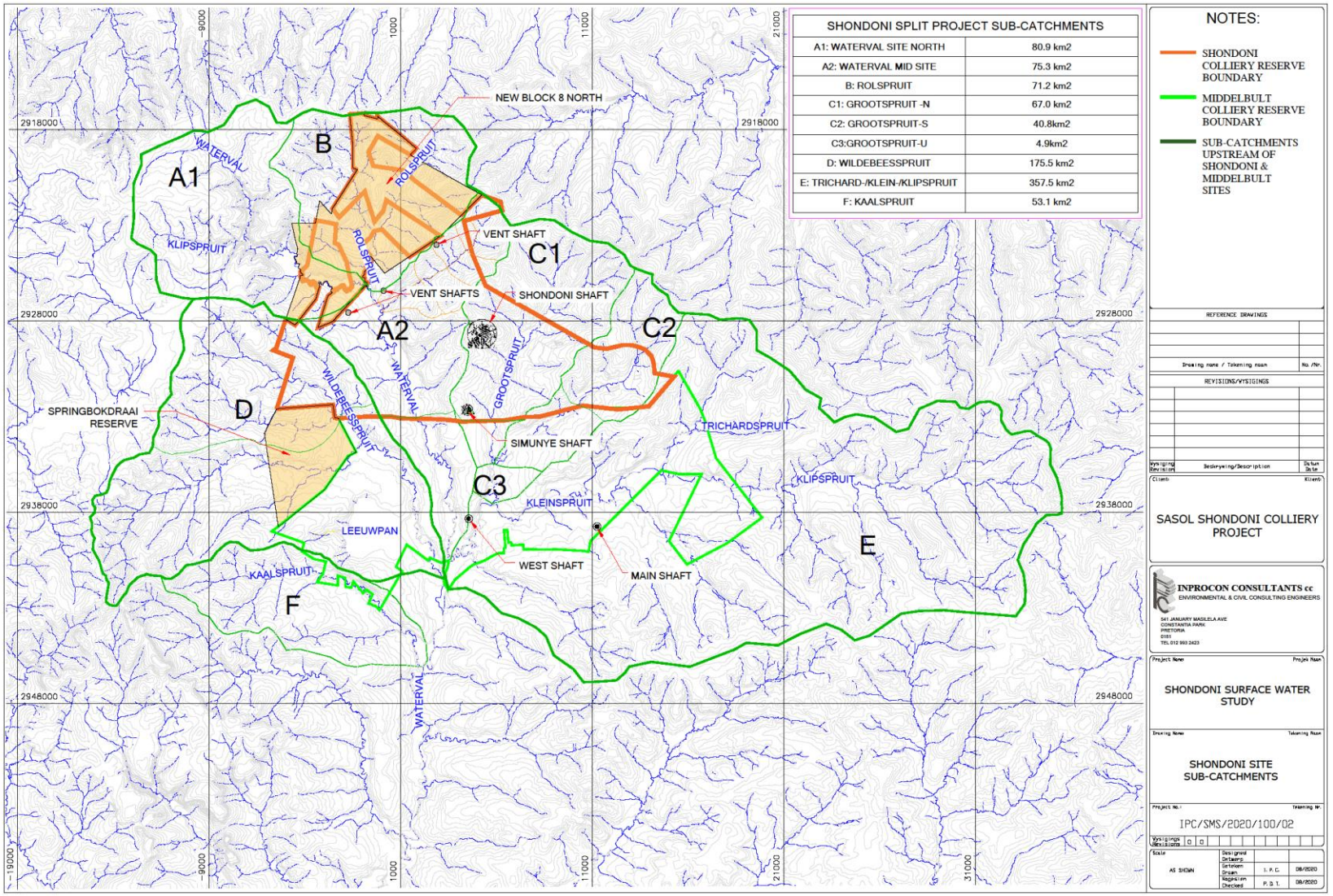


Figure 8.4.9.1(a): Sub-Catchments and Drainage Lines in the Shondoni Project Area

8.4.9.2. Catchment Characteristics

The Shondoni Colliery site area of 143.7 km² straddles four major drainage lines defined as the Wildebeesspruit in the west, the Waterval River and Grootspruit in the middle portion and a tributary of Grootspruit over the eastern portion as can be seen in Figures 8.4.9.1(a) above. The new Block 8 Reserve Area straddles two major drainage lines i.e. the Waterval River in the western area and the Rolspruit through the central part into the Waterval River. The Waterval River eventually drains to the Vaal River upstream of the Vaal Dam, from where the stream flows in a westerly direction to the Vaal Barrage, Bloemhof Dam and eventually joining the Orange River.

Natural surface water runoff from the Shondoni site generally occurs from north to south and is routed towards the southern boundary of Shondoni Colliery from catchments A1, A2, B, C1 and C2. A small portion (15.7 km²) of Shondoni Colliery on the western boundary is crossed by the Wildebeesspruit originating in catchment D.

However, surface water impacts, including floods resulting from catchments A2, C1, C2 and D have been addressed in earlier studies by Jones & Wagener (2010 & 2014) and will not form part of this study as no incremental impacts are expected as a result of the reduced Shondoni Colliery, the additional new Block 8 North Reserve Area and the removal of Middelbult Colliery as a separate management unit.

The characteristics of the relevant catchments are summarised in the Table 8.4.9.2(a) below.

Table 8.4.9.2(a): Overall Catchment Area Details

Catchment	Area (km²)	1085 Slope (%)	Longest Water course length (km)
Catchment A1	80.9	0.46	17.442
Catchment A1 + A2	80.9 + 75.3	0.27	33.590
Catchment B	71.2	0.56	10.807
Catchment C1	67.0	0.44	13.414
Catchment C2	40.8	0.58	14.232
Catchment C1 + C2 + C3	112.7	0.37	15.912
Catchment D	175.5	N/A	N/A

There are also a few farm and local dams within the applicable catchments that could have an impact on the hydrology of the catchments.

8.4.9.3. Site Specific Sub-catchments

For the Shondoni Colliery mining area, all applicable sub-catchments for determining surface water flows and impacts were taken into account by Jones & Wagener (2010) for the Shondoni and the Simunye Shafts and the related infrastructure.

At this stage no site-specific sub-catchments are required for the new Block 8 North Reserve Area, as this area will have no mining infrastructure and will be ventilated by means of four new ventilation shafts located in the west and north-west region of Shondoni Colliery. The Rolspruit situated in catchment B is the primary stream flowing through the new Block 8 North Reserve Area.

8.4.9.4. Existing Storm Water Infrastructure

The existing stormwater infrastructure for Shondoni Colliery, including the Shondoni and Simunye Shaft Complexes, have been taken into account by Jones & Wagener and addressed in their earlier surface water specialist and floodline reports (2010 & 2014).

The following stormwater related infrastructure are located in the Shondoni Shaft Complex area (see Figure 4.4(a)):

- Service Water Reservoir
- Shondoni PCD;
- Shondoni Incline PCD;
- Attenuation Dam;
- Diversion berms and canal;
- Surface bunker with bunded storage area;
- Oil and silt trap;
- Parking, offices, stores and building areas; and
- Sewage Treatment Plant authorised discharge into Grootspruit

Similarly, the following infrastructure are situated at the Simunye Shaft area (see Figure 4.5(a)):

- Top and Bottom Service Water Dams;
- Parking, offices, stores and building areas;
- Electrical sub-station;
- Stonedust dump; and
- Berms, dirty water drains and bunded areas

There are four new ventilation shafts required in the revised Shondoni Colliery area as shown in Figure 4.6.2(a). The surface water related infrastructure required at these ventilation shafts are the following:

- Access roads;
- Ventilation ducts with fans; and
- Substation for power supply

The four ventilation shafts will require footprint areas of 1.5 ha (two northern shafts combined) and 1.0 ha and 0.4 ha respectively for the two western shafts. The new ventilation shafts are the following:

- North ventilation shaft (upcast) – located 395 m from nearest stream
- North ventilation shaft (downcast) – located 520 m from nearest stream
- West ventilation shaft (upcast) – located 1680 m from nearest stream
- West ventilation shaft (downcast) – located 870 m from nearest stream

Currently no new stormwater infrastructure is required on the new Block 8 North Reserve Area as all mining activities will be underground with no infrastructure required on the surface area. Similarly, no new stormwater infrastructure will be required for the four new ventilation shafts, except for local diversion berms to divert clean stormwater past the open shaft areas.

8.4.9.5. Receiving Water Body

The receiving water body for the assessment of potential surface water quantity/quality impacts of the Shondoni mine is the Vaal Dam as motivated by Jones & Wagener in their surface water specialist report (2010). There will be no change as a result of the additional new Block 8 North Reserve Area or the splitting of the Shondoni/Middelbult into two separate management units.

From the Jones & Wagener surface water report (2010) the following parameters were used for the receiving water body, the Vaal Dam:

- A catchment of approximately 38500 km^2 for the Vaal River to the Vaal Dam
- The Mean Annual Runoff (MAR) for the Vaal River at the Vaal Dam of 1929 x 106 m^3. This has been revised upwards to 1992 x 106 m^3 as per the latest WR2012 report.

8.4.9.6. Mean Annual Runoff (MAR)

MAR for the baseline conditions is based on the relevant quaternary runoff as obtained from the published WR2012, as well as the latest rainfall records obtained from the nearest operational rainfall gauge at Langsloot, which resulted in a MAP of 699.8 mm at Shondoni Colliery. This revised MAP is very similar to the MAP of 698 mm obtained from the SAWB Design Rainfall Depths at selected stations in South Africa.

Runoff volumes were calculated for each catchment area where the streams exit Shondoni Colliery's southern boundary. The outflows at these points and percentage of quaternary MAR at each point are listed in Table 8.4.9.6(a) below.

Table 8.4.9.6(a): Mean Annual Runoff impacts on Quaternary C12D

Catchment	Area km^2	MAR m^3	%
Quaternary C12D – up to 2009 (MAP = 667 mm)	899	63,440,000	
Quaternary C12D – up to Jun 2020 (MAP = 699.8 mm)	899	66,559,700	100
Sub-catchment A1 + A2 + B exit node 2	210	15,547,900	23,3
Sub-catchment C1 exit node 3	63.4	4,694,000	7,0
Sub-catchment C2 exit node 4	27	1,999,000	3,0
Sub-catchment D exit node 1	64	4,738,400	7,1
Total for sub-catchments A1, A2, B, C1, C2 & D	364,4	26,979,300	4,05

From Table 8.4.9.6(a) above it is evident that the mining at Shondoni Colliery and the new Block 8 North Reserve Area will have a significant regional impact on the receiving water should the catchment areas upstream of Shondoni be isolated and clean surface water not released into the receiving water body. The mean annual runoff from the project area is 74 mm, which corresponds well with the runoff of 50 to 100 mm listed for quaternary C12D in WR2012 map.

However, for the larger Vaal Dam receiving water body, the impact will be much lower with the MAR from the Shondoni Colliery and new Block 8 North Area being only 1,35% of the total MAR for the Vaal Dam.

8.4.9.7. Average Dry Weather Flows

The average dry weather flows for each of the nearby catchments was again derived from the monthly quaternary flow data set supplied in the WR2005 Report and adjusted with the records obtained from nearby rainfall station at Langsloot. The dry weather flow is defined as the average flow per month over the lowest three consecutive month period. This period is June to August for the drainage zone (C) in which the site is located.

The monthly flows for the C12D quaternary have been re-calculated and is shown in Table 8.4.9.7(a) below.

Table 8.4.9.7(a): Mean Monthly Runoff for Quaternary C12D (x106 m³)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total
%	9.6	16.3	12.2	17.5	19.3	12.0	5.5	2.7	0.8	0.9	0.6	2.6	100
Mean	**6.39**	**10.85**	**8.12**	**11.64**	**12.84**	**8.00**	**3.66**	**1.80**	**0.53**	**0.60**	**0.40**	**1.73**	**66.56**

The calculated average dry weather flow for the revised Shondoni Colliery mining area and new Block 8 North Reserve Area is summarised in Table 8.4.9.7(b) below.

Table 8.4.9.7(b): Average Dry Weather Flows at Shondoni Colliery Southern Boundary

Catchment	Flow (x10³ m³/month)	Flow l/s
Quaternary C12D average	510.0	194
Node 1 Sub-catchment: Wildebeesspruit	36.2	13.8
Node 2 Sub-catchment: Waterval River	118.8	45.2
Node 3 Sub-catchment: Grootspruit	35.7	13.6
Node 4 Sub-catchment: Grootspruit tributary	15.3	5.8

As can be seen the average dry weather flow over the Shondoni Colliery project area is reasonably high and represents about 40% of the quaternary average dry weather flow, mainly because of the relatively large catchment area above the four outflow nodes at the southern boundary of Shondoni Colliery.

It is thus essential that these surface water outflows from the Shondoni mining area be released to the downstream users in the receiving water body and maximised by means of proper mitigation measures.

8.4.9.8. Flood Peaks and Volumes

There are four streams impacting on the Shondoni Colliery and new Block 8 North Reserve Area i.e. Wildebeesspruit on the western boundary, Waterval River through part of the new Block 8 North Reserve Area and the middle of Shondoni Colliery, Rolspruit through the middle of the new Block 8 North Reserve Area and Grootspruit and its tributary through the eastern part of Shondoni Colliery. The drainage parameters for each of these streams were determined and are summarized in Table 8.4.9.8(a) below. Where applicable the catchment areas were combined in order to determine the correct drainage parameters for a specific location in the catchments.

Table 8.4.9.8(a): Shondoni Colliery Stream Parameters

No	Sub-Catchment	L km	Hmax	Hmin	Delta H m	S = H/1000L	H10	H85	S 1085 (m/m)
1	Waterval N A1	17.442	1685	1580	105	0.0060	1608	1668	0.0046
2	Waterval Mid A2	33.59	1685	1555	130	0.0039	1584	1652	0.0027
3	Rolspruit B	10.807	1663	1580	83	0.0077	1580	1625	0.0056
4	Grootspruit C1	13.414	1651	1565	86	0.0064	1569	1613	0.0044
5	Grootspruit C2	14.232	1660	1563	97	0.0068	1569	1631	0.0058
6	Grootspruit C+C1+C2	15.912	1651	1560	91	0.0057	1563.5	1608	0.0037

The Rational method was used for calculating the flood peaks for the various flood recurrence intervals. The results were checked against the Alternative Rational, Unit Hydrograph and Empirical Methods and found to be relatively of the same order. The Rational Method was thus adopted as the method for determining the flood peaks at the various locations identified.

The calculated flood peaks for the identified streams flowing into the receiving water body downstream of the Shondoni Colliery site are shown in Table 8.4.9.8(b) below.

Table 8.4.9.8(b): Flood peaks (m^3/s)

Sub-Catchment	Return Period (Years)			
	1:10	1:20	1:50	1:100
A1: Waterval River (north)	115	150	200	260
A1 + A2: Waterval River (mid)	180	230	315	400
B: Rolspruit	140	180	240	305
C1: Grootspruit	100	130	175	220
C2: Grootspruit tributary	70	90	120	155
C1 + C2 + C3: Grootspruit total	150	195	265	335

For the determination of flood volumes for the identified streams, a triangular hydrograph with the peak flow occurring at the critical storm duration (Tc) was assumed. The receding duration of the hydrograph was taken as equal to 2 times the critical storm duration. The flood volume results are shown in Table 8.4.9.8(b).

Table 8.4.9.8(b): Flood Volumes (x 10^6 m^3)

Sub-Catchment	Area	T_c	Return period (Years)			
	km^2	hours	1:10	1:20	1:50	1:100
A1: Waterval River (north)	80.9	4.77	2.96	3.86	5.15	6.70
A1 + A2: Waterval River (mid)	227.4	9.68	9.41	12.02	16.47	20.91
B: Rolspruit	71.2	3.06	2.31	2.97	3.97	5.04
C1: Grootspruit	67.0	3.96	2.14	2.78	3.74	4.70
C2: Grootspruit tributary	40.8	3.72	1.41	1.81	2.41	3.11
C1 + C2 + C3: Grootspruit total	112.7	4.81	3.90	5.06	6.88	8.70

The flood peaks and volumes given above are considered baseline values for current existing conditions. These flood peaks need to be adjusted to compensate for any substantial new dams or isolating areas constructed within the catchments.

The flood peaks and volumes calculated are considered representative for the current catchment conditions.

8.4.9.9. Floodlines

Floodlines for the 1:50 and 1:100 year recurrence intervals were compiled by Jones & Wagener for the Shondoni Colliery and Middelbult areas in 2014, including some portions of the new Block 8 North Reserve Area. The floodlines for the Shondoni Colliery as compiled by Jones and Wagener are delineated in Figure 8.4.9.9(a) below.

Similarly the 1:100 year floodlines for sub-catchment B, which covers the new Block 8 North Reserve Area are shown in Figure 8.4.9.9(b) below.

Where reasonably accurate survey contours are not available estimates of the approximate position of the floodlines are made by interpolation between available contours. The 100 m buffer zone (100m distance measured from stream centre line towards both left and right flanks of a stream) is also indicated and has preference in the areas where it is wider than the 1:100 yr floodlines.

The contours used for extracting the stream cross sections only supports a rough and conservative indication of the floodlines. The Shondoni present and future surface infrastructure fall well outside these floodlines. More accurate contours for refinement of floodlines is required only where future development or infrastructure is proposed to be located nearer to streams or drainage lines.

8.4.9.10. Watercourse Alterations

Due to the underground mining operations at Shondoni Colliery no watercourse alterations or stream diversions are foreseen. The proposed mine plan shown in Figure 4.4.2.3(a) indicates that several streams will be undermined which requires an exemption (or amendment if necessary) in terms of GN704 for undermining of streams.

Drainage paths that may be affected by surface subsidence are shown in Figures 8.4.9.9(a) and (b) below and should be excluded from high extraction mining. In these identified areas only mining by means of bord and pillar should be undertaken.

The proposed four new ventilation shafts will not directly impact on any watercourses and will be located outside the 1:100 year floodline zone. Stream diversions will thus not be required at these locations.

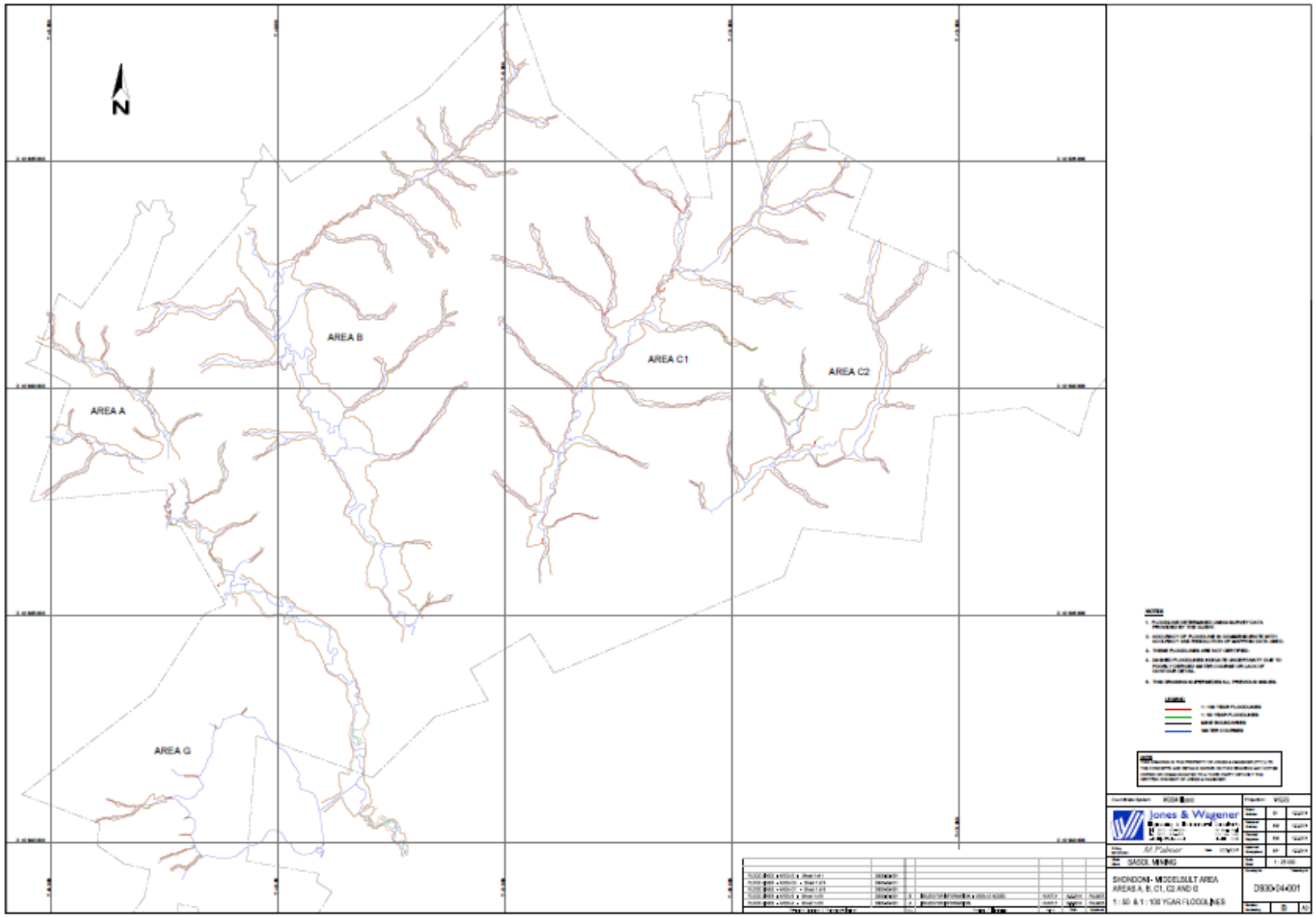


Table 8.4.9.9(a): Floodlines for Middelbult/Shondoni Colliery by Jones & Wagener

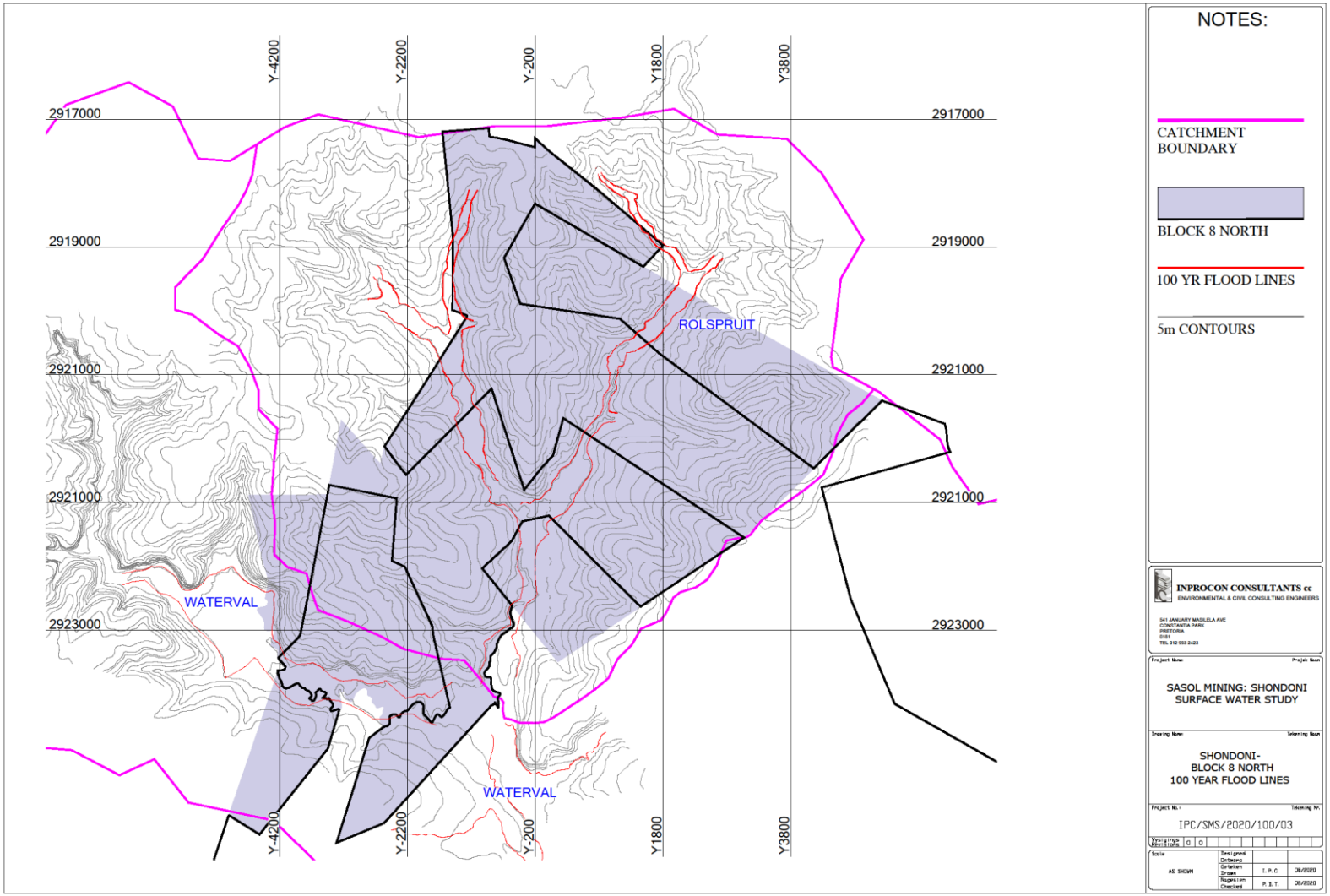


Table 8.4.9.9(b): Floodlines for Rolspruit in Sub-Catchment B in the new Block 8 North Reserve Area

8.4.9.11. Surface Water Use

Clean Water
Surface water use downstream of the site is used primarily for informal domestic purposes, agricultural and natural aquatic systems. There are a few small farm dams and one municipal dam located within the Shondoni Colliery project area but no major dams are located immediately downstream of the site.

A list of downstream water users and their specific water uses (domestic, irrigation and livestock) are provided in the 2010 Specialist report by Jones & Wagener.

Clean surface water at the Shondoni Colliery area is diverted past contact areas and released into the receiving water body, whereas any contact storm water is intercepted and contained in the two PCD's at the Shondoni Shaft Complex

Service Water
Refer to sections 4.4.4.2 and 4.5.4.2 of this report for a description of the service water use and reticulation at the Shondoni and Simunye Shaft Complexes.

8.4.9.12. Climatic Water Balance

The Climatic Water Balance (B) in mm is calculated using only two components, namely Rainfall (R) in mm and Evaporation (E) in mm (S-pan x 0,88) and is defined by B = R – E.

The value of B is calculated for the wettest six-month period of the year on record. E is thus the evaporation from a soil surface over the corresponding period for which R was calculated.

The value is recalculated for successively drier years to establish whether B is positive for more or less than 20% of the time for which data is available.

For the Shondoni site the Langsloot rainfall station #0478292 was used and for the evaporation station C1E007 (Grootdraai Dam). A record length of 26 years with the hydrological year ending 2019/20 was analysed.

During the period of consideration there were five events that resulted in positive B-values for the site. See Table 8.4.9.12(a).

8.4.9.13. Drainage Density

The drainage densities for the drainage lines in the various sub-catchments in the Shondoni Colliery and new Block 8 North Reserve Area have been calculated and are included in Table 8.4.9.13(a) below.

Table 8.4.9.12(a): Climatic Water Balance calculation for Wettest 20 Years (Wet season October - March)

Year	R (mm)	E (mm)	B (mm)
1995/96	1225	717.7	418.3
2009/10	1100.1	774.0	205.6
2008/09	979.8	767.8	123.9
1998/99	864.7	748.0	39.7
1999/00	938.2	717.7	25.3
2005/06	777.3	733.0	-20.3
1997/98	785.2	767.8	-48.6
2012/13	801.2	768.2	-54.7
1996/97	888	752.3	-97.3
2004/05	682.2	750.3	-122.5
2010/11	723.8	754.0	-128.8
2003/04	677.3	750.8	-134.1
2016/17	701.1	756.5	-155.8
2007/08	641.2	744.1	-160.9
2013/14	607.3	759.8	-177.6
2017/18	629.8	742.9	-186.4
2002/03	661	787.3	-181.3
1994/95	664	756.3	-193.8
2011/12	671.1	777.7	-230.0
2001/02	567.1	738.4	-256.5

Table 8.3.12: Drainage Density of Sub-Catchments

Sub-Catchment	Area (km²)	Streams (km)	Drainage Density km/km²
A1	80.9	71.0	0.878
A2	75.3	59.5	0.790
B	71.2	58.8	0.826
C1	66.5	55.4	0.833
C2	46.2	26.3	0.569
D	175.5	133.3	0.760
E	357.5	216.0	0.604
F	53.1	17.4	0.328
Total	926.2	637.7	0.689

The calculated drainage densities of well below 1.0 km/km² in the sub-catchments imply a relatively small number of drainage lines or streams in the Shondoni Project area, with most drainage lines in sub-catchments A1, C1 and B.

8.4.9.14. Surface Water Quality

Surface water quality will be finalized when water quality data from a surface water sample run has been completed.

8.4.9.15. Water Balance

The current water and salt balances are relayed in section 4.4.4.5 and 4.5.4.5 of this report.

The water balance for Shondoni Colliery needs to be updated to include additional water requirements for the four new ventilation shafts in the western and north-western area of Shondoni Colliery. These four new shafts will service the new Block 8 North Reserve Area underground mining operations.

8.4.10. Terrestrial Ecology (Plant and Animal Life) Aspects

Specialist consultants from ECOREX Consulting Ecologists CC were requested to conduct a detailed Terrestrial Ecology (Plant and Animal Life) specialist study in support of the proposed project.

The relevant Specialist Report is:

Terrestrial Ecology Baseline Report Shondoni / Middelbult Project (Secunda, Mpumalanga Province); August 2020.

The information provided below represents a concise summary of the baseline description compiled for the greater Shondoni/ Middelbult Colliery project area.

8.4.10.1. Flora and Vegetation Communities

The project area is situated within Soweto Highveld Grassland near the boundary with Eastern Highveld Grassland (see Figure 8.4.10.1(a)). Both of these vegetation types form part of the Mesic Highveld Grassland Bioregion. Soweto Highveld Grassland is a listed Threatened Ecosystem that has been classified as Vulnerable.

Regional and Local Vegetation Associations

In terms of the regional and local vegetation associations, Breytenbach *et al*. (1992) and Breytenbach *et al*. (1993) classified three primary associations in the Bb land type (*Cynodon dactylon - Pogonarthria squarrosa* Grassland, *Themeda triandra - Aristida sciurus* Grassland and *Eragrostis curvula – Eragrostis plana* Grassland) and two primary associations in the Ea land type (*Themeda triandra - Eragrostis curvula* Grassland in low-lying areas and *Themeda triandra - Heteropogon contortus* Grassland in high-lying areas).

All of these associations are potentially present in the project area. During the 2010 EIA/ EMP Process, Hoare (2010) described two grassland communities (*Themeda triandra – Berkheya carlinopsis* Grassland, *Hyparrhenia hirta – Helichrysum nudifolium* Grassland) and one riparian wetland community on Middelbult (Block 8), which forms part of the Shondoni project area. It is likely that other grassland and wetland associations are present elsewhere in the project area and this will be confirmed during summer fieldwork to be conducted. In the interim, all grassland associations have been mapped as "Grassland" in the vegetation map provided in Figure 8.4.10.1(b), which is based on the National Landcover Classification.

Four plant Species of Conservation Concern (SCC) are known to occur in the general vicinity of the project area, three of which are classified as Near Threatened (*Stenostelma umbelluliferum, Kniphofia typhoides, Gladiolus robertsoniae*) and one as Vulnerable (Listed Sensitive Species No. 647). Fragments of natural grassland and riparian wetlands are the most important habitats in the project area for these species. Twenty-five species that are protected under Schedule 11 of the Mpumalanga Nature Conservation Act (No. 10 of 1998) have been recorded from the general vicinity of the project area. None of these species are protected under national legislation. A relatively high number of alien species (67 species) are known to occur in the vicinity of the project area, of which 25 are listed as invasive species under the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) – NEMBA Alien and Invasive Species Lists (2014).

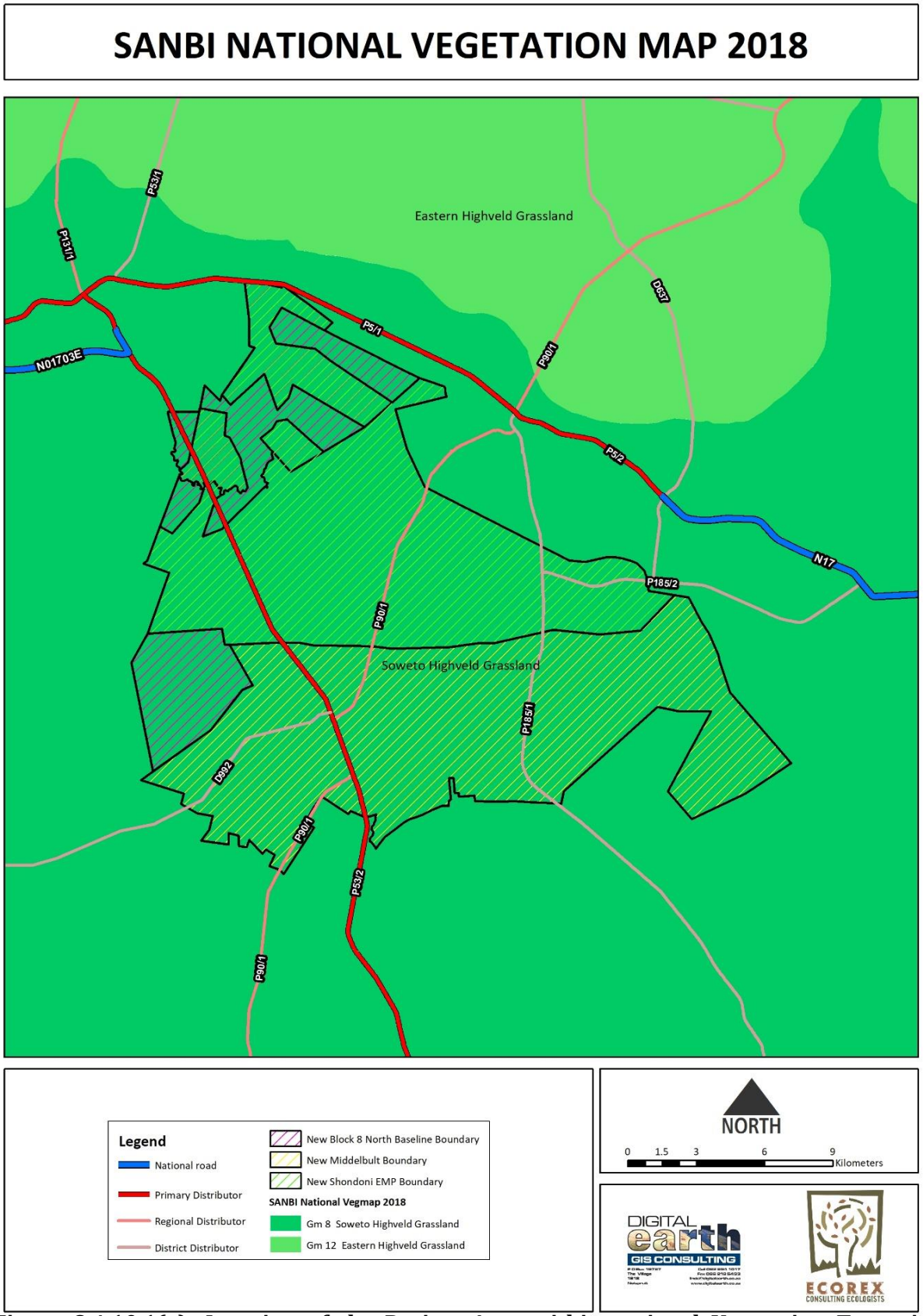


Figure 8.4.10.1(a): Location of the Project Area within national Vegetation Types in western Mpumalanga

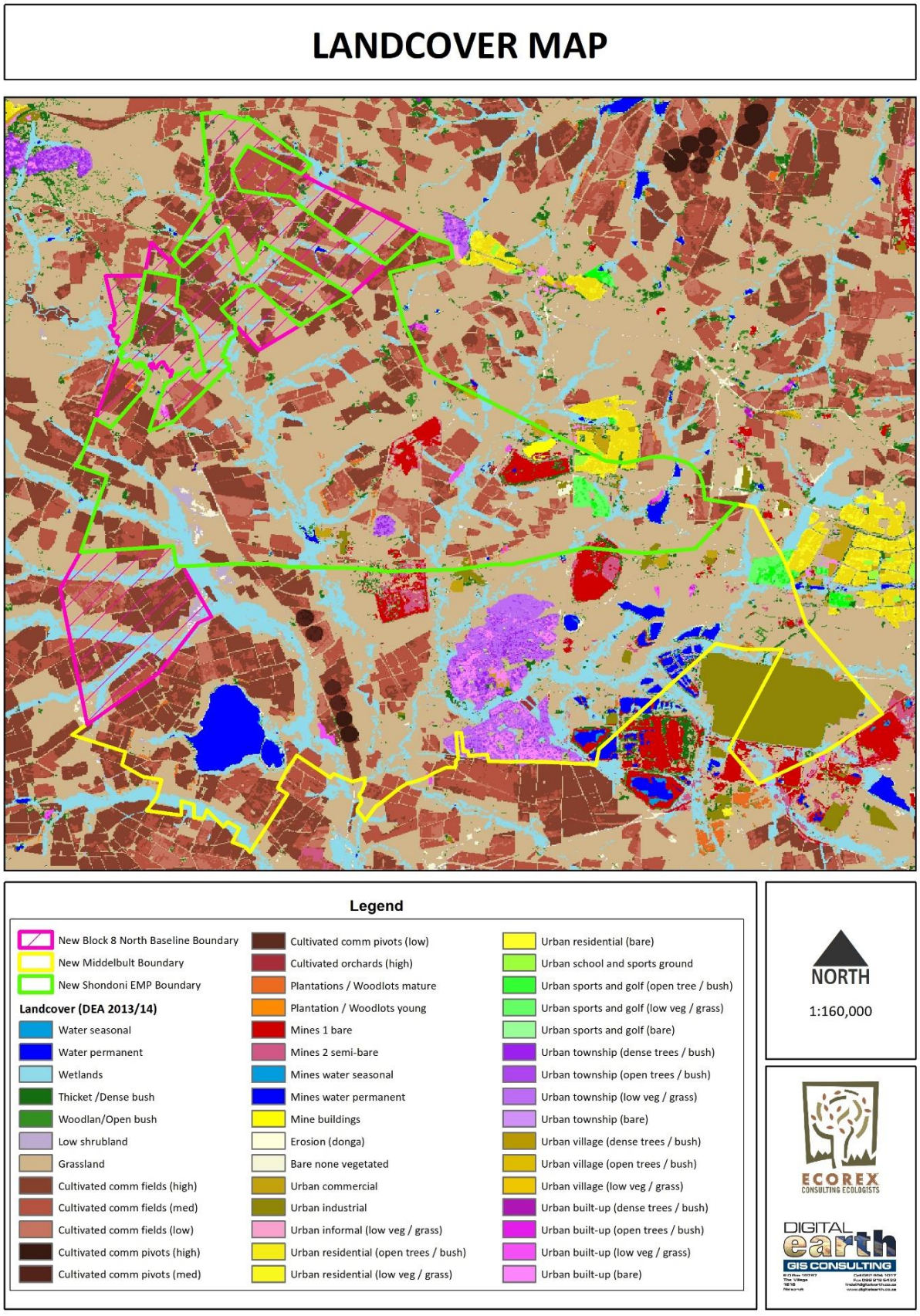


Figure 8.4.10.1(b): Vegetation Communities / Habitats represented in the Project Area

8.4.10.2. Mammals

Twenty-nine mammal species have been recorded in the vicinity of the project area in the Virtual Museum of African Mammals, although this list does not include numerous cryptic and / or nocturnal species and true species richness is likely to be higher.

Six of these mammal species are classified as Near Threatened and one species (Mountain Reedbuck) is classified as Endangered. Two of the six Near Threatened species were confirmed to occur in the Middelbult section of the project area by Wetland Consulting Services (2010), namely Southern African Vlei Rat and African Clawless Otter and are likely to be resident. Mountain Reedbuck has been recorded fairly recently in the QDGC 2629AC but it is not certain whether this was in the project area or not.

The high degree of habitat modification in the western Mpumalanga Highveld means that any remnant natural habitat, particularly the larger fragments of grassland, riparian wetland systems and large endorheic pans such as Leeuwpan (within the Middelbult Colliery EMPr boundary area), are important habitat for mammal fauna.

8.4.10.3. Avifauna

While the project area is not situated within any Important Bird and Biodiversity Areas (IBAs), it is located adjacent to the eastern boundary of the Devon Grasslands IBA.

Avifaunal species richness is high, with 217 bird species having been recorded during the current Southern African Bird Atlas Project in the atlas mapping units in which the project area is situated.

Twenty avifauna SCC have been recorded in the eleven South African Bird Atlas Project (SABAP2) mapping units in which the project area is situated. Three of these are classified as Endangered, of which two have been confirmed to occur in the project area, namely African Marsh Harrier and Yellow-billed Stork. Five of the SCC are classified as Vulnerable, of which two have been confirmed in the project area (Caspian Tern, Greater Painted-snipe). Twelve Near Threatened species occur in the mapping units in which the project area is situated, of which seven have been confirmed to occur at Leeuwpan, namely Greater Flamingo, Lesser Flamingo, Maccoa Duck, Chestnut-banded Plover, Curlew Sandpiper, Bar-tailed Godwit and Black-winged Pratincole.

The most import habitat for avifauna SCC is fragments of natural grassland, the larger and less fragmented riparian wetlands and Leeuwpan, the large endorheic pan in the southwestern part of the project area.

8.4.10.4. Herpetofauna

Twenty reptile species and 14 amphibian species have been recorded in the general vicinity of the project area according to Virtual Museum records, although this excludes numerous cryptic species and is unlikely to be a true estimate of species richness.

No threatened herpetofauna are expected to occur within the project area. One Near Threatened species potentially occurs in the area, namely the Giant Bullfrog. Potential breeding habitat for this species is present in the project area, particularly around Leeuwpan, although there is limited suitable habitat surrounding the pan. Most important habitat for herpetofauna is natural grassland, riparian wetlands and endorheic pans (particularly Leeuwpan).

8.4.10.5. Ecological Importance

Environmental Screening Tool

The Department of Environmental Affairs' Environmental Screening Tool indicated that the project area has Medium Sensitivity for Animal Species and Plant Species Themes, and Very High Sensitivity for the Terrestrial Biodiversity Theme. The rating for the Animal Species theme is based on modelled distribution of two threatened mammal species (Oribi, Spotted-necked Otter) and a threatened butterfly species (Heidelberg Copper). However, habitat characteristics in the project area are unsuitable for Oribi and Heidelberg Copper.

The rating for the Plant Species Theme is based on the confirmed occurrence of a threatened and Listed Sensitive Species (No. 647) and the modelled occurrence of another threatened species (*Pachycarpus suaveolens*). While the Listed Sensitive Species has a high likelihood of occurring in the project area, justifying the theme sensitivity, there are no records of *P. suaveolens* from the general vicinity of the project area.

The Very High Sensitivity rating of the Terrestrial Biodiversity Theme is justified by the location of the project area in Soweto Highveld Grassland, which is a listed Threatened Ecosystem (Vulnerable). In addition, the project area contains a number of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), and has been identified as a Focus Area for the provincial Protected Areas Expansion Program.

Mpumalanga Biodiversity Sector Plan (MBSP)

According to the MBSP, the key areas that need to be conserved in the project area are major drainage lines (portions of these drainage lines are classified as Critical Biodiversity Areas and Ecological Support Areas) and fragments of Natural Grassland (which are classified as Critical Biodiversity Areas or as Other Natural Areas).

It appears that Leeuwpan may have been incorrectly classified as Modified Habitat under the assumption that it is a man-made impoundment (Dr Mervyn Lötter, pers.comm.), but this endorheic pan should have been classified as a CBA on the basis of the confirmed occurrence of avifaunal SCC. The desired management objectives for CBAs are that they be kept in a natural or near-natural state, with no further loss of habitat or species.

Only low-impact, biodiversity-sensitive land-uses such as low-intensity livestock grazing are considered appropriate, while land-uses such as any form of mining or prospecting, conversion of natural habitat for agriculture or plantation forestry, expansion of existing settlements or infrastructure, and the building of new infrastructure or linear developments such as roads, railways, pipelines, etc., are considered inappropriate.

Site Ecological Importance (SEI)

An assessment of the SEI of the vegetation communities and habitats in the project area was conducted as a desktop assessment and will need to be verified by fieldwork. The habitat with the highest SEI in the project area is Natural Grassland, which is classified as High. This is largely because it represents fragments of a Vulnerable vegetation type (Soweto Highveld Grassland), has confirmed sightings of two threatened bird species (Martial Eagle, African Grass Owl), and potentially provides habitat for a number of other SCC.

The two other types of Natural Habitat present in the project area, namely Wetlands and Endorheic Pans (Leeuwpan), have an SEI of Medium. Wetlands support a small population of African Grass Owl and potentially support another two threatened bird species (African Marsh Harrier, Greater Painted-snipe), and also have relatively high connectivity (i.e. riparian wetlands are not highly fragmented). Leeuwpan has confirmed sightings of two Endangered species (African Marsh Harrier, Yellow-billed Stork), two Vulnerable bird species (Caspian Tern, Greater Painted-snipe) and several Near Threatened species (e.g. Greater and Lesser Flamingos, Maccoa Duck, Chestnut-banded Plover), as well as having high Functional Integrity as a result of its large size and is considered to have moderate resilience to disturbance. Most of the Modified Habitat in the project area has a Very Low SEI, but Modified Grassland (Old Lands) has a slightly higher SEI (Low) because of its higher Functional Integrity and the potential to support a few SCC once functional grassland is restored (e.g. Blue Korhaan).

8.4.10.6. Potential Project-related Impacts

Loss of Natural Habitat within a listed Threatened Ecosystem

The construction of any project infrastructure within Natural Habitat will result in a loss of this high value habitat and most likely be an impact of High Significance. This will also potentially prevent the project from achieving No Net Loss of Natural Habitat. This is particularly likely in grassland vegetation, which is unlikely to be successfully restored to its original state during project closure.

Loss and / or Fragmentation of Critical Biodiversity Areas (CBA's)

Two types of Critical Biodiversity Areas are located in the project area. The construction of any project infrastructure within these CBAs will result in a loss of some of this habitat, and will be non-compliant with land-use guidelines in the Mpumalanga Biodiversity Sector Plan. This is likely to be an impact of High Significance.

Loss of populations of Species of Conservation Concern

At least four plant SCC potentially occur in the project area, although this has not been confirmed. If populations of these (or other SCC) are confirmed during summer fieldwork, and the project layout includes infrastructure impacting these populations, then this will be an impact of High Significance.

Establishment of populations of alien and invasive plant species

A fairly high number of alien and invasive plant species are already present in the project area, indicating that a significant seed-base of these species is already present. The creation of disturbed ground during construction, as well as the regular movement of heavy vehicles into the project area, is likely to facilitate transport and establishment of new populations of these species. While this is potentially an impact of High Significance, it is fairly easy to mitigate and will most likely have a post-mitigation significance of Medium or Low.

Loss of and / or disturbance to fauna Species of Conservation Concern

Two Near Threatened mammals, three Endangered bird species, three Vulnerable bird species and seven Near Threatened bird species have been confirmed to occur in the project area. Construction and operational activities could result in habitat loss for these species or disturbance to these species through elevated noise levels and higher numbers of people and vehicles in the area. This is likely to be an impact of Medium Significance.

8.4.11. Aquatic Ecosystems Aspects

Specialist consultants from AquaAssess Consulting were requested to conduct a detailed Aquatic Ecosystem specialist study in support of the proposed project.

The relevant Specialist Report is:

Sasol Shondoni: Amendment and Consolidation of Environmental Authorisations: Aquatic Ecosystem Assessment, August 2020.

The information provided below represents a concise summary of the baseline description compiled for the greater Shondoni/ Middelbult Colliery project area.

In support of the proposed project, an aquatic ecosystem assessment is required to characterise the aquatic ecosystems and establish the baseline status (present ecological status; PES) of aquatic ecosystems within the project area, based on existing and new data.

The project area falls within the Upper Vaal River (C) water management area (WMA) within secondary catchment C1. The study area is drained by the Waterval River and various of its tributaries (including the Rolspruit, Bankspruit, Grootspruit, Trichardspruit, Klipspruit and Kaalspruit). The study area falls mainly within quaternary catchment C12E which is drained by the Waterval River, a tributary of the Vaal River. The Kaalspruit also flows through the study area within quaternary C12F (drained by the Waterval River).

The results discussed in terms of this assessment are based on a single survey during winter and historical data from 2010 (Wetland Consulting Services 2010) and 2002 (Palmer and Engelbrecht 2002). A winter survey is considered unreliable in terms of fish data, as fish tend to move to warmer water during winter. The data sampled in 2010 is considered outdated as they do not reflect recent developments and expansion of residential areas.

In addition, oxbow lakes which are present along the Bankspruit and Waterval River, could not be sampled because they were dry. These seasonally inundated wetlands support specialised fauna adapted to seasonal drying and are therefore important in terms of overall biodiversity. It will be essential to include reliable data from a summer survey for a more accurate description of the baseline environment.

Finally, sampling in the Rolspruit during winter was considered unreliable due to low water levels and an assessment of the Rolspruit was based on a desktop assessment (DWS 2014).

Thirteen sites were sampled during July 2020, located upstream and downstream of Sasol activities in the Waterval River, Grootspruit, Trichardtspruit, Bankspruit and Kaalspruit sub-catchments. The baseline assessment was based on on-site water quality measurements (electrical conductivity, pH, temperature and oxygen) with limited laboratory analysis (major salts and ICP scans for metals), aquatic macroinvertebrates (using SASS5, IHAS and MIRAI), habitat integrity (using the IHI) and fish.

The results are summarised below in each section provided.

8.4.11.1. Waterval River

Based on the desktop study (DWS 2014), the Waterval River was classified as PES C-D (Moderately to Largely Modified).

The middle and lower reaches of the Waterval River within the study area are considered to have a high sensitivity and importance, with riparian wetlands and oxbow lakes playing an important role in overall diversity. The river is also considered to play an important role in fish migration and habitat connectivity between reaches.

Throughout the Waterval River, water quality has been affected by domestic waste water and sewage effluent. This was particularly evident at site WV1 (see Figure 8.4.11.1(a)) , which had a high ammonium concentration and a very low diversity of aquatic macroinvertebrates (only three taxa, including an abundance of chironomid midges and oligochaetes, typically found in sewage-affected watercourses) and a complete absence of fish. Habitats, however, remained Moderately Modified, having been compromised by erosion caused by stormwater discharges, farm dams and road crossings. Overall, the upper reach was considered Category D-E (Largely to Seriously Modified).

Diversity of fish and aquatic macroinvertebrates was slightly higher in the middle reach (based on site WV2; Figure 8.4.11.1(a)), which was considered Moderately to Largely Modified (PES C-D). Only two fish species were sampled within this reach, neither of which are considered intolerant of changes in water quality.

The most downstream reach of the Waterval River was considered PES D (Largely Modified). This site is clearly impacted by inflows from the Grootspruit. Ammonium and phosphate concentrations were high, indicating sewage and domestic waste water. Diversity of aquatic macroinvertebrates was low and fish were completely absent during July 2020. In addition, the surface of the water at site WV3 (see Figure 8.4.11.1(a)) was completely covered in foam (indicating detergents) and the sampling site had to be moved slightly upstream (and renamed WV3B).

Conditions in the Waterval River have deteriorated from Moderately to Largely Modified (PES C to PES D) in 2010 to Largely to Seriously Modified (PES D to E) in 2020.

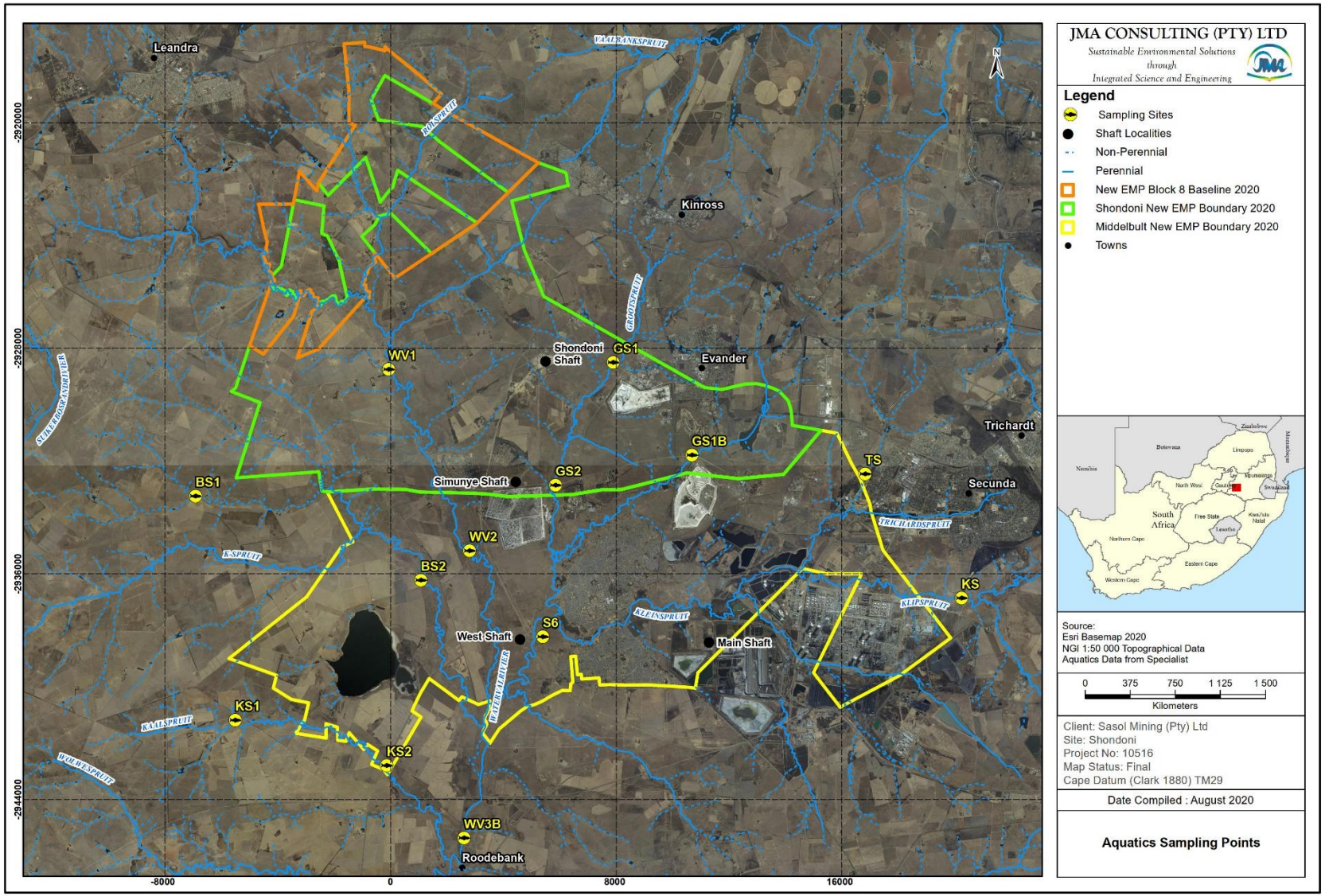


Figure 8.4.11.1(a): Map showing location of sampling sites (green markers) within the study area

8.4.11.2. Rolspruit

The Rolspruit was assessed at a desktop level only due to low water levels during July 2020. Based on DWS (2014), the Rolspruit is classified as PES C-D (Moderately to Largely Modified), with a low to moderate Ecological Importance and Sensitivity (EIS). Impacts to the Rolspruit are mainly from agricultural activities and water quality is likely to be of good quality. It is likely that the Rolspruit plays an important role in ameliorating water quality impacts (mainly due to domestic effluent and sewage emanating from Leandra) in the receiving Waterval River. It is essential that a follow up survey be conducted in summer to confirm this. The Rolspruit will be affected by new Block 8 North Reserve Area activities.

8.4.11.3. Grootspruit (including the Evanderspruit, Trichardtspruit and Klipspruit)

The upper reaches of the Grootspruit (GS1 (Figure 8.4.11.1(a)), Trichardtspruit (TS (Figure 8.4.11.1(a)) and Klipspruit (KS (Figure 8.4.11.1(a)) are still relatively intact with a PES of Moderately Modified to Largely Modified (PES C-D) in terms of habitat integrity and aquatic macroinvertebrates. The fish diversity was low but is expected to improve during summer months.

Further downstream, the PES deteriorates significantly due to mining and domestic effluent. Site GS2 (Figure 8.4.11.1(a)) is severely impacted by upstream tailings dams and other mining activities, as well as erosion due to road crossings and flow modifications. Salt concentrations were very high and may have been limiting to sensitive species. The middle reach of the Grootspruit was classified PES D (Largely Modified). No fish were sampled at site GS2 (Figure 8.4.11.1(a)).

The Evanderspruit has been significantly impacted by domestic effluent originating from Evander Town and its waste water treatment works. No aquatic macroinvertebrates or fish were sampled from this site pointing to Critically Modified conditions. Ammonium and salt concentrations were high at this site and oxygen concentrations were very low, all of which would have been limiting to aquatic biota. (Ammonium can form toxic ammonia under certain conditions).

Downstream of the confluences with the Evanderspruit and the Trichardtspruit, the Grootspruit at site S6 (Figure 8.4.11.1(a)) was considered PES E to F (Seriously to Critically Modified). Only three common, tolerant aquatic macroinvertebrate taxa were sampled and no fish. Ammonium and salt concentrations were high at this site and oxygen concentrations were very low, all of which would have been limiting to aquatic biota.

8.4.11.4. Bankspruit

During the 2010 survey (Wetland Consulting Services 2010), the Bankspruit was found to be highly sensitive and important, with near-pristine conditions present (PES A-B). It was recommended that it be given priority conservation status, with only low risk activities permitted. In addition, the temporary oxbow lakes associated with the Bankspruit "should be regarded as important and sensitive ecosystems for their role in supporting and enhancing biodiversity". It was recommended that incised reaches of the Bankspruit and Waterval River be rehabilitated to restore the hydrology that supports these oxbow lakes.

During 2020, the PES of the Bankspruit had deteriorated to a Category C-D (Moderately to Largely Modified, although most of the impacts were due to agricultural activities (farm dams and roads) and water quality remained relatively good. The channel has become increasingly eroded and incised and the diversity of aquatic macroinvertebrate and fish was relatively low. However, low water levels and flows at the time of sampling reduced the availability and suitability of sampling sites. It would therefore be essential to re-sample these sites when water levels are higher and oxbow lakes are suitable for sampling. The oxbow lakes are likely to fill from mid-December to February. A summer survey is considered essential to accurately assess the Bankspruit in terms of both fish and aquatic macroinvertebrates.

8.4.11.5. Kaalspruit

The Kaalspruit showed the same trend as the Bankspruit, deteriorating from PES B – C (Largely Natural to Moderately Modified) in 2010 to PES C - D (Moderately to Largely Modified during 2020). While habitats were largely intact, water quality impacts (increased salinity) were evident at the downstream site, resulting in a relatively low diversity of aquatic macroinvertebrates. Fish were completely absent from the Kaalspruit during July 2020. It is uncertain whether this absence was due to unsuitable winter sampling conditions or poor water quality and it would be essential to do a follow up survey during summer to verify the findings.

8.4.11.6. Conclusion

Based on an initial winter survey in July 2020, most sites in the study area were considered PES D (Largely Modified). There has been a pronounced decline at all sites since the 2002 and 2010 surveys. However, certain critical ecological information is missing and should be verified with a follow up survey in summer.

Firstly, a fish survey conducted in winter is considered unreliable because fish tend to swim to warmer water in winter. (The last fish survey was conducted in 2002 (Palmer and Engelbrecht 2002) and is considered outdated). It is therefore uncertain whether the deterioration noticed for fish and aquatic macroinvertebrates (especially in the Kaalspruit, Waterval River and Bankspruit) is due to a deterioration in water quality or due to unsuitable winter sampling conditions. A follow up survey during summer will be essential to accurately assess the baseline ecological conditions.

Secondly, several oxbow lakes associated with the Bankspruit and Waterval River will only fill with water during mid- to late-summer. These oxbow lakes support specialised pan-adapted species that can tolerate prolonged periods of dryness. These include Anostraca, Conchostraca, Copepoda, Ostrocoda and Cladocera (Palmer and Engelbrecht 2002). The specialised and sensitive nature of these pan-adapted invertebrate fauna justifies classifying these ox-bows as sensitive and important ecosystems. A summer survey will be required to confirm this status.

Although slightly degraded, the Bankspruit remains the most important and sensitive aquatic system within the study area, not only due to relatively good water quality but also due to the presence of sensitive ox-bow lakes in its riparian floodplain. Rehabilitation interventions are recommended in this sub-catchment to maintain the integrity of the ox-bow lakes.

Although the Rolspruit is classified as PES Category C-D (Moderately to Largely Modified) in the Desktop assessment (DWS 2014), it is likely to play an important role in diluting water quality impacts to the receiving Waterval River. The Rolspruit has therefore been identified as a potential sensitivity and undermining of the Rolspruit should be avoided. This will be confirmed during a summer survey.

Potential subsidence of mining areas overlying the Waterval River may result in a loss of surface water to groundwater which will affect the integrity of the Waterval River beyond the extent of the study area. Considering that the Waterval River supports important riparian floodplains (including ox-bow lakes) and serves as an important migration corridor for fish, undermining (high extraction) of the Waterval River should therefore also be avoided.

Since the integrity of most of the watercourses within the study area has been compromised to a greater or lesser extent, the importance of sound recommendations for mitigation and rehabilitation (and possible offsets) will become paramount for Sasol Shondoni and will be investigated and proposed during the following EIA Phase of the project.

8.4.12. Wetlands Aspects

Specialist consultants WCS Scientific (Pty.) Ltd. were requested to conduct a detailed Wetland delineation and assessment specialist study in support of the proposed project.

The relevant Specialist Report is:

Draft Baseline Report Sasol Shondoni, Block 8 & Middelbult Wetland Delineation and Assessment; August 2020.

The information provided below represents an extract of the baseline description compiled with specific reference to the greater Shondoni/ Middelbult Colliery project area.

8.4.12.1. Freshwater Ecosystem Priority Areas

The Atlas of Freshwater Ecosystem Priority Areas in South Africa (Nel, Driver, Strydom, Maherry, Petersen, Hill, Roux, Nienaber, van Deventer, Swartz, and Smith-Adao; 2011) which represents the culmination of the National Freshwater Ecosystem Priority Areas project (NFEPA), provides a series of maps detailing strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. The NFEPA project aims to:

- Identify Freshwater Ecosystem Priority Areas (FEPAs) to meet national biodiversity goals for freshwater ecosystems; and
- Develop a basis for enabling effective implementation of measures to protect FEPAs, including free-flowing rivers.

FEPAs were identified through a systematic biodiversity planning approach that incorporated a range of biodiversity aspects such as ecoregion, current condition of habitat, presence of threatened vegetation, fish, frogs and birds, and importance in terms of maintaining downstream habitat.

FEPAs should be regarded as ecologically important and as generally sensitive to changes in water quality and quantity, owing to their role in protecting freshwater ecosystems and supporting sustainable use of water resources (Driver, Nel, Snaddon, Murray, Roux, Hill, Swartz, Manuel and Funke; 2011).

For the Mpumalanga Province, a Water Research Commission funded project (Mbona et al., 2015), updated the wetland mapping and the classification of FEPAs. According to the updated NFEPA map for the Mpumalanga Highveld, a number of wetland areas within the study area have been highlighted as FEPA's (Figure 8.4.12.1(a)).

8.4.12.2. Provincial Conservation Plans

The Mpumalanga Biodiversity Sector Plan (MBSP) is a spatial tool that comprises a set of maps of biodiversity priority areas for use in land-use and development planning, environmental assessment and regulation, and natural resource management (Lotter; 2015). One of the key outputs of the MBSP is the identification of biodiversity priority areas. This was achieved through the compilation of maps indicating CBAs.

Figure 8.4.12.2(a) illustrates the terrestrial biodiversity assessment of the MBSP for the study area. CBA Irreplaceable areas, the highest biodiversity priorities, are indicated in red. It is clear from the linear nature of many of these CBAs that they are associated with the larger wetlands and rivers of the study area, while large areas of CBAs also occur associated with remaining natural grassland areas. Of particular note are the areas of the study area that are classified as CBA's, both irreplaceable and optimal.

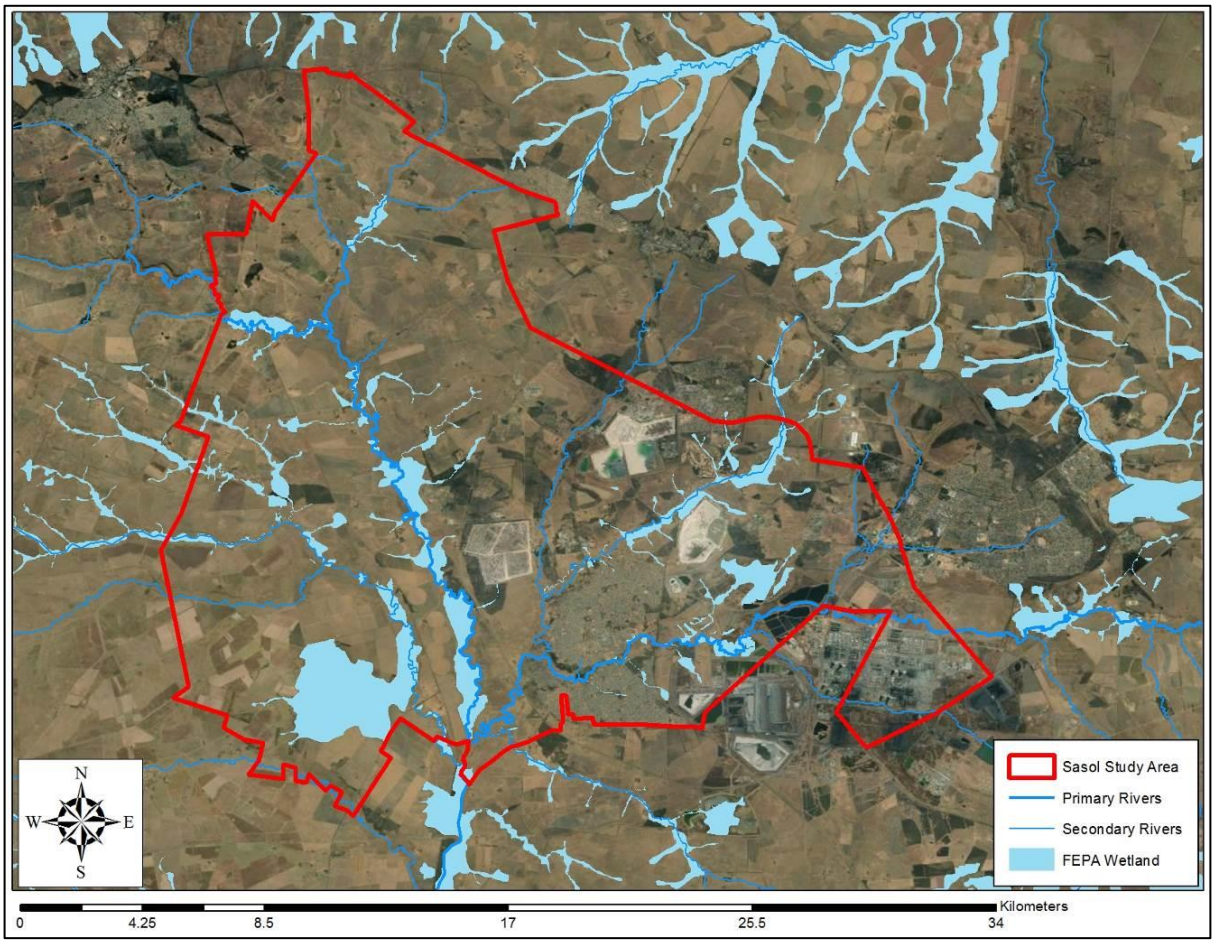


Figure 8.4.12.1(a): Map showing the Mpumalanga Highveld NFEPA wetlands dataset highlighting the presence of FEPA wetlands within the study area

CBA - Irreplaceable: This category comprises areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence and of species and the functioning of ecosystems. Such biodiversity or landscape facets are usually at risk of being lost due to the remaining distribution being below target. For example, only known sites for certain threatened species or areas of high connectivity value which have high risk of having connectivity disrupted (i.e. critical corridor linkages in the landscape).

CBA - Optimal: The CBA Optimal Areas, previously referred to as Important & Necessary in the Mpumalanga Biodiversity Conservation Plan Version 1, are the best localities out of a larger selection of available planning units as they are optimally located to meet both the various biodiversity targets and defined criteria. Even though these areas may display a lower Irreplaceability value or selection frequency score than the previous categories, it must be noted that these areas collectively reflect the smallest area required to meet the feature targets and as such, they are also regarded as CBAs.

Ecological Support Areas-Local Corridors: These are fine scale connectivity pathways that contribute to connectivity between climate change focal areas. They represent alternative pathways for movement, and thus lessen the effect of critical linkages and provide networks that are more robust to disturbance. The ecological functionality of these corridors to support biodiversity connectivity needs to be maintained.

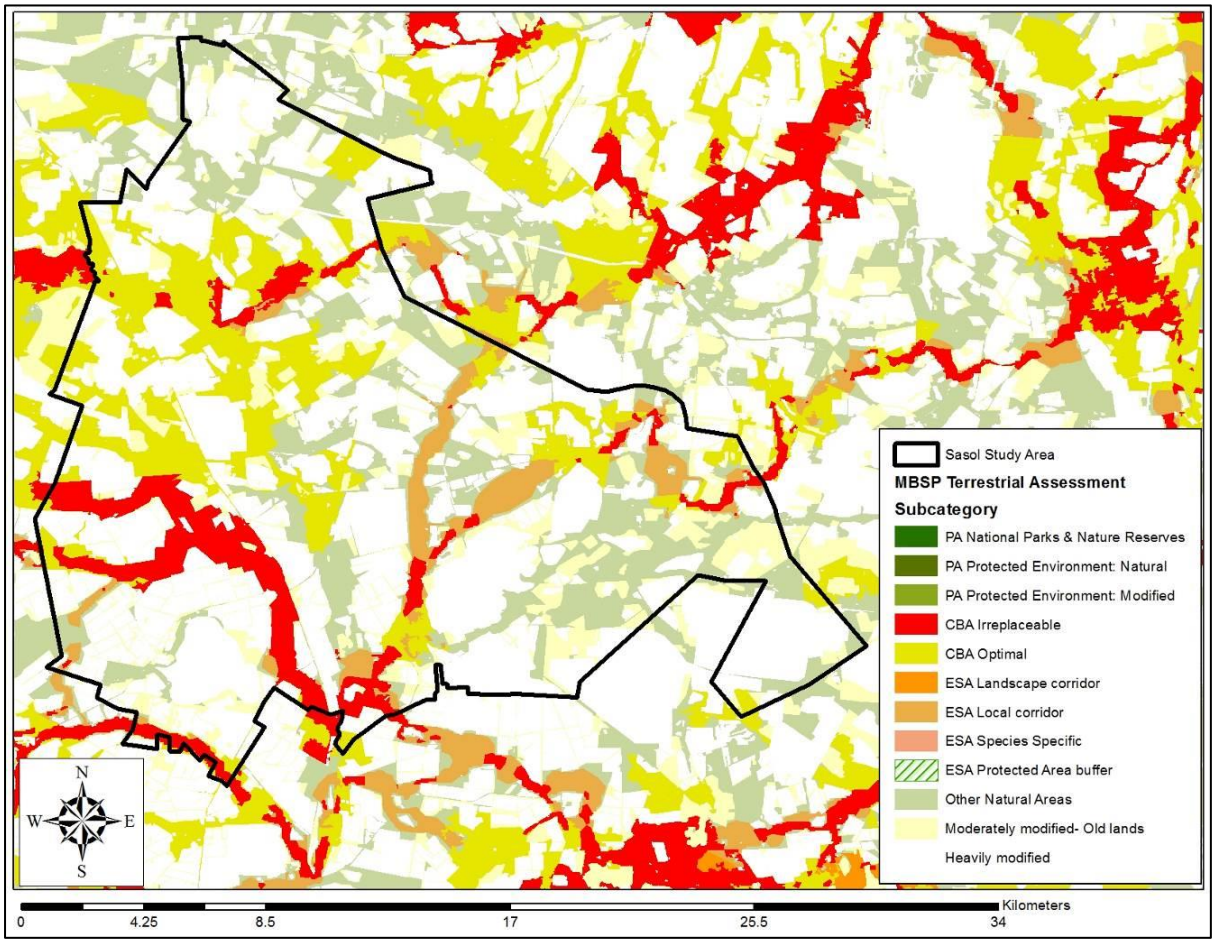


Figure 8.4.12.2(a): Extract from the Mpumalanga Biodiversity Sector Plan 2013 terrestrial biodiversity assessment

8.4.12.3. Site Specific Assessment

Wetlands within the southern half of the study area were visited, delineated and assessed in early 2018 during the Highveld summer season (WCS; 2018). As part of the assessment of the remainder of the wetlands, a field survey was undertaken in July 2020 during the Highveld winter season to identify and delineate wetlands in the field and to collect the required input data to inform classification of the wetlands.

Wetland Delineation & Typing

Within the study area six (6) different hydro-geomorphic (HGM) wetland types were identified, namely:

- Floodplain wetland
- Channelled Valley Bottom wetland
- Unchannelled Valley Bottom wetland
- Floodplain wetland
- Seep wetland
- Depression wetland

In addition to the wetlands, four further watercourse types were mapped and included within the wetland delineation:

- Drainage Line
- Artificial Depressions – wetland habitat formed within areas of subsidence.
- Artificial Seeps – seepage originating from mine-related infrastructure and urban/informal settlements
- Artificial – manmade features, such as diversions and dams.

Together the wetlands and the watercourses within the study area cover approximately 7 678 hectares or 23 % of the study area (study area covers 33 975 ha).

The delineated wetlands and watercourses are illustrated in the map below (Figure 8.4.12.3(a)), while Table 8.4.12.3(a) provides information on the actual extent of the wetlands in terms of area and the contribution that the different types of wetlands make towards the total wetland area.

Table 8.4.12.3(a): Wetland types (both natural and artificial) and the approximate total area of each within the study area

Wetland HGM Type	Area (Ha)	% of wetland area	% of study area
Floodplain	4038.3	52.60%	11.89%
Channelled Valley Bottom	1677.64	21.85%	4.94%
Unchannelled Valley Bottom	568.93	7.41%	1.67%
Seep	503.05	6.55%	1.48%
Depression	663.63	8.64%	1.95%
Drainage Line	140.65	1.83%	0.41%
Dam	56.82	0.74%	0.17%
Artificial Seep	12.62	0.16%	0.04%
Artificial Depression	12.15	0.16%	0.04%
Diversion	4.16	0.05%	0.01%
GRAND TOTAL	**7677.97**	100%	23%

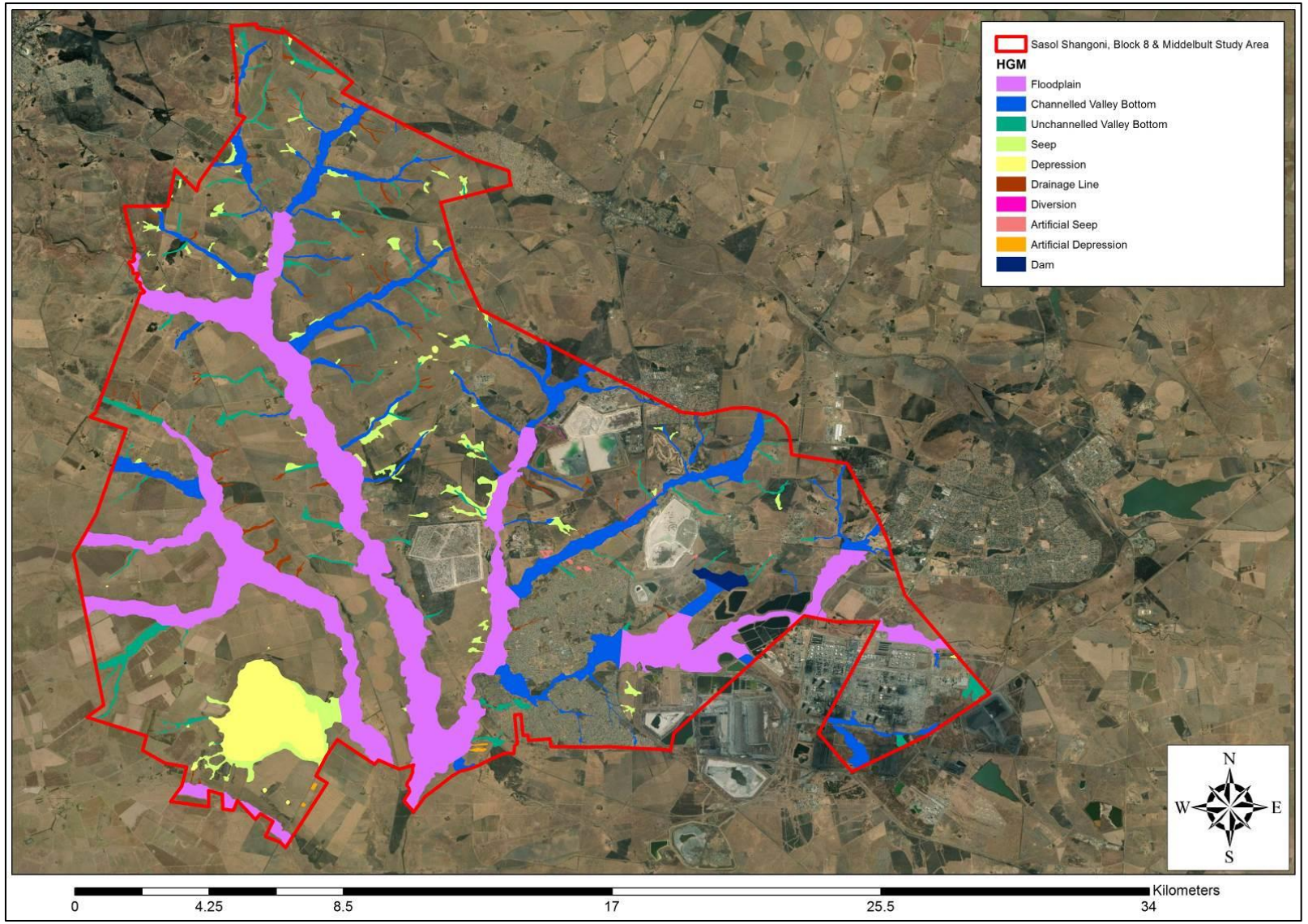


Figure 8.4.12.3(a): Map of the study area showing the extent and HGM classification of the delineated wetlands

Floodplain wetlands are the most extensive wetland type within the study area, covering over 4 000 ha (52.6 % of the wetland area onsite). The large floodplain wetlands onsite are associated with the Waterval River, Grootspruit, Klipspruit, Rolspruit, Kaalspruit and K-spruit. Typically these are broad, flat wetland systems with clearly defined channels and obvious floodplain features such as oxbows, cut-off meanders, off-channel depressions and levees. In many cases the deeply incised channels of the floodplain wetlands on site limit the occurrence of bank overtopping flood events, making these systems very dependent on lateral flow inputs. Within the study area such lateral flow inputs are likely more important in maintaining saturation of the floodplain margins than channel overtopping events derived from upstream inputs. As a result of limited bank overtopping, many of these floodplain wetlands contain large areas of rather temporary wetness that in some cases might even be classed as terrestrial. However, for the purpose of this study, the floodplain wetland boundaries were delineated along the edge of the topographic valley floor.

Channelled valley bottom wetlands cover approximately 1 678 ha (22 % of the wetland area). These systems range from small, narrow headwater wetlands to large, broad systems grading into floodplain wetlands. Channelled valley bottom wetlands, as the name indicates, are always associated with a stream channel, are located along valley floors and do not display typical floodplain features. These wetlands can vary from temporary to permanent in nature and are maintained predominantly by surface water inputs. Several of the channelled valley bottom wetlands on site display features such as backwater depressions, but due to their limited extent, these systems were not classified as floodplains. However, further downstream, where such features become more prevalent, the systems have been classified differently.

Unchannelled valley bottom wetlands are characterised by their position along valley floors, the absence of a defined channel and the prevalence of diffuse flows. Within the study area they typically occur near the headwaters of the various drainage systems. Although these wetlands cover only 569 ha of the study area, it is considered likely that under natural conditions these wetlands would have been even more extensive, with changes in land use (e.g. conversion to urban infrastructure), linear infrastructure crossings and numerous dams resulting in channel incision within many of the wetlands on site. Typically the unchannelled valley bottom wetlands of the study area can be considered seasonal systems.

Seep wetlands cover 503 ha of the study area, or 6.6 % of the wetland areas. Seep wetlands are typically maintained by sub-surface interflow through the soil profile, with surface water only appearing during periods of complete saturation. Given the widespread vertic clay soils within the study area which are generally not conducive to interflow, Seep wetlands are limited in occurrence and extent, especially when compared to other regions of the Mpumalanga Highveld characterised by more sandy soils (e.g. the Witbank coalfields).

Depression wetlands, also termed pans, cover just over 664 ha of the study area. This is predominantly due to the large extent of Leeuwpan (647 ha) in the southwest of the study area. Twenty other depressions occur within the study area, all of them smaller than 3 ha in size. These small depressions are likely to be freshwater systems and are typically dominated by sedges across the pan basin and are temporary to seasonal in nature, whereas Leeuwpan, which receives additional flows from Evander Mine, is a permanent system.

Artificial Depression wetlands were observed to have established within areas of surface subsidence associated with past underground mining. Any wetland habitat occurring within identified subsidence footprints was classified as artificial in origin (WCS; 2018). Five artificial wetlands were mapped within the study area, ranging in size from 0.3 ha to 5.2 ha and covering a combined area of 12.2 ha in total. These depression wetlands are thought to be a product of flow accumulation, primarily from precipitation and surface runoff, in low points within the landscape created by subsidence.

In many instances, these depressions are small and lie within cultivated or disturbed lands, and represent temporary wetland habitat with very limited plant species diversity. Although the occurrence of subsidence related depression wetlands is relatively low within the study area, subsidence is still evident within a number of the valley bottom and floodplain wetlands in the east of the Middelbult Colliery (WCS; 2018).

Drainage Lines. Eighty-two drainage lines were mapped within the study area (140.7 ha). These are not wetlands, but rather represent visible preferential flow paths that convey surface runoff into downslope wetlands. Typically the drainage lines display a discernible flow path but are characterised by a mix of terrestrial grass species. Within the study area they are usually associated with black clay soils of the Arcadia soil form.

8.4.12.4. Wetland Present Ecological State (PES)

The results of the Present Ecological State (PES) assessment are summarised in Table 8.4.12.4(a) and illustrated in Figure 8.4.12.4(a).

The majority of the wetland habitat was determined to be in PES categories C and D (Moderately to Largely Modified) with a total of 75 % of wetland habitat by area falling within these two categories combined. Approximately 9 % of the wetland habitat onsite was found to fall within PES categories E and F (Seriously to Critically Modified), which is a relatively high proportion.

It is likely that due to the fact that the eastern half of the study area is heavily utilised and land use modifications have been extensive, that the wetlands within this context are deteriorating to such a degree. The wetlands in the western half of the study area, where the dominant land use is agriculture are generally in better condition with the majority of wetlands Largely Modified or better.

All wetlands habitat found to fall within PES category A (Pristine), and the majority of wetlands rated B (Largely Natural) (>99 %) lie within the northern portion of the study area, for which a desktop PES assessment only was undertaken. At the other end of the scale, none of the desktop assessed wetlands fall within PES category F (critically modified). All wetlands found to be Critically Modified, and approximately 91 % of wetlands falling within PES category E (Seriously Modified) fall within the southern portion of the study area, for which a detailed PES assessment, taking into account onsite observations, was undertaken.

This strongly suggests that the desktop PES assessment tool used may be contributing towards overestimation of wetland condition. It is expected that as the desktop PES assessment tool relies solely on available land use data to inform the assessment, impacts that are not directly related to a specific land use type are not considered.

It is anticipated that when the more detailed, comprehensive wetland PES assessment tool is applied to all wetlands within the study area (this will form part of the comprehensive baseline and impact assessment report), impacts such as erosion, sedimentation, point source pollution and changes to flows, will be more fully considered and will influence a more realistic outcome in terms of the PES of the wetland systems in the north of the study area.

Table 8.4.12.4(a): Summarised results of the desktop PES assessment. Table shows the percentage of each wetland type (in terms of extent) falling into each PES category, as well as the overall percentage per category (bottom row).

Wetland Type	PES A	PES B	PES C	PES D	PES E	PES F	Total (Ha)
Channelled Valley Bottom	0.63%	19.24%	42.81%	5.55%	28.64%	3.13%	1677.64
Depression	0.05%	0.20%	1.39%	98.31%	0.05%	0.00%	663.63
Drainage Line	5.87%	20.88%	35.67%	26.47%	11.11%	0.00%	140.65
Floodplain	0.00%	17.40%	29.15%	52.16%	1.28%	0.00%	4038.30
Seep	2.92%	11.60%	35.80%	42.44%	7.23%	0.00%	503.05
Unchannelled Valley Bottom	0.00%	10.40%	58.75%	19.89%	10.95%	0.00%	568.93
Total (Ha)	**33.92**	**1173.79**	**2469.18**	**3215.93**	**646.94**	**52.45**	**7592.21**
% per PES category	**0.45%**	**15.46%**	**32.52%**	**42.36%**	**8.52%**	**0.69%**	**100.00%**

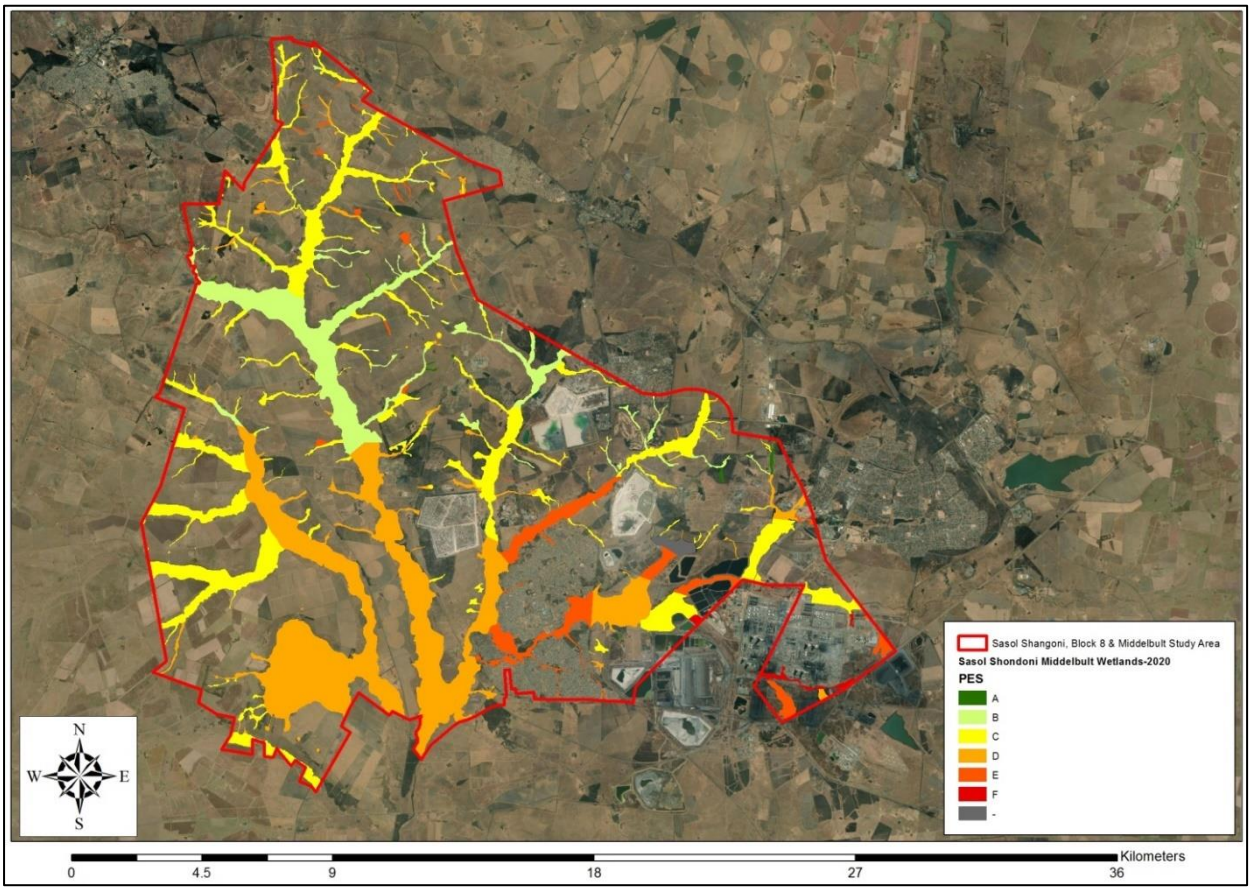


Figure 8.4.12.4(a): Results of the PES assessment of wetlands within the study area

8.4.12.5. Wetland Importance & Sensitivity (IS)

The following factors, in addition to observations made during the site assessments, such as the levels of disturbance of the wetland habitats present, species composition, habitat functionality and assumed sensitivities (related to the HGM type), contributed to the outcomes of the IS assessments:

- The wetland vegetation type of the area, Mesic Highveld Grassland Group 3, which is considered to be Least Threatened, but Not Protected.
- The designation of various sections of the study area, including large areas of delineated wetland habitat, as a "Critical Biodiversity Area – Irreplaceable" or "Critical Biodiversity Area – Optimal" according to the Mpumalanga Biodiversity Sector Plan.
- Numerous wetlands within the study area are classified as FEPA wetlands.
- The wetlands provide areas of relatively natural habitat within a mosaic of agricultural, urban and mining development and the valley bottom and floodplain systems provide linear corridors linking remaining areas of natural habitat, and as such, are expected to be utilised for breeding, feeding or migration by a wide range of species.
- The capacity of the wetlands and different wetland types to support rare, endangered or protected fauna and flora. For example, Serval, Highveld Golden Mole, Southern African Vlei Rat, African Clawless Otter, and Swamp Musk Shrew (all listed as Near Threatened according to the 2016 assessment) have been recorded in the study area quarter degree squares (2629AC, 2629CA, 2628BD and 2628DB) (FitzPatrick Institute of African Ornithology, 2020) and are known to utilise wetland and moist grassland habitat.

The results of the Wetland Importance and Sensitivity (IS) assessment are summarised in Table 8.4.12.5(a) and illustrated in Figure 8.4.12.5(a).

Almost 53 % of wetland habitat was considered to be of High Importance and Sensitivity, with this including the majority of the Floodplain wetlands on site. A key determinant resulting in the High Importance and Sensitivity rating of many of the Floodplain wetlands was the ecological importance and sensitivity, specifically the landscape level aspect. The threatened status of the vegetation type of the area, the diversity of habitats supported by the floodplain wetlands and the large size of these wetlands contributed towards this rating. This result also largely mirrors the Mpumalanga Biodiversity Sector Plan (2014), which identified much of the floodplain wetlands as Critical Biodiversity Areas (CBA's) Irreplaceable or Optimal.

43 % of wetlands were considered to be of Moderate Importance and Sensitivity, and this includes the majority of the Channelled Valley Bottom (79 %) and Unchannelled Valley Bottom (82 %), Depression (99 %) and Seep (94 %) wetlands, and just under half of the Drainage Lines (48 %). All of the artificial wetlands and approximately half of the Drainage Lines were rated as being of Low/Marginal Importance and Sensitivity.

Table 8.4.12.5(a): Summarised results of the Wetland Importance and Sensitivity assessment. The table shows the percentage of each wetland type (in terms of extent) falling into each IS category, as well as the overall percentage per category (bottom row).

Wetland Type	Very High	High	Moderate	Low/Marginal	Total (Ha)
Artificial Depression				100.00%	12.15
Artificial Seep				100.00%	12.62
Channelled Valley Bottom		19.58%	79.04%	1.37%	1677.64
Depression		0.02%	99.03%	0.95%	663.63
Drainage Line			47.74%	52.26%	140.65
Floodplain	3.34%	89.32%	7.34%		4038.30
Seep		0.37%	93.53%	6.10%	503.05
Unchannelled Valley Bottom		12.11%	81.73%	6.16%	568.93
Total (Ha)	**134.75**	**4006.63**	**3282.23**	**193.38**	**7616.99**
% per IS category	**1.77%**	**52.60%**	**43.09%**	**2.54%**	**100.00%**

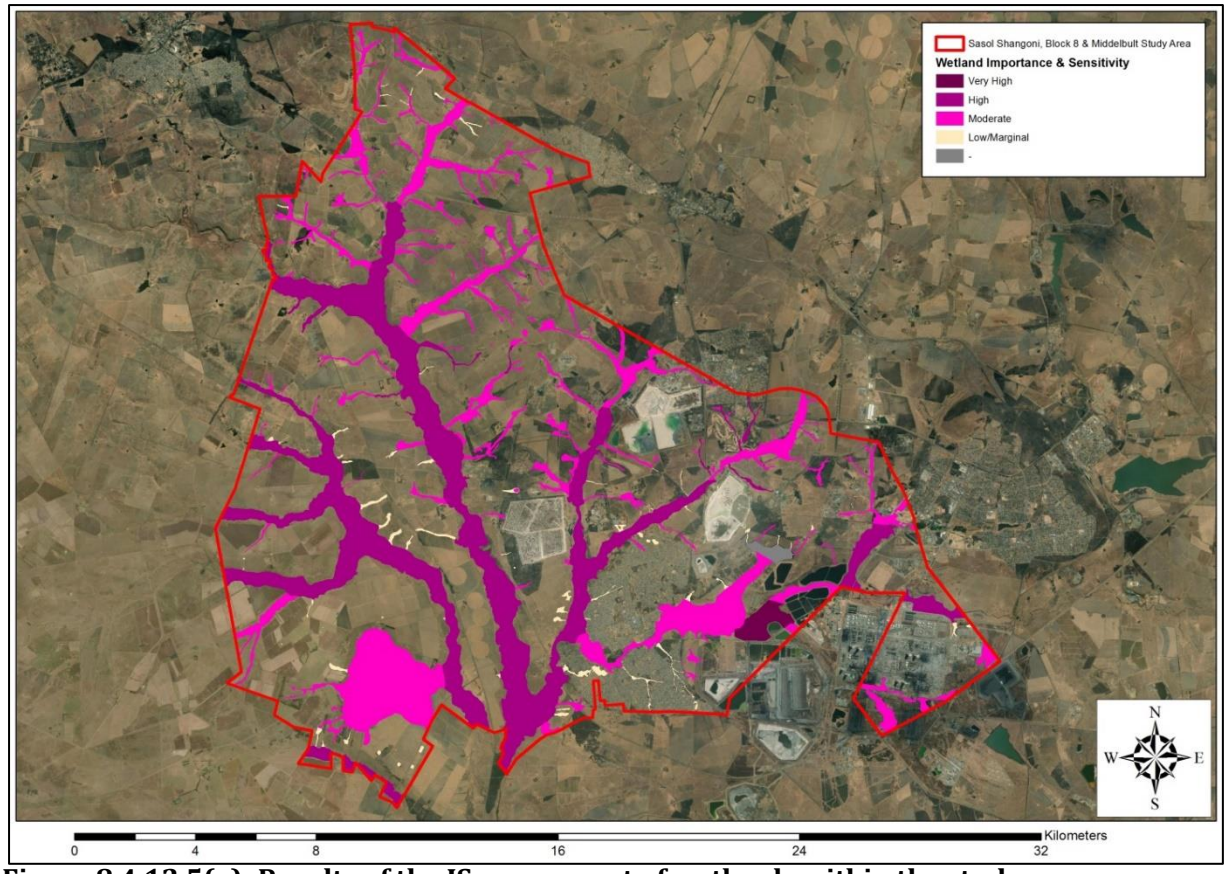


Figure 8.4.12.5(a): Results of the IS assessment of wetlands within the study area

8.4.12.6. Potential Project Related Impacts

Loss of flow from wetlands

The wetlands and watercourses within the study area are maintained by a combination of direct rainfall, surface runoff, interflow and groundwater inputs. The relevant importance of these various inputs differs between wetland types and between individual wetlands depending on characteristics of the catchment, soil and underlying geology. Not all wetlands and watercourses receive water from all the mentioned input sources, i.e. some wetlands will not receive groundwater inputs (e.g. the small depressions or headwater valley bottom systems) while others might be maintained virtually exclusively by surface runoff and direct precipitation (e.g. the numerous small drainage lines on site). The larger valley bottom and floodplain wetlands are however expected to receive flows from all the mentioned input sources, including groundwater (generally expected to be shallow groundwater from the weathered aquifer or from alluvial aquifers).

Underground mining will result in a drawdown of groundwater underneath the wetlands, raising the risk that groundwater inputs to wetlands could be lost or reduced. This potential loss of surface water and shallow groundwater supporting the wetlands on site into the mined-out voids underground is one of the biggest concerns from a wetland perspective. This impact is likely to be most significant in areas of shallow undermining, specifically also where alluvial aquifers associated with the larger rivers and streams are undermined.

Surface subsidence in wetlands

Underground mining will be undertaken using the bord-and-pillar method, which seeks to ensure structural stability of the overlying rock strata. However, undermining of wetlands raises the risk of subsidence within the wetlands where pillars fail or underground workings collapse. Subsidence within the wetlands does not only alter the surface topography of the wetlands and impact on the flow characteristics of wetlands, leading to knock-on changes in wetland vegetation, increased risk of erosion and general habitat degradation, but can also lead to the creation of preferential flow paths from surface water in the wetlands into the underground mining voids, increasing the loss of water from the wetlands.

Discharge of contaminated mine water

During the operational phase of the mine, groundwater will enter the mine workings and, where excess water is encountered, will need to be pumped to surface and disposed. Such water could potentially become contaminated within the mine workings and lead to water quality impacts to receiving watercourses on surface.

Decant of contaminated mine water

The most significant water quality impact is however likely going to occur only many years or decades after mine closure. Following completion of mining, the underground mine workings will fill with water and potentially start decanting. The likelihood or location of possible sub-surface decants have not yet been determined, but should they occur are likely to occur in low-lying locations, i.e. near rivers and wetlands. Decanting water is likely to be significantly contaminated and potentially acidic, with severe consequences for water quality and aquatic biota in receiving watercourses if allowed to enter these watercourses uncontrolled and untreated. Decant of poor quality water is also likely to persist for many decades after mine closure.

8.4.13. Air Quality Aspects

Specialist consultants from Airshed Planning Professionals were requested to conduct a detailed Air Quality specialist study in support of the proposed project.

The relevant Specialist Report is:

Air Quality Impact Assessment – Sasol Shondoni/ Middelbult Colliery, July 2020.

The information provided below represents a concise summary of the baseline description compiled for the greater Shondoni/ Middelbult Colliery project area.

The Shondoni / Middelbult operations need to comply with all regulations published under the National Environment Management: Air Quality Act (Act No. 39 of 2004), including compliance with the National Ambient Air Quality Standards (NAAQS) at all off site locations, and with the National Dust Control Regulations dust fallout limits as well as compliance with all further regulations published under the Act, including National Atmospheric Emission Inventory System (NAEIS) and Greenhouse Gas (GHG) emission reporting. No Section 21 listed activities are, or will be, conducted at the Shondoni / Middelbult operations, therefore an Atmospheric Emissions License (AEL) is not required to operate.

Air quality sensitive receptors in the project area include the towns of Embalenhle, Secunda, Evander, Kinross, Trichardt and Brendan Village. Other sensitive receptors include various farmsteads to the north, west and south of the operations. The topography of the project area is very flat, ranging from between 1500 m and 1700 m above mean sea level. The land use in the project area includes coal and gold mining surface infrastructure, including processing plants, stockpiles and tailings storage facilities, residential areas and industrial areas. The remainder of land use is agricultural, particularly to the west and south of the Shondoni / Middelbult operations, as well as to the north of the Shondoni Shaft Complex.

Other emission sources in the project area include large and small scale industrial operations, coal and gold mines, gold processing plants, coal stockpiling and handling operations, wind erosion from stockpiles, tailings storage facilities and other exposed areas, domestic fuel burning for heating and cooking, vehicle entrainment and vehicle exhaust emissions, fugitive dust from agricultural activities, biomass burning, most notably veldt fires, power station emission, landfills and water treatment operations, uncontrolled refuse and tyre burning, and brickworks.

The predominant wind field in the project area is from the east-north-easterly and west-north-westerly sectors. During the day winds from the west-north western sector are more prevalent while winds from the east-north-eastern sector occur more frequently during the night. The average wind speed over the 2015 to 2019 period was 2.46 m/s with an average wind speed of 2.9 m/s during the day and an average wind speed of 2.01 m/s during the night. Monthly variability in the wind field shows that the highest wind speeds occur during the spring months from August to November. Winds are generally calm during autumn and winter (April to July), with summer having fewer calm conditions, but generally lower wind speeds than spring. A seasonal shift in the wind field is also observed, with predominant winds from the east-northeast during the summer and early autumn (December to March) and very little wind from the west-northwest during the summer compared to winter and spring.

Ambient air quality is currently sampled at four Air Quality Monitoring Stations (AQMS) in the project area, namely the Sasol Secunda Club AQMS, Sasol Embalenhle AQMS, Sasol Bosjesspruit AQMS and DEFF Secunda AQMS.

During the 2017 to 2019 sampling period particulate (PM10 and PM2.5) concentrations were in non-compliance with the SA NAAQS at all four stations (for at least one year out of the three). Measured hourly nitrogen dioxide (NO2) concentrations exceeded the NAAQS at the Embalenhle and Secunda stations during 2017 and 2018, but annual average NO2 concentrations were in compliance with the NAAQS for all years at all stations. Measured sulphur dioxide (SO2) and carbon monoxide (CO) concentrations were in compliance with the NAAQS at all stations for all averaging periods. Measured ozone (O3) concentrations exceeded the SA NAAQS at all four monitoring stations, likely due to high point source and fugitive Volatile Organic Compound (VOC) emissions in the project area.

Although there is no SA NAAQS for hydrogen sulphide (H2S), recorded H2S concentrations were evaluated against the WHO guidelines. Daily average H2S concentrations were well below the WHO guideline for health impacts, but hourly concentrations were significantly above the odour detection threshold, with even annual average concentrations in exceedance of the odour detection threshold at two of the stations. It can be concluded that while there is no significant health impact from elevated H2S concentrations, odour impacts from ground level H2S in the project area are a significant concern.

Based on diurnal trends, vehicle exhaust and domestic fuel burning are the main contributing sources to particulate (PM10 and PM2.5), NO2 and CO pollution in the project area. Particulate concentrations are generally higher in the vicinity of industrial activities, mining and material handling operations, such as at the Bosjesspruit AQMS. Elevated industrial sources such as power plants and refineries are the main contributing sources to ground level SO2 and H2S.

Sampled dust fallout rates sampled during 2019 at all eight sampling locations close to the Shondoni Operations and overland conveyor were well below the National Dust Control Regulations limit for non-residential areas (1200 mg/m^2/day).

8.4.14. Noise Aspects

Acoustic Consulting Engineer Dr Ben van Zyl was requested to conduct a detailed Noise specialist study in support of the proposed project.

The relevant Specialist Report is:

Sasol Shondoni Block 8 North Noise Study Baseline Report, June 2020.

The information provided below represents a concise summary of the baseline description compiled with specific reference to the Shondoni Colliery EMP boundary area.

8.4.14.1. General State of the Noise Environment

Shondoni Colliery is located in a district where the initial rural ambient noise character has been affected over time by an increase in ambient levels as a result of scattered mining and other industrial activities, by traffic on the main roads, as well as by farming activities. Therefore, for purposes of noise impact assessment, typical ratings for rural districts in accordance with SANS 10103 criteria do not apply anymore in the project area and surroundings.

8.4.14.2. Noise-sensitivities

Noise-sensitive receptor areas and locations relevant to the Shondoni Colliery project area are the Chicken farm west of the Shondoni Shaft Complex and Brendan Village located more or less in the middle of the Shondoni and Simunye Shaft Complexes. Brendan Village is sensitised by its proximity to the Shondoni overland conveyor.

8.4.14.3. Current Baseline Levels

Current baseline ambient noise ratings (prior to commencement of new operations in terms of this new proposed project) were derived from data available from various previous investigations and noise surveys. The results are summarised in the table below. For perspective, it is noted that the corresponding typical background noise ratings for rural districts (SANS 10103) are 45 dBA daytime and 35 dBA night-time, respectively.

Table 8.4.14.3(a): Current Baseline Levels

Area		Baseline ambient noise level L_{Aeq} (dBA)	
		Daytime	Night-time
Shondoni Colliery	Chicken Farm	50	45
	Brendan Village	50	45

8.4.14.4. Existing Noise Impacts on Chicken Farm

Ambient noise at the Chicken Farm is determined primarily by farming activities, such as manual work activities, tractor movements, motor vehicles and speech communication.
Another significant source of ambient noise, especially after working hours, is domestic activity in and around residences located on the premises.

With the premises bordering on the R547 main road, traffic noise is also a source contributing to the ambient level.
However, because of low traffic volumes on this road, the contribution to the average ambient level at the Chicken Farm is relatively small compared to work and domestic activity noise.

In surveys carried out before and after commissioning of the Shondoni overland conveyor, it was found that noise from the Shondoni Shaft Complex operations, including the overland conveyor, could not be heard on the Chicken Farm.

Current Shondoni operations therefore have no discernible effect on the average night-time ambient level and negligible noise impact on people working and living on the Chicken Farm.

8.4.14.5. Existing Noise Impacts on Brendan Village

Local traffic, maintenance work and domestic activity are the primary sources of ambient noise in Brendan Village. Like the Chicken Farm, it also borders on the R547 main road on the western side. With low traffic volumes, the contribution of traffic noise from the main road is relatively small.

Other than the Shondoni overland conveyor, the nearest source of mining noise is the Simunye Shaft Complex approximately 750 m south of the village. Visually and acoustically, the village is partially screened off from the Simunye Shaft Complex by topography and as far as could be established, noise from the shaft is not audible in the village. Shondoni Shaft operations could also not be heard in Brendan Village. Noise from other mining activities in the district could not be heard and did not affect readings obtained during surveys and investigations.

Surveys carried out after commissioning of the conveyor, showed that conveyor noise increases the average night-time ambient level in Brendan Village by 3 dB. The worst-case impact measured during a start-stop sequence at the first row of houses nearest to the conveyor, was 4 dB. This is still less than 5 dB, the level considered to be a moderate impact.

8.4.14.6. Existing Noise Impacts in New Block 8 North Reserve Area

Current Shondoni Colliery operations are inaudible in the new Block 8 North Reserve Area and have no effect on ambient noise levels in that area.

8.4.15. Visual Aspects

Specialist Consultants Studio IWM Architects (Pty) Ltd were requested to conduct a detailed Visual Aspects specialist study in support of the proposed project.

The relevant Specialist Report is:

Visual Aspects Specialist Study Report for SASOL MINING (Pty) Ltd – Shondoni /Middelbult Colliery, June 2020.

The information provided below represents a concise summary of the baseline description compiled for the greater Shondoni/ Middelbult Colliery project area.

The Visual Impact Assessment (VIA) represents a social component within the holistic realm of EIA components and must as such be integrated with the biophysical and economic components of the studies done.

The specific deliverables of the baseline component of the VIA includes:

- The performance of a Contextual Analyses
- The performance of a View Shed Analyses
- The performance of a current status Photographic Assessment
- A description of the Visual Baseline (current) Conditions
- The performance of a Landscape Visual Quality Assessment
- The performance of a Visual Character (Sense of Place) Assessment

8.4.15.1. Contextual Analysis

It is important to provide a contextual description of the project area as it provides the main emphasis for the required visual character of the site and its activities.

Macro Context

The project site is located in the Mpumalanga Province of South Africa. The Mpumalanga Province is bounded in the north by the Limpopo Province of SA, in the west by the Gauteng Province of SA, in the east by the Swaziland and Mozambique and in the south by the Free State and Kwa-Zulu Natal Provinces of SA.

Regional Context

A discussion on the Regional Context provides the motivation to keep the area visually acceptable. Mpumalanga means "Place where the Sun Rises" and people are drawn to the province by its magnificent scenery, fauna and flora. With a surface area of only 76 495 km^2, it is the second-smallest province after Gauteng, yet has the fourth-largest economy in South Africa.

The area has a network of excellent roads and railway connections, making it highly accessible. Because of its popularity as a tourist destination, Mpumalanga is also served by a number of small airports, including the Kruger Mpumalanga International Airport. Mpumalanga falls mainly within the grassland biome. The escarpment and the Lowveld form a transitional zone between this grassland area and the savanna biome. Major economic contributors include agriculture, mining, manufacturing and tourism.

District Context

A discussion on the District Context provides a background of the visual nature of the regional attractions and activities, motivating operations to inhibit development that will change the structure of the visual character of the area.

The project area is located in the Gert Sibande District. The district is the largest of the three districts in the province, making up almost half of its geographical area.

The Main Economic Sectors are: Manufacturing (49.4%), agriculture (38.1%), transport (31.4%), trade (29.2%), community services (26.9%), construction (26.6%), electricity (26.1%), finance (23.8%), mining (23.3%).
(https://municipalities.co.za/overview/132/gert-sibande-district-municipality)

Micro Context

Land use within the project area is predominantly agriculture, consisting of maize cropping and grazing. Underground gold mining activities also occur in the area and surface infrastructure consists of shaft complexes and gold slimes dams. Human settlements in the vicinity of the project area are largely urbanised with scattered farmsteads and farm worker houses. Mixed commercial and residential land use activities are concentrated in the towns of Leandra, Evander, Embalenhle, Brendan Village and Secunda located in close vicinity to the project area.

The Sasol Shondoni and Middelbult Collieries are thus compatible with the near vicinity land use of the area and will be assessed as such.

8.4.15.2. Visibility Analysis

Where views are not obstructed by nearby objects, the existing shaft complexes and the conveyor system draws the observer's attention. If not for the setting of the project area, within an active mining area and quite far from public roads in the veldt, mining infrastructure would probably have been a short/medium-range visual concern. But in this instance, considering the setting of the site, the visual intrusion becomes moderate and acceptable.

The visual impact of the site, on the settlements in near vicinity of the site is moderate, but little or no measures can be taken to improve this. The fact that the Sasol Shondoni and Middelbult Collieries are viewed against the backdrop of rolling hills contributes to camouflage it, and the vegetation blocking many close, medium and long-range views, helps to make it become visually acceptable.

View Shed Analysis

A view shed analysis (see Figure 8.4.15.2(a)) was performed prior to the site-specific photographic analysis in order to determine the visibility of the site from priority access points/routes such as public roads, and also from farms with houses and rural settlements.

The analysis was performed with Global Mapper, creating a 3-dimensional topographical contour map, using ALOS World 3D – 30m data and Global Mapper creating the 2-dimesional View-Shed maps.

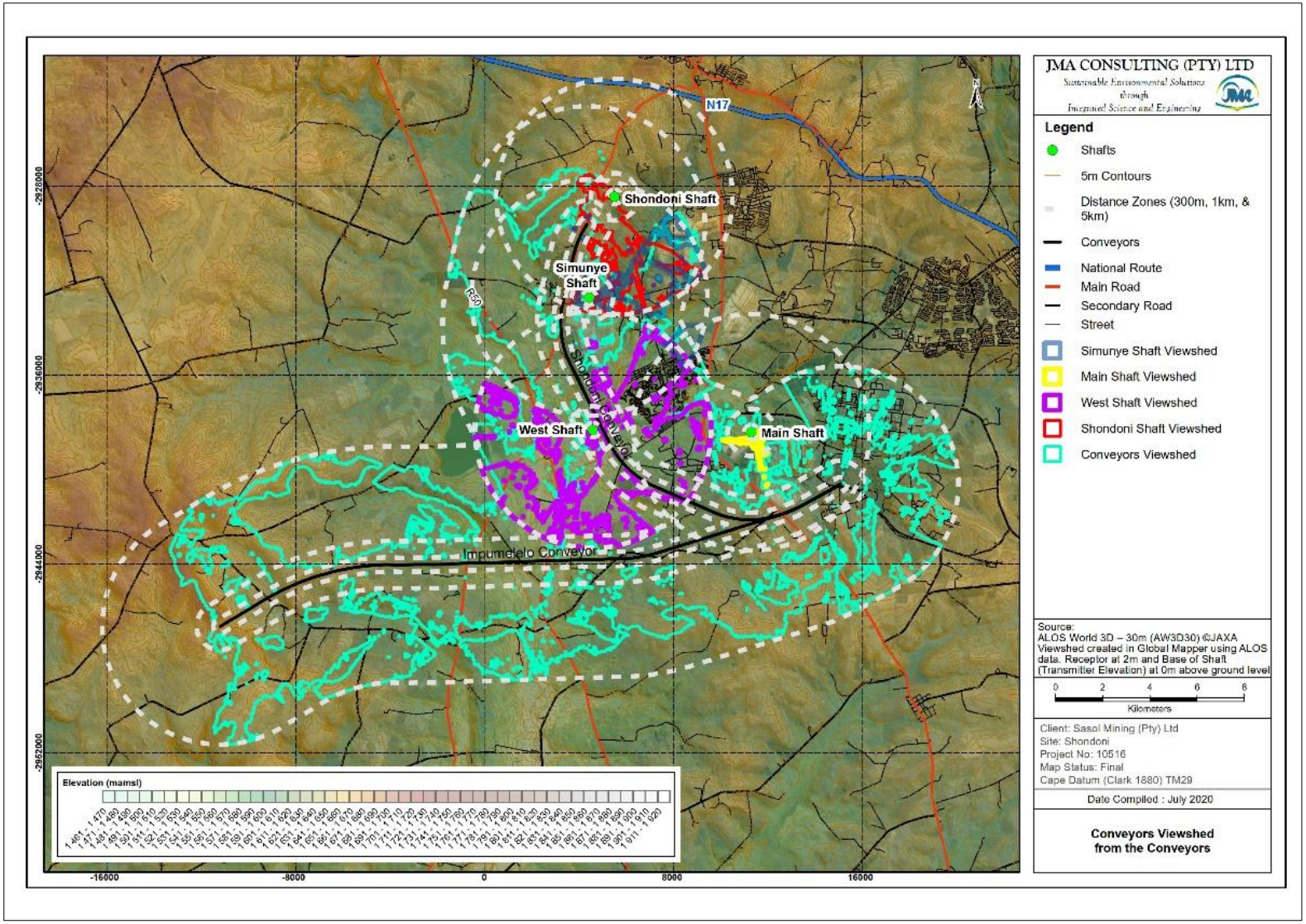


Figure 8.4.15.2(a): Combined View-Shed Map of the Sasol Mining Existing Project Area Elements

The view-shed analysis represented in Figure 8.4.15.2(a) indicates the visibility of the five existing project area elements (see description below) from all areas shown in coloured lines, and non-visibility from all other areas. It is however important to note here that the view-shed analysis is based entirely on the surface elevation data obtained from the 5 m contours and does not take vegetation or surface infrastructure into consideration.

The resulting maps provided a sound basis from which to assess potential vantage points to the sites and on which to base planning for the photographic assessment.

Visibility Range of Proposed Sites

A photographic assessment was carried out to define areas that contain key possible observation sites from which the existing facilities are visible. This analysis is used to visualise the visibility of the proposed facilities in relation to the existing baseline infrastructure over both short-, medium- and long-range views and subsequently understand the potential impacts on the environment because of them. Points from which photos were taken were chosen to explain the visibility of the site from all angles.

As evident on Figure 8.4.15.2(a), the five existing project area elements (each shaft complex has their own buffers and the fifth is the conveyor system), along with the New Proposed Block 8 North Areas that was analysed in detail are the following:

- Shondoni Shaft;
- Simunye Shaft;
- Main Shaft;
- West Shaft;
- The Conveyor System; and
- The New Proposed Block 8 North Areas.

After visiting the project area, and selecting the view points for the photographical survey along public roads and from settlements surrounding the sites, it was observed that although there are some short, medium and long-range views to the Sasol Shondoni and Middelbult Collieries, the true visibility of the sites from long-range are more restricted than indicated on the View-Shed Analysis, because of the vegetation, topography and unrelated infrastructure.

8.4.15.3. Photographic Assessment

A detailed photographic survey was done of the project area and adjacent areas from numerous surrounding vantage points shown in Figure 8.4.15.3(a). The photographic compilations are produced in 2D by taking a series of photographs of a 3D environment.

These are used to complete a view of the project area. This is done to give a clearer indication of the visual nature of the areas that will visually be affected by the activities, which will in turn aid in the design and installation of visual mitigation measures.

The photographic assessment proves support of the above-mentioned visibility range of the Sasol Shondoni and Middelbult Collieries sites.

The assessment distinguishes between long-, medium- and short-range views as well as highly-, slightly-, and not-visible views. Also indicated on the map in Figure 8.4.15.3(a) are several buffers.

Within and on the 300 m buffer around the sites, the vantage points will be short-range views. Within and on the 1 km buffer around the sites, the vantage points will be medium-range views. Further than that, all vantage points will be long-range views.

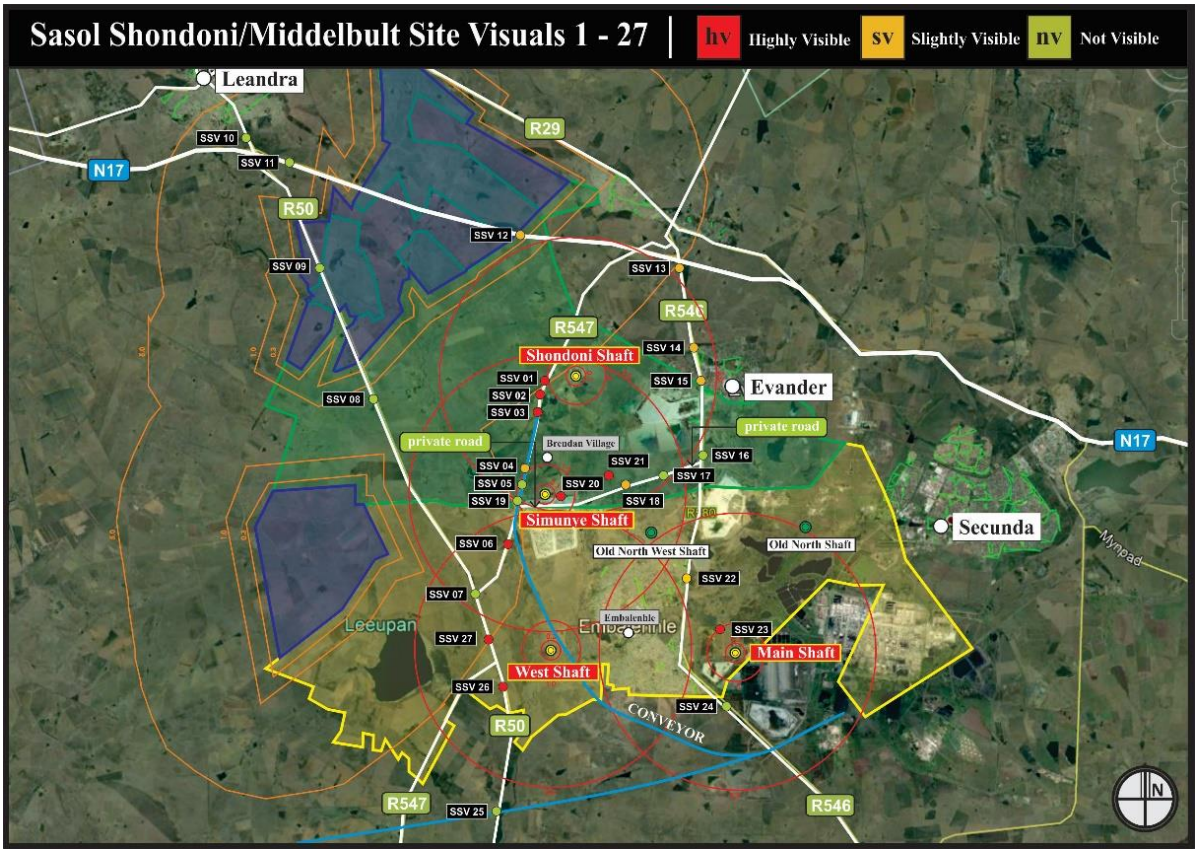


Figure 8.4.15.3(a): Map of Sasol Shondoni and Middelbult Collieries and Vantage Points from which Photographs were taken.

To avoid clustering of data and information, the photographic assessment is presented at the hand of 10 photographic in the Visual Impact Baseline Study, each representing views to Sasol Shondoni and Middelbult Collieries.

See Figure 8.4.15.3(b) for an example of the photographic compilation analysing the Sasol Shondoni and Middelbult Collieries.

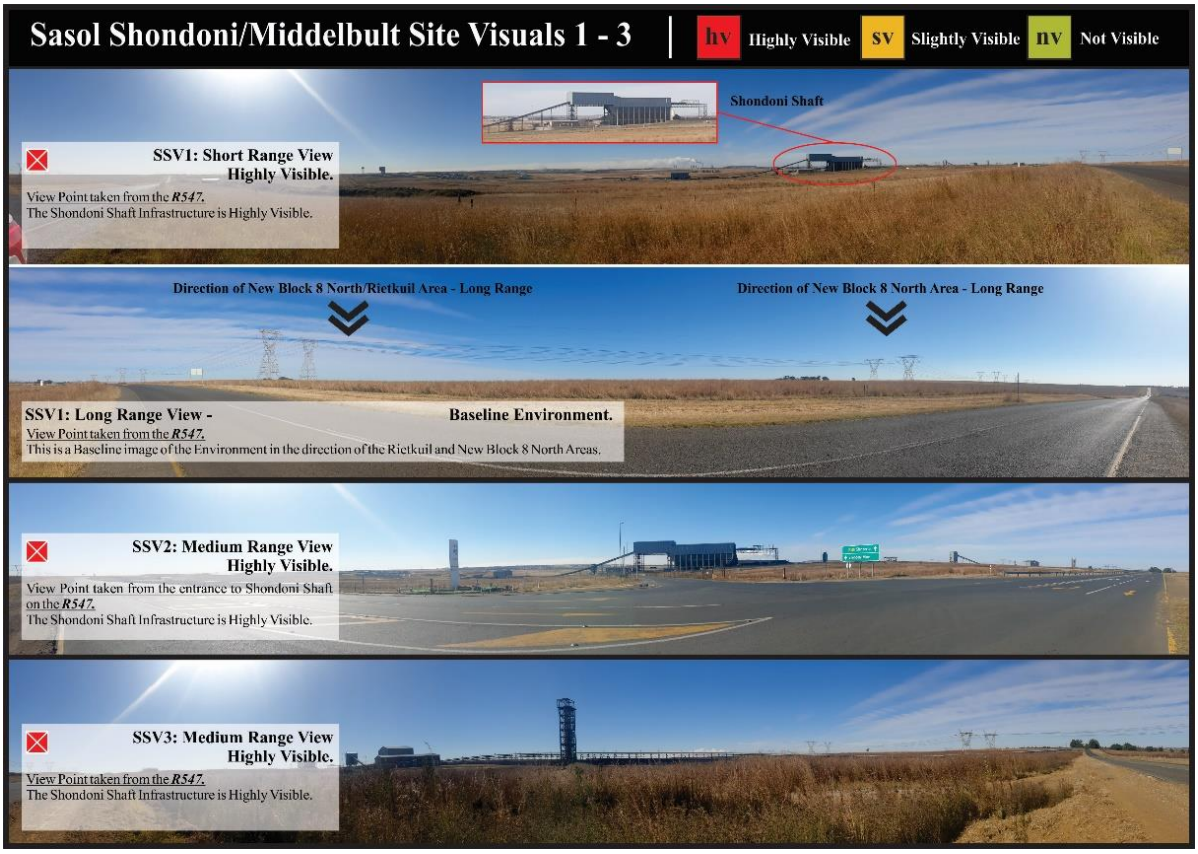


Figure 8.4.15.3(b): Sasol Shondoni and Middelbult Collieries Visuals 1 - 3. An Example of a Photographic Compilation Analysing the Sasol Shondoni and Middelbult Collieries.

8.4.15.4. Current Visual Character

<u>Regional Visual Character – Long-Range Views</u>

Regionally the visual character is three-fold:

The first: is that of the coalfields of Mpumalanga. The area around Secunda is largely occupied by mining activities and facilities. Here the perceived degree of human intrusion is moderate to high, and the vegetation not uniquely grassland anymore.

Therefore if the infrastructure is viewed from close up, against the surrounding environment as backdrop, the visual impact will be relatively low, as the nature of these elements will not contrast greatly with their surrounding visual context.

The second: is that of the grassland in which the project area is located. The perceived degree of human intrusion in this area is low with natural grasslands surrounding the 6 different analysed elements. The adjacent veldt is acceptable for natural camouflage of lower structures.

The visual impact of the 6 existing project area elements within their individual 5 km buffer areas are moderate.

The third: is that of human settlement.

The (a) Settlements of Leandra, Evander, Brendan Village, Secunda and Embalenhle (b) rural- and informal settlements, (c) farms and small holdings make out the bulk of human settlement in the near vicinity of the project area. Because the Sasol Shondoni and Middelbult Collieries are situated right in the middle of these human settlements, the Operations are visible from some of these settlements and the roads situated close by in all directions. The area is characterised by extensive human intrusion and alteration, and is visually very complex.

a) Settlements

- Leandra – The New Block 8 North project area is within the 5 km buffer from Leandra, but no or very little infrastructure is foreseen to be visible.
- Evander – The Shondoni Shaft Complex is visible from long-range views, but because of the distance to the Shaft it is barely noticeable on the horizon rendering the impact insignificant. There are also other mining activities in the area, blending the complex into the environment.
- Brendan Village – None of the shaft complexes are visible from Brendan Village, but the conveyor route is located across the road from the settlement. For the most part the existing trees will successfully screen the conveyor route. Because it is a low lying structure, the impact will also be softened by the grasses growing naturally in the area. Further the brick wall built to hide the conveyor makes the visual impact minimal.
- Secunda – None of the project area elements are visible from Secunda.
- Embalenhle – Main and West Shafts Complexes are visible from this settlement, but it is located far enough away that the long-range views render the impact insignificant. There are also other mining activities in the area, blending the Complex into the environment.

b) Rural- and Informal Settlements

The New Block 8 North project area is within the 5 km buffer from the Leandra Informal Settlement, but no or very little infrastructure is foreseen to be visible.

c) Farms and Small Holdings

The visual impact of the site, on the Farms and Small Holdings in the near vicinity of the site is moderate, but little or no measures can be taken to improve this. The fact that the Sasol Shondoni and Middelbult Collieries are viewed against the backdrop of rolling hills contributes to camouflage it, and the vegetation blocking many close, medium and long-range views, helps to make it becomes visually acceptable.

In terms of visual character, the existing facility does not intrude radically with the surrounding regional visual character.

Local Visual Character – Short/Medium-Range Views

For the purposes of this assessment, short-range views are defined as those views that are closer than 300 m to a feature, whether the view is not visible, slightly visible or highly visible.

Physical Objects Obscuring Views

When buildings, vegetation or landforms obscure a view, the range of the view is shortened, thus, eliminating the long-range view concerning objects further away. This view can no longer be influenced by the visual intrusion of an object you are no longer able to see.

In instances where physical objects do not dominate short-range views or obscure objects that are further off in the distance, the eye is automatically drawn to any prominent vertical feature, even if these are some distance away.

In this instance, short-range views across to the Shaft Complexes and their surroundings are generally restricted. Except for views from the West of Shondoni Shaft Complex and south and east of the Simunye Shaft Complex, short-range views are not accessible.

The conveyor route has five public road crossings as well as a number of private road crossings. The visual impact of the conveyor belt at these road crossings is high, but unavoidable. For the conveyor route the southern, northern and western sides are dominated by long-range views, whereas the eastern side is dominated by short-range views. Regarding the long-range views; although the conveyor belt can be seen, the visual impact is generally low.

Medium-range views offer more visibility of the mining infrastructure, but vegetation and infrastructure next to the roads offer screening in many instances.

It is important to note that the vegetation found along the roads is constantly changing, and as such the visibility of the site and surroundings subtly changes as time passes. The fact that the site is visible from short/medium-range views does not however suggest a complete negative visual impact, as there are other factors also to consider.

The Setting of the Site

Where views are not obstructed by nearby objects, the existing Shaft Complexes and the Conveyor System draws the observer's attention. If not for the setting of the project area, within an active mining area and quite far from public roads in the veldt, mining infrastructure would probably have been a short/medium-range visual concern. But in this instance, considering the setting of the site, the visual intrusion becomes moderate and acceptable.

The Backdrop against which an Element is Viewed

Another factor that may influence short-range views is the backdrop against which a project element is viewed. When viewed from close up, landscape elements are usually seen against the sky and are therefore more visible. When the same elements are viewed against a backdrop of similar colour, they tend to be "hidden" more. This phenomenon is generally reserved for medium/long-range views, as in this instance, accept in specific cases where an operation is situated close to objects higher than the components of the site.

Landscape Character

For the purposes of this assessment, landscape character is a discussion of the nature and occurrence of the physical environment.

Morphology and Topography

Currently many other mining activities, human settlements and agricultural activities surround the relevant mining infrastructure. The project area and its surrounds therefore occur in an area where the local topography and morphology have been altered due to many activities. The area therefore by no means represents a green fields morphological and/or topographical environment.

Surface Vegetative Cover

The project area is located in the Highveld Grassland Savannah Biome, the grassland savannah being a mixture of the Savannah Biome and Grassland Biome of the South African vegetation types. However, the photographic report visualizes a typical Grassland characteristic to the project area.

Visually this vegetation community is quite permeable, allowing for long-range views, especially where the viewer is in an elevated position and looks onto lower-lying areas. Small clumps of larger trees may however obscure long-range views locally.

It must be realised that vegetation is temporary and that the degree and specific instances of visual screening or obstruction offered by vegetation, constantly changes as the plants grow and die and seasons change.

Current On-Site and Adjacent Land Use

From a land use perspective, the overall landscape character is dominated by mining, agricultural and residential activities.

Sasol Shondoni and Middelbult Collieries are thus compatible with the near vicinity land use of the area and will be assessed as such.

Existing Visual Character

The existing visual character of the project area and greater region is far from undisturbed and is in fact characterised extensively by manmade elements and mining activities. The existing Sasol Shondoni and Middelbult Collieries sites are not uniquely visible and therefore do not visually dominate the area, and do not visually contrast with the area's character context.

Landscape Visual Quality Assessment

For the purposes of this assessment landscape quality is a measurement of the union of ecological integrity and aesthetic appeal. Ecological integrity refers to the condition or overall health of the landscape measured in terms of the quality of the physical environment – morphology, topography and vegetation.

Using these criteria to analyse the landscape quality of the Sasol Shondoni and Middelbult Collieries and its immediate surroundings, the following conclusions were subjectively (but in a professional opinion) made. Where the natural/expected condition of the site and immediate surroundings is unaltered, a rating of 1 is given, and where the expected existing condition is not present or has been changed, a rating of 0 is given.

Table 8.4.15.4(a): Local Landscape Quality

Ecological Integrity	
Morphology	0
Topography	0
Vegetation	0
Aesthetic Appeal	
Topographical ruggedness	0
Presence of water	1
Natural versus human landscape	0
Land use compatibility	1

As can be seen from the Table above, the ecological integrity of the site and immediate surroundings has been largely altered. With the exception of the localised alteration of the horizon from some vantage points, no significant topographical alterations have occurred at Sasol Shondoni and Middelbult Collieries – no excavations.

From the above it can be argued that the landscape quality is relatively low, but acceptable, considering that industry and mining in this area is a major economic booster for the region and the country. The area character is already damaged and typically classified as mining. Substantial human intervention has already occurred locally, and the visual intrusion of the Sasol Shondoni and Middelbult Collieries are relatively low.

Visual Character (Sense of Place) Assessment

According to Lynch (Lynch, 1992) a sense of place is "the extent to which a person can recognise or recall a place as being distinct from other places, as having a vivid or unique, or at least particular character of its own".

Using these criteria to analyse the sense of place of the Sasol Shondoni and Middelbult Collieries, the following subjective conclusions are made:

The region discussed in the mining district of Secunda has a very specific character, which is a mining, agricultural and residential/rural combination. The area itself has a relatively moderate - low visual quality, but fits into the character of place. This area is not visually unique, as it is a monotonous, typical mining/industrial area, but the natural landscape, the grasslands of Mpumalanga does give the region a unique feeling when viewed from other vantage points.

The current Sasol Shondoni and Middelbult Collieries operations character is similar to those of other mining facilities in the larger area and it can therefore not be considered to have a unique genius loci or sense of place.

The presence of the Sasol Shondoni and Middelbult Collieries do detract from the aesthetic appeal of the area, but as other mining activities also occur in the larger area, the visual impact is to some extent lessened. The nature of the visual impact will however be undesirable and visual mitigation should be considered where applicable.

8.5. DESCRIPTION OF THE CURRENT LAND USES

Refer to Figure 8.5(a) for an illustration of the different Land Use aspects associated with the Shondoni Colliery project area. Proposed activities associated with this project is also provided on Figure 8.5(a).

This map was compiled from the Department of Environmental Affairs (DEA, now Department of Environmental Affairs, Forestry and Fisheries) National Land Cover Dataset (2018).

Land use within the project area is predominantly agriculture; commercial annual crops (maize cropping) and natural grassland. Some old grassland fields (fallow) can also be differentiated within the Shondoni Colliery project area.

Mining activities are evident in the south and south-eastern part of the project area where pits and slimes dams can be distinguished.

Mixed commercial and residential land use activities are concentrated in the towns of Evander, located in the east while the residential area of Brendan Village occurs in the south.

The towns and residential areas of Secunda, Evander, Embalenhle and Kinross are located adjacent to the south-eastern, southern and north-eastern boundaries of the project area, respectively.

The adjacent land use consists of agricultural activities in the north and west, mixed commercial and residential activities to the south and east, coal and gold mining activities occur in the region with concentrations to the south, and industrial activities (SSO) in the southeast corner of the map.

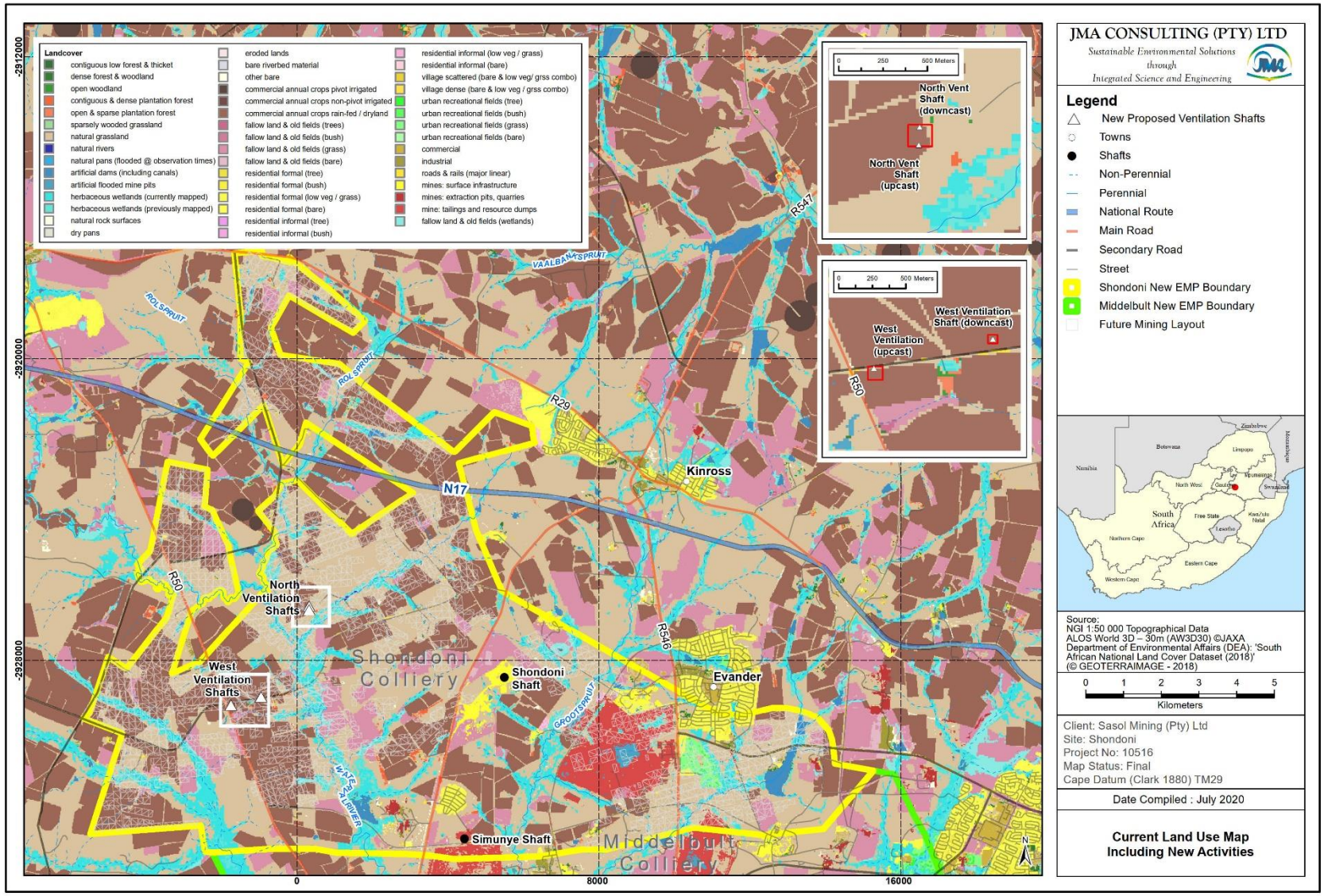


Figure 8.5(a): Current Land Use of the Project and Surrounding Area

8.6. ENVIRONMENTAL FEATURES & INFRASTRUCTURE AT NEW SITES/ACTIVITIES

The assessment made in this section was informed by a map compiled by overlaying the current land use (provided in Figure 8.5(a)) associated with the project area, the proposed activities associated with the project and the relevant environmental features as recorded and discussed by the different specialists in section 8.4 of this report.

As mentioned in sections 8.4 and 9.6 of this report, various specialist environmental studies could not be finalised and concluded as a result of time constraints imposed by the Covid-19 pandemic. Consequently, the environmental features provided and discussed in the following two sections of this report, still require verification by further field assessments. Only winter surveys could be performed for several of the environmental components considered and the summer surveys are still required. A request to extent the EIA Phase of the project in order to finalise and conclude the specialist environmental assessments is described and provided in section 9.6 of this report.

The environmental features and infrastructure map compiled is provided as Figure 8.7(a) and the details is discussed in section 8.7 of this report.

Table 8.6(a) below, lists the proposed project activities and also identifies the current land use (discussed in section 8.5) and the environmental features associated with these activities.

The potential impact (considering all life-cycle phases of a particular activity) that the proposed project activities might have on the current land use and environmental features identified will be verified and assessed in detail during the EIA phase of this project.

Table 8.6(a): Environmental Features associated with proposed Activities

Activity	Current Land Use	Environmental Feature
Underground Mining	Natural Grassland, Commercial Annual Crops, Fallow land and Old Fields, Wetlands, Natural Rivers, Artificial Dams, Mining Related Activities.	Archaeological and Heritage Aspects, Geological Aspects, Surface Water, Terrestrial Ecological Aspects, Wetlands
West Upcast Ventilation Shaft	Commercial Annual Crops	Geological Aspects, Surface Water, Terrestrial Ecological Aspects, Wetlands
West Downcast Ventilation Shaft	Commercial Annual Crops	Geological Aspects, Surface Water, Terrestrial Ecological Aspects, Wetlands
North Upcast Ventilation Shaft	Commercial Annual Crops	Archaeological and Heritage Aspects, Geological Aspects, Surface Water, Terrestrial Ecological Aspects, Wetlands
North Downcast Ventilation Shaft	Commercial Annual Crops	Archaeological and Heritage Aspects, Geological Aspects, Surface Water, Terrestrial Ecological Aspects, Wetlands

8.7. ENVIRONMENTAL AND CURRENT LAND USE MAP

All the information generated by the specialists during their baseline assessments in support of this project, was collated to show the geographical distribution of the relevant environmental features associated with the Shondoni Colliery project area.

These environmental features as well as the existing shaft complexes and proposed activities were overlaid and the resulting Environmental Features and Infrastructure Map is provided in Figure 8.7(a).

A large-Scale version of this map is attached as **APPENDIX 8(A)** to this report.

The following Environmental Features are presented on this map:

- Archaeological and Heritage Resources
- Geological Aspects (Faults)
- Surface Water Environment (Rivers and Streams)
- Terrestrial Ecological Important Areas
- Wetland Environment

The following existing Infrastructure are presented on this map:

- Position of the Shondoni and Simunye Shaft Complexes

The following proposed activities are presented on this map

- Position of the four proposed Ventilation Shafts
- Layout and extent of the future underground mining associated with Shondoni Colliery

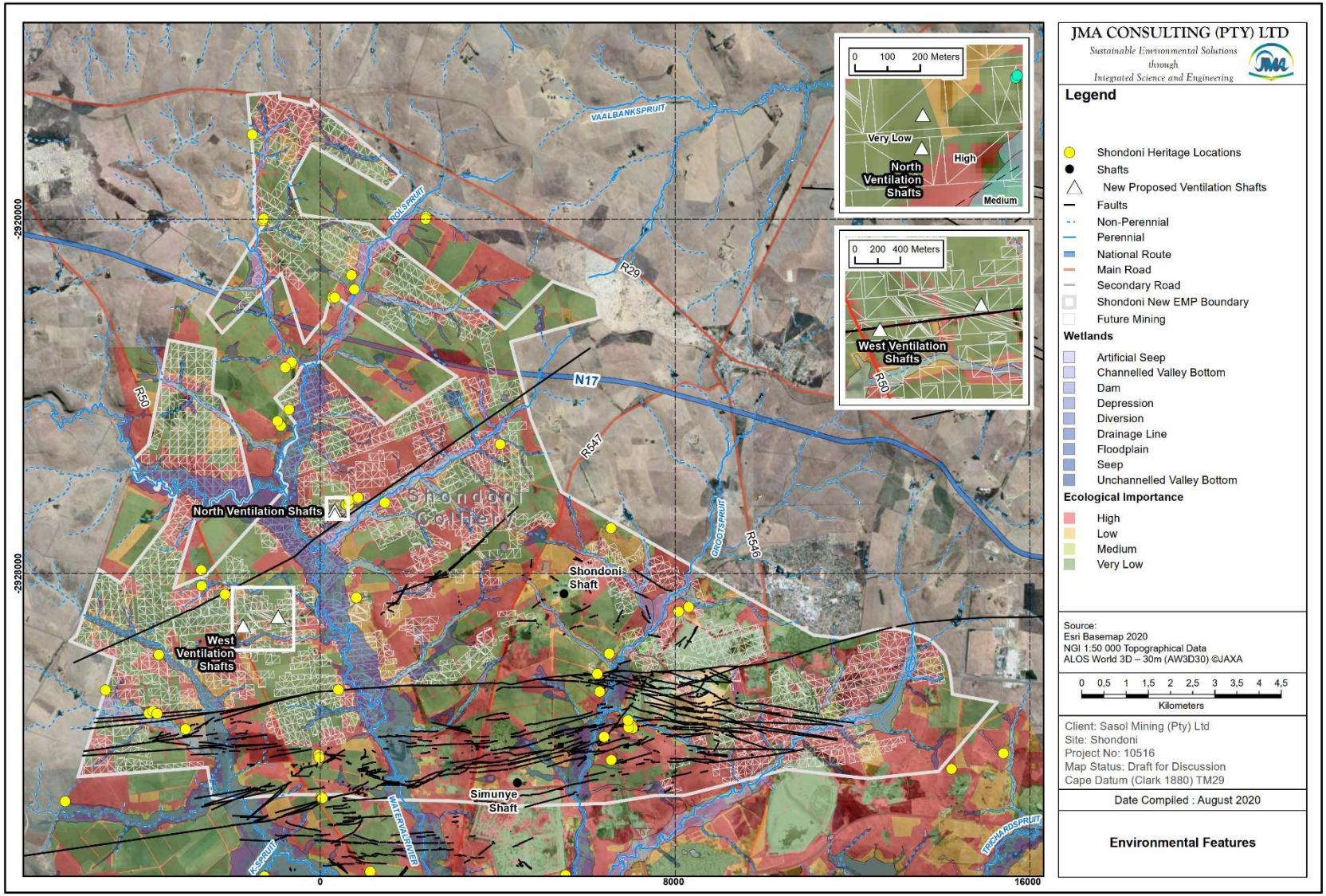


Figure 8.7(a): Environmental Features and Infrastructure at Shondoni Colliery

8.8. POTENTIAL IMPACTS ASSOCIATED WITH PROPOSED ACTIVITIES

This section does not provide the comprehensive impact assessment for the overall project but relates specifically to a **provisional impact assessment** conducted for all the proposed activities with new footprints to **confirm the initial site layout** as shown in Figure 8.7(a). The site layout reflected in Figure 8.7(a) therefore **already represents a considered** layout in which certain environmental features have been considered.

This site layout includes the localities of the proposed ventilation shafts, which represents the **preferred alternative sites** selected based predominantly on ventilation simulation models and an environmental site selection process in as far as possible. This process and outcome of which is described in detail in section 8.1, 8.12, 8.13 and 8.14 of this report.

As indicated in the following section (Table 8.9(d)) of this report, the extent of the risk anticipated with a Level 4, 5 and 6 Risk, is less severe in nature than risks considered to be of a significant nature (Level 1, 2 and 3 Risk).

The potential impacts listed in Table 8.8(a) therefore relate specifically to impacts, that if still considered significant (i.e. Level 1, 2 and 3 Risk) after mitigation, it would require an alteration in the site layout as proposed in Figure 8.7(a).

Please note that only activities requiring new site footprints are listed in the Potential Impact Table. It should also be noted that the impact assessment was conducted from the premise that all the design features aimed at environmental protection of the identified environmental features on site would be implemented during development. These include the minimisation of developmental footprints.

With reference to the outcome of the impact assessment as reflected in Table 8.8(a), the following is relevant:

- The purpose of the impact assessment is to inform/confirm the site layout plan.
- Impacts assessed varied between **Level 4** and **Level 6** in terms of the Level of Risk associated with the activity.
- Impacts related to loss of Terrestrial Ecological Habitat, rated as a **Level 5** Risk based on the fact that the footprint proposed for the north ventilation shafts might impact on a small fraction of the natural grassland (Soweto Highveld Grassland; Threatened Ecosystem; Vulnerable). The location of these shafts was however determined by the ventilation simulation model to ensure optimal ventilation benefit.

Table 8.8(a): Potential Impacts Identified and Assessed (Design Mitigation taken into Consideration)

Activity	Environmental Aspect	Potential Impact	Quantity/ Magnitude	Toxicity/ Severity	Extent/ Spatial Scale	Duration	Status	Legislation	I & AP's	Severity Score	Consequence Category	Probability	Risk
West Upcast Ventilation Shaft	Land Use/ Capability	Changes in land use/ capability due to development of infrastructure	2	2	1	1	1	1	2	**10**	**I3**	**P7**	**Level 4**
	Surface Water (Aquatic Ecosystems)	Contamination of the surface water resource shaft related activities	2	2	1	1	1	1	2	**10**	**I3**	**P4**	**Level 5**
	Terrestrial Ecology	Deterioration of floral and faunal habitat due to shaft related activities	2	2	1	2	1	1	3	**12**	**I3**	**P5**	**Level 5**
	Wetlands	Deterioration in surface water quality due to shaft related activities	2	2	1	1	1	1	2	**10**	**I3**	**P4**	**Level 5**
	Air Quality	Deterioration in Air Quality due to gaseous emissions from vehicle activities as well as dust generated during construction and decommissioning activities	1	0	0	0	1	1	1	**5**	**I2**	**P4**	**Level 6**
	Noise	Noise generating activities associated with shaft structure	2	1	0	1	1	1	2	**8**	**I2**	**P7**	**Level 5**
	Visuals	Impacts on visibility, visual exposure, visual intrusion and landscape morphology due to the presence of infrastructure	2	1	0	0	1	1	2	**7**	**I2**	**P6**	**Level 6**
West Downcast Ventilation Shaft	Land Use/ Capability	Changes in land use/ capability due to development	2	2	1	1	1	1	2	**10**	**I3**	**P7**	**Level 4**
	Surface Water (Aquatic Ecosystems)	Contamination of the surface water resource shaft related activities	2	2	1	1	1	1	2	**10**	**I3**	**P4**	**Level 5**
	Terrestrial Ecology	Deterioration of floral and faunal habitat due to shaft related activities	2	2	1	2	1	1	3	**12**	**I3**	**P5**	**Level 5**
	Wetlands	Deterioration in surface water quality due to shaft related activities	2	2	1	1	1	1	2	**10**	**I3**	**P4**	**Level 5**
	Air Quality	Deterioration in Air Quality due to gaseous emissions from vehicle activities as well as dust generated during construction and decommissioning activities	1	0	0	0	1	1	1	**5**	**I2**	**P4**	**Level 6**
	Noise	Noise generating activities associated with shaft structure	2	1	0	1	1	1	2	**8**	**I2**	**P7**	**Level 5**
	Visuals	Impacts on visibility, visual exposure, visual intrusion and landscape morphology due to the presence of infrastructure	2	1	0	0	1	1	2	**7**	**I2**	**P6**	**Level 6**

Activity	Environmental Aspect	Potential Impact	Quantity/ Magnitude	Toxicity/ Severity	Extent/ Spatial Scale	Duration	Status	Legislation	I & AP's	Severity Score	Consequence Category	Probability	Risk
North Upcast Ventilation Shaft	Land Use/ Capability	Changes in land use/ capability due to development	2	2	1	1	1	1	2	**10**	**I3**	**P7**	**Level 4**
	Surface Water (Aquatic Ecosystems)	Contamination of the surface water resource shaft related activities	2	2	1	1	1	1	2	**10**	**I3**	**P4**	**Level 5**
	Terrestrial Ecology	Deterioration of floral and faunal habitat due to shaft related activities	2	2	1	3	1	1	3	**13**	**I3**	**P6**	**Level 5**
	Wetlands	Deterioration in surface water quality due to shaft related activities	2	2	1	1	1	1	2	**10**	**I3**	**P4**	**Level 5**
	Air Quality	Deterioration in Air Quality due to gaseous emissions from vehicle activities as well as dust generated during construction and decommissioning activities	1	0	0	0	1	1	1	**5**	**I2**	**P4**	**Level 6**
	Noise	Noise generating activities associated with shaft structure	2	1	0	1	1	1	2	**8**	**I2**	**P7**	**Level 5**
	Visuals	Impacts on visibility, visual exposure, visual intrusion and landscape morphology due to the presence of infrastructure	2	1	0	0	1	1	2	**7**	**I2**	**P6**	**Level 6**
North Downcast Ventilation Shaft	Land Use/ Capability	Changes in land use/ capability due to development	2	2	1	1	1	1	2	**10**	**I3**	**P7**	**Level 4**
	Surface Water (Aquatic Ecosystems)	Contamination of the surface water resource shaft related activities	2	2	1	1	1	1	2	**10**	**I3**	**P4**	**Level 5**
	Terrestrial Ecology	Deterioration of floral and faunal habitat due to shaft related activities	2	2	1	3	1	1	3	**13**	**I3**	**P6**	**Level 5**
	Wetlands	Deterioration in surface water quality due to shaft related activities	2	2	1	1	1	1	2	**10**	**I3**	**P4**	**Level 5**
	Air Quality	Deterioration in Air Quality due to gaseous emissions from vehicle activities as well as dust generated during construction and decommissioning activities	1	0	0	0	1	1	1	**5**	**I2**	**P4**	**Level 6**
	Noise	Noise generating activities associated with shaft structure	2	1	0	1	1	1	2	**8**	**I2**	**P7**	**Level 5**
	Visuals	Impacts on visibility, visual exposure, visual intrusion and landscape morphology due to the presence of infrastructure	2	1	0	0	1	1	2	**7**	**I2**	**P6**	**Level 6**

8.9. ENVIRONMENTAL IMPACT SIGNIFICANCE ASSESSMENT METHODOLOGY

The impact assessment methodology that will be used for this project is based on a Sasol Mining Standard (7x7) Impact Assessment Rating Matrix.

The protocol comprises a series of steps in order to systematically go through a process of:

- Identifying and quantifying an impact (determining the severity) - Step 1
- Calculating the likelihood of an impact happening - Step 2
- Quantification of the level of magnitude associated with the impact - Step 3

During the identification process the following aspects are considered:

- The physical quantity of the potential impact (be it a volume, concentration or quantitative measurement)
- The toxicity of impact, measured against a pre-defined hazard rating
- The measurement of the extent of an impact
- The duration of the impact, measured in years
- The environmental status of the impact
- The regulatory impact in terms of legislation that has relevance
- The impact on any Interested and Affected Parties

A quantitative rating system is used to assign a value to each of the above aspects.

Table 8.9(a): Impact Assessment Criteria

Criteria	Definition	Points
Quantity/ Magnitude	**The quantity (Volume) that will impact on the environment**	
	Less than 1m³ / incident or > 10 mg/ m³ or < 61dBa - Minor	0
	More than 1 m³ but less than 10 m³ per incident or > 25 mg/ m³	1
	More than 10 m³ but less than 100 m³ per incident > 50 mg/ m³ or > 61dBa - Moderate	2
	More than 100 m³ but less than 1000 m³ per incident or > 100mg/ m³	3
	More than 1000 m³ per incident \ continuous or > 120 mg/ m³ or > 85dBa - Major	4
Toxicity/ Severity	**Hazard rating (Dangerous properties of hazardous material)**	
	Non-hazardous – (substances which will not result in any risk)	0
	Hazard rating 1 – (Substances which could result in relatively low risk) – Minor	1
	Hazard rating 2 – (Substances which could result in serious risk) – Moderate	2
	Hazard rating 3 – (Substance which could result in severe risk) - Major	3
Extent/ Spatial Scale	**How far does the impact extend?**	
	Limited to Business unit	0
	Limited to mine lease area	1
	Regional (Refer to municipal area)	2
	National (Refer to Mpumalanga area)	3
	International (refer to beyond South Africa's boundaries)	4
Duration	**How long will the impact last?**	
	Less than 5 years	0
	Between 5 – 15 years	1
	Exceeding mine lifetime	2
	Impact permanently present	3
Status	**Status of impact**	
	Beneficial (Improve the environment) – no risk reduction needed	-1
	Neutral (No change to the environment) – No risk reduction needed	0
	Adverse (Degradation of the environment) – Risk reduction needed	1
Legislation	**Are there any regulatory requirements applicable to aspects – impacts?**	
	None	0
	Yes, no fines, not cause loss of operating permit, but still reportable incident	1
	Yes, and will result in / prosecution or loss in production	2
	Yes, and will cause loss of operating permit or mine stoppage.	3
	Yes, and may lead to closing down of mine	4
I & AP's	**Interested and affected parties (I&AP)**	
	No impact	0
	Impact to employees in unit	1
	Impact to local community / stakeholders	2
	Impact to general public – beyond municipal area (impact on reputation)	3

Once a sum value has been determined for a specific impact, an Impact Severity Score is calculated (C-number) as **Step 1**, based on the Table below:

Table 8.9(b): Impact Assessment Criteria

Severity score	Risk matrix Consequence Category
21 - 22	(C) I7
19 - 20	(C) I6
17 - 18	(C) I5
14 - 16	(C) I4
10 - 13	(C) I3
5 - 9	(C) I2
Less than 5	(C) I1

During **Step 2** the likelihood of an impact occurring/re-occurring is assessed at the hand of the Table provided below:

Table 8.9(c): Likelihood of an Impact Occurring (P-value)

Likelihood Descriptors	Probability Intervals	Likelihood Definitions	P-value
Unforeseen	0 – 0.1%	The event is not foreseen to occur (never expected to happen)	P1
Highly unlikely	0.1 – 1%	The event may occur in exceptional circumstances (highly unlikely)	P2
Very unlikely	1 – 5%	The event may occur in certain circumstances (rarely)	P3
Low	5 – 15%	The event could occur (low likelihood; 1/100 years)	P4
Possible	15 – 40%	The event may occur (can happen; 1/10 years)	P5
Likely	40 – 75%	The event will probably occur (Likely; once a year)	P6
Almost Certain	75 – 100%	The event is expected to occur or occurs regularly (Frequently; more than once a year)	P7

Finally, the overall impact is quantified in a "Level of Risk" matrix, by combining the C-value (calculated in **Step 1**) with the P-value (calculated in **Step 2**) in the matrix provided below (**Step 3**). The overall impacts will be ranked based on the Level of Risk, as identified below:

Table 8.9(d): Level of Risk Matrix for Impacts

	P1	P2	P3	P4	P5	P6	P7
(C) I7	Level 4 Risk	Level 3 Risk	Level 3 Risk	Level 2 Risk	Level 1 Risk	Level 1 Risk	Level 1 Risk
(C) I6	Level 4 Risk	Level 3 Risk	Level 3 Risk	Level 2 Risk	Level 2 Risk	Level 1 Risk	Level 1 Risk
(C) I5	Level 5 Risk	Level 4 Risk	Level 3 Risk	Level 3 Risk	Level 2 Risk	Level 2 Risk	Level 2 Risk
(C) I4	Level 6 Risk	Level 5 Risk	Level 4 Risk	Level 4 Risk	Level 3 Risk	Level 3 Risk	Level 3 Risk
(C) I3	Level 6 Risk	Level 5 Risk	Level 5 Risk	Level 4 Risk	Level 4 Risk	Level 3 Risk	Level 3 Risk
(C) I2	Level 6 Risk	Level 6 Risk	Level 6 Risk	Level 5 Risk	Level 5 Risk	Level 4 Risk	Level 4 Risk
(C) I1	Level 6 Risk	Level 6 Risk	Level 6 Risk	Level 6 Risk	Level 6 Risk	Level 6 Risk	Level 6 Risk

8.10. POSITIVE AND NEGATIVE IMPACTS

The primary positive impact associated with this project relates to the positive socio-economic impact, i.e. economic benefit that will be achieved by this project. Refer to section 4.3 of this report for a comprehensive description of the project motivation in this regard.

The overall motivation for the proposed project is to ensure and optimise sustainable coal reserve utilisation whilst ensuring effective and directed management of an operational mine, i.e. Shondoni Colliery.

The potential negative environmental impacts will be assessed by a team of competent and qualified natural scientists during the EIA Phase of this project.

Refer to section 9.3 of this report for a comprehensive list of actions to be performed during the EIA Phase of this project.

Best practice, applicable management measures will also be proposed during this assessment in order to avoid, modify, remedy and/or control the negative impacts associated with the proposed activities.

8.11. POSSIBLE MITIGATION MEASURES

The possible mitigation measures contemplated for the potential impacts associated with the proposed activities **should be considered during the design** of the facilities. These measures can broadly be summarised as follows:

- The footprint site has to be selected to not/ to a minimum, encroach on sensitive environmental features.
- The footprint size of the proposed infrastructure should be minimised through detailed design according to site specific environmental features.

Table 8.11(a) summarises the potential impacts identified for the proposed activities with new footprints, the possible mitigation measures that could be implemented and the level of Residual Risk anticipated.

Table 8.11(a): Potential Impacts Identified, Possible Mitigation Measures and Level of Residual Risk

Activity	Environmental Aspect	Potential Impact	Possible Mitigation Measures	Long Term Residual Risk Significance
West Upcast Ventilation Shaft	Land Use/ Capability	Changes in land use/ capability due to development of infrastructure	Minimise the development footprints. Optimise the post closure land use to achieve the post closure land use objectives.	**Level 6**
	Surface Water (Aquatic Ecosystems)	Contamination of the surface water resource shaft related activities	Prevent contamination of surface water by implementing and optimising acceptable /approved storm water management plan.	**Level 6**
	Terrestrial Ecology	Deterioration of floral and faunal habitat due to shaft related activities	Minimise the development footprints. Minimise spillages of contaminants. Optimise the post closure land capability to achieve the post closure land use objectives.	**Level 6**
	Wetlands	Deterioration in surface water quality due to shaft related activities	Prevent contamination of surface water by implementing and optimising acceptable/ approved storm water management plan.	**Level 6**
	Air Quality	Deterioration in Air Quality due to gaseous emissions from vehicle activities as well as dust generated during construction and decommissioning activities	Service machinery and vehicles on a regular basis. Prevent unnecessary idling of engines. Minimise dust fall-out by implementing effective dust suppression programmes.	**Level 6**
	Noise	Noise generating activities associated with shaft structure.	Noise Monitoring. Implement noise screening measures if necessary. Routine maintenance and vegetative cover control - housekeeping.	**Level 6**
	Visuals	Impacts on visibility, visual exposure, visual intrusion and landscape morphology due to the presence of infrastructure	Optimise Air Quality Management measures. Conduct effective housekeeping for visible areas.	**Level 6**
West Downcast Ventilation Shaft	Land Use/ Capability	Changes in land use/ capability due to development of infrastructure	Minimise the development footprints. Optimise the post closure land use to achieve the post closure land use objectives.	**Level 6**
	Surface Water (Aquatic Ecosystems)	Contamination of the surface water resource shaft related activities	Prevent contamination of surface water by implementing and optimising acceptable/ approved storm water management plan.	**Level 6**
	Terrestrial Ecology	Deterioration of floral and faunal habitat due to shaft related activities	Minimise the development footprints. Minimise spillages of contaminants. Optimise the post closure land capability to achieve the post closure land use objectives.	**Level 6**
	Wetlands	Deterioration in surface water quality due to shaft related activities	Prevent contamination of surface water by implementing and optimising acceptable/ approved storm water management plan.	**Level 6**
	Air Quality	Deterioration in Air Quality due to gaseous emissions from vehicle activities as well as dust generated during construction and decommissioning activities	Service machinery and vehicles on a regular basis. Prevent unnecessary idling of engines. Minimise dust fall-out by implementing effective dust suppression programmes.	**Level 6**
	Noise	Noise generating activities associated with shaft structure.	Noise Monitoring. Implement noise screening measures if necessary. Routine maintenance and vegetative cover control - housekeeping.	**Level 6**
	Visuals	Impacts on visibility, visual exposure, visual intrusion and landscape morphology due to the presence of infrastructure	Optimise Air Quality Management measures. Conduct effective housekeeping for visible areas.	**Level 6**

Activity	Environmental Aspect	Potential Impact	Possible Mitigation Measures	Long Term Residual Risk Significance
North Upcast Ventilation Shaft	Land Use/ Capability	Changes in land use/ capability due to development of infrastructure	Minimise the development footprints. Optimise the post closure land use to achieve the post closure land use objectives.	**Level 6**
	Surface Water (Aquatic Ecosystems)	Contamination of the surface water resource shaft related activities	Prevent contamination of surface water by implementing and optimising acceptable/ approved storm water management plan.	**Level 6**
	Terrestrial Ecology	Deterioration of floral and faunal habitat due to shaft related activities	Minimise the development footprints. Minimise spillages of contaminants. Optimise the post closure land capability to achieve the post closure land use objectives.	**Level 4**
	Wetlands	Deterioration in surface water quality due to shaft related activities	Prevent contamination of surface water by implementing and optimising acceptable/ approved storm water management plan.	**Level 6**
	Air Quality	Deterioration in Air Quality due to gaseous emissions from vehicle activities as well as dust generated during construction and decommissioning activities	Service machinery and vehicles on a regular basis. Prevent unnecessary idling of engines. Minimise dust fall-out by implementing effective dust suppression programmes.	**Level 6**
	Noise	Noise generating activities associated with shaft structure.	Noise Monitoring. Implement noise screening measures if necessary. Routine maintenance and vegetative cover control - housekeeping.	**Level 6**
	Visuals	Impacts on visibility, visual exposure, visual intrusion and landscape morphology due to the presence of infrastructure	Optimise Air Quality Management measures. Conduct effective housekeeping for visible areas.	**Level 6**
North Downcast Ventilation Shaft	Land Use/ Capability	Changes in land use/ capability due to development of infrastructure	Minimise the development footprints. Optimise the post closure land use to achieve the post closure land use objectives.	**Level 6**
	Surface Water (Aquatic Ecosystems)	Contamination of the surface water resource shaft related activities	Prevent contamination of surface water by implementing and optimising acceptable/ approved storm water management plan.	**Level 6**
	Terrestrial Ecology	Deterioration of floral and faunal habitat due to shaft related activities	Minimise the development footprints. Minimise spillages of contaminants. Optimise the post closure land capability to achieve the post closure land use objectives.	**Level 4**
	Wetlands	Deterioration in surface water quality due to shaft related activities	Prevent contamination of surface water by implementing and optimising acceptable/ approved storm water management plan.	**Level 6**
	Air Quality	Deterioration in Air Quality due to gaseous emissions from vehicle activities as well as dust generated during construction and decommissioning activities	Service machinery and vehicles on a regular basis. Prevent unnecessary idling of engines. Minimise dust fall-out by implementing effective dust suppression programmes.	**Level 6**
	Noise	Noise generating activities associated with shaft structure.	Noise Monitoring. Implement noise screening measures if necessary. Routine maintenance and vegetative cover control - housekeeping.	**Level 6**
	Visuals	Impacts on visibility, visual exposure, visual intrusion and landscape morphology due to the presence of infrastructure	Optimise Air Quality Management measures. Conduct effective housekeeping for visible areas.	**Level 6**

8.12. OUTCOME OF SITE SELECTION MATRIX

In as much as the ideal situation would be to fully avoid sensitive environmental features by utilising a Site Selection Matrix, the nature of the proposed activities at Shondoni Colliery are dictated by the mineable seams within the naturally occurring mineral deposit.

The coal mined at Shondoni Colliery will contribute as feedstock to the SSO. Significant portions of the areas where coal mining could be conducted economically have been depleted. To ensure a sustainable supply of coal to Sasol's petrochemical facilities, Sasol Mining has embarked on a reserve acquisition project by acquiring prospecting and mining rights over areas within or adjacent to the Secunda Complex mining right.

Extension of the current underground mining activities into the new Block 8 North Reserve Area will therefore be associated with granted prospecting rights that will be included into the greater mining right (MP 30/5/1/2/3/2/ 1/138 MR) applicable to the coal reserve area.

To ensure sufficient ventilation in the proposed extended underground workings, four new ventilation shafts (two upcast and two downcast) are required in the north, north-western region of the Shondoni Colliery EMP boundary area. These shafts are required to ensure sufficient airflow in the underground mine workings which is a legal requirement in terms of the Mine Health and Safety Act and Regulations.

The locality of these shafts was determined by ventilation simulation models which are informed by *inter alia* the mine layout and mine schedule. The most important limitation of these simulations is the ability to provide 80 m^3/s (1 m/s in the last through road)of airflow as a minimum legal requirement for each underground section.

Based on the above, it follows that a traditional Site Selection Matrix was not employed to select the preferred sites associated with the proposed activities. Sites were selected to ensure an optimal ventilation benefit and then subjected to an environmental impact assessment to confirm their suitability/acceptability from an environmental perspective.

Alternative sites were investigated for both the West and North Up- and Downcast Ventilation Shafts as discussed in Table 8.1.1(a). In the case of the West Ventilation Shafts, the alternative sites could not be considered as the simulation models indicated that this would result in inadequate ventilation to the underground workings. In terms of the North Ventilation Shafts, the simulated positions were environmentally unsuitable (close to a watercourse). The alternative sites proposed further away from the watercourse could however be selected as the preferred alternative as the simulation models indicated that sufficient ventilation could be provided from these locations.

8.13. NO ALTERNATIVE SITE MOTIVATION

A comprehensive Alternative Selection was performed on all the proposed activities associated with this project and is relayed in section 8.1 of this report.

Specifically as far as Site Alternatives are concerned, the following is relevant:

- The nature of the proposed activities at Shondoni Colliery is dictated by the mineable seams within the naturally occurring mineral deposit.
- The coal mined at Shondoni Colliery will contribute as feedstock to the SSO. Significant portions of the areas where coal mining could be conducted economically have been depleted. To ensure a sustainable supply of suitable quality coal to Sasol's petrochemical facilities, Sasol Mining has embarked on a reserve acquisition project by acquiring prospecting and mining rights over areas within or adjacent to the Secunda Complex mining right.
- Extension of the current underground mining activities into the new Block 8 North Reserve Area will therefore be associated with granted prospecting rights that will be included into the greater mining right (MP 30/5/1/2/3/2/ 1/138 MR) applicable to the coal reserve area.
- To ensure sufficient ventilation in the proposed extended underground workings, four new ventilation shafts are required in the north, north-western region of the Shondoni Colliery EMP boundary area. These shafts are required to ensure sufficient airflow in the underground mine workings which is a legal requirement in terms of the Mine Health and Safety Act and Regulations.
- The locality of these shafts was determined by ventilation simulation models which are informed by *inter alia* the mine layout and mine schedule. The most important limitation of these simulations is the ability to provide 80 m^3/s (1 m/s in the last through road)of airflow as a minimum legal requirement for each underground section.
- Based on the above, it follows that a traditional Site Selection Matrix was not employed to select the preferred sites associated with the proposed activities. Sites were selected to ensure an optimal ventilation benefit and then subjected to an environmental impact assessment to confirm their suitability/acceptability from an environmental perspective.
- **Alternative sites were investigated for both the West and North Up- and Downcast Ventilation Shafts as discussed in Table 8.1.1(a). In the case of the West Ventilation Shafts, the alternative sites could not be considered as the simulation models indicated that this would result in inadequate ventilation to the underground workings.**
- In terms of the North Ventilation Shafts, the simulated positions were environmentally unsuitable as they were located close to a watercourse. The alternative sites proposed could however be selected as the preferred alternative as the simulation models indicated that sufficient ventilation could be provided from these locations.

The potential environmental impact associated with these activities will be assessed during the EIA Phase of this project and adequate management objectives and measures will be proposed to effectively manage the identified impacts.

8.14. MOTIVATED PREFERRED ALTERNATIVE SITE

The proposed Site Layout Plan presented to I&AP's for consideration during this Scoping Phase Stakeholder Engagement Process, is depicted in Figure 8.14(a). A large-scale version of this Site Layout Plan is attached as **APPENDIX 8(A)** to this report.

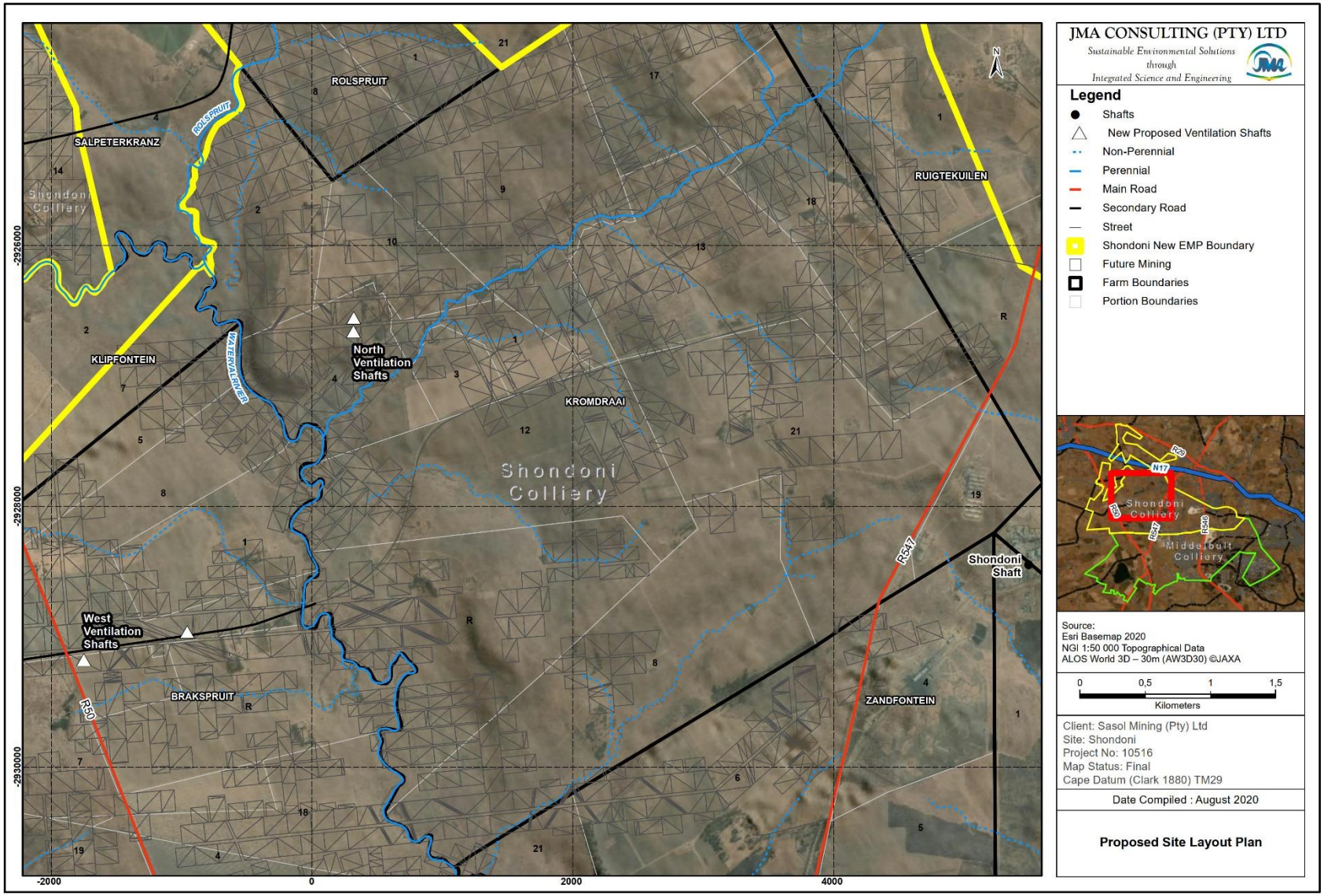


Figure 8.14(a): Preferred Alternative Sites – Proposed Site Layout Plan

9. PLAN OF STUDY

9.1. DESCRIPTION OF ALTERNATIVES TO BE CONSIDERED (INCLUDING NO-GO)

A detailed identification of, assessment and motivation for Alternatives associated with the proposed activities (including the no-go options), has been conducted and reported on in section 8.1 of the Draft Scoping Report.

The outcome of this assessment is presented in Tabular format in Table 9.1(a) below.

The Alternatives in this table were provided to I&AP's for their review and consideration during the Scoping Phase Stakeholder Engagement.

No Alternatives were identified for further assessment by the I&AP's, hence no further Alternatives Assessment will be done in the EIA phase.

Table 9.1(a): Alternatives Assessment Including the No-Go Option (as per Table 8.1(a))

Activity	Alternative Property	Alternative Site	Alternative Type of Activity	Alternative Design/ Layout	Alternative Technology	Alternative Operational Aspects	No-Go Alternative
Underground mining of new Block 8 North Reserve	Extension of current underground mining activities on properties associated with granted prospecting rights within the new Block 8 North Reserve Area that will be included into the mining right (MP 30/5/1/2/3/2/1/138 MR) applicable to the coal reserve area.	Extension of a current activity approved in the 2011 EMPr.	Coal Mining can be done as either open cast or underground mining. As a result of the depth of coal within the Shondoni Colliery EMP boundary area, open cast mining is not possible and therefore only underground mining methods are viable.	The mine plan/ schedule provided in section 4.4.2.3 of this report was optimised during a series of planning meetings during which aspects related to *inter alia* coal seam extraction, water make, subsidence and groundwater recharge was considered and optimised.	Underground mining can be done by three major methods namely Bord and Pillar Mining, Increased or High Extraction Mining, Total Extraction Mining. These methods are discussed in section 4.4.2.1 of this report. Bord and Pillar Mining is currently being conducted but the other methods will be considered if deemed necessary/viable.	Standard Bord and Pillar Mining is currently being conducted.	The coal mined at Shondoni Colliery will contribute as feedstock to the SSO. Significant portions of the areas where coal mining could be conducted economically have been depleted. To ensure a sustainable supply of suitable quality coal to Sasol's petrochemical facilities, Sasol Mining has embarked on a reserve acquisition project by acquiring prospecting and mining rights over areas within or adjacent to the Secunda Complex mining right.
Preferred Alternative	**No Property Alternative**	**No Site Alternative**	**Underground Mining**	**No Design/ Layout Alternative**	**Currently Bord and Pillar Mining. Other methods could be considered if deemed necessary/ viable.**	**Currently Bord and Pillar Mining. Other methods could be considered if deemed necessary/ viable.**	**The no-go option will prevent sustainable development**
West Upcast Ventilation Shaft	Operations will be on Properties associated the mining right (MP 30/5/1/2/3/2/1/138 MR) applicable to the coal reserve area.	**Alternative Site 1**: Position identified by simulation model to ensure adequate ventilation. Site located in close proximity to farmer residences. **Alternative Site 2:** Positions selected further from farmer residences in attempt to alleviate potential negative impacts but simulation model indicated these positions would result in a ventilation limitation.	Ventilation Shafts are required in order to ensure sufficient airflow in the underground mine workings which is a legal requirement in terms of the Mine Health and Safety Act and Regulations.	The design and layout of a ventilation shaft is determined by ventilation simulation models. The most important limitation of these simulations is the ability to provide 80 m^3/s (1 m/s in the last through road)of airflow as a minimum legal requirement for each underground section.	The development of the ventilation shaft will be done in compliance with current legislation and best practise guidelines and through standard civil construction technologies as determined by the approved civil designs as well as site conditions.	The Ventilation Shaft will operate in accordance with approved design specifications as informed by the simulation model to ensure an optimal ventilation benefit.	Ventilation Shafts are required in order to ensure sufficient airflow in the underground mine workings.
Preferred Alternative	**No Property Alternative**	**Alternative Site 1**	**No Activity Type Alternative**	**No Design/ Layout Alternative**	**No Technology Alternative**	**No Operational Aspects Alternative**	**The no-go option will result in inadequate underground ventilation**
West Downcast Ventilation Shaft	Operations will be on Properties associated the mining right (MP 30/5/1/2/3/2/1/138 MR) applicable to the coal reserve area.	**Alternative Site 1:** Position identified by simulation model to ensure adequate ventilation. Site located in close proximity to farmer residences. **Alternative Site 2:** Positions selected further from farmer residences in attempt to alleviate potential negative impacts but simulation model indicated these positions would result in a ventilation limitation.	Ventilation Shafts are required in order to ensure sufficient airflow in the underground mine workings which is a legal requirement in terms of the Mine Health and Safety Act and Regulations.	The design and layout of a ventilation shaft is determined by ventilation simulation models. The most important limitation of these simulations is the ability to provide 80 m^3/s (1 m/s in the last through road)of airflow as a minimum legal requirement for each underground section.	The development of the ventilation shaft will be done in compliance with current legislation and best practise guidelines and through standard civil construction technologies as determined by the approved civil designs as well as site conditions.	The Ventilation Shaft will operate in accordance with approved design specifications as informed by the simulation model to ensure an optimal ventilation benefit.	Ventilation Shafts are required in order to ensure sufficient airflow in the underground mine workings.

Activity	Alternative Property	Alternative Site	Alternative Type of Activity	Alternative Design/ Layout	Alternative Technology	Alternative Operational Aspects	No-Go Alternative
Preferred Alternative	**No Property Alternative**	**Alternative Site 1**	**No Activity Type Alternative**	**No Design/ Layout Alternative**	**No Technology Alternative**	**No Operational Aspects Alternative**	**The no-go option will result in inadequate underground ventilation**
North Upcast Ventilation Shaft	Operations will be on Properties associated the mining right (MP 30/5/1/2/3/2/1/138 MR) applicable to the coal reserve area.	**Alternative Site 1:** Position identified by simulation model to ensure adequate ventilation. Downcast Shaft located too close to a watercourse. **Alternative Site 2**: Approximately 530 m to the east of Alternative Site 1. Adequate ventilation still possible and located further away from watercourse.	Ventilation Shafts are required in order to ensure sufficient airflow in the underground mine workings which is a legal requirement in terms of the Mine Health and Safety Act and Regulations.	The design and layout of a ventilation shaft is determined by ventilation simulation models. The most important limitation of these simulations is the ability to provide 80 m^3/s (1 m/s in the last through road)of airflow as a minimum legal requirement for each underground section.	The development of the ventilation shaft will be done in compliance with current legislation and best practise guidelines and through standard civil construction technologies as determined by the approved civil designs as well as site conditions.	The Ventilation Shaft will operate in accordance with approved design specifications as informed by the simulation model to ensure an optimal ventilation benefit.	Ventilation Shafts are required in order to ensure sufficient airflow in the underground mine workings.
Preferred Alternative	**No Property Alternative**	**Alternative Site 2**	**No Activity Type Alternative**	**No Design/ Layout Alternative**	**No Technology Alternative**	**No Operational Aspects Alternative**	**The no-go option will result in inadequate underground ventilation**
North Downcast Ventilation Shaft	Operations will be on Properties associated the mining right (MP 30/5/1/2/3/2/1/138 MR) applicable to the coal reserve area.	**Alternative Site 1:** Position identified by simulation model to ensure adequate ventilation. Site located too close to a watercourse. **Alternative Site 2:** Approximately 530 m to the east of Alternative Site 1. Adequate ventilation still possible and further away from watercourse.	Ventilation Shafts are required in order to ensure sufficient airflow in the underground mine workings which is a legal requirement in terms of the Mine Health and Safety Act and Regulations.	The design and layout of a ventilation shaft is determined by ventilation simulation models. The most important limitation of these simulations is the ability to provide 80 m^3/s (1 m/s in the last through road)of airflow as a minimum legal requirement for each underground section.	The development of the ventilation shaft will be done in compliance with current legislation and best practise guidelines and through standard civil construction technologies as determined by the approved civil designs as well as site conditions.	The Ventilation Shaft will operate in accordance with approved design specifications as informed by the simulation model to ensure an optimal ventilation benefit.	Ventilation Shafts are required in order to ensure sufficient airflow in the underground mine workings.
Preferred Alternative	**No Property Alternative**	**Alternative Site 2**	**No Activity Type Alternative**	**No Design/ Layout Alternative**	**No Technology Alternative**	**No Operational Aspects Alternative**	**The no-go option will result in inadequate underground ventilation**

9.2. ASPECTS FOR ENVIRONMENTAL IMPACT ASSESSMENT

The aspects to be assessed during the environmental impact assessment are listed in Table 9.2(a) below and are provisional. In preparation for the EIA Phase, workshops will be held with all the relevant specialists and they will finalise the aspects and impacts for each of the activities listed in Table 9.2(a), after which they will conduct their individual impact assessments as indicated in section 8.9 of this report.

Column 1: Specific **Activities** (current and proposed) occurring at Shondoni Colliery that could potentially have an environmental impact.

Column 2: **Aspects** associated with the Activity. Aspects were provisionally identified by the EAP and will be verified during the workshop with the relevant specialists. Aspects are defined as the mechanisms by which the project activities impact on receptors (e.g. people, economy, infrastructure, institutions and natural environment).

Column 3: **Environmental Components** provisionally identified by the EAP and to be verified during the workshop with the relevant specialists, that will be impacted on by the specific aspect during a specific project phase (Construction Phase, Operational Phase and Decommissioning Phase).

Current activities at Shondoni Colliery are provided per Shaft Complex separately as well as the proposed activities in Table 9.2(a).

Both current and proposed activities will be assessed and management measures will be proposed for both current and proposed activities in order to facilitate an integrated EMPr that addresses the management of the whole operational mine, i.e. Shondoni Colliery inclusive of all activities and associated aspects.

Table 9.2(b) provides further categorisation and an associated description of the different aspects and impacts related to a particular environmental component to be assessed and verified by the team of specialists during the EIA Phase of the project.

Table 9.2(a): Activity and Aspect Table to be assessed during the Environmental Impact Assessment

Activity	Aspect	Environmental Component
Shondoni Shaft Complex		
Access Roads	Road Surface, Road Verge	Soils, Groundwater, Surface Water, Plant Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Security Fence and Access	Fences and Booms	Surface Water, Animal Life, Aquatic Ecosystems, Wetlands Air Quality, Noise, Visuals
Offices, Workshops and Changehouses	Building Material	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Internal Roads and Parking Areas	Road Surface, Road Verge	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Electricity Supply	Substations, Overhead Power Lines	Surface Water, Animal Life, Plant Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Fuel & Oil Storage	Tanks	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Explosives Off-Load Area	Off-Load Footprint Area	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Man and Material Shaft Infrastructure	Decline Shafts, Conveyors	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Conveyor System	Conveyors	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Ventilation Shaft	Building Material, Fans	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Underground Mining	Surface Subsidence, Gas Accumulation, Generation of Acid Mine Drainage (AMD)	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Topsoil/ Overburden Stockpile	Stockpile Footprint	Topography, Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Coal Storage in Surface Bunker	Building Material, Storage Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Emergency Throw-Out Area and Stockpile	Stockpile Footprint	Topography, Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Stonedust Dump	Dump Footprint	Topography, Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Potable Water Supply System	Pumping of Potable Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Potable Water Reservoir	Reservoir Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Shondoni PCD & Shondoni Incline PCD	Storage of Process/ Service Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals

Activity	Aspect	Environmental Component
Surface Service Water Reservoir	Reservoir Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Service Water Reticulation System	Pumping of Service Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Storm Water Berms and Canals	Reduction of Runoff to Natural Resource	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Attenuation Dam/ Structure	Reducing the Velocity of Storm Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Oil and Silt Traps	Storage of Oil and Silt	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Sewage Treatment Plant	Sludge Drying Beds	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Iso Yard (Temporary storage of general, domestic and industrial waste)	Yard Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Iso Yard (Temporary storage of hazardous waste)	Yard Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Capital Yard (Temporary storage of scrap metal)	Yard Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Simunye Shaft		
Access Roads	Road Surface, Road Verge	Soils, Groundwater, Surface Water, Plant Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Security Fence and Access	Fences and Booms	Surface Water, Animal Life, Aquatic Ecosystems, Wetlands Air Quality, Noise, Visuals
Offices, Workshops and Changehouses	Building Material	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Internal Roads and Parking Areas	Road Surface, Road Verge	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Electricity Supply	Substations, Overhead Power Lines	Surface Water, Animal Life, Plant Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Fuel Storage	Tanks	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Man and Material Shaft Infrastructure	Decline Shafts, Conveyors	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Ventilation Shaft	Building Material, Fans	Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Underground Mining	Surface Subsidence, Gas Accumulation, Generation of AMD	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Topsoil/ Overburden Stockpile	Stockpile Footprint	Topography, Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals

Activity	Aspect	Environmental Component
Stonedust Dump	Dump Footprint	Topography, Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Potable Water Supply System	Pumping of Potable Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Potable Water Reservoir	Reservoir Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Service Water Dam (Top & Bottom)	Storage of Process/ Service Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Service Water Reticulation System	Pumping of Service Water	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Storm Water Berms and Canals	Reduction of Runoff to Natural Resource	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Sewage Treatment Plant	Sludge Drying Beds	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Storage Yard (Temporary storage of general, domestic and industrial waste)	Yard Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Storage Yard (Temporary storage of hazardous waste)	Yard Footprint	Soils, Groundwater, Surface Water, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
Proposed Activities		
Underground Mining	Surface Subsidence, Gas Accumulation, Generation of AMD	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
West Upcast Ventilation Shaft	Building Material, Fans, Access Road	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
West Downcast Ventilation Shaft	Building Material, Fans, Access Road	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
North Upcast Ventilation Shaft	Building Material, Fans, Access Road	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals
North Downcast Ventilation Shaft	Building Material, Fans, Access Road	Heritage, Soils, Groundwater, Surface Water, Plant Life, Animal Life, Aquatic Ecosystems, Wetlands, Air Quality, Noise, Visuals

Table 9.2(b): Potential Impact Categories and Impact Descriptions to be assessed during the Environmental Impact Assessment

Environmental Component	Environmental Component Aspect	Description of Nature of Potential Impact/Issue
Socio Cultural	Geographic Processes (land use patterns)	Changes in land use patterns due to conversion of agricultural land to mining and industrial land use.
	Demographic Processes (population composition e.g. age, gender, race)	Changes in population numbers and profile due to potential influx of migrant workers for construction, operation and decommissioning phases.
	Institutional & Legal Processes (municipal services, public infrastructure, housing)	Changes in the demand for municipal services, transport and housing due to the increase in population.
	Cultural Processes (social, cultural and traditional practices)	Changes in the cultural dynamics of the area due to influx of people with different cultural and social backgrounds.
Heritage Resources	Historical and Cultural (places, buildings, structures, burial grounds, graves)	Damage to, or destruction of, heritage resources due to construction, mining and decommissioning activities.
Socio Economic	Economic Efficiency (labour, employment, output and growth)	Positive changes in economic output and regional exports due to the activities and operations associated with Shondoni Colliery.
	Economic Equity (poverty, income)	Positive changes in employment, tax income, increased social spending and increased incomes due to employment offered at Shondoni Colliery.
	Economic Stability (diversity, resource use)	Positive changes in economic stability through diversification due to the activities and operations associated with Shondoni Colliery.
Land Use	Beneficial Land Use (derelict, vacant, residential, industrial, mining, agricultural, recreational, wilderness, conservation)	Changes in land use due to due to the construction of mining infrastructure and processes as well as potential surface subsidence
Topography	Morphology	Creation of dangerous/unstable excavations due to mining, as well as dangerous/unstable mounds/piles/dumps due to stockpiling of soil and ROM.
	Stability	Creation of areas prone to surface subsidence due to underground mining activities (high extraction mining).
Soils	Soil Horizon	Loss of soil horizon due to site clearance for construction of ancillary infrastructure.
	Soil Fertility	Loss of soil fertility due to incorrect stockpiling of soils required for rehabilitation purposes.
	Soil Contamination	Contamination of soil due to spillages of ROM during conveyance or due to spillages/seepages/leakages of contaminated water from pipes, canals, sumps and dams.
Land Capability	Land Capability (wetland, arable (dryland), arable (irrigation), grazing, wilderness, rehabilitated)	Changes in the land capability due to the construction of mining infrastructure and processes as well as potential surface subsidence
Geology	Lithology	Changes in lithology due to underground mining activities.
	Mineral Resources	Sterilization of mineral resources due to the construction of infrastructure on potential future mining areas.
Geochemistry	Acid Mine Drainage Generation (AMD)	Potential of AMD to be generated due to the geochemical properties of the rock and coal found in the underground workings.

Environmental Component	Environmental Component Aspect	Description of Nature of Potential Impact/Issue
Groundwater	Quantity (presence, flow, availability) of Groundwater	Increase in groundwater recharge from surface as a result of underground mine compartments (voids) created and due to possible surface subsidence. Decrease in borehole yield of external users as a result of underground water being pumped from the workings. Decrease in yield to rivers/streams and wetlands due to water being pumped from the underground workings. Depletion in storage capacity post closure can result in decant of groundwater.
	Quality of Groundwater	Contamination of the groundwater resource due to the storage of contaminated underground water (mine/ service water) in underground water compartments or the seepage/ infiltration of contaminated water from surface activities. Deterioration of groundwater quality due AMD formation.
Surface Water	Quantity (presence, flow, availability) of Surface Water	Depletion in the quantity of surface water due to the loss of surface water to groundwater in subsided areas, loss of direct rainfall in quarries and dams, as well as the capture of contaminated storm water runoff in Pollution Control Dams, i.e. loss of catchment yield.
	Quality of Surface Water	Contamination of the surface water resource due to discharge/ decant of contaminated mine water and contaminated runoff from "dirty areas" directly into the surface water resources and/or spillages of contaminated water from tanks, sumps, pipes and dams.
Plant Life	Habitat	Impact on, or destruction of habitat due to site clearance for construction of roads, buildings and plant infrastructure and utilities.
	Biodiversity	Impact on, or destruction of Bio-Diversity due to a loss in habitat or as a result of contamination of soils or water.
	Red Data List Species (sensitive, threatened, endangered)	Potential threat to identified species if construction and operational activities are not prevented in close proximity to the identified specimens.
Animal Life	Habitat	Impact on, or destruction of habitat due to vegetation habitat disturbance as well the construction and presences of fences.
	Biodiversity	Impact on, or destruction of Bio-Diversity due to habitat disturbance or as a result of water pollution, air pollution, noise and traffic.
	Red Data List Species (sensitive, threatened, endangered)	Potential threat to potential present threatened species if construction and operational activities are not prevented in close proximity to identified specimens.
Wetlands	Habitat	Impact on, or destruction of habitat due to site clearance for construction of roads, buildings and plant infrastructure and utilities as well as underground mining activities.
	Importance and Sensitivity (IS)	Deterioration in IS category due to impact on wetland species composition, habitat functionality and assumed sensitivities.
	Present Ecological State (PES)	Deterioration in PES due to impacts on habitat as well as wetland functions and services attributes.

Environmental Component	Environmental Component Aspect	Description of Nature of Potential Impact/Issue
Aquatic Ecosystems	Habitat (IHAS)	Impact on, or Destruction of Habitat due to impacts on habitat attributes such as water flow and water quality.
	Biodiversity (SASS5, FAII, Toxicity)	Impact on, or Destruction of Bio-Diversity due to impacts on habitat.
Air Quality	Dust Fallout / Gaseous Emissions on surface	Deterioration in Ambient Air Quality due to gaseous emissions from construction/ decommissioning vehicle activities as well as dust generated by conveyor transport, handling, stockpiling and wind entrainment of ROM as well as during construction and decommissioning activities.
	Gas in Underground Workings	Accumulation of Gas (from machinery, blasting and natural gas) in Underground Workings
Noise	Ambient Sound Level	Increase in the Ambient Sound Levels due to construction, mining, transport and decommissioning activities.
	Noise	Generation of Noise from specific Shaft Complex noise generating activities.
Visuals	Visual Aspects (visibility, visual exposure, visual intrusion and landscape morphology)	Impacts on visibility, visual exposure, visual intrusion and landscape morphology due to the presence of infrastructure, as well the occurrence of dust emissions during the construction, operation and decommissioning of infrastructure and processes at Shondoni Colliery.

9.3. ASPECTS TO BE ASSESSED BY SPECIALISTS

Details pertaining to the Specialist Environmental Studies that have to finalised and concluded during the EIA Phase in support of the project are relayed in Table 9.3(a).

Table 9.3(a): Aspects to be assessed by Specialists during the EIA Phase of the project

Environmental Component	Actions to be performed/ Aspects to be assessed
Socio-Cultural/Economic	• Site visit by specialist • Telephonic interviews with key I&AP's • Financial information assessment • Financial modelling of economic impacts • Conduct an impact Assessment • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Finalise specialist report
Archaeological and Heritage	• Conduct an impact assessment • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Finalise specialist report
Palaeontology	• Initiate and finalise assessment • Conduct an impact assessment • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Finalise specialist report
Soils, Land Use and Land Capability	• Areas delineated as being of a "High Sensitivity" in terms of the Screening Tool Report (Agricultural concern) that coincide with sites of potential structural (geological) weakness, or depths to mining of less than 70m, should be assessed in more detail • Finalise and conclude baseline assessment • Conduct an impact assessment • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Detailed soil utilisation and surface rehabilitation plan • Finalise specialist report
Geology and Geochemistry	• Conduct an impact assessment/ geochemical modelling • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Finalise specialist report
Groundwater	• Conduct an impact assessment • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Update Water Balance • Finalise specialist report
Surface Water	• Site Visit / Site Infrastructure Audit • Floodline update/ finalisation • Update Water Balance • Conduct an impact assessment • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Finalise specialist report

Environmental Component	Actions to be performed/ Aspects to be assessed
Terrestrial Ecology (Plant Life and Animal Life)	• Perform summer survey to conclude baseline assessment. The Mpumalanga Tourism & Parks Authority (MTPA) minimum guidelines for specialist reports stipulates that a "floristic (plant) survey must be conducted during the growing season of all species that may potentially occur (this may require more than one season's survey in order to identify flowering species) with two (2) visits undertaken (November & February). Visits during other seasons will be determined by the flowering and fruiting times of species that do not occur during the summer". Temperate Highveld grassland generally has two flowering periods in which different groups of plants are in flower, namely a pre-rains, post-fire period (August – October/ November) and a mid-rains period (December – March). Furthermore, the new "Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa" (SANBI, 2020) deals with the seasonality and timing of specialist surveys and states that the "timing of the survey needs to coincide with the flowering periods of most, if not all, the Species of Conservation Concern, with priority being given to the highly threatened species". Therefore a **September / October survey** to search for species *Stenostelma umbelluliferum* and *Gladiolus robertsoniae*, both of which would be impossible to find during mid-summer, and a **January / February survey** to search for species *Nerine gracilis and Kniphofia typhoides* still needs to be performed. • Conduct an impact assessment • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Finalise specialist report
Aquatic Ecosystems	• A considerable amount of information is required to finalise and conclude the Aquatic Ecosystems Specialist assessment in support of this project. There are two reasons for this: 1) The only historical data available for the study area was based on surveys conducted in 2002 (fish) and 2010 (aquatic macroinvertebrates), and for slightly different study areas. Since then, considerable development and expansion of residential areas has taken place in the catchment and aquatic ecosystems have been modified accordingly. These historical data are therefore of low confidence and are considered unreliable. 2) The single survey conducted during winter (July 2020) is not likely to yield reliable data in terms of fish and aquatic macroinvertebrates for the following reasons: ➢ Fish tend to migrate to warmer waters in winter. Therefore, it is uncertain whether the low diversity recorded during July 2020 was due to low water quality or an absence of fish. It is essential that a follow up survey be conducted during summer. ➢ Oxbow lakes along the riparian floodplains of the Bankspruit and Waterval River were dry at the time of sampling. These seasonal to ephemeral depressions only fill with water in mid-to-late summer (usually from mid-December onwards) and support a unique fauna that are specially adapted to seasonal drying (e.g. they may have dormant life cycle stages which allow them to survive prolonged periods of drying). These specialised fauna (e.g. Ostracoda, Copepoda, Cladocera and Conchostraca) contribute to the overall biodiversity within the study area. Furthermore, because each oxbow lake has a different depth and width, the vegetation it supports differs, as does the faunal community. This results in a mosaic of habitats supporting different fauna and flora, with a greater overall biodiversity within the study area. Certain damselflies may, for example, prefer shallow pools, rather than deeper pools or faster flowing watercourses. ➢ The Rolspruit was only assessed at a desktop level during the July 2020 survey because water levels were considered too low for effective sampling. The Rolspruit could be impacted by mining expansions associated with Block 8 and it would be essential to include a more detailed assessment of the Rolspruit in the final report. It is likely that this watercourse plays a role in improving water quality in the receiving Waterval River (as most of the impacts along it are agricultural).

Environmental Component	Actions to be performed/ Aspects to be assessed
	If this watercourse is to be undermined, it would be essential to determine the impact of potential subsidence and a loss of surface water to groundwater. • To ensure a comprehensive description of the aquatic ecosystems and sensitive areas of high biodiversity value, ***a summer survey is critical and is proposed for mid-December-February.*** • Conduct an impact assessment • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Finalise specialist report
Wetlands	• The baseline report compiled details a Scoping level assessment of wetland habitat within the project study area and is based largely on existing and desktop information. As part of the EIA phase of the study, extensive further work is proposed to improve the accuracy and level of detail of the wetland assessment. • To ensure the desired, and required, improved accuracy and level of detail on the wetland delineation and assessment can be achieved, ***it is critical that further wetland work be undertaken during the summer months, and ideally towards the peak of the summer growing season (i.e. between November and March).*** The soils across the bulk of the study area are dominated by vertic clays which display limited soil wetness indicators (which are used in the delineation of wetland boundaries). Therefore, vegetation indicators play a primary role in determining the wetland boundaries on site. This makes it critical to undertake further field work during the summer growing season so as to maximise the use of vegetation indicators. Undertaking the wetland delineation season during the dry season would result in only low confidence wetland delineation being possible. • Work proposed for the EIA phase of the study is summarised below. Delineation, typing (classification) and mapping of the wetlands/riparian habitat. This will include: ➢ Ground truthing to verify the wetlands delineated at a desktop level within the study area; ➢ During the field verification of the wetland systems, hydric indicator (soil mottling) data and vegetation information will be used refine the desktop delineated wetlands as per the DWAF (2005) wetland delineation guideline; ➢ Typing of the wetlands within the proposed mining area and infrastructure footprints according to their Hydro Geomorphic (HGM) setting based on the approach which has been modified for use in southern Africa by Kotze, Marneweck, Batchelor, Lindley and Collins (2007), and most recently updated by Ollis et al. (2013). • Ecological categorisation of the wetlands and riparian zones - Present Ecological State (PES) and Importance and Sensitivity (IS). This will include: ➢ Field assessments of the wetlands within the study area to collect ecological assessment data to undertake Present Ecological State (PES) assessments. This will be done in order to establish a baseline of the current state and ecological importance of the wetlands. ➢ For the purpose of assessing the PES of wetlands the Level 1 assessment as described by the WET-Health manual (Macfarlane et al., 2007), will be applied. ➢ The Rountree et al. (2013) methodology will be applied for the determination of the EIS. • Functional Assessment of the wetlands. A functional assessment of the ground truthed wetlands on site will be undertaken using the level 2 assessment as described in "Wet-EcoServices" (Kotze, Marneweck, Batchelor, Lindley and Collins, 2008). This method provides a scoring system for establishing wetland ecosystem services. It enables one to make relative comparisons of systems based on a logical framework that measures the likelihood that a wetland is able to perform certain functions. Generic functional assessment of the riparian areas will also be included considering the landscape setting, surrounding land use and ecological information recorded onsite.

Environmental Component	Actions to be performed/ Aspects to be assessed
	• Impact Assessment. Proposed project activities will be overlain onto the wetland delineation in GIS to identify possible impacts to wetlands. Impacts will be identified and assessed. Impacts will include loss of flow from wetlands, surface subsidence in wetlands, discharge of contaminated service water and decant of contaminated mine water. • In line with the mitigation hierarchy recommendations will be developed to avoid, minimise and/or mitigate likely impacts to wetlands. • Finalise specialist report
Air Quality	• Compilation of a detailed emission inventory of all emissions from the current and future Shondoni operations. Emission estimation will be based on sampled emission rates (if available) or internationally published emission factors. • Preparation of topographical, meteorological, land use, source, building and emissions data required for input to the dispersion model. • Application of an approved atmospheric dispersion model and simulation of incremental and cumulative air pollutant concentrations of the identified pollutants occurring as a result of current and future Shondoni operations (specific to mining related activities). • Conducting of an impact assessment including: o compliance evaluation of emissions and air pollutant concentrations based on South African National Ambient Air Quality Standards and National Dust Control Regulations; o analysis of the potential for local air quality impacts given sensitive receptor locations • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Finalise specialist report
Noise	• Identify areas and specific noise receptors sensitized by the proposed ventilation shaft locations • Carry out noise surveys to establish baseline noise ratings at locations representing areas sensitized by the proposed ventilation shafts • Set up a predictive noise model and generate noise contour maps to quantify the noise footprints and impacts of the ventilation shafts • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Finalise specialist report
Visual	• Conduct an impact assessment • Compilation of a management plan including recommendations for mitigation measures and monitoring requirements to ensure compliance with the relevant legislation • Finalise specialist report

The outcomes of the specialist environmental assessments will be incorporated into the EIA Report. The comprehensive Specialist Reports that adhere to the EIA Regulations (GNR 982 of 4 December 2014), as amended (2017) – Appendix 6, and which contain each specialist's Impact Assessment and Management Measures proposed, will be appended to the EIA Report during the EIA Phase of this S&EIR Process.

9.4. IMPACT ASSESSMENT METHODOLOGY

This project entails the split of a current approved integrated EMPr, to have separate management programmes for a decommissioning mine (Middelbult Colliery) and an operational mine (Shondoni Colliery).

In order to support the applicability and implementation of the Shondoni Colliery EMPr, an Environmental Impact Assessment will be performed for each of the Shondoni Colliery project life cycle phases (i.e. pre-construction/design phase, construction phase, operational phase, decommissioning and post-closure phase), **for all project related activities (both current and proposed).**

For current/ existing activities, the pre-construction/design and construction life cycle phases will not be addressed as they are no longer applicable to the current activities and hence the current project activities will not be evaluated for these two life cycle phases.

The Impact Assessment methodology comprises of three parts and will be conducted in Tabular format:

- Aspect Identification
- Impact Definition
- Impact Evaluation

These three parts are systematically addressed in the sections below. Firstly, the Activities deemed to have a potential environmental impact will be identified and categorised in order to identify the Aspect related to each Activity per life cycle phase. Afterwards, the Environmental Impact associated with the Aspect will be defined and finally, evaluated with reference to the Impact Assessment Methodology.

9.4.1. Relevant Project Activities

Activities as defined by the National Environmental Management Act 107 of 1998, means policies, programmes, processes, plans and projects. Activities associated with Shondoni Colliery were identified and are listed in Table 9.2(a).

9.4.2. Identification of Aspects per Life Cycle Phase

An Environmental Aspect as defined by the EAP is the mechanisms by which the project activities impact on receptors (e.g. people, economy, infrastructure, institutions and natural environment).

Aspects associated with the Shondoni Colliery Activities are also provided in Table 9.2(a).

9.4.3. Impact Description/ Definition per Life Cycle Phase

Direct/Indirect and Cumulative Impacts associated with the above-mentioned Aspects will be identified per life-cycle phase.

Direct impacts require quantitative assessment as opposed to Indirect and Cumulative Impacts that are described qualitatively. In addition, an indication of any fatal flaws (i.e. very significant adverse impact which cannot be avoided or mitigated) will also be considered and provided if applicable.

9.4.4. Evaluation of Environmental Impacts

The impact assessment methodology that will be used for this project is based on a Sasol Mining Standard (7x7) Impact Assessment Rating Matrix.

The protocol comprises a series of steps in order to systematically go through a process of:

- Identifying and quantifying an impact (determining the severity) - Step 1
- Calculating the likelihood of an impact happening - Step 2
- Quantification of the level of magnitude associated with the impact - Step 3

During the identification process the following aspects are considered:

- The physical quantity of the potential impact (be it a volume, concentration or quantitative measurement)
- The toxicity of impact, measured against a pre-defined hazard rating
- The measurement of the extent of an impact
- The duration of the impact, measured in years
- The environmental status of the impact
- The regulatory impact in terms of legislation that has relevance
- The impact on any Interested and Affected Parties

A quantitative rating system is used to assign a value to each of the above aspects.

Table 9.4.4(a): Impact Assessment Criteria

Criteria	Definition	Points
Quantity/ Magnitude	**The quantity (Volume) that will impact on the environment**	
	Less than 1m³ / incident or > 10 mg/ m³ or < 61dBa - Minor	0
	More than 1 m³ but less than 10 m³ per incident or > 25 mg/ m³	1
	More than 10 m³ but less than 100 m³ per incident > 50 mg/ m³ or > 61dBa - Moderate	2
	More than 100 m³ but less than 1000 m³ per incident or > 100mg/ m³	3
	More than 1000 m³ per incident \ continuous or > 120 mg/ m³ or > 85dBa - Major	4
Toxicity/ Severity	**Hazard rating (Dangerous properties of hazardous material)**	
	Non-hazardous – (substances which will not result in any risk)	0
	Hazard rating 1 – (Substances which could result in relatively low risk) – Minor	1
	Hazard rating 2 – (Substances which could result in serious risk) – Moderate	2
	Hazard rating 3 – (Substance which could result in severe risk) - Major	3
Extent/ Spatial Scale	**How far does the impact extend?**	
	Limited to Business unit	0
	Limited to mine lease area	1
	Regional (Refer to municipal area)	2
	National (Refer to Mpumalanga area)	3
	International (refer to beyond South Africa's boundaries)	4
Duration	**How long will the impact last?**	
	Less than 5 years	0
	Between 5 – 15 years	1
	Exceeding mine lifetime	2
	Impact permanently present	3
Status	**Status of impact**	
	Beneficial (Improve the environment) – no risk reduction needed	-1
	Neutral (No change to the environment) – No risk reduction needed	0
	Adverse (Degradation of the environment) – Risk reduction needed	1
Legislation	**Are there any regulatory requirements applicable to aspects – impacts?**	
	None	0
	Yes, no fines, not cause loss of operating permit, but still reportable incident	1
	Yes, and will result in / prosecution or loss in production	2
	Yes, and will cause loss of operating permit or mine stoppage.	3
	Yes, and may lead to closing down of mine	4
I & AP's	**Interested and affected parties (I&AP)**	
	No impact	0
	Impact to employees in unit	1
	Impact to local community / stakeholders	2
	Impact to general public – beyond municipal area (impact on reputation)	3

Once a sum value has been determined for a specific impact, an Impact Severity Score is calculated (C-number) as **Step 1**, based on the Table below:

Table 9.4.4(b): Impact Assessment Criteria

Severity score	Risk matrix Consequence Category
21 - 22	(C) I7
19 - 20	(C) I6
17 - 18	(C) I5
14 - 16	(C) I4
10 - 13	(C) I3
5 - 9	(C) I2
Less than 5	(C) I1

During **Step 2** the likelihood of an impact occurring/re-occurring is assessed at the hand of the Table provided below:

Table 9.4.4(c): Likelihood of an Impact Occurring (P-value)

Likelihood Descriptors	Probability Intervals	Likelihood Definitions	P-value
Unforeseen	0 – 0.1%	The event is not foreseen to occur (never expected to happen)	P1
Highly unlikely	0.1 – 1%	The event may occur in exceptional circumstances (highly unlikely)	P2
Very unlikely	1 – 5%	The event may occur in certain circumstances (rarely)	P3
Low	5 – 15%	The event could occur (low likelihood; 1/100 years)	P4
Possible	15 – 40%	The event may occur (can happen; 1/10 years)	P5
Likely	40 – 75%	The event will probably occur (Likely; once a year)	P6
Almost Certain	75 – 100%	The event is expected to occur or occurs regularly (Frequently; more than once a year)	P7

Finally, the overall impact is quantified in a "Level of Risk" matrix, by combining the C-value (calculated in **Step 1**) with the P-value (calculated in **Step 2**) in the matrix provided below (**Step 3**). The overall impacts will be ranked based on the Level of Risk, as identified below:

Table 9.4.4(d): Level of Risk Matrix for Impacts

	P1	P2	P3	P4	P5	P6	P7
(C) I7	Level 4 Risk	Level 3 Risk	Level 3 Risk	Level 2 Risk	Level 1 Risk	Level 1 Risk	Level 1 Risk
(C) I6	Level 4 Risk	Level 3 Risk	Level 3 Risk	Level 2 Risk	Level 2 Risk	Level 1 Risk	Level 1 Risk
(C) I5	Level 5 Risk	Level 4 Risk	Level 3 Risk	Level 3 Risk	Level 2 Risk	Level 2 Risk	Level 2 Risk
(C) I4	Level 6 Risk	Level 5 Risk	Level 4 Risk	Level 4 Risk	Level 3 Risk	Level 3 Risk	Level 3 Risk
(C) I3	Level 6 Risk	Level 5 Risk	Level 5 Risk	Level 4 Risk	Level 4 Risk	Level 3 Risk	Level 3 Risk
(C) I2	Level 6 Risk	Level 6 Risk	Level 6 Risk	Level 5 Risk	Level 5 Risk	Level 4 Risk	Level 4 Risk
(C) I1	Level 6 Risk	Level 6 Risk	Level 6 Risk	Level 6 Risk	Level 6 Risk	Level 6 Risk	Level 6 Risk

9.5. METHOD FOR ASSESSING DURATION SIGNIFICANCE

The proposed method for assessing the duration of an impact is listed in Table 9.5(a) below.

Table 9.5(a): Method for Assessing Duration as Part of the Impact Significance Rating

Duration	**How long will the impact last?**	
	Less than 5 years	0
	Between 5 – 15 years	1
	Exceeding mine lifetime	2
	Impact permanently present	3

9.6. CONSULTATION TIMELINE WITH COMPETENT AUTHORITIES

Shondoni Colliery operates as a mine in terms of the MPRDA and NEMA and hence the application(s) to be lodged in terms of this project are done in terms of the Single Environmental System, with DMRE as the Competent Authority and therefore the primary authority to be consulted.

Sasol Mining intends to expand its mining right (MP 30/5/1/2/3/2/1/138 MR) area which requires the inclusion of four granted prospecting rights within the Shondoni Colliery EMP boundary. Incorporating these areas require application and related amendment application processes to be initiated before 10 September 2020 which is the first lapsing date of the relevant prospecting rights.

The Covid-19 virus was classified as a pandemic by the World Health Organisation ("WHO"), and following related developments within South Africa, the Government declared a National State of Disaster relating to Covid-19 in terms of section 27(1) of the Disaster Management Act, 2002. On 23 March 2020, President Cyril Ramaphosa announced measures to combat the spread of the Covid-19 coronavirus in South Africa – a nationwide lockdown with severe restrictions on travel and movement. The initial national lockdown was for a period of 21 days which as increased to five weeks.

Section 26(2)(b) of the Disaster Management Act, 2002, provides that a national disaster, once declared, must be managed in accordance with existing legislation, as well as contingency arrangements as amplified by disaster management regulations or directions issued in terms of section 27(2) of the Disaster Management Act, 2002. These directions are issued pursuant to regulation 10(8) of the Regulations to provide for measures necessary to manage Covid-19 and are valid for the duration of the declared national state of disaster.

On 31 March 2020 the Minister of Forestry, Fisheries and the Environment issued directions to address, prevent and combat the spread of Covid-19 and to alleviate, contain and minimise the effects of the national state of disaster, as set out in the Schedule to Government Notice (GNR 439 of 31 March 2020). The purpose of the directions is to, amongst others, ensure fair processes, especially relating to licensing processes, public participation processes, appeal processes, reporting requirements and the provision of waste management services during the lockdown period.

On 9 April 2020 the Minister of Mineral Resources and Energy issued Directions in order to provide guidance on the implementation of the provisions for essential goods and services as set out in the Schedule to Government Notice (GNR 462 of 11 April 2020). The purpose of the Directions is to ensure fair processes relating to licensing, consultation, appeals and compliance processes and reporting requirements during the lockdown period which commenced at midnight on 26 March 2020.

However, at that time no guidance was provided for future projects and applications affected directly by the directions and measures implemented. All EA applications are supported by preparatory specialist environmental studies as formally directed and required by environmental legislation and governance thereof.

The appointed project team, many situated in different provinces, were not able to initiate or conduct these specialist environmental studies due to the severe restrictions on travel (between different provinces) and movement measures that were implemented.

Considering all these factors, the Project Team concluded that if the EA Application is to be submitted in September 2020, not all specialist environmental studies would be able to be finalised in order to support the 300 day Single Environmental System timeframe, which is initiated once an application has been lodged.

Hence, the Applicant and EAP consulted with the DMRE – Ms Mashudu Maduka (Acting Regional Manager) on the 15th of July 2020 - in terms of applying/ requesting an extension on the date that the EA application be submitted.

The Applicant and the EAP were however advised by the DMRE that Regulation 3(7) of the EIA Regulations (2014 as amended) is applicable and an extension on the 300-day Single Environmental System timeframe can be applied for/ motivated for during the Scoping Phase.

Regulation 3(7) reads: *"In the event where the scope of work must be expanded based on the outcome of an assessment done in accordance with these Regulations, which outcome could not be anticipated prior to undertaking the assessment, or in the event where exceptional circumstances can be demonstrated, the competent authority may, prior to lapsing of the relevant prescribed timeframe, in writing, extend the relevant prescribed timeframe and agree with the applicant on the length of such extension."*

We hereby request an extension on the prescribed timeframe for the EIA Phase of the project due to the exceptional circumstances described above.

Extension is requested on the prescribed timeframe for the EIA Phase, i.e. submitting the Final EIA/ EMP report to the DMRE in order to finalise and conclude the supporting specialist environmental studies in support of this project.

A comprehensive description of all the specialist environmental assessments that still need to be performed in order to provide comprehensive ecological and scientific information of high integrity in support of this project is relayed in section 9.3 of this report.

These descriptions clearly indicate the necessity for the extension requested in terms of the timeframe for the EIA Phase of the project.

The proposed timeframe and dates for the EIA Phase of this project is provided in Table 9.6(a).

Consultation with DWS will be initiated and conducted in support of the amendment process of the WUL applicable to the project area. WUL 08/C12D/ACFGIJ/2027will be amended to incorporate all the water uses (current and new) associated with this new proposed Shondoni Colliery EMP boundary area.

Table 9.6(a): Consultation Timeline with DMRE

E-Meeting with DMRE (CA)	**15 July 2020**
Submission of the Environmental Authorisation (EA) application in terms of the NEMA to the DMRE (CA)	**02 September 2020**
Draft Scoping Report submitted to DMRE (CA)	**04 September 2020**
Scoping Phase Public Meeting for I&AP's	**04 September 2020**
Draft Scoping Report available to I&AP's	**04 September 2020**
CA and I&AP Review Process (30 days) concludes	**07 October 2020**
Submit Final Scoping Report (which has been subjected to Public Participation) to DMRE (CA)	**16 October 2020**
CA to Review/Accept Scoping Report (43 days)	**30 November 2020**
Impact Phase Public Meeting for I&AP's	**17 May 2021**
Draft EIA and EMP Report submitted to DMRE (CA)	**18 May 2021**
Draft EIA and EMP Report available to I&AP's	**18 May 2021**
CA and I&AP Review Process (30 days) concludes	**17 June 2021**
Submit Final EIA and EMP Report (which has been subjected to Public Participation) to DMRE (CA)	**05 July 2021**
Approval by CA	**22 October 2021**

9.7. EIA PHASE STAKEHOLDER ENGAGEMENT PROGRAMME PARTICULARS

9.7.1. Notification of Interested and Affected Parties

An extensive list/register of I&AP's and authorities was compiled and updated during the Scoping Phase and the same database will be used for communication with I&AP's during the EIA Phase.

However, should any person be identified, or should any person request to be registered as an I&AP to the project, at any stage of the project, he/she will be given the opportunity to do so and be notified of the project accordingly.

Notification of I&AP's and authorities on the progress of the project will be done according to the regulations as set out in GNR 982 (as amended) which includes notification letters, newspaper advertisements, and site notices. These notices and advertisements will inform the I&AP's on details of the Public Meeting during the EIA Phase.

9.7.2. Details of Engagement Process

Meetings with authorities during the EIA Phase will be organised on request. The I&AP's will be invited to attend a Public Meeting during which the results of the environmental impact assessment and proposed management and mitigation measures will be communicated to them. Should some of the I&AP's wish to be consulted in a Focus Group format, such meetings will be scheduled and conducted.

All I&AP's will receive the opportunity to comment on any of the information generated during the S&EIR Process, in the review periods of the reports, which will be submitted to the relevant authorities.

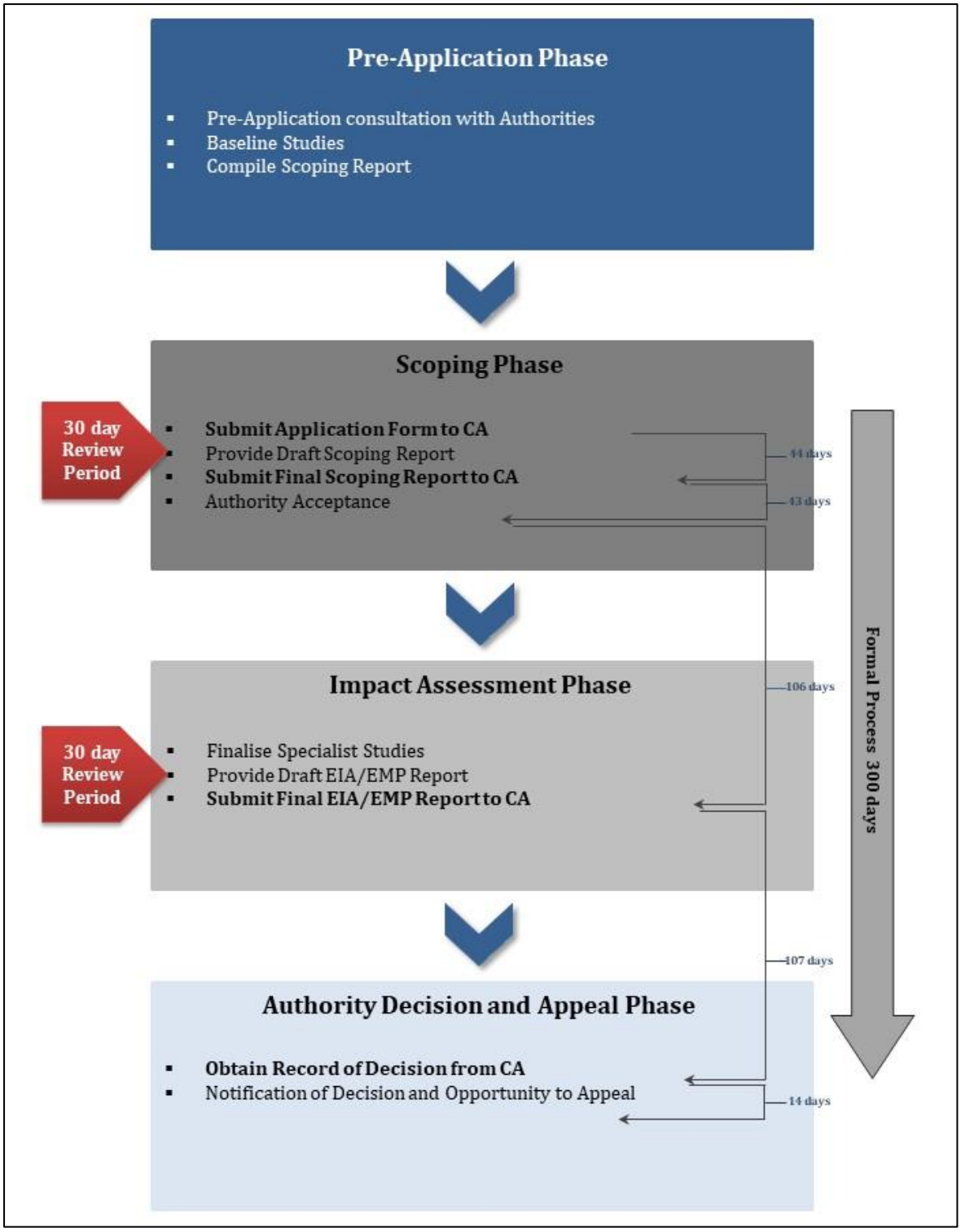
All comments that are raised by I&AP's will be incorporated into an I&AP Comments Register. JMA Consulting will then address each and every issue or comment raised. This register will be updated during the process and will be available for review as it will be included in the draft EIA Report to be made available for review.

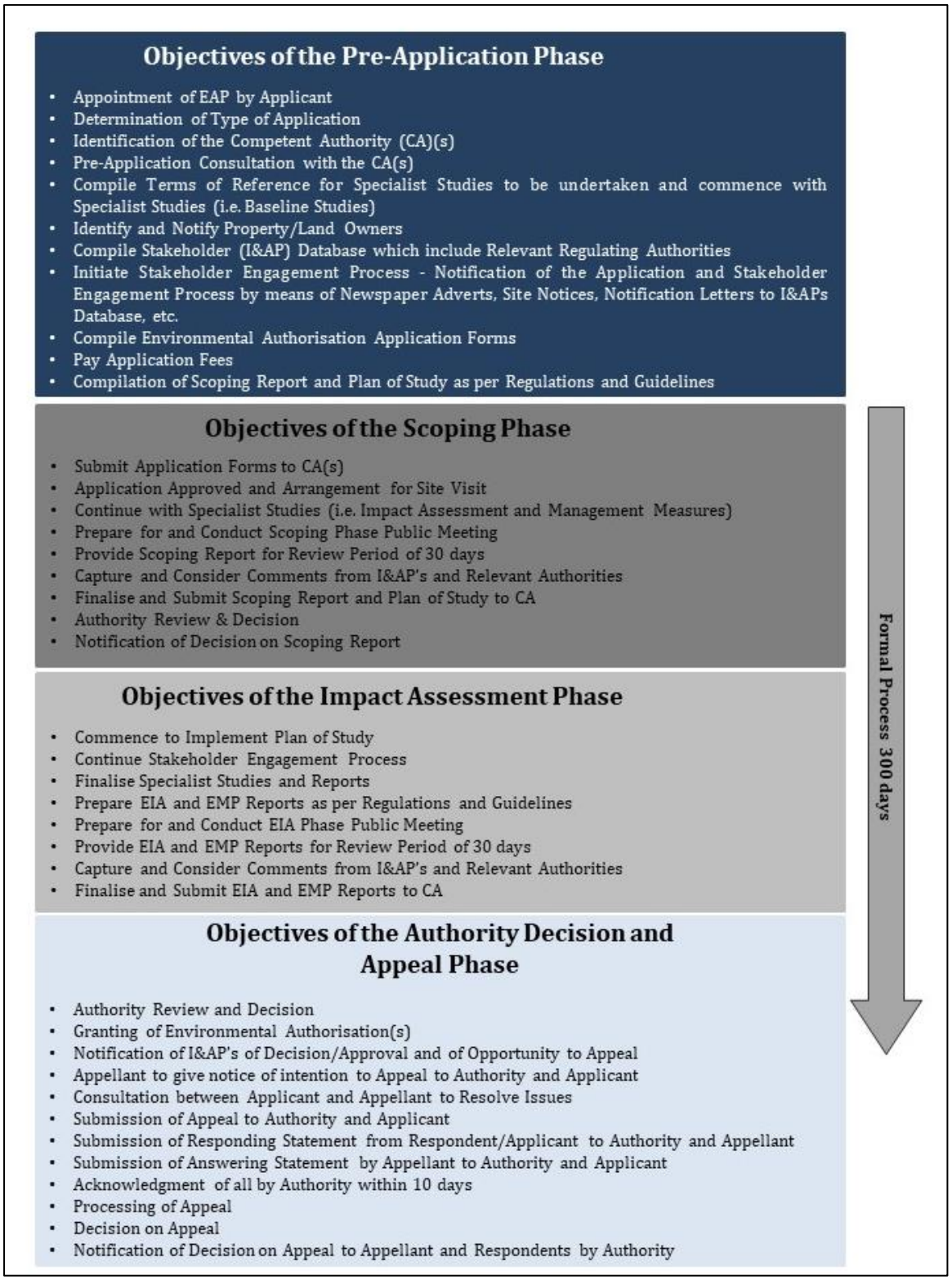
9.7.3. Information to be provided to Interested and Affected Parties

Throughout the SEP, I&AP's will have access to draft reports at public venues. They will also be able to access all draft reports on the JMA Consulting website (www.jmaconsult.co.za).

A detailed SEP Report, containing information of all the actions that were undertaken with regard to the SEP (for both phases, Scoping and EIA), will be compiled for this project and be submitted along with the final EIA Report to the relevant CA.

9.8. TASKS TO BE UNDERTAKEN DURING ENVIRONMENTAL IMPACT ASSESSMENT





9.9. MANAGEMENT MEASURES TO AVOID, MANAGE OR MITIGATE IMPACTS

The details of the management measures to be implemented at Shondoni Colliery will be developed during the EIA Phase of the project.

However, JMA Consulting has developed a Mitigation/Management Measure Table (Table 9.9(a)) which indicates potential options available for the mitigation/management of specific environmental impacts and risks.

The Table was compiled specifically for Shondoni Colliery and considered all typical activities associated with this type of operation and identifies and describes the impacts and possible mitigation/management measures per environmental component.

The last column in the Table indicates if a potential Residual Risk would be present after decommissioning and closure.

Table 9.9(a): Mitigation and Management Measures and Potential Residual Risk

Environmental Component	Impact Category	Description of Nature of Potential Impact/Issue	Possible Mitigation Type	Potential for Residual Risk	
				Yes	No
Socio Cultural	Geographic Processes (land use patterns)	Changes in land use patterns due to conversion of agricultural land to mining and industrial land use.	Optimise the post closure land use to support the post closure land use objectives.	X	
	Demographic Processes (population composition e.g. age, gender, race)	Changes in population numbers and profile due to potential influx of migrant workers for construction, operation and decommissioning phases.	Implement an employment policy of local recruitment first as far as possible.	X	
	Institutional & Legal Processes (municipal services, public infrastructure, housing)	Changes in the demand for municipal services, transport and housing due to the increase in population.	Consult with local authorities to ensure the availability and maintenance of services as a result of increased demand. Contribute to local development through the mine social and labour plan.	X	
	Cultural Processes (social, cultural and traditional practices)	Changes in the cultural dynamics of the area due to influx of people with different cultural and social backgrounds.	Implement an employment policy of local recruitment first as far as possible. Contribute to local upliftment and cultural development through the mine social and labour plan.	X	
Heritage Resources	Historical and Cultural (places, buildings, structures, burial grounds, graves)	Damage to, or destruction of, heritage resources due to construction, mining and decommissioning activities.	Avoid the encroachment upon and destruction of Heritage Resources.		X
Socio Economic	Economic Efficiency (labour, employment, output and growth)	Positive changes in economic output and regional exports due to the activities and operations associated with Shondoni Colliery.	Maximise local recruitment.		X
	Economic Equity (poverty, income)	Positive changes in employment, tax income, increased social spending and increased incomes due to employment offered by Shondoni Colliery.	Maximise local procurement. Minimise Risks of external costs.		X
	Economic Stability (diversity, resource use)	Positive changes in economic stability through diversification due to the activities and operations associated with Shondoni Colliery.	Maximise impact of tax and social funds.		X
Land Use	Beneficial Land Use (derelict, vacant, residential, industrial, mining, agricultural, recreational, wilderness, conservation)	Changes in land use due to due to the construction of mining infrastructure and processes as well as potential surface subsidence.	Minimise the development footprints. Optimise the post closure land use to achieve the post closure land use objectives.	X	

Environmental Component	Impact Category	Description of Nature of Potential Impact/Issue	Possible Mitigation Type	Potential for Residual Risk	
				Yes	No
Topography	Morphology	Creation of dangerous/unstable excavations due to mining, as well as dangerous/unstable mounds/piles/dumps due to stockpiling of soil and ROM.	Ensure that relevant facilities (stockpiles, dumps) are operated in strict accordance with the design principles and ensure final decommissioning and closure in compliance with closure plans/designs.		X
	Stability	Creation of areas prone to surface subsidence due to underground mining activities (high extraction mining).	Assessments should be performed to determine which areas classify as significant risks and Sasol should rehabilitate accordingly.	X	
Soils	Soil Horizon	Loss of soil horizon due to site clearance for construction of ancillary infrastructure.	Minimise development footprints.	X	
	Soil Fertility	Loss of soil fertility due to incorrect stockpiling of soils required for rehabilitation purposes.	Handle and stockpile soil in compliance with guidelines provided.		X
	Soil Contamination	Contamination of soil due to coal spillages of ROM during conveyance or due to spillages/seepages/leakages of contaminated water from pipes, canals, sumps and dams.	Minimise spillages and leakages. Remediate spillages as soon as possible.	X	
Land Capability	Land Capability (wetland, arable (dryland), arable (irrigation), grazing, wilderness, rehabilitated)	Changes in the land capability due to the construction of mining infrastructure and processes as well as potential surface subsidence.	Minimise the development footprints. Optimise the post closure land capability to achieve the post closure land use objectives.	X	
Geochemistry	Acid Mine Generation (AMD)	Potential of AMD to be generated due to the geochemical properties of the rock and coal found in the underground workings.	Reduce infiltration of contaminated groundwater into the adjacent aquifer. Minimise changes in the quality and quantity of water reaching the natural environment.		X
Groundwater	Quantity (presence, flow, availability) of Groundwater	Increase in groundwater recharge from surface as a result of underground mine compartments (voids) created and due to possible surface subsidence. Decrease in borehole yield of external users as a result of underground water being pumped from the workings. Decrease in yield to rivers/streams and wetlands due to water being pumped from the underground workings. Depletion in storage capacity post closure can result in decant of groundwater.	Optimise storage capacity in underground mine water compartments. Allow for re-flooding of the underground workings. Supply external users with supplementary water in the cases where a mining-related impact was proven and formal agreements are in place.		X

Environmental Component	Impact Category	Description of Nature of Potential Impact/Issue	Possible Mitigation Type	Potential for Residual Risk	
				Yes	No
	Quality of Groundwater	Contamination of the groundwater resource due to the storage of contaminated underground water (mine/ service water) in underground water compartments or the seepage/ infiltration of contaminated water from surface activities. Deterioration of groundwater quality due AMD formation.	Monitor underground groundwater quality. During pumping/ reticulation of underground water, prevent the mixing of poor and good quality water in surface water containment facilities. Operate PCD's, Service Water Dams to prevent spillages. Maintain liner integrity to prevent seepage for these facilities. Manage contaminated water from underground facilities by implementing appropriate measures to prevent decant of polluted water.	X	
Surface Water	Quantity (presence, flow, availability) of Surface Water	Depletion in the quantity of surface water due to the loss of surface water to groundwater in subsided areas, loss of direct rainfall in quarries and dams, as well as the capture of contaminated storm water runoff in Pollution Control Dams, i.e. loss of catchment yield.	Minimise the recharge of surface water to the underground workings. Minimise dirty water areas at the site where practically possible.		X
	Quality of Surface Water	Contamination of the surface water resource due to discharge/ decant of contaminated mine water and contaminated runoff from "dirty areas" directly into the surface water resources and/or spillages of contaminated water from tanks, sumps, pipes and dams.	Prevent contamination of surface water runoff. Operate PCD's, Service/Process Water Dams to prevent spillages. Optimise the Storm Water Management Plan to capture runoff from dirty water areas.		X
Plant Life	Habitat	Impact on or destruction of habitat due to site clearance for construction of roads, buildings and plant infrastructure and utilities.	Minimise the development footprints. Optimise the post closure land capability to achieve the post closure land use objectives.		X
	Biodiversity	Impact on or destruction of biodiversity due to a loss in habitat or as a result of contamination of soils or water.	Minimise the development footprints. Minimise spillages of contaminants. Optimise the post closure land capability to achieve the post closure land use objectives.		X
	Red Data List Species (sensitive, threatened, endangered)	Potential threat to identified species if construction and operational activities are not prevented in close proximity to the identified specimens.	Avoid impact on Red Data List Species.	X	
Animal Life	Habitat	Impact on or destruction of habitat due to vegetation habitat disturbance as well the construction and presence of fences.	Minimise the development footprints. Optimise the post closure land capability to achieve the post closure land use objectives.		X
	Biodiversity	Impact on or destruction of biodiversity due to habitat disturbance or as a result of water pollution, air pollution, noise and traffic.	Minimise the development footprints. Minimise spillages of contaminants. Optimise the post closure land capability to achieve the post closure land use objectives.		X

Environmental Component	Impact Category	Description of Nature of Potential Impact/Issue	Possible Mitigation Type	Potential for Residual Risk	
				Yes	No
	Red Data List Species (sensitive, threatened, endangered)	Potential threat to potential present threatened species if construction and operational activities are not prevented in close proximity to identified specimens.	Avoid impact on Red Data List Species.	X	
Wetlands	Habitat	Impact on or destruction of habitat due to site clearance for construction of roads, buildings and plant infrastructure and utilities as well as underground mining activities.	Avoid development within wetlands. Minimise disturbance of wetland habitat.		X
	Importance and Sensitivity (IS)	Deterioration in IS category due to impact on wetland species composition, habitat functionality and assumed sensitivities.	Avoid development within wetlands. Minimise disturbance of wetland habitat.		X
	Present Ecological State (PES)	Deterioration in PES due to impacts on habitat as well as wetland functions and services attributes.	Avoid development within wetlands. Minimise disturbance of wetland habitat.	X	
Aquatic Ecosystems	Habitat (IHAS)	Impact on, or Destruction of Habitat due to impacts on habitat attributes such as water flow and water quality.	Prevent surface water impacts into wetlands and streams through effective water management.		X
	Biodiversity (SASS5, FAII, Toxicity)	Impact on, or Destruction of biodiversity due to impacts on habitat.	Prevent surface water impacts into wetlands and streams through effective water management.		X
Air Quality	Dust Fallout / Gaseous Emissions on surface	Deterioration in Ambient Air Quality due to gaseous emissions from construction/ decommissioning vehicle activities as well as dust generated by conveyor transport, handling, stockpiling and wind entrainment of ROM as well as during construction and decommissioning activities.	Service machinery and vehicles on a regular basis. Prevent unnecessary idling of motors. Minimise dust fall-out by implementing effective dust suppression programmes.		
	Gas in Underground Workings	Accumulation of Gas (from machinery, blasting and natural gas) in Underground Workings.	Optimise Ventilation Management System.		X
Noise	Ambient Sound Level	Increase in the Ambient Sound Levels due to construction, mining, transport and decommissioning activities.	Conduct Noise Monitoring and Audits and implement noise reduction measures where required and possible.		X
	Noise	Generation of Noise from specific Shaft Complex noise generating activities.	Conduct Noise Monitoring and Audits and implement noise reduction measures where required and possible.		X
Visuals	Visual Aspects (visibility, visual exposure, visual intrusion and landscape morphology)	Impacts on visibility, visual exposure, visual intrusion and landscape morphology due to the presence of infrastructure, as well the occurrence of dust emissions during the construction, operation and decommissioning of infrastructure and processes at Shondoni Colliery.	Optimise Air Quality Management measures. Conduct effective housekeeping for visible areas.		X

10. INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

10.1 IMPACT ON SOCIO-ECONOMIC CONDITIONS OF DIRECTLY AFFECTED PERSONS

Required for the EIA Report.

A Socio-economic Specialist has been appointed and will compile a Specialist Study Report in this regard.

10.2 IMPACT ON THE NATIONAL ESTATE (SECTION 3(2) OF THE NHRA)

Required for the EIA Report.

A Heritage Specialist has been appointed and will compile a Specialist Study Report in this regard.

11. REQUIREMENTS IN TERMS OF 24(4)(A) AND (B) OF THE ACT

Table 11(a) serves to show that section 24(4)(a) and (b) of the Act has been adhered to when compiling the EIAR and EMPR for this project. The chapter which relays the specific information required as per the regulation is given in the second column of the Table.

In addition, a Scoping Report Checklist Table (Table 11(b)) has been compiled in accordance with the guideline as set out in the EIA Regulations (GNR 982) of 04 December 2014 (as amended in 2017); Appendix 2. Table 11(b) serves to show that the Appendix guideline has been adhered to when compiling this report. The chapter which relays the specific information required as per the guideline is given in the second column of the Table.

Table 11(a): Section 24(4)(a) and (b) of the Act Checklist Table

24 (4) Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment-	
(a) must ensure, with respect to every application for an environmental authorisation-	**Section**
(i) coordination and cooperation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state;	NA
(ii) that the findings and recommendations flowing from an investigation, the general objectives of integrated environmental management laid down in this Act and the principles of environmental management set out in section 2 are taken into account in any decision made by an organ of state in relation to any proposed policy, programme, process, plan or project;	CA Responsibility
(iii) that a description of the environment likely to be significantly affected by the proposed activity is contained in such application;	EA Application and Section 8
(iv) investigation of the potential consequences for or impacts on the environment of the activity and assessment of the significance of those potential consequences or impacts; and	Section 8 & 9
(v) public information and participation procedures which provide all interested and affected parties, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures; and	Section 8 & 9
(b) must include, with respect to every application for an environmental authorisation and where applicable-	**Section**
(i) investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity;	Section 8
(ii) investigation of mitigation measures to keep adverse consequences or impacts to a minimum;	Section 8 & 9
(iii) investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), excluding the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act;	Section 10 & EIA Report to follow
(iv) reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;	EIA Report to follow
(v) investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implementation;	EIA Report to follow
(vi) consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3); and	Section 8
(vii) provision for the adherence to requirements that are prescribed in a specific environmental management Act relevant to the listed or specified activity in question	Section 5

Table 11(b): Scoping Report Checklist Table

Scoping Report Guideline - Appendix 2 GNR 982 EIA Regulations 4 December 2014 (as amended 2017)	
Headings	**Section in Report**
Environmental Practitioner (EAP)	
Details of the EAP who prepared the report	Section 2
Expertise of the EAP	Section 2
CV of the EAP	Section 2
Location of Activity	
Location of Activity - 21-digit Surveyor General code	Section 3
Location of Activity - Physical address	Section 3
Location of Activity - Farm name	Section 3
** coordinates of boundary of the property*	Section 3
Map/ Plan which locates proposed activity as well as associated Infrastructure	
**linear activity = description and coordinates of the corridor in which the proposed activity is to be undertaken*	Section 3
**property not defined = coordinates within which the activity is to be undertaken*	Section 3
Description of the Scope of the Proposed Activity	
All listed and specified activities triggered and being applied for	Section 4
Description of the activities to be undertaken including the associated structures and infrastructure	Section 4
Description of the Policy and Legislative Context	
Identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments applicable to this activity and are to be considered in the assessment process	Section 5
Motivation for the Need and Desirability for the Proposed Development	
Need and desirability for the proposed development and the need and desirability of the activity in the context of the preferred location	Section 6
Description of the Process followed to reach the Proposed preferred Activity, site and location of the development footprint within the site including	
Details of all the alternatives considered	Section 8
Details of the PPP undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs	Section 8
Summary of issues raised by I&AP's and an indication of the manner in which the issues were incorporated, or the reasons for not including them	Section 8
Environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Section 8
Impacts and risks identified which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts can (a) be reversed (b) may cause irreplaceable loss of resources and (c) can be avoided, managed or mitigated.	Section 8
The methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives	Section 8
Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Section 8
Possible mitigation measures that could be applied and level of residual risk	Section 8
Outcome of the site selection matrix	Section 8
If no alternatives, including alternatives for locations for the activity were investigated, the motivation for not considering such	Section 8
Concluding statement indicating the preferred alternatives, including preferred location of the activity	Section 8
Plan of Study for undertaking the Environmental Impact Assessment process to be undertaken, including	

Scoping Report Guideline - Appendix 2 GNR 982 EIA Regulations 4 December 2014 (as amended 2017)	
Headings	**Section in Report**
A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity	Section 9
A description of the aspects to be assessed as part of the environmental impact assessment process	Section 9
Aspects to be assessed by specialists	Section 9
A description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists	Section 9
An indication of the stages at which the competent authority will be consulted	Section 9
Particulars of the PPP that will be conducted during the environmental impact assessment process	Section 9
A description of the tasks that will be undertaken as part of the environmental impact assessment process	Section 9
Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored	Section 9
Undertaking under oath or affirmation by the EAP in relation to	
The correctness of information provided in the reports	Section 12
The inclusion of comments and inputs from stakeholders and I&AP's	Section 12
Any information provided by the EAP to I&AP's and any responses by the EAP to the comments or inputs made by interested and affected parties	Section 12
An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and I&AP's on the plan of study for undertaking the environmental impact assessment	Section 12
Any specific Information that may be required by the CA	Section 11
Any other matters required in terms of section 24(4)(a) and (b) of the Act	Section 11

12. UNDERTAKING - CORRECTNESS OF INFORMATION

I, **René Wolmarans**, herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from Stakeholders and Interested and Affected Parties have been correctly recorded in the report.

Signature of the EAP: _____

René Wolmarans (Pr. Sci. Nat.)

Date: _____

13. UNDERTAKING - PLAN OF STUDY LEVEL OF AGREEMENT

I, **René Wolmarans**, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with Interested and Affected Parties and Stakeholders, has been correctly recorded and reported herein.

Signature of the EAP: _____

René Wolmarans (Pr. Sci. Nat.)

Date: _____

14. REFERENCES

Breytenbach, P. J. J., Myburgh, W. J., Theron, G. K., & Bredenkamp, G. J. (1992). The phytosociology of the Villiers–Grootvlei area, South Africa. 1. Physical environment and the plant communities of the Bb Land Type. South African Journal of Botany, 58(4), 239-249.

Breytenbach, P. J. J., Myburgh, W. J., Theron, G. K., & Bredenkamp, G. J. (1993). The phytosociology of the Villiers–Grootvlei area, South Africa. 4. The plant communities of the Ea Land Type. South African Journal of Botany, 59(2), 235-246.

Department of Water and Sanitation (DWS) (2014). A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Compiled by RQIS-RDM.

Driver, Nel, Snaddon, Murray, Roux, Hill, Swartz, Manuel & Funke (2011). Implementation Manual for Freshwater Ecosystem Priority Areas. Water Research Commission, WRC Report No. 1801/1/11.

FitzPatrick Institute of African Ornithology (2020). Mammal MAP Virtual Museum. Accessed at http://vmus.adu.org.za/?vm=MammalMAP on 2020-07-22.

Hoare, D. (2010). Vegetation baseline survey and Environmental Impact Assessment for the Sasol Mining Middelbult (Block 8) Shondoni Project. Unpublished report prepared for Wetland Consulting Services.

Jones & Wagener Report (2010). Surface Water Specialist Report for the Environmental Management Plan and Environmental Impact Assessment for the Sasol Shondoni Project. Unpublished report prepared for JMA Consulting (Pty) Ltd.

Jones & Wagener Report (2014). Sasol Shondoni Mineral Rights Area Floodlines Report.

Lotter (2015). Technical Report for the Mpumalanga Biodiversity Sector Plan – MBSP. Mpumalanga Tourism & Parks Agency, Mbombela (Nelspruit).

Mbona, N., Job, N., Smith, J., Nel, J., Holness, S., Memani, S. & Dini, J. (2015). Supporting better decision-making around coal mining in the Mpumalanga Highveld through the development of mapping tools and refinement of spatial data on wetlands. WRC Report No TT 614/14. Water Research Commission, Pretoria.

Miller, S. (2010). Cultural heritage resources impact assessment for Harmony Gold Mine, Evander. Unpublished report African Heritage Resources.

Palmer RW & Engelbrecht J (2002). Middelbult Block 8: Aquatic Ecosystem Baseline Assessment. Unpublished report prepared for Oryx Environmental.

Wetland Consulting Services (Pty) Ltd (2010). Specialist Aquatic Ecosystem Assessment for the Sasol Mining, Middelbult (Block 8) Shondoni Project. Unpublished report prepared for JMA Consulting (Pty) Ltd.

Wetland Consulting Services (Pty) Ltd (2010). Sasol Middelbult (Block 8) – Shondoni Shaft. Terrestrial Ecology: Fauna for the Sasol Mining, Middelbult (Block 8) Shondoni Project. Unpublished report prepared for JMA Consulting (Pty) Ltd.

Wetland Consulting Services (Pty) Ltd (2018). Baseline Wetland Delineation and Assessment for the Sasol Middelbult Mine. WCS Report Reference: 1270-2017.

-END OF SCOPING REPORT-

APPENDIX 2(A)

Synoptic CV of the EAP

RENĒ WOLMARANS (Pr. Sci. Nat.)

Environmental Assessment Practitioner

Position: Scientist

Joined JMA: 2012

Qualifications:

M.Sc. (Cum Laude) Zoology, University of Pretoria, 2010
B.Sc. Hons. Zoology, University of Pretoria, 2007
B.Sc. Ecology, University of Pretoria, 2006

Career:

- **May 2012 – Present**
  Environmental Assessment Practitioner at JMA Consulting (Pty) Ltd.
- **July 2009 – April 2012**
  Environmental Practitioner at Clean Stream Scientific Services (Pty) Ltd.
- **January 2009 – June 2009**
  Intern at South African National Biodiversity Institute (SANBI).

Key Performance Areas:

René Wolmarans is responsible for the compilation of Basic Assessment Reports (BAR), Scoping and Plan of Study Reports, Environmental Impact Assessment (EIA) Reports and Environmental Management Programme (EMP) Reports.

She assists in the development of Integrated Water and Waste Management Plans (IWWMP) and External Audit Reports of Water Use Licences (WUL) and Waste Management Licences (WML). In addition, she facilitates the Stakeholder Engagement Programmes as required by Environmental Management Legislation.

Professional Associations:

SACNASP
South African Council for Natural Scientific Professions

IAIAsa
International Association for Impact Assessment South Africa

Contact Details:

Phone: +27 13 665 1788
E-mail: rene@jmaconsult.co.za

Selected Recent Relevant Projects:

- **Glencore Operations South Africa (Pty) Ltd – Lion Smelter (2018 – 2019)**: Scoping Report, EIA and draft EMP Reports, Stakeholder Engagement Process Report, IWWMP.
- **Hernic Ferrochrome (Pty) Ltd – Morula Operations (2017 – 2018):** Scoping Report, EIA and draft EMP Reports, Stakeholder Engagement Process Report, IWWMP.
- **Glencore Operations South Africa (Pty) Ltd – Rustenburg Smelter (2016 & 2018):** WML and WUL External Audit Reports.
- **Sasol Mining (Pty) Ltd - Decommissioning and Closure Application for Borrow Pits (2016):** BAR and Closure Plan, Stakeholder Engagement Process Report.
- **Samancor Chrome – Ferrometals (2015):** BAR and draft EMP Report.
- **Glencore Operations South Africa (Pty) Ltd - Rhovan (2014 – 2015):** BAR and draft EMP Report.

APPENDIX 3(A)

Business Registration Certificate

No. 05/38590/07

Republic of South Africa Republiek van Suid-Afrika

Certificate
Sertifikaat

CERTIFIED
A true and exact copy
of the original.

BAFANA MAKHUBO
Commissioner of Oaths Ex Officio
(Attorney of the High Court)
1 Sturdee Avenue
Rosebank, Johannesburg
REPUBLIC OF SOUTH AFRICA

I hereby Certify that
Ek Sertifiseer hierby dat

(a) A company named SOUTH AFRICAN COAL OIL AND GAS CORPORATION LIMITED was incorporated as a Public company on 26 September 1950.

(b) By Special Resolution registered on 2 July 1979 the name was changed to SASOL EEN LIMITED.

(c) By Special Resolution registered on 2 July 1979 the company was converted from a Public to a Private company. Simultaneously the translated name SASOL ONE (PROPRIETARY) LIMITED was registered as per form CM7 dated 27 June 1979.

(d) By Special Resolution registered on 16 November 1983 the name of the company was changed to SASOL BEDRYF (EIENDOMS) BEPERK.

(e) Simultaneously with the change of name the translated name SASOL OPERATIONS (PROPRIETARY) LIMITED was registered as per form CM7 dated 16 November 1983.

Signed at PRETORIA this TWENTY FIFTH day of
Geteken te PRETORIA op hede die *dag van*

MAY One thousand Nine hundred and EIGHTY FOUR.
Eenduisend Negehonderd

P.T.O.

Registrar of Companies
Registrateur van Maatskappye

GP-S H 128

(f) Accordingly, as on the date of this certificate the name of the company is SASOL OPERATIONS (PROPRIETARY) LIMITED.

BAFANA MAKHUBO
Commissioner of Oaths Ex Officio
(Attorney of the High Court)
1 Sturdee Avenue
Rosebank, Johannesburg
REPUBLIC OF SOUTH AFRICA

CERTIFIED
A true and exact copy
of the original.

Republic of South Africa
Companies Act, 1973, Section 44(1)(b)

Republiek van Suid-Afrika
Maatskappywet, 1973, Artikel 44(1)(b)

Form/Vorm CM9

Registration No. of company/Registrasienommer van maatskappy

UC 38590

Certificate of change of name of company

Sertifikaat van verandering van naam van maatskappy

This is to certify that/Hierby word gesertifiseer dat

SOUTH AFRICAN COAL, OIL AND GAS CORPORATION LIMITED

has changed its name by SPECIAL RESOLUTION and is now called
sy naam verander het by SPESIALE BESLUIT en nou genoem word

SASOL EEN ~~(BIBNDOMS)~~ BEPERK

and that the new name has this day been entered in the Register of Companies.
en dat die nuwe naam op hierdie dag in die Register van Maatskappye aangeteken is.

Signed and sealed at Pretoria, this/Geteken en geseël te Pretoria op hede die 5de

day of/dag van Julie

One Thousand Nine Hundred and/Eenduisend Negehonderd nege en negentig

Registrar of Companies/Registrateur van Maatskappye

Seal of Companies Registration Office
Seël van Registrateur van Maatskappye

CERTIFIED
A true and exact copy
of the original.

BAFANA MAKHUBO
Commissioner of Oaths Ex Officio
(Attorney of the High Court)
1 Sturdee Avenue
Rosebank, Johannesburg
REPUBLIC OF SOUTH AFRICA

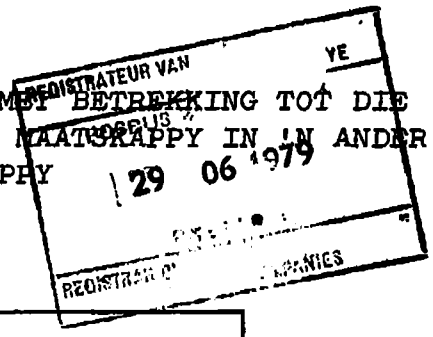
Vorm CM 45

REPUBLIEK VAN SUID-AFRIKA

MAATSKAPPYWET, 1973

GEWYSIGDE SERTIFIKAAT VAN INLYWING MET BETREKKING TOT DIE OMSKEPPING VAN EEN TIPE OF VORM VAN MAATSKAPPY IN IN ANDER TIPE OF VORM VAN MAATSKAPPY

(Artikel 28 (1))



Registrasienommer van maatskappy
UC 38590

Hierby word gesertifiseer dat ~~SOUTH AFRICAN COAL, OIL AND GAS CORPORATION LIMITED~~ SASOL EEN (EIENDOMS) BPK.

wat geregistreer is op 26 SEPTEMBER 1950

by SPESIALE BESLUIT omskep is van 'n PUBLIEKE MAATSKAPPY

in 'n PRIVAAT MAATSKAPPY en dat die naam van die maatskappy in my register voorkom, as SASOL EEN (EIENDOMS) BEPERK met ingang van die datum van hierdie sertifikaat.

Geteken en geseël op hede die 2de dag van Julie
Eenduisend Negehonderd Negeëntagtig

REGISTRATEUR VAN MAATSKAPPYE

Seël van Registrasiekantoor vir Maatskappye

Klaudi Forster
Ex Officio: Commissioner of Oaths
Attorney of the High Court of South Africa

Certified a true copy of the original

MAATSKAPPYWET, 1973

Aansoek om registrasie van vertaalde of verkorte vorm van 'n naam van 'n maatskappy

(Moet vergesel gaan van vorm CM 5 met naam soos goedgekeur)
[Artikel 43 (1)]

Naam van maatskappy SASOL EEN (EIENDOMS) BEPERK

Registrasienommer van maatskappy UC 38590

Geregistreerde posadres van maatskappy POSBUS 1
SASOLBURG
9570

( ) *Vertaalde vorm van naam wat geregistreer moet word SASOL ONE (PROPRIETARY) LIMITED

*Verkorte vorm van naam wat geregistreer moet word N.V.T.

Opmerking: Afsonderlike vorm moet gebruik word vir vertaalde of verkorte vorm van naam.

*Skrap indien nie van toepassing nie.

Certified a true copy of the original.

Riaan Verster
Ex Officio: Commissioner of Oaths
Attorney of the High Court of South Africa
1 Sturdee Avenue, Rosebank, 2196

Datum 27 JUNIE 1979 Handtekening A.R. Roodt
SEKRETARIS

L.W. Indien hierdie gedeelte nie ingevul word nie sal bevestiging van die registrasie nie aangestuur word nie.

Naam geregistreer 2/7/1979

Naam van applikant SASOL EEN (EIENDOMS) BEPERK

Posadres POSBUS 1
SASOLBURG
9570

REGISTRATEUR VAN MAATSKAPPYE
PRIVAATSAK X429 PRIVATE BAG
Die naam is op hierdie datum geregistreer
- 8 - 7 - 1979
Datumstempel van Registrasiekantoor vir Maatskappye
PRETORIA
Registrateur van Maatskappye
REGISTRAR OF COMPANIES

Republic of South Africa
Companies Act, 1973, Section 44(1)(b)

Republiek van Suid-Afrika
Maatskappywet, 1973, Artikel 44(1)(b)

Form/Vorm CM9

BAFANA MAKHUBO
Commissioner of Oaths Ex Officio
(Attorney of the High Court)
1 Sturdee Avenue
Rosebank, Johannesburg
REPUBLIC OF SOUTH AFRICA

CERTIFIED
A true and exact copy
of the original.

Registration No. of company/Registrasienommer van maatskappy

00/
~~UC~~ 38590/07

Certificate of change of name of company

Sertifikaat van verandering van naam van maatskappy

This is to certify that/Hierby word gesertifiseer dat

SASOL EEN (EIENDOMS) BEPERK

has changed its name by SPECIAL RESOLUTION and is now called
sy naam verander het by SPESIALE BESLUIT en nou genoem word

SASOL BEDRYF (EIENDOMS) BEPERK

and that the new name has this day been entered in the Register of Companies.
en dat die nuwe naam op hierdie dag in die Register van Maatskappye aangeteken is.

Signed and sealed at Pretoria, this/Geteken en geseël te Pretoria op hede die 16de

day of/dag van November

One Thousand Nine Hundred and/Eenduisend Negehonderd Drie en Tagtig

Certificate of change of name dated 16/11/83 herewith
Hierby sertifikaat van verandering van naam gedateer

Name of Company
Naam van maatskappy Sasol Bedryf (Edms) Bpk

Postal Address
Posadres Posbus 5486
2000 JOHANNESBURG

Date stamp of companies Registration Office
Registrar of ~~COMPANIES~~ REGISTRATEUR VAN MAATSKAPPYE
PRIVAATSAK/PRIVATE BAG X429
Datumstempel van registrasiekantoor vir Maatskappye.
Registrateur van Maatskappye 16 NOV 1983
PRETORIA
REGISTRAR OF COMPANIES

Republic of South Africa
Companies Act, 1973, Section 44(1)(b)

Republiek van Suid-Afrika
Maatskappywet, 1973, Artikel 44(1)(b)

Form/Vorm CM9

BAFANA MAKHUBO
Commissioner of Oaths Ex Officio
(Attorney of the High Court)
1 Sturdee Avenue
Rosebank, Johannesburg
REPUBLIC OF SOUTH AFRICA

CERTIFIED
A true and exact copy
of the original.

Registration No. of company/Registrasienommer van maatskappy

05/38590/07

Certificate of change of name of company

Sertifikaat van verandering van naam van maatskappy

This is to certify that/Hierby word gesertifiseer dat

SASOL BEDRYF (EIENDOMS) BEPERK

has changed its name by SPECIAL RESOLUTION and is now called
sy naam verander het by SPESIALE BESLUIT en nou genoem word

SASOL MYNBOU (EIENDOMS) BEPERK

and that the new name has this day been entered in the Register of Companies.
en dat die nuwe naam op hierdie dag in die Register van Maatskappye aangeteken is.

Signed and sealed at Pretoria, this/Geteken en geseël te Pretoria op hede die 1 ste

day of/dag van July

One Thousand Nine Hundred and/Eenduisend Negehonderd Agt en tagtig

Registrar of Companies/Registrateur van Maatskappye

Certificate of change of name dated _____ herewith
Hierby sertifikaat van verandering van naam gedateer

Name of Company Sasol Mynbou (Edms) BPK
Naam van maatskappy

Postal Address
Posadres Posbus 5486
JOHANNESBURG 2000

REGISTRATEUR VAN MAATSKAPPYE
PRIVAATSAK/PRIVATE BAG X138
Date stamp of companies Registration Office
Registrar of Companies
1988 -07- 04
Datumstempel van registrasiekantoor vir
Maatskappye.
Registrateur van Maatskappye.
PRETORIA 0001
REGISTRAR OF COMPANIES

REPUBLIEK VAN SUID-AFRIKA – REPUBLIC OF SOUTH AFRICA
MAATSKAPPYWET – COMPANIES ACT, 1973

Vorm / Form CM 9A

Registrasienommer van Maatskappy
Registration number of Company

05/38590/07

SERTIFIKAAT VAN VERANDERING VAN VERTALING/~~VERKORTE VORM~~ VAN NAAM VAN MAATSKAPPY
CERTIFICATE OF CHANGE OF TRANSLATION/SHORTENED FORM OF NAME OF COMPANY

Naam van Maatskappy
Name of Company SASOL MYNBOU (EDMS) BEPERK

Hierby word gesertifiseer dat die Maatskappy die vorige vertaling*/~~verkorte vorm~~ van sy naam
This is to certify that the Company has changed the former translation*/~~shortened~~ form of its name

GESERTIFISEER AS 'N WARE AFSKRIF VAN DIE OORSPRONKLIKE
CERTIFIED AS A TRUE COPY OF THE ORIGINAL

van
from SASOL OPERATIONS (PTY) LIMITED

in/to

SASOL MINING (PTY) LIMITED

verander het en dat die nuwe vertaling*/~~verkorte vorm~~ van sy naam vandag geregistreer is.
and that the new translation*/~~shortened~~ form of its name has this day been registered.

Geteken en geseël te PRETORIA op hede die
Signed and sealed at PRETORIA this 1ste

dag van
day of Julie Eenduisend Negehonderd
One thousand Nine hundred and Agt en Tagtig

M Hamman
Registrateur van Maatskappye / Registrar of Companies

Moet deur die maatskappy voltooi word – To be completed by company

Sertifikaat van verandering vertaling*/~~verkorte vorm~~ van naam van maatskappy gedateer 1 Julie 1988
Certificate of change of translation*/shortened form of name of company, dated
gaan hiermee.
herewith.

Datumstempel van Registrasiekantoor vir Maatskappye
Date Stamp of Companies Registration Office

REGISTRATEUR VAN MAATSKAPPYE
PRIVAATSAK/PRIVATE BAG X237
1988 -07- 01
PRETORIA 0001
REGISTRAR OF COMPANIES

Registrateur van Maatskappye
Registrar of Companies

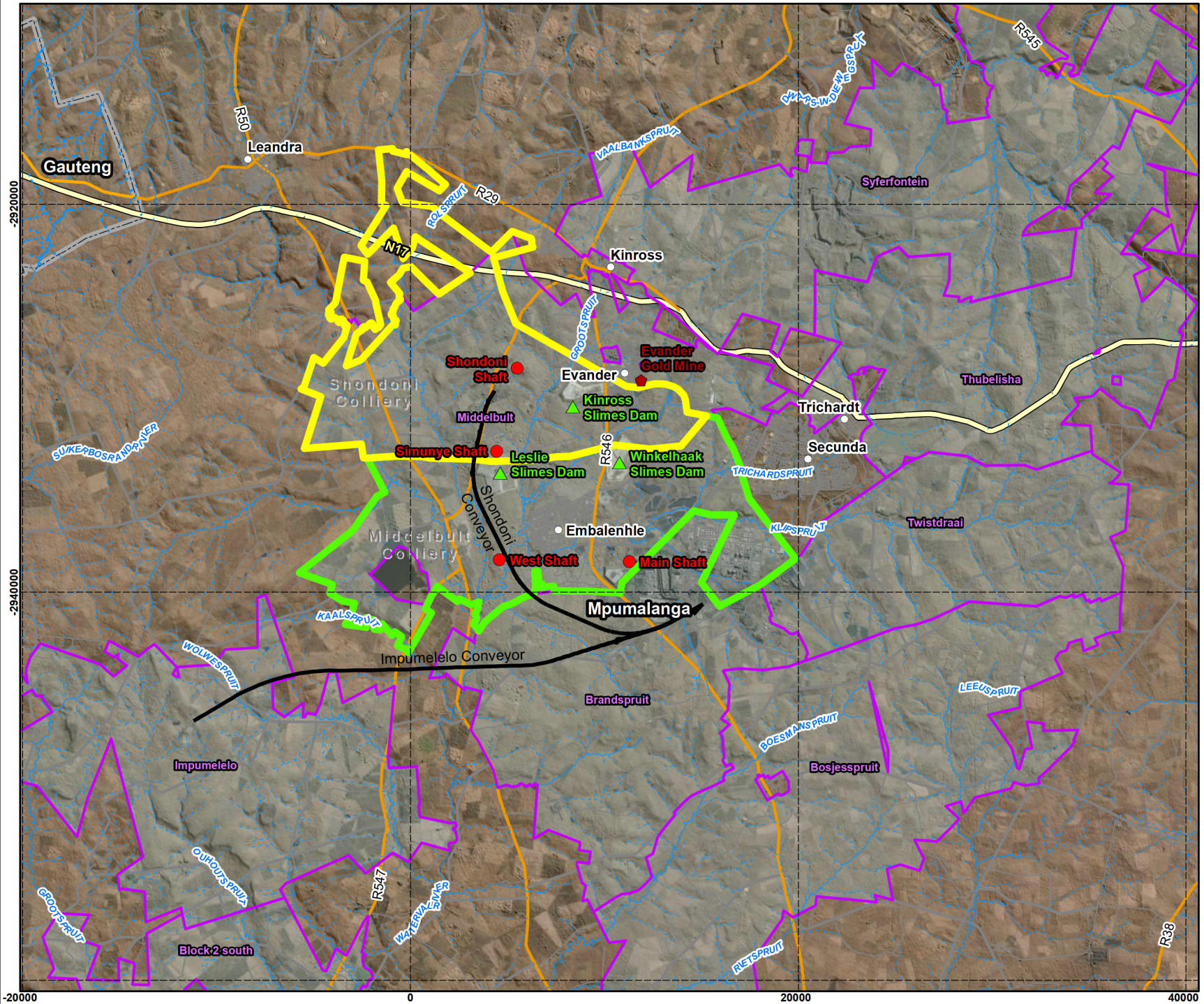
Naam van Maatskappy
Name of Company SASOL MYNBOU (EDMS) BEPERK

Posadres
Postal address Posbus 5486
JOHANNESBURG 2000

Form Ref. No. W909(A) Waltons Stationery Co., P.O. Box 11358, Cape Town, 8000 Reproduced under Government Authority No. 5057/23/11/73

APPENDIX 3(B)

Large Scale Activity and Major Infrastructure Map



JMA CONSULTING (PTY) LTD

Sustainable Environmental Solutions through Integrated Science and Engineering

Legend

- Slimes Dams
- Evander Gold Mine
- Towns
- Shafts
- Conveyor Belts
- Non-Perennial
- Perennial
- National Route
- Main Road
- Secondary Road
- Street
- Shondoni New EMP Boundary
- Middelbult New EMP Boundary
- Other Sasol Mine Boundaries
- Province Boundary

Source:
Esri Basemap 2020
NGI 1:50 000 Topographical Data
Boundary and Infrastructure Data from Sasol

0 2 4 6 8 10
Kilometers

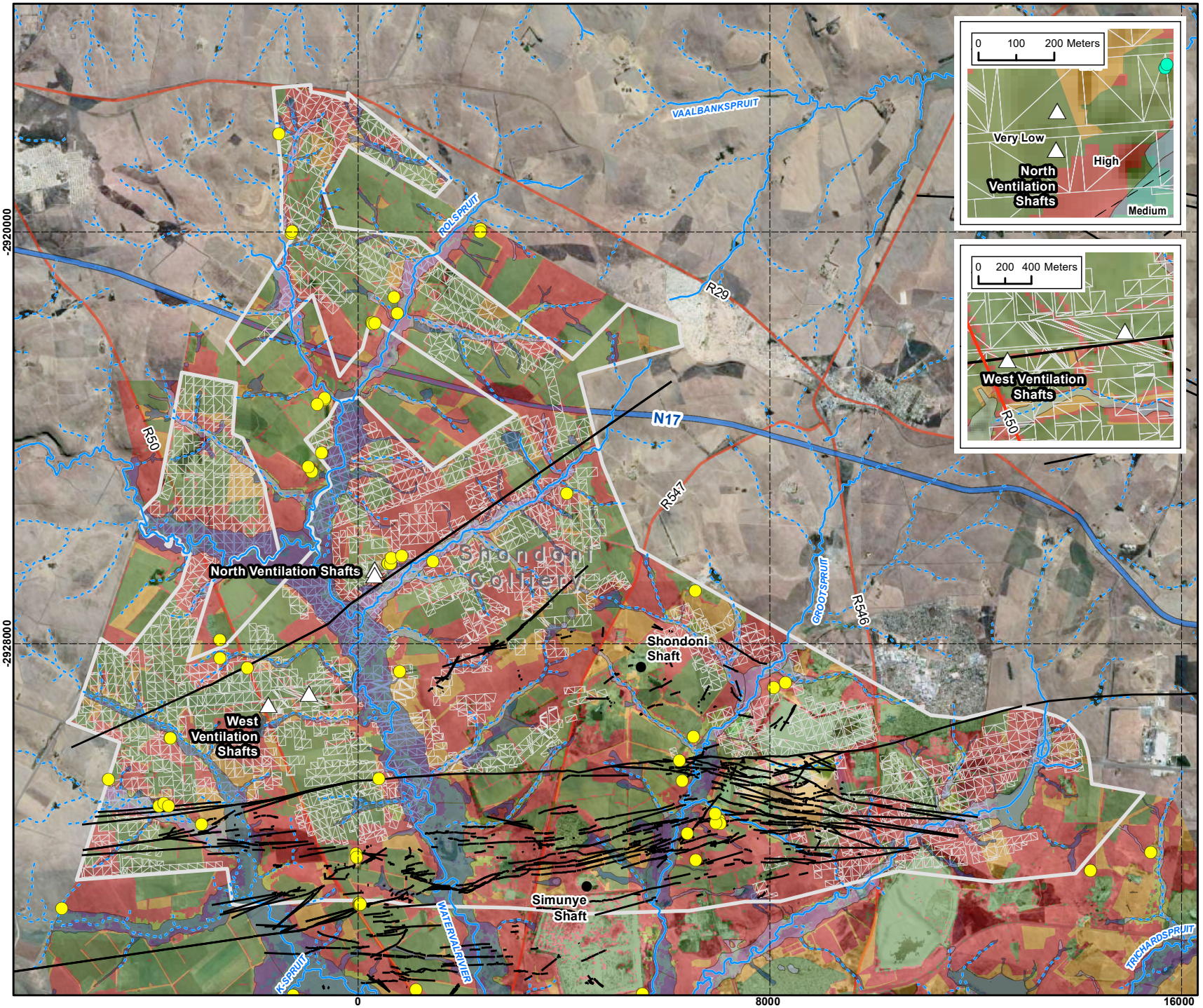
Client: Sasol Mining (Pty) Ltd
Site: Shondoni
Project No: 10516
Map Status: Final
Cape Datum (Clark 1880) TM29

Date Compiled : July 2020

Site Layout and Major Infrastructure

APPENDIX 8(A)

Large Scale Environmental Features and Activity Map



JMA CONSULTING (PTY) LTD

Sustainable Environmental Solutions through Integrated Science and Engineering

Legend

- Shondoni Heritage Locations
- Shafts
- New Proposed Ventilation Shafts
- Faults
- Non-Perennial
- Perennial
- Shondoni New EMP Boundary

Sasol_Shondoni_J...

Wetlands

- Artificial Seep
- Channelled Valley Bottom
- Dam
- Depression
- Diversion
- Drainage Line
- Floodplain
- Seep
- Unchannelled Valley Bottom
- Future Mining

Ecological Importance

- High
- Low
- Medium
- Very Low
- National Route
- Main Road
- Secondary Road

Source:
Esri Basemap 2020
NGI 1:50 000 Topographical Data
ALOS World 3D – 30m (AW3D30) ©JAXA

0 0,5 1 1,5 2 2,5 3 3,5 4 4,5
Kilometers

Client: Sasol Mining (Pty) Ltd
Site: Shondoni
Project No: 10516
Map Status: Final
Cape Datum (Clark 1880) TM29

Date Compiled : August 2020

Wetlands & Terrestrial Ecology Sensitivity Areas

APPENDIX 8(B)

Sasol Mining Response to Mr James Objection

14 October 2020

Mr Riaan Grobbelaar
JMA Consulting (Pty) Ltd
PO Box 883
Delmas
2210

By email: riaan@jmaconsult.co.za

Dear Riaan

Objection by Sasol Mining against the proposed construction of buildings by the Andrew James Trust on Portion 134 of the farm Winkelhaak 135 IS

Several years ago, the Andrew James Trust approached Sasol Mining with a request for permission to construct a private dwelling, shed and access road on his property.

The Andrew James Trust had to engage with Sasol Mining as the holder of a mining right (ref no 30/5/1/2/2/138 MR). Sasol Mining was allowed to extract coal on the land in question. The applicable mining right was obtained by Sasol Mining and converted to a new order mining right as prescribed by the Mineral and Petroleum Resources Development Act.

Upon closer evaluation, Sasol Mining determined the proposed site was located directly above a panel earmarked for future mining activities. Should Sasol Mining allow the proposed surface development to take place, it would limit access to a considerable body of economically extractable coal. Sasol Mining identified an alternative site on the same property where the proposed improvements would not negatively impact mining. This alternative site was however not acceptable to the surface owner.

Following several further engagements, Sasol Mining decided to approve development within the area indicated in the attached map, on condition that the surface owner would allow Sasol Mining to conduct mining beneath the surface improvements at such a safety factor as approved by the Principal Inspector of the Department of Mineral Resources and Energy and the surface owner indemnifying Sasol Mining from any liability. The approved site would not exceed 2 hectares in extent.

Sasol Mining (Pty) Ltd 1950/038590/07
Sasol Mining Rights and Properties Uno Building Paul Kruger Street Trichardt PO Box 699 Trichardt 2300 Republic of South Africa
Telephone +27 (0)17 610 1111 www.sasol.com

Apart from requests to inspect certain documentation including the approved mining right and corresponding environmental management programme which was allowed, Sasol Mining has not received any further communication from the surface owner.

Sasol Mining is still of the opinion that any surface improvements will limit coal extraction and cause significant revenue losses and cannot give permission to develop infrastructure apart from what was previously agreed.

Sincerely

Paul Cronje
Head: Mining Rights and Properties
Direct telephone +27 17 614 8001
Email paul.cronje@sasol.com

APPENDIX 8(C)

National Web Based Environmental Screening Tool Report

SCREENING REPORT FOR AN ENVIRONMENTAL AUTHORIZATION OR FOR A PART TWO AMENDMENT OF AN ENVIRONMENTAL AUTHORISATION AS REQUIRED BY THE 2014 EIA REGULATIONS – PROPOSED SITE ENVIRONMENTAL SENSITIVITY

EIA Reference number: MP 30/5/1/2/2/138 MR

Project name: Shondoni Colliery Block 8 North

Project title: Shondoni Colliery EMP Amendment

Date screening report generated: 12/05/2020 10:12:27

Applicant: Sasol Mining (Pty) Ltd

Compiler: JMA Consulting (Pty) Ltd

Compiler signature:

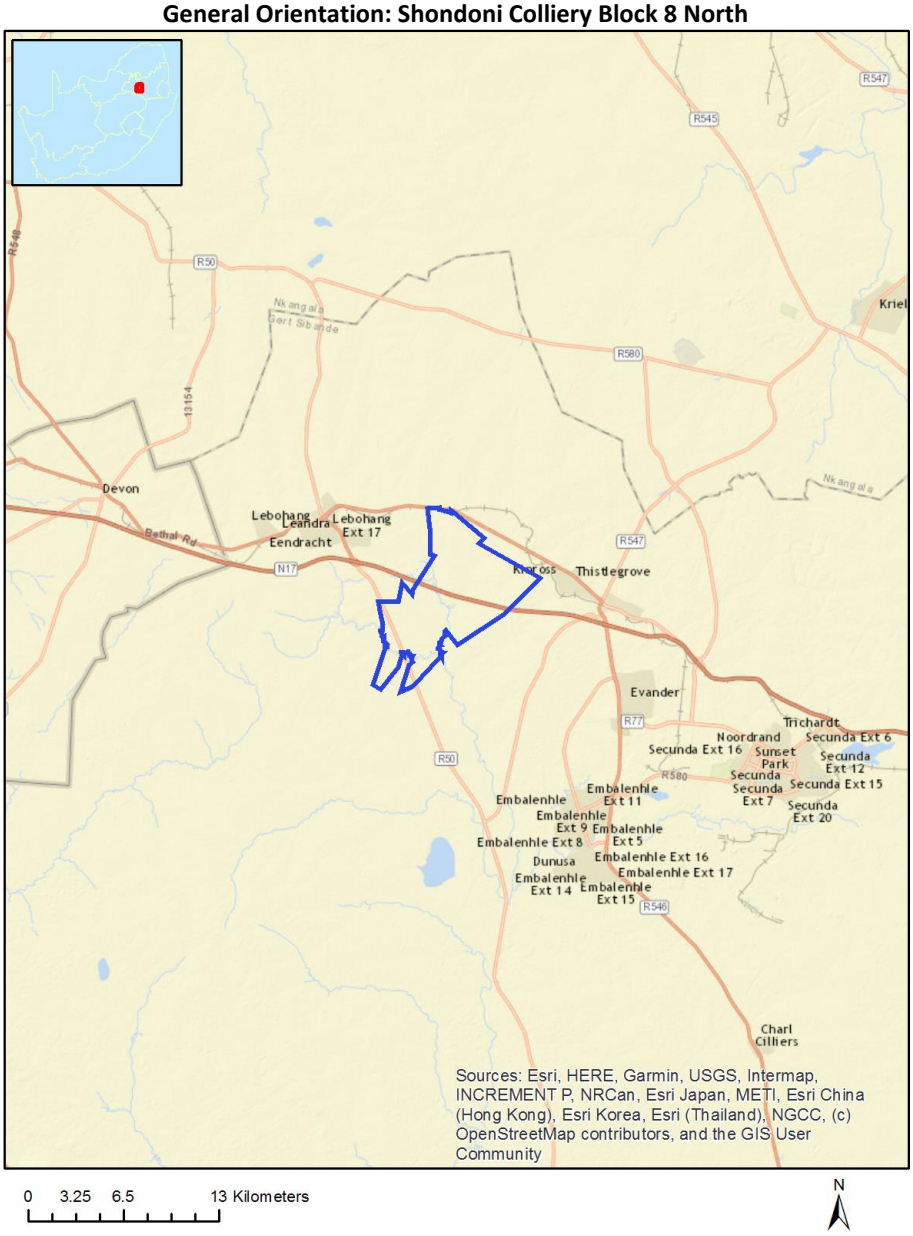
……

Table of Contents

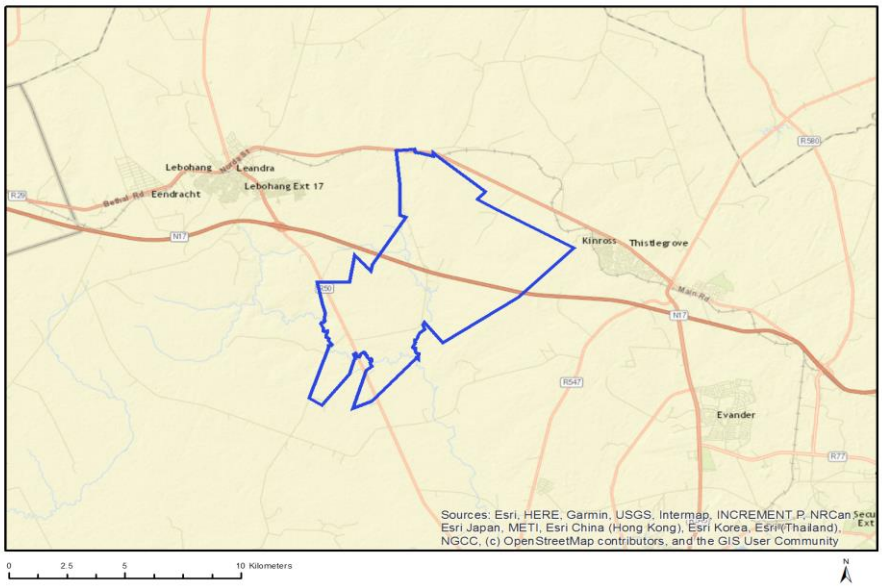
Proposed Project Location

Orientation map 1: General location

General Orientation: Shondoni Colliery Block 8 North



Map of proposed site and relevant area(s)



Cadastral details of the proposed site

Property details:

No	Farm Name	Farm/ Erf No	Portion	Latitude	Longitude	Property Type
1	RUIGTEKUILEN	129	0	26°26'1.58S	29°3'3.82E	Farm
2	SALPETERKRANZ	351	0	26°25'25.68S	28°57'50.25E	Farm
3	KLIPFONTEIN	357	0	26°27'13.36S	28°56'29.58E	Farm
4	GROOTLAAGTE	311	0	26°23'6.39S	28°58'0.3E	Farm
5	BLESBOKSPRUIT 90	98	0	26°21'46.18S	28°59'20E	Farm
6	ROLSPRUIT	127	0	26°24'33.28S	29°0'33.18E	Farm
7	UITMALMAAK	126	0	26°22'46.1S	29°1'29.35E	Farm
8	KROMDRAAI	128	0	26°27'23.71S	29°1'17.54E	Farm
9	VOGELSTRUISBULT	127	6	26°24'31.45S	28°59'23.61E	Farm Portion
10	VOGELSTRUISBULT	127	18	26°24'52.03S	28°59'47.7E	Farm Portion
11	ROLSPRUIT	127	9	26°24'51.88S	29°0'3.35E	Farm Portion
12	ROLSPRUIT	127	1	26°25'50.37S	29°0'17.96E	Farm Portion
13	SALPETERKRANZ	351	1	26°25'44.63S	28°56'52.23E	Farm Portion
14	KLIPFONTEIN	357	5	26°28'23.31S	28°57'13.09E	Farm Portion
15	ROLSPRUIT	127	22	26°25'19.45S	29°1'47.36E	Farm Portion
16	ROLSPRUIT	127	23	26°25'19.23S	29°0'58.67E	Farm Portion
17	ROLSPRUIT	127	4	26°24'16.33S	28°58'56.99E	Farm Portion
18	UITMALMAAK	126	6	26°22'39.7S	29°0'21.01E	Farm Portion
19	VOGELSTRUISBULT	127	14	26°24'41.75S	28°58'44.61E	Farm Portion
20	BLESBOKSPRUIT 90	98	0	26°21'45.79S	28°59'19.3E	Farm Portion
21	ROLSPRUIT	127	18	26°24'52.03S	28°59'47.7E	Farm Portion
22	ROLSPRUIT	127	13	26°24'32.26S	28°58'48.55E	Farm Portion
23	ROLSPRUIT	127	9	26°25'16.13S	29°0'20.98E	Farm Portion
24	KROMDRAAI	128	2	26°26'39.29S	28°59'43.95E	Farm Portion
25	KROMDRAAI	128	17	26°25'54.39S	29°1'39.41E	Farm Portion
26	UITMALMAAK	126	0	26°22'18.7S	29°0'28.45E	Farm Portion
27	ROLSPRUIT	127	2	26°23'24.95S	29°0'55.01E	Farm Portion

28	VOGELSTRUISBULT	127	16	26°24'55.12S	28°59'3.82E	Farm Portion
29	VOGELSTRUISBULT	127	15	26°24'41.19S	28°59'13.66E	Farm Portion
30	ROLSPRUIT	127	7	26°24'44.95S	28°59'35.75E	Farm Portion
31	ROLSPRUIT	127	24	26°23'8.23S	29°0'4.47E	Farm Portion
32	GROOTLAAGTE	311	4	26°22'58.5S	28°58'42.77E	Farm Portion
33	SALPETERKRANZ	351	9	26°25'38.4S	28°57'31.4E	Farm Portion
34	ROLSPRUIT	127	20	26°25'7.61S	29°0'52.12E	Farm Portion
35	VOGELSTRUISBULT	127	21	26°25'15.08S	29°1'26.13E	Farm Portion
36	ROLSPRUIT	127	5	26°24'55.6S	28°59'47.29E	Farm Portion
37	THE SPRINGS	129	1	26°25'40.1S	29°2'54.41E	Farm Portion
38	GROOTLAAGTE	311	5	26°23'36.32S	28°58'30.4E	Farm Portion
39	SALPETERKRANZ	351	4	26°25'55.43S	28°59'3.54E	Farm Portion
40	ROLSPRUIT	127	12	26°24'8.42S	29°2'4.17E	Farm Portion
41	ROLSPRUIT	127	17	26°24'47.42S	28°59'33.27E	Farm Portion
42	VOGELSTRUISBULT	127	11	26°25'37.08S	29°1'9.83E	Farm Portion
43	ROLSPRUIT	127	0	26°24'25.15S	29°1'1.39E	Farm Portion
44	ROLSPRUIT	127	8	26°26'2.79S	28°59'54.97E	Farm Portion
45	GROOTLAAGTE	311	9	26°22'36.85S	28°59'13.65E	Farm Portion
46	SALPETERKRANZ	351	4	26°25'55.43S	28°59'3.54E	Farm Portion
47	KLIPFONTEIN	357	0	26°27'3.16S	28°56'33.56E	Farm Portion
48	UITMALMAAK	126	2	26°22'34.33S	29°1'12.88E	Farm Portion
49	VOGELSTRUISBULT	127	19	26°24'57.79S	29°0'8.99E	Farm Portion
50	VOGELSTRUISBULT	127	5	26°24'19.84S	28°59'47.5E	Farm Portion
51	ROLSPRUIT	127	10	26°24'59.62S	29°0'40.33E	Farm Portion
52	ROLSPRUIT	127	3	26°23'39.19S	28°59'31.94E	Farm Portion
53	ROLSPRUIT	127	7	26°25'11.36S	28°59'27.54E	Farm Portion
54	RUIGTEKUILEN	129	2	26°25'24.26S	29°2'18.24E	Farm Portion
55	GROOTLAAGTE	311	1	26°24'39.45S	28°58'17.63E	Farm Portion
56	KLIPFONTEIN	357	2	26°27'20.31S	28°58'38.78E	Farm Portion
57	KLIPFONTEIN	357	4	26°27'34.56S	28°57'54.07E	Farm Portion
58	GROOTLAAGTE	311	0	26°22'30.91S	28°58'6.44E	Farm Portion
59	SALPETERKRANZ	351	10	26°25'20.19S	28°56'51.95E	Farm Portion
60	SALPETERKRANZ	351	14	26°26'27.1S	28°58'41.43E	Farm Portion
61	KLIPFONTEIN	357	6	26°27'16.55S	28°57'28.9E	Farm Portion
62	SALPETERKRANZ	351	0	26°25'59.19S	28°58'5.19E	Farm Portion
63	SALPETERKRANZ	351	7	26°24'40.83S	28°57'35.29E	Farm Portion
64	GROOTLAAGTE	311	3	26°22'31.83S	28°59'37.51E	Farm Portion
65	SALPETERKRANZ	351	18	26°24'43.09S	28°56'51.71E	Farm Portion
66	SALPETERKRANZ	351	13	26°24'51.89S	28°58'14.35E	Farm Portion
67	KLIPFONTEIN	357	7	26°27'35.26S	28°58'49.3E	Farm Portion

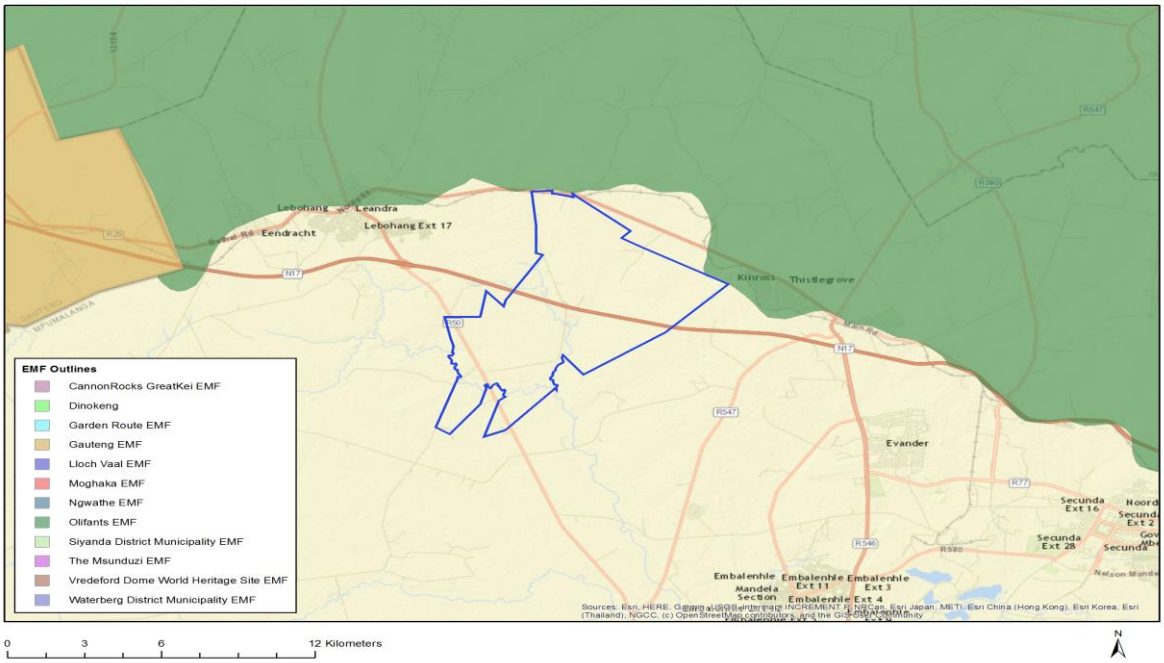
Development footprint[1] vertices:
No development footprint(s) specified.

Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area

No nearby wind or solar developments found.

[1] "development footprint", means the area within the site on which the development will take place and incudes all ancillary developments for example roads, power lines, boundary walls, paving etc. which require vegetation clearance or which will be disturbed and for which the application has been submitted.

Environmental Management Frameworks relevant to the application



Environmental Management Framework	LINK
Olifants EMF	https://screening.environment.gov.za/ScreeningDownloads/EMF/Zone_46,_67,_78,_80,_92,_103,_122,_129.pdf

Environmental screening results and assessment outcomes

The following sections contain a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development site as well as the most environmental sensitive features on the site based on the site sensitivity screening results for the application classification that was selected. The application classification selected for this report is: Mining|Mining Right|Mining - Mining Right.

Relevant development incentives, restrictions, exclusions or prohibitions

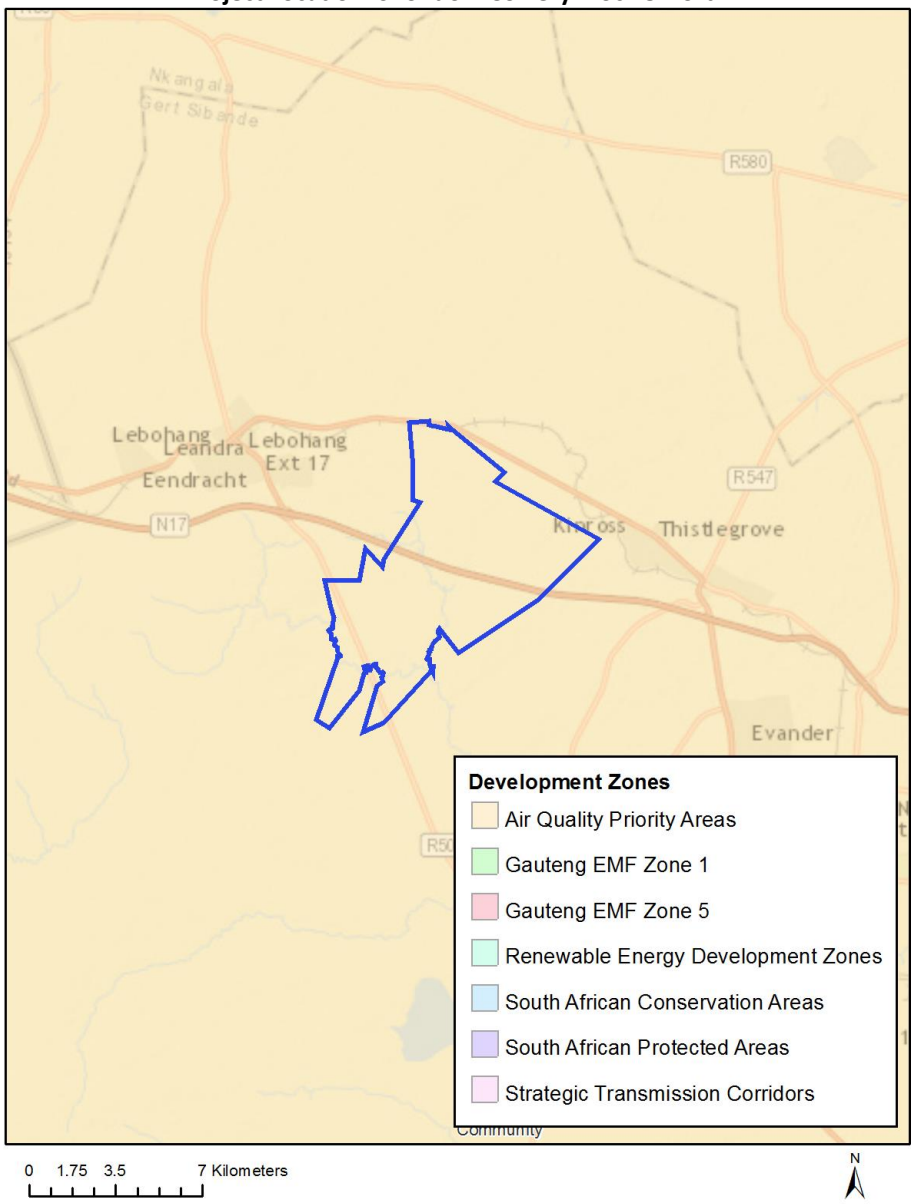
The following development incentives, restrictions, exclusions or prohibitions and their implications that apply to this site are indicated below.

Incentive, restriction or prohibition	Implication

Air Quality-Highveld Priority Area	https://screening.environment.gov.za/ScreeningDownloads/DevelopmentZones/HIGHVELD_PRIORITY_AREA_AQMP.pdf

Map indicating proposed development footprint within applicable development incentive, restriction, exclusion or prohibition zones

Project Location: Shondoni Colliery Block 8 North



Proposed Development Area Environmental Sensitivity

The following summary of the development site environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		X		
Animal Species Theme			X	
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme		X		
Civil Aviation Theme		X		
Paleontology Theme			X	
Plant Species Theme			X	
Defence Theme				X
Terrestrial Biodiversity Theme	X			

Specialist assessments identified

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report. It is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the site situation.

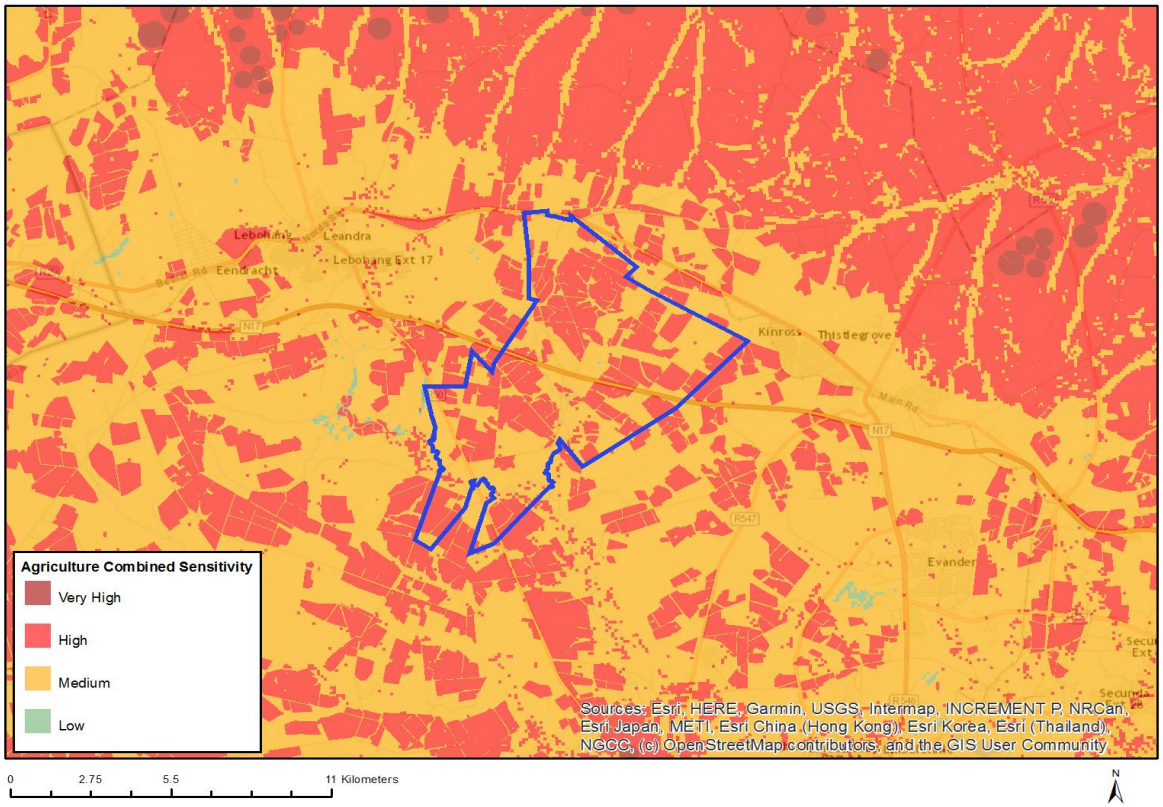
No	Specialist assessment	Assessment Protocol
1	Agricultural Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Agriculture_Assessment_Protocols.pdf
2	Landscape/Visual Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
3	Archaeological and Cultural Heritage Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
4	Palaeontology Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
5	Terrestrial Biodiversity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Terrestrial_Biodiversity_Assessment_Protocols.pdf

6	Aquatic Biodiversity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Aquatic_Biodiversity_Assessment.pdf
7	Hydrology Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
8	Noise Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_Noise_Impacts_Assessment_Protocols.pdf
9	Radioactivity Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
10	Traffic Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
11	Geotechnical Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
12	Climate Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
13	Health Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
14	Socio-Economic Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
15	Ambient Air Quality Impact Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
16	Seismicity Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
17	Plant Species Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf
18	Animal Species Assessment	https://screening.environment.gov.za/ScreeningDownloads/AssessmentProtocols/DraftGazetted_General_Requirement_Assessment_Protocols.pdf

Results of the environmental sensitivity of the proposed area.

The following section represents the results of the screening for environmental sensitivity of the proposed site for relevant environmental themes associated with the project classification. It is the duty of the EAP to ensure that the environmental themes provided by the screening tool are comprehensive and complete for the project. Refer to the disclaimer.

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY

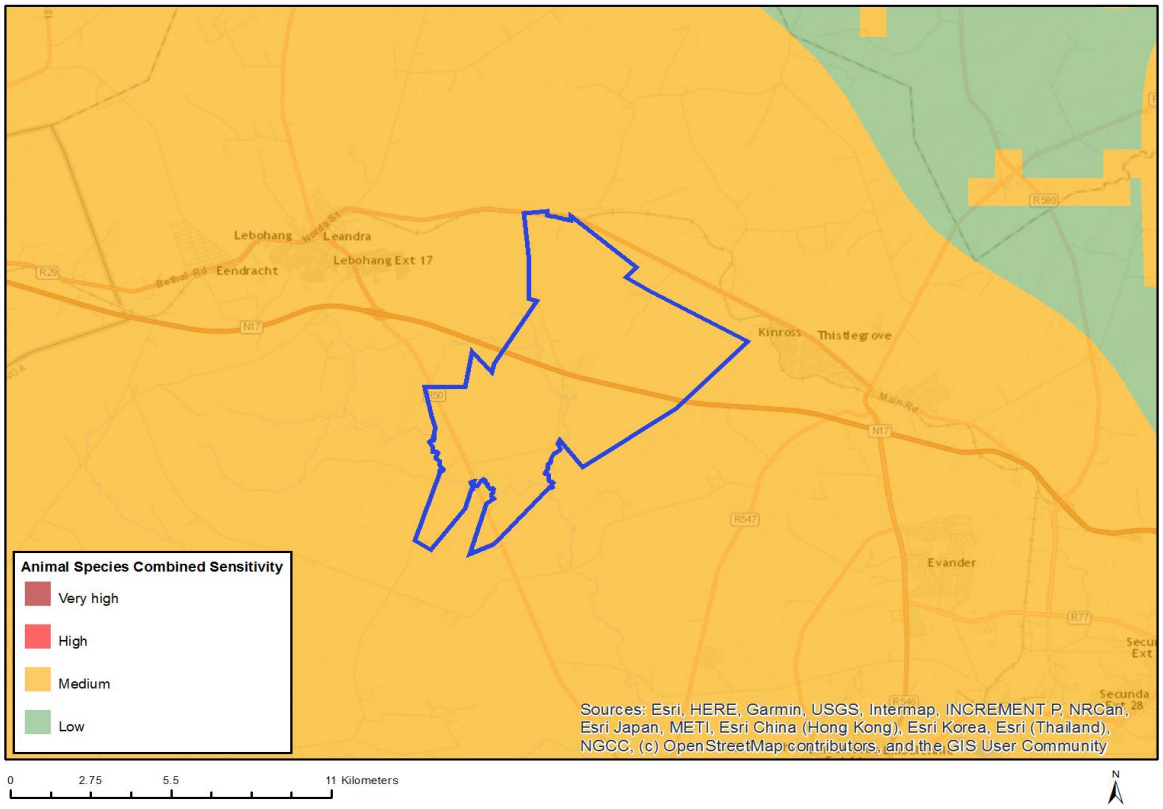


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Land capability;09. Moderate-High/10. Moderate-High
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate
High	Annual Crop Cultivation / Planted Pastures Rotation;Land capability;09. Moderate-High/10. Moderate-High
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low
Medium	Land capability;06. Low-Moderate/07. Low-Moderate/08. Moderate

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

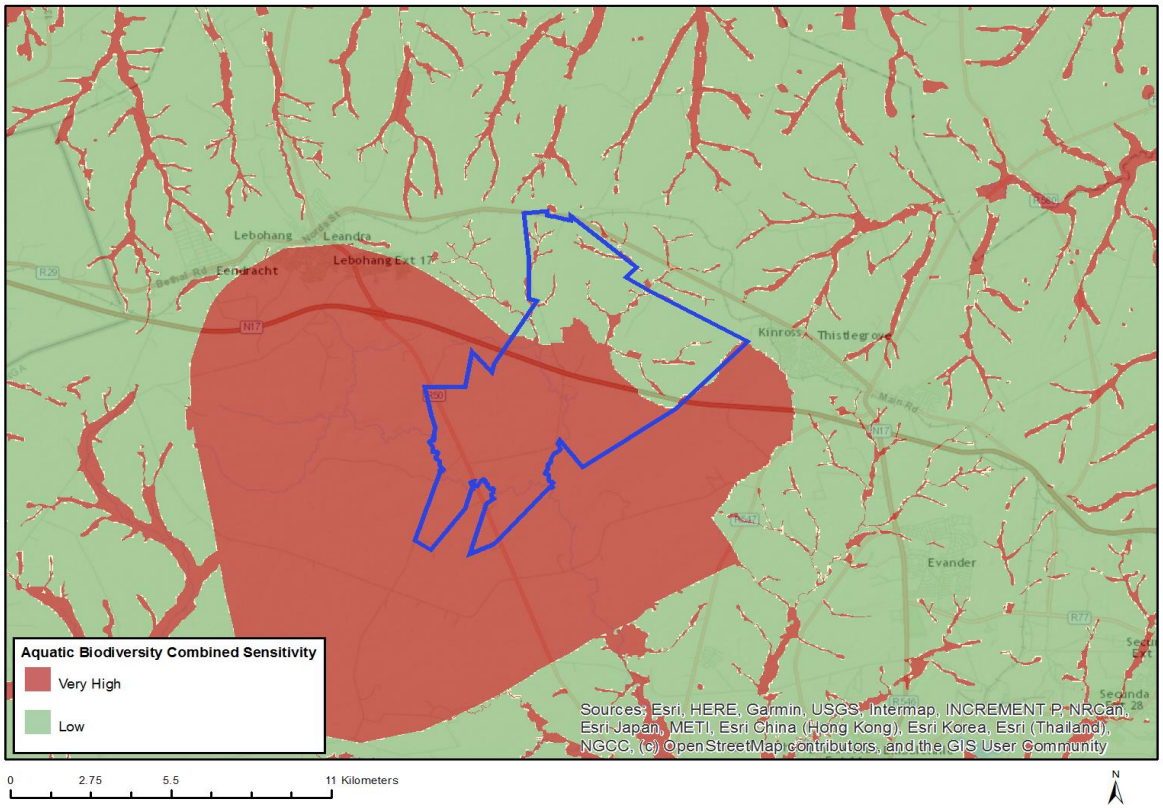


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Insecta-Chrysoritis aureus
Medium	Mammalia-Hydrictis maculicollis

MAP OF RELATIVE AQUATIC BIODIVERSITY THEME SENSITIVITY

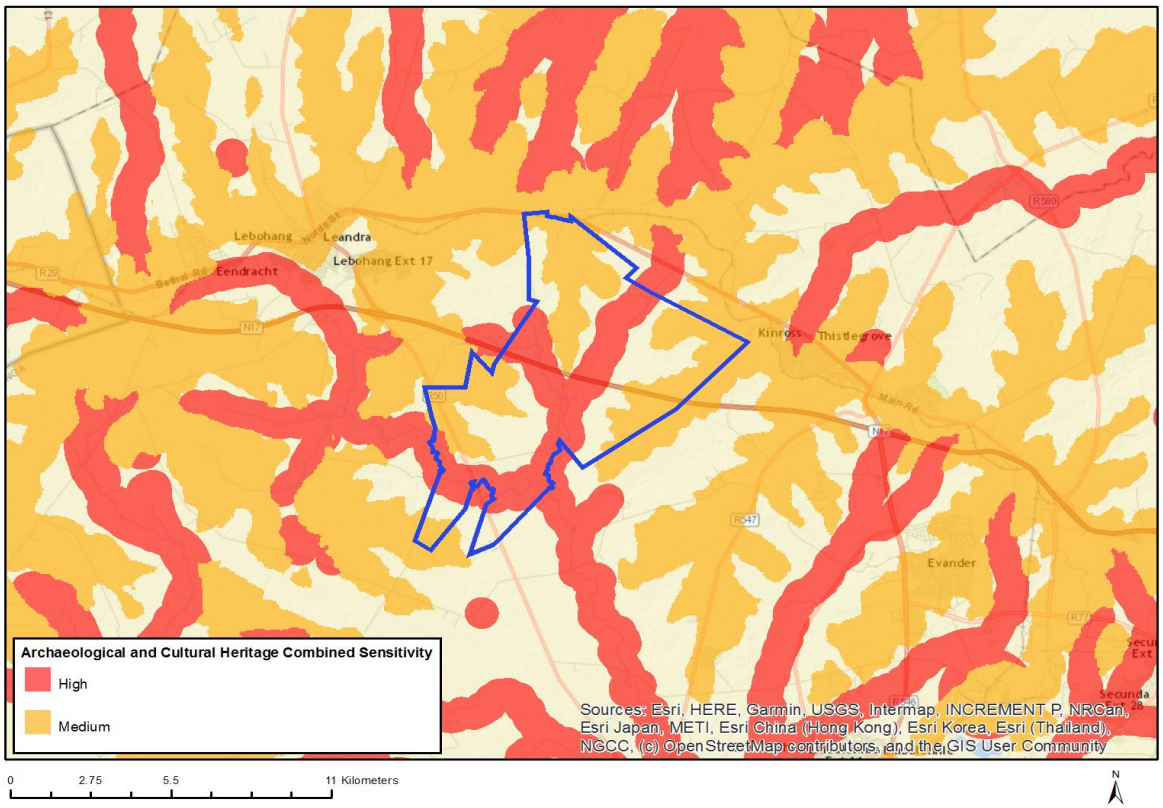


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Aquatic CBAs
Very High	Strategic water source area
Very High	Wetlands and Estuaries
Very High	Freshwater ecosystem priority area quinary catchments

MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY

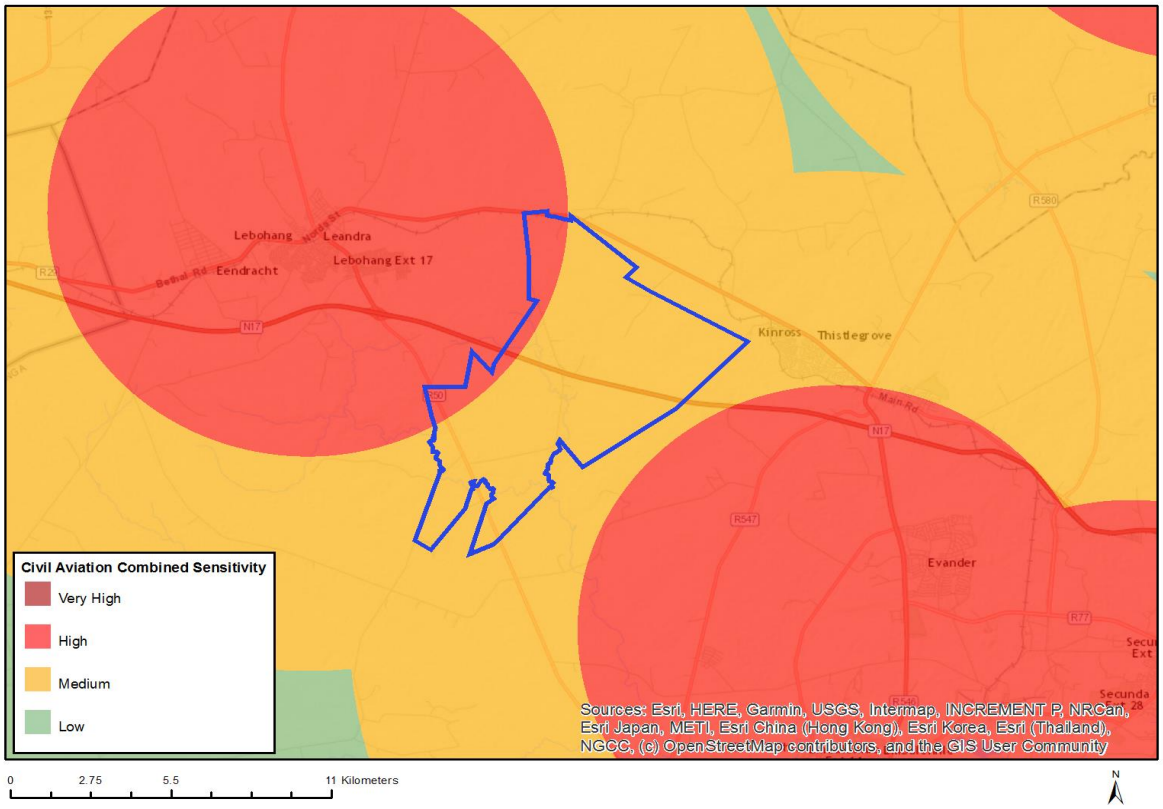


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Within 500 m of an important river
High	Within an important wetland
High	Within 500 m of an important wetland
Medium	Mountain or ridge

MAP OF RELATIVE CIVIL AVIATION THEME SENSITIVITY

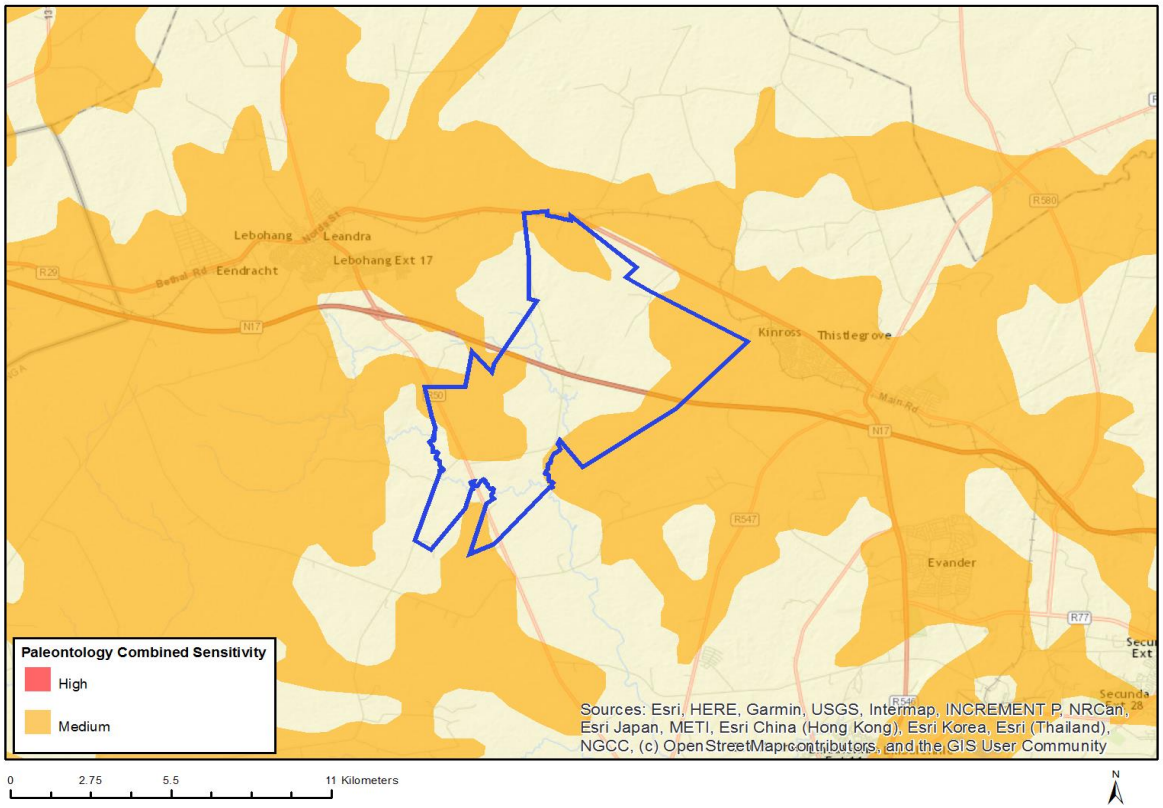


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Within 8 km of other civil aviation aerodrome
Medium	Between 8 and 15 km of other civil aviation aerodrome

MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY

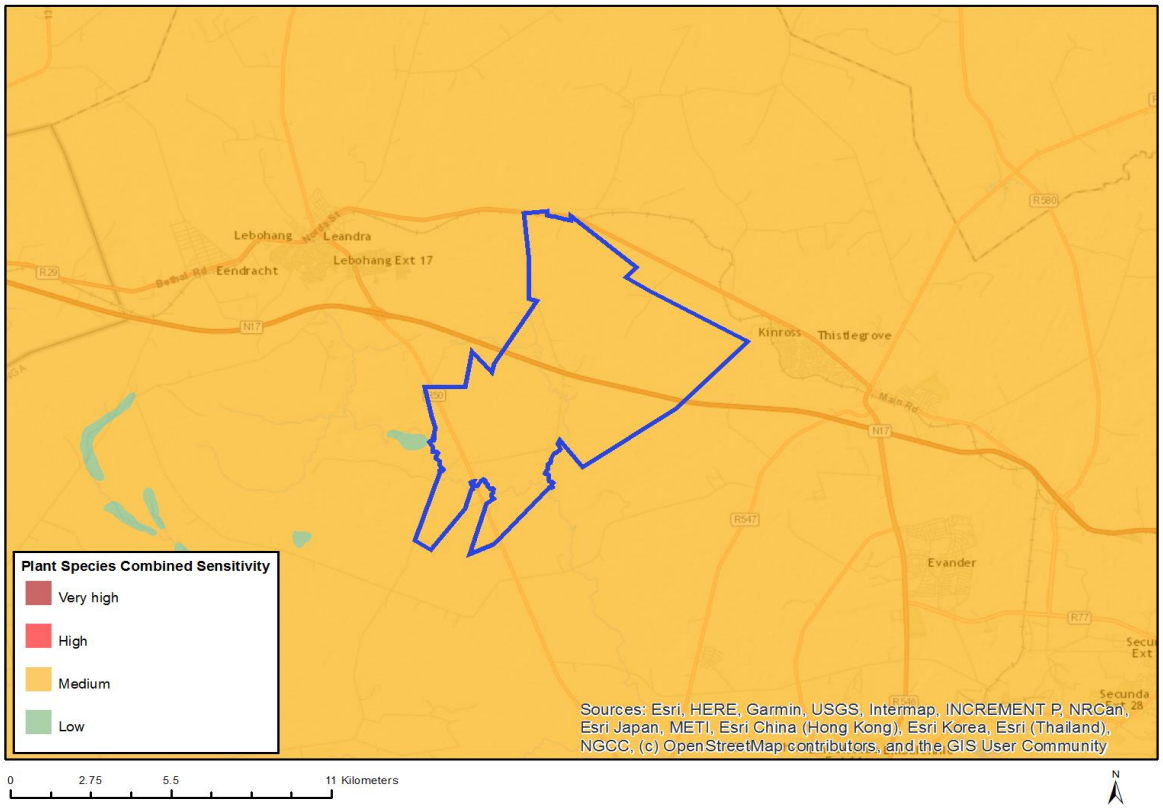


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Rock units with a medium paleontological sensitivity

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY

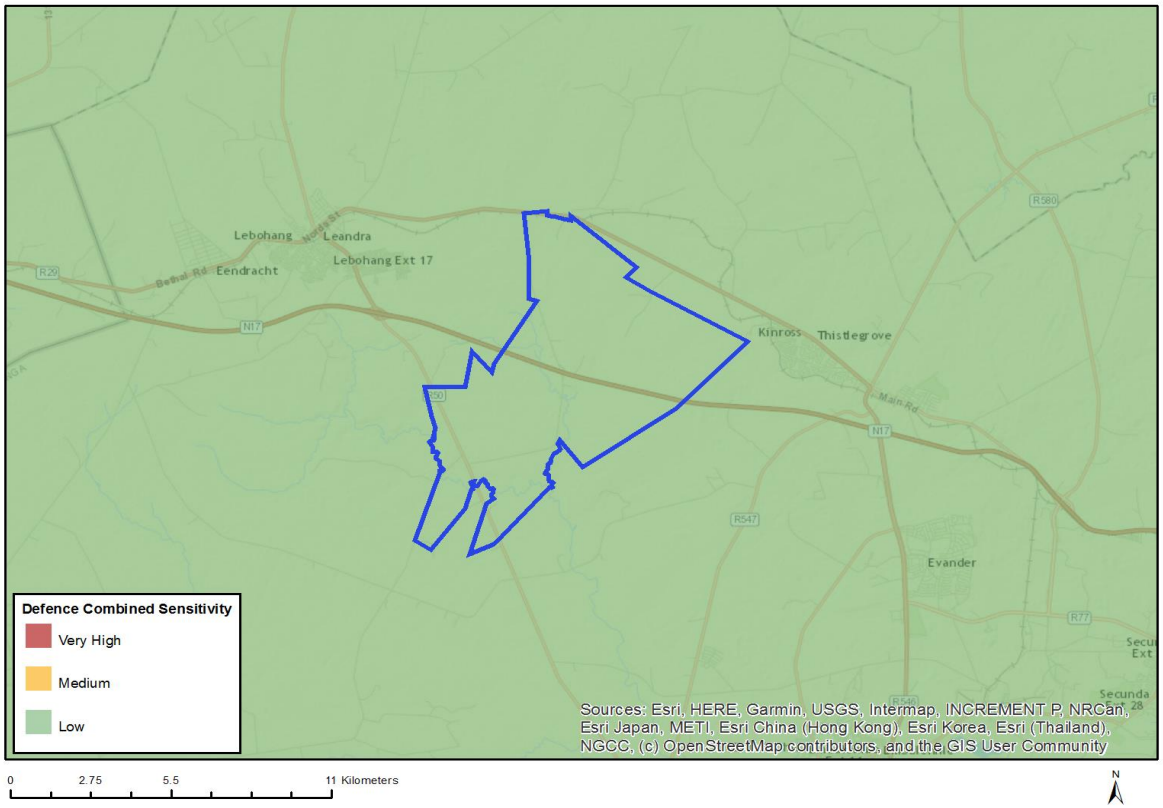


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Sensitive species 647
Medium	Pachycarpus suaveolens

MAP OF RELATIVE DEFENCE THEME SENSITIVITY

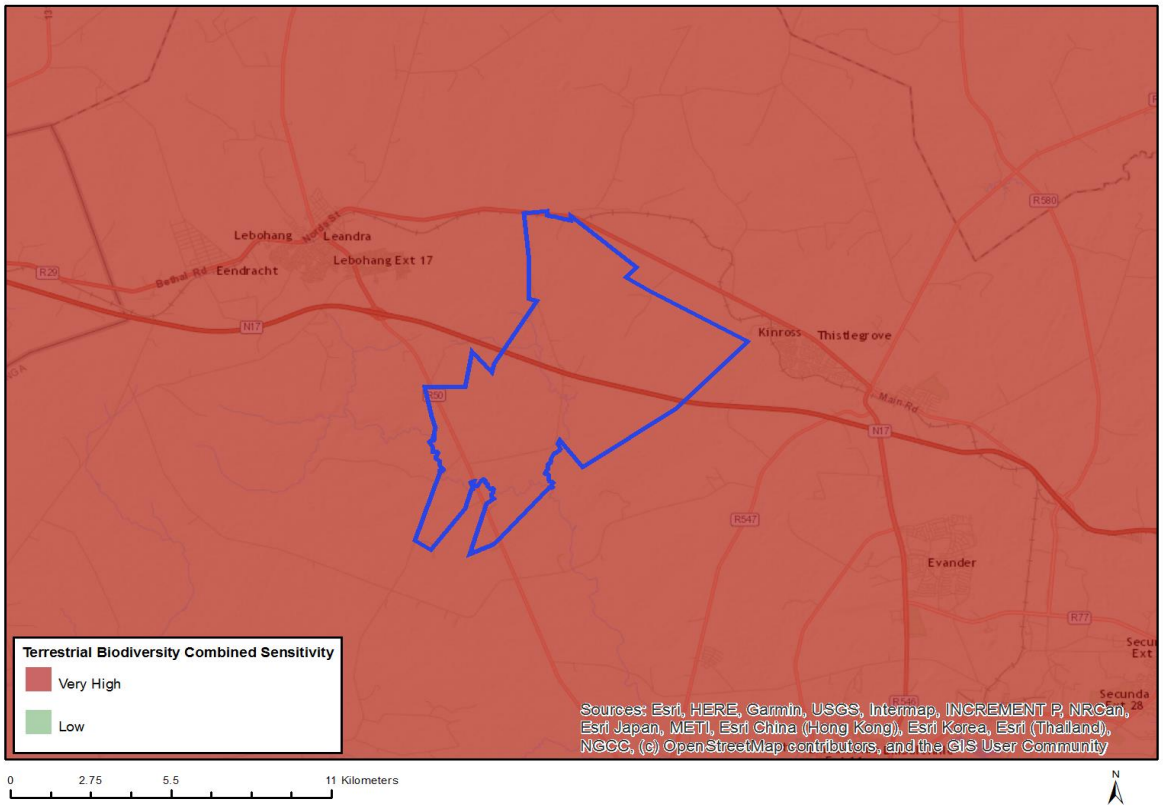


Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low sensitivity

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	Vulnerable ecosystem
Very High	Critical Biodiversity Area 2
Very High	Critical Biodiversity Area 1
Very High	Focus Areas for land-based protected areas expansion
Very High	Freshwater ecosystem priority area quinary catchments
Very High	Strategic Water Source Area

APPENDIX 8(D)

Professional Opinion – Earth Science Solutions

Our Ref:
Your Ref:

30th August 2020

JMA Consulting (Pty) Ltd
15 Vickers Street
DELMAS
2210

Dear Rene and Riaan,

RE: PROFESSIONAL OPINION – SCREENING TOOL REQUIREMENT - AGRICULTURAL POTENTIAL STUDIES – HIGH SENSITIVITY SITES

Following on from our initial discussions and subsequent interaction and feedback from the authorities (DEFF) regarding the utilisation of the Screening Tool, the following considerations are tabled as supporting information and my professional opinion and understanding of the utilisation of the Screening Tool.

This professional opinion is based on a number of inputs from other professionals and information supplied by the proponent, as well as input and information received from the authorities relating to the use of the Screening Tool.

The inputs include:

- The information supplied as part of the Project Description in which it states that the mining methods to be employed will include both "**Underground Bord and Pillar Mining**" (UBP) and "**Total Extraction"** (TE). This is important information as it implies on the one hand stability of underground mining in the case of the Bord and Pillar method, and subsidence in the case of the Total extraction. The associated risk of disturbance at surface is in the two cases is considered low, or even very low in the case of UBP, while the risk of the collapse of the roof for the TE is definite, and the potential for these effects to report to surface are considered much greater/higher.
- The **Mine Plan** obtained from the proponent via the lead consultants shows the areas that are to be undermined, but does not at this stage distinguish between UBP and TE. With the information at hand we are able to delineate the areas of potential impact but would need the method of mining and Engineering geological Report detailing the rock engineering test results before a risk profile of impact at surface could be drawn.
- The mine plan showing contours of the "**depth of underground mining below surface**". This information is important as it adds to the risk assessment profiling and the ability to determine where the impacts of subsidence will or will not report to the surface.
- The **Regional Geology** (1:250 000 Geological Series 2628 East Rand). The regional geology shows large areas of volcanic derived dolerite sills (horizontally layered sill) that have intruded the sedimentary sequence.

The importance of this feature is its "competent" nature, its inherent resistance to weathering and the resultant positive strength of materials (engineering) properties that are considered as part of the structural integrity of the mining materials. These aspects are very important when considering subsidence and the potential for impacts at surface. The sills structures have formed a resistant "capping" to much of the area, the topography having only broken through along lines of structural weakness (fractures and faults) that now form the shallow wide open streams and rivers that trend south across the study area. It is these areas, where the topography is lower and the depth to mining is more shallow, and where as a result the risk of subsidence is higher, and impacts could be realised at surface.

- An explanation by Mr Rhulani Kubayi on the use of the screening tool (see e-mail attached). In summary, this states that the **Screening Tool is a guideline to be used "to flag sensitivities** that need to be considered during an EIA study as well as the types of specialist studies that need to be conducted to address sensitivities in a given area". He goes on to say, that in the case of Shondoni and, based on my explanation of the mining method to be used (Underground Bord and Pillar Mining) "it turns out in his specific case he's got reason to believe that an agricultural potential study **may not be necessary** as the proposed project involves underground mining (which presumably won't negatively impact on the agricultural potential on the surface area)". His advice to us was, "that we request a pre-app meeting with the relevant competent authority (via the EAP in the project he's involved in) so he can make his case about the exclusion of the agricultural studies in the EIA project".

With this information available, it is my professional opinion that:

- If the mining method is restricted to Bord and Pillar mining and the depth to mining is greater than 70m below surface, then the risk of impact at surface will be low and additional and more intensive studies of the agricultural potential of the site will only be required where the engineering geology is highlighted as weak or vulnerable to collapse.
- However, where the geological structure (faults/fracturing) results in areas of potential weakness, or the depth to mining is less than 70m, or, where the mining method to be employed is "Total Extraction", there is an increased risk of subsidence and impact at surface, and these areas should be considered for further study.

Based on the information available, it is recommended that:

- Areas delineated as being of a "High Sensitivity" in terms of the Screening Tool Report (Agricultural concern) that coincide with sites of potential structural (geological) weakness, where the mining method is planned as Total Extraction and the engineering geology (structural geology) indicates the potential for impacts at surface, and/or depths to mining of less than 70m are planned, should be assessed in more detail to determine the Agricultural Potential of the land.

The spatial area of concern on the Block 8N and the historic Shondoni Block 8 sites will be calculated, and an estimate of the time and cost required to undertake this additional work will be submitted once the detailed mine plan is available.

Please do not hesitate to make contact with me if you require any additional input or explanation in this regard.

Yours sincerely
Earth Science Solutions

Ian Jones - BSc (Geol), Pr.Sci.Nat (400040/08)