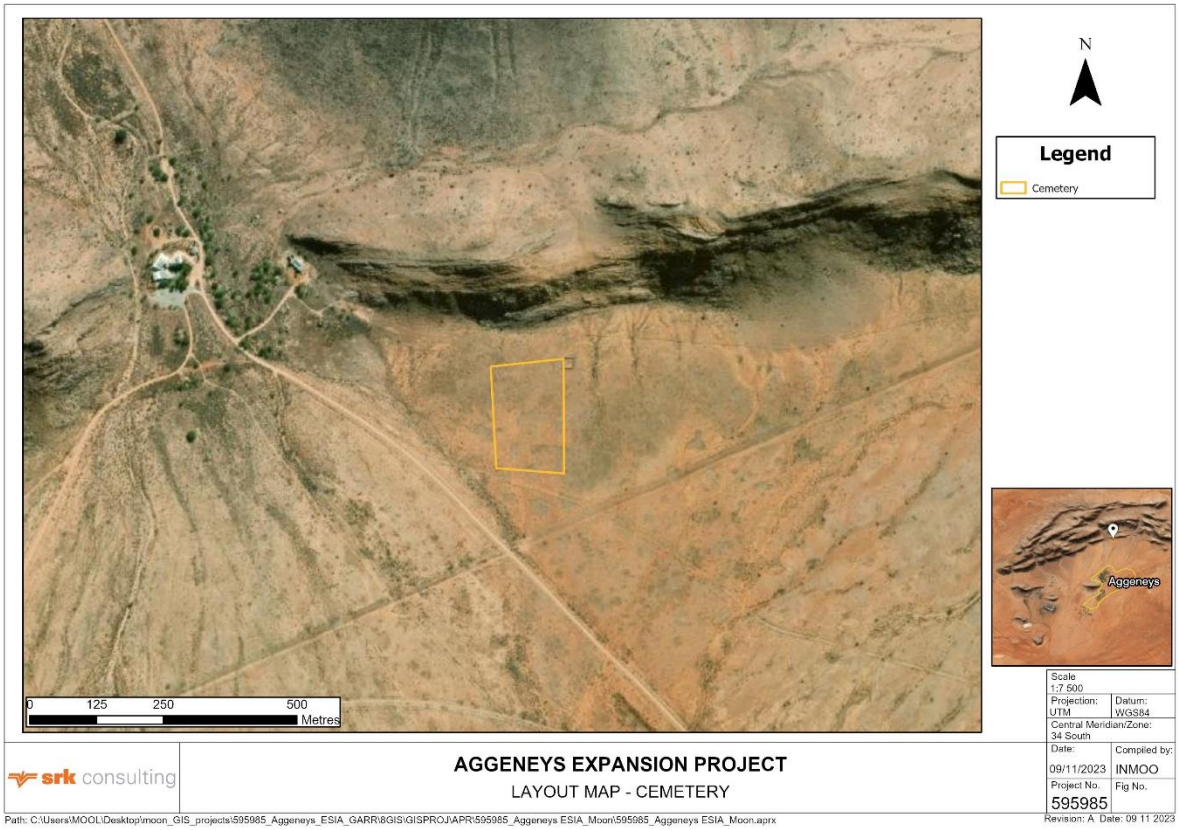

Figure 2-6: Location of the proposed Aggeneys cemetery.

2.2.9 Golf Course

The current golf course consists of nine holes, with a surface area of approximately 12.18 ha, spaced over an area of approximately 48 ha. Other facilities include a clubhouse with supporting services. The golf course is irrigated with up to ± 270m³/day reclaimed water from the neighbouring WWTW. During winter months the volume of irrigated reclaimed water can be as low as 70 m³/day. The current WWTW however need to dispose of approximately 420 m³/day, as per its existing water use licence. This provides the technical motivation to increase the size of the irrigated area of the golf course by another nine holes. Expansion of the golf course would also improve the recreational activities available for residents.

It is therefore proposed to expand the golf course with an additional nine holes over an additional approximately 109 ha (and an estimated additional irrigated area of 12 hectares). The location of the expanded golf course is depicted in Figure 2-3**Error! Reference source not found.**.

A layout for the golf course has not been established.

2.2.10 Nursery

The main purpose of the nursery is to hold plants collected during search & rescue operations and propagate plant species for the rehabilitation of areas post mining. It consists of outdoor and undercover germination and seedling growth facilities. Most species propagated are local and adapted to dry conditions, requiring reduced water volumes for irrigation. The current nursery has the necessary potable water, sewerage, and electricity services. The nursery also provides training services for local education facilities, including a school outreach programme.

As surface operations of the surrounding mines expand, more threatened and protected species need to be held and stored for future rehabilitation purposes. it is proposed to double the capacity of the current nursery by extending the footprint towards the east. This will entail expanding the current

propagation area from an extent of approximately 1 ha to 2.15 ha. A neighbouring existing building, previously used by the dart club, will be converted to teaching facilities.

The expanded nursery will utilise increased volumes of water, but no supply services will need to be upgraded. The correct biodiversity permit from DAERL as per the Northern Cape will be required for the propagation of threatened and protected plant species.

The expansion footprint of the nursery can be seen in Figure 2-3.

2.2.11 Shooting Range

No shooting range currently exists in the vicinity of the town. A shooting range has been requested for recreational purposes. The South African Police Service has also encouraged the development of a shooting range for training purposes. The proposed site is approximately 3.5 km north-east of Aggeneys and 3 km north-west of the N14.

The proposed shooting range consists of a handgun and shotgun range of 25 m in distance, and a 1 000 m rifle shooting line. The vegetation would be brush cut to ensure the targets can be adequately sited and the shooting range would need to be adequately fenced. The site will be fenced for security and safety purposes. No additional infrastructure will be provided on site.

The shooting will occur in a north-east direction towards the hills and away from the town and N14. The location of the shooting range has been approved by the SAPS and a licence from SAPS will be received for the facility.

The footprint of the proposed shooting range can be seen in Figure 2-7.

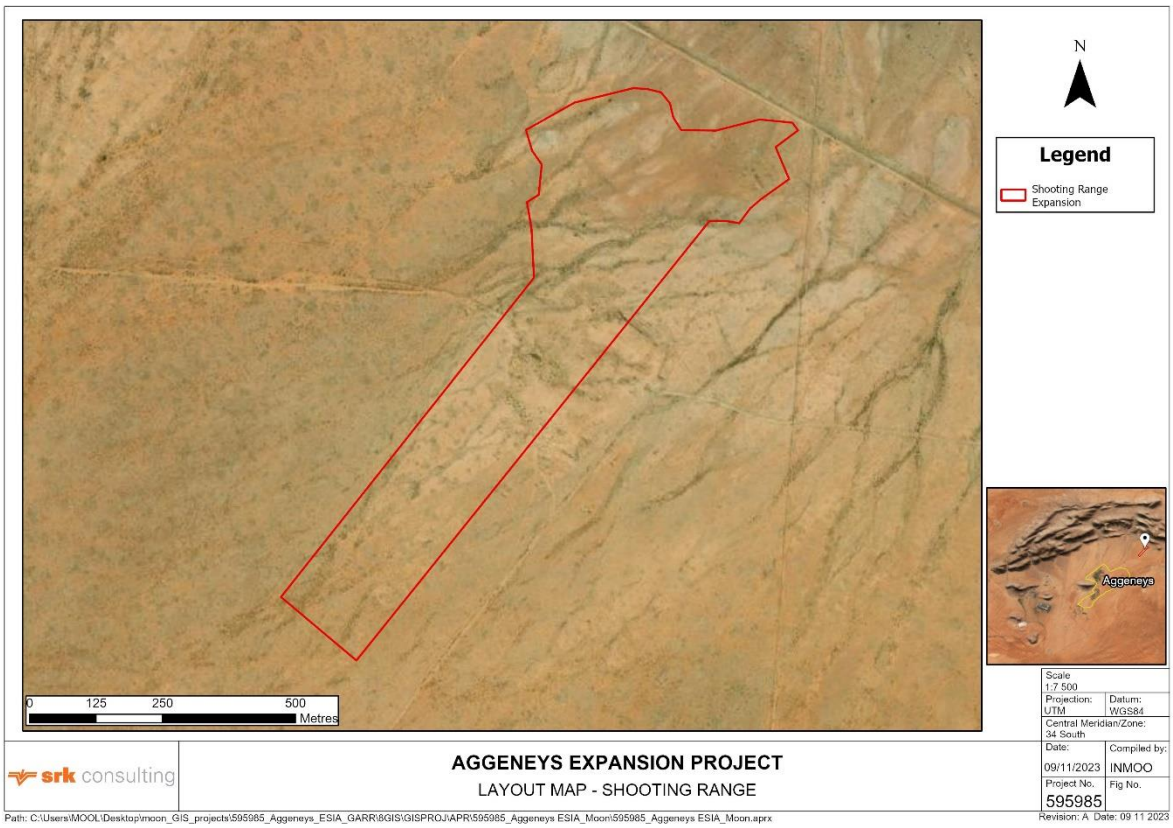

Figure 2-7: Location of the proposed Aggeneys shooting range.

2.3 Management Plans

2.3.1 Aggeneys Spatial Development & Infrastructure Plan (2022)

The purpose of the Aggeneys Spatial Development and Infrastructure Plan (BVI, 2022) (ASDIP) is to guide, facilitate and manage the future expansion and growth of the town over the short, medium and long term in a responsible and sustainable manner. It can be considered both a growth management plan and a precinct plan.

The document identifies the extent of the development required to provide a sustainable town to supply the requirements of the developments in the vicinity of the town. Furthermore, it determines the infrastructure requirements to supply the required residential units, as well as other necessary land uses.

The developments documented in the ASDIP form the basis of this EIA application. The ASDIP and Aggeneys Infrastructure Master Plan, an appendix to the ASDIP, are included as Appendix E5 and Appendix E6, respectively.

2.3.2 Conservation Area Management Plan (Ekotrust, 2022)

A Conservation Area Management Plan (CAMP) was recently updated for all land portions owned and managed by Black Mountain Mine ((Ekotrust, 2022). The CAMP integrated the principles underpinning the Performance Standard on Environmental and Social Sustainability, Guidance Note 6 of the International Finance Corporation (IFC) (2019), namely the recognition 'that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development'. The CAMP aims to:

- protect and conserve biodiversity;
- maintain the benefits of ecosystem services; and
- promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

The report provided comprehensive management guidelines based on ecological principles for the conservation and set-aside areas controlled by BMM. Six programmes were identified:

- Soil Management;
- Vegetation Management;
- Water Management;
- Wildlife Management;
- Infrastructure Management; and
- Connectivity.

Land Use Zones were determined for the implementation of the management guidelines. Land Use Zones include:

- Mining;
- Conservation Area;
- General Use;
- Farming;
- Game Camp;
- Set-aside;
- Solar Development Zone; and

- Special Economic Zone

A Land Use Zonation Map is included as

The land use zones relevant to the development activities include general use (including residential), mining (including restricted conservation areas) and set-aside areas, as identified in the Gamsberg Biodiversity Offset Agreement. All proposed activities occur within the general use/residential zone, with the exception of:

- the cemetery and section of the shooting range located in the set-aside area, and
- the landfill and a section of the WWTW effluent pipeline is situated in the mining zone, outside of the restricted conservation zone.

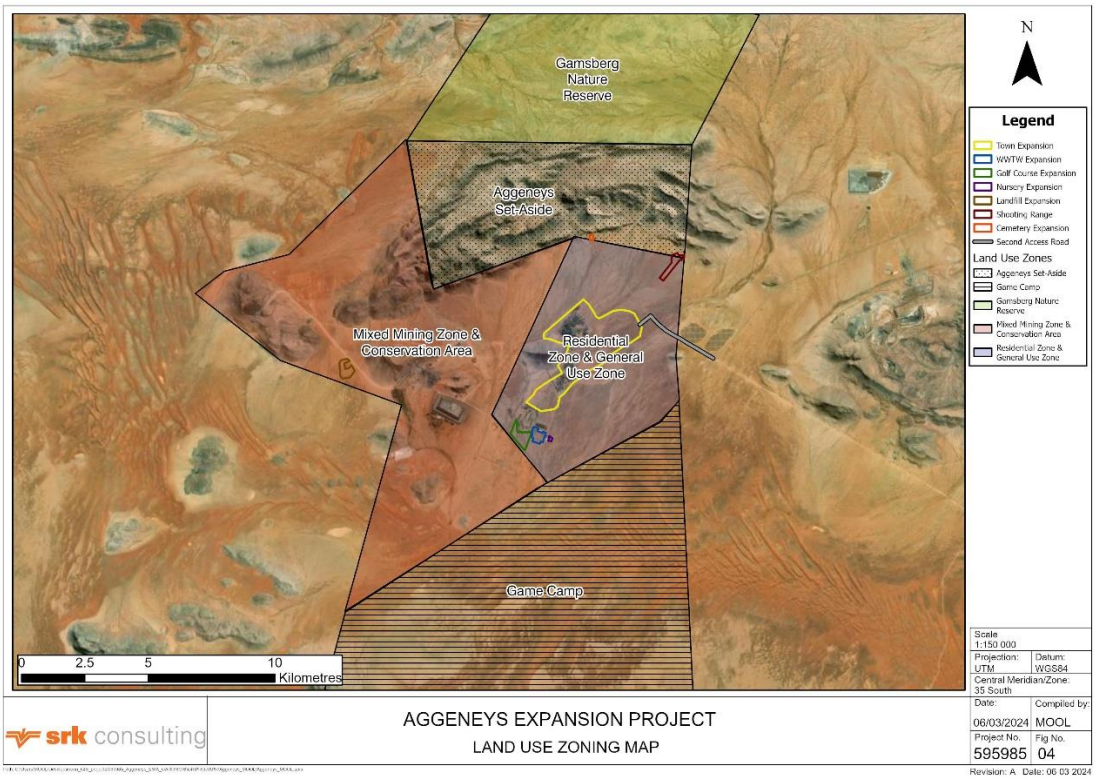

Figure 2-8: Land Use Zonation map for BMM-controlled land around Aggeneys (EkoTrust 2022).

3 Environmental Objectives

This section specifies the impact management objectives and outcomes used to determine the extent of management action(s) required to mitigate the impacts identified during the impact assessment process. A summary of the potential impacts of the proposed development identified and assessed in the EIA Report is presented in the following tables: Aggeneys urban expansion area (Table 3-1); Landfill (Table 3-2); WWTW (Table 3-3); cemetery (Table 3-4); and shooting range (Table 3-5). Additional details on the nature of these impacts are provided in the Draft EIA Report (SRK Consulting Report No: 595985/4, June 2024).

Table 3-1: Summary of potential impacts of the Aggeneys urban expansion area and their significance

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Air quality	Increased dust emissions	Low	Very Low	-	-

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Hydrology	Alternation of ephemeral watercourse water quality	Low	Insignificant		
Hydrology	Alteration in geomorphology of ephemeral watercourses	Low	Very Low	-	-
Hydrology	Alteration to hydrology of ephemeral watercourse	Insignificant	-	Medium	Insignificant
Visual	Alteration of landscape	Medium	Medium	-	-
Traffic	Increased traffic	Low	Low	Medium	Medium
Traffic	Decreased commuting	-	-	High (positive)	-
Socio-economic	Increased employment opportunities	Medium (positive)	Medium (positive)	Low (positive)	Low (positive)
Socio-economic	Increased tax base	-	-	Medium (positive)	Medium (positive)
Socio-economic	Increased rural node services	-	-	Medium (positive)	Medium (positive)
Nuisance impacts	Increased noise, odour and light pollution	Low	Insignificant	Medium	Insignificant
Heritage	Loss of archaeological resources	Very Low	Insignificant	-	-
Heritage	Loss of palaeontological resources	Very Low	Insignificant	-	-
Waste	Waste Impacts	Medium	Insignificant	-	-
Aquatic Biodiversity	Loss of ephemeral watercourse vegetation	Medium	Insignificant	-	-
Aquatic Biodiversity	Loss of ecological processes provided by ephemeral watercourses	Medium	-	-	-
Plant Species	Loss of terrestrial plant SCC and protected species populations and their habitat	Medium	Very Low	-	-
Plant Species	Increased poaching of plant species	Medium	Low	High	Low
Plant Species	Loss of SCCs in nursery due to WWTW	-	-	Very Low	Very Low
Plant Species	Expansion of Nursery	Medium	-	-	-
Terrestrial Biodiversity	Disruption to terrestrial ecosystem processes	Medium	Low	Medium	Low
Terrestrial Biodiversity	Loss of Bushmanland Arid Grassland	Low	Low	-	-
Terrestrial Biodiversity	Loss of Aggeneys Gravel Vygieveld	Low	Low	-	-
Terrestrial Ecology	Loss of terrestrial ecosystem connectivity	Medium	Low	-	-
Terrestrial Ecology	Loss of CBA	High	Very Low	-	-
Terrestrial Ecology	Spread of IAS	Medium	Insignificant	High	Insignificant
Animal species	Loss of herpetological fauna and habitat	Low	Very Low	-	-
Animal species	Loss of mammal fauna and habitat	Low	Very Low	-	-
Animal species	Loss of animal SCC and habitat	Very Low	Insignificant	-	-
Animal species	Direct loss and disturbance of animals	Low	Insignificant	Medium	Low

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Animal species	Avifauna disturbance	Very Low	Insignificant	Medium	Very Low
Animal species	Avifauna habitat loss	Medium	Low	-	-
Animal species	Avifauna mortality			Medium	Low
Climate change					
Cumulative	Cumulative Aquatic Biodiversity Impact	Medium	-	-	-
Cumulative	Cumulative Terrestrial Biodiversity Impact	Medium	-	Medium	-

Negative status of impact					Positive status of impact				
High	Medium	Low	Very Low	Insignificant	Insignificant	Very Low	Low	Medium	High

Table 3-2: Summary of potential impacts of the landfill and their significance

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Air quality	Increased dust emissions	Low	Very Low	-	-
Hydrology	Alternation of ephemeral watercourse water quality	Low	Insignificant		
Hydrology	Alteration in geomorphology of ephemeral watercourses	Low	Very Low	-	-
Hydrology	Alteration to hydrology of ephemeral watercourse	Insignificant	-	Medium	Insignificant
Geohydrology	Impact on groundwater	Very Low	Very Low	Very Low	Very Low
Visual	Alteration of landscape	-	-	Very Low	Insignificant
Nuisance impacts	Increased noise, odour and light pollution	Low	Insignificant	Medium	Insignificant
Heritage	Loss of palaeontological resources	Very Low	Insignificant	-	-
Waste	Waste Impacts	Medium	Insignificant	-	-
Aquatic Biodiversity	Loss of ephemeral watercourse vegetation	Medium	Insignificant	-	-
Aquatic Biodiversity	Loss of ecological processes provided by ephemeral watercourses	Medium	-	-	-
Plant Species	Loss of terrestrial plant SCC and protected species populations and their habitat	Medium	Very Low	-	-
Terrestrial Biodiversity	Disruption to terrestrial ecosystem processes	Medium	Low	Medium	Low
Terrestrial Biodiversity	Loss of Bushmanland Arid Grassland	Low	Low	-	-
Terrestrial Ecology	Loss of terrestrial ecosystem connectivity	Medium	Low	-	-
Terrestrial Ecology	Loss of CBA	High	Very Low	-	-
Terrestrial Ecology	Spread of IAS	Medium	Insignificant	High	Insignificant

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Animal species	Loss of herpetological fauna and habitat	Low	Very Low	-	-
Animal species	Loss of mammal fauna and habitat	Low	Very Low	-	-
Animal species	Loss of animal SCC and habitat	Very Low	Insignificant	-	-
Animal species	Direct loss and disturbance of animals	Low	Insignificant	Medium	Low
Animal species	Avifauna disturbance	Very Low	Insignificant	Medium	Very Low
Animal species	Avifauna habitat loss	Medium	Low	-	-
Animal species	Avifauna mortality			Medium	Low
Climate change	Increased GHG emissions	Medium	-	-	-
Cumulative	Cumulative Aquatic Biodiversity Impact	Medium	-	-	-
Cumulative	Cumulative Terrestrial Biodiversity Impact	Medium	-	Medium	-

Negative status of impact: High | Medium | Low | Very Low | Insignificant

Positive status of impact: Insignificant | Very Low | Low | Medium | High

Table 3-3: Summary of potential impacts of the WWTW and their significance

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Air quality	Increased dust emissions	Low	Very Low	-	-
Hydrology	Alternation of ephemeral watercourse water quality	Low	Insignificant		
Hydrology	Alteration in geomorphology of ephemeral watercourses	Low	Very Low	-	-
Hydrology	Alteration to hydrology of ephemeral watercourse	Insignificant	-	Medium	Insignificant
Geohydrology	Impact on groundwater	Very Low	Very Low	Very Low	Very Low
Nuisance impacts	Increased noise, odour and light pollution	Low	Insignificant	Medium	Insignificant
Heritage	Loss of palaeontological resources	Very Low	Insignificant	-	-
Waste	Waste Impacts	Medium	Insignificant	-	-
Aquatic Biodiversity	Loss of ephemeral watercourse vegetation	Medium	Insignificant	-	-
Aquatic Biodiversity	Loss of ecological processes provided by ephemeral watercourses	Medium	-	-	-
Plant Species	Loss of terrestrial plant SCC and protected species populations and their habitat	Medium	Very Low	-	-
Plant Species	Loss of SCCs in nursery due to WWTW	-	-	Very Low	Very Low
Terrestrial Biodiversity	Disruption to terrestrial ecosystem processes	Medium	Low	Medium	Low

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Terrestrial Biodiversity	Loss of Bushmanland Arid Grassland	Low	Low	-	-
Terrestrial Ecology	Loss of terrestrial ecosystem connectivity	Medium	Low	-	-
Terrestrial Ecology	Loss of CBA	High	Very Low	-	-
Terrestrial Ecology	Spread of IAS	Medium	Insignificant	High	Insignificant
Animal species	Loss of herpetological fauna and habitat	Low	Very Low	-	-
Animal species	Loss of mammal fauna and habitat	Low	Very Low	-	-
Animal species	Loss of animal SCC and habitat	Very Low	Insignificant	-	-
Animal species	Direct loss and disturbance of animals	Low	Insignificant	Medium	Low
Animal species	Avifauna disturbance	Very Low	Insignificant	Medium	Very Low
Animal species	Avifauna habitat loss	Medium	Low	-	-
Animal species	Avifauna mortality			Medium	Low
Climate change	Increased GHG emissions	Medium	-		
Cumulative	Cumulative Aquatic Biodiversity Impact	Medium	-	-	-
Cumulative	Cumulative Terrestrial Biodiversity Impact	Medium	-	Medium	-

Negative status of impact					Positive status of impact				
High	Medium	Low	Very Low	Insignificant	Insignificant	Very Low	Low	Medium	High

Table 3-4: Summary of potential impacts of the cemetery and their significance

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Air quality	Increased dust emissions	Low	Very Low	-	-
Geohydrology	Impact on groundwater	Very Low	Very Low	Very Low	Very Low
Heritage	Loss of archaeological resources	Very Low	Insignificant	-	-
Heritage	Loss of palaeontological resources	Very Low	Insignificant	-	-
Plant Species	Loss of terrestrial plant SCC and protected species populations and their habitat	Medium	Very Low	-	-
Terrestrial Biodiversity	Disruption to terrestrial ecosystem processes	Medium	Low	Medium	Low
Terrestrial Biodiversity	Loss of Bushmanland Arid Grassland	Low	Low	-	-
Terrestrial Biodiversity	Loss of Aggeneys Gravel Vygieveld	Low	Low	-	-
Terrestrial Ecology	Loss of terrestrial ecosystem connectivity	Medium	Low	-	-

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Terrestrial Ecology	Loss of CBA	High	Very Low	-	-
Terrestrial Ecology	Loss of Biodiversity Set Aside Area	High	Very Low	-	-
Terrestrial Ecology	Spread of IAS	Medium	Insignificant	High	Insignificant
Animal species	Loss of herpetological fauna and habitat	Low	Very Low	-	-
Animal species	Loss of mammal fauna and habitat	Low	Very Low	-	-
Animal species	Loss of animal SCC and habitat	Very Low	Insignificant	-	-
Animal species	Direct loss and disturbance of animals	Low	Insignificant	Medium	Low
Animal species	Avifauna disturbance	Very Low	Insignificant	Medium	Very Low
Animal species	Avifauna habitat loss	Medium	Low	-	-
Animal species	Avifauna mortality			Medium	Low
Cumulative	Cumulative Aquatic Biodiversity Impact	Medium	-	-	-
Cumulative	Cumulative Terrestrial Biodiversity Impact	Medium	-	Medium	-

Negative status of impact: High | Medium | Low | Very Low | Insignificant

Positive status of impact: Insignificant | Very Low | Low | Medium | High

Table 3-5: Summary of potential impacts of the shooting range and their significance

Impact group	Impact Description	During Construction		During Operation	
		without mitigation	with mitigation	without mitigation	with mitigation
Plant Species	Loss of terrestrial plant SCC and protected species populations and their habitat	Medium	Very Low	-	-
Animal species	Direct loss and disturbance of animals	Low	Insignificant	Medium	Low
Animal species	Avifauna disturbance	Very Low	Insignificant	Medium	Very Low
Terrestrial Biodiversity	Disruption to terrestrial ecosystem processes	Medium	Low	Medium	Low
Terrestrial Ecology	Loss of terrestrial ecosystem connectivity	Medium	Low	-	-
Terrestrial Ecology	Loss of Biodiversity Set Aside Area	High	Very Low	-	-

Negative status of impact: High | Medium | Low | Very Low | Insignificant

Positive status of impact: Insignificant | Very Low | Low | Medium | High

3.1 Impacts on Air Quality

Air emissions during the construction phase are expected for each of the components of the development. Air emissions are mostly limited to dust and other fugitive emissions from vehicles, as

well as (during operation) noxious emissions such as Hydrogen sulfide from the WWTW and landfill. No air quality impacts are expected from the construction of the shooting range.

Dust will be generated by the movement, disturbance and storage of soil and building materials such as sand, which are mostly inert substances with no toxic impact. The construction activities will result in dust emissions from the movement of construction vehicles on dirt roads, vehicular emissions, the disturbance of sandy soils, and the stockpiling of topsoil and building sand.

The movement of construction vehicles on gravel roads also generates dust. Dust can cover infrastructure such as solar panels, as well as vegetation, reducing productivity. Dust emissions are temporary in nature and can readily be managed by standard construction techniques. However, the duration of the impact will be over the medium term, due to the phased nature of the activity.

No significant air emissions are anticipated during the operational phase of the development. In terms of the expanded urban area, emissions would be typical of those occurring in a residential area (mostly linked to vehicles). There is nothing to indicate that traffic volumes, and associated emissions, would be at a different intensity from those in the existing town. While there would be cumulatively more emissions in absolute terms, this would be spread over a wider area and are unlikely to cause national ambient air quality standards to be exceeded.

The management objective for this impact is:

- Reduce dust and noxious emissions.

3.2 Noise Impacts

During the construction phase noise will be generated by the operation of earthmoving and construction equipment, such as bulldozers, frontend loaders, scrapers, excavators, concrete mixers as well as haulage and other kinds of trucks.

As the activity is the expansion of Aggeneys, Noise Sensitive Areas (houses, schools, creches, etc.) do occur in town. However, impacts of noise are reduced as the activity will be limited to business hours and will occur over the medium term. No significant point sources of noise during the operation phase of the proposed development were identified in the scoping study, with the main source of noise anticipated to be due to vehicles. The shooting range is 3 km from town.

The operation of the infrastructure and services required for the expanded town will result in an increase in ambient noise in the vicinity of the proposed footprint. However, based on the large distances between potential receptors (neighbouring residences etc.), the increase should be negligible. No significant noise impacts are anticipated as a result of the operation phase of the development and therefore no specialist assessment is proposed to address noise impacts.

Although there is a cumulative impact associated with the increased extent of urban development, including residential, commercial, and light industrial land uses, this increase should not be significant as the layout is based on sound planning principles, including density requirements.

The management objectives for this impact are to ensure and demonstrate legal compliance in terms of noise generation.

3.3 Impacts on Groundwater

Potential impacts on groundwater are primarily associated with the operation of the landfill, cemetery, and WWTW. Construction phase impacts have also been evaluated for these components of the overall expansion project.

During construction phase, the risks are associated with construction vehicles and refuelling and/or spillages from hydrocarbon products (e.g., diesel) other liquids, and environmentally hazardous substances. There is also a risk from on-site sanitation facilities.

Risks associated with the operation of the landfill and WWTW are associated with the loss of containment of leachate (for the landfill) or loss of containment of raw or partially treated sewage, e.g. leaks in liners and/or pipelines. This will in turn contaminate and degrade the quality of groundwater.

In general, impacts on groundwater due to cemeteries arise due to the decomposition process and are typically identified as potential microbiological and trace element contamination. The development proposal is for a small cemetery, with a total of 2000 - 2500 graves over an estimated 25–30-year period, i.e. a predicted burial rate in the order of 60 to 100 people per year.

In terms of receptors, currently there are no users of groundwater downgradient of the WWTW and in this instance the direct impact on groundwater is assessed. A production borehole is located ± 250 m southwest of the closest corner of the cemetery expansion area. However, from the inferred groundwater flow direction, groundwater flow is expected to be away from this receptor.

The management objectives for this impact are to:

- Prevent contamination of ground and surface water resources;
- Contain spills and/ or leaks within the site;
- Prevent any materials, spills or leaks from coming into contact with the underlying soils / geology.

3.4 Impacts on Surface Water

Potential impacts of the construction and operation of Aggeneys and supporting infrastructure on surface water relate specifically to the presence of ephemeral watercourses in the arid landscape. The topography of the areas in which the proposed activities are to take place are relatively flat and are characterised to have ephemeral drainage features which can be described as minor incisions through which water runs occasionally during high rainfall events. The ephemeral drainage lines were mostly all shallow (< 1 m in depth) and narrow (< 5 m in width). Several ephemeral drainage lines were identified in close proximity to all of the proposed development footprints, and in some instances will be directly impacted.

The riparian habitat of the study area is Class C moderately modified PES, and moderate EIS, indicating that ephemeral watercourses are considered to be ecologically important and sensitive at a local scale. The functioning and/or biodiversity of these features is not usually sensitive to anthropogenic disturbances and typically play a small role in providing ecological services at the local scale. This information was used in the determination of the buffer zones for the watercourses.

The proposed expanded footprint of Aggeneys and associated infrastructure, including the access road, expanded landfill and expanded WWTW have aquatic impacts of significance, whereas the proposed cemetery and shooting range lack significant aquatic impacts.

The impact management objective for this impact is:

- Minimise disturbance to ephemeral watercourse vegetation and ecological processes;
- Minimise changes to the hydrology of watercourses;
- Reduce the impact on water quality of watercourses; and
- Prevent erosion by appropriate rehabilitation of disturbed areas.

3.5 Impacts on Terrestrial Ecology

The proposed development footprints fall within Bushmanland Arid Grassland (BAG), listed as Least Concern. The cemetery is located in Aggeneys Gravel Vygieveld (AGV), listed as Least Concern as

well, whereas the electricity substation is in transformed Bushmanland Inselberg Shrubland (BIS) (Least Concern). However, the entire proposed substation expansion footprint is transformed, whereas the vegetation of the cemetery is a sandy grassland and does not fit the description of AGV.

The majority of the vegetation is moderately intact and consists of flat grassy plains. The cemetery and landfill footprints are located in CBA1 whereas the remainder are CBA2. However, these are all located on the grassy plains that lack the threatened and endemic species of the surrounding inselbergs. Furthermore, as the vegetation types are Least Concern and consist of large contiguous areas, there is little conservation worth. Utilising (Desmet & Marsh, 2008), a finer scale CBA map, no sites are located in CBA1. However, utilising the Namakwa SDF (2008) that mapped CBAs at a finer scale, only the cemetery is situated in a CBA 1.

Two plant species of special concern (SCC) were observed within the study area during the survey. Both species are Sensitive Species and cannot be identified due to the risk of plant poaching. Whereas one species occurs as widely scattered individuals, the latter species occurs as a small dense population on the edge of the footprint and should not be directly impacted. No faunal SCCs should be negatively impacted by the development.

There is a high likelihood of protected and/or endangered species being present within the footprint. These will require permits for removal and relocation.

The cemetery and marginally the shooting range is located within a biodiversity set aside area which is managed for conservation purposes. However, there are no sensitive biodiversity receptors within the footprint of the cemetery, and the section of the shooting range within the set-aside is a transformed abandoned quarry. The town expansion footprint is located in a NPAES priority area.

The operational impacts of the expansion of Aggeneys and related infrastructure relate to the increased human population and associated activities. The increased population will have an impact on the fauna and flora of the vicinity of Aggeneys directly through increased vehicle collisions with animals, and an increase in the illegal harvesting of plants. The expanded urban landscape with increased light and noise, will result in changes in faunal behaviour. The increased population may result in an increase in invasive alien species, including plants and animals such as dogs, cats, and rodents.

The impact management objective for this impact is:

- Minimise disturbance to vegetation;
- Minimise impacts to Species of Special Concern;
- Minimise the spread of invasive alien species; and
- Prevent erosion by appropriate rehabilitation of disturbed areas.

3.6 Impacts on Heritage Resources

Damage or destruction to heritage resources on the site may occur due to earthworks and excavations during construction. Heritage studies have not identified areas/material within the proposed development areas.

Excavation activities might uncover heritage resources and the impact management objective for this impact is to prevent destruction of possible archaeological and / or paleontological material should such resources be uncovered.

3.7 Impacts on the socio-economic environment

There are a number of positive socio-economic benefits that will result as a direct and indirect effect of this activity. The most notable being:

- Job Creation;
- Increase in local tax base;
- Increase in GDP; and
- Expansion of rural service node.

Aggeneys is situated in a sparsely populated area of the Northern Cape where employment opportunities are largely limited to agriculture and, in the specific case of Aggeneys, mining. The expansion of economic activity, including mining and the special economic zone, requires the provision of additional housing and support infrastructure. The construction of the required infrastructure for the expansion of the urban area of Aggeneys will result in an increase in employment opportunities. This will mostly be limited to the construction industry but will also increase employment in support industries such as retail and accommodation. Construction activities will require the hiring of required equipment and specialised skills outside of Aggeneys. Furthermore, it will require the supply of construction materials, including building sand and aggregates, bricks and other building blocks, steel and related materials.

The proposed development would result in direct positive investment in Aggeneys and the Khai Ma Local Municipality and would result in the creation of a number of employment opportunities during the construction phase. Additional socio-economic benefits resulting from indirect employment (provision of services and goods), stimulation of the local economy, and government levies and taxes paid would also result from the development.

The management objective for this impact is to maximise the positive impact on the local economy, including the use of local and unskilled labour.

3.8 Impacts on Traffic

The potential traffic related impacts relating to the proposed site have been identified and include:

- An increase in local and regional traffic on the N14,
- An upgraded access point off the N14 to serve as a second access road; and
- A reduction in commuting of the local workforce.

Aggeneys is located approximately 3 km away from the N14 National Road, the main transport route in the area. The road is well maintained as a result of high levels of utilisation by the mining industry. The expansion of the town will result in increased general traffic in the area, consisting mostly of private vehicles. However, transport supplied by BMM to its employees should reduce traffic levels.

A second access road is proposed for the town. The access road will utilise the existing intersection with the N14.

Note that the impacts will occur both in the short-term (i.e. during the construction phase) and long-term once town expansion is completed (operational phase).

The management objectives for this impact are:

- Prevent damage to road infrastructure; and
- Minimise traffic safety risks.

3.9 Impacts relating to Waste Management

Lack of adequate waste management during both construction and operation could result in spread of litter, illegal dumping, contamination of soil and water resources, and increased prevalence of scavengers at the site.

All construction activities result in the generation of construction waste. The construction labour force residing in Aggeneys will also generate waste. This waste will consist mostly of domestic waste, as well as building rubble. General waste will be stored temporarily at a waste transfer station within town before being transported by truck to the new landfill. All facilities will need to be managed properly to prevent windblown litter impacting the surrounding area.

The construction of the cemetery, landfill, WWTW, and shooting range is expected to generate negligible amounts of waste. The majority of domestic and construction waste will be generated during the construction of the expanded Aggeneys urban footprint.

The expanded population of the town will result in increased generation of general waste. This waste will consist mostly of domestic waste. General waste will be stored temporarily at a waste transfer station within town before being transported by truck to the landfill. All facilities will need to be managed properly to prevent windblown litter impacting the surrounding area. No hazardous waste, apart from used oil and oil rags, is expected to be generated by the development. All hazardous waste will be transported to the nearest hazardous waste treatment facility in Cape Town.

The management objectives for this impact are:

- Prevent waste pollution of surrounding habitats and watercourses; and
- Legally compliant management and disposal of solid waste.

3.10 Climate Change Impacts

The assessment of the impacts of a development on climate change relates mostly to the emission of greenhouse gases (GHG) and the loss of carbon storage in soil and vegetation. The development site is located in an arid area with low and seasonal vegetation cover and will not result in a significant loss of stored carbon.

The expanded WWTW would result in increased emissions of GHG due to the greater volume of sewerage to be treated. As with the landfill, it is expected that an Environmental Authorisation (if issued) would specify the reporting requirements in terms of the GHG reporting regulations. Emissions from the landfill and WWTW will be reported as they trigger these regulations.

Furthermore, climate adaptation is an important aspect of the impact of climate change. Aggeneys is located in an area of South Africa which is expected to experience higher temperatures and lower rainfall. Although this is unlikely to impact Aggeneys' source of bulk water supply, the Orange River, it will increase the number of days experienced by residents and workers where adverse weather, especially high temperatures, becomes a health risk. It is important to implement climate adaptation measures, such as the installation of heat pumps for cooling and using indigenous species for landscaping, in the design of residences.

The management objectives for this impact are:

- For the landfill and WWTW, monitor and report Scope 1 emissions.

4 Measures Applicable to the Detailed Design Phase

4.1 Roles and Responsibilities

The key role players during the design phase of the project are:

- The holder of the Environmental Authorisation (Black Mountain Mining (Pty.) Ltd); and
- The design engineers responsible for the design of the various facilities (roads, transmission lines and substation, pipelines, WWTW, landfill and cemetery) and any associated activities.

4.1.1 The Applicant (Black Mountain Mining (Pty.) Ltd)

The Applicant is responsible for ensuring that the measures in this EMPr are complied with and must:

- Ensure that the engineering consultant team is aware of and takes into consideration all relevant measures in the EMPr; and
- Confirm that all relevant environmental management measures in the EMPr have been incorporated into the project design on completion of the detail design phase.

4.1.2 Design Engineers

The design engineers must:

- Take cognisance of all relevant measures in the EMPr and ensure integration thereof in the detailed design; and
- Reference the environmental management measures applicable to the construction (Section 5) and operational (Section 6) phases of the project in all documents that will be applicable to future phases of the project (e.g. tender documents).

4.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the design phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 4-1 below.

Table 4-1: Environmental management and mitigation measures that must be implemented during the Design Phase

Design Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsibility**	**Timeframe / Frequency**	**Monitoring Methods**	**Performance Indicators**
Authorisations	1		• The Applicant	• Before construction commences	• Keep record of all permits, licences, and authorisations	• Required licences/permits on file
	2	Ensure that all conditions stated in required licences and permits are integrated into the project design and management. These include, but may not be limited to: • Appointment of Environmental Control Officer; and • Permits for the disturbance or removal of protected plant species.				
	3	Review the detailed design facilities related to the urban expansion of Aggeneys to determine whether there are significant deviations from the authorised project description and obtain confirmation from DAERL regarding the need, or not, to apply for an amendment to the authorisation.		• During detailed design	• Technical review	• Confirmation from technical teams and/or DAERL
Biodiversity set asides	4	Identify areas of equal conservation value within the Aggeneysberge to replace the loss of CBA	• Consultant team	• Before construction commences	• Check Biodiversity Offset Agreement	• Amended Biodiversity Offset Agreement
Biodiversity set asides	5	Amend the existing Biodiversity Offset Agreement to remove the proposed footprints and include the remainder of the Aggeneysberge currently outside of the set aside area;	• Consultant team	• Before construction commences	• Check Biodiversity Offset Agreement	• Amended Biodiversity Offset Agreement
Preparation of Construction Phase	6	Include the EMPr in all tender documents to ensure that sufficient resources are allocated to environmental management by the Contractor.	• Consultant team	• Prior to call for tenders	• Check tender documents and contract	• Incorporated in tender documents
	7	Plan and make adequate financial provision for rehabilitation and restoration activities and clearly allocate timing and responsibility for environmental rehabilitation.	• The Applicant	• Before construction commences	• Review rehabilitation plan and financial provisions	• Rehabilitation plan and financial provisions
	8	Inclusion (and subsequent installation) of strategically located groundwater monitoring boreholes around the landfill, WWTW and cemetery in final layout and design drawings.	• Design engineer	• In preparation for building plan approval	• Approved building plans	• Approved building plans
Procurement	9	Procurement contracts to address employment of local labour	• The applicant	• Prior to appointment of contracts	• Annual compliance audit	• Specifications

Design Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsibility**	**Timeframe / Frequency**	**Monitoring Methods**	**Performance Indicators**
Protection of Animals (Avifuana)	10	All electrical infrastructure is to be of bird-friendly insulated design in line with the latest Eskom Technical Standards.	• Design engineer	• In preparation for building plan approval	• Approved building plans	• Approved building plans

5 Measures Applicable to the Construction Phase

5.1 Roles and Responsibilities

The key role players during the construction phase of the project are anticipated as follows:

- The Applicant, i.e. Black Mountain Mining (Pty.) Ltd;
- Resident Engineer (RE), who will oversee the activities of the contractors on site;
- Contractors responsible for the construction of the project;
- Any sub-contractors hired by the contractor; and
- Environmental Control Officer (ECO).

The anticipated construction phase organogram is presented in Figure 5-1 below and shows the proposed lines of communication during this phase. All instructions relating to the EMPr will be given to the contractor via the RE. In an emergency situation, the ECO may give an instruction directly to the Contractor/ sub-contractors. Both the Contractor and ECO will report issues of concern to the RE, who in turn will report on progress to the applicant. The Applicant will retain responsibility for ensuring that the Contractor fully implements the provisions of the EMPr.

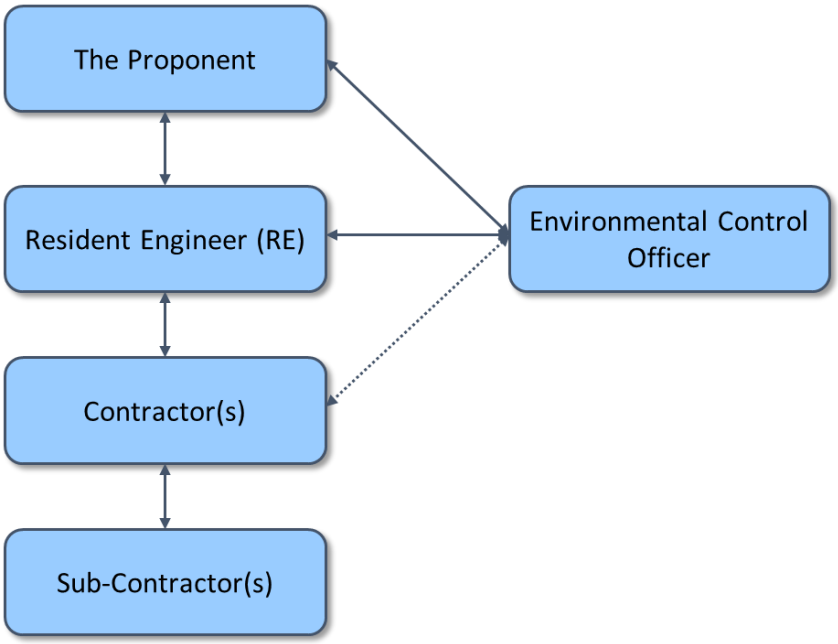

Figure 5-1: Construction phase reporting structure

Key roles and responsibilities during the construction phase with respect to the implementation of the EMPr are outlined below.

5.1.1 The Applicant (Black Mountain Mining (Pty.) Ltd)

The Applicant has the overall responsibility for management of the project. In terms of environmental management, the applicant must:

- Appoint suitably experienced Engineers who will be responsible for the overall management of activities on site during the Construction Phase;
- Appoint a suitably qualified ECO to monitor compliance with the EMPr for the duration of the Construction Phase;
- Ensure that the Engineers are aware of the requirements of the EMPr, implement the EMPr and monitor the Contractor's activities on site;

- Ensure that the Contractor is aware of and contractually bound to the provisions of this EMPr by including the relevant environmental management requirements in the tender and contract documents, as appropriate;
- Ensure that the Contractor remedies environmental problems timeously and to the satisfaction of the ECO and authorities (when necessary); and
- Notify the authorities should problems not be remedied timeously.

5.1.2 The Resident Engineer

The Applicant will appoint suitably qualified Engineering company who will in turn designate a suitable Resident Engineer (RE) who will be responsible for overseeing activities of the Contractor during the Construction Phase. The RE must:

- Ensure that the Contractor is duly informed of the EMPr and associated responsibilities and implications of this EMPr prior to commencement of construction;
- Monitor the Contractor's activities (together with the ECO) with regard to the requirements outlined in the EMPr;
- Relay all instructions from the ECO to the Contractor and ensure that these are fully understood and implemented;
- Report any environmental emergencies/concerns to the ECO immediately;
- Act as a point of contact for local residents and community members; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the Applicant, ECO, and where applicable, the relevant authorities.

5.1.3 The Contractor

The Contractor will be required to appoint or designate a Contractor's Environmental Representative (CR) who will assume responsibility for the Contractor's environmental management requirements on site and be the point of contact between the Contractor and the ECO. The CR must:

- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Monitor the Contractor's activities with regard to the requirements outlined in the EMPr;
- Ensure that all employees and sub-contractors comply with the EMPr;
- Immediately notify the ECO of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the ECO.

The Contractor has a duty to demonstrate respect and care for the environment. The Contractor will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations, and relevant legislation.

5.1.4 Sub-contractors:

All Sub-contractors will be required to:

- Ensure that all employees are duly informed of the EMPr and associated responsibilities and implications of this EMPr prior to commencement of construction;
- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Monitor employees' activities with regard to the requirements outlined in the EMPr;
- Immediately notify the ECO of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the ECO.

The Sub-contractor has a duty to demonstrate respect and care for the environment. The Sub-contractor will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation, resulting from their presence on site.

5.1.5 The Environmental Control Officer (ECO)

The ECO must be a suitably qualified/experienced environmental professional, appointed by the applicant, for the duration of the Construction Phase of the Project. The ECO must:

- Request Method Statements from the Contractor prior to the start of relevant construction activities, where required, and approve these (as appropriate) without causing undue delay;
- Monitor, review and verify compliance with the EMPr by the main Contractor, as well as any sub-contractors and specialist contractors;
- Undertake site inspections at least once a month to determine compliance with the EMPr;
- Identify areas of non-compliance and recommend corrective actions (measures) to rectify them in consultation with the Applicant, the RE, and the Contractor, as required;
- Compile a checklist highlighting areas of non-compliance following each ECO inspection;
- Ensure follow-up and resolution of all non-compliances;
- Provide feedback for continual improvement in environmental performance;
- Respond to changes in project implementation or unanticipated site activities which are not addressed in the EMPr, and which could potentially have environmental impacts, and advise the Applicant, the RE, and Contractor as required; and
- Undertake a site closure inspection, which may result in recommendations for additional clean-up and rehabilitation measures.

5.2 Compliance and Monitoring

5.2.1 Method Statements

A Method Statement is a document setting out specific details regarding the plant, materials, labour, and the method the Contractor proposes using to carry out certain activities, usually activities that may have a detrimental effect on the environment. It is submitted by the Contractor to the ECO.

The purpose of a Method Statement is for the Contractor to provide additional details regarding the proposed methodology for certain activities, and for the ECO to confirm that these meet the requirements of the EMPr and acceptable environmental practice. This allows the EMPr to be less prescriptive and affords the Contractor a certain amount of flexibility or to respond to stipulations in the EMPr. It also provides a reference point to detect deviations from the agreed approach to an activity.

Each Method Statement will address environmental management aspects relevant to the activity and will typically provide detailed descriptions of items including, but not necessarily limited to:

- Nature, timing and location of activities;
- Procedural requirements and steps;
- Management responsibilities;
- Material and equipment requirements;
- Transportation of equipment to and from site;
- Method for moving equipment/material while on site;
- How and where material will be stored;
- Emergency response approaches, particularly related to spill containment and clean-up; and
- Response to compliance/non-conformance with the requirements of the EMPr.

The following list provides examples of Method Statements that may be requested from the Contractor:

- Environmental awareness course preparation;
- Material and equipment storage and delivery;
- Fuel storage, dispensing and fuel spills;

- Waste management;
- Management of contaminated water;
- Erosion and stormwater control; and
- Cement batching.

The Method Statements will be submitted by the Contractor to the ECO not less than 14 days prior to the intended date of commencement of an activity. The ECO shall approve / reject the Method Statement within two days of receipt of the method statement. An activity for which a Method Statement has been requested shall not commence until the ECO has approved such method and, once approved, the Contractor shall abide by the relevant Method Statement. A suitable Method Statement format can be agreed between the ECO and Contractor.

5.2.2 Environmental Records and Reports

Environmental records and reports required during the Construction Phase are listed in Table 5-1.

Table 5-1: Reports required during Construction

Report	Frequency	From	To
Environmental Checklist	Weekly	CR	ECO
Environmental Compliance Report	Monthly	ECO	Applicant and RE
Site Closure Audit	End of Contract	ECO	Applicant and RE

Environmental Checklist

The CR will undertake weekly site inspections to check on the implementation of the EMPr by the Contractor and complete a brief report/checklist after the inspection. The completed checklists shall be submitted to the ECO at the end of each inspection. This checklist should be discussed between the CR and the ECO during the initial site inspection, and agreement reached on the preferred format and content.

Environmental Compliance Report

The ECO will prepare monthly Environmental Compliance Reports, detailing any environmental issues, non-compliances, and actions to be implemented. These reports will be based on the ECO's observations and the weekly Environmental Checklists. Environmental Compliance Reports will be submitted to the Applicant and a full record will be kept by the ECO, for submission to DAERL on request.

When more frequent site visits are undertaken by the ECO, the frequency of reports will increase accordingly to allow for timeous reporting of environmental issues and actions required.

Photographic Records

If the ECO identifies any areas of concern, the ECO will request photographic records, which must be submitted by the Contractor for record purposes. Photographic records will typically be recorded in the monthly compliance reports.

Construction Site Closure Audit

The ECO will undertake a final site closure audit on completion of the Construction Phase. The purpose of this is to confirm compliance with all site closure requirements identified by the ECO, and that the site has been left in an environmentally suitable condition. If outstanding environmental

requirements are observed during this inspection, a further inspection must be carried out to confirm compliance. The site closure audit report will be submitted to the Applicant for record purposes, and to DAERL if requested..

5.2.3 Corrective Action

Corrective action is a critical component of the plan-do-check-act cycle, and it is through corrective action that continuous improvement can be achieved. Where repeated non-compliance is recorded, procedures may need to be altered accordingly to avoid further corrective actions.

If environmental compliance monitoring by the CR and ECO indicates non-compliance with the EMPr or approved Method Statements, the RE will formally notify the Contractor through a Corrective Action Request. The Corrective Action Request documents:

- The nature of the non-conformance/environmental damage;
- The actions or outcomes required to correct the situation; and
- The date by which each corrective or preventive action must be completed.

Upon receipt of the Corrective Action Request, the Contractor will be required to produce a Corrective Action Plan (or similar plan), which will detail how the required actions will be implemented. The Corrective Action Plan must be submitted to the ECO for approval prior to implementation. Once it has been approved, the corrective action must be carried out within the time limits stipulated in the Corrective Action Request. Additional monitoring by the CR and ECO will then be required to confirm the success or failure of the corrective action.

5.3 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the construction phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in the following tables:

- Expanded Aggeneys urban area - Table 5-2;
- Landfill - Table 5-3
- Wastewater Treatment Works - Table 5-4
- Cemetery - Table 5-5; and
- Shooting Range - Table 5-6.

Table 5-2: Environmental management and mitigation measures that must be implemented during the Construction Phase of the Expanded Aggeneys urban area.

Construction Phase Measures: Expanded Aggeneys Urban Area						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
General	1	All contractors must have an approved Environmental Management Plan in place that ensures that environmental impacts are minimised as far as practicable possible.	• Applicant • Contractor(s)	• Prior to construction activities	• ECO Audits	• Visual inspection
Initial appointments and preparations	2	Appoint an ECO to oversee construction activities.	• Applicant	• Before construction commences • Once the final construction footprint has been pegged	• Review appointment documentation	• Appointment documents
	3	Appoint a suitably qualified botanist/specialist to complete the Search & Rescue operation for protected species, as per the CAMP (Ekotrust, 2022), before any construction activities commence.				
	4	Implement a search and rescue of the entire footprint immediately prior to construction to move any fauna that are directly threatened by the construction activities and unlikely to move out by themselves. No wildlife may be removed from the site or surrounding areas unless approved by the ECO in conjunction with the appropriate permits obtainable from relevant competent authorities.	• Herpetologist or equivalent specialist	• Before construction starts	• Visual inspection • Record of relocations	• Records of relocations

[1] Unless otherwise indicated, monitoring will be undertaken by the ECO, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Construction Phase Measures: Expanded Aggeneys Urban Area						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
	5	Avifaunal specialist to undertake an avifaunal walkthrough of the development footprint to identify any breeding sites. Identified breeding sites must be clearly indicated on a map of the site and all staff must be made aware of these areas. Any additional mitigation measures recommended by the avifaunal specialist are implemented.	• Avifaunal specialist • Contractor(s)	• Six weeks before construction commences • Once -off	• Review avifaunal report • Environmental Management Plan Content	• Avifaunal report kept on file • Breediing sites map displayed on site • Documentary/photographic evidence of complying with any additional mitigation measures recommended by the specialist in the walkthrough report are provided.
	6	Watercourses and associated buffers within the vicinity of the footprints must be demarcated prior to construction	• Contractor(s)	• Pre-construction	• Visual inspection by CR and ECO	• Number of footprints with demarcated watercourses
Clearing	7	Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once)	• Contractor(s)	• Start of construction	• Visual inspection by CR and ECO	• Monitor extent of clearing
Clearing	8	Limit the footprint area of the construction activity to what is absolutely essential.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches

Construction Phase Measures: Expanded Aggeneys Urban Area						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Clearing	9	Ensure that no vegetation is removed or disturbed outside the delineated construction site boundary.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Clearing	10	Vegetation trimming or clearing, and construction related activities, should be kept to. periods outside of large rainfall events	• Contractor(s)	• Throughout construction	• Visual inspection •	• Record of work stoppages due to weather
Clearing and earthworks	11	Areas to be cleared of vegetation or topsoil shall be cleared only when required, and shall be surfaced or revegetated immediately on completion of the construction activity in that area	• Contractor	• Start of construction	• Visual inspection	• Size of disturbed areas
Clearing and stockpiles	12	When necessary, appropriate dust control measures (such as wetting of soil and covering of stockpiles) shall be implemented	• Contractor(s)	• Throughout construction	• ECO audits	• No visible dust plumes, especially during string winds
Complaints register / grievance mechanism	13	Maintain and disclose a complaint register. The register must record: • Complainant name and contact details; • Date complaint was lodged; • Person who recorded the complaint; • Nature of the complaint; • Actions taken to investigate the complaint and outcome of the investigation; • Action taken to remedy the situation; and • Date on which feedback was provided to complainant.	• Contractor(s)	• Duration of construction activities	• Monthly ECO Audits	• Register on site • Complaints followed up and closed out

Construction Phase Measures: Expanded Aggeneys Urban Area						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Concrete / cement work	14	Use Ready-Mix concrete rather than batching where possible. Where a batching plant is used ensure that the latest technology in supressing dust is used. Batch plant should be erected in a lined area with berms to contain material in event of spillage	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.
Concrete / cement work	15	Ensure that no cement truck delivery chutes are cleaned on site. Cleaning operations are to take place at a suitable washing facility is to be developed in the vicinity of Aggeneys in consultation with the ECO.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Inspection of incident records
Concrete / cement work	16	Batch cement in a bunded area within the boundaries of the development footprint only (where unavoidable).	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.
Concrete / cement work	17	Ensure that cement is mixed on mortar boards and not directly on the ground (where possible).	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Inspection of incident records
Concrete / cement work	18	Place cement bags in bins and dispose of bags as waste to a licensed waste disposal facility.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Construction layout	19	Access roads should be kept to a minimum and their length and width should be minimised to reduce the surface area from which dust can be generated	• Contractor	• Start of construction	• Visual inspection	• Visibility of dust coming off construction site • Number of registered complaints
Demarcation of working area	20	Demarcate construction site boundaries upon establishment. Control security and access to the site. Fence off site boundaries to the satisfaction of the ECO and ensure that plant, labour, and materials remain within site boundaries.	• Contractor(s)	• Start of construction	•	•
Demarcation of working area	21	No-Go areas (watercourse buffers) must be clearly demarcated/ clearly marked (i.e. with danger tape) before any construction activities commence on site and appropriate measures implemented to ensure compliance	• Contractor(s)	• Start of construction	• Visual inspection by CR and ECO	• No disturbance to no-go areas
Dust management	22	Avoid clearing of vegetation until absolutely necessary (i.e. just before earthworks).	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Size of disturbed areas
Dust management	23	Regularly evaluate the effectiveness of all dust management measures. Amend how or which measures are used if necessary.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of registered complaints
Dust management	24	Stabilise exposed surfaces as soon as is practically possible.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Dust management	25	Avoid excavation and handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible
Dust management	26	If required, place wind barriers at right angles to prevailing wind currents as close to the work areas as possible. Vertical barriers should be at least 2 m high and screening material must have a porosity of 50% or less. For larger surfaces place barriers at intervals of approximately 10 times the barrier height, if feasible	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints
Dust management	27	Minimise dust generated off stockpiles: • Locate piles in sheltered areas where possible; • Minimise the slope of the stockpile; • Limit stockpile sizes; and • Cover stockpiles when not in active use for some time and / or use an environmentally friendly chemical spray to bind soil.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Dust mitigation measures in place • Number of days that dust plumes are visible • Number of registered complaints
Dust management	28	Cover trucks transporting loose material to or from site with tarpaulins, plastic, or canvas.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Dust mitigation measures in place • Number of registered complaints

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Dust management	29	Ensure that any material spilled from trucks on public roads during transport to or from the site is cleaned up.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Number of registered complaints
Dust management	30	Limit construction vehicle speeds to 40 km/hr on gravel roads.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of registered complaints
Dust management	31	Limit the number of vehicles allowed on-site and restrict the movement of these vehicles over unsurfaced or unvegetated areas once they are on site to reduce dust problems.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints
Employment	32	Recruit local labour as far as feasible to increase the benefits to the local households	• Contractor(s)	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)
Employment	33	Employ labour intensive methods in construction where feasible	• Contractor	• Throughout construction	• Annual compliance audits	• Employment numbers
Employment	34	Sub-contract to local construction companies where possible	• Contractor	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Employment	35	Use local suppliers where feasible and arrange with local SMMEs and BBBEE compliant enterprises to provide transport, catering and other services to the construction crews	• Contractor	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)
Environmental awareness training	36	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of construction waste and activities on the environment; • Suitable disposal of construction waste and litter; • Specific flora and fauna SCC on site and correct procedure; • Consequences of plant poaching; • Key measures in the EMPr relevant to worker's activities; • How incidents and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names	• Contractor(s)	• Before workers start working on-site • Before new activities are undertaken	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed environmental training • Compliance of workers with EMPr
Existing infrastructure	37	Existing infrastructure and services within or close proximity to the construction footprint are to be located (via GPS if necessary) and demarcated prior to construction activities commencing	• Contractor(s)	• Start of construction	• ECO Audits	• Inspection of site drawings
Existing infrastructure	38	Relevant authority agencies and/or Department of the service supplied are to be notified should existing infrastructure be damaged by construction related activities	• Contractor(s)	• Throughout construction	• ECO Audits	• Inspection of incident records
Existing infrastructure	39	Other users are to be notified of any planned disruptions to services ahead of time	• Contractor(s)	• Throughout construction	• ECO Audits	• Inspection of incident records
Fire management	40	Ensure that no fires are permitted on or adjacent to site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	41	Smoking is not to be permitted on site except in designated areas	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Visual evidence

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Fire management	42	Ensure that sufficient fire-fighting equipment is available on site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Certified extinguishers in appropriate locations.
Fire management	43	Any fire incidents or accidents must be recorded, and a record thereof must be kept on site	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	44	Equip all fuel stores and waste storage areas with fire extinguishers.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Fire management	45	Ensure that all personnel on site are aware of the location of fire-fighting equipment on the site and how the equipment is operated.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Training records
Fire management	46	Suitably maintain firefighting equipment.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Hazardous materials	47	Design and construct hazardous material storage facilities, including fuel storage, with suitable impermeable materials and a minimum bund containment capacity equal to 110% of the largest container.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	48	Locate hazardous material storage facilities, especially fuel storage, outside of watercourse buffers	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	49	Ensure that contaminants are not placed directly on the ground.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	50	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of spills of hazardous materials, including waste materials; • Evidence of contamination and leaks.

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Hazardous materials	51	Avoid unnecessary use and transport of hazardous substances.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of spills of hazardous materials, including waste materials; • Evidence of contamination and leaks.
Hazardous materials	52	Keep Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Availability of MSDSs
Hazardous substance handling	53	The proper storage and handling of hazardous substances (hydrocarbons and chemicals) needs to be administered to prevent leaks and spills. Drip trays must be used during pouring of liquids and secondary containment must be in place during storage	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Use of drip trays • Secondary containment for stored hazardous materials
Hazardous substance handling	54	All static machinery and plant are to be placed on drip trays at all times (i.e. whilst being used and when being stored) to contain any spillages that may occur	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Use of drip trays
Hazardous substance handling	55	Spillages should be cleaned up immediately and any contaminated soil from the construction site must be removed and disposed of at a permitted waste disposal facility	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records
Hazardous substance handling	56	Sufficient spill kits must be made available in the event of a spill it must be cleaned up immediately and disposed of appropriately	• Contractor(s)	• Throughout construction	• Environmental Compliance report • ECO audits	• Incident records • Number of spill kits available
Heritage resources	57	The fossils located at Point 94 (29°15'27.40"S 18°49'11.61"E) should be protected and no construction should hinder the fossil deposits. A buffer zone of approximately 50m be implemented around Point 94, at the Golf Course Expansion site	• Contractor(s) •	• Prior to vegetation clearing and earthworks commencing	• Visual inspection	• Audit Reports • Site inspection reports
Heritage resources	58	Upon the initiation of excavation for the necessary infrastructural components, within the designated area (Point 94), it is suggested that the area be closely monitored by the Environmental Control Officer, and construction officer for any additional fossil remains	• Contractor(s)	• Throughout construction	• Visual inspection	• Audit Reports • Site inspection reports

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Heritage resources	59	If any concentrations of heritage material / fossils are exposed during construction, all work in that area must cease and it be reported immediately to a relevant authority so that the required investigations can be undertaken. This could entail Phase 2 mitigation to be determined by the Mcgregor Museum	• Contractor(s) • Archaeologist	• Throughout construction	• Visual inspection	• Sampling or destruction permits
Heritage resources	60	The ECO and construction manager should be aware of any fossils that may be present, or any fossils that may be uncovered during excavation into the underlying strata ;	• Contractor(s)	• Throughout construction	• Annual compliance audit	• Inclusion of fossils in Environmental Awareness Programme
Heritage resources	61	Any exposures encountered during the excavation must be inspected for fossil remains and if any are present a qualified palaeontologist should immediately be notified. The remains of trace fossils, plants, and vertebrates are all of the palaeontological interest and must be recorded and sampled by the palaeontologist at the developer's expense	• Contractor(s) • Palaeontologist	• In the event that artefacts are found.	• Annual compliance audit	• Report to palaeontologist • Palaeontologist Report
Heritage resources	62	A Chance Find Protocol for all heritage resources should be drafted and implemented for the development	• Contractor(s) • Heritage Specialist	• In the event that artefacts are found.	• Annual compliance audit	• Report to archaeologist • Archaeologist Report
Increased traffic	63	Provide suitable traffic accommodation measures as part of construction contract to inform other road users of presence of construction related traffic. Measures to be provided subject to approval by the Engineer	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased traffic	64	Traffic accommodation measures to be provided in terms of Chapter 13 of the South African Road Traffic Signs Manual	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased traffic	65	Ensure construction traffic is confined to site area	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased Traffic	66	Ensure that vehicle loads are within legislated limits, i.e. maximum Gross vehicle mass of 56 000kg	• The Applicant	• Throughout construction	• Visually inspect vehicles for any obvious faults or overloading	• Inspection records

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Increased Traffic	67	Source relevant permits from the Northern Cape Department of Transport should abnormal loads be required for transport of components	• The Applicant	• Throughout construction	• Annual compliance audit	• Permits
Laydown areas	68	Laydown areas should be restricted to areas either already impacted or which is proposed to be impacted by the development	• Contractor(s)	• Throughout construction	• Visual inspection	• Laydown boundaries demarcated
Laydown areas	69	No laydown areas to be within watercourses or buffer zones	• Contractor(s)	• Throughout construction	• Visual inspection	• Laydown boundaries demarcated • Watercourse buffer area outside footprints demarcated
Invasive species management	70	All invasive alien species occurring within disturbed areas must be removed and disposed of as waste. All disturbed areas must be regularly monitored for the emergence of alien invasive species	• Contractor(s)	• Throughout construction	• Visual inspection • IAS monitoring plan • Environmental compliance report	• Number of identified IAS • Area of cleared IAPs
Layout	71	Submit a method statement for site camp location and establishment for approval by the ECO at least two weeks prior to establishment of the camp.	• Contractor(s)	• At least 2 weeks prior to establishment of site camp	• Visual inspections • Method statement	• Approved method statement
Layout	72	Establish a suitably fenced site camp at the start of the contract, which will allow for site offices, vehicle, equipment, material and waste storage areas to be consolidated as much as possible. Locate the site camp at a position approved by the ECO. Provide water and / or ablution facilities at the site camp for personnel.	• Contractor(s)	• Start of construction	•	• Site boundaries demarcated • Signage in place
Noise management	73	Maintain all generators, vehicles, and other equipment in good working order to minimise exhaust fumes and excess noise.	• All contractors operating machinery	• Throughout construction	• Random noise measurements	• Results of random noise measurements • Absence of noise complaints
Noise management	74	No construction piling should occur at night where possible. Piling should only occur during the day to take advantage of unstable atmospheric conditions (which lessen the effects of project related noise).	• Contractor(s)	• Throughout construction	• ECO audits	• Absence of noise complaints

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Noise management	75	Construction staff should receive "noise sensitivity" training such as switching off vehicles when not in use, location of Noise sensitive areas, etc.	• Contractor(s)	• Start of construction • Throughout construction	• ECO audits	• Training records
Noise management	76	An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase	• Applicant	• Start of construction • Throughout construction	• Noise survey	• Survey report
Protection of animals	77	No hunting, poaching or otherwise harming of wildlife on and around the site	• Contractor(s)	• Throughout construction	• ECO audits	• Reported incidents, complaints, or other evidence
Protection of animals	78	Environmental awareness programme to include protection of all fauna on site.	• Contractor(s)	• Throughout construction	• ECO audits	• Training records
Protection of animals	79	Do not harm, catch or kill animals by any means, including poisoning, trapping, shooting or setting of snares.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	80	Provide contact details for an animal handler if any dangerous animals are encountered on the construction site	• Contractor(s)	• Throughout construction	• Photographic evidence	• Details of animal handle displayed on walls at site office • Number of incidents of animals removed

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Protection of animals	81	Safely remove and relocate any fauna that may be physically harmed by construction activities.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	82	Backfill trenches as soon as possible. Inspect open trenches daily for animals which may have fallen or become trapped	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals (avifauna)	83	Should additional SCC be found breeding within the disturbance footprint prior to or during construction all works within 500 m of the breeding site must be halted and an avifaunal specialist must be contacted for further instruction. Any resulting recommendation by the avifaunal specialist to protect the breeding SCC must be implemented;	• Contractor(s) • Avifaunal specialist	• Before construction commences • Once the final construction footprint has been pegged	• Visual inspection by CR and ECO • Appointment of avifaunal specialist	• Appointment documents • Inspection report
Protection of animals (avifauna)	84	Breeding sites of SCC are to be clearly demarcated with construction tape as per the instruction of the avifaunal specialist;	• Contractor(s) • Avifaunal specialist	• Before construction commences • Once the final construction footprint has been pegged	• Visual inspection by CR and ECO	• Number of breeding sites demarcated

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Protection of animals (avifauna)	85	All electrical infrastructure is to be of bird-friendly insulated design in line with the latest Eskom Technical Standards.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Design specifications • Number of incidents of dead birds found at base of
Protection of animals (avifauna)	86	Bury all low and medium voltage powerlines where technically possible and install bird flight diverters where this is not possible, in line with Eskom Technical Standards.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Compliance with specification • Number of incidents of dead birds found at base of transmission lines
Protection of animals (avifauna)	87	All fencing must be of a single-fence design to avoid avian species getting trapped between double-fencing, and the Birdlife SA Guideline for Birds & Fences must be complied with.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Compliance of specification
Protection of animals (avifauna)	88	All water reservoirs must be covered with netting or mesh to avoid birds drowning. Any other open water must have areas where birds can exit safely to prevent drownings.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Number of incidents of dead birds found around reservoirs and other open water
Protection of plants	89	Fence off sensitive habitats containing species threatened by poaching	• Contractor (s)	• Throughout construction	• Visual inspection	• Number of fenced off areas
Protection of plants	90	Monitor access points and routes of transportation for vehicles used in poaching	• Applicant	• Throughout construction	• Visual inspection	• Evidence of camera monitoring
Protection of plants	91	Monitor SCC populations threatened with poaching	• Applicant	• Throughout construction	• Visual inspection • SCC report	• Population counts
Protection of plants	92	Include the importance of SCC, the threat and penalties of poaching within the environmental awareness programme	• Contractor (s)	• Throughout construction	• Survey of Environmental Awareness Programme	• Content of Environmental Awareness Programme

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Record keeping	93	Maintain a register of complaints, e.g. for monitoring levels of nuisance experienced by neighbours. Respond to complaints by increasing the frequency and/or intensity management measures, e.g. dust suppression	• Contractor(s)	• Throughout construction	• ECO audits	• Register
Safety and security	94	Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.) are established prior to commencing construction.	• Contractor(s)	• Throughout construction	• Approval by CR and ECO.	• Compliance with specification.
Safety and security	95	Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification.
Safety and security	96	Secure the site camp, particularly to restrict access unauthorised to fuels and any other hazardous substances.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Controlled access
Safety and security	97	Store all construction material and equipment in locked containers within the site camp. Employ 24 hour security for the Site Camp.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Controlled access
Safety and security	98	Provide suitable emergency and safety signage on site and demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc.).	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Signage
Safety and security	99	Advise the ECO of any emergencies on site, together with a record of action taken	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Incidents register
Site Camp management	100	Provide appropriate sanitation facilities for the duration of the proposed construction activities and remove all waste to an appropriate facility.	• Contractor(s)	• Throughout construction	•	•
Site Camp management	101	Do not leave any food out in the open to avoid attracting animals.	• Contractor(s)	• Throughout construction	•	•
Stockpiles	102	Dust control measures such as wetting and covering of stockpiles to be implemented when necessary	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of dust generation
Stormwater / run-off management	103	Ensure suitable control of run-off during the construction phase to prevent erosion of topsoil on stockpiles and adjacent land and undeveloped portions of the site	• Contractor(s)	• Throughout Construction	• Visual inspection of downstream areas and topsoil stockpiles	• No erosion

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Stormwater / run-off management	104	Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and other contaminated wastewater and fuels into any water sources and the stormwater system.	• Contractor(s)	• When cleaning existing plant and removing old equipment	• Monitor activity against method statement	• Implementation of preventative actions • Visibility of water pollution
Stormwater / run-off management	105	Collect stormwater from bunded areas in a suitable container and remove from the site for appropriate disposal.	• Contractor(s)	• Throughout construction	• Visual inspection	• Incidents of stormwater contamination
Stormwater / run-off management	106	Direct runoff or pump water from construction sites away from freshwater features, so that it is first captured in detention ponds for settlement. Ensure that flows are dissipated to prevent scour and initially collected in a tank or similar containment that allows coarse sediment to settle.	• Contractor(s)	• Throughout construction	• Visual inspection	• Visible leaks/water wastage • Visible surface erosion
Stormwater / run-off management	107	Incorporate adequate erosion and stormwater management measures during construction to prevent erosion and the associated sedimentation of freshwater features. Management measures may include berms, silt fences, hessian curtains and stormwater diversion away from areas susceptible to erosion. Avoid additional disturbance during the implementation of these measures.	• Contractor(s)	• Throughout construction	• Visual inspection	• Visible leaks/water wastage • Visible surface erosion
Stormwater management	108	The stormwater management plan for the site should ensure that any impacts of stormwater from the site are mitigated as far as possible within the site (measures such as the use of permeable surfaces, re-use of runoff from built areas such as roofs as well as the use of measures such as swales) to minimise the stormwater impacts on the watercourse	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby watercourses
Stormwater management	109	The alternative flow structure must be designed in such a way that the width of the banks is close to that of the natural banks of the drainage line	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby watercourses
Stormwater management	110	If necessary, pre-treatment areas such as oil, sediment and litter traps should be included in the stormwater management design	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby watercourses

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Surface water management	111	Movement of vehicle and plant movement must only be allowed in designated areas which has been identified for construction and are required to remain within the development footprint where existing roads are not present. Diversion of flow must be made for water to either flow through a culvert or similar structure to mimic the natural direction of flow;	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on wastercourses
Topsoil storage	112	Designate and demarcate areas to be used for topsoil stockpiling within disturbed areas or the development footprint.	• Contractor(s)	• Before construction commences	• Visual inspection •	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Topsoil storage	113	Stockpile topsoil prior to the commencement of construction activities (stockpile no higher than 1.5 m) and conserve topsoil for landscaping and rehabilitation	• Contractor(s)	• Before construction commences	• Visual inspection	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Topsoil storage	114	Locate topsoil stockpiles in an area protected from the wind and agreed with the ECO.	• Contractor(s)	• Before construction commences	• Visual inspection	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Transportation and refuelling	115	Leakages must be repaired promptly and drip trays, with spill socks, placed underneath plant or vehicles until such leakages have been repaired	• Contractor(s)	• Throughout construction	• Visual inspection	• Maintenance records
Transportation and refuelling	116	Machinery must be re-fuelled and serviced in a designated area with an impermeable surface (concrete is not impermeable and requires a sealant), with runoff contained and directed into an oil separator. It is expected that no such areas would be established at the construction site, which then means that vehicles and machinery are not to be serviced or refuelled on site.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Transportation and refuelling	117	Contractor must ensure all construction plant and vehicles are licensed and maintained in a good working condition in order to minimise potential soil pollution.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection

Construction Phase Measures: Expanded Aggeneys Urban Area						
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Transportation and refuelling	118	Use appropriately sized drip trays for all refuelling and/or repairs done on machinery – ensure these are strategically placed to capture any spillage of fuel, oil, etc.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Vehicle maintenance	119	No plant, vehicles or other equipment may be washed on the construction site	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Waste Management	120	Implement effective waste management	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of litter in and around the site
Waste Management	121	Develop and implement a waste management plan to address classification of waste streams, segregation at source, control of waste on site before disposal, removal of wastes from site, and record keeping.	• Contractor(s) • ECO	• Prior to construction commencing	• Approval of the waste management plan(s) by the ECO	• Approved waste management plan(s)
Waste Management	122	Identify and separate materials that can be reused or recycled to minimise waste, e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling.	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	123	The waste transfer station located in Aggeneys must be managed according to all relevant norms and standards	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	124	No disposal of wastes, other than at registered landfill sites	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste management	125	Ensure that on site sanitation facilities are adequately managed and effluent is disposed of correctly	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	126	Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licensed landfill site, and proof of disposal retained for auditing purposes)	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	127	Ensure that construction materials (e.g. bags of cement) are suitably stored and protected to avoid wastage	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports •

Construction Phase Measures: Expanded Aggeneys Urban Area						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Waste Management	128	Excess excavated material that cannot be used for backfill should not be allowed to accumulate on site and should be disposed of at a formal landfill site or suitable spoil site identified in conjunction with the ECO.	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	129	Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or on existing roads and/ or access tracks between demarcated areas.	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of driving outside demarcated areas (ECO audit reports)
Waste Management	130	No clearing of vegetation, abstraction, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of disturbance demarcated areas (ECO audit reports)
Waste Management	131	Appropriate scavenger-proof solid waste management facilities with lids must be provided on-site during construction and must be regularly emptied	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Absence of windblown litter
Waste management	132	Aim to minimise waste through reducing and re-using (packaging) material.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas • Visual inspection of construction areas (litter) • Check waste disposal slips	• Availability of rubbish bins and skips for different recyclable wastes
Waste management	133	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips
Waste management	134	Collect all waste in bins and/or skips at the construction site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips
Waste management	135	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.	• Contractor(s)	• Throughout construction	• Visual inspection of construction areas (litter)	• Absence of litter

Construction Phase Measures: Expanded Aggeneys Urban Area						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Waste management	136	Dispose of waste appropriately and obtain certificates.	• Contractor(s)	• Throughout construction	• Check waste disposal slips	• Waste disposal certificates
Waste management	137	Do not allow any burning or burying of waste on site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Availability of rubbish bins and skips • Waste storage capacity
Water Management	138	No polluted water from washing of mechanical plant or equipment to be discharged to the ground. This must be collected in a tank for evaporation and disposal	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records
Waste management	139	Ensure that no discarded materials are buried on site or on any other land not designated for this purpose.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years
Site rehabilitation	42	A rehabilitation plan must be compiled in line with the Conservation Area Management Plan (2022) and submitted to the ECO for approval. This revegetation plan must be implemented.	• Contractor • ECO	• Pre-construction	• ECO audit report	• Presence of rehabilitation plan
Site rehabilitation	140	Ensure that slopes are immediately stabilised to prevent erosion, using geofabric or other appropriate erosion stabilisation techniques.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	141	Remove all construction equipment, vehicles, equipment, waste and surplus materials, including site offices, temporary fencing and other facilities, from the site.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	142	Clean up and remove any spills and contaminated soil in the appropriate manner.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	143	Ensure that affected areas are rehabilitated following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	144	Rehabilitate areas adjacent to the site (if disturbance is unavoidable) to at least the same condition as was present prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years

Construction Phase Measures: Expanded Aggeneys Urban Area						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Site rehabilitation	145	Use harvested topsoil for rehabilitation and landscaping following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	146	Rehabilitate project areas with locally indigenous species, including those removed from the site prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	147	Rehabilitate any disturbed areas as soon as construction in the area is complete.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years
Site rehabilitation	148	Appoint a specialist contractor to remove alien and weed species in areas disturbed as a result of construction activities to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998).	• The Applicant	• After Construction	• Annual compliance audits	• Ongoing absence of alien vegetation
Monitoring	149	Appoint a qualified person to monitor rehabilitation success.	• The Applicant	• Once rehabilitation has been completed in the first section	• Contract documentation	• Appointment
Monitoring	150	Monitor rehabilitation success every three months in the first year, and every six months thereafter until acceptable species densities and cover are achieved. Monitor by means of 3 m x 3 m fixed plots in which species presence and cover is assessed, as well as fixed point photography.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success
Monitoring	151	Monitor erosion of rehabilitated areas every three months in the first year, and every six months thereafter until acceptable species densities and cover are achieved. Monitor by means of a visual assessment.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success

Construction Phase Measures: Expanded Aggeneys Urban Area						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Climate change	152	Measures to increase the resilience of the development to climate change and resource efficiency should be implemented, including • Installation of water meters to reduce water use; • Installation of Heat pumps for indoor climate control; • Installation of induction ovens; • Water use reducing toilets and showers; • Green house design; • Solar panels and solar geysers; and • Sourcing electricity from renewable energy facilities in the vicinity of Aggeneys.	• Contractor(s)	• Throughout construction	• Updates after each monitoring	• Regular monitoring
Climate change	153	Utilise mostly local indigenous plant species for landscaping to reduce water use.	• Contractor(s)	• Throughout construction	• Visual inspection	• Proportion of landscape areas utilising indigenous arid species

Table 5-3: Environmental management and mitigation measures that must be implemented during the Construction Phase of the Expanded landfill.

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
General	1	All contractors must have an approved Environmental Management Plan in place that ensures that environmental impacts are minimised as far as practicable possible.	• Applicant • Contractor(s)	• Prior to construction activities	• ECO Audits	• Visual inspection
Initial appointments and preparations	2	Appoint an ECO to oversee construction activities.	• Applicant	• Before construction commences • Once the final construction footprint has been pegged	• Review appointment documentation	• Appointment documents
	3	Appoint a suitably qualified botanist/specialist to complete the Search & Rescue operation for protected species, as per the CAMP (Ekotrust, 2022), before any construction activities commence.				
	4	Implement a search and rescue of the entire footprint immediately prior to construction to move any fauna that are directly threatened by the construction activities and unlikely to move out by themselves. No wildlife may be removed from the site or surrounding areas unless approved by the ECO in conjunction with the appropriate permits obtainable from relevant competent authorities.	• Herpetologist	• Before construction starts	• Visual inspection • Record of relocations	• Records of relocations

[2] Unless otherwise indicated, monitoring will be undertaken by the ECO, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
	5	Avifaunal specialist to undertake an avifaunal walkthrough of the development footprint to identify any breeding sites. Identified breeding sites must be clearly indicated on a map of the site and all staff must be made aware of these areas. Any additional mitigation measures recommended by the avifaunal specialist are implemented.	• Avifaunal specialist • Contractor(s)	• Six weeks before construction commences • Once -off	• Review avifaunal report • Environmental Management Plan Content	• Avifaunal report kept on file • Breediing sites map displayed on site • Documentary/photographic evidence of complying with any additional mitigation measures recommended by the specialist in the walkthrough report are provided.
	6	Watercourses and associated buffers within the vicinity of the footprints must be demarcated prior to construction	• Contractor(s)	• Pre-construction	• Visual inspection by CR and ECO	• Number of footprints with demarcated watercourses
Clearing	7	Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once)	• Contractor(s)	• Start of construction	• Visual inspection by CR and ECO	• Monitor extent of clearing
Clearing	8	Limit the footprint area of the construction activity to what is absolutely essential.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Clearing	9	Ensure that no vegetation is removed or disturbed outside the delineated construction site boundary.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Clearing	10	Camel thorns (*Vachellia erioloba*) and tree aloes (*Aloidendron dichotomum*) must be avoided as much as practically possible	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Map of avoided trees
Clearing	11	Vegetation trimming or clearing, and construction related activities, should be kept to periods outside of large rainfall events	• Contractor(s)	• Throughout construction	• Visual inspection •	• Record of work stoppages due to weather
Clearing and earthworks	12	Areas to be cleared of vegetation or topsoil shall be cleared only when required, and shall be surfaced or revegetated immediately on completion of the construction activity in that area	• Contractor	• Start of construction	• Visual inspection	• Size of disturbed areas
Clearing and stockpiles	13	When necessary, appropriate dust control measures (such as wetting of soil and covering of stockpiles) shall be implemented	• Contractor(s)	• Throughout construction	• ECO audits	• No visible dust plumes, especially during string winds

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Complaints register / grievance mechanism	14	Maintain and disclose a complaint register. The register must record: • Complainant name and contact details; • Date complaint was lodged; • Person who recorded the complaint; • Nature of the complaint; • Actions taken to investigate the complaint and outcome of the investigation; • Action taken to remedy the situation; and • Date on which feedback was provided to complainant.	• Contractor(s)	• Duration of construction activities	• Monthly ECO Audits	• Register on site • Complaints followed up and closed out
Concrete / cement work	15	Use Ready-Mix concrete rather than batching where possible.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.
Concrete / cement work	16	Ensure that no cement truck delivery chutes are cleaned on site. Cleaning operations are to take place at a suitable washing facility is to be developed on site in consultation with the ECO.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Inspection of incident records
Concrete / cement work	17	Batch cement in a bunded area within the boundaries of the development footprint only (where unavoidable).	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Concrete / cement work	18	Ensure that cement is mixed on mortar boards and not directly on the ground (where possible).	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Inspection of incident records
Concrete / cement work	19	Place cement bags in bins and dispose of bags as waste to a licensed waste disposal facility.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.
Construction layout	20	Access roads should be kept to a minimum and their length and width should be minimised to reduce the surface area from which dust can be generated	• Contractor	• Start of construction	• Visual inspection	• Visibility of dust coming off construction site • Number of registered complaints
Demarcation of working area	21	Demarcate construction site boundaries upon establishment. Control security and access to the site. Fence off site boundaries to the satisfaction of the ECO and ensure that plant, labour, and materials remain within site boundaries.	• Contractor(s)	• Start of construction	•	•
Demarcation of working area	22	No-Go areas (watercourse buffers) must be clearly demarcated/ clearly marked (i.e. with danger tape) before any construction activities commence on site and appropriate measures implemented to ensure compliance	• Contractor(s)	• Start of construction	• Visual inspection by CR and ECO	• No disturbance to no-go areas
Dust management	23	Avoid clearing of vegetation until absolutely necessary (i.e. just before earthworks).	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Size of disturbed areas

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Dust management	24	Regularly evaluate the effectiveness of all dust management measures. Amend how or which measures are used if necessary.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of registered complaints
Dust management	25	Stabilise exposed surfaces as soon as is practically possible.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints
Dust management	26	Avoid excavation and handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible
Dust management	27	If required, place wind barriers at right angles to prevailing wind currents as close to the work areas as possible. Vertical barriers should be at least 2 m high and screening material must have a porosity of 50% or less. For larger surfaces place barriers at intervals of approximately 10 times the barrier height, if feasible	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Dust management	28	Minimise dust generated off stockpiles: • Locate piles in sheltered areas where possible; • Minimise the slope of the stockpile; • Limit stockpile sizes; and • Cover stockpiles when not in active use for some time and / or use an environmentally friendly chemical spray to bind soil.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Dust mitigation measures in place • Number of days that dust plumes are visible • Number of registered complaints
Dust management	29	Cover trucks transporting loose material to or from site with tarpaulins, plastic, or canvas.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Dust mitigation measures in place • Number of registered complaints
Dust management	30	Ensure that any material spilled from trucks on public roads during transport to or from the site is cleaned up.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Number of registered complaints
Dust management	31	Limit construction vehicle speeds to 40 km/hr on gravel roads.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of registered complaints

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Dust management	32	Limit the number of vehicles allowed on-site and restrict the movement of these vehicles over unsurfaced or unvegetated areas once they are on site to reduce dust problems.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints
Employment	33	Recruit local labour as far as feasible to increase the benefits to the local households	• Contractor(s)	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)
Employment	34	Employ labour intensive methods in construction where feasible	• Contractor	• Throughout construction	• Annual compliance audits	• Employment numbers
Employment	35	Sub-contract to local construction companies where possible	• Contractor	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)
Employment	36	Use local suppliers where feasible and arrange with local SMMEs and BBBEE compliant enterprises to provide transport, catering and other services to the construction crews	• Contractor	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Environmental awareness training	37	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of construction waste and activities on the environment; • Suitable disposal of construction waste and litter; • Specific flora and fauna SCC on site and correct procedure; • Consequences of plant poaching; • Key measures in the EMPr relevant to worker's activities; • How incidents and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names	• Contractor(s)	• Before workers start working on-site • Before new activities are undertaken	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed environmental training • Compliance of workers with EMPr
Existing infrastructure	38	Existing landfill infrastructure and services within or close proximity to the construction footprint are to be located (via GPS if necessary) and demarcated prior to construction activities commencing	• Contractor(s)	• Start of construction	• ECO Audits	• Inspection of site drawings
Existing infrastructure	39	Relevant authority agencies and/or Department of the service supplied are to be notified should existing infrastructure be damaged by construction related activities	• Contractor(s)	• Throughout construction	• ECO Audits	• Inspection of incident records
Existing infrastructure	40	Other users are to be notified of any planned disruptions to services ahead of time	• Contractor(s)	• Throughout construction	• ECO Audits	• Inspection of incident records
Fire management	41	Ensure that no fires are permitted on or adjacent to site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	42	Smoking is not to be permitted on site except in designated areas	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Visual evidence
Fire management	43	Ensure that sufficient fire-fighting equipment is available on site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Certified extinguishers in appropriate locations.

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Fire management	44	Any fire incidents or accidents must be recorded, and a record thereof must be kept on site	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	45	Equip all fuel stores and waste storage areas with fire extinguishers.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Fire management	46	Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Training records
Fire management	47	Suitably maintain firefighting equipment.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Groundwater management	48	All leachate management measures in the design of the landfill site to be implemented, including the correct construction of the GCL	• Contractor(s)	• Throughout construction	• Approved building plans	• Compliance with specification.
Groundwater management and monitoring	49	Install monitoring wells around the landfill.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification.
Groundwater management and monitoring	50	Conduct quarterly monitoring of groundwater for leachate water quality indicators	• Contractor(s)	• Throughout construction • Quarterly	• Quarterly water quality testing	• Compliance with specification.
Groundwater management and monitoring	51	Compile a database of groundwater monitoring results to determine any trends in quality	• Contractor(s)	• Throughout construction	• Water quality database	• Compliance with specification.
Hazardous materials	52	Design and construct hazardous material storage facilities, including fuel storage, with suitable impermeable materials and a minimum bund containment capacity equal to 110% of the largest container.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	53	Locate hazardous material storage facilities, especially fuel storage, outside of watercourse buffers	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	54	Ensure that contaminants are not placed directly on the ground.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Hazardous materials	55	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of spills of hazardous materials, including waste materials; • Evidence of contamination and leaks.
Hazardous materials	56	Avoid unnecessary use and transport of hazardous substances.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of spills of hazardous materials, including waste materials; • Evidence of contamination and leaks.
Hazardous materials	57	Keep Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Availability of MSDSs
Hazardous substance handling	58	The proper storage and handling of hazardous substances (hydrocarbons and chemicals) needs to be administered to prevent leaks and spills. Drip trays must be used during pouring of liquids and secondary containment must be in place during storage	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Use of drip trays • Secondary containment for stored hazardous materials
Hazardous substance handling	59	All static machinery and plant are to be placed on drip trays at all times (i.e. whilst being used and when being stored) to contain any spillages that may occur	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Use of drip trays
Hazardous substance handling	60	Spillages should be cleaned up immediately and any contaminated soil from the construction site must be removed and disposed of at a permitted waste disposal facility	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records
Hazardous substance handling	61	Sufficient spill kits must be made available in the event of a spill it must be cleaned up immediately and disposed of appropriately	• Contractor(s)	• Throughout construction	• Environmental Compliance report • ECO audits	• Incident records • Number of spill kits available

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Heritage resources	62	If any concentrations of heritage material / fossils are exposed during construction, all work in that area must cease and it be reported immediately to a relevant authority so that the required investigations can be undertaken. This could entail Phase 2 mitigation to be determined by the Albany Museum).	• Contractor(s) • Archaeologist	• Throughout construction	• Visual inspection	• Sampling or destruction permits
Heritage resources	63	The ECO and construction manager should be aware of any fossils that may be present, or any fossils that may be uncovered during excavation into the underlying strata ;	• Contractor(s)	• Throughout construction	• Annual compliance audit	• Inclusion of fossils in Environmental Awareness Programme
Heritage resources	64	Any exposures encountered during the excavation must be inspected for fossil remains and if any are present a qualified palaeontologist should immediately be notified. The remains of trace fossils, plants, and vertebrates are all of the palaeontological interest and must be recorded and sampled by the palaeontologist at the developer's expense	• Contractor(s) • Palaeontologist	• In the event that artefacts are found.	• Annual compliance audit	• Report to palaeontologist • Palaeontologist Report
Heritage resources	65	A Chance Find Protocol for all heritage resources should be drafted and implemented for the development	• Contractor(s) • Heritage Specialist	• In the event that artefacts are found.	• Annual compliance audit	• Report to archaeologist • Archaeologist Report
Increased traffic	66	Provide suitable traffic accommodation measures as part of construction contract to inform other road users of presence of construction related traffic. Measures to be provided subject to approval by the Engineer	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased traffic	67	Traffic accommodation measures to be provided in terms of Chapter 13 of the South African Road Traffic Signs Manual	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased traffic	68	Ensure construction traffic is confined to site area	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased Traffic	69	Ensure that vehicle loads are within legislated limits, i.e. maximum Gross vehicle mass of 56 000kg	• The Applicant	• Throughout construction	• Visually inspect vehicles for any obvious faults or overloading	• Inspection records

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Increased Traffic	70	Source relevant permits from the Northern Cape Department of Transport should abnormal loads be required for transport of components	• The Applicant	• Throughout construction	• Annual compliance audit	• Permits
Laydown areas	71	Laydown areas should be restricted to areas either already impacted or which is proposed to be impacted by the development	• Contractor(s)	• Throughout construction	• Visual inspection	• Laydown boundaries demarcated
Laydown areas	72	No laydown areas to be within watercourses or buffer zones	• Contractor(s)	• Throughout construction	• Visual inspection	• Laydown boundaries demarcated • Watercourse buffer area outside footprints demarcated
Invasive species management	73	All invasive alien species occurring within disturbed areas must be removed and disposed of as waste. All disturbed areas must be regularly monitored for the emergence of alien invasive species	• Contractor(s)	• Throughout construction	• Visual inspection • IAS monitoring plan • Environmental compliance report	• Number of identified IAS • Area of cleared IAPs
Layout	74	Submit a method statement for site camp location and establishment for approval by the ECO at least two weeks prior to establishment of the camp.	• Contractor(s)	• At least 2 weeks prior to establishment of site camp	• Visual inspections • Method statement	• Approved method statement
Layout	75	Establish a suitably fenced site camp at the start of the contract, which will allow for site offices, vehicle, equipment, material and waste storage areas to be consolidated as much as possible. Locate the site camp at a position approved by the ECO. Provide water and / or ablution facilities at the site camp for personnel.	• Contractor(s)	• Start of construction	•	• Site boundaries demarcated • Signage in place
Noise management	76	Maintain all generators, vehicles, and other equipment in good working order to minimise exhaust fumes and excess noise.	• All contractors operating machinery	• Throughout construction	• Random noise measurements	• Results of random noise measurements • Absence of noise complaints
Noise management	77	No construction activities should occur at night where possible. Piling should only occur during the day to take advantage of unstable atmospheric conditions (which lessen the effects of project related noise).	• Contractor(s)	• Throughout construction	• ECO audits	• Absence of noise complaints

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Noise management	78	Construction staff should receive "noise sensitivity" training such as switching off vehicles when not in use, location of Noise sensitive areas, etc.	• Contractor(s)	• Start of construction • Throughout construction	• ECO audits	• Training records
Noise management	79	An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase	• Applicant	• Start of construction • Throughout construction	• Noise survey	• Survey report
Protection of animals	80	No hunting, poaching or otherwise harming of wildlife on and around the site	• Contractor(s)	• Throughout construction	• ECO audits	• Reported incidents, complaints, or other evidence
Protection of animals	81	Environmental awareness programme to include protection of all fauna on site.	• Contractor(s)	• Throughout construction	• ECO audits	• Training records
Protection of animals	82	Do not harm, catch or kill animals by any means, including poisoning, trapping, shooting or setting of snares.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	83	Provide contact details for an animal handler if any dangerous animals are encountered on the construction site	• Contractor(s)	• Throughout construction	• Photographic evidence	• Details of animal handle displayed on walls at site office • Number of incidents of animals removed

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Protection of animals	84	Safely remove and relocate any fauna that may be physically harmed by construction activities.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	85	Backfill trenches as soon as possible. Inspect open trenches daily for animals which may have fallen or become trapped	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals (avifauna)	86	Should additional SCC be found breeding within the disturbance footprint prior to or during construction all works within 500 m of the breeding site must be halted and an avifaunal specialist must be contacted for further instruction. Any resulting recommendation by the avifaunal specialist to protect the breeding SCC must be implemented;	• Contractor(s) • Avifaunal specialist	• Before construction commences • Once the final construction footprint has been pegged	• Visual inspection by CR and ECO • Appointment of avifaunal specialist	• Appointment documents • Inspection report
Protection of animals (avifauna)	87	Breeding sites of SCC are to be clearly demarcated with construction tape as per the instruction of the avifaunal specialist;	• Contractor(s) • Avifaunal specialist	• Before construction commences • Once the final construction footprint has been pegged	• Visual inspection by CR and ECO	• Number of breeding sites demarcated

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Protection of animals (avifauna)	88	All electrical infrastructure is to be of bird-friendly insulated design in line with the latest Eskom Technical Standards.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Design specifications • Number of incidents of dead birds found at base of
Protection of animals (avifauna)	89	Bury all low and medium voltage powerlines where technically possible and install bird flight diverters where this is not possible, in line with Eskom Technical Standards.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Compliance with specification • Number of incidents of dead birds found at base of transmission lines
Protection of animals (avifauna)	90	All fencing must be of a single-fence design to avoid avian species getting trapped between double-fencing, and the Birdlife SA Guideline for Birds & Fences must be complied with.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Compliance of specification
Protection of animals (avifauna)	91	All water reservoirs must be covered with netting or mesh to avoid birds drowning. Any other open water must have areas where birds can exit safely to prevent drownings.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Number of incidents of dead birds found around reservoirs and other open water
Protection of plants	92	Fence off sensitive habitats containing species threatened by poaching	• Contractor (s)	• Throughout construction	• Visual inspection	• Number of fenced off areas
Protection of plants	93	Monitor access points and routes of transportation for vehicles used in poaching	• Applicant	• Throughout construction	• Visual inspection	• Evidence of camera monitoring
Protection of plants	94	Monitor SCC populations threatened with poaching	• Applicant	• Throughout construction	• Visual inspection • SCC report	• Population counts
Protection of plants	95	Include the importance of SCC, the threat and penalties of poaching within the environmental awareness programme	• Contractor (s)	• Throughout construction	• Survey of Environmental Awareness Programme	• Content of Environmental Awareness Programme
Record keeping	96	Maintain a register of complaints, e.g. for monitoring levels of nuisance experienced by neighbours. Respond to complaints by increasing the frequency and/or intensity management measures, e.g. dust suppression	• Contractor(s)	• Throughout construction	• ECO audits	• Register

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Safety and security	97	Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.) are established prior to commencing construction.	• Contractor(s)	• Throughout construction	• Approval by CR and ECO.	• Compliance with specification.
Safety and security	98	Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification.
Safety and security	99	Secure the site camp, particularly to restrict access unauthorised to fuels and any other hazardous substances.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Controlled access
Safety and security	100	Store all construction material and equipment in locked containers within the site camp. Employ 24 hour security for the Site Camp.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Controlled access
Safety and security	101	Provide suitable emergency and safety signage on site, and demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc.).	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Signage
Safety and security	102	Advise the ECO of any emergencies on site, together with a record of action taken	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Incidents register
Site Camp management	103	Provide appropriate sanitation facilities for the duration of the proposed construction activities and remove all waste to an appropriate facility.	• Contractor(s)	• Throughout construction	•	•
Site Camp management	104	Do not leave any food out in the open to avoid attracting animals.	• Contractor(s)	• Throughout construction	•	•
Stockpiles	105	Dust control measures such as wetting and covering of stockpiles to be implemented when necessary	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of dust generation
Stormwater / run-off management	106	Ensure suitable control of run-off during the construction phase to prevent erosion of topsoil on stockpiles and adjacent land and undeveloped portions of the site	• Contractor(s)	• Throughout Construction	• Visual inspection of downstream areas and topsoil stockpiles	• No erosion

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Stormwater / run-off management	107	Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and other contaminated wastewater and fuels into any water sources and the stormwater system.	• Contractor(s)	• When cleaning existing plant and removing old equipment	• Monitor activity against method statement	• Implementation of preventative actions • Visibility of water pollution
Stormwater / run-off management	108	Collect stormwater from bunded areas in a suitable container and remove from the site for appropriate disposal.	• Contractor(s)	• Throughout construction	• Visual inspection	• Incidents of storm-water contamination
Stormwater / run-off management	109	Direct runoff or pump water from construction sites away from freshwater features, so that it is first captured in detention ponds for settlement. Ensure that flows are dissipated to prevent scour and initially collected in a tank or similar containment that allows coarse sediment to settle.	• Contractor(s)	• Throughout construction	• Visual inspection	• Visible leaks/water wastage • Visible surface erosion
Stormwater / run-off management	110	Incorporate adequate erosion and stormwater management measures during construction to prevent erosion and the associated sedimentation of freshwater features. Management measures may include berms, silt fences, hessian curtains and stormwater diversion away from areas susceptible to erosion. Avoid additional disturbance during the implementation of these measures.	• Contractor(s)	• Throughout construction	• Visual inspection	• Visible leaks/water wastage • Visible surface erosion
Stormwater management	111	The stormwater management plan for the site should ensure that any impacts of stormwater from the site are mitigated as far as possible within the site (measures such as the use of permeable surfaces, re-use of runoff from built areas such as roofs as well as the use of measures such as swales) to minimise the stormwater impacts on the watercourse	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby water-courses
Stormwater management	112	The alternative flow structure must be designed in such a way that the width of the banks is close to that of the natural banks of the drainage line	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby water-courses
Stormwater management	113	If necessary, pre-treatment areas such as oil, sediment and litter traps should be included in the stormwater management design	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby water-courses

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Surface water management	114	Movement of vehicle and plant movement must only be allowed in designated areas which has been identified for construction and are required to remain within the development footprint where existing roads are not present. Diversion of flow must be made for water to either flow through a culvert or similar structure to mimic the natural direction of flow;	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on wastercourses
Topsoil storage	115	Designate and demarcate areas to be used for topsoil stockpiling within disturbed areas or the development footprint.	• Contractor(s)	• Before construction commences	• Visual inspection •	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Topsoil storage	116	Stockpile topsoil prior to the commencement of construction activities (stockpile no higher than 1.5 m) and conserve topsoil for landscaping and rehabilitation	• Contractor(s)	• Before construction commences	• Visual inspection	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Topsoil storage	117	Locate topsoil stockpiles in an area protected from the wind and agreed with the ECO.	• Contractor(s)	• Before construction commences	• Visual inspection	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Transportation and refuelling	118	Leakages must be repaired promptly and drip trays, with spill socks, placed underneath plant or vehicles until such leakages have been repaired	• Contractor(s)	• Throughout construction	• Visual inspection	• Maintenance records
Transportation and refuelling	119	Machinery must be re-fuelled and serviced in a designated area with an impermeable surface (concrete is not impermeable and requires a sealant), with runoff contained and directed into an oil separator. It is expected that no such areas would be established at the construction site, which then means that vehicles and machinery are not to be serviced or refuelled on site.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Transportation and refuelling	120	Contractor must ensure all construction plant and vehicles are licensed and maintained in a good working condition in order to minimise potential soil pollution.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Transportation and refuelling	121	Use appropriately sized drip trays for all refuelling and/or repairs done on machinery – ensure these are strategically placed to capture any spillage of fuel, oil, etc.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Vehicle maintenance	122	No plant, vehicles or other equipment may be washed on the construction site	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Waste Management	123	Implement effective waste management	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of litter in and around the site
Waste Management	124	Develop and implement a waste management plan to address classification of waste streams, segregation at source, control of waste on site before disposal, removal of wastes from site, and record keeping.	• Contractor(s) • ECO	• Prior to construction commencing	• Approval of the waste management plan(s) by the ECO	• Approved waste management plan(s)
Waste Management	125	Identify and separate materials that can be reused or recycled to minimise waste, e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling.	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	126	No disposal of wastes, other than at registered landfill sites	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste management	127	Ensure that on site sanitation facilities are adequately managed and effluent is disposed of correctly	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	128	Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licensed landfill site, and proof of disposal retained for auditing purposes)	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	129	Ensure that construction materials (e.g. bags of cement) are suitably stored and protected to avoid wastage	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports •

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Waste Management	130	Excess excavated material that cannot be used for backfill should not be allowed to accumulate on site and should be disposed of at a formal landfill site or suitable spoil site identified in conjunction with the ECO.	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	131	Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or on existing roads and/ or access tracks between demarcated areas.	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of driving outside demarcated areas (ECO audit reports)
Waste Management	132	No clearing of vegetation, abstraction, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of disturbance demarcated areas (ECO audit reports)
Waste Management	133	Appropriate scavenger-proof solid waste management facilities with lids must be provided on-site during construction and must be regularly emptied	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Absence of wind-blown litter
Waste management	134	Aim to minimise waste through reducing and re-using (packaging) material.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas • Visual inspection of construction areas (litter) • Check waste disposal slips	• Availability of rubbish bins and skips for different recyclable wastes
Waste management	135	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips
Waste management	136	Collect all waste in bins and/or skips at the construction site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips
Waste management	137	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.	• Contractor(s)	• Throughout construction	• Visual inspection of construction areas (litter)	• Absence of litter

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Waste management	138	Dispose of waste appropriately and obtain certificates.	• Contractor(s)	• Throughout construction	• Check waste disposal slips	• Waste disposal certificates
Waste management	139	Do not allow any burning or burying of waste on site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Availability of rubbish bins and skips • Waste storage capacity
Water Management	140	No polluted water from washing of mechanical plant or equipment to be discharged to the ground. This must be collected in a tank for evaporation and disposal	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records
Waste management	141	Ensure that no discarded materials are buried on site or on any other land not designated for this purpose.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years
Site rehabilitation	42	A rehabilitation plan must be compiled in line with the Conservation Area Management Plan (2022) and submitted to the ECO for approval. This revegetation plan must be implemented.	• Contractor • ECO	• Pre-construction	• ECO audit report	• Presence of rehabilitation plan
Site rehabilitation	142	Ensure that slopes are immediately stabilised to prevent erosion, using geofabric or other appropriate erosion stabilisation techniques.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	143	Remove all construction equipment, vehicles, equipment, waste and surplus materials, including site offices, temporary fencing and other facilities, from the site.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	144	Clean up and remove any spills and contaminated soil in the appropriate manner.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	145	Ensure that affected areas are rehabilitated following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	146	Rehabilitate areas adjacent to the site (if disturbance is unavoidable) to at least the same condition as was present prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years

Construction Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Site rehabilitation	147	Use harvested topsoil for rehabilitation and landscaping following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	148	Rehabilitate project areas with locally indigenous species, including those removed from the site prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	149	Rehabilitate any disturbed areas as soon as construction in the area is complete.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years
Site rehabilitation	150	Appoint a specialist contractor to remove alien and weed species in areas disturbed as a result of construction activities to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998).	• The Applicant	• After Construction	• Annual compliance audits	• Ongoing absence of alien vegetation
Monitoring	151	Appoint a qualified person to monitor rehabilitation success.	• The Applicant	• Once rehabilitation has been completed in the first section	• Contract documentation	• Appointment
Monitoring	152	Monitor rehabilitation success every three months in the first year, and every six months thereafter until acceptable species densities and cover are achieved. Monitor by means of 3 m x 3 m fixed plots in which species presence and cover is assessed, as well as fixed point photography.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success
Monitoring	153	Monitor erosion of rehabilitated areas every three months in the first year, and every six months thereafter. Monitor by means of a visual assessment.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success

Table 5-4: Environmental management and mitigation measures that must be implemented during the Construction Phase of the Expanded WWTW.

Construction Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
General	1	All contractors must have an approved Environmental Management Plan in place that ensures that environmental impacts are minimised as far as practicable possible.	• Applicant • Contractor(s)	• Prior to construction activities	• ECO Audits	• Visual inspection
Initial appointments and preparations	2	Appoint an ECO to oversee construction activities.	• Applicant	• Before construction commences • Once the final construction footprint has been pegged	• Review appointment documentation	• Appointment documents
	3	Appoint a suitably qualified botanist/specialist to complete the Search & Rescue operation for protected species, as per the CAMP (Ekotrust, 2022), before any construction activities commence.				
	4	Implement a search and rescue of the entire footprint immediately prior to construction to move any fauna that are directly threatened by the construction activities and unlikely to move out by themselves. No wildlife may be removed from the site or surrounding areas unless approved by the ECO in conjunction with the appropriate permits obtainable from relevant competent authorities.	• Herpetologist	• Before construction starts	• Visual inspection • Record of relocations	• Records of relocations

[3] Unless otherwise indicated, monitoring will be undertaken by the ECO, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Construction Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
	5	Avifaunal specialist to undertake an avifaunal walkthrough of the development footprint to identify any breeding sites. Identified breeding sites must be clearly indicated on a map of the site and all staff must be made aware of these areas. Any additional mitigation measures recommended by the avifaunal specialist are implemented.	• Avifaunal specialist • Contractor(s)	• Six weeks before construction commences • Once -off	• Review avifaunal report • Environmental Management Plan Content	• Avifaunal report kept on file • Breediing sites map displayed on site • Documentary/photographic evidence of complying with any additional mitigation measures recommended by the specialist in the walkthrough report are provided.
	6	Watercourses and associated buffers within the vicinity of the footprints must be demarcated prior to construction	• Contractor(s)	• Pre-construction	• Visual inspection by CR and ECO	• Number of footprints with demarcated watercourses
Clearing	7	Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once)	• Contractor(s)	• Start of construction	• Visual inspection by CR and ECO	• Monitor extent of clearing
Clearing	8	Limit the footprint area of the construction activity to what is absolutely essential.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches

Construction Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Clearing	9	Ensure that no vegetation is removed or disturbed outside the delineated construction site boundary.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Clearing	10	Camel thorns (*Vachellia erioloba*) and tree aloes (*Aloidendron dichotomum*) must be avoided as much as practically possible	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Map of avoided trees
Clearing	11	Vegetation trimming or clearing, and construction related activities, should be kept to periods outside of large rainfall events	• Contractor(s)	• Throughout construction	• Visual inspection •	• Record of work stoppages due to weather
Clearing and earthworks	12	Areas to be cleared of vegetation or topsoil shall be cleared only when required, and shall be surfaced or revegetated immediately on completion of the construction activity in that area	• Contractor	• Start of construction	• Visual inspection	• Size of disturbed areas
Clearing and stockpiles	13	When necessary, appropriate dust control measures (such as wetting of soil and covering of stockpiles) shall be implemented	• Contractor(s)	• Throughout construction	• ECO audits	• No visible dust plumes, especially during string winds

Construction Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Complaints register / grievance mechanism	14	Maintain and disclose a complaint register. The register must record: • Complainant name and contact details; • Date complaint was lodged; • Person who recorded the complaint; • Nature of the complaint; • Actions taken to investigate the complaint and outcome of the investigation; • Action taken to remedy the situation; and • Date on which feedback was provided to complainant.	• Contractor(s)	• Duration of construction activities	• Monthly ECO Audits	• Register on site • Complaints followed up and closed out
Concrete / cement work	15	Use Ready-Mix concrete rather than batching where possible.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.
Concrete / cement work	16	Ensure that no cement truck delivery chutes are cleaned on site. Cleaning operations are to take place at a suitable washing facility is to be developed on site in consultation with the ECO.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Inspection of incident records
Concrete / cement work	17	Batch cement in a bunded area within the boundaries of the development footprint only (where unavoidable).	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.

Construction Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Concrete / cement work	18	Ensure that cement is mixed on mortar boards and not directly on the ground (where possible).	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Inspection of incident records
Concrete / cement work	19	Place cement bags in bins and dispose of bags as waste to a licensed waste disposal facility.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.
Construction layout	20	Access roads should be kept to a minimum and their length and width should be minimised to reduce the surface area from which dust can be generated.	• Contractor	• Start of construction	• Visual inspection	• Visibility of dust coming off construction site • Number of registered complaints
Demarcation of working area	21	Demarcate construction site boundaries upon establishment. Control security and access to the site. Fence off site boundaries to the satisfaction of the ECO and ensure that plant, labour, and materials remain within site boundaries.	• Contractor(s)	• Start of construction	•	•
Demarcation of working area	22	No-Go areas (watercourse buffers) must be clearly demarcated/ clearly marked (i.e. with danger tape) before any construction activities commence on site and appropriate measures implemented to ensure compliance	• Contractor(s)	• Start of construction	• Visual inspection by CR and ECO	• No disturbance to no-go areas
Dust management	23	Avoid clearing of vegetation until absolutely necessary (i.e. just before earthworks).	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Size of disturbed areas

Construction Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Dust management	24	Regularly evaluate the effectiveness of all dust management measures. Amend how or which measures are used if necessary.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of registered complaints
Dust management	25	Stabilise exposed surfaces as soon as is practically possible.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints
Dust management	26	Avoid excavation and handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible
Dust management	27	If required, place wind barriers at right angles to prevailing wind currents as close to the work areas as possible. Vertical barriers should be at least 2 m high and screening material must have a porosity of 50% or less. For larger surfaces place barriers at intervals of approximately 10 times the barrier height, if feasible.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints

Construction Phase Measures: Expanded WWTW						
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Dust management	28	Minimise dust generated off stockpiles: • Locate piles in sheltered areas where possible; • Minimise the slope of the stockpile; • Limit stockpile sizes; and • Cover stockpiles when not in active use for some time and / or use an environmentally friendly chemical spray to bind soil.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Dust mitigation measures in place • Number of days that dust plumes are visible • Number of registered complaints
Dust management	29	Cover trucks transporting loose material to or from site with tarpaulins, plastic, or canvas.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Dust mitigation measures in place • Number of registered complaints
Dust management	30	Ensure that any material spilled from trucks on public roads during transport to or from the site is cleaned up.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Number of registered complaints
Dust management	31	Limit construction vehicle speeds to 40 km/hr on gravel roads.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of registered complaints

Construction Phase Measures: Expanded WWTW						
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Dust management	32	Limit the number of vehicles allowed on-site and restrict the movement of these vehicles over unsurfaced or unvegetated areas once they are on site to reduce dust problems.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints
Employment	33	Recruit local labour as far as feasible to increase the benefits to the local households	• Contractor(s)	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)
Employment	34	Employ labour intensive methods in construction where feasible	• Contractor	• Throughout construction	• Annual compliance audits	• Employment numbers
Employment	35	Sub-contract to local construction companies where possible	• Contractor	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)
Employment	36	Use local suppliers where feasible and arrange with local SMMEs and BBBEE compliant enterprises to provide transport, catering and other services to the construction crews	• Contractor	• Throughout construction	• Annual compliance audits	• Employment records (to include whether local or non-local)

Construction Phase Measures: Expanded WWTW						
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Environmental awareness training	37	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of construction waste and activities on the environment; • Suitable disposal of construction waste and litter; • Specific flora and fauna SCC on site and correct procedure; • Consequences of plant poaching; • Key measures in the EMPr relevant to worker's activities; • How incidents and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names	• Contractor(s)	• Before workers start working on-site • Before new activities are undertaken	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed environmental training • Compliance of workers with EMPr
Existing infrastructure	38	Existing landfill infrastructure and services within or close proximity to the construction footprint are to be located (via GPS if necessary) and demarcated prior to construction activities commencing	• Contractor(s)	• Start of construction	• ECO Audits	• Inspection of site drawings
Existing infrastructure	39	Relevant authority agencies and/or Department of the service supplied are to be notified should existing infrastructure be damaged by construction related activities	• Contractor(s)	• Throughout construction	• ECO Audits	• Inspection of incident records
Existing infrastructure	40	Other users are to be notified of any planned disruptions to services ahead of time	• Contractor(s)	• Throughout construction	• ECO Audits	• Inspection of incident records
Fire management	41	Ensure that no fires are permitted on or adjacent to site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	42	Smoking is not to be permitted on site except in designated areas	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Visual evidence
Fire management	43	Ensure that sufficient fire-fighting equipment is available on site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Certified extinguishers in appropriate locations.

Construction Phase Measures: Expanded WWTW						
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Fire management	44	Any fire incidents or accidents must be recorded, and a record thereof must be kept on site	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	45	Equip all fuel stores and waste storage areas with fire extinguishers.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Fire management	46	Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Training records
Fire management	47	Suitably maintain firefighting equipment.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Hazardous materials	48	Design and construct hazardous material storage facilities, including fuel storage, with suitable impermeable materials and a minimum bund containment capacity equal to 110% of the largest container.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	49	Locate hazardous material storage facilities, especially fuel storage, outside of watercourse buffers	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	50	Ensure that hazardous materials are not placed directly on the ground.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	51	Keep Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Availability of MSDSs
Hazardous substance handling	52	All static machinery and plant are to be placed on drip trays at all times (i.e. whilst being used and when being stored) to contain any spillages that may occur	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Use of drip trays
Hazardous substance handling	53	Spillages should be cleaned up immediately and any contaminated soil from the construction site must be removed and disposed of at a permitted waste disposal facility	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records
Hazardous substance handling	54	Sufficient spill kits must be made available in the event of a spill it must be cleaned up immediately and disposed of appropriately	• Contractor(s)	• Throughout construction	• Environmental Compliance report • ECO audits	• Incident records • Number of spill kits available

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Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Heritage resources	55	If any concentrations of heritage material / fossils are exposed during construction, all work in that area must cease and it be reported immediately to a relevant authority so that the required investigations can be undertaken. This could entail Phase 2 mitigation to be determined by the Albany Museum).	• Contractor(s) • Archaeologist	• Throughout construction	• Visual inspection	• Sampling or destruction permits
Heritage resources	56	The ECO and construction manager should be aware of any fossils that may be present, or any fossils that may be uncovered during excavation into the underlying strata ;	• Contractor(s)	• Throughout construction	• Annual compliance audit	• Inclusion of fossils in Environmental Awareness Programme
Heritage resources	57	Any exposures encountered during the excavation must be inspected for fossil remains and if any are present a qualified palaeontologist should immediately be notified. The remains of trace fossils, plants, and vertebrates are all of the palaeontological interest and must be recorded and sampled by the palaeontologist at the developer's expense	• Contractor(s) • Palaeontologist	• In the event that artefacts are found.	• Annual compliance audit	• Report to palaeontologist • Palaeontologist Report
Heritage resources	58	A Chance Find Protocol for all heritage resources should be drafted and implemented for the development	• Contractor(s) • Heritage Specialist	• In the event that artefacts are found.	• Annual compliance audit	• Report to archaeologist • Archaeologist Report
Increased traffic	59	Provide suitable traffic accommodation measures as part of construction contract to inform other road users of presence of construction related traffic. Measures to be provided subject to approval by the Engineer	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased traffic	60	Traffic accommodation measures to be provided in terms of Chapter 13 of the South African Road Traffic Signs Manual	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased traffic	61	Ensure construction traffic is confined to site area	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Increased Traffic	62	Ensure that vehicle loads are within legislated limits, i.e. maximum Gross vehicle mass of 56 000kg	• The Applicant	• Throughout construction	• Visually inspect vehicles for any obvious faults or overloading	• Inspection records

Construction Phase Measures: Expanded WWTW						
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Increased Traffic	63	Source relevant permits from the Northern Cape Department of Transport should abnormal loads be required for transport of components	• The Applicant	• Throughout construction	• Annual compliance audit	• Permits
Laydown areas	64	Laydown areas should be restricted to areas either already impacted or which is proposed to be impacted by the development	• Contractor(s)	• Throughout construction	• Visual inspection	• Laydown boundaries demarcated
Laydown areas	65	No laydown areas to be within watercourses or buffer zones	• Contractor(s)	• Throughout construction	• Visual inspection	• Laydown boundaries demarcated • Watercourse buffer area outside footprints demarcated
Invasive species management	66	All invasive alien species occurring within disturbed areas must be removed and disposed of as waste. All disturbed areas must be regularly monitored for the emergence of alien invasive species	• Contractor(s)	• Throughout construction	• Visual inspection • IAS monitoring plan • Environmental compliance report	• Number of identified IAS • Area of cleared IAPs
Layout	67	Submit a method statement for site camp location and establishment for approval by the ECO at least two weeks prior to establishment of the camp.	• Contractor(s)	• At least 2 weeks prior to establishment of site camp	• Visual inspections • Method statement	• Approved method statement
Layout	68	Establish a suitably fenced site camp at the start of the contract, which will allow for site offices, vehicle, equipment, material and waste storage areas to be consolidated as much as possible. Locate the site camp at a position approved by the ECO. Provide water and / or ablution facilities at the site camp for personnel.	• Contractor(s)	• Start of construction	•	• Site boundaries demarcated • Signage in place
Noise management	69	Maintain all generators, vehicles, and other equipment in good working order to minimise exhaust fumes and excess noise.	• All contractors operating machinery	• Throughout construction	• Random noise measurements	• Results of random noise measurements • Absence of noise complaints
Noise management	70	No construction activities should occur at night where possible. Piling should only occur during the day to take advantage of unstable atmospheric conditions (which lessen the effects of project related noise).	• Contractor(s)	• Throughout construction	• ECO audits	• Absence of noise complaints

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Noise management	71	Construction staff should receive "noise sensitivity" training such as switching off vehicles when not in use, location of Noise sensitive areas, etc.	• Contractor(s)	• Start of construction • Throughout construction	• ECO audits	• Training records
Noise management	72	An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase	• Applicant	• Start of construction • Throughout construction	• Noise survey	• Survey report
Protection of animals	73	No hunting, poaching or otherwise harming of wildlife on and around the site	• Contractor(s)	• Throughout construction	• ECO audits	• Reported incidents, complaints, or other evidence
Protection of animals	74	Environmental awareness programme to include protection of all fauna on site.	• Contractor(s)	• Throughout construction	• ECO audits	• Training records
Protection of animals	75	Do not harm, catch or kill animals by any means, including poisoning, trapping, shooting or setting of snares.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	76	Provide contact details for an animal handler if any dangerous animals are encountered on the construction site	• Contractor(s)	• Throughout construction	• Photographic evidence	• Details of animal handle displayed on walls at site office • Number of incidents of animals removed

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Protection of animals	77	Safely remove and relocate any fauna that may be physically harmed by construction activities.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	78	Backfill trenches as soon as possible. Inspect open trenches daily for animals which may have fallen or become trapped	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals (avifauna)	79	The Maccoa Duck breeding site must be clearly demarcated as per instruction of an avifaunal specialist following the walkthrough.	• Contractor(s) • Avifaunal specialist	• Once-off prior to commencement of construction	• Visual inspection • Appointment of avifuanal specialist • Avifuanal Specialist Report	• Demarcated maccoa duck breeding area • Number of incidents of animals on WWTW
Protection of animals (avifauna)	80	Should additional SCC be found breeding within the disturbance footprint prior to or during construction all works within 500 m of the breeding site must be halted and an avifaunal specialist must be contacted for further instruction. Any resulting recommendation by the avifaunal specialist to protect the breeding SCC must be implemented;	• Contractor(s) • Avifaunal specialist	• Before construction commences • Once the final construction footprint has been pegged	• Visual inspection by CR and ECO • Appointment of avifaunal specialist	• Appointment documents • Inspection report

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Protection of animals (avifauna)	81	Breeding sites of SCC are to be clearly demarcated with construction tape as per the instruction of the avifaunal specialist;	• Contractor(s) • Avifaunal specialist	• Before construction commences • Once the final construction footprint has been pegged	• Visual inspection by CR and ECO	• Number of breeding sites demarcated
Protection of animals (avifauna)	82	All electrical infrastructure is to be of bird-friendly insulated design in line with the latest Eskom Technical Standards.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Design specifications • Number of incidents of dead birds found at base of
Protection of animals (avifauna)	83	Bury all low and medium voltage powerlines where technically possible and install bird flight diverters where this is not possible, in line with Eskom Technical Standards.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Compliance with specification • Number of incidents of dead birds found at base of transmission lines
Protection of animals (avifauna)	84	All fencing must be of a single-fence design to avoid avian species getting trapped between double-fencing, and the Birdlife SA Guideline for Birds & Fences must be complied with.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Compliance of specification
Protection of animals (avifauna)	85	All water reservoirs must be covered with netting or mesh to avoid birds drowning. Any other open water must have areas where birds can exit safely to prevent drownings.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Number of incidents of dead birds found around reservoirs and other open water
Protection of plants	86	Fence off sensitive habitats containing species threatened by poaching	• Contractor (s)	• Throughout construction	• Visual inspection	• Number of fenced off areas
Protection of plants	87	Monitor access points and routes of transportation for vehicles used in poaching	• Applicant	• Throughout construction	• Visual inspection	• Evidence of camera monitoring
Protection of plants	88	Monitor SCC populations threatened with poaching	• Applicant	• Throughout construction	• Visual inspection • SCC report	• Population counts

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Protection of plants	89	Include the importance of SCC, the threat and penalties of poaching within the environmental awareness programme	• Contractor (s)	• Throughout construction	• Survey of Environmental Awareness Programme	• Content of Environmental Awareness Programme
Record keeping	90	Maintain a register of complaints, e.g. for monitoring levels of nuisance experienced by neighbours. Respond to complaints by increasing the frequency and/or intensity management measures, e.g. dust suppression	• Contractor(s)	• Throughout construction	• ECO audits	• Register
Safety and security	91	Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.) are established prior to commencing construction.	• Contractor(s)	• Throughout construction	• Approval by CR and ECO.	• Compliance with specification.
Safety and security	92	Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification.
Safety and security	93	Secure the site camp, particularly to restrict access unauthorised to fuels and any other hazardous substances.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Controlled access
Safety and security	94	Store all construction material and equipment in locked containers within the site camp. Employ 24 hour security for the Site Camp.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Controlled access
Safety and security	95	Provide suitable emergency and safety signage on site, and demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc.).	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Signage
Safety and security	96	Advise the ECO of any emergencies on site, together with a record of action taken	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Incidents register
Site Camp management	97	Provide appropriate sanitation facilities for the duration of the proposed construction activities and remove all waste to an appropriate facility.	• Contractor(s)	• Throughout construction	•	•
Site Camp management	98	Do not leave any food out in the open to avoid attracting animals.	• Contractor(s)	• Throughout construction	•	•
Stockpiles	99	Dust control measures such as wetting and covering of stockpiles to be implemented when necessary	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of dust generation

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Stormwater / run-off management	100	Ensure suitable control of run-off during the construction phase to prevent erosion of topsoil on stockpiles and adjacent land and undeveloped portions of the site	• Contractor(s)	• Throughout Construction	• Visual inspection of downstream areas and topsoil stockpiles	• No erosion
Stormwater / run-off management	101	Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and other contaminated wastewater and fuels into any water sources and the stormwater system.	• Contractor(s)	• When cleaning existing plant and removing old equipment	• Monitor activity against method statement	• Implementation of preventative actions • Visibility of water pollution
Stormwater / run-off management	102	Collect stormwater from bunded areas in a suitable container and remove from the site for appropriate disposal.	• Contractor(s)	• Throughout construction	• Visual inspection	• Incidents of stormwater contamination
Stormwater / run-off management	103	Direct runoff or pump water from construction sites away from freshwater features, so that it is first captured in detention ponds for settlement. Ensure that flows are dissipated to prevent scour and initially collected in a tank or similar containment that allows coarse sediment to settle.	• Contractor(s)	• Throughout construction	• Visual inspection	• Visible leaks/water wastage • Visible surface erosion
Stormwater / run-off management	104	Incorporate adequate erosion and stormwater management measures during construction to prevent erosion and the associated sedimentation of freshwater features. Management measures may include berms, silt fences, hessian curtains and stormwater diversion away from areas susceptible to erosion. Avoid additional disturbance during the implementation of these measures.	• Contractor(s)	• Throughout construction	• Visual inspection	• Visible leaks/water wastage • Visible surface erosion
Stormwater management	105	The stormwater management plan for the site should ensure that any impacts of stormwater from the site are mitigated as far as possible within the site (measures such as the use of permeable surfaces, re-use of runoff from built areas such as roofs as well as the use of measures such as swales) to minimise the stormwater impacts on the watercourse	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby watercourses
Stormwater management	106	The alternative flow structure must be designed in such a way that the width of the banks is close to that of the natural banks of the drainage line	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby watercourses

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Stormwater management	107	If necessary, pre-treatment areas such as oil, sediment and litter traps should be included in the stormwater management design	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on nearby watercourses
Surface water management	108	Movement of vehicle and plant movement must only be allowed in designated areas which has been identified for construction and are required to remain within the development footprint where existing roads are not present. Diversion of flow must be made for water to either flow through a culvert or similar structure to mimic the natural direction of flow;	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on wastercourses
Topsoil storage	109	Designate and demarcate areas to be used for topsoil stockpiling within disturbed areas or the development footprint.	• Contractor(s)	• Before construction commences	• Visual inspection •	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Topsoil storage	110	Stockpile topsoil prior to the commencement of construction activities (stockpile no higher than 1.5 m) and conserve topsoil for landscaping and rehabilitation	• Contractor(s)	• Before construction commences	• Visual inspection	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Topsoil storage	111	Locate topsoil stockpiles in an area protected from the wind and agreed with the ECO.	• Contractor(s)	• Before construction commences	• Visual inspection	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Transportation and refuelling	112	Leakages must be repaired promptly and drip trays, with spill socks, placed underneath plant or vehicles until such leakages have been repaired	• Contractor(s)	• Throughout construction	• Visual inspection	• Maintenance records

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Transportation and refuelling	113	Machinery must be re-fuelled and serviced in a designated area with an impermeable surface (concrete is not impermeable and requires a sealant), with runoff contained and directed into an oil separator. It is expected that no such areas would be established at the construction site, which then means that vehicles and machinery are not to be serviced or refuelled on site.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Transportation and refuelling	114	Contractor must ensure all construction plant and vehicles are licensed and maintained in a good working condition in order to minimise potential soil pollution.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Transportation and refuelling	115	Use appropriately sized drip trays for all refuelling and/or repairs done on machinery – ensure these are strategically placed to capture any spillage of fuel, oil, etc.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Vehicle maintenance	116	No plant, vehicles or other equipment may be washed on the construction site	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Waste Management	117	Implement effective waste management	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of litter in and around the site
Waste Management	118	Develop and implement a waste management plan to address classification of waste streams, segregation at source, control of waste on site before disposal, removal of wastes from site, and record keeping.	• Contractor(s) • ECO	• Prior to construction commencing	• Approval of the waste management plan(s) by the ECO	• Approved waste management plan(s)
Waste Management	119	Identify and separate materials that can be reused or recycled to minimise waste, e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling.	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	120	No disposal of wastes, other than at registered landfill sites	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste management	121	Ensure that on site sanitation facilities are adequately managed and effluent is disposed of correctly	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records

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Waste Management	122	Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licensed landfill site, and proof of disposal retained for auditing purposes)	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	123	Ensure that construction materials (e.g. bags of cement) are suitably stored and protected to avoid wastage	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports •
Waste Management	124	Excess excavated material that cannot be used for backfill should not be allowed to accumulate on site and should be disposed of at a formal landfill site or suitable spoil site identified in conjunction with the ECO.	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	125	Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or on existing roads and/ or access tracks between demarcated areas.	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of driving outside demarcated areas (ECO audit reports)
Waste Management	126	No clearing of vegetation, abstraction, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of disturbance demarcated areas (ECO audit reports)
Waste Management	127	Appropriate scavenger-proof solid waste management facilities with lids must be provided on-site during construction and must be regularly emptied	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Absence of windblown litter
Waste management	128	Aim to minimise waste through reducing and re-using (packaging) material.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas • Visual inspection of construction areas (litter) • Check waste disposal slips	• Availability of rubbish bins and skips for different recyclable wastes
Waste management	129	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips

Construction Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Waste management	130	Collect all waste in bins and/or skips at the construction site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips
Waste management	131	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.	• Contractor(s)	• Throughout construction	• Visual inspection of construction areas (litter)	• Absence of litter
Waste management	132	Dispose of waste appropriately and obtain certificates.	• Contractor(s)	• Throughout construction	• Check waste disposal slips	• Waste disposal certificates
Waste management	133	Do not allow any burning or burying of waste on site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Availability of rubbish bins and skips • Waste storage capacity
Water Management	134	No polluted water from washing of mechanical plant or equipment to be discharged to the ground. This must be collected in a tank for evaporation and disposal	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records
Waste management	135	Ensure that no discarded materials are buried on site or on any other land not designated for this purpose.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years
Site rehabilitation	42	A rehabilitation plan must be compiled in line with the Conservation Area Management Plan (2022) and submitted to the ECO for approval. This revegetation plan must be implemented.	• Contractor • ECO	• Pre-construction	• ECO audit report	• Presence of rehabilitation plan
Site rehabilitation	136	Ensure that slopes are immediately stabilised to prevent erosion, using geofabric or other appropriate erosion stabilisation techniques.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	137	Remove all construction equipment, vehicles, equipment, waste and surplus materials, including site offices, temporary fencing and other facilities, from the site.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years

Construction Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Site rehabilitation	138	Clean up and remove any spills and contaminated soil in the appropriate manner.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	139	Ensure that affected areas are rehabilitated following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	140	Rehabilitate areas adjacent to the site (if disturbance is unavoidable) to at least the same condition as was present prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	141	Use harvested topsoil for rehabilitation and landscaping following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	142	Rehabilitate project areas with locally indigenous species, including those removed from the site prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	143	Plant suitable indigenous sedge and reed vegetation on as many settling ponds as practically possible in consultation with an avifaunal specialist and botanist.	• Contractor(s)	• Once-off prior to commencement of operation phases	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	144	Rehabilitate any disturbed areas as soon as construction in the area is complete.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years
Site rehabilitation	145	Appoint a specialist contractor to remove alien and weed species in areas disturbed as a result of construction activities to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998).	• The Applicant	• After Construction	• Annual compliance audits	• Ongoing absence of alien vegetation
Monitoring	146	Appoint a qualified person to monitor rehabilitation success.	• The Applicant	• Once rehabilitation has been completed in the first section	• Contract documentation	• Appointment

Construction Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Monitoring	147	Monitor rehabilitation success every three months in the first year, and every six months thereafter until acceptable species densities and cover are achieved. Monitor by means of 3 m x 3 m fixed plots in which species presence and cover is assessed, as well as fixed point photography.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success
Monitoring	148	Monitor erosion of rehabilitated areas every three months in the first year, and every six months thereafter. Monitor by means of a visual assessment.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success

Table 5-5: Environmental management and mitigation measures that must be implemented during the Construction Phase of the cemetery.

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
General	1	All contractors must have an approved Environmental Management Plan in place that ensures that environmental impacts are minimised as far as practicable possible.	• Applicant • Contractor(s)	• Prior to construction activities	• ECO Audits	• Visual inspection
Initial appointments and preparations	2	Appoint an ECO to oversee construction activities.	• Applicant	• Before construction commences • Once the final construction footprint has been pegged	• Review appointment documentation	• Appointment documents
	3	Appoint a suitably qualified botanist/specialist to complete the Search & Rescue operation for protected species, as per the CAMP (Ekotrust, 2022), before any construction activities commence.				

[4] Unless otherwise indicated, monitoring will be undertaken by the ECO, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Clearing	4	Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once)	• Contractor(s)	• Start of construction	• Visual inspection by CR and ECO	• Monitor extent of clearing
Clearing	5	Limit the footprint area of the construction activity to what is absolutely essential.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Clearing	6	Ensure that no vegetation is removed or disturbed outside the delineated construction site boundary.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Clearing		Vegetation trimming or clearing, and construction related activities, should be kept to periods outside of large rainfall events	• Contractor(s)	• Throughout construction	• Visual inspection •	• Record of work stoppages due to weather
Clearing and earthworks	7	Areas to be cleared of vegetation or topsoil shall be cleared only when required, and shall be surfaced or revegetated immediately on completion of the construction activity in that area	• Contractor	• Start of construction	• Visual inspection	• Size of disturbed areas
Clearing and stockpiles	8	When necessary, appropriate dust control measures (such as wetting of soil and covering of stockpiles) shall be implemented	• Contractor(s)	• Throughout construction	• ECO audits	• No visible dust plumes, especially during string winds

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Complaints register / grievance mechanism	9	Maintain and disclose a complaint register. The register must record: • Complainant name and contact details; • Date complaint was lodged; • Person who recorded the complaint; • Nature of the complaint; • Actions taken to investigate the complaint and outcome of the investigation; • Action taken to remedy the situation; and • Date on which feedback was provided to complainant.	• Contractor(s)	• Duration of construction activities	• Monthly ECO Audits	• Register on site • Complaints followed up and closed out
Construction layout	10	Access roads should be kept to a minimum and their length and width should be minimised to reduce the surface area from which dust can be generated	• Contractor	• Start of construction	• Visual inspection	• Visibility of dust coming off construction site • Number of registered complaints
Demarcation of working area	11	Demarcate construction site boundaries upon establishment. Control security and access to the site. Fence off site boundaries to the satisfaction of the ECO and ensure that plant, labour, and materials remain within site boundaries.	• Contractor(s)	• Start of construction	•	•
Demarcation of working area	12	No-Go areas (SCC buffers) must be clearly demarcated/ clearly marked (i.e. with danger tape) before any construction activities commence on site and appropriate measures implemented to ensure compliance	• Contractor(s)	• Start of construction	• Visual inspection by CR and ECO	• No disturbance to no-go areas
Dust management	13	Avoid clearing of vegetation until absolutely necessary (i.e. just before earthworks).	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Size of disturbed areas

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Dust management	14	Regularly evaluate the effectiveness of all dust management measures. Amend how or which measures are used if necessary.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of registered complaints
Dust management	15	Stabilise exposed surfaces as soon as is practically possible.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints
Dust management	16	Avoid excavation and handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible
Dust management	17	Limit construction vehicle speeds to 40 km/hr on gravel roads.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of registered complaints
Dust management	18	Limit the number of vehicles allowed on-site and restrict the movement of these vehicles over unsurfaced or unvegetated areas once they are on site to reduce dust problems.	• Contractor(s)	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Number of days that dust plumes are visible • Number of registered complaints

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Environmental awareness training	19	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of construction waste and activities on the environment; • Suitable disposal of construction waste and litter; • Specific flora and fauna SCC on site and correct procedure; • Consequences of plant poaching; • Key measures in the EMPr relevant to worker's activities; • How incidents and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names	• Contractor(s)	• Before workers start working on-site • Before new activities are undertaken	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed environmental training • Compliance of workers with EMPr
Fire management	20	Ensure that no fires are permitted on or adjacent to site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	21	Smoking is not to be permitted on site except in designated areas	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Visual evidence
Fire management	22	Ensure that sufficient fire-fighting equipment is available on site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Certified extinguishers in appropriate locations.
Fire management	23	Any fire incidents or accidents must be recorded, and a record thereof must be kept on site	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	24	Equip all fuel stores and waste storage areas with fire extinguishers.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Fire management	25	Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Training records

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Fire management	26	Suitably maintain firefighting equipment.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Hazardous materials	27	Design and construct hazardous material storage facilities, including fuel storage, with suitable impermeable materials and a minimum bund containment capacity equal to 110% of the largest container.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	28	Locate hazardous material storage facilities, especially fuel storage, outside of watercourse buffers	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	29	Ensure that contaminants are not placed directly on the ground.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification
Hazardous materials	30	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of spills of hazardous materials, including waste materials; • Evidence of contamination and leaks.
Hazardous materials	31	Avoid unnecessary use and transport of hazardous substances.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of spills of hazardous materials, including waste materials; • Evidence of contamination and leaks.
Hazardous materials	32	Keep Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Availability of MSDSs

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Hazardous substance handling	33	The proper storage and handling of hazardous substances (hydrocarbons and chemicals) needs to be administered to prevent leaks and spills. Drip trays must be used during pouring of liquids and secondary containment must be in place during storage	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Use of drip trays • Secondary containment for stored hazardous materials
Hazardous substance handling	34	All static machinery and plant are to be placed on drip trays at all times (i.e. whilst being used and when being stored) to contain any spillages that may occur	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Use of drip trays
Hazardous substance handling	35	Spillages should be cleaned up immediately and any contaminated soil from the construction site must be removed and disposed of at a permitted waste disposal facility	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records
Hazardous substance handling	36	Sufficient spill kits must be made available in the event of a spill it must be cleaned up immediately and disposed of appropriately	• Contractor(s)	• Throughout construction	• Environmental Compliance report • ECO audits	• Incident records • Number of spill kits available
Heritage resources	37	A 30 m buffer must be included around the existing family cemetery.	• Contractor(s)	• Prior to vegetation clearing and earthworks commencing	• Visual inspection	• Audit Reports • Site inspection reports
Heritage resources	38	If any concentrations of heritage material / fossils are exposed during construction, all work in that area must cease and it be reported immediately to a relevant authority so that the required investigations can be undertaken. This could entail Phase 2 mitigation to be determined by the Albany Museum).	• Contractor(s) • Archaeologist	• Throughout construction	• Visual inspection	• Sampling or destruction permits
Heritage resources	39	The ECO and construction manager should be aware of any fossils that may be present, or any fossils that may be uncovered during excavation into the underlying strata;	• Contractor(s)	• Throughout construction	• Annual compliance audit	• Inclusion of fossils in Environmental Awareness Programme

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Heritage resources	40	Any exposures encountered during the excavation must be inspected for fossil remains and if any are present a qualified palaeontologist should immediately be notified. The remains of trace fossils, plants, and vertebrates are all of the palaeontological interest and must be recorded and sampled by the palaeontologist at the developer's expense	• Contractor(s) • Palaeontologist	• In the event that artefacts are found.	• Annual compliance audit	• Report to palaeontologist • Palaeontologist Report
Heritage resources	41	A Chance Find Protocol for all heritage resources should be drafted and implemented for the development	• Contractor(s) • Heritage Specialist	• In the event that artefacts are found.	• Annual compliance audit	• Report to archaeologist • Archaeologist Report
Increased traffic	42	Provide suitable traffic accommodation measures as part of construction contract to inform other road users of presence of construction related traffic. Measures to be provided subject to approval by the Engineer	• Contractor(s)	• Throughout construction	• H&S Audits	• Audit Reports
Laydown areas	43	Laydown areas should be restricted to areas either already impacted or which is proposed to be impacted by the development	• Contractor(s)	• Throughout construction	• Visual inspection	• Laydown boundaries demarcated
Laydown areas	44	No laydown areas to be within watercourses or buffer zones	• Contractor(s)	• Throughout construction	• Visual inspection	• Laydown boundaries demarcated • Watercourse buffer area outside footprints demarcated
Invasive species management	45	All invasive alien species occurring within disturbed areas must be removed and disposed of as waste. All disturbed areas must be regularly monitored for the emergence of alien invasive species	• Contractor(s)	• Throughout construction	• Visual inspection • IAS monitoring plan • Environmental compliance report	• Number of identified IAS • Area of cleared IAPs
Noise management	46	Maintain all generators, vehicles, and other equipment in good working order to minimise exhaust fumes and excess noise.	• All contractors operating machinery	• Throughout construction	• Random noise measurements	• Results of random noise measurements • Absence of noise complaints

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Noise management	47	No construction piling should occur at night where possible. Piling should only occur during the day to take advantage of unstable atmospheric conditions (which lessen the effects of project related noise).	• Contractor(s)	• Throughout construction	• ECO audits	• Absence of noise complaints
Noise management	48	Construction staff should receive "noise sensitivity" training such as switching off vehicles when not in use, location of Noise sensitive areas, etc.	• Contractor(s)	• Start of construction • Throughout construction	• ECO audits	• Training records
Noise management	49	An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase	• Applicant	• Start of construction • Throughout construction	• Noise survey	• Survey report
Protection of animals	50	No hunting, poaching or otherwise harming of wildlife on and around the site	• Contractor(s)	• Throughout construction	• ECO audits	• Reported incidents, complaints, or other evidence
Protection of animals	51	Environmental awareness programme to include protection of all fauna on site.	• Contractor(s)	• Throughout construction	• ECO audits	• Training records
Protection of animals	52	Do not harm, catch or kill animals by any means, including poisoning, trapping, shooting or setting of snares.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	53	Provide contact details for an animal handler if any dangerous animals are encountered on the construction site	• Contractor(s)	• Throughout construction	• Photographic evidence	• Details of animal handle displayed on walls at site office • Number of incidents of animals removed

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Protection of animals	54	Safely remove and relocate any fauna that may be physically harmed by construction activities.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	55	Backfill trenches as soon as possible. Inspect open trenches daily for animals which may have fallen or become trapped	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals (avifauna)	56	Should additional SCC be found breeding within the disturbance footprint prior to or during construction all works within 500 m of the breeding site must be halted and an avifaunal specialist must be contacted for further instruction. Any resulting recommendation by the avifaunal specialist to protect the breeding SCC must be implemented;	• Contractor(s) • Avifaunal specialist	• Before construction commences • Once the final construction footprint has been pegged	• Visual inspection by CR and ECO • Appointment of avifaunal specialist	• Appointment documents • Inspection report
Protection of animals (avifauna)	57	Breeding sites of SCC are to be clearly demarcated with construction tape as per the instruction of the avifaunal specialist;	• Contractor(s) • Avifaunal specialist	• Before construction commences • Once the final construction footprint has been pegged	• Visual inspection by CR and ECO	• Number of breeding sites demarcated
Protection of animals (avifauna)	58	All fencing must be of a single-fence design to avoid avian species getting trapped between double-fencing, and the Birdlife SA Guideline for Birds & Fences must be complied with.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Compliance of specification

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Protection of animals (avifauna)	59	All water reservoirs must be covered with netting or mesh to avoid birds drowning. Any other open water must have areas where birds can exit safely to prevent drownings.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Number of incidents of dead birds found around reservoirs and other open water
Protection of plants	60	Fence off sensitive habitats containing species threatened by poaching	• Contractor (s)	• Throughout construction	• Visual inspection	• Number of fenced off areas
Protection of plants	61	Monitor access points and routes of transportation for vehicles used in poaching	• Applicant	• Throughout construction	• Visual inspection	• Evidence of camera monitoring
Protection of plants	62	Monitor SCC populations threatened with poaching	• Applicant	• Throughout construction	• Visual inspection • SCC report	• Population counts
Protection of plants	63	Include the importance of SCC, the threat and penalties of poaching within the environmental awareness programme	• Contractor (s)	• Throughout construction	• Survey of Environmental Awareness Programme	• Content of Environmental Awareness Programme
Record keeping	64	Maintain a register of complaints, e.g. for monitoring levels of nuisance experienced by neighbours. Respond to complaints by increasing the frequency and/or intensity management measures, e.g. dust suppression	• Contractor(s)	• Throughout construction	• ECO audits	• Register
Safety and security	65	Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.) are established prior to commencing construction.	• Contractor(s)	• Throughout construction	• Approval by CR and ECO.	• Compliance with specification.
Safety and security	66	Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification.
Safety and security	67	Fence with cemetery using appropriate fencing	• Contractor(s)	• Pre-construction	• ECO Audits	• Controlled access
Safety and security	68	Provide suitable emergency and safety signage on site, and demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc.).	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Signage

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Safety and security	69	Advise the ECO of any emergencies on site, together with a record of action taken	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Incidents register
Site Camp management	70	Provide appropriate sanitation facilities for the duration of the proposed construction activities and remove all waste to an appropriate facility.	• Contractor(s)	• Throughout construction	•	•
Site Camp management	71	Do not leave any food out in the open to avoid attracting animals.	• Contractor(s)	• Throughout construction	•	•
Stockpiles	72	Dust control measures such as wetting and covering of stockpiles to be implemented when necessary	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of dust generation
Stormwater / run-off management	73	Ensure suitable control of run-off during the construction phase to prevent erosion of topsoil on stockpiles and adjacent land and undeveloped portions of the site	• Contractor(s)	• Throughout Construction	• Visual inspection of downstream areas and topsoil stockpiles	• No erosion
Stormwater / run-off management	74	Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and other contaminated wastewater and fuels into any water sources and the stormwater system.	• Contractor(s)	• When cleaning existing plant and removing old equipment	• Monitor activity against method statement	• Implementation of preventative actions • Visibility of water pollution
Stormwater / run-off management	75	No vehicles, construction materials or any other machinery may be stored on site.	• Contractor(s)	• Throughout construction	• Visual inspection	• Incidents of stormwater contamination
Surface water management		Movement of vehicle and plant movement must only be allowed in designated areas which has been identified for construction and are required to remain within the development footprint where existing roads are not present. Diversion of flow must be made for water to either flow through a culvert or similar structure to mimic the natural direction of flow;	• Contractor(s)	• Throughout construction	• Visual inspection during ECO audits	• Visible impacts on wastercourses
Topsoil storage	76	Designate and demarcate areas to be used for topsoil stockpiling within disturbed areas or the development footprint.	• Contractor(s)	• Before construction commences	• Visual inspection •	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Topsoil storage	77	Stockpile topsoil prior to the commencement of construction activities (stockpile no higher than 1.5 m) and conserve topsoil for landscaping and rehabilitation	• Contractor(s)	• Before construction commences	• Visual inspection	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Topsoil storage	78	Locate topsoil stockpiles in an area protected from the wind and agreed with the ECO.	• Contractor(s)	• Before construction commences	• Visual inspection	• Incidence of erosion; and • Incidents of incorrect storage of topsoil.
Transportation and refuelling	79	Leakages must be repaired promptly and drip trays, with spill socks, placed underneath plant or vehicles until such leakages have been repaired	• Contractor(s)	• Throughout construction	• Visual inspection	• Maintenance records
Transportation and refuelling	80	Machinery must be re-fuelled and serviced in a designated area with an impermeable surface (concrete is not impermeable and requires a sealant), with runoff contained and directed into an oil separator. It is expected that no such areas would be established at the construction site, which then means that vehicles and machinery are not to be serviced or refuelled on site.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Transportation and refuelling	81	Contractor must ensure all construction plant and vehicles are licensed and maintained in a good working condition in order to minimise potential soil pollution.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Transportation and refuelling	82	Use appropriately sized drip trays for all refuelling and/or repairs done on machinery – ensure these are strategically placed to capture any spillage of fuel, oil, etc.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Vehicle maintenance	83	No plant, vehicles or other equipment may be washed on the construction site	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Waste Management	84	Implement effective waste management	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of litter in and around the site

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Waste Management	85	Develop and implement a waste management plan to address classification of waste streams, segregation at source, control of waste on site before disposal, removal of wastes from site, and record keeping.	• Contractor(s) • ECO	• Prior to construction commencing	• Approval of the waste management plan(s) by the ECO	• Approved waste management plan(s)
Waste Management	86	Identify and separate materials that can be reused or recycled to minimise waste, e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling.	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	87	All waste should be transported to the waste transfer station located in Aggeneys on a daily basis	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	88	No disposal of wastes, other than at registered landfill sites	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste management	89	Ensure that on site sanitation facilities are adequately managed and effluent is disposed of correctly	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	90	Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licensed landfill site, and proof of disposal retained for auditing purposes)	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	91	Ensure that construction materials (e.g. bags of cement) are suitably stored and protected to avoid wastage	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports •
Waste Management	92	Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or on existing roads and/ or access tracks between demarcated areas.	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of driving outside demarcated areas (ECO audit reports)

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Waste Management	93	No clearing of vegetation, abstraction, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of disturbance demarcated areas (ECO audit reports)
Waste management	94	Aim to minimise waste through reducing and re-using (packaging) material.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas • Visual inspection of construction areas (litter) • Check waste disposal slips	• Availability of rubbish bins and skips for different recyclable wastes
Waste management	95	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips
Waste management	96	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.	• Contractor(s)	• Throughout construction	• Visual inspection of construction areas (litter)	• Absence of litter
Waste management	97	Dispose of waste appropriately and obtain certificates.	• Contractor(s)	• Throughout construction	• Check waste disposal slips	• Waste disposal certificates
Waste management	98	Do not allow any burning or burying of waste on site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Availability of rubbish bins and skips • Waste storage capacity
Water Management	99	No polluted water from washing of mechanical plant or equipment to be discharged to the ground. This must be collected in a tank for evaporation and disposal	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records
Waste management	100	Ensure that no discarded materials are buried on site or on any other land not designated for this purpose.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Site rehabilitation	42	A rehabilitation plan must be compiled in line with the Conservation Area Management Plan (2022) and submitted to the ECO for approval. This revegetation plan must be implemented.	• Contractor • ECO	• Pre-construction	• ECO audit report	• Presence of rehabilitation plan
Site rehabilitation	101	Ensure that slopes are immediately stabilised to prevent erosion, using geofabric or other appropriate erosion stabilisation techniques.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	102	Remove all construction equipment, vehicles, equipment, waste and surplus materials, including site offices, temporary fencing and other facilities, from the site.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	103	Clean up and remove any spills and contaminated soil in the appropriate manner.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	104	Ensure that affected areas are rehabilitated following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	105	Rehabilitate areas adjacent to the site (if disturbance is unavoidable) to at least the same condition as was present prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	106	Use harvested topsoil for rehabilitation and landscaping following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	107	Rehabilitate project areas with locally indigenous species, including those removed from the site prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	108	Rehabilitate any disturbed areas as soon as construction in the area is complete.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years

Construction Phase Measures: Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Site rehabilitation	109	Appoint a specialist contractor to remove alien and weed species in areas disturbed as a result of construction activities to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998).	• The Applicant	• After Construction	• Annual compliance audits	• Ongoing absence of alien vegetation
Monitoring	110	Appoint a qualified person to monitor rehabilitation success.	• The Applicant	• Once rehabilitation has been completed in the first section	• Contract documentation	• Appointment
Monitoring	111	Monitor rehabilitation success every three months in the first year, and every six months thereafter until acceptable species densities and cover are achieved. Monitor by means of 3 m x 3 m fixed plots in which species presence and cover is assessed, as well as fixed point photography.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success
Monitoring	112	Monitor erosion of rehabilitated areas every three months in the first year, and every six months thereafter until acceptable species densities and cover are achieved. Monitor by means of a visual assessment.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success

Table 5-6: Environmental management and mitigation measures that must be implemented during the Construction Phase of the shooting range.

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
General	1	All contractors must have an approved Environmental Management Plan in place that ensures that environmental impacts are minimised as far as practicable possible.	• Applicant • Contractor(s)	• Prior to construction activities	• ECO Audits	• Visual inspection
Initial appointments and preparations	2	Appoint an ECO to oversee construction activities.	• Applicant	• Before construction commences • Once the final construction footprint has been pegged	• Review appointment documentation	• Appointment documents
	3	Appoint a suitably qualified botanist/specialist to complete the Search & Rescue operation for protected tree species, particularly *Vachellia erioloba* and *Aloidendron dichotomum,* as per the CAMP (Ekotrust, 2022), before any construction activities commence.				
	4	Avifaunal specialist to undertake an avifaunal walkthrough of the development footprint to identify any breeding sites. Identified breeding sites must be clearly indicated on a map of the site and all staff must be made aware of these areas. Any additional mitigation measures recommended by the avifaunal specialist are implemented.	• Avifaunal specialist • Contractor(s)	• Six weeks before construction commences • Once -off	• Review avifaunal report • Environmental Management Plan Content	• Avifaunal report kept on file • Breediing sites map displayed on site • Documentary/photographic evidence of complying with any additional mitigation measures recommended by the specialist in the walkthrough report are provided.

[5] Unless otherwise indicated, monitoring will be undertaken by the ECO, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Complaints register / grievance mechanism	5	Maintain and disclose a complaint register. The register must record: • Complainant name and contact details; • Date complaint was lodged; • Person who recorded the complaint; • Nature of the complaint; • Actions taken to investigate the complaint and outcome of the investigation; • Action taken to remedy the situation; and • Date on which feedback was provided to complainant.	• Contractor(s)	• Duration of construction activities	• Monthly ECO Audits	• Register on site • Complaints followed up and closed out
Concrete / cement work	6	Use Ready-Mix concrete rather than batching where possible.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.
Concrete / cement work	7	Ensure that no cement truck delivery chutes are cleaned on site. Cleaning operations are to take place at a suitable washing facility is to be developed in the vicinity of Aggeneys in consultation with the ECO.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Inspection of incident records
Concrete / cement work	8	Batch cement in a bunded area within the boundaries of the development footprint only (where unavoidable).	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Concrete / cement work	9	Ensure that cement is mixed on mortar boards and not directly on the ground (where possible).	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Inspection of incident records
Concrete / cement work	10	Place cement bags in bins and dispose of bags as waste to a licensed waste disposal facility.	• Contractor(s)	• Throughout construction	• Visual inspection and approval by CR and ECO.	• Number of incidents of batching outside works footprint; • Contamination of water and soil; and • Visible litter / waste on site.
Construction layout	11	Access roads should be kept to a minimum and their length and width should be minimised to reduce the surface area from which dust can be generated	• Contractor	• Start of construction	• Visual inspection	• Visibility of dust coming off construction site • Number of registered complaints
Demarcation of working area	12	Demarcate construction site boundaries upon establishment. Control security and access to the site. Fence off site boundaries to the satisfaction of the ECO and ensure that plant, labour, and materials remain within site boundaries.	• Contractor(s)	• Start of construction	•	•

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Environmental awareness training	13	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of construction waste and activities on the environment; • Suitable disposal of construction waste and litter; • Specific flora and fauna SCC on site and correct procedure; • Consequences of plant poaching; • Key measures in the EMPr relevant to worker's activities; • How incidents and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names	• Contractor(s)	• Before workers start working on-site • Before new activities are undertaken	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed environmental training • Compliance of workers with EMPr
Fire management	14	Ensure that no fires are permitted on or adjacent to site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	15	Smoking is not to be permitted on site except in designated areas	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Visual evidence
Fire management	16	Ensure that sufficient fire-fighting equipment is available on site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Certified extinguishers in appropriate locations.
Fire management	17	Any fire incidents or accidents must be recorded, and a record thereof must be kept on site	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Number of fire incidents
Fire management	18	Equip all fuel stores and waste storage areas with fire extinguishers.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Fire management	19	Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits.	• Training records

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Fire management	20	Suitably maintain firefighting equipment.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Certified extinguishers in appropriate locations.
Invasive species management	21	All invasive alien species occurring within disturbed areas must be removed and disposed of as waste. All disturbed areas must be regularly monitored for the emergence of alien invasive species	• Contractor(s)	• Throughout construction	• Visual inspection • IAS monitoring plan • Environmental compliance report	• Number of identified IAS • Area of cleared IAPs
Noise management	22	Maintain all generators, vehicles, and other equipment in good working order to minimise exhaust fumes and excess noise.	• All contractors operating machinery	• Throughout construction	• Random noise measurements	• Results of random noise measurements • Absence of noise complaints
Noise management	23	No construction piling should occur at night where possible. Piling should only occur during the day to take advantage of unstable atmospheric conditions (which lessen the effects of project related noise).	• Contractor(s)	• Throughout construction	• ECO audits	• Absence of noise complaints
Noise management	24	Construction staff should receive “noise sensitivity” training such as switching off vehicles when not in use, location of Noise sensitive areas, etc.	• Contractor(s)	• Start of construction • Throughout construction	• ECO audits	• Training records
Noise management	25	An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase	• Applicant	• Start of construction • Throughout construction	• Noise survey	• Survey report
Protection of animals	26	No hunting, poaching or otherwise harming of wildlife on and around the site	• Contractor(s)	• Throughout construction	• ECO audits	• Reported incidents, complaints, or other evidence
Protection of animals	27	Environmental awareness programme to include protection of all fauna on site.	• Contractor(s)	• Throughout construction	• ECO audits	• Training records

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Protection of animals	28	Do not harm, catch or kill animals by any means, including poisoning, trapping, shooting or setting of snares.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	29	Provide contact details for an animal handler if any dangerous animals are encountered on the construction site	• Contractor(s)	• Throughout construction	• Photographic evidence	• Details of animal handle displayed on walls at site office • Number of incidents of animals removed
Protection of animals	30	Safely remove and relocate any fauna that may be physically harmed by construction activities.	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches
Protection of animals	31	Backfill trenches as soon as possible. Inspect open trenches daily for animals which may have fallen or become trapped	• Contractor(s)	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Area cleared relative to development footprint • Area disturbed outside of construction site boundary • Number of incidents of animals found in trenches

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Protection of animals (avifauna)	32	Should additional SCC be found breeding within the disturbance footprint prior to or during construction all works within 500 m of the breeding site must be halted and an avifaunal specialist must be contacted for further instruction. Any resulting recommendation by the avifaunal specialist to protect the breeding SCC must be implemented;	• Contractor(s) • Avifaunal specialist	• Before construction commences • Once the final construction footprint has been pegged	• Visual inspection by CR and ECO • Appointment of avifaunal specialist	• Appointment documents • Inspection report
Protection of animals (avifauna)	33	Breeding sites of SCC are to be clearly demarcated with construction tape as per the instruction of the avifaunal specialist;	• Contractor(s) • Avifaunal specialist	• Before construction commences • Once the final construction footprint has been pegged	• Visual inspection by CR and ECO	• Number of breeding sites demarcated
Protection of animals (avifauna)	34	All fencing must be of a single-fence design to avoid avian species getting trapped between double-fencing, and the Birdlife SA Guideline for Birds & Fences must be complied with.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Compliance of specification
Protection of animals (avifauna)	35	All water reservoirs must be covered with netting or mesh to avoid birds drowning. Any other open water must have areas where birds can exit safely to prevent drownings.	• Contractor(s) • SR	• Throughout construction	• Visual inspection	• Number of incidents of dead birds found around reservoirs and other open water
Record keeping	36	Maintain a register of complaints, e.g. for monitoring levels of nuisance experienced by neighbours. Respond to complaints by increasing the frequency and/or intensity management measures, e.g. dust suppression	• Contractor(s)	• Throughout construction	• ECO audits	• Register
Safety and security	37	Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.) are established prior to commencing construction.	• Contractor(s)	• Throughout construction	• Approval by CR and ECO.	• Compliance with specification.
Safety and security	38	Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site.	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Compliance with specification.

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Safety and security	39	Provide suitable emergency and safety signage on site, and demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc.).	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Signage
Safety and security	40	Advise the ECO of any emergencies on site, together with a record of action taken	• Contractor(s)	• Throughout construction	• Monthly ECO Audits	• Incidents register
Site Camp management	41	Provide appropriate sanitation facilities for the duration of the proposed construction activities and remove all waste to an appropriate facility.	• Contractor(s)	• Throughout construction	•	•
Site Camp management	42	Do not leave any food out in the open to avoid attracting animals.	• Contractor(s)	• Throughout construction	•	•
Stockpiles	43	Dust control measures such as wetting and covering of stockpiles to be implemented when necessary	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of dust generation
Transportation and refuelling	44	Leakages must be repaired promptly and drip trays, with spill socks, placed underneath plant or vehicles until such leakages have been repaired	• Contractor(s)	• Throughout construction	• Visual inspection	• Maintenance records
Transportation and refuelling	45	Machinery must be re-fuelled and serviced in a designated area with an impermeable surface (concrete is not impermeable and requires a sealant), with runoff contained and directed into an oil separator. It is expected that no such areas would be established at the construction site, which then means that vehicles and machinery are not to be serviced or refuelled on site.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Transportation and refuelling	46	Contractor must ensure all construction plant and vehicles are licensed and maintained in a good working condition in order to minimise potential soil pollution.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Transportation and refuelling	47	Use appropriately sized drip trays for all refuelling and/or repairs done on machinery – ensure these are strategically placed to capture any spillage of fuel, oil, etc.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Vehicle maintenance	48	No plant, vehicles or other equipment may be washed on the construction site	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Visual inspection
Waste Management	49	Implement effective waste management	• Contractor(s)	• Throughout construction	• Visual inspection by ECO	• Absence of litter in and around the site

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Waste Management	50	Develop and implement a waste management plan to address classification of waste streams, segregation at source, control of waste on site before disposal, removal of wastes from site, and record keeping.	• Contractor(s) • ECO	• Prior to construction commencing	• Approval of the waste management plan(s) by the ECO	• Approved waste management plan(s)
Waste Management	51	Identify and separate materials that can be reused or recycled to minimise waste, e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling.	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	52	All general waste must be transported to the Aggeneys transfer station on a daily basis.	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	53	No disposal of wastes, other than at registered landfill sites	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste management	54	Ensure that on site sanitation facilities are adequately managed and effluent is disposed of correctly	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	55	Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licensed landfill site, and proof of disposal retained for auditing purposes)	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports • Waste disposal records
Waste Management	56	Ensure that construction materials (e.g. bags of cement) are suitably stored and protected to avoid wastage	• Contractor(s)	• Throughout construction	• Visual inspection	• ECO audit reports •
Waste Management	57	Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or on existing roads and/ or access tracks between demarcated areas.	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of driving outside demarcated areas (ECO audit reports)

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Waste Management	58	No clearing of vegetation, abstraction, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO	• Contractor(s)	• Throughout construction	• Visual inspection	• No evidence of disturbance demarcated areas (ECO audit reports)
Waste management	59	Aim to minimise waste through reducing and re-using (packaging) material.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas • Visual inspection of construction areas (litter) • Check waste disposal slips	• Availability of rubbish bins and skips for different recyclable wastes
Waste management	60	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips
Waste management	61	Collect all waste in bins and/or skips at the construction site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Presence of litter • Availability of rubbish bins and skips
Waste management	62	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.	• Contractor(s)	• Throughout construction	• Visual inspection of construction areas (litter)	• Absence of litter
Waste management	63	Dispose of waste appropriately and obtain certificates.	• Contractor(s)	• Throughout construction	• Check waste disposal slips	• Waste disposal certificates
Waste management	64	Do not allow any burning or burying of waste on site.	• Contractor(s)	• Throughout construction	• Visual inspection of waste collection and disposal areas	• Availability of rubbish bins and skips • Waste storage capacity
Water Management	65	No polluted water from washing of mechanical plant or equipment to be discharged to the ground. This must be collected in a tank for evaporation and disposal	• Contractor(s)	• Throughout construction	• ECO audits	• Incident records • Waste disposal records

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Waste management	66	Ensure that no discarded materials are buried on site or on any other land not designated for this purpose.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years
Site rehabilitation	42	A rehabilitation plan must be compiled in line with the Conservation Area Management Plan (2022) and submitted to the ECO for approval. This revegetation plan must be implemented.	• Contractor • ECO	• Pre-construction	• ECO audit report	• Presence of rehabilitation plan
Site rehabilitation	67	Ensure that slopes are immediately stabilised to prevent erosion, using geofabric or other appropriate erosion stabilisation techniques.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	68	Remove all construction equipment, vehicles, equipment, waste and surplus materials, including site offices, temporary fencing and other facilities, from the site.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	69	Clean up and remove any spills and contaminated soil in the appropriate manner.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	70	Ensure that affected areas are rehabilitated following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	71	Rehabilitate areas adjacent to the site (if disturbance is unavoidable) to at least the same condition as was present prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	72	Use harvested topsoil for rehabilitation and landscaping following construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	73	Rehabilitate project areas with locally indigenous species, including those removed from the site prior to construction.	• Contractor(s)	• Throughout construction	• Post Construction ECO audit	• Construction sites fully rehabilitated within two years
Site rehabilitation	74	Rehabilitate any disturbed areas as soon as construction in the area is complete.	• Contractor(s)	• Throughout construction	• Monthly ECO audits	• Construction sites fully rehabilitated within two years

Construction Phase Measures: Shooting Range						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Site rehabilitation	75	Appoint a specialist contractor to remove alien and weed species in areas disturbed as a result of construction activities to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998).	• The Applicant	• After Construction	• Annual compliance audits	• Ongoing absence of alien vegetation
Monitoring	76	Appoint a qualified person to monitor rehabilitation success.	• The Applicant	• Once rehabilitation has been completed in the first section	• Contract documentation	• Appointment
Monitoring	77	Monitor rehabilitation success every three months in the first year, and every six months thereafter until acceptable species densities and cover are achieved. Monitor by means of 3 m x 3 m fixed plots in which species presence and cover is assessed, as well as fixed point photography.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success
Monitoring	78	Monitor erosion of rehabilitated areas every three months in the first year, and every six months thereafter until acceptable species densities and cover are achieved. Monitor by means of a visual assessment.	• Contractor(s)	• Once rehabilitation has been completed in the first section	• Updates after each monitoring	• Regular monitoring • Rehabilitation success

6 Measures Applicable to the Operational Phase

6.1 Roles and Responsibilities

The key role players during the operation phase of the project are:

- The Applicant, i.e. The holder of the Environmental Authorisation (Black Mountain Mining (Pty.) Ltd); and
- Personnel, including employees and contractors.

6.1.1 The Applicant

The Applicant has overall responsibility for the operation of the Aggeneys by BMM. In terms of environmental management, the applicant must:

- Ensure that all personnel (employees and employees of contractors) are aware of, and contractually bound to, the provisions of this EMPr by including the relevant environmental management requirements into key performance areas and/or contracts.
- Notify the authorities should problems not be remedied timeously

6.1.2 Personnel, including employees and contractors

Personnel employed by the Applicant, either directly or contractors must:

- Comply with the applicable environmental commitments, procedures, restrictions, and guidance specified in the EMPr;
- Co-operate fully in implementing applicable environmental procedures;
- Ensure that copies of the EMPr are available at its offices and on site;
- Ensure that all its personnel on site, (including any sub-contractors and their staff) are familiar with and understand the requirements of the EMPr, that are relevant to their activities; and
- Ensure that any problems and non-conformances are remedied in a timely manner, to the satisfaction of the Applicant.

Personnel employed directly by the Applicant, Contractors, and their sub-contractors, have a duty to demonstrate respect and care for the environment and may be held liable in their individual capacity for not complying with commitments, procedures, restrictions, and guidance specified in the EMPr.

6.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the operational phase, as well as responsibilities and timelines for the implementation of these measures, and monitoring thereof, are laid out in the following tables:

- Expanded Aggeneys urban area -Table 6-1;
- Landfill - Table 6-2;
- Wastewater Treatment Works -Table 6-3; and
- Cemetery - Table 6-4.

The shooting range is not a listed activity, and due to the nature of the activity, does not require an OEMPr.

Table 6-1: Environmental management and mitigation measures that must be implemented for the operational phase of the expanded Aggeneys urban area .

Operational Phase Measures: Expanded Urban Area of Aggeneys						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Invasive Alien Species Management	1	Implement the management measures relating to the control of IAS included in the CAMP (Ekotrust, 2022).	• The Applicant	• Throughout the operational life	• Annual compliance auditing	• Compliance audits
Employment	2	Recruit local labour as far as feasible to increase the benefits to the local households	• Applicant	• Throughout the operational life	• Annual compliance audit	• Employment records
	3	Utilise local and regional suppliers of materials and services if they have the required skills and capacity	• Applicant	• Throughout the operational life	• Annual compliance audit	• Employment records
Traffic Management	4	Speed limit enforcement must be implemented by BMM	• Applicant	• Throughout the operational life	• Visual inspection	• Visual inspection
	5	All traffic signs and other safety tools must be properly maintained	•	• Throughout the operational life	• Visual inspection	• Traffic statistics

Table 6-2: Environmental management and mitigation measures that must be implemented for the operational phase of the expanded landfill.

Operational Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Access Control	1	Access to the site shall be controlled at all times – no unauthorised access shall be allowed, and no waste collectors or sorters shall be allowed onto the site	• The Applicant	• Throughout the operational life	• Visual inspection by BMM ECO	• Waste delivery documents
	1	Only Company vehicles may deliver general waste to the landfill. All private waste must be delivered to the waste transfer station in Aggeneys.	• The Applicant	• Throughout the operational life	• Visual inspection by BMM ECO	• Waste delivery documents
	1	Access control onto the site will also ensure that no	• The Applicant	• Throughout the operational life	• Visual inspection by BMM ECO	• Waste delivery documents

Operational Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
		hazardous waste[6], or other unsuitable waste, is allowed to be disposed of on the site. All vehicles shall be visually inspected as they enter the site to ensure that no hazardous or unsuitable waste enters the site.				
Windblown litter	2	The site shall be surrounded by a 2m high fence, which will assist in trapping windblown litter so that it does not spread outside the site.	• The Applicant	• ECO audit	• Visual inspection	• State of condition of fence
Windblown litter	3	All waste (with the exception of building rubble, which may be used for cover material) shall be deposited as close as possible to the working face of the landfill cell	• The Applicant	• Throughout the operational life	• Visual inspection	• Compliance with measure
Windblown litter	4	The working face shall preferably be positioned on the leeward side of an earth bund wall, which will provide some protection against the prevailing winds. The bund wall should be 1 m higher than the highest level of waste	• The Applicant	• Throughout the operational life	• Visual inspection	• Compliance with measure
Windblown litter	5	A minimum of 150 mm of cover material shall be applied at the end of each working day to the newly deposited (and compacted) waste	• The Applicant	• Throughout the operational life • Daily	• Visual inspection	• Compliance with measure
Windblown litter	6	All windblown litter that collects along the boundary fence of the site, and any litter that escapes from the site, shall be collected at least weekly, and appropriate measures shall be put in place to prevent the escape of litter	• The Applicant	• Throughout the operational life • Weekly	• Visual inspection	• Compliance with measure
Waste Management	7	No dumping around the site shall be allowed	• The Applicant	• Throughout the operational life • Weekly	• Visual inspection	• Amount of collected waste
Waste compaction	8	Newly deposited waste shall be compacted in the landfill cell on a daily basis	• The Applicant	• Throughout the operational life	• Visual inspection	• Compliance with measure

[6] Note: small quantities of hazardous waste included in normal domestic waste is included in the classification for “general waste”. Large quantities however (e.g. a bakkie load of carcasses or zinc / carbon batteries) would be classified as hazardous waste.

Operational Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
				• Daily		
Waste compaction	9	Cover material shall be applied daily (at a thickness of at least 150mm) to the compacted material, thereby further compacting the waste	• The Applicant	• Throughout the operational life • Daily	• Visual inspection	• Compliance with measure
Pollution of Soil and Stormwater	10	Implementation of a site specific stormwater management plan, to ensure stormwater exiting the site meets the requirements in terms of quality and volume	• The Applicant	• Prior to construction and throughout the operational life	• Building plan approval	• Approved building plans • Compliance audits
	11	Separation of clean and dirty stormwater on site and treatment of dirty stormwater prior to discharge	• The Applicant	• Throughout the operational life	• Annual compliance auditing	• Water monitoring records and infrastructure
Groundwater management and monitoring		Conduct quarterly monitoring of groundwater for leachate water quality indicators	• The Applicant	• Throughout the operational life • Quarterly	• Quarterly groundwater quality monitoring reports	• Water quality results
Groundwater management and monitoring		Compile a database of groundwater monitoring results to determine any trends in quality	• The Applicant	• Throughout the operational life • Quarterly	• Quarterly groundwater quality monitoring reports	• Compliance with measure
Employment	12	Recruit local labour as far as feasible to increase the benefits to the local households	• Applicant	• Throughout the operational life	• Annual compliance audit	• Employment records
	13	Utilise local and regional suppliers of materials and services if they have the required skills and capacity	• Applicant	• Throughout the operational life	• Annual compliance audit	• Employment records
GHG Emissions	14	Report all GHG emissions to DFFE as may be required by the NEM:AQA	• Applicant	• Throughout the operational life	• Annual compliance audit	• Compliance with measure
Rehabilitation (cell)	15	Once a cell has been filled to capacity, it shall be covered with topsoil (from the next newly cleared cell) and the natural vegetation re-established by transplanting from other cleared areas and from the seeds in the topsoil, as well as a suitable indigenous grass seed mix if necessary	• Applicant	• Throughout the operational life	• Annual compliance audit	• Environmental Awareness communication posters
Rehabilitation (cell)	16	Indigenous vegetation shall also be established on the slopes of active cells as soon as possible (to prevent erosion	• Applicant	• Throughout the operational life	• Annual compliance audit	• Environmental Awareness

Operational Phase Measures: Expanded Landfill						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
		of the cover material).				communication posters
Fire management	17	Ensure that an adequate fire break is present around the facility	• Applicant	• Throughout operation	• Annual compliance audit	• Compliance with measure

Table 6-3: Environmental management and mitigation measures that must be implemented for the operational phase of the expanded WWTW

Operational Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Access Control	1	Access to the site shall be controlled at all times.	• The Applicant	• Throughout the operational life	• Visual inspection by BMM ECO	• Waste delivery documents
Complaints register / grievance mechanism	2	Maintain and disclose a complaint register. The register must record: • Complainant name and contact details; • Date complaint was lodged; • Person who recorded the complaint; • Nature of the complaint; • Actions taken to investigate the complaint and outcome of the investigation; • Action taken to remedy the situation; and Date on which feedback was provided to complainant.	• The Applicant	• Throughout the operational life	• Monthly ECO Audits	• Register on site • Complaints followed up and closed out
Stormwater management	3	An internal inspection of the wastewater ponds should be conducted quarterly and findings of inspection recorded. Records of inspections need to be maintained for auditing purposes	• The Applicant	• Throughout the operational life • Quarterly	• Quarterly monitoring report • Records of inspection	• Number of leaks
	1	Should any blockages or leaks be found during the inspection these are to be reported to Facility Manager;	• The Applicant	• Throughout the operational life	• Quarterly monitoring report • Records of inspection	• Number of leaks
	1	Pumps and equipment should be serviced according to the manufacturer's specifications or annually (whichever is the more frequent) to ensure that no failures occur	• The Applicant	• Throughout the operational life	• Annual compliance auditing • Records of inspection	• Number of services
	1	Screening systems should be cleaned on a daily basis and more frequently if required i.e. during high flows/if a blockage is noticed;	• The Applicant	• Throughout the operational life • Daily	• Annual compliance auditing • Records of inspection	• Number of inspections

Operational Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
	1	BMM must apply the regulations set out in the Green Drop program initiated by the Department of Water and Sanitation at all times;	• The Applicant	• Throughout the operational life	• Annual compliance auditing • Records of inspection	• Compliance with measure
	1	Treated effluent is to meet Standards listed in Table 8-1 below and be sampled on a monthly basis during operation/as stipulated in the WULA;	• The Applicant	• Throughout the operational life • Monthly	• Annual compliance auditing • Records of inspection	• Compliance with measure
	1	All infrastructure should be inspected for leaks at least bi-annually. Should any leaks be detected or reported, these must be repaired as soon as possible to prevent potential for pollution of the watercourses downstream.	• The Applicant	• Throughout the operational life	• Annual compliance auditing • Records of inspection	• Compliance with measure
	1	All the WWTW ponds must be inspected for leaks or malfunctions regularly (at least annually). Should any leaks be detected or reported, these must be repaired as soon as possible to prevent pollution of watercourses.	• The Applicant	• Throughout the operational life	• Annual compliance auditing • Records of inspection	• Compliance with measure
	1	Conduct regular water quality monitoring and recording of the discharged or irrigated effluent to ensure that the water quality is within the parameters specified by DWS (at least monthly or as specified by the water use license). Should the water quality not comply with the DWS discharge limits and conditions, the effluent must not be allowed to enter the natural environment and should be recirculated through the WWTW.	• The Applicant	• Throughout the operational life	• Annual compliance auditing • Records of inspection	• Compliance with water quality standards
Sludge Generation	1	Conduct an internal inspection annually to determine if the ponds require cleaning. Records of inspections need to be maintained for auditing purposes;	• The Applicant	• Throughout the operational life • Annual	• Annual compliance auditing • Records of inspection	• Compliance with measure
Sludge Generation	1	A method statement should be in place for desludging of the ponds and this should be reviewed every time desludging occurs and revised if necessary;	• The Applicant	• Throughout the operational life	• Annual compliance auditing • Method statement	• Number of ponds desludged

Operational Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Sludge Generation	1	Desludging activities should take place while still allowing the WWTW to function;	• The Applicant	• Throughout the operational life	• Annual compliance auditing • Method statement	• Number of ponds desludged
Sludge Generation	1	Should any ponds need to be temporarily decommissioned other outstanding maintenance activities must also be conducted during this time.	• The Applicant	• Throughout the operational life	• Annual compliance auditing • Method statement	• Number of ponds desludged
Sludge Generation	1	Effluent will be diverted into the existing ponds which will function both as the anaerobic and primary pond as well as the holding pond for water to be reused while the anaerobic pond cannot be used	• The Applicant	• Throughout the operational life	• Annual compliance auditing • Method statement	• Number of ponds desludged
Sludge Generation	1	Any environmental incidents, such a pond overflow, should be recorded in an Incidents Report/ Register kept on site and should also be reported to the authorities.	• The Applicant	• Throughout the operational life	• Annual compliance auditing • Method statement • Incidents register	• Number of incidents
Faunal Management	1	Plant suitable indigenous sedge and reed vegetation on as many settling ponds as practically possible in consultation with an avifaunal specialist and botanist.	• The Applicant • Botanist/Avifaunal specialist	• Before operation commences • Throughout the operational life	• Annual compliance auditing	• List of plant species planted; and • Area planted
Faunal Management	1	Avifaunal specialist to undertake 1 hour training session with ECO and CR on site with O&M team prior to operational commencement.	• The Applicant • Avifaunal specialist	• Before operation commences • Throughout the operational life	• Annual compliance auditing • Training documents	• Attendance register
Groundwater management and monitoring	1	Conduct quarterly monitoring of groundwater for leachate water quality indicators	• The Applicant	• Throughout the operational life • Quarterly	• Quarterly groundwater quality monitoring reports	• Water quality results
Groundwater management and monitoring	1	Compile a database of groundwater monitoring results to determine any trends in quality	• The Applicant	• Throughout the operational life • Quarterly	• Quarterly groundwater quality monitoring reports	• Compliance with measure

Operational Phase Measures: Expanded WWTW						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
GHG Emissions	2	Report all GHG Emissions to DFFE as may be required by the NEM:AQA.	• Applicant	• Throughout the operational life	• Annual compliance audit	• Compliance with measure

Table 6-4: Environmental management and mitigation measures that must be implemented for the operational phase of the expanded cemetery

Operational Phase Measures: Expanded Cemetery						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[1]**	**Performance Indicators**
Groundwater management and monitoring		The current BMM groundwater monitoring programme should be extended to include the monitoring of potential cemetery contaminants at the nearby production borehole (HC-BH07) on a quarterly basis	• The Applicant	• Throughout the operational life • Quarterly	• Quarterly monitoring report	• Water quality results

7 Measures Applicable to the Decommissioning Phase

It is unlikely that the activities associated with the urban expansion of Aggeneys will be decommissioned. Developments, including the construction of the Namakwa Special Economic Zone (SEZ), are underway to ensure the sustainability post the closure of the nearby mines. The exception to this is the landfill. It has a potential lifespan of 31 years and will require closure. Measures for the decommissioning of the facility are not yet available and will require environmental authorisation under the 2014 EIA regulations (as amended in 2021). The responsibility for decommissioning, and for obtaining the necessary environmental authorisation, will lie with the holder of the EA for the development of the project (Black Mountain Mining (Pty.) Ltd).

8 Monitoring Programme

8.1 Biodiversity and Ecological Monitoring

A Conservation Area Management Plan (CAMP) was recently updated for all land portions owned and managed by Black Mountain Mine ((Ekotrust, 2022). The CAMP integrated the principles underpinning the Performance Standard on Environmental and Social Sustainability, Guidance Note 6 of the International Finance Corporation (IFC) (2019), namely the recognition 'that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development'. The CAMP aims to:

- protect and conserve biodiversity;
- maintain the benefits of ecosystem services; and
- promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

The report provided comprehensive management guidelines based on ecological principles for the conservation and set-aside areas controlled by BMM. Six programmes were identified:

- Soil Management;
- Vegetation Management (including invasive alien species (IAS));
- Water Management;
- Wildlife Management;
- Infrastructure Management; and
- Connectivity.

The CAMP addresses the monitoring requirements of the Terrestrial Biodiversity and Aquatic Impact Assessment report and must be implemented as part of the EMPr.

8.2 Surface and Groundwater Monitoring

The monitoring requirements presented in this section are subject to requirements that are expected to be specified in the Water Use Licences for the landfill and WWTW. The conditions in the Water Use Licences will take precedence over those specified here.

Baseline groundwater monitoring is to be carried out by the BMM at the newly drilled and existing monitoring boreholes. Once the ponds are operational, the up-gradient borehole (WWTW and Landfill) will serve as background points; with other boreholes serving as the down-gradient monitoring point.

Water samples from the boreholes and the outflow pipe must be analysed according to the parameters listed in Table 8-1 below. The pH, EC/TDS, and/or dissolved oxygen can be tested on site by means of instruments and devices certified by the South African Bureau of Standards (SABS). The remaining parameters must be analysed by a SABS certified laboratory.

Monitoring results will be submitted to the DWS once they become available.

Table 8-1: Effluent monitoring parameters and discharge standards (adapted from the General Authorisation for discharge of wastewater to a water course, GN R. 665 of 6 September 2013)

SUBSTANCE/PARAMETER	GENERAL LIMIT	SPECIAL LIMIT
Faecal Coliforms (per 100 ml)	1000	75
Chemical Oxygen Demand (mg/l)	75 (i)	30(i)
pH	5,5-9,5	5,5-7,5
Ammonia (ionised and un-ionised) as Nitrogen (mg/l)	6	2
Nitrate/Nitrite as Nitrogen (mg/l)	15	1,5
Chlorine as Free Chlorine (mg/l)	0,25	0
Suspended Solids (mg/l)	25	10
Electrical Conductivity (mS/m)	70 mS/m above intake to a maximum of 150 mS/m	50 mS/m above background re-ceiving water, to a maximum of 100 mS/m
Ortho-Phosphate as phosphorous (mg/l)	10	1 (median) and 2,5 (maximum)
Fluoride (mg/l)	1	1
Soap, oil or grease (mg/l)	2,5	0
Dissolved Arsenic (mg/l)	0,02	0,01
Dissolved Cadmium (mg/l)	0,005	0,001
Dissolved Chromium (VI) (mg/l)	0,05	0,02
Dissolved Copper (mg/l)	0,01	0,002
Dissolved Cyanide (mg/l)	0,02	0,01
Dissolved Iron (mg/l)	0,3	0,3
Dissolved Lead (mg/l)	0,01	0,006
Dissolved Manganese (mg/l)	0,1	0,1
Mercury and its compounds (mg/l)	0,005	0,001
Dissolved Selenium (mg/l)	0,02	0,02
Dissolved Zinc (mg/l)	0,1	0,04
Boron (mg/l)	1	0,5

9 Monitoring, Reporting and Auditing

BMM is responsible to appoint an appropriate professional to conduct annual audits to determine whether all conditions of all permissions, CEMPr and OEMPr are being complied with.

After each audit occasion an official report must be compiled by the relevant auditor to report on the findings of the audits, which must be made available to DAERL within 30 days from the date on which such audit was finalised. The audit report must:

i) State whether conditions of this report and environmental permits are being adhered to;

ii) Include an interpretation of available data and test results regarding the operation of the site and its impacts on the environment, and specifically the monitoring plan as described in section 8;

iii) Show results graphically and conduct a trend analysis;

iv) Report on all incidents and complaints;

v) Specify target dates for the implementation of the recommendations of the permit or GA to achieve compliance; and

vi) Contain recommendations regarding non-compliance or potential non-compliance and must specify target dates for the implementation of the recommendations by the holder of the Integrated Permit and whether corrective action taken for the previous audit's non-conformances was adequate.

10 Environmental Awareness Plan

On-site training must be provided if contractors are employed to conduct maintenance activities. No personnel may be allowed onto site without having been instructed on the requirements of the approved CEMPr and OEMPr.

The training must deal specifically with triggers that would require the implementation of management measures contained in the CEMPr and OEMPr. These include, but are not limited to:

- Identification and avoidance of environmentally sensitive features on/ near the site;
- If excavations are involved, identification of potential heritage resources;
- Materials handling practices; and
- Waste management practices.

It is compulsory for the contractor to convey the sentiments of the CEMPr and OEMPr to all personnel involved in the operation/maintenance activities (including sub-contractors). This should be done via regular toolbox talks as well as more formal training sessions, and attendance registers maintained for auditing purposes.

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Clayton Weatherall-Thomas Pr Sci Nat, reg EAP (EAPASA)
Senior Environmental Scientist

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Rob Gardiner Pr Sci Nat, re. EAP (EAPASA)
Principal Environmental Scientist, Partner

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Appendices

Appendix A: CVs of Key Professionals

Rob Gardiner

Principal Environmental Scientist

Profession	Principal Environmental Scientist
Education	MBA, Port Elizabeth Technikon, 2004 MSc, University of Leeds, 1993 BSc (Hons), Chemistry, University of Cape Town, 1989
Registrations/ Affiliations	Pr Sci Nat, Environmental Scientist (South Africa), 400079/03 Registered EAP (South Africa), 2020/1390 Member IAIA

Specialisation

Environmental impact assessments, environmental management plans, environmental monitoring, environmental auditing, and environmental management systems, ISO 14001.

Expertise

Rob Gardiner has been involved in the field of environmental consulting for over 30 years. His experience has been obtained in the infrastructure, energy, mining, and manufacturing sectors. His expertise includes:

- environmental assessments;
- environmental management systems (EMS) and management plans (EMP);
- water quality; and
- environmental due diligence and environmental auditing.

Employment

2001 – present	SRK Consulting (Pty) Ltd, Principal Environmental Scientist and responsible for the Eastern Cape ESG department in Port Elizabeth
1998 – 2001	Gardiner Associates, Sole Proprietor and Environmental Consultant, Port Elizabeth. Assisted numerous clients in implementation, and aspects of, ISO 14001. This included conducting Initial Reviews implementing environmental monitoring and management programmes, conducting third party audits of suppliers and contractors, and identifying and assessing compliance with legal and other requirements.
1991 – 1998	CSIR, Division of Textile Technology, Port Elizabeth. Responsible for the Division's environmental management offerings to the South African textile industry, including ISO 14001 awareness and eco-labelling. Also responsible for the CSIR's environmental impact assessment offerings in the Eastern Cape Region.

Languages

English – read, write, speak

Afrikaans – read, write, speak

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental Assessment: Energy

Location:	Coega Special Economic Zone, Port Elizabeth, Eastern Cape
Project duration & year:	2020 – 2021
Client:	Engie Southern Africa (Pty) Ltd
Name of Project:	200 MW Risk Mitigation Gas to Power Project
Project Description:	EIA for the development of a 200 MW Gas to Power project in Zone 13 of the Coega Special Economic Zone, including a new mooring location in the Port of Ngqura for the importing of LNG.
Job Title and Duties:	Environmental Assessment Practitioner, Project Partner
Value of Project:	R 900 000

Location:	Coega Special Economic Zone, Port Elizabeth, Eastern Cape
Project duration & year:	2016 - 2019
Client:	Coega Development Corporation
Name of Project:	Coega 3000 MW Gas to Power Project
Project Description:	Detailed Scoping Report and development of project description for a 3000 MW Gas to Power project including infrastructure for the importing of LNG, regasification, gas distribution, and three 1000 MW gas turbine power plants.
Job Title and Duties:	Environmental Assessment Practitioner, Project Partner
Value of Project:	R 1,200 000

Location:	Groot Winterhoek Mountains, Kirkwood, Eastern Cape, South Africa
Project duration & year:	2014 – 2017
Client:	Vulisango Holdings (Pty) Ltd
Name of Project:	Inyanda – Roodeplaat 150 MW Wind Energy Facility
Project Description:	Environmental Assessment for the Inyanda-Roodeplaat 150 MW Wind Energy Facility in the Groot Winterberg Mountains, Kirkwood, Eastern Cape
Job Title and Duties:	Environmental Assessment Practitioner, Project Review
Value of Project:	R 1,200 000

Location:	Hopetown, Northern Cape, South Africa
Project duration & year:	2015 – 2017
Client:	Afri-Coast Energy (Pty) Ltd
Name of Project:	Kloofsig 3 x 75 MW photovoltaic solar energy facility
Project Description:	Environmental Assessment for the 3 x 75 MW Kloofsig photovoltaic (PV) solar energy facility, Hopetown, Northern Cape
Job Title and Duties:	Environmental Assessment Practitioner, Project Review
Value of Project:	R 1,300 000

Location:	Humansdorp, Eastern Cape
Project duration & year:	2013
Client:	Rushmere Noach Incorporated
Name of Project:	Banna Ba Pifhu 50 MW Wind Energy Project
Project Description:	External review of the Environmental Assessment for the 50 MW Wind Energy Project (17 turbines, ranging from 1.2 MW to 3.2 MW)
Job Title and Duties:	External Review
Value of Project:	R 50 000

Rob Gardiner

Principal Environmental Scientist

Key Experience:	**Environmental Assessment: Energy**
Location:	Cradock, Eastern Cape, South Africa
Project duration & year:	2012
Client:	Af-Rom (Pty) Ltd
Name of Project:	Dobbin 75 MW photovoltaic solar energy facility
Project Description:	Environmental Impact assessment
Job Title and Duties:	Environmental Assessment Practitioner / Project Manager
Value of Project:	R 600 000
Location:	Victoria West, Northern Cape, South Africa
Project duration & year:	2012
Client:	Af-Rom (Pty) Ltd
Name of Project:	Brakpoort 75 MW photovoltaic solar energy facility
Project Description:	Environmental Impact assessment
Job Title and Duties:	Environmental Assessment Practitioner / Project Manager
Value of Project:	R 600 000
Location:	Uitenhage, Eastern Cape, South Africa
Project duration & year:	2011
Client:	Afri-Coast Engineers (Pty) Ltd
Name of Project:	Ranger Wind Energy Facility
Project Description:	Environmental Screening
Job Title and Duties:	Environmental Assessment Practitioner / Project Manager
Value of Project:	± R 100 000
Location:	Uitenhage, Eastern Cape, South Africa
Project duration & year:	2014
Client:	Afri-Coast Engineers (Pty) Ltd
Name of Project:	Ranger Wind Energy Facility
Project Description:	Preparation of an Environmental Management Plan for 3 x 1 MW wind turbines on the Ranger game farm, adjacent to the Groendal Nature Reserve
Job Title and Duties:	Environmental Assessment Practitioner, Project Review
Value of Project:	R 50 000
Location:	Blue Horizon Bay, Eastern Cape, South Africa
Project duration & year:	2014
Client:	Afri-Coast Engineers (Pty) Ltd
Name of Project:	Betshanger Wind Energy Facility
Project Description:	Preparation of an Environmental Management Plan for 3 x 1 MW wind turbines on the farm Betshanger , Blue Horizon Bay
Job Title and Duties:	Environmental Assessment Practitioner, Project Review
Value of Project:	R 50 000
Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2012
Client:	Orion Engineered Carbons
Name of Project:	Orion 19.5 MW Cogeneration Plant
Project Description:	Environmental Assessment and Air Emission License amendment, for the development of a 19.5 MW electrical power cogeneration plant
Job Title and Duties:	Environmental Assessment Practitioner, Project Manager
Value of Project:	R 180 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental Assessment: Energy

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2009 - 2010
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	NMBM / CEF 27 MW Wind Energy Facility EIA
Project Description:	Environmental Assessment for a 27 MW Wind Energy Facility on three potential sites within the Nelson Mandela Bay Municipal area
Job Title and Duties:	Environmental Assessment Practitioner / Project Review
Value of Project:	± R 1,600 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2012 - 2013
Client:	MetroWind
Name of Project:	27 MW van Stadens Wind Energy Facility
Project Description:	Environmental consulting services for the construction of the 27 MW van Stadens Wind Energy Facility
Job Title and Duties:	Environmental Assessment Practitioner / Project Review
Value of Project:	R 1,400 000

Key Experience: Environmental Assessment: Linear projects

Location:	Addo road
Project duration & year:	2017 – 2018
Client:	South African National Roads Agency SOC Limited
Name of Project:	Upgrade of the Roads R335 & R342 between Addo and Paterson
Project Description:	Environmental Assessment of the upgrade of National Roads R335 & R342 between Addo and Paterson, Eastern Cape (12 km), including environmental authorisation for borrow pits, Water Use Authorisations, and a Maintenance Management Plan.
Job Title and Duties:	Environmental Assessment Practitioner, Project Partner
Value of Project:	R 850 000

Location:	St Marks to Sabalele village, Eastern Cape, South Africa
Project duration & year:	2014
Client:	South African National Roads Agency SOC Limited
Name of Project:	Upgrade of the DR 08376 from the R61 at St Marks to Sabalele Village
Project Description:	Environmental Assessment of the widening and surfacing of the R61 at St Marks to Sabalele Village (1 km), including assessment of borrow pits and river crossings
Job Title and Duties:	Environmental Assessment Practitioner, Project Partner
Value of Project:	R 300 000

Location:	Cradock to Middleburg, Eastern Cape, South Africa
Project duration & year:	9 months, 2012
Client:	South African National Roads Agency SOC Limited
Name of Project:	Upgrade of National Route 10, Section 4, Cradock to Knutsford
Project Description:	Environmental Assessment Services
Job Title and Duties:	Project Partner
Value of Project:	R 250 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental Assessment: Energy

Location:	Ngcobo, Eastern Cape, South Africa
Project duration & year:	2012
Client:	South African National Roads Agency SOC Limited
Name of Project:	Upgrade of Route 61, Section 6 from Qumanco River to Ngcobo Town
Project Description:	Environmental Assessment Services
Job Title and Duties:	Project Partner
Value of Project:	R 250 000

Location:	Orange Free State, South Africa
Project duration & year:	2012
Client:	South African National Roads Agency SOC Limited
Name of Project:	Upgrade of National Route 1, Section 14, between Trompsburg Interchange and Fonteintjie
Project Description:	Environmental Assessment Services
Job Title and Duties:	Project Partner
Value of Project:	R 250 000

Location:	Graaff-Reinet to Cradock, Eastern Cape, South Africa
Project duration & year:	2011
Client:	South African National Roads Agency SOC Limited
Name of Project:	Upgrade of Route 61, Section 2: Draairivier to Elinus Farm between Graaff-Reinet and Cradock
Project Description:	Environmental Assessment Services
Job Title and Duties:	Project Partner
Value of Project:	R 250 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2009 - 2011
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	132 kV Overhead Powerline from Bloemendal to Tembani T-off
Project Description:	Environmental Impact Assessment
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 300 000

Location:	Uitenhage, Eastern Cape, South Africa
Project duration & year:	2009 - 2011
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	132 kV Overhead Powerline from Sans Souci Substation to the new Nivens Drift substation
Project Description:	Environmental Impact Assessment
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 300 000

Location:	Cradock to Middelburg, Eastern Cape, South Africa
Project duration & year:	2010
Client:	South African National Roads Agency SOC Limited
Name of Project:	Upgrade of National Route 10, Section 4 (±24 km) Tafelberg to Middelburg
Project Description:	Environmental Assessment Services
Job Title and Duties:	Project Manager, Environmental Assessment Practitioner
Value of Project:	R 100 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental Assessment: Energy

Location:	Seaview, Eastern Cape, South Africa
Project duration & year:	2016
Client:	Nelson Mandela Bay Municipality
Name of Project:	Seaview Bulk Water Supply
Project Description:	Environmental Assessment for a bulk water infrastructure, including two 2.5 ML clear water reservoirs, one in the Island Nature Reserve, and 10 km of new pipelines, ranging from 200 mm to 700 mm diameter, near Seaview, Port Elizabeth
Job Title and Duties:	Environmental Assessment Practitioner, Project Review
Value of Project:	R 150 000

Location:	Addo to Motherwell, Eastern Cape, South Africa
Project duration & year:	2007 - 2010
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	Nooitgedagt/Coega Low Level Scheme water supply pipeline
Project Description:	Environmental Impact Assessment
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 500 000

Location:	Gonubie, East London, Eastern Cape
Project duration & year:	2008
Client:	Eastern Cape Department of Roads and Public Works
Name of Project:	East Coast Resorts Road Upgrade
Project Description:	Basic Assessment
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 150 000

Location:	St Francis Bay, Eastern Cape, South Africa
Project duration & year:	2003
Client:	Kouga Municipality
Name of Project:	St Francis Bay Bulk Water Supply (16 km) Pipeline
Project Description:	Environmental Scoping Study
Job Title and Duties:	Project Manager
Value of Project:	R 60 000

Location:	Matatiele to Mount Frere, Eastern Cape, South Africa
Project duration & year:	2003
Client:	Eastern Cape Department of Roads and Public Works
Name of Project:	Environmental Assessment and Environmental Management Plan, Trunk Road 08015 (± 22 km), between Mount Frere and the R 56 between Matatiele and Mount Fletcher.
Project Description:	Environmental Scoping Study and Environmental Management Plan
Job Title and Duties:	Project Manager, Environmental Assessment Practitioner
Value of Project:	R 50 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental Assessment: Energy

Location:	Port Elizabeth, Eastern Cape
Project duration & year:	2014
Client:	Airports Company South Africa
Name of Project:	Port Elizabeth Airport Runway End Safety Area and Strip Compliance
Project Description:	Environmental Assessment for the Extension of the Runway End Safety Area to comply with the recommendations of the International Civil Aviation Authority
Job Title and Duties:	Environmental Assessment Practitioner, Project Review
Value of Project:	R 140 000

Key Experience: Environmental Assessment: Mining & Industrial

Location:	Sokoto, Sokoto state, Nigeria
Project duration & year:	2021 – 2022
Client:	BUA Cement Plc
Name of Project:	Line 4 and Line 5 Expansion ESIA
Project Description:	Environmental & Social Impact Assessment and Resettlement Action Plan for the 3000 million tonnes per annum Line 4 expansion and the 3000 million tonnes per annum Line 5 expansion at BUA's Sokoto cement plant
Job Title and Duties:	Environmental Assessment Practitioner, Project Partner
Value of Project:	USD 600 000

Location:	Coega Special Economic Zone, Port Elizabeth, Eastern Cape
Project duration & year:	2020 – 2021
Client:	ALO Polymers
Name of Project:	Coega Polyethylene Terephthalate Polymer Plant EIA
Project Description:	Environmental Assessment, including air emission licence, for a 900 ton per day polyethylene terephthalate (PET) polymer plant in the Coega Special Economic Zone
Job Title and Duties:	Environmental Assessment Practitioner, Project Partner
Value of Project:	R 700 000

Location:	Coega Special Economic Zone, Port Elizabeth, Eastern Cape
Project duration & year:	2013
Client:	African Oxygen Limited (Afrox)
Name of Project:	Afrox Air Separation Unit Basic Assessment
Project Description:	Environmental Assessment for the storage of dangerous goods (300 m^3 liquid oxygen) at the Afrox Air Separation Unit in the Coega Special Economic Zone
Job Title and Duties:	Environmental Assessment Practitioner, Project Partner
Value of Project:	R 90 000

Location:	Kimberly, Northern Cape
Project duration & year:	2019
Client:	African Oxygen Limited (Afrox)
Name of Project:	Afrox Kimberly 90 m^3 LPG Basic Assessment
Project Description:	Environmental Assessment, including Major Hazard Installation risk assessment and Water Use Authorisation, for the storage of dangerous goods (90 m^3 liquid petroleum gas) at the Afrox Depot in Kimberly, Northern Cape.
Job Title and Duties:	Environmental Assessment Practitioner, Project Partner
Value of Project:	R 300 000

Rob Gardiner

Principal Environmental Scientist

Key Experience:	**Environmental Assessment: Mining & Industrial**
Location:	Great Dyke (Selous to Ngezi), Zimbabwe
Project duration & year:	2016
Client:	Zimplats
Name of Project:	Expansion at the Selous Metallurgical Complex: Environmental & Social Risk Assessment and Environmental and Social Management Plan for Step 1
Project Description:	Environmental & Social Risk Assessment
Job Title and Duties:	Project Manager, Environmental Assessment Practitioner
Value of Project:	R 150 000
Location:	Bas Congo Province, Democratic Republic of Congo
Project duration & year:	2013 - 2013
Client:	Nyumba Ya Akiba sarl
Name of Project:	Nyumba Ya Akiba 3,000 tpd Cement Project
Project Description:	Environmental & Social Impact Assessment
Job Title and Duties:	Client Liaison, Environmental Assessment Practitioner
Value of Project:	USD 350 000
Location:	Coega Special Economic Zone, Port Elizabeth, Eastern Cape
Project duration & year:	2012 - 13
Client:	AfriSam (Pty) Ltd
Name of Project:	Coega 3,000 tpd Cementitious Material Grinding & Blending Plant
Project Description:	Environmental Impact Assessment
Job Title and Duties:	Project Manager, Environmental Assessment Practitioner
Value of Project:	R 700 000
Location:	Great Dyke (Selous to Ngezi), Zimbabwe
Project duration & year:	2012
Client:	Zimplats
Name of Project:	Phase 3 Expansion: Consolidated Environmental Impact Assessment
Project Description:	Environmental & Social Impact Assessment
Job Title and Duties:	Project Manager
Value of Project:	R 2,500 000
Location:	Selous Metallurgical Complex, Zimbabwe
Project duration & year:	2012
Client:	Zimplats
Name of Project:	Sulfur Dioxide Abatement Installation at Selous Metallurgical Complex (SMC)
Project Description:	Environmental & Social Impact assessment
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	R 1,500 000
Location:	Coega Special Economic Zone, Port Elizabeth, Eastern Cape
Project duration & year:	2006 - 2007
Client:	Straits Chemicals
Name of Project:	Straits Chemicals Chlor-Alkali Plant EIA
Project Description:	Environmental Impact Assessment
Job Title and Duties:	Project Manager, Environmental Assessment Practitioner
Value of Project:	R 1,000 000

Rob Gardiner

Principal Environmental Scientist

Key Experience:	**Environmental Assessment: Mining & Industrial**
Location:	Hankey, Eastern Cape, South Africa
Project duration & year:	2009
Client:	Nkari Mining
Name of Project:	Prospecting EMP
Project Description:	Environmental Management Programme
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 100 000
Location:	Paterson, Eastern Cape, South Africa
Project duration & year:	2010
Client:	Vulani Coronation Mining
Name of Project:	Prospecting permit application for silica mine
Project Description:	Environmental Management Plan for Prospecting Right
Job Title and Duties:	Project Partner
Value of Project:	R 100 000

Key Experience:	**Environmental assessment: Housing / change in land use**
Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2014
Client:	Nelson Mandela Bay Municipality
Name of Project:	Walmer erf 1948 Housing Development
Project Description:	Basic Assessment for mixed use housing development on a portion of erf 1948 Walmer (2,000 residential opportunities on 20 hectares) Nelson Mandela Bay
Job Title and Duties:	Environmental Assessment Practitioner, Project Review
Value of Project:	R 250 000
Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2014 – 2017
Client:	Nelson Mandela Bay Municipality
Name of Project:	Walmer erf 11305 Housing Development
Project Description:	Environmental Impact Assessment for mixed use housing development (1,700 residential opportunities on 43.74 hectares) on erf 11305, Walmer, Nelson Mandela Bay
Job Title and Duties:	Environmental Assessment Practitioner, Project Review
Value of Project:	R 1,200 000
Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2009 – 2016
Client:	Nelson Mandela Bay Municipality
Name of Project:	Seaview Low Cost Housing
Project Description:	Environmental Impact Assessment for the development of a 20 hectare site for the provision of 400 low cost housing units and associated wastewater treatment works, Seaview, Eastern Cape
Job Title and Duties:	Environmental Assessment Practitioner, Project Review
Value of Project:	R 470 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental Assessment: Mining & Industrial

Location:	KwaNobuhle, Eastern Cape, South Africa
Project duration & year:	2011 – 2013
Client:	Nelson Mandela Bay Municipality
Name of Project:	KwaNobuhle Area 11 EIA
Project Description:	Environmental Assessment (including public participation) of KwaNobuhle Extension 11, mixed-use housing development (3,000 residential opportunities on 143 hectares) near Uitenhage
Job Title and Duties:	Environmental Assessment Practitioner, Project Partner
Value of Project:	R 570 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2012 – 2015
Client:	Nelson Mandela Bay Municipality
Name of Project:	Jachtvlake Integrated Human Settlement EIA
Project Description:	Environmental Impact Assessment for the mixed-use housing, commercial and industrial development in the Jachtvlakte Precinct (14,000 residential opportunities on 2,382 hectares), Nelson Mandela Bay
Job Title and Duties:	Environmental Assessment Practitioner, Project Review
Value of Project:	R 1 000 000

Location:	Motherwell, Eastern Cape, South Africa
Project duration & year:	2009 - 2012
Client:	NuWay Housing
Name of Project:	Coega Ridge Integrated Housing Development
Project Description:	Environmental Assessment (including public participation) for the development of the integrated Coega Ridge housing project (3,200 hectares). High density node consisting of 38,000 residential opportunities, medium density node includes a golf course, equestrian centre and hotel, the low density node includes limited housing and a lodge.
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 1 000 000

Location:	Gqebera, Walmer, Eastern Cape, South Africa
Project duration & year:	2010
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	Walmer/Gqebera Low Cost Housing EIA
Project Description:	Environmental Assessment and application for exemption, for the re-development of Areas Q, G and O, totalling 83 hectares, in Gqebera in the Walmer Township, Port Elizabeth
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 250 000

Location:	Rosedale, Uitenhage, Eastern Cape, South Africa
Project duration & year:	2009
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	Rosedale Low Cost Housing EIA
Project Description:	Environmental Assessment (including public participation) and Environmental Impact Assessment of development of a 41 hectares site for the provision of 877 low cost housing units at Rosedale, Uitenhage
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 200 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental Assessment: Mining & Industrial

Location:	St Albans, Eastern Cape, South Africa
Project duration & year:	2009
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	St Albans Low Cost Housing EIA
Project Description:	Environmental Assessment (including public participation) for the development of a 28 hectares site for the provision of low cost housing (600 units) at St Albans, Port Elizabeth
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 300 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2006
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	SEA of the Greater Happy Valley area
Project Description:	Strategic Environmental Assessment
Job Title and Duties:	Project Manager
Value of Project:	R 150 000

Location:	St Francis Bay, Eastern Cape, South Africa
Project duration & year:	2006
Client:	Watersplash Investments (Pty) Ltd
Name of Project:	Change in Land Use Application for Part 2 of Farm 707, Osbosch 707
Project Description:	Environmental Scoping Study
Job Title and Duties:	Project Manager
Value of Project:	R 150 000

Location:	Coega Special Economic Zone, Port Elizabeth, Eastern Cape
Project duration & year:	2005 - 2006
Client:	Coega Development Corporation
Name of Project:	Change in Land use of the Remainder of the Coega IDZ (± 7200 Hectares)
Project Description:	Environmental Impact Assessment
Job Title and Duties:	Project Manager, Environmental Assessment Practitioner
Value of Project:	R 500 000

Location:	Motherwell, Eastern Cape, South Africa
Project duration & year:	2005
Client:	Motherwell Urban Renewal Project
Name of Project:	Motherwell Golf Course
Project Description:	Environmental Scoping Study
Job Title and Duties:	Project Manager, Environmental Assessment Practitioner
Value of Project:	R 100 000

Location:	Uitenhage, Eastern Cape, South Africa
Project duration & year:	2004 - 2005
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	Nelson Mandela Bay Logistics Park Scoping Study
Project Description:	Environmental Scoping Study
Job Title and Duties:	Project Manager, Environmental Assessment Practitioner
Value of Project:	R 100 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental Assessment: Mining & Industrial

Location:	St Francis Bay, Eastern Cape, South Africa
Project duration & year:	2003
Client:	Golf Data
Name of Project:	St Francis Golf Links EIA
Project Description:	Environmental Impact Assessment
Job Title and Duties:	Project Manager, Environmental Assessment Practitioner
Value of Project:	R 300 000

Key Experience: Environmental auditing & due diligence

Location:	Nelson Mandela Bay Municipality, Eastern Cape
Project duration & year:	2022
Client:	Nelson Mandela Bay Municipality
Name of Project:	Water quality risk assessment
Project Description:	Risk assessment of the impact of emergency water supply scenario on water quality
Job Title and Duties:	Project Partner, specialist
Value of Project:	R 500 000

Location:	George Industria, Western Cape, South Africa
Project duration & year:	2020
Client:	Coca-Cola Bottling (South Africa)
Name of Project:	Phase I Environmental Due Diligence of Erven 5314 and 16837
Project Description:	Phase I Environmental Due Diligence of Erven 5314 and 16837
Job Title and Duties:	Project Manager, Environmental Assessment Practitioner
Value of Project:	R 70 000

Location:	Grand Cape Mount County, Republic of Liberia
Project duration & year:	2016
Client:	Aureus Mining
Name of Project:	New Liberty Gold Mine
Project Description:	ISO 14001 compliance audit
Job Title and Duties:	Lead Auditor
Value of Project:	R 150 000

Location:	Coega Special Economic Zone, Port Elizabeth, Eastern Cape
Project duration & year:	2012
Client:	Coega Development Corporation
Name of Project:	Environmental Due Diligence study for Zones 12 of the Coega Special Economic Zone
Project Description:	Phase 1 & 2 Environmental Due Diligence Study
Job Title and Duties:	Project Manager, Environmental Scientist
Value of Project:	R 250 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2014
Client:	SAB Miller
Name of Project:	Water Vulnerability Assessment for iBhayi Brewery, Perseverance, Port Elizabeth
Project Description:	Assess vulnerability to changes in quality and availability of water supply
Job Title and Duties:	Environmental Scientist
Value of Project:	R 150 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental Assessment: Mining & Industrial

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2009
Client:	SAB Miller
Name of Project:	Water Vulnerability Assessment for iBhayi Brewery, Perseverance, Port Elizabeth
Project Description:	Assess vulnerability to changes in quality and availability of water supply
Job Title and Duties:	Environmental Scientist
Value of Project:	R 100 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2009
Client:	Coca Cola Fortune (Pty) Ltd
Name of Project:	Water Vulnerability Assessment for Lakeside Plant, North End, Port Elizabeth
Project Description:	Assess vulnerability to changes in quality and availability of water supply
Job Title and Duties:	Environmental Scientist
Value of Project:	R 100 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2010
Client:	Environ, on behalf of Evonik
Name of Project:	Project Casablanca – Phase I Environmental Due Diligence of Algorax
Project Description:	Phase 1 Environmental Due Diligence Study
Job Title and Duties:	Environmental Scientist
Value of Project:	R 150 000

Location:	Coega Special Economic Zone, Port Elizabeth, Eastern Cape
Project duration & year:	2008
Client:	Coega Development Corporation
Name of Project:	Environmental Due Diligence study for Zones 6 & 7 of the Coega Special Economic Zone
Project Description:	Phase 1 & 2 Environmental Due Diligence Study
Job Title and Duties:	Project Manager, Environmental Scientist
Value of Project:	R 250 000

Location:	Coega Special Economic Zone, Port Elizabeth, Eastern Cape
Project duration & year:	2004
Client:	Coega Development Corporation
Name of Project:	Environmental Due Diligence study for Zones 1, 2 and 3 of the Coega Special Economic Zone
Project Description:	Environmental Due Diligence Study
Job Title and Duties:	Project Manager, Environmental Scientist
Value of Project:	R 250 000

Location:	Luanda, Angola
Project duration & year:	2002
Client:	BP
Name of Project:	BP Waste Management Audits
Project Description:	Third party waste contractor audits
Job Title and Duties:	Lead Auditor
Value of Project:	R 50 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental monitoring & remediation

Location:	Port Elizabeth, South Africa
Project duration & year:	2021
Client:	Kahn Properties
Name of Project:	Dust fallout monitoring at Imperial Logistics
Project Description:	Dust fallout monitoring at an industrial site
Job Title and Duties:	Project Partner, Reviewer
Value of Project:	Confidential

Location:	Paranam, Suriname
Project duration & year:	2011 - 2012
Client:	Suriname Aluminum Company, LLC
Name of Project:	Geochemical assessment of pit lake water and sediment
Project Description:	Water quality monitoring
Job Title and Duties:	Environmental Scientist
Value of Project:	R 300 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2004 - 2010
Client:	Nelson Mandela Bay Municipality
Name of Project:	Landfill Monitoring
Project Description:	Monitoring of groundwater, surface water and landfill gas at the Koedoeskloof, Arlington, KwaNobuhle, and iBhayi Landfill Sites
Job Title and Duties:	Environmental Scientist, Project Reviewer
Value of Project:	R 3,500 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2009
Client:	Nelson Mandela Bay Municipality
Name of Project:	North End Lake Water Quality Management Plan
Project Description:	Water Quality Management Plan
Job Title and Duties:	Project Manager, Environmental Scientist
Value of Project:	R 150 000

Location:	Struandale, Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2009
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	Decommissioning of the NMBM Gas Works
Project Description:	Basic Assessment
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 150 000

Location:	North End, Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2009
Client:	Transnet Capital Projects
Name of Project:	Decommissioning of Transnet's North End Ash Deposit
Project Description:	Site Contamination Assessment & Basic Assessment
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 150 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental monitoring & remediation

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2005-2007
Client:	Confidential
Name of Project:	Groundwater Contamination Assessment at manufacturing concern
Project Description:	Delineation and monitoring of chlorinated hydrocarbon plume in groundwater
Job Title and Duties:	Project Manager, Environmental Scientist
Value of Project:	R 600 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2003 - 2004
Client:	Client confidential
Name of Project:	In-situ chemical oxidation of chlorinated hydrocarbon contamination
Project Description:	In-situ chemical oxidation with potassium permanganate
Job Title and Duties:	Project Manager, Environmental Scientist
Value of Project:	R 500 000

Location:	Port of Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2003
Client:	Transnet National Port Authority
Name of Project:	Water Quality Monitoring Programme for the Port of Port Elizabeth
Project Description:	Development of a water quality monitoring programme
Job Title and Duties:	Project Manager, Environmental Scientist
Value of Project:	R 50 000

Key Experience: Environmental assessment: Waste management

Location:	Port of Port Elizabeth and Port of Ngqura, Eastern Cape, South Africa
Project duration & year:	2009 - 2010
Client:	Transnet National Ports Authority
Name of Project:	Waste Management Plans for the Ports of Port Elizabeth and Ngqura
Project Description:	Waste Management Plan
Job Title and Duties:	Project Partner
Value of Project:	R 500 000

Location:	Nelson Mandela Bay Municipality, Eastern Cape, South Africa
Project duration & year:	2008 - 2009
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	NMBM Waste Transfer Sites: Environmental Screening
Project Description:	Environmental Screening / Site selection
Job Title and Duties:	Project Partner
Value of Project:	R 300 000

Location:	Cacadu District Municipality, Eastern Cape, South Africa
Project duration & year:	2008
Client:	Cacadu District Municipality
Name of Project:	Cacadu District Municipality: Integrated Waste Management Plan
Project Description:	Status Quo Assessment of Waste Management Facilities
Job Title and Duties:	Project Manager
Value of Project:	R 60 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental assessment: Waste management

Location:	Graaff Reinet, Eastern Cape, South Africa
Project duration & year:	2007 - 2008
Client:	Camdeboo Local Municipality
Name of Project:	Establishment of new landfill site for Graaff Reinet
Project Description:	Environmental Impact Assessment
Job Title and Duties:	Project Partner / Environmental Assessment Practitioner
Value of Project:	R 250 000

Location:	Walmer, Eastern Cape, South Africa
Project duration & year:	2004
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	Walmer Gqebera Landfill Site: Landfill Gas Risk Assessment
Project Description:	Qualitative Environmental Risk Assessment
Job Title and Duties:	Environmental Assessor
Value of Project:	R 100 000

Location:	iBhayi, Eastern Cape, South Africa
Project duration & year:	2002
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	iBhayi Landfill Site: Application for Buffer Zone Relaxation
Project Description:	Quantitative Environmental Risk Assessment
Job Title and Duties:	Project Manager
Value of Project:	R 150 000

Key Experience: Environmental Management Systems

Location:	Nelson Mandela Metropolitan Municipality, Eastern Cape, South Africa
Project duration & year:	2002 - 2005
Client:	Nelson Mandela Metropolitan Municipality
Name of Project:	Environmental Management System implementation
Project Description:	Environmental Management System (ISO 14001 based)
Job Title and Duties:	Project Manager, Environmental Consultant
Value of Project:	R 1,200 000

Location:	Cato Ridge, KwaZulu Natal, South Africa
Project duration & year:	2003
Client:	Assmang
Name of Project:	ISO 14001 Implementation
Project Description:	Environmental Management System (ISO 14001 compliant)
Job Title and Duties:	Project Review
Value of Project:	R 200 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2002
Client:	Delphi Catalysts
Name of Project:	14001 implementation
Project Description:	Environmental Management System (ISO 14001 certified)
Job Title and Duties:	Environmental Consultant
Value of Project:	R 150 000

Rob Gardiner

Principal Environmental Scientist

Key Experience: Environmental Management Systems

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	2000
Client:	PPC
Name of Project:	PPC Grassridge Quarry: ISO 14001 implementation
Project Description:	Environmental Management System (ISO 14001 certified)
Job Title and Duties:	Technical advisor
Value of Project:	R 50 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	1999
Client:	CSIR, Division of Textile Technology
Name of Project:	ISO 14001 implementation
Project Description:	Environmental Management System (ISO 14001 certified)
Job Title and Duties:	Technical advisor
Value of Project:	R 50 000

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration & year:	1998 - 1999
Client:	Duracell Eveready
Name of Project:	Duracell Eveready: ISO 14001 implementation
Project Description:	Environmental Management System (ISO 14001 certified)
Job Title and Duties:	Environmental Consultant
Value of Project:	R 150 000

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Profession	Senior Environmental Scientist
Education	MSc (Botany), Nelson Mandela Metropolitan University, 2009 BSc (Hons), Botany, Nelson Mandela Metropolitan University, 2006 BSc (Biological Science), Nelson Mandela Metropolitan University, 2005
Registrations/ Affiliations	Pr Sc Nat (Ecological Science) (Reg No, 128641) EAP (Reg No, 2019/681)
Awards	None

Specialisation

Environmental Impact Assessments, Basic Assessments, Environmental Auditing, Mining Permits and Rights, Prospecting Rights, Ecological and Botanical Specialist reports, Rehabilitation Plans

Expertise

Clayton has been involved in environmental assessment and management for the past 6 years and botanical and ecological specialist work for the past 12. Clayton has auditing experience, and his environmental management experience includes Environmental Impact Assessments (EIAs), Basic Assessments, Environmental Management Programmes (EMPrs). Clayton has done botanical, vegetation, ecological and faunal specialist assessments for a wide variety of projects as well.

Employment

2023 - present	SRK Consulting (Pty) Ltd, Senior Environmental Scientist, Gqeberha
2017 - 2022	Algoa Consulting Mining Engineers, Environmental Assessment Practitioner Gqeberha
2012 - 2013	Nelson Mandela Metropolitan Municipality, Conservation Officer, Gqeberha
2011 - 2012	Wildlife and Environmental Society of South Africa (WESSA), Conservation Officer, Gqeberha
2008	Nelson Mandela Metropolitan Municipality, Herbarium Assistant, Gqeberha
2006	Water Research Commission, Botanical and Ecological Specialist, Gqeberha
2004 - 2015	Nelson Mandela Metropolitan Municipality, Student Demonstrator, Gqeberha

Publications

A Journal article on biome boundaries.

Languages

English – read, write, speak

Afrikaans- read, write, speak

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Publications

1. Robbert Duker, Richard M. Cowling, Derek R. du Preez, Marius L. van der Vyver, Clayton R. Weatherall-Thomas and Alastair J. Potts (2014) Community-level assessment of freezing tolerance: frost dictates the biome boundary between Albany subtropical thicket and Nama-Karoo in South Africa. Journal of Biogeography 42(1): 167-178

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience: Basic Assessments

Location:	Kabeljous, Eastern Cape, South Africa
Project duration/date:	2023 - 2024
Client:	Wincanton Trust
Name of Project:	Redevelopment of House Frost
Project Description:	Basic Assessment for the Redevelopment of a residence on the coast
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	R 120 000.00

Location:	Humansdorp, Eastern Cape, South Africa
Project duration/date:	2023 - Ongoing
Client:	Lex Gutsche Investment Trust
Name of Project:	Construction of Gutsche Boathouse
Project Description:	Basic Assessment for the construction of a boathouse on the Kromme Estuary
Job Title and Duties:	Environmental Assessment Practitioner, Project Manager
Value of Project:	R 200 000.00

Location:	Komga, Eastern Cape, South Africa
Project duration/date:	2022
Client:	UsibaIP
Name of Project:	Komga Quarry
Project Description:	Basic Assessment, including mining permit application and general authorization and Terrestrial Biodiversity and Plant Species compliance statement
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Location:	Patensie, Eastern Cape, South Africa
Project duration/date:	2020
Client:	Ikwezi Mining Ventures (Pty) Ltd
Name of Project:	Prospecting right application for dolomite mine
Project Description:	Basic Assessment and Prospecting Right application
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Location:	Coega Special Economic Zone, Port Elizabeth, South Africa
Project duration/date:	2019
Client:	Ngqura Sand (Pty) Ltd
Name of Project:	Mining permit application for a sand mine
Project Description:	Basic Assessments and mining permit application
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience: Basic Assessments

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	2018
Client:	Schoenmakers Mining (Pty) Ltd
Name of Project:	Mining permit application for a sand mine
Project Description:	Basic Assessment and mining permit application
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Location:	Hankey, Eastern Cape, South Africa
Project duration/date:	2017
Client:	ELC PERM 1 (Pty) Ltd
Name of Project:	Loerie Limestone Mine
Project Description:	Basic Assessment and mining permit application
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Location:	Despatch, Eastern Cape, South Africa
Project duration/date:	2017
Client:	Sandman Quarries (Pty) Ltd
Name of Project:	Sand and stone mine
Project Description:	Basic Assessment and mining permit application
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Key Experience: Environmental Impact Assessments

Location:	Aggeneys, Northern Cape, South Africa
Project duration/date:	2024 - Ongoing
Client:	Black Mountain Mining (Pty) Ltd
Name of Project:	BMM TSF ESIA
Project Description:	Environmental Impact Assessment, including a Waste Management Licence and Water Use Authorisation, for a BMM Tailings Storage Facility (TSF)
Job Title and Duties:	Environmental Assessment Practitioner, project coordinator, Ecological Specialist
Value of Project:	R 2 500 000.00

Location:	Aggeneys, Northern Cape, South Africa
Project duration/date:	2023 - Ongoing
Client:	Black Mountain Mining (Pty) Ltd
Name of Project:	Aggeneys Expansion ESIA
Project Description:	Environmental Impact Assessment, including a Waste Management Licence and Water Use Authorisation, for expansion of village of Aggeneys
Job Title and Duties:	Environmental Assessment Practitioner, project coordinator, Ecological Specialist
Value of Project:	R 2 500 000.00

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience: Environmental Impact Assessments

Location:	Kinkelbos, Eastern Cape, South Africa
Project duration/date:	2022
Client:	GG Bradfield
Name of Project:	Establishment of pastures EIA
Project Description:	Scoping Phase and Report for the clearance of indigenous vegetation
Job Title and Duties:	Environmental Assessment Practitioner, project coordinator
Value of Project:	N/A

Location:	Empangeni, KwaZulu-Natal, South Africa
Project duration/date:	2020
Client:	Yu Zhou Enterprise (Pty) Ltd
Name of Project:	Million Streams clay mine and brick plant
Project Description:	Scoping Report for the establishment of a clay mine and brick plant
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Location:	Coega Special Economic Zone, Eastern Cape, South Africa
Project duration/date:	2020
Client:	Coega Mining (Pty) Ltd
Name of Project:	Sand mine EIA
Project Description:	Environmental Impact Assessment and mining right application, including Ecological specialist assessment
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	2019
Client:	Driftsands Mining (Pty) Ltd
Name of Project:	Sand mine EIA
Project Description:	Environmental Impact Assessment and mining right application, including Botanical specialist assessment
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Location:	Loerie, Eastern Cape, South Africa
Project duration/date:	2019
Client:	ELC Perm 2 (Pty) Ltd
Name of Project:	Kleinfontein Kalkmyn EIA
Project Description:	Environmental Impact Assessment and mining right application, including Ecological specialist assessment.
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	2017
Client:	Lloyds Clay Mine
Name of Project:	Clay Mine Mining Licence Conversion
Project Description:	Environmental Impact Assessment and mining right application
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience Environmental Audits

Location:	Coega Special Economic Zone, Eastern Cape, South Africa
Project duration/date:	2022
Client:	Coega Mining (Pty) Ltd
Name of Project:	Annual Environmental Audit
Project Description:	Environmental Assessment Practitioner
Job Title and Duties:	EIA for a 27 MW wind farm (including comparative site suitability assessment) and associated infrastructure
Value of Project:	Environmental Assessment Practitioner, project coordinator
	N/A

Location:	Coega Special Economic Zone, Eastern Cape, South Africa
Project duration/date:	2021
Client:	CEMZA
Name of Project:	Construction Phase Closure Audit
Project Description:	Environmental audit
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	2018
Client:	Glendore Sand
Name of Project:	Mine Closure for a sand mine
Project Description:	Environmental Audit and Mine closure
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	2018
Client:	Glendore Sand
Name of Project:	Mine Closure for a stone mine
Project Description:	Environmental Audit and mine closure
Job Title and Duties:	Environmental Assessment Practitioner
Value of Project:	N/A

Key Experience Biodiversity & Ecological Reports

Location:	Gqeberha, Eastern Cape, South Africa
Project duration/date:	2024
Client:	A & H Homebuilders and Decorators
Name of Project:	Erf 185 Kabega Residential Development
Project Description:	Terrestrial Biodiversity and Plant Species Impact Assessment for a Section 24(G) application
Job Title and Duties:	Terrestrial Ecologist, author
Value of Project:	R 40 000.00

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience — Biodiversity & Ecological Reports

Location:	Gqeberha, Eastern Cape, South Africa
Project duration/date:	2024
Client:	Wezy Enterprises
Name of Project:	Erf 427 Theescombe Residential Development
Project Description:	Terrestrial Biodiversity Screening Assessment
Job Title and Duties:	Terrestrial Ecologist, author
Value of Project:	R 30 000.00

Location:	Gqeberha, Eastern Cape, South Africa
Project duration/date:	2024
Client:	Johan Meiring & Associates
Name of Project:	Erf 2006 Walmer Residential Development
Project Description:	Vegetation verification, Forest survey and NFA permit application
Job Title and Duties:	Terrestrial Ecologist, author
Value of Project:	R 25 000.00

Location:	Aggeneys, Northern Cape, South Africa
Project duration/date:	2023 - Ongoing
Client:	Black Mountain Mining (Pty) LTd
Name of Project:	Aggeneys Expansion ESIA
Project Description:	Ecological and Biodiversity, including plant species, animal species, terrestrial and aquatic biodiversity, Impact Assessment
Job Title and Duties:	Ecological Specialist, project manager, co-author
Value of Project:	R 150 000.00

Location:	Humansdorp, Eastern Cape
Project duration/date:	2023
Client:	Lex Gutsche Investment Trust
Name of Project:	Construction of Gutsche Boathouse
Project Description:	Terrestrial Biodiversity, including Plant Species Impact Assessment for the construction of a boathouse on the Kromme Estuary
Job Title and Duties:	Terrestrial Ecologist, author
Value of Project:	R 40 000.00

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience — Biodiversity & Ecological Reports

Location:	Grahamstown, Eastern Cape, South Africa
Project duration/date:	2023
Client:	WBHO
Name of Project:	Great Fish River N2 Upgrade
Project Description:	Protected Species survey and biodiversity permits, author
Job Title and Duties:	Botanical specialist
Value of Project:	R 40 000.00

Location:	St. Francis Bay, Eastern Cape, South Africa
Project duration/date:	2023
Client:	Goedgeloof Properties
Name of Project:	Goedgeloof Storage Facility
Project Description:	Botanical and Terrestrial Biodiversity Impact Assessment for an EIA for a light industrial development, author
Job Title and Duties:	Ecological Specialist, Author
Value of Project:	R 30 000.00

Location:	Komga, Eastern Cape, South Africa
Project duration/date:	2022
Client:	UsibaIP
Name of Project:	Komga Quarry
Project Description:	Terrestrial Biodiversity and Plant Species compliance statement
Job Title and Duties:	Ecological Specialist
Value of Project:	N/A
Project duration/date:	2022
Client:	CEN Integrated Environmental Management Unit
Name of Project:	Dubula Farm Solar PV Facility
Project Description:	Terrestrial Biodiversity and Plant Species Impact Assessment
Job Title and Duties:	Author
Value of Project:	R 32 000.00

Location:	Humansdorp, Eastern Cape, South Africa
Project duration/date:	2022
Client:	Habitat Link Consulting
Name of Project:	Nordex Concrete Tower Facility
Project Description:	Terrestrial Biodiversity and Plant Species Impact Assessment
Job Title and Duties:	Ecological Specialist, Author
Value of Project:	R 22 000.00

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience — Biodiversity & Ecological Reports

Location:	Greenbushes, Eastern Cape, South Africa
Project duration/date:	2022
Client:	Habitat Link Consulting
Name of Project:	Greenbushes Solar PV Facility
Project Description:	Terrestrial Biodiversity and Plant Species Compliance Statement
Job Title and Duties:	Ecological Specialist, Author
Value of Project:	R 20 000.00

Location:	Gqeberha, Eastern Cape, South Africa
Project duration/date:	2022
Client:	Habitat Link Consulting
Name of Project:	Westering Residential Development
Project Description:	Terrestrial Biodiversity Impact Assessment and Plant Species Compliance Statement
Job Title and Duties:	Ecological Specialist, Co-author
Value of Project:	R 25 000.00

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	2022
Client:	CEN Integrated Environmental Management Unit
Name of Project:	Little Chelsea Citrus Development
Project Description:	Terrestrial Biodiversity and Plant Species Biodiversity Baseline Assessment
Job Title and Duties:	Author
Value of Project:	R 20 000.00

Location:	Southwell, Eastern Cape, South Africa
Project duration/date:	2022
Client:	Algoa Consulting Mining Engineers
Name of Project:	Southwell Sand Mine
Project Description:	Terrestrial Biodiversity and Plant Species Compliance Statement
Job Title and Duties:	Author
Value of Project:	R 20 000.00

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience — Biodiversity & Ecological Reports

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	2022
Client:	CEN Integrated Environmental Management Unit
Name of Project:	Greenbushes Solar PV Facility
Project Description:	Terrestrial Biodiversity and Plant Species Compliance Statement
Job Title and Duties:	Author
Value of Project:	R 20 000.00

Location:	Greenbushes, Eastern Cape, South Africa
Project duration/date:	2021
Client:	Setplan
Name of Project:	Kuyga residential development
Project Description:	Botanical and Terrestrial Biodiversity Impact Assessment for an EIA for a residential development, co-author
Job Title and Duties:	Botanical specialist
Value of Project:	N/A

Location:	Port Elizabeth and Coega Special Economic Zone, Eastern Cape, South Africa
Project duration/ date:	2021
Client:	Red Cap Impofu (Pty) Ltd
Name of Project:	Impofu Grid Extension
Project Description:	Terrestrial Biodiversity and Plant Species Impact Assessment for Chatty-Dedisa Grid Extension
Job Title and Duties:	Botanical Specialist, co-author
Value of Project:	N/A

Location:	Kirkwood, Eastern Cape, South Africa
Project duration/date:	2021
Client:	Habitat Link Consulting (Pty) Ltd
Name of Project:	Moses Mabhida Multi-Purpose Sports Hall
Project Description:	Botanical opinion letter for the condition of the vegetation on site
Job Title and Duties:	Botanist
Value of Project:	N/A

Location:	Mount Frere, Eastern Cape, South Africa
Project duration/date:	2021
Client:	Habitat Link Consulting (Pty) Ltd
Name of Project:	Mount Frere Police Station
Project Description:	Botanical opinion letter for the condition of the vegetation on site
Job Title and Duties:	Botanist
Value of Project:	N/A

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience — Biodiversity & Ecological Reports

Location:	Kariega, Eastern Cape, South Africa
Project duration/date:	2020
Client:	Habitat Link Consulting (Pty) Ltd
Name of Project:	Expansion of Kamesh Police Station
Project Description:	Botanical opinion letter for the condition of the vegetation on site
Job Title and Duties:	Botanist
Value of Project:	N/A

Location:	Paterson, Eastern Cape, South Africa
Project duration/date:	2020
Client:	Habitat Link Consulting (Pty) Ltd
Name of Project:	Waggie poultry broiler facility
Project Description:	Botanical opinion letter for the condition of the vegetation on site
Job Title and Duties:	Botanist
Value of Project:	N/A

Location:	Riebeek-East, Eastern Cape, South Africa
Project duration/date:	2020
Client:	Habitat Link Consulting (Pty) Ltd
Name of Project:	Seriso Cultivation
Project Description:	S24G application and establishment of new cultivated areas , Botanical specialist report
Job Title and Duties:	Botanist, co-author
Value of Project:	N/A

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/ date:	2019 – 2020
Client:	Lwethuma Environmental Consulting
Name of Project:	Malabar Shopping Centre
Project Description:	Terrestrial Biodiversity and Plant and Animal Species Impact Assessment for a commercial development
Job Title and Duties:	Ecologist, co-author
Value of Project:	N/A

Location:	Coega Special Economic Zone, Port Elizabeth, South Africa
Project duration/date:	2019
Client:	Ngqura Sand (Pty) Ltd
Name of Project:	Ngqura Sand Sand Mine Mining Permit
Project Description:	Ecological Impact Assessment
Job Title and Duties:	Ecological Specialist
Value of Project:	N/A

Location:	Coega Special Economic Zone, Eastern Cape, South Africa
Project duration/date:	2020
Client:	Coega Mining (Pty) Ltd
Name of Project:	Coega Mining Sand Mine Mining Right
Project Description:	Ecological Impact Assessment
Job Title and Duties:	Ecological Specialist
Value of Project:	N/A

Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	2019
Client:	Driftsands Mining (Pty) Ltd
Name of Project:	Driftsands Mining Sand Mine Mining Right
Project Description:	Ecological Impact Assessment
Job Title and Duties:	Ecological Specialist
Value of Project:	N/A

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience — Biodiversity & Ecological Reports

Location: Loerie, Eastern Cape, South Africa
Project duration/date: 2019
Client: ELC Perm 2 (Pty) Ltd
Name of Project: Kleinfontein Kalkmyn Mining Right
Project Description: Ecological Specialist Assessment
Job Title and Duties: Ecological Specialist
Value of Project: N/A

Location: King Williams Town, Eastern Cape, South Africa
Project duration/date: 2019
Client: Algoa Consulting Mining Engineers cc
Name of Project: Mount Coke Quarry
Project Description: Ecological specialist report for a mining permit application for a hard rock quarry
Job Title and Duties: Ecologist, author
Value of Project: N/A

Location: Hogsback, Eastern Cape, South Africa
Project duration/date: 2019
Client: Habitat Link Consulting (Pty) Ltd
Name of Project: Subdivision and residential development
Project Description: Botanical Specialist assessment for BA
Job Title and Duties: Botanist, author
Value of Project: N/A

Location: Port Elizabeth, Eastern Cape, South Africa
Project duration/date: 2019
Client: CEN Environmental Consulting (Pty) Ltd
Name of Project: Florida Heights Residential Development
Project Description: Botanical Assessment for EIA for residential development
Job Title and Duties: Botanist, author
Value of Project: N/A

Location: Humansdorp, Eastern Cape, South Africa
Project duration/date: 2019
Client: Habitat Link Consulting (Pty) Ltd
Name of Project: EIA for Development of Portion 3 of Farm Zwartebosch 347
Project Description: Botanical Screening Assessment
Job Title and Duties: Botanist, author
Value of Project: N/A

Location: Prieska, Northern Cape, South Africa
Project duration/date: 2018
Client: Algoa Consulting Mining Engineers cc
Name of Project: EIA for Sogea Satom concrete wind tower factory
Project Description: Botanical Specialist Assessment
Job Title and Duties: Botanist, author
Value of Project: N/A

Location: Addo, Eastern Cape, South Africa
Project duration/date: 2018
Client: Habitat Link Consulting (Pty) Ltd
Name of Project: EIA for development of low cost housing in Addo
Project Description: Botanical Screening Assessment
Job Title and Duties: Botanist, author
Value of Project: N/A

Clayton Richard Weatherall-Thomas

Senior Environmental Scientist

Key Experience Biodiversity & Ecological Reports

Location:	Hankey, Eastern Cape, South Africa
Project duration/date:	2017
Client:	ELC PERM 1 (Pty) Ltd
Name of Project:	Loerie Limestone Mine
Project Description:	Botanical specialist assessment
Job Title and Duties:	Botanical Specialist
Value of Project:	N/A
Location:	Western Cape, South Africa
Project duration/date:	2017
Client:	Water Research Commission
Name of Project:	Macrophyte health and updated estuary habitat and plant species data for Western Cape estuaries.
Project Description:	Plant species identification for estuaries in the Western Cape
Job Title and Duties:	Botanist, co-author
Value of Project:	N/A
Location:	Kimberley, Northern Cape, South Africa
Project duration/date:	2017
Client:	Boscia Ecological Consulting
Name of Project:	EIA for KimCrush aggregate mine
Project Description:	Ecological Impact Assessment
Job Title and Duties:	Botanist, co-author
Value of Project:	N/A
Location:	Kimberley, Northern Cape, South Africa
Project duration/date:	2017P
Client:	Public Process Consultants
Name of Project:	FreshGro Citrus Development
Project Description:	Botanical Specialist Assessment for development of citrus orchards
Job Title and Duties:	Botanist, co-author
Value of Project:	N/A
Location:	Kirkwood, Eastern Cape, South Africa
Project duration/date:	2015
Client:	
Name of Project:	EIA for KimCrush aggregate mine
Project Description:	Ecological Impact Assessment
Job Title and Duties:	Botanist, co-author
Value of Project:	N/A
Location:	Port Elizabeth, Eastern Cape, South Africa
Project duration/date:	2012
Client:	Jeffares & Green (Pty) Ltd
Name of Project:	Proposed Redhouse-Chelsea Arterial and Walker Drive Extension EIA
Project Description:	Vegetation Impact Assessment
Job Title and Duties:	Botanist, co-author
Value of Project:	N/A

Environmental Assessment Practitioners Association of South Africa

Registration No. 2019/681

Herewith certifies that

Clayton Richard
Weatherall-Thomas

is registered as an

Environmental Assessment Practitioner

Registered in accordance with the prescribed criteria of Regulation 15. (1) of the Section 24H Registration Authority Regulations (Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).

Effective: 01 March 2024 Expires: 28 February 2025

Chairperson

Registrar

SAQA
SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Clayton Richard Weatherall-Thomas

Registration Number: 128641

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Ecological Science (Professional Natural Scientist)

Effective **7 September 2022** Expires **31 March 2025**

Chairperson

Chief Executive Officer

To verify this certificate scan this code