Scientific Aquatic Services

Applying science to the real world

29 Arterial Road West, Oriel, Bedfordview, 2007
Tel 011 616 7893
Fax 086 724 3132
admin@sasenvgroup.co.za
www.sasenvgroup.co.za

Name: Stephen van Staden
Date: 05 October 2021
Ref: SAS 219162

TECHNICAL MEMORANDUM

SLR Consulting (Africa) (Pty) Ltd
Block 7, Fourways Manor Office Park
Cnr Roos and Macbeth Streets
Johannesburg,
2026
Mobile: 0832268570
E-mail: ndaly@slrconsulting.com

Attention: Ms Natasha Smyth

WETLAND VERIFICATION AS PART OF THE WATER USE AUTHORISATION PROCESS FOR THE PROPOSED MAMATWAN MINE PROJECT NEAR KATHU, NORTHERN CAPE PROVINCE.

INTRODUCTION

Scientific Aquatic Services (SAS) was appointed by SLR Consulting (Africa) (Pty) Ltd to consider the characteristics of a watercourse associated with the proposed Mamatwan mine project hereafter referred to as the 'Mamatwan Expansion activities' near Kathu, Northern Cape Province, South Africa.

In order to ensure that the assessment was undertaken fully in compliance with the requirements of Government Notice (GN) 509 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998), all watercourses within 500m of the proposed Mamatwan Expansion activities were considered. To ensure that known features were considered a detailed analysis of National and Provincial Legislation, Policies, Guidelines and Databases was undertaken. Refer to Appendix B.

OUTCOME OF DESKTOP ASSESSMENT

Use was made of aerial photography, digital satellite imagery, and available provincial and national freshwater resource management databases to identify points of interest prior to the field survey. A desktop study was undertaken during which the relevant national and provincial databases were consulted to determine the location of any watercourses in the vicinity of the proposed infrastructure. In addition, digital satellite imagery was used to identify any watercourses present within 500m of the proposed

Mamatwan Expansion activities. The outcome of the desktop assessment is provided in Appendix B. Based on the outcome of the background database study no wetlands nor rivers were identified by the National Freshwater Ecosystem Priority Areas (NFEPA, 2011) database within the proposed Mamatwan expansion activities and investigation area, nor are any watercourses indicated by the topographic data for the area. The proposed Mamatwan expansion activities are situated within the Eastern Kalahari Bushveld Group 1 wetland vegetation type considered Least Threatened (LT) according to Mbona *et al.* (2014).

The identification of watercourses through the use of desktop assessment methods is based on identifying features displaying a diversity of digital signatures. In this regard, specific mention is made of the following:

- Vegetation associated with watercourses: a distinct increase in density as well as shrub size near flow paths;
- Hue: with water flow paths often shown as white/grey or black. Outcrops or bare soils display varying chroma created by varying vegetation cover, geology and soil conditions; and
- Texture: with areas displaying various textures, created by varying vegetation cover and soil conditions.

ASSUMPTIONS AND LIMITATIONS

- Delineation and assessment of the watercourse is confined to the proposed Mamatwan expansion activities and investigation areas as depicted in Appendix A - Figure A1 and Figure A2, and does not include the neighbouring and adjacent properties, although land uses and possible catchment impacts occurring on surrounding properties were taken into consideration;
- A site visit was conducted on the 7th November 2019 to observe and delineate watercourses within the Mamatwan activities and investigation area. Due to the nature of impacts within the investigation area, the applicability of the use of soil indicators was limited as the dominant soils in the area can be considered anthrosols (soils that have been modified profoundly by human activities);
- Similarly, as a result of the land use within the investigation area much of the vegetation has already been cleared thus limiting the usefulness of vegetation as an indicator;
- Infrastructure in the area has severely affected runoff patterns due to increased extent of impermeable surfaces which has affected natural hydrological processes; and
- Given the prevailing conditions on site at the time of the field assessment, the precautionary principle was applied when verifying the existence of a watercourse and data obtained in the field was compared to digital signatures in digital satellite imagery.

DEFINITIONS

As part of this memorandum, the following definitions as per the National Water Act, 1998 (Act No. 36 of 1998) (NWA) are of relevance:

Watercourse means-

(a) A river or spring;
(b) A natural channel in which water flows regularly or intermittently;
(c) A wetland, lake or dam into which, or from which water flows; and
(d) Any collection of water, which the Minister may, by notice of the Gazette, declare a watercourse.

Wetland means-

"Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."

Riparian habitat includes-

"The physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent areas".

Regulated Area of a Watercourse means-

(a) The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
(b) In the absence of a determined 1 in 100-year flood line or riparian area, the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or
(c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.

In terms of Section 21 of the National Water Act, 1998 (Act No. 36 of 1998) which provides the water uses that would trigger the need for a water Use Authorisation, the following are applicable to this project:

Section 21(c) of the National Water Act, 1998 (Act No. 36 of 1998) – impeding or diverting the flow of water in a watercourse.
Section 21(i) of the National Water Act, 1998 (Act No. 36 of 1998) – altering the beds, banks, course or characteristics of a watercourse.

KEY OBSERVATIONS OF THE SITE VERIFICATION

Terrestrial soil characterised by yellow brown (high chroma) coloured soils were found within the undisturbed areas of the proposed Mamatwan expansion activities. Due to the physical properties (i.e. well-drained and single soil structure) of these soils no signs of wetness (iron (Fe) and manganese (Mn) oxides) were observed and further confirm the absence of wetland conditions. Upon investigation of these soils, by means of hand auguring within 50cm of the soil surface within the Mamatwan expansion activities, wetland indicators such as mottling, gleying or other redoximorphic characteristics were not present (Figure 1).

Figure 1: (left) Runoff associated with mine operations and (right) soils within the proposed Mamatwan expansion activities showing no signs of wetness within the first 50cm.

Using digital satellite imagery, it was observed that the robust vegetation response within the upgradient portion of Adams pit, within the investigation area is as a result of the mining activities taking place in the area. Prior to these activities no wetness signatures are observable in the satellite imagery. It therefore evident that as a result of altered natural flow patterns linked to the activities within the investigation area, the wet response is artificial and is entirely driven by regular water inflow into the upgradient portion of the Adams pit. This portion of Adams pit receives surplus water from the mine storage dams and from the ore processing plant regularly. Furthermore, the Adams pit is used as a stormwater storage dam as part of the mine stormwater management system.

Figure 2: Artificially driven freshwater feature identified within the Mamatwan expansion activities.

Therefore, this artificial wet response is unlikely to persist under "normal circumstances" in accordance with the definition provided by the National Water Act, 1998 (Act No. 36 of 1998) as when the mining activities cease, the hydrological driver of this anthropogenically derived freshwater feature will cease.

CONCLUSION OF FINDINGS AND SPECIALIST OPINION

In consideration of the findings during the watercourse verification within the Mamatwan expansion activities, the following can be concluded:

- No true watercourses as defined by the National Water Act, 1998 (Act No. 36 of 1998) were observed within the proposed Mamatwan expansion and investigation area.
- It is therefore the opinion of the freshwater ecologist that the artificial freshwater feature with associated hydrophytic vegetation cannot be deemed a watercourse given that under normal circumstances it would not persist. In addition, the Zones of Regulation advocated by the National Water Act, 1998 (Act No.36 of 1998) and the National Environmental Management Act 1998 (Act No.107 of 1998), are not applicable in protection of the artificial feature identified.

Yours Faithfully,

Digital Documentation Not Signed for Security Purpose

Stephen van Staden

Pri. Sci. Nat

APPENDIX A

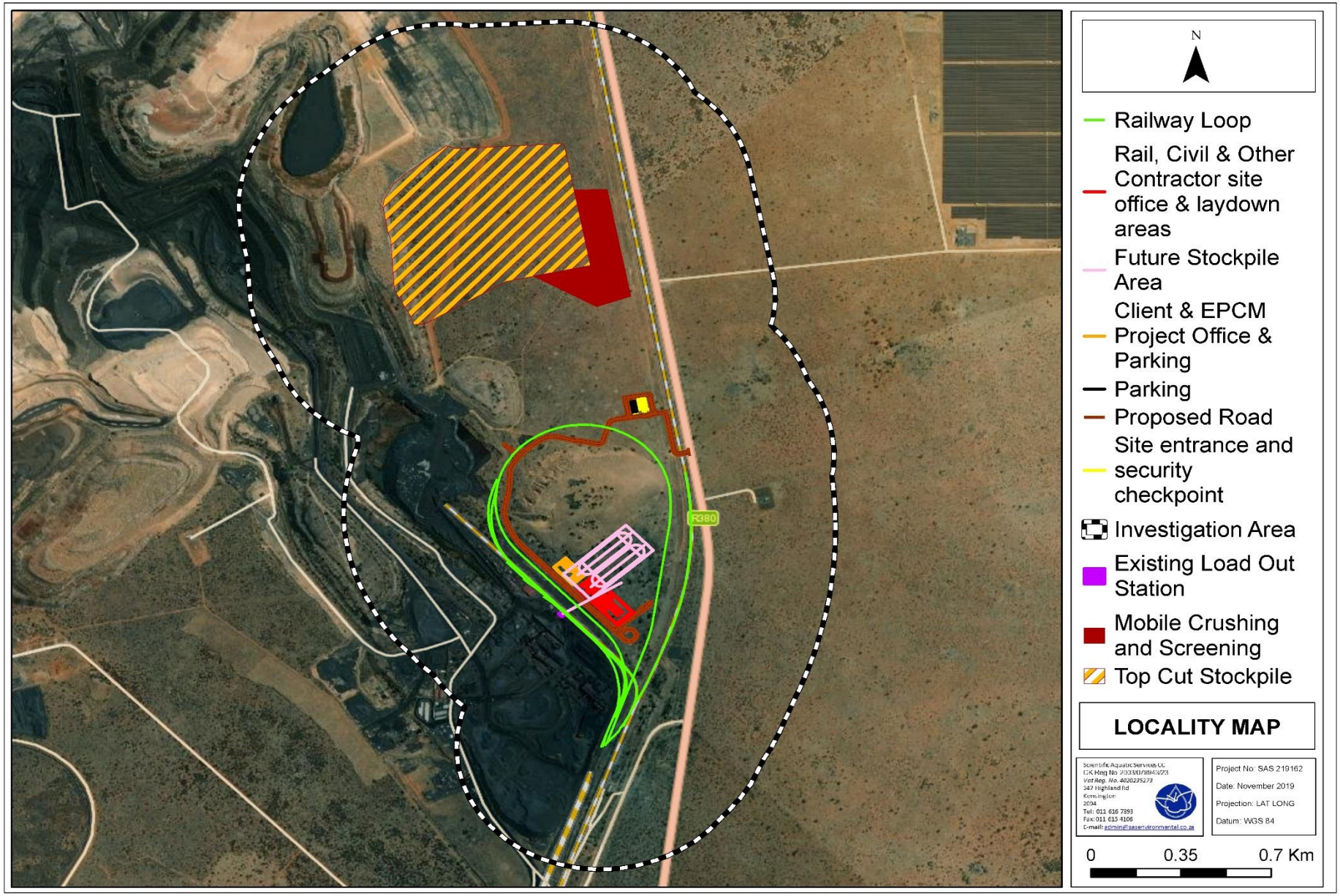

Figure A1: Location of the proposed infrastructure and investigation area in relation to the surrounds, depicted on digital satellite imagery.

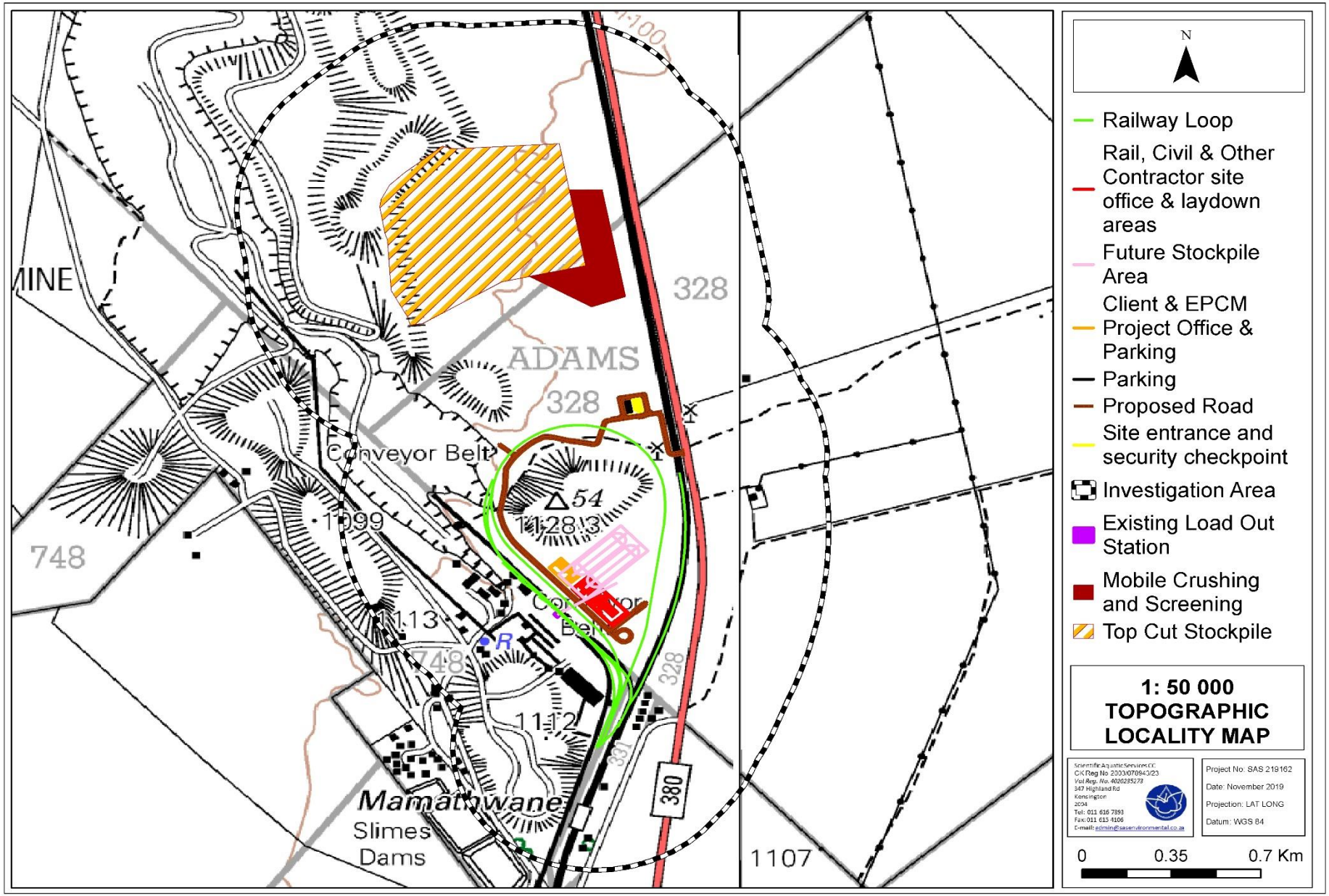

Figure A2: The location of the proposed infrastructure and investigation area depicted on a 1: 50 000 topographic map.

APPENDIX 2

Table 1: Desktop data relating to the character of watercourses associated with the proposed Mamatwan Expansion activities and surrounding region.

Aquatic ecoregion and sub-regions in which the Mamatwan Expansion Activities is located	
Ecoregion	Southern Kalahari
Catchment	Orange
Quaternary Catchment	D41K
WMA	Lower Vaal
subWMA	Molopo
Dominant characteristics of the Southern Kalahari (29.01) Aquatic Ecoregion Level 2 (Kleynhans *et al.*, 2007)	
Dominant primary terrain morphology	Plains; moderate relief, Closed Hills, mountains; moderate and high relief.
Dominant primary vegetation types	Karroid Kalahari Bushveld, Kalahari Mountain Bushveld, Kalahari Plateau Bushveld
Altitude (m a.m.s.l)	700 - 1500
MAP (mm)	0 - 500
The coefficient of Variation (% of the MAP)	30 - 40
Rainfall concentration index	60 - >65
Rainfall seasonality	Late Summer
Mean annual temp. (°C)	16 - 22
Winter temperature (July)	0 - 22
Summer temperature (Feb)	16 - >32
Median annual simulated runoff (mm)	<5 – 40
National Biodiversity Assessment (2018): South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	
According to the NBA (2018): SAIIAE there are no wetland features or rivers associated with the Mamatwan Expansion Activities nor the investigation area, thus corresponding with the NFEPA Database (2011).	

Detail of the Mamatwan Expansion Activities in terms of the National Freshwater Ecosystem Priority Area (NFEPA, 2011) database	
FEPACODE	The Mamatwan Expansion Activities is situated in an area defined as an upstream management catchment (FEPACODE 4). Upstream management catchments are required to prevent the downstream degradation of Freshwater Ecosystem Priority Areas (FEPAs) and Fish Support Areas (FSAs).
NFEPA Wetlands	According to the NFEPA database (2011) no wetlands are located within the Mamatwan Expansion Activities or investigation areas. An artificial unchannelled valley bottom wetland is indicated approximately 1.7 km south of the Mamatwan Expansion Activities. This wetland is indicated to be heavily to critically modified (Class Z3).
Wetland Vegetation Type	The Mamatwan Expansion Activities are situated within the Eastern Kalahari Bushveld Group 1 Wetland Vegetation Type considered Least Threatened according to SANBI, 2012 and Mbona *et al.* (2014),
NFEPA Rivers	According to the NFEPA Database there are no rivers associated with the Mamatwan Expansion Activities nor with the investigation area. The Vlermuisleegte River is situated approximately 5km south west of the Mamatwan Expansion Activities.
Detail of the Mamatwan Expansion Activities in terms of the Northern Cape Critical Biodiversity Areas (2016) (Figure 5)	
The majority of the Mamatwan Expansion Activities are defined as “Other Natural Areas” (ONA). According to the Technical Guidelines for CBA, Maps document, ONA’s consist of all areas in good or fair ecological condition, that fall outside the protected area network and have not been identified as CBAs or ESAs (SANBI, 2017).	

CBA = Critical Biodiversity Area; DWS = Department of Water and Sanitation; EI = Ecological Importance; ES = Ecological Sensitivity; ESA = Ecological Support Area; m.a.m.s.l = Metres Above Mean Sea Level; MAP = Mean Annual Precipitation; NBA = National Biodiversity Assessment; NFEPA = National Freshwater Ecosystem Priority Areas; PES = Present Ecological State; SAIIAE = South African Inventory of Inland Aquatic Ecosystems; WMA = Water Management Area


N
Railway Loop
Rail, Civil & Other Contractor site office & laydown areas
Future Stockpile Area
Client & EPCM Project Office & Parking
Parking
Proposed Road
Site entrance and security checkpoint
Investigation Area
Existing Load Out Station
Mobile Crushing and Screening
Top Cut Stockpile
Northern Cape CBA Map
Other Natural Areas
NORTHERN CAPE CBA MAP
Scientific Aquatic Services CC
CK Reg No 2003/078943/23
Vat Reg. No. 4020235273
347 Highland Rd
Kensington
2094
Tel: 011 616 7893
Fax: 011 615 4105
E-mail: admin@sasenvironmental.co.za
Project No: SAS 219162
Date: November 2019
Projection: LAT LONG
Datum: WGS 84
0
0.35
0.7 Km