SEATON ENVIRONMENTAL

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT IN TERMS OF SECTION 24 (5) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (NO. 107 OF 1998)

THE PROPOSED DEVELOPMENT OF VARIOUS PORTIONS OF THE FARM ROOIKOPPIES 297-JQ

PROPOSED MARIKANA EXTENSION

RUSTENBURG LOCAL MUNICIPALITY

Prepared for Homes 2000 (Pty) Limited

DEDECT Reference number: NWP/EIA/119/2019

September 2020

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THE PROPOSED DEVELOPMENT OF VARIOUS PORTIONS OF THE FARM ROOIKOPPIES 297-JQ

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Table Of Contents

1. INTRODUCTION TO THE SCOPING AND EIA PROCESS

The 2014 Environmental impact assessment Regulations became effective on 4 December 2014 and Amendments were promulgated in 2017. In terms of these EIA Regulations, it is required that authority for and approval be obtained from the relevant environment authority, which in this case is the Gauteng Department of Agriculture and Rural Development (GDARD) for specific types of activities/ developments.

The objective of the Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment and reporting of the activities that have been identified. The purpose of these procedures is to provide the competent authority with adequate information to make decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorised, and that activities which are authorised, are undertaken in such a manner.

The procedures are also intended to ensure that:

- the minimum information that is necessary for decision-making is provided;
- adequate information is provided to I&APs to enable them to participate effectively;
- issues, ideas and concerns raised by I&APs are properly considered;
- issues, impacts and alternatives are considered and assessed in a structured and objective manner; and
- the requirements for the management of impacts over the life cycle of activities.

Based on the nature of ***this particular application***, it is required that the ***Scoping and Environmental impact assessment*** process be followed. The process takes place in three broad phases, namely (1) submission of an application form, (2) Scoping phase and the (3) Environmental Impact Assessment phase.

The purpose of the ***scoping phase*** is to determine the “scope” of the EIA that will be conducted in respect of the activity for which authorisation is being applied for. The emphasis during scoping is to identify:

- issues;
- potential impacts; and
- potential alternatives.

Public participation is a key element of scoping and must be conducted in accordance with at least the minimum requirements as set out in the Regulations. The scoping process culminates in the compilation of a scoping report. The minimum requirements of a scoping report are set out in the Regulations.

Once the authority accepts a Scoping report, the Full Environmental impact assessment must be undertaken. The purpose of the EIA is to:

- address issues that have been raised during the scoping phase;
- assess alternatives to the proposed activity in a comparative manner;
- assess all identified impacts and determine the significance of each impact; and
- formulate mitigation measures.

After the different aspects of the assessment have been undertaken, including any specialist studies and specialized processes, an EIA report is compiled, which must contain at least the information listed in the Regulations, including a draft environmental management plan. This also includes further involvement of interested and affected parties.

This report serves as the DRAFT Environmental Impact Assessment report and details the description of the project, its location and purpose. A brief indication of the tasks undertaken have been listed, consultations undertaken with the relevant authorities, affected and interested parties and how issues and alternatives will be determined. The participation and contribution of registered and affected parties is also included. This DRAFT environmental impact assessment report is to be circulated to I&AP's to demonstrate that their comments have been addressed.

2. DETAILS AND EXPERTISE OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

Seaton Environmental have more than 30 years' experience in town, regional and environmental planning. This includes environmental impact assessment and environmental management. The Company has undertaken numerous applications for Environmental Authorisation in terms of the previous Environmental Impact Assessment Regulations, as well as in terms of the current 2014 / 2017 EIA Regulations in all Provinces in South Africa. Various diverse applications have been undertaken, which include developments for residential, commercial, industrial, institutional and business land uses, various types of bulk and service infrastructure (roads, sewers, power provision, water pipelines, etc), filling stations, game /guest lodges in conservation and protected areas and agricultural activities including fish farming and chicken abattoirs.

Refer **Appendix 1: Seaton Environmental Company Profile**

Details of the company:
Seaton Environmental Company Registration number : CK 95/02499/23
Established 1995
Judy Johnston – Registration with Environmental Assessment Practitioners Association of South Africa (EAPASA) Number 2019/849

Company Address details
63 St Annes Lane, Irene, 0062
P O Box 936, Irene, 0062
Tel 012 667 2107
Fax 086 218 9637
Cell 082 920 6115
Email seaton@yebo.co.za

Specialists involved in the project:

Role	Company	Name
Vegetation specialist	David Hoare Consulting	David Hoare
Wetland Delineation and Assessment	WSC Scientific (Pty) Ltd	Shavaughn Davies
Heritage Impact	A Pelser Archaeological Consulting	Anton Pelser
Health Impact	Rayten Engineering	Clive Wray
Civil Engineering	Hlanganani Consulting Engineers	Ben Dreyer
Traffic Impact	Mariteng Traffic Consulting	Louis Du Toit
Town Planning	Hunter Theron	Chris Theron
Community Facilitation	Paulisto Trading Enterprise	Ramotswa Molefi

3. DESCRIPTION OF THE PROJECT

3.1 The Application Site

The site comprises of 16 Portions of the Farm Rooikoppies 297-JQ, ie RE/16, 57, 58, RE/194, RE/195, 198, 199, 200, 201, 202, 203, 204, 205, 206 and 207, located in the Rustenburg Local Municipal area of the North West Province. These Portions measure a total of approximately 116 hectares, which are located to the east and south east of the village of Marikana, west and north of the Tharisa Chrome Mine. The site is within the Local Municipal area of Rustenburg, Bojanala District. Refer Error! Reference source not found..

The approximate centre of the site is 25°42'41"S and 27°29'57"E.

PROPERTY	**AREAS (Hectares)**
Remainder of Portion 16 of the Farm Rooikoppies 297-JQ	4.80
Portion 57 of the Farm Rooikoppies 297-JQ	33.06
Portion 58 of the Farm Rooikoppies 297-JQ	15.26
Remainder of Portion 194 of the Farm Rooikoppies 297-JQ	1.17
Remainder of Portion 195 of the Farm Rooikoppies 297-JQ	2.34
Portion 198 of the Farm Rooikoppies 297-JQ	0.66
Portion 199 of the Farm Rooikoppies 297-JQ	1.83
Portion 200 of the Farm Rooikoppies 297-JQ	1.32
Portion 201 of the Farm Rooikoppies 297-JQ	1.32
Portion 202 of the Farm Rooikoppies 297-JQ	1.32
Portion 203 of the Farm Rooikoppies 297-JQ	7.64
Portion 204 of the Farm Rooikoppies 297-JQ	8.01
Portion 205 of the Farm Rooikoppies 297-JQ	14.36
Portion 206 of the Farm Rooikoppies 297-JQ	7.61
Portion 207 of the Farm Rooikoppies 297-JQ	15.22
Total	**115.92**

The site comprises mostly of existing farmed/ agricultural land, which has been used for such purposes for many years, although the most western side of the site, along the road to Marikana, consists of old structures, dwellings and outbuildings, most of which are abandoned and are no longer used. As such, the majority of the site has been altered and transformed by the historic

agricultural use of the land and there is little remaining natural vegetation or habitat on the site.

There is a small watercourse which flows in a northerly direction through the central part of the site, part of which is encompassed in a riparian area. This watercourse has also been largely disturbed over the years by the intensive agricultural activities.

There is an area of ±20 hectares on part of the site which was previously used for open cast mining. This has subsequently been professionally rehabilitated and vegetation has also become re-established over this area. Part of the mined area has impacted on the status and condition of the watercourse. This previously, now rehabilitated area is protected by means of servitudes for access, so that the rehabilitated land can be maintained until a future use is determined.

There are powerlines traversing the southern most corner of the site, under which no development is permitted. Refer Error! Reference source not found., which indicates these features on the site

3.2 Background History of the Project

Mining activities have been operational in this year for many years which has influenced the movement and migration of people and communities, particularly around work and employment opportunities. As mining activities have expanded over time into the farming areas, the need to address and resettle communities has become part of the interrelated process of mining operations.

Furthermore, as mining activities have grown and expanded towards and into community villages, the quality of the communities living conditions have become more and more impacted, where there are increasing implications to health and safety of the community areas. There are, however, ***ongoing*** negotiations and liaisons in this area between the communities, various government organisations and the various mining houses regarding matters related to land availability, relocation and resettlement of affected communities.

This application site forms one particular site which the Tharisa Mine has undertaken to peruse for the formal development of a primarily residential enclave, for the resettlement of the Mmwaditlhokwa and Lapologang communities, due to their planned and imminent mining activities in the area where these communities are currently located. The land owner has agreed to the sale and transfer of the land to the mine, for the specific purposes of establishing a formal living environment, to include not only residential uses (to include state-assisted houses, bonded houses, and rental stock) but all associated community facilities and amenities are also to be provided.

LOCALITY PLAN: VARIOUS PORTIONS OF THE FARM ROOIKOPPIES 297-JQ

Legend

The Site

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

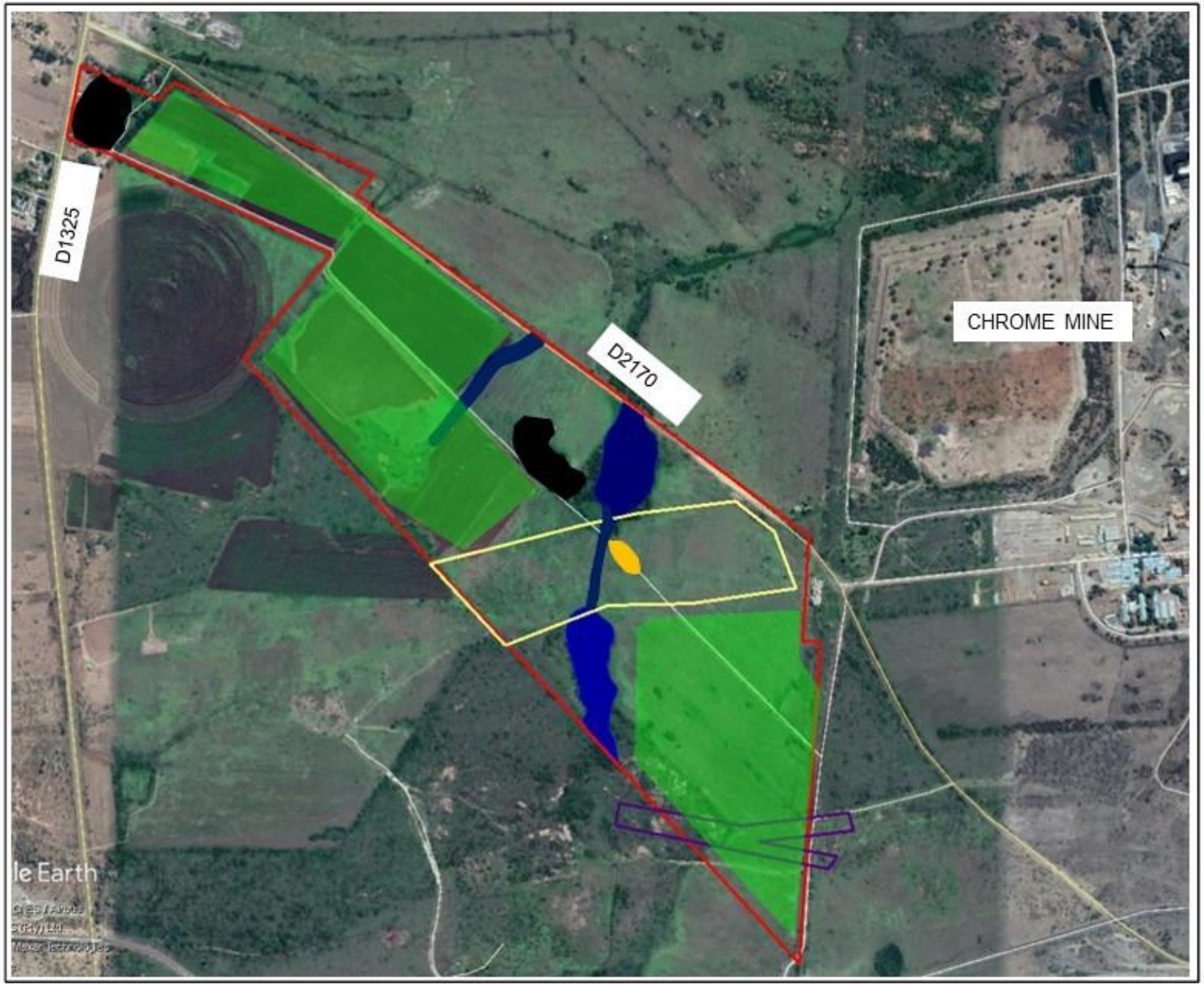
Date: 2018-03-19

N
W E
S

0 500 metres 1000m

SEATON THOMSON & ASSOCIATES

SITE PLAN: VARIOUS PORTIONS OF THE FARM ROOIKOPPIES 297-JQ



Legend

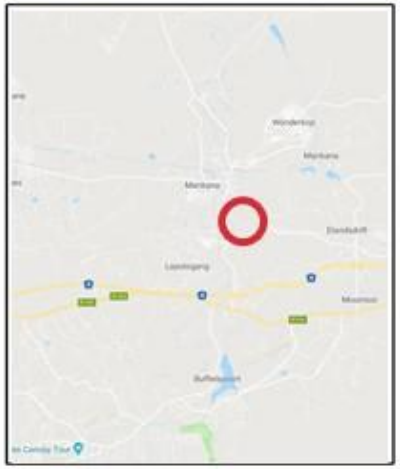
- The Site
- Watercourse & riparian area
- Rehabilitated mined area
- Structures, buildings
- Graveyard
- Agricultural lands
- Powerline servitude

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

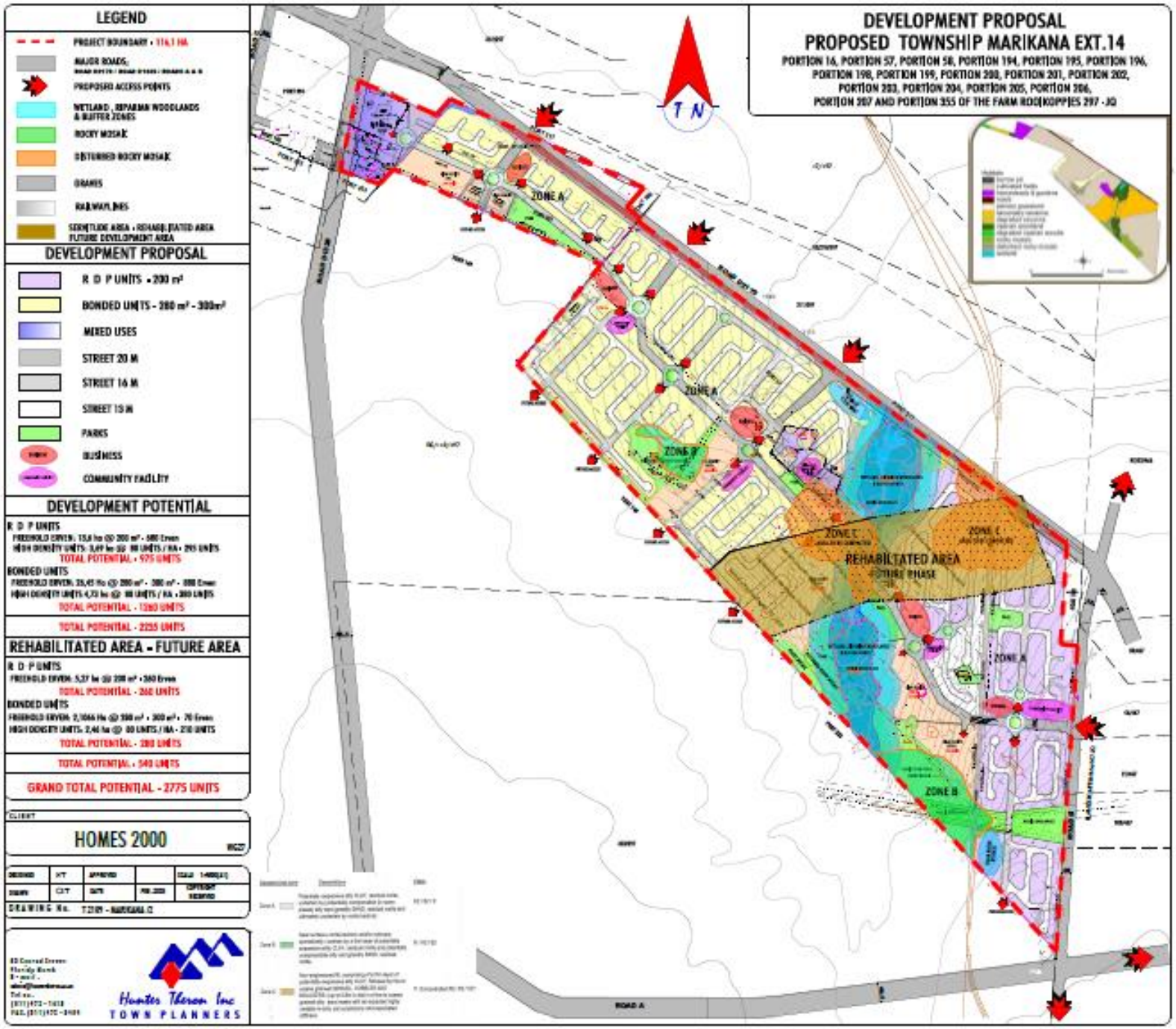
Date: 2018-03-19

N
W E
S

0 350 metres 700m



SEATON THOMSON & ASSOCIATES


LEGEND
PROJECT BOUNDARY - 116.1 HA
MAJOR ROADS;
PROPOSED ACCESS POINTS
WETLAND , REPARIAN WOODLANDS & BUFFER ZONES
ROCKY MOSAIC
DISTURBED ROCKY MOSAIC
GRAVES
RAILWAY LINES
SERVITUDE AREA - REHABILITATED AREA FUTURE DEVELOPMENT AREA
DEVELOPMENT PROPOSAL
R D P UNITS - 200 m²
BONDED UNITS - 300 m² - 900m²
MIXED USES
STREET 20 M
STREET 16 M
STREET 13 M
PARKS
BUSINESS
COMMUNITY FACILITY
DEVELOPMENT POTENTIAL
R D P UNITS
TOTAL POTENTIAL - 975 UNITS
BONDED UNITS
TOTAL POTENTIAL - 1280 UNITS
TOTAL POTENTIAL - 2255 UNITS
REHABILITATED AREA - FUTURE AREA
R D P UNITS
TOTAL POTENTIAL - 260 UNITS
BONDED UNITS
TOTAL POTENTIAL - 280 UNITS
TOTAL POTENTIAL - 540 UNITS
GRAND TOTAL POTENTIAL - 2775 UNITS
CLIENT
HOMES 2000
DRAWING No.
Hunter Theron Inc
TOWN PLANNERS
DEVELOPMENT PROPOSAL
PROPOSED TOWNSHIP MARIKANA EXT.14
PORTION 16, PORTION 57, PORTION 58, PORTION 194, PORTION 195, PORTION 196, PORTION 198, PORTION 199, PORTION 200, PORTION 201, PORTION 202, PORTION 203, PORTION 204, PORTION 205, PORTION 206, PORTION 207 AND PORTION 355 OF THE FARM ROOIKOPPIES 297 - JQ
T N
ZONE A
ZONE A
ZONE B
ZONE C
ZONE C
REHABILITATED AREA
FUTURE PHASE
ZONE A
ZONE B
ROAD A

3.3 Description of the Project

The purpose of the establishment of this new housing area is because the Tharisa Mine mining company wishes to relocate and resettle the existing MMmadithlokwa community village and part of the Lapologang community village, that are currently located on land that is scheduled to be used for mining purposes and the communities need to be resettled to an area of formal housing, services, amenities and facilities.

Application is, therefore, made on behalf of ***Homes 2000 (Pty) Limited***, which acts as the professional development company for the Mine, for authorisation for and approval of the development of Portions 297-JQ, ie RE/16, 57, 58, RE/194, RE/195, 198, 199, 200, 201, 202, 203, 204, 205, 206 and 207 of the Farm Rooikoppies 297-JQ.

The proposed activity comprises predominantly residential areas, to provide homes and accommodation, targeted at various income levels with a mix of diverse housing types and densities. Integrated with the residential components, will be the provision of associated community facilities and amenities, which would include mixed and diverse community centres, churches, educational and other institutional facilities, business opportunities for local shopping and retail, parks and open spaces. The envisaged residential uses would be primarily for the low and middle income levels of the community with a mix of diverse affordable housing types and densities. Refer Error! Reference source not found.

An initial preliminary overview of the proposed ***housing breakdown*** is set out below. It should be noted that that housing breakdown in terms of number of units, coverage area may change as the planning process proceeds and as the community facilitation also proceeds.

- RPD housing units – approximately 14 hectares of freehold stands of 200m² in area, about 680 Erven

- RPD high density units – approximately 4 to 5 hectares at a density of 80 units per hectare, about 295 units

The approximate total potential RDP units would be 975 - 1000 units

- Freehold bonded housing units – within an area of ±27 hectares, at 280m² - 300m² sized stands, approximately 880 Erven

- Freehold high density units – within an area of ±5 hectares at 80 units per hectare, approximately 380 Erven

The approximate total potential bonded units would be 1260 units

The approximate preliminary total of all residential units would be ±2800 accommodation units.

A watercourse crosses through the middle of the site. More detailed investigations by specialists will determine the extent of these areas, so that they can be set aside for open space, conservation and passive recreational uses.

The project will include the provision of all bulk and internal services and infrastructure, including roads, water, sewerage, power and stormwater management. A sewerage treatment plant will need to be provided to manage sewage effluent and a water reservoir to store potable water.

Refer Error! Reference source not found.

The development application will **also include** all required bulk and internal service infrastructure and services and roads, which will include the following specific infrastructure:

Services
An engineering services report has been undertaken, which identifies the location and availability of existing services and also determines the requirements to provide services to and within the development. **Refer Appendix 5: Rooikoppies Services Report**. A short summary is set out below

Water – there is an existing source for the provision of water in the area, which originates from the Buffelspoort Dam to the south of the N4. The feasibility of this has not been fully determined. Bulk water is also available from Rand Water, with the nearest connection is approximately 5km from the site. The existing infrastructure comprises a 500mm ø water main near the proposed development on the western side of the Sterkstroom. The connection is ±0,9 km from the proposed development. The RW connection supplies 3 reservoirs located ±1,5 km from the site with 3Mℓ with top water level (TWL) 1207.57 m ,1 Mℓ and 3Mℓ with TWL of 1224.4 m

The engineers are in the process of further investigating and obtaining relevant further information, volumes and capacities to determine the availability of the supply to accommodate the needs and demands of the new development.

Sewerage – There is no sewage treatment or outfall sewer infrastructure available in close proximity to the proposed development. The nearest Wastewater Treatment Plant (WWTP) identified is located at Wonderkop, ±5km from proposed development. The capacity could not be confirmed but it is likely that the capacity will need to be increased. It is, however, being considered that a package plant be investigated to address sewerage needs on the site.

Several package treatment technologies exist for the treatment of domestic wastewater in SA and the most common types installed in is an activated sludge/extended aeration plant. In most cases, these systems consist of a septic tank, followed by an aerated tank, a clarifier and a disinfection tank. Microorganisms are suspended in the sludge by means of aeration and mixing. Activated sludge systems can be continuously or intermittently fed or operated as a fill and draw system.

The design criteria for the effluent generated from a single household is ± 0.6 to 0.7 kl/day. If we work on 0.6 kl/day then the sewage purification works needs a treatment capacity of 2.4 Ml/l. The engineers are in the process of further investigating and obtaining relevant further information, volumes and capacities to determine the availability of infrastructure and/ or package plant types to accommodate the needs and demands of the new development.

It is expected that the release of treated water from the plant will be utilized in both the development (for garden irrigation) and also to be released into the watercourse, at acceptable water quality standards. A water use licence will be required.

Power - Power is available in the area from various different locations and a report in this regard is contained in **Appendix 6: Rooikoppies Electrical Supply Report**, however, the engineers are in the process of investigating and obtaining relevant further information, volumes and capacities to determine the availability of the supply to accommodate the needs and demands of the new development. This information will be provided in the Environmental Impact Assessment report.

Stormwater Drainage – there is no stormwater infrastructure on or in close proximity to the site. This would have to be addressed in the services planning on site, to ensure runoff is appropriately attenuated, which can then be released into the watercourse on the site.

Roads and Traffic Impact – The site has access and connectivity to good surrounding roads and is located on and adjoining a well gravelled District Road, with the western boundary of the site adjoining the main road to Marikana. Given the size of the development, it is expected that the development will be responsible for some external road upgrade. These upgrades include amongst others the following:

- Surfacing of Road D2170, between Road D1325 and Road B. This includes the possible widening of the existing bridge structure. NOTE: In the event the widening of the bridge is financially not viable, alternative access roads will be investigated.;
- Extension of Road D2170, between Road D1325 and Road C;
- Construction of Road C, between Road D2170 and Road A; and
- Surfacing of Road B.

The proposed development will be a high public transport trip generator and additional public transport facilities will be required to accommodate the additional commuter demand. The report in **Appendix 7: Rooikoppies Roads and Traffic Report** identifies proposed formal stop points.

A summary of the report notes that:

- The proposed development will generate more than 150 peak hour trips.
- Road D1325 and Road D2170 are provincial roads. Any intersections proposed along these roads will have to comply with the design requirements of the North West Province – Department Roads and Transport.
- Road A and Road B are identified as local authority roads.

- A new road marked Road C is proposed to provide access to the land parcel located to the west of Road D1325.
- The study area is well served with existing roads which will provide sufficient access to the applicant site.
- A comprehensive traffic report is required, to determine the full impact of the proposed development on the road network.

3.4 Listed Activities

The application will most likely involve the following listed activities in terms of GN 983, 984 and 985 of the 2014 Environmental Impact Assessment Regulations (and 2017 Amendments), published in terms of the National Environmental Management Act (NEMA) (No. 107 of 1998). Confirmation and verification of listed activities can only be determined after the specialist surveys have been completed.

Indicate the number and date of the relevant notice:	Activity No (s) and Activity Description (in terms of the relevant notice)	Describe each listed activity as per project description
GN.R. 327 of 7 April 2017	9. The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	Installation of stormwater infrastructure to address stormwater runoff on the site, which infrastructure may trigger the Regulation threshold of more than 1000 metres in length
GN.R. 327 of 7 April 2017	10. The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or	Installation of infrastructure for disposal of sewerage on the site, which infrastructure may trigger the Regulation threshold of more than 1000 metres in length

Indicate the number and date of the relevant notice:	Activity No (s) and Activity Description (in terms of the relevant notice)	Describe each listed activity as per project description
	(b) where such development will occur within an urban area.	
GN.R. 327 of 7 April 2017	12. The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	Wetland conditions are present on site, which will be retained for open space, however, various infrastructure, such as roads, sewers, water pipelines and electricity cables, exceeding 100m² will need to cross the watercourse and also be placed along and parallel to the water course.
GN.R. 327 of 7 April 2017	13. The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more,	Provision of water to supply the community on site will need to be stored, to ensure there is reserve water. A reservoir will need to be

Indicate the number and date of the relevant notice:	Activity No (s) and Activity Description (in terms of the relevant notice)	Describe each listed activity as per project description
	unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	constructed that falls within the threshold
GN.R. 327 of 7 April 2017	19. The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	Wetland conditions are present on site, which will be retained for open space, however, various infrastructure, such as roads, sewers, water pipelines and electricity cables will need to cross the watercourse and also be placed along and parallel to the water course and these activities will require that there is excavation, removal and / or depositing of soil within the wetland/ watercourse area
GN.R. 327 of 7 April 2017	25. The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres.	The provision of a sewerage treatment facility will be required to treat and manage sewerage from the development, the volumes of which will trigger the listed threshold.
GN.R. 327 of 7 April 2017	26. Residential, retail, recreational, tourism, commercial or institutional developments of 1 000 square metres or more, on land previously used for mining or heavy industrial purposes; — excluding — (i) where such land has been remediated in terms of part 8 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or	A small part of the site has been subject to mining, which has been rehabilitated.

Indicate the number and date of the relevant notice:	Activity No (s) and Activity Description (in terms of the relevant notice)	Describe each listed activity as per project description
	(ii) where an environmental authorisation has been obtained for the decommissioning of such a mine or industry in terms of this Notice or any previous NEMA notice; or (iii) where a closure certificate has been issued in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) for such land	
GN.R. 327 of 7 April 2017	27. The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Transformation of the land for development of residential uses and associated social facilities, roads and infrastructure, will result in the clearance of indigenous vegetation that may exceed one hectare, but less than 20 hectares.
GN.R. 327 of 7 April 2017	28. Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	Transformation of the land for development of residential uses and associated social facilities, roads and infrastructure, is to occur on land that is being partly utilized for agricultural purposes
GN.R. 325 of 7 April 2017	15. The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Transformation of the land for development of residential uses and associated social facilities, roads and infrastructure, will result in the clearance of indigenous vegetation that will exceed 20 hectares

Indicate the number and date of the relevant notice:	Activity No (s) and Activity Description (in terms of the relevant notice)	Describe each listed activity as per project description
GN.R. 324 of 7 April 2017	12. The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (a) In Eastern Cape, Free State, Gauteng, Limpopo, North West and Western Cape provinces: i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional management plan iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; or iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	Transformation of the land for development of residential uses and associated social facilities, roads and infrastructure, may result in the clearance of some indigenous vegetation exceed 300m² in the CBA areas of the site.
GN.R. 324 of 7 April 2017	14. The development of — (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; h. **North West** iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;	Wetland conditions are present on site, which will be retained for open space, however, various infrastructure, such as roads, sewers, water pipelines and electricity cables, exceeding 10m² will need to cross the watercourse and also be placed along and parallel to the water course and may occur in the Provinces CBA areas.

3.5 Need and Desirability

The initiative behind the project originates from the Tharisa Chrome Mine, which is located to the south east of Marikana, Rustenburg. The purpose and intent of the Mine is to relocate and resettle the MMmadithlokwa and part of the Lapologang community villages that are currently located on land which the Tharisa Mine is planning to be mined in the near future. This intent has hugely beneficial social implications in terms of providing these communities with the opportunity to live in an amenable environment with formal houses and all essential services, which are not subject to the mining impacts of health and safety.

The site forms part of a large area of land that has not been affected by any mining activities, but has been used for farming and agricultural purposes for a long period of time. It is located to the south east of the village of Marikana, straddling the main road from the N4 freeway to Marikana town. It is located in close proximity to the various mines in the area where many of the future residents are employed and also close to the village of Marikana, where there are supportive community facilities and amenities. Therefore, the site has good access attributes relative to existing communities and working opportunities in close proximity, especially as a significant number of future relocated resident are employed on the adjoining mines.

In addition to these locational factors, the site is one of the few remaining large parcels of land in this predominantly mining area that has reasonably attractive and appealing environmental attributes which can contribute to a relatively healthy living environment, including a watercourse and associated riparian habitat.

Furthermore, the site is located with close proximity to existing service infrastructure in the form of water, sewage and electricity, all of which are located nearby both in the adjoining mines and the village of Marikana, making development of the land economically more suitable to develop and in optimising existing infrastructure.

The large size of the property and nature of proposed land use activities to be developed, will also create a significant capital investment into the land and the local economy in this area.

3.6 Evaluation of Alternatives

Introduction

The identification of alternatives, as required is considered in terms of the definition of "***alternatives***", which is to be considered in relation to the proposed activity, which refers to different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and

(f) the option of not implementing the activity.

Discussion on how Alternatives were determined in accordance with the above

In terms of the definition for “alternatives” given above. The following issues were considered in determining “alternatives”:

a) **The property on which or location where it is proposed to undertake the activity:** There is only “one site” available by this applicant, as that piece of land is the subject of negotiations with the land owner and the mining company involved in the provision of housing and related uses to accommodate and resettle the beneficiaries from land to be mined. Alternative sites, therefore, could not be considered and assessed in this instance.

b) **The type of activity to be undertaken:** The proposed activity comprises predominantly residential areas, to provide homes and accommodation, targeted at various income levels with a mix of diverse housing types and densities. Integrated with the residential components, will be the provision of associated community facilities and amenities, which would include mixed and diverse community centres, churches, educational and other institutional facilities, business opportunities for local shopping and retail, parks and open spaces. The envisaged residential uses would be primarily for the low and middle income levels of the community with a mix of diverse affordable housing types and densities. As it is intended to create a holistic living environment for future residents, the application provides a mix of land uses.

c) **The design or layout of the activity**: The design has to take into consideration land available and proximity to access, existing and proposed roads and servitudes, the watercourse as well as the development of the context of the wider area. As the land holding is large, alternative layouts of individual phases/ Erven is possible and can be considered, although this will be restricted and guided by allowable road access, slope of the land and other constraints. Alternative design/ layout of specific neighbourhoods at a detailed level are possible once final development plans are approved.

Overall, the design has been done in accordance with the land available, as well as the various constraints, such as the watercourse, the previously mined areas, access, etc. The position of the activities could be “moved” around on the site, although this will have no appreciable impact on the nature of the activity, its function and operation. There are therefore, limited options for alternative layouts and design, due to the size and location of the site, and taking into consideration the access to the site and the location of roads. As a result of this, assessing any different layouts for the site is limited, based on the location of the site and other constraints, such as the roads and access.

d) **The technology to be used in the activity**: As the preferred use is for a predominantly residential development and associated supportive facilities and amenities, there are limited technology alternatives that can be

considered for these uses, although individual components of the development could utilise diverse technological alternatives.

e) **The operational aspects of the activity**: As the preferred use is for a predominantly residential development and associated supportive facilities and amenities, there are limited options for alternative "operational" aspects, although individual components of the development could utilise diverse operational alternatives.

f) **The option of not implementing the activity**: The direct impacts associated with the entire proposal not being constructed include:

   a. The loss of opportunity to provide a new living environment with housing and associated facilities to a community the needs to be relocated and resettled due to mining activities.
   b. Loss of other potential socio-economic activities, in terms of job creation during both the construction and operational periods
   c. Loss of potentially extensive capital investment in the area and associated implications to land values would occur.

If the **no-go alternative** is adopted, then the site would remain in its current state, which is both vacant in some parts and in others is utilized for agricultural purposes. It would be considered as under-utilised in an area under pressure for use, especially residential uses associated with the expansion of the existing Marikana area, but also for accommodating those working on the surrounding mines.

Therefore, the no-go alternative would not meet current social and economic needs in the area and pressure for development in the wider area will only increase as more residential homes are needed. Need and demand within the surrounding area would increase for jobs, services and amenities to the communities, due to the ongoing development and transformation of the area. No capital investment would occur, nor income generated in this local area. Therefore, the no-go alternative is not considered a preferred alternative

Alternatives

The application is restricted to the application site, ie Portions 297-JQ, ie RE/16, 57, 58, RE/194, RE/195, 198, 199, 200, 201, 202, 203, 204, 205, 206 and 207 of the Farm Rooikoppies 297-JQ. This is the land that Tharisa Mine has obtained specifically for the purpose of resettling the informal settlements located on the mining lands. Therefore, this site is the subject of the application and the boundaries are defined.

There are, therefore, constraints and limitations to exploring a wide range of alternatives on the site. Alternatives, therefore, that can be explored relate primarily to layout configurations, size of facility and visual issues. A significantly different alternative use of the site could be for mining purposes, as the site is located in the heart of an intensively mined area. This will be further explored below. No alternative site locations have been investigated. A no-go option is also

considered an alternative, should the site be considered too sensitive for development or if any fatal flaws are identified.

Preferred Alternative - The applicant's preferred development alternative is to develop the ±118 hectare site, for mixed type residential dwelling units and residential buildings, together with various types of supportive facilities and community amenities. The purpose and intent of the project is to relocate and resettle the MMmadithlokwa and part of the Lapologang community villages that are currently living on land which the Tharisa Mine is planning to be mined in the near future. It is envisaged that the nature of the development will form a holistic community environment, which will contain a range of housing typologies which meet different income affordability categories, as well as to include a range of community facilities, including business opportunities, schools and other institutional facilities.

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The preferred alternative is further summarised below:

An initial preliminary overview of the proposed ***housing breakdown*** is set out below. It should be noted that that housing breakdown in terms of number of units, coverage area may change as the planning process proceeds and as the community facilitation also proceeds.

- RPD housing units – approximately 14 hectares of freehold stands of 200m² in area, about 680 Erven

- RPD high density units – approximately 4 to 5 hectares at a density of 80 units per hectare, about 295 units

The approximate total potential RDP units would be 975 - 1000 units

- Freehold bonded housing units – within an area of ±27 hectares, at 280m² - 300m² sized stands, approximately 880 Erven

- Freehold high density units – within an area of ±5 hectares at 80 units per hectare, approximately 380 Erven

The approximate total potential bonded units would be 1260 units

The approximate preliminary total of all residential units would be ±2800 accommodation units.

The preferred alternative will **also include** all bulk and internal services infrastructure, which includes a bulk water connection to the nearest existing point to a water storage reservoir to be constructed on the site, to provision of a sewerage waste treatment works, to address the treatment and disposal of sewerage in the development, the necessary electrical connections, internal roads and access points.

Alternative 1 – This alternative also provides for the provision of residential requirements with associated community amenities, but consideration has been given to alternative layout designs, different housing typologies, which more specifically include a significantly greater amount of high-rise / walk-up complexes, so aiming for a considerably ***higher density***. A higher density would contribute significantly to a greater feasibility for the extremely high costs of bulk services and infrastructural provision, especially as the area is generally poor in the availability of these services.

This option would also provide for more land for business/ industrial uses and opportunities, although this may not be feasible in this area, due to the dominance of the mining industry and its related businesses,

The provision of significantly higher residential densities for the communities of this area is NOT considered a preferred, or good or strong alternative as it does not appeal to, nor is desirable to the communities here. Providing high density facilities would likely be unutilised and abandoned and vandalised. The provision of high density in this area close to Marikana is also considered out of scale with the area and would be visually incompatible with nature of the surrounding area.

Alternative 2 - The land falls within the heart of a predominantly mining area and a part of the site has already been partly used for mining purposes. It is therefore, not considered unreasonable that another alternative use would be for the use of the site for mining

Historically, the site forms part of a much wider area which has been the subject of mining activities for many decades and although use of the land for mining is not considered a realistic option by the Mining company initiating the project, it must be pointed out that if the land is not proactively developed and settled, it is feasible that mining could be undertaken on the property. Furthermore, this option, having potentially highly significant environmental impacts in close proximity to existing residential areas of Marikana and established businesses, would not be considered suitable.

Other Alternatives – In an effort to minimize the electrical load of the development on the power grid, the developers may consider promoting or presenting policies to utilising mixed power alternatives, to include solar heated geysers, gas stoves and energy sufficient lighting. Policies for energy sufficient lighting should include the following:

- The use of low energy lamps for exterior lighting with timer switches or photocell switches.
- To make use of natural lighting where possible.
- Should conventional geysers be installed it shall be fitted with ripple control relays which will allow the Council to control the electrical load of the geysers from their Substation control room. The developer shall further install ripple relays in all streetlight control boxes.

Provision will also be considered to provide for water saving and harvesting measures to reduce demands on municipal supplies

No-Go Alternative – An option of retaining the current situation on site, ie retain the current farming and agricultural activities on the land, but this could be perceived as the underutilisation of land in an area under pressure for use, either for development and settlement or even for mining purposes. There is also the possibility of degradation of the land or even informal land occupation and invasion if the land is not settled or the agricultural activities are ceased.

Discussion - All three alternatives are generally considered viable and realistic for development of the site and within the context of the surrounding area, although there would be different environmental implications associated with each option. The use of the site for mixed residential uses, would accommodate the specific need and objective of the Tharisa Mine in its programme to relocate and resettle the community villages currently living on the planned mining land. Use of the site for formal residential development not only addresses housing needs for these communities, but also accommodates the opportunity for being in close proximity to existing places of employment (at the Mines). Such integration of land uses has benefits in terms of economies of scale and agglomeration.

The use of the site for mining, should the potential exist, is not considered as one of the more feasible or viable alternatives for the purposes of this Environmental Impact Assessment.

3.7 Comparative Assessment of Alternatives

In accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended, and the Environmental Impact Regulations, a description and comparative assessment of all the alternatives for the proposed development must be considered and assessed. A number of possible proposals or alternatives for accomplishing the same objectives have been considered. For the purposes of this project, the following alternatives have been identified

The site is a large piece of undeveloped and largely degraded portion of land with minimal environmental attributes.

Alternative Sites for the Development - The site is privately owned and the application for its development is to be made by a private company. The application, therefore, is restricted to the application site, which is the subject of the application and the boundaries are defined. There are, therefore, constraints and limitations to exploring a wide range of alternatives on the prescribed site. Alternatives, therefore, that can be explored relate primarily to layout configurations, size of facility and isual issues. No alternative site locations have been investigated.

Alternative Uses for the Site – The land use in highest demand on this site is predominantly residential, with the intent of relocating and resettling specific communities for mining land. Integrated with the residential use is the provision of community facilities and amenities, small business opportunities, etc. Based on socio-economic reasons, this would be the most appropriate use on the site, particularly due its excellent location for living in close to the existing town of

Marikana and also due to the proximity of various mines where people work. Much higher residential densities are not desirable to these communities, but there will be opportunities for a mix of uses to be established on the site, such as all types of community amenities, schools, churches and business uses, etc.

The option of utilising the site for mining purposes is not unrealistic, due this being the heart of the chrome mining belt of the North West Province. As the mine has committed to the use of this land for community resettlement, it is understood that further mining here is no longer a serious consideration.

Alternative Layouts – A variety of endless layout alternatives are generally possible and would be considered suitable for establishment on the site. As the site is large, various layouts are possible, but the principles contained in **Error! Reference source not found.** provide the basis on which alternative layouts can be considered. Of importance is the retention of businesses on the western side of the site, along the D1325 road, being one of the main roads to Marikana and the maintenance of the protected watercourse and riparian area through the centre of the site. Within these constraints, there are many alternations possible to the layout.

No-Go Alternative – An option of retaining the current situation on site, ie. retain the current farming and agricultural activities on the land, is a viable option, as the value of the land for food production cannot be underestimated. However, the desperate need for accommodating the resettlement of the identified communities, must be seen as a priority in the context of the other possible alternatives.

Furthermore, should no development proceed, not only would the communities to be resettled have no where to go, it would also mean there would be no job creation, nor residential amenities provided and there would be no capital on operational investment into this area. There is also the possibility of further degradation of the site or even informal land occupation and invasion.

From an environmental perspective, any of the alternatives would be suitable, as the site has little remaining natural features or attributes and there is nothing of conservation worthy value, apart from the protection of the already degraded watercourse. However, the proposed use and the preferred Alternative have huge priority to accommodate and resettle communities in distress.

4. DESCRIPTION OF RECEIVING ENVIRONMENT

4.1 Bio- Physical

Climate

This area is a strongly seasonal summer-rainfall region, warm temperatures in summer with very dry winters. Mean annual precipitation (MAP) is approximately 654 mm. The incidence of frost is high on winter mornings. Temperatures vary between -5°C and 35°C, with an average of 15.8°C.

The climate for the area is typical of the general climatic conditions for the area and will not have any detrimental or negative impact on the proposed development. The proposed development will not affect the local microclimate, although the natural rain runoff from the site will need to be adequately managed, in view of the reduced natural surface area anticipated from the development.

Geology and Soils

A specialist geotechnical investigation has been undertaken on the site and the report is contained in **Appendix 8: Geotechnical Investigation Report**. A summary of the more relevant findings are set out below:

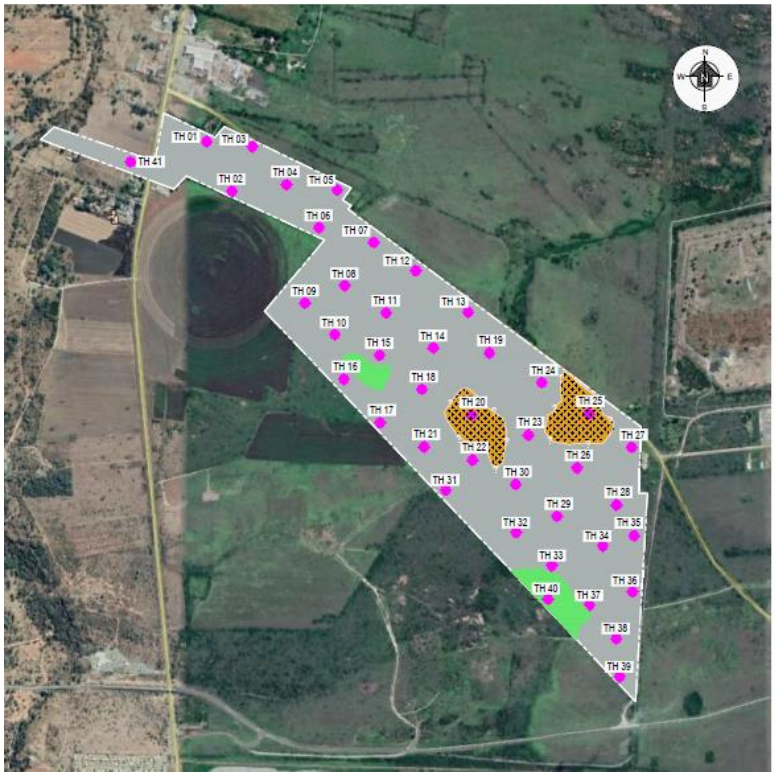
According to the 1:250 000 Rustenburg 2526 geological map, the site is underlain by Norite of the Rustenburg Layered Suite, Bushveld Complex**.** From a macro point of view, the majority of the site is underlain by potentially expansive highly to completely weathered, silty clay with scattered coarse grained sand in profile, residual norite, which in turn is underlain by fine to medium grained silty and gravelly SAND, interspersed with silty clay lenses over the upper reached in places, residual norite and ultimately by very soft rock and harder norite bedrock with depth.

The report notes that a watercourse transverses the site from the South to the North, approximately 500m from the Eastern boundary which provides adequate surface drainage of the immediate surrounding areas. In addition, the site generally falls moderately from the South to the North with an estimated nominal slope of 1%. At the time of the fieldwork, moderate natural surface water run-off with a moderate to high probability of sporadic ponding is expected to occur on the site during downpours. It is therefore advisable that all new building platforms, access roads and parking areas slightly be elevated in relation to the immediate surroundings in order to assist channelling of surface water run-off and to contribute towards the internal stability of structures and road pavements.

There are no problems associated with collapse potential are foreseen for this development. It is also noted that problems associated with heaving within the potentially expansive silty CLAY with scattered coarse grained sand in profile, residual norite can be expected to occur across the site. No groundwater was encountered in the field work, although groundwater seepage is possible within foundation and service trench excavations especially at the contact of weaker and more competent horizons, normally in the form of a perched groundwater table and especially towards the end of the rainy season, or during a more profound rainy

season. It is recommended that proper surface run-off and subsurface drainage including damp proofing form part of the permanent works.

Specific guidelines and recommendations are provided for foundation treatment for the various envisaged uses on the site, which are contained in more detail in **Appendix 8: Geotechnical Investigation Report.**



NOTES:
1. Demarcation of zones is approximate and should be confirmed during construction.
2. Refer to text of report for detailed foundation recommendations.
3. GGL = Ground level at geotechnical investigation fieldwork stage
4. Site class designation:

Geotechnical zone	Descriptions	Class
Zone A	Potentially expansive silty CLAY, residual norite, underlain by potentially compressible (in some places) silty and gravelly SAND, residual norite and ultimately underlain by norite bedrock.	H2 / S2 / R
Zone B	Near surface norite bedrock and/or outcrops, sporadically overlain by a thin layer of potentially expansive silty CLAY, residual norite and potentially compressible silty and gravelly SAND, residual norite.	R / H2 / S2
Zone C	Non-engineered fill, comprising of a thin layer of potentially expansive silty CLAY, followed by fine to coarse grained GRAVEL, COBBLES AND BOULDERS (up to 0.8m in dia) in a fine to coarse grained silty sand matrix with an expected highly variable in-situ soil consistency and associated stiffness.	P (Uncontrolled fill) / S2 / H2

Mining Activities

As previously indicated, part of the site (±20 hectares) has been subject to open cast mining, which occurred between 2005 and 2007, the area being shown on the Site Plan, contained in **Appendix 3: Rooikoppies Site Plan.** The mined area also went through part of the riparian area and watercourse, significantly altering this drainage system. Some initial rehabilitation was undertaken in 2007 and further repairs to the rehabilitated areas was also undertaken in 2014.

A final rehabilitation close out audit was undertaken and a rehabilitation report to this effect is contained in **Appendix 9: Rooikoppies Mining Rehabilitation Report.** The final rehabilitation work, briefly, addressed the following elements

- Upgrading the watercourse, including a culvert and road access over the watercourse
- Drainage concerns on the site
- All uneven surfaces were repaired, including spreading topsoil
- Boulders were removed and subsided areas repaired.

It should be noted that the consultants stated that Lonmin must be responsible for ongoing inspections, maintenance and repair work, where required on the site.

Agricultural Land
A large portion of the site has historically been used for agricultural production, but this has become increasingly unfeasible and uneconomical as mining activities have expanded and intensified in the surrounding area over the years. The impacts that have contributed to the devaluation of the agricultural potential of the land, include the loss of an area of approximately 20 hectares that was completely destroyed by the open cast mining activities. This land, whilst it has since been rehabilitated, no longer contains suitable soils for farming activities.

The farmer of the land has also indicated that as mining activities have increased and expanded over the years, there have been increasing problems with theft of produce off the land, theft of equipment, tools, etc, fires burning and destroying the crops, all initiated by people living in and around the Marikana area.

It has also been indicated that the area is significantly lacking in water supply and availability, with very poor or regular, dependable rainfall. In addition, the ground and surface water is also unsuitable for crop irrigation, due to the contaminated nature of the water from the toxic effluent from the adjoining mines. The site lies downstream of mining activities and, as such, is a receiver of toxic and contaminated water.

The combined loss of land to mining activities, theft of crops, equipment, burning of crops, inadequate rainfall, contaminated ground and surface water, have contributed to a significant economic and financial loss to the land owner, to the level that it is no longer economically feasible to use the land for any ongoing agricultural activities.

As it is well known to the mining houses in the area, mining activities have many years to still continue in this area, which will only further compound the problems of agricultural land in this area. The future of agricultural potential together with mining and its associated activities, do not work harmoniously with one another in this area and there is limited agricultural potential for the land into the future.

Vegetation
Specialist investigation surveys were conducted on the site and is contained in **Appendix 10: Rooikoppies Vegetation Survey.** A summary of the findings are set out below:

The site is largely disturbed, consisting of cultivated lands as well as previously cultivated areas, along with some homestead / garden combinations, roads / tracks and some natural areas. There is no mining infrastructure on site, but surrounding areas are dominated by mines, human settlements and cultivation. The natural areas on site consist mostly of remnant patches of woodland and savanna-type vegetation. The wider area of the site is surrounded by further agricultural activities and extensive mining activities. The site remains as one of the few parcels of open land in an area, although has few if any important ecological connectivity with natural ecological areas.

The study area falls within one regional vegetation type, namely Marikana Thornveld, which is found mainly in North-West and Gauteng Provinces and it

occurs on plains from the Rustenburg area in the west, through Marikana and Brits to the Pretoria area in the east.

Historical evidence notes that cultivation on the site has had the biggest impact on the natural vegetation of the area. There is no imagery between July 2004 and September 2009, but during this period, the vegetation was completely cleared in a swathe through the central part of the site, which is known and confirmed to have been for open cast mining. This has resulted in the central part of the riparian woodland being cleared.

A summary of historical disturbance on site is as follows:
1. Cultivation.
2. Major earthworks, probably associated with mining.
3. Harvesting of wood from woody vegetation.
4. Grazing by domestic livestock
5. Invasion by alien invasive trees on site.

The areas distinguished on site were divided into the following categories:
1. Riparian Woodland;
2. Rocky Mosaic;
3. Wetland;
4. Secondary Savanna;
5. Degraded Savanna;
6. Pioneer Grassland;
7. Transformed areas, including roads, homesteads and gardens, cultivated fields, and a borrow pit.

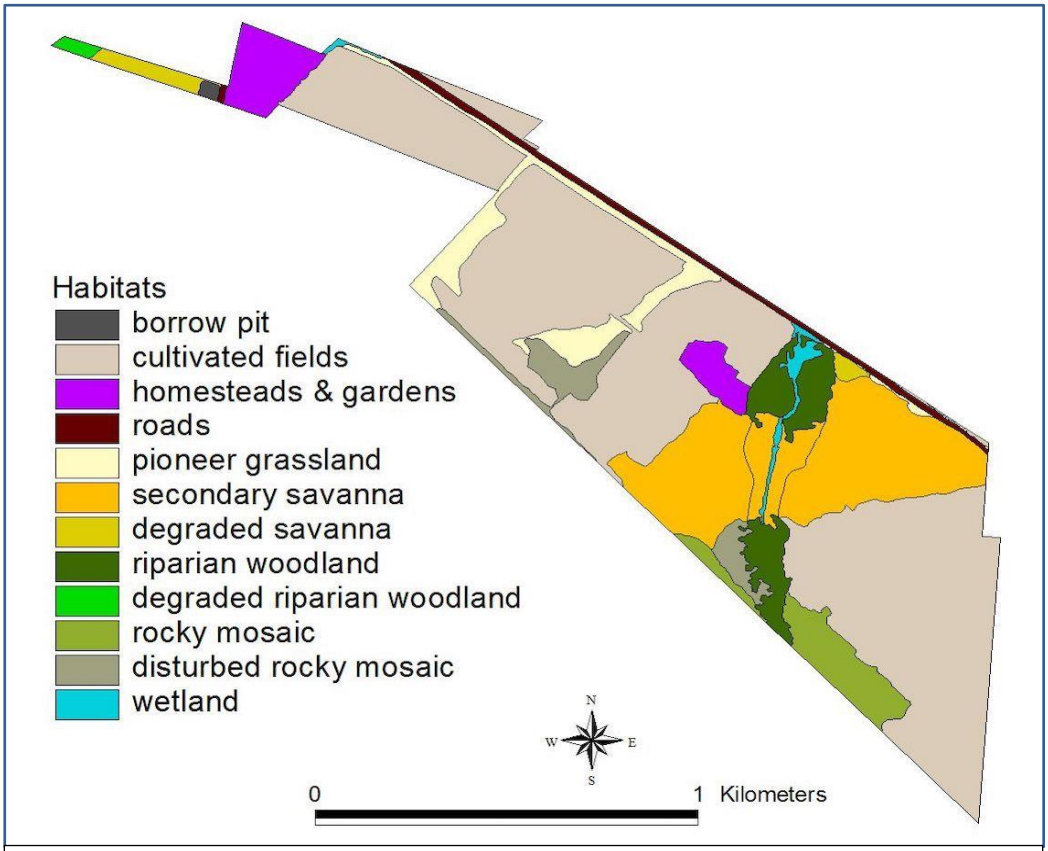


Figure 4: Habitats on site.

Table 2: Area in hectares of each habitat class found on site.

Habitat class	Area (hectares)
Riparian Woodland (intact & degraded)	5.499 0.336
Rocky Mosaic (intact & degraded)	4.573 3.693
Wetland	1. 087
Degraded Savanna	1.474
Secondary Savanna	21.291
Pioneer Grassland	6.380
Transformed Areas (borrow pit, cultivation, homesteads & gardens, roads)	0.191 66.548 5.192 2.595
TOTAL	**118.859**

The report indicates that there are 16.662 hectares of intact natural vegetation on site. Rocky Mosaic vegetation and Riparian Woodland in a natural state over the largest proportion of the natural vegetation on site and cultivation is the largest land cover of the site.

In general, the natural vegetation that would have occurred naturally in this area is Marikana Thornveld, which is a mixed thornveld occurring on the clay flats, which are largely ploughed on site, with the exception of rocky areas.

Riparian Woodland

The central drainage line is a small tributary of the Maretlwana, which passes through Marikana to eventually join the Sterkstroom and then the Crocodile River. The drainage has been impacted by mining and agricultural activities. The origins of this drainage are lost in the mining activities to the south of the study area, but historical aerial imagery (July 2004) shows that it originated just over 2 km further south, of which 1.3 km of the system is now lost to mining.

There is some uncertainty in assigning riparian status to the woodland, since the species composition of the woodland and the location of the drainage channel within the woodland do not provide a clear indication that the woodland is specifically associated with the riparian zone. Also, agricultural activities have resulted in vegetation clearance to the edge of the woodland and it is unknown what the original vegetation patterns on site would have been in the absence of such clearing, i.e. whether the woodland would have extended further outwards or been replaced by some other vegetation composition and structure. Evidence to support the position that it is most likely riparian vegetation is obtained from historical imagery, from topographical information and from patterns in other parts of the landscape.

There was strong evidence of wood harvesting within the woodland area. This appears to be occurring along the fringes, which would have the effect of diminishing the extent of the woodland progressively. Harvesting appeared to target any woody species which have combustible wood.

Rocky Mosaic:

There are areas of remaining natural vegetation in the south-eastern part of the study area that extend southwards out of the boundaries of the study area. These areas consist of a mosaic of low rock outcrops of rounded rocks, interspersed by open areas with black clay soils. The vegetation in these areas is an open low woodland, with more dense woodland on the rocky areas. The biodiversity importance of the habitat is the fact that the rocks provide a diversity of habitats for plant species, so that there is a constant species turnover from one rock outcrop to the next, as well as a difference in species composition between the rocky areas and the adjacent clay soil areas. The rocky areas are also unsuitable for cultivation, so they have been spared the historical loss of habitat associated with cultivation. This means that these areas are now the only remaining open habitats not lost due to historical land use and are therefore important repositories of biodiversity.

Wetlands

There is a channel running through the woodland in the south-eastern part of the site and a patch of wetland on the side of the road in the northern part of the site. The south-eastern channelled wetland is a natural system associated with a low drainage valley. The channel meanders through the woodland but has been canalized in the central section where the woodland has been removed. Both within the woodland and in open areas the channel is characterised by the presence of the tall graminoid, *Cyperus sexangularis*. There are other species that were found within these areas.

Secondary Savanna

The vegetation through the southern part of the site, where the rehabilitated open cast mine is located developed a secondary savanna with scattered thorn trees and a well-developed perennial grass cover. The species richness appears to be relatively low. Below is a picture of this cover over the rehabilitated open cast mining area

Figure 10: Wetlands within drainage channel in south-central part of site.

Figure 11: Secondary savanna in previously cleared areas.

Discussion and Summary

According to the North West Biodiversity Sector Plan, most of the vegetation on site is not considered to have high conservation value, although parts are mapped within the CBA2 category, which indicates that it has importance for meeting conservation goals and/or maintaining ecological processes in the landscape.

The largest constituent of the site is cultivated lands. Remaining patches of natural vegetation, which have been disturbed to varying degrees, include riparian woodland, vegetation of rocky outcrops and wetland vegetation. There are some secondary savanna areas that have developed in areas that are currently not cultivated.

On the basis of ecological process factors and the conservation value of remaining natural habitat within Marikana Thornveld, all woodlands, rocky outcrop vegetation and natural wetlands are mapped as having HIGH sensitivity, habitats within the drainage valley are mapped as having MEDIUM-HIGH sensitivity (despite being secondary), and secondary savanna and disturbed rocky outcrops are mapped as having MEDIUM sensitivity.

There are a three listed plant species of lower conservation concern (Near Threatened that could potentially occur on site, i.e. they have a geographical distribution that includes the site and habitat conditions on site are favourable for them. These species are *Drimia sanguinea*, *Lithops lesliei* subsp. *lesliei* and *Stenostelma umbelluliferum.* None of these species were found on site during the field survey.

The report recommends the following

1. Riparian Woodland and Rocky Mosaics represent remnants of indigenous natural vegetation on site, which is within a listed ecosystem, namely Marikana Thornveld. It is recommended that these areas, as well as an appropriate buffer zone, are omitted from any development plans and that they are maintained as ecological corridors in the landscape.

2. The declared aliens that occur on site are listed in Appendix 2. In terms of the National Environmental Management: Biodiversity Act, invasive species are either prohibited or require a permit to be retained on site. It is recommended that these species are controlled using registered control methods.

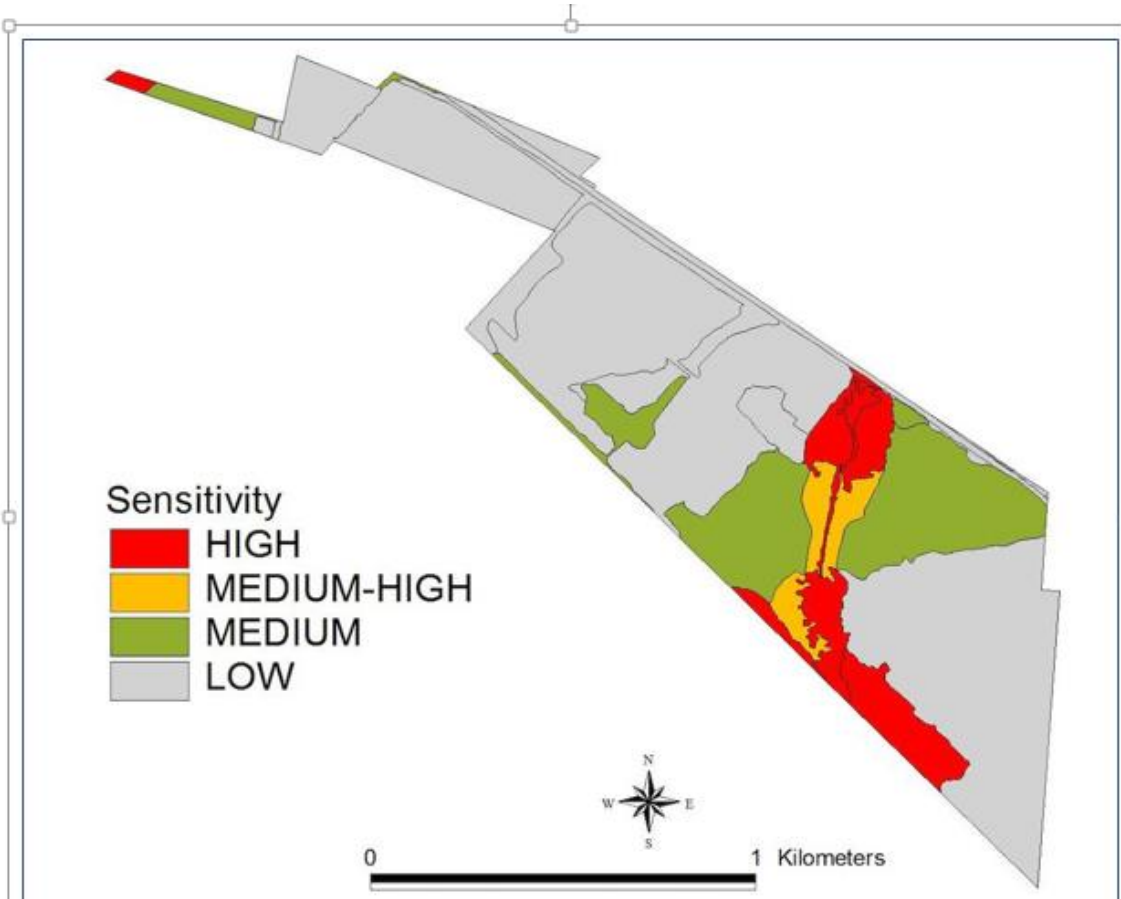


Figure 12: Habitat sensitivity of the site.

Wetland / Riparian Zone Delineation
Specialist investigation surveys were conducted on the site and is contained in **Appendix 11: Rooikoppies Wetland Delineation and Assessment.** A summary of the report is below

The report notes that there is a small stream through the centre the site. It flows in a generally northerly direction. Riparian habitat is associated with the watercourse. Riparian vegetation is a mix of woody and non-woody vegetation and is classified as riparian woodland according to the vegetation survey conducted for the study area. However, past surface mining has taken place through the central portion of this watercourse and resulted in removal of the central section of riparian vegetation and the natural channel. The mined area has since been rehabilitated, and the affected section of watercourse recreated across the mine footprint.

As a result, this section of channel is straight, compared to the up and downstream reaches which meander through the riparian vegetation, and the woodland typical of the surrounding natural riparian vegetation has been replaced with a low profile, graminoid dominated vegetation community, with little to no woody component. Identification of vegetation was hampered by the season in which the survey was undertaken (winter) as vegetation, particularly grasses and herbaceous species were mostly dead or not flowering. The riparian vegetation was dominated by woody tree and shrub species, and where not extensively cleared, species including *Rhus lancea*, *Acacia* sp., *Protasparagus* sp., and *Ziziphus mucronata* were observed. The grass species *Ischaemum afrum* was observed frequently, particularly along the margins of the riparian woodland and in open patches within this vegetation type. Within the marginal zone of the riparian habitat, namely within the wetter active channel, typical hydrophytes such as *Cyperus sexangularis*, *Typha capensis* and *Phragmites*.

Several artificial wet areas were noted, and mapped, within the study area. These wet areas are associated with irrigation dams for the most part.

The riparian habitat can play an important role through the following functions:

- It provides habitat and migratory pathways for terrestrial and aquatic fauna within a transformed landscape,
- Buffers the aquatic environment from increasing surface runoff and noise pollution,
- The rooting system of the trees (and other vegetation) helps to stabilise the banks and limit erosion.
- The plants provide a refuge for aquatic species utilizing the river and stream, and also create a mosaic of habitats which encourage greater diversity among the species able to utilise the river ecosystem,
- Organic inputs to the river provide a food source for aquatic species, and
- The canopy cover provided by the trees shades the channel and contributes towards maintaining lower water temperatures.

In terms of importance, the riparian habitats delineated fall within areas considered to be Critical Biodiversity Areas according to the North West Province's Biodiversity Sector Plan, which means that these areas are necessary in meeting the provinces biodiversity targets. The vegetation unit for the area – Marikana

Thornveld – is considered Vulnerable according to the published National List of Ecosystems that are Threatened and in Need of, and therefore intact areas of habitat should be maintained to limit further losses.

Given the above points, the riparian habitat on site can be considered important from both a functional and conservation perspective and should be properly managed and prevented from deteriorating further.

Whilst a buffer of 50-52 metres is recommended (with no assumption of mitigation included), it is noted that if appropriate mitigation measures are put in place to limit sediment runoff from the construction areas during the construction phase, the total required buffer width **drops to 29-30 metres**.

The report provides an impact assessment of the proposed development on the riparian area, which includes

- loss of riparian habitat - recommendations provided are to ensure development remains outside the riparian habitat and that stormwater management measures are required to further protect the riparian vegetation

- Loss of Soil Storativity/Increased Stormwater Runoff - recommendations provided are that the development be designed in such a way that the extent of impermeable surfaces is reduced as far as possible through the use of Sustainable Urban Drainage Systems (SUDS). This method involves the incorporation of features, such as vegetated swales, permeable paving, infiltration trenches and rainwater tanks for water storage and harvesting for onsite purposes, into the development design, in order to help maintain or replicate pre-development water cycles. Secondly, any increased surface runoff that is generated should be properly managed onsite to ensure no net increase in the quantity or velocity of flows in downstream watercourses. This can be achieved through inclusion of flow attenuation facilities in the design layout

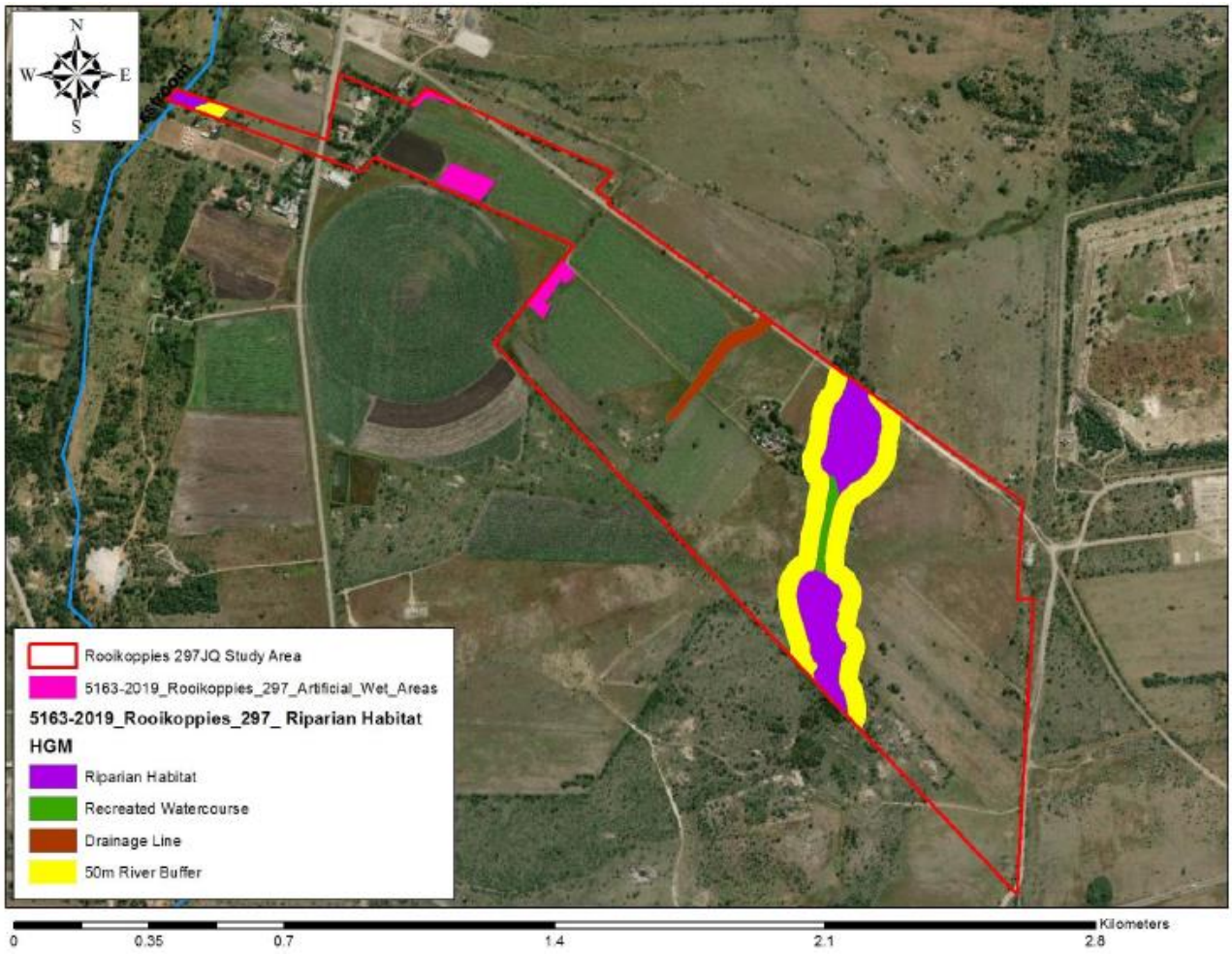
- Impoundment and Concentration of Flows - recommendations provided are to minimise the risk of erosion and that the extent of disturbed vegetation and soil should be kept to a minimum. Detailed measures are contained in the report and carried over into the EMPr.

- Increased Flow Volumes - recommendations provide that indicate water generated from the sewage treatment facility should be utilised within the development as far as possible. Irrigation of vegetated areas and maintenance of any water features should be done using treated sewage water. Discharged flows should be dissipated before entering the river and the volumes released should not fluctuate, but should remain constant and as minimal as possible. It is suggested that a series of vegetated attenuation ponds/artificial wetlands be considered between the sewage treatment facility and the receiving riparian zone to dissipate increased flow volumes and velocities

- Water Quality Deterioration - recommendations provide that potentially polluting substances on site should be strictly controlled and further detail is provided in the report and contained in the EMPr.

- Disturbance of Riparian Habitat - recommendations provide that the development be not permitted in the riparian area and protected with fencing and/ or barriers

It is finally noted that should any development (including attenuation facilities) be planned within the delineated watercourses on site which will impact the water resource, such development is subject to authorisation under Section 21 of the National Water Act (Act 36, 1998), and will require the submission of a Water Use Licence application for all relevant activities. As this is more than likely to occur, such application will need to be undertaken later in the process.



Fauna

An assessment of the fauna on site indicated that, as a result of high levels of human presence, services and infrastructure, land use activities, and especially the wider scale agricultural activities and the open cast mining in the area, coupled with surrounding habitat destruction and disturbances, there was little evidence of remaining indigenous fauna

The majority of larger mammal species are likely to have been eradicated or have moved away from the area. This is mainly a result of human disturbances on site as well as in the surrounding and adjoining areas. No sensitive or endangered mammals were actually recorded within the study area

In summary, the site is considered to have a very low conservation value for a faunal point of view, as the site has little remaining habitat due to human disturbance and development on and around the site.

General Pollution
The site itself contains little in the form of physical pollution, due to its intensive use for farming and agricultural activities and the previous open cast mining, which has been rehabilitated. There is no dumping and littering evident.

Air Quality
A Specialist air quality assessment and health risk impact analysis was undertaken and is contained in **Appendix 12: Baseline Air Quality & Health Risk Assessment for Rooikoppies.** A summary of the findings are set out below

The baseline air quality assessment was undertaken through a review of meteorological monitoring data, available air quality monitoring data, air quality legislation and the identification of nearby existing emissions sources surrounding the project site. Comparison of ambient air pollutant concentrations, using available ambient air quality data, is made with the South African National Ambient Air Quality Standards where applicable. As part of the baseline assessment, a basic health risk assessment report was also compiled.

The land use immediately surrounding the proposed residential development consists predominantly of cultivated land, subsistence farming and mining. Mining activities are predominant in all directions surrounding the proposed site. The closest mines being located approximately 250 m to the east and 100 m to the south of the proposed development. Urban smallholdings are found to the north-west and south-east of the development. Decreasing elevation can be noticed from surrounding mines towards the proposed residential development. Exposure to relatively high pollutant concentrations in this area is therefore likely.

The towns of Marikana and Wonderkop are located approximately <1 km north-west and 4.9 km north-east of the proposed development, respectively. The towns of Lapologang and Mooinooi are situated 4 km south-west and 5.5 km south-east of the proposed development, respectively. The area is classified as rural in nature. The town of Elandsdrift is found approx. 5.6 km east of the proposed development. There was no air quality monitoring station close to the proposed development (that could be determined) to present background concentrations for SO2, NO2, CO, PM10 and PM2.5 concentrations. However, there was background data available for dust-fall rates as well as passive sampling taking place at a neighbouring mine. Background air quality data was obtained from an Air Quality Impact Assessment (AQIA) undertaken in 2014 by Airshed Planning Professionals (Pty) Ltd.

Dust-fall rates for buckets located in non-residential areas range from 74 – 1 060 mg/m2/day for the period. There were no exceedances of the non-residential standard of 1 200 mg/m2/day, during the period August 2018 – August 2019. Higher dust-fall rates are recorded at site D14, located approximately 0.6km south of the proposed development.

Dust-fall rates for buckets located in residential areas range from 20 – 1 010 mg/m2/day for the period. There were 5 exceedances of the residential standard during the period August 2018 – August 2019. A total of three exceedances were recorded during December 2018 at sites, D09, D13 and D19. These stations are

located approximately 3.25 km south, 1.72 km west and 2.95 km south-east, respectively from the proposed development. Two exceedances were recorded in 2019, with D19 exceeding in January 2019 and D12, situated approximately 1.79 km south west of the proposed development, exceeding in June 2019 (Figure 5-9).

The NAAQS annual average guideline for SO2 is 19 ppb. Results for SO2 during the period August 2018 – July 2019 ranged from <0.4 – 3.91 ppb. There were no exceedances recorded of the annual average during the monitoring period provided.

The NAAQS annual average standard for NO2 is 21 ppb. Monitoring results for NO2 during the period August 2018 – July 2019 ranged from 0.35 – 13.17 ppb. There were no exceedances recorded of the annual average during the monitoring period provided.

An AQIA was undertaken in 2014 for a mine and chrome sand drying plant located near to the proposed residential development site (approximately 100m south of the mine). The dispersion modelling results given in the AQIA report are used to provide an indication of background particulate matter, SO2, NOx and CO concentrations at the proposed residential development site.

The predicted annual average PM10 concentrations and the frequency of exceedances of the daily standard during the operational phase of the mine were modelled. The results were presented for a mitigated scenario. The annual standard of 40 µg/m3 is not expected to exceed outside of the mine boundary. Daily exceedances of the standard (75 µg/m3) however occur slightly outside of the mine boundary, towards the west and north (Airshed, 2014).

The predicted annual average PM2.5 concentrations and the frequency of exceedances of the daily standard during the operational phase of a nearby mine were modelled. The results are for a partially mitigated scenario. In this scenario, the annual standard of 20 µg/m3 (at the time of the report being compiled, the standard was 25 µg/m3) is predicted to exceed, up to 4 km, outside the north boundary of the mine (Airshed, 2014). Due to the decrease in the annual standard, this distance is likely to increase.

Daily exceedances of the current standard (40 µg/m3) (at the time of the report being compiled, the standard was 65 µg/m3) are predicted to occur between 5 km to 6 km outside the north boundary of the mine (Airshed, 2014). Due to the decrease in the annual standard, this distance is likely to increase.

The predicted annual average PM2.5 concentrations and the frequency of exceedances of the daily standard during the operational phase of a nearby mine were modelled. The predicted results show that exceedances of the standard 20 µg/m3 (at the time of the report being compiled, the standard was 25 µg/m3) occurs within the mine boundary (Airshed, 2014). However, due to the decrease in the annual standard, this distance is likely to increase. Further, there were no daily exceedances predicted, although this may now change as the daily standard has since decreased from 65 µg/m3 to 40 µg/m3.

Emissions of CO, NOx and SO2 from the chrome drying plant were considerably low, and the model predicted no exceedances of the relevant NAAQS.

It is important to understand the current situation regarding PM10 and PM2.5 emissions in South Africa, and how likely these emissions are to occur in and around the proposed residential development. The proposed residential development on various portions of the Farm Rooikoppies 297-JQ will be situated close to numerous mines, the closest being to the east (approximately 250 m) and south (approximately 100 m). The proposed development will also be in close proximity to agricultural activities. These factors will contribute to PM10 and PM2.5 emissions in the area.

The frequency of south-easterly and east-south-east winds that blow along the axis of the development would serve to combine emissions from the surrounding pollution sources, namely; mining areas, vehicle dust entrainment from unpaved roads, potential biomass burning and agricultural activities, industrial activities and residential fuel burning activities. Exposure to high concentrations of emissions could occur.

In conclusion, the pollutants of concern in the area are PM10 and PM2.5, due to the distance of predicted exceedances depicted in the AQIA compiled by Airshed in 2014. Daily exceedances of PM10 occur outside the mine boundary, while annual exceedance and daily exceedances of PM2.5 also occur up to 6 km north of the plant boundary. Due to the close proximity of the proposed development to the mine boundary (approximately 100 m) exposure to high levels of PM10 and PM2.5 could occur, as the exceedances are predicted to occur over the area where the proposed residential development is situated.

The report notes that ambient conditions are not ideal for residential use, but that if an alternative site is note possible, a climate control system with a filter as part of the building design should be considered. This would not only ensure air circulation but will reduce the build-up of dust particles within the home. Additionally, a barrier of trees surrounding the east and south of proposed residential development. Higher trees can act as porous bodies which influence local dispersion of pollution and aid the deposition and removal of airborne pollutants.

Health Risk Impact Assessment

The specialist report is contained within **Appendix 12: Baseline Air Quality & Health Risk Assessment for Rooikoppies** which provides more detail on the potential health risks to communities on the site. In particular, the report re-iterates the findings contained in air quality assessment and the potential health problems from the adjoining mining activities. These are associated with potentially hazardous materials released into the air and arising from dust fallout. The report lists various potential illness and diseased associated with the dust fallout conditions in the area.

Further potential risks have been identified to originate from agricultural activities and biomass burning and from wood fires in informal settlement areas.

4.2 Social and Economic status

The proposed development of the site for predominantly residential use with associated supportive facilities, will contribute positively to the social conditions of the area, and ***especially to the beneficiary communities***, which require relocation and resettlement. Specialists have been involved with community facilitation and negotiations for a considerable time with the intended beneficiaries and a report by the consultants is included in **Appendix 13: Community Survey Report.**

The site falls within an area characterised predominantly by mining activities, together with pockets of farming and agriculture activities. The majority of the inhabitants and communities of the area are involved in these activities. Marikana is the nearest and largest community village / settlement to the site, the sites western boundary less than a kilometre from the town. The town and the application site are located in the heart of this mining belt, which stretches at least 10 km to the west and 10km to the east of the site.

Therefore, both socially and economically, the local conditions are associated with mining and agriculture.

The intended community for settlement on the site will primarily come from the resettlement of the Mmwaditlhokwa and Lapologang communities, due to the planned and imminent extension of mining activities in the area and into the area where these communities are currently located. The impact of mining activities experienced by these communities include exposure to the health hazards and disturbances from blasting, air pollution, contaminated water resources, noise from blasting and mine operations, lack of social and institutional amenities such as schools clinics, etc. They are, as such, a typical distressed mining community.

However, this application is intended to resolve these circumstances for as many families as is possible on the site. The land ownership transactions are for the specific purposes of establishing a formal living environment, to include not only residential uses, but all associated community facilities and amenities. A full package environment is to be created for the relocated communities.

It should be pointed out that the mine is involved in an intensive consultative and negotiation processes with the communities, which also includes various government role players and organisations. This important process was commenced before the initiation of the EIA process and, as such, the representations, needs and requirements of the community are being fed into the EIA via the social / community facilitators. The project is seen, therefore, very much as a public / private sector partnership.

A short summary of the findings in **Appendix 13: Community Survey Report** is as follows

In coordination with community leaders Paulisto Trading Enterprise designed, distributed, collected and analysed a comprehensive survey undertaken with the community. Field workers comprising of community members of Mmaditlhokwa

and supervisory staff were used in collecting survey data. Various aspects such as livelihood, economics, social amenities, employment, etc. formed part of the survey questionnaire, so as to understand the communities and to obtains solutions specifically for the communities of Mmaditlhokwa and Lapologang and to improve the lives of its employees, and to engage in a housing project and allocate stands for its employees.

The report provides information on the community households surveyed to determine their socio-economic circumstances, where they originated from, their employment conditions, etc.

The development of the site also contributes to a more economically viable use of valuable land within this area, as the site is currently under utilised and provides minimal returns to the wider area or to the local communities. The historic use of the site for agricultural and farming purposes was earlier described as no longer viable or economically feasible, due to various conditions and circumstances in the area and on the land.

4.3 Visual and Aesthetic

The site can be currently viewed as an open area of land, comprising of some agricultural farming activities and large open, unutilized areas which are disturbed (from previous open cast mining). The site is relatively flat with no significant physical features, apart from the watercourse through the centre of the site, with a disturbed riparian area. Development of the site will significantly change the current image of the site from an open area to an urban footprint.

4.4 Cultural and Archaeological

A specialist investigation surveys were conducted on the site and is contained in **Appendix 14: Heritage Impact Assessment**. A summary of the findings are set out below:

The report notes that earlier mining activities in the area have had significant impact on the loss of any cultural or heritage features. As a result, the natural and cultural landscape has been significantly altered from its original character in recent historical times. If any significant archaeological and/or historical sites, features or material did exist here in the past it would have been largely disturbed or destroyed as a result. Some graves were identified in the area however, while the ruins of recent structures (farming related) are also present in some sections.

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools. In South Africa the Stone Age can be divided basically into three periods. It is however important to note that dates are relative and only provide a broad framework for interpretation. A basic sequence for the South African Stone Age (Lombard et.al 2012) is as follows:

Earlier Stone Age (ESA) up to 2 million – more than 200 000 years ago
Middle Stone Age (MSA) less than 300 000 – 20 000 years ago
Later Stone Age (LSA) 40 000 years ago – 2000 years ago

It should also be noted that these dates are not a neat fit because of variability and overlapping ages between sites (Lombard et.al 2012: 125).

The closest known Stone Age sites in the vicinity of Marikana are located in an area known as the Magaliesberg Research Area. It includes rock shelters and rock engravings in the Magaliesberg Mountains. These date back to the Middle and Late Stone Age (Bergh 1999: 4).

No Stone Age sites or material were identified in the study area during the assessment. If any material were to be present it would be single, out of context tools scattered around the area.

The Iron Age is the name given to the period of human history when metal was mainly used to produce artifacts. In South Africa it can be divided in two separate phases according to (Bergh 1999: 96-98), namely:

Early Iron Age (EIA) 200 – 1000 A.D.
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

Early Iron Age (EIA) 250 – 900 A.D.
Middle Iron Age (MIA) 900 – 1300 A.D.
Late Iron Age (LIA) 1300 – 1840 A.D.

An initial Phase I HIA study for Tharisa's Marikana Mine was done by Pistorius in 2007 and identified the following types and ranges of heritage resources in the area:

- Stone walled settlements dating from the Late Iron Age and historical period.
- Graveyards, historical as well as contemporary.
- A historical village and homestead.
- Mining heritage remains.
- Isolated and randomly scattered stone tools.
- Historical houses and outdated discarded agricultural implements.

The report provides a good overview of the history of the area. The oldest map for Rooikoppies 297JR that could be obtained from the Chief Surveyor General's database (www.csg.dla.gov.za) dates to 1890 and is for Portion 1 of the farm (CSG Document B11714). It shows that at the time the farm was numbered as No.171 (and known as Roodekopjes) and was situated in the Rustenburg District, Ward of Hex Rivier in the Zuid-Afrikaansche Republiek (ZAR). Portion 1 was formally surveyed for W.A. du Plessis and M.S.A. Erasmus in July 1890. No historical sites or features could be identified from this map however.

Results of the study area assessment
No archaeological sites, features or material were identified in the area during the fieldwork. Some remains of recent farming-related structures were present in the

area, but these sites have no cultural heritage significance, as they more than likely date to less than 60 years ago and are nearly completely destroyed. An existing farm stead in the area, as well as some houses and stores close to Marikana (north-western corner of proposed development area) is also not of any significance, although if these structures are going to be negatively impacted on by the proposed development social consultation will have to be undertaken with the current occupant and owners before demolition is undertaken.

The only site of any cultural heritage significance found in the study area during the assessment was a **Grave Site** containing a number of unknown stone-packed graves. There are around 20 graves on site, with none of them having any formal headstones with identificatory inscriptions. The site has been demarcated with large boulders forming a boundary, and the client has indicated that they are prepared to exclude the site from their development and preserve it in situ.

Graves always carry a High Cultural Heritage Significance rating and should preferably be protected and not impacted by any development. The best practice would be to steer clear of the grave site and fence it in to ensure its protection. The site should then be managed through a Heritage Management Plan. Although the graves sites might not be directly impacted on by the proposed development actions, there could be some indirect impacts on it as a result of it. It is therefore recommended that the site be properly cleaned, the graves on it recorded in detail and a Graves Register be drafted and the site fenced-in properly, allowing possible family members/descendants of the deceased buried there access in order to visit.

Figure 19: A closer view of one of the stone-packed graves.

Figure 17: A view of the Grave Site recorded in the study area.

Finally, from a Cultural Heritage point of view, the proposed development of affordable housing and related activities on various portions of the farm Rooikoppies 297JQ, near Marikana in the Northwest Province, should be allowed to continue.

The report has been submitted to SAHRA, who have provided interim comments, which are contained in **Appendix 14: Heritage Impact Assessment.** Further comments will be issued on submission of the DRAFT Environmental Impact Assessment report.

4.5 Safety and Security

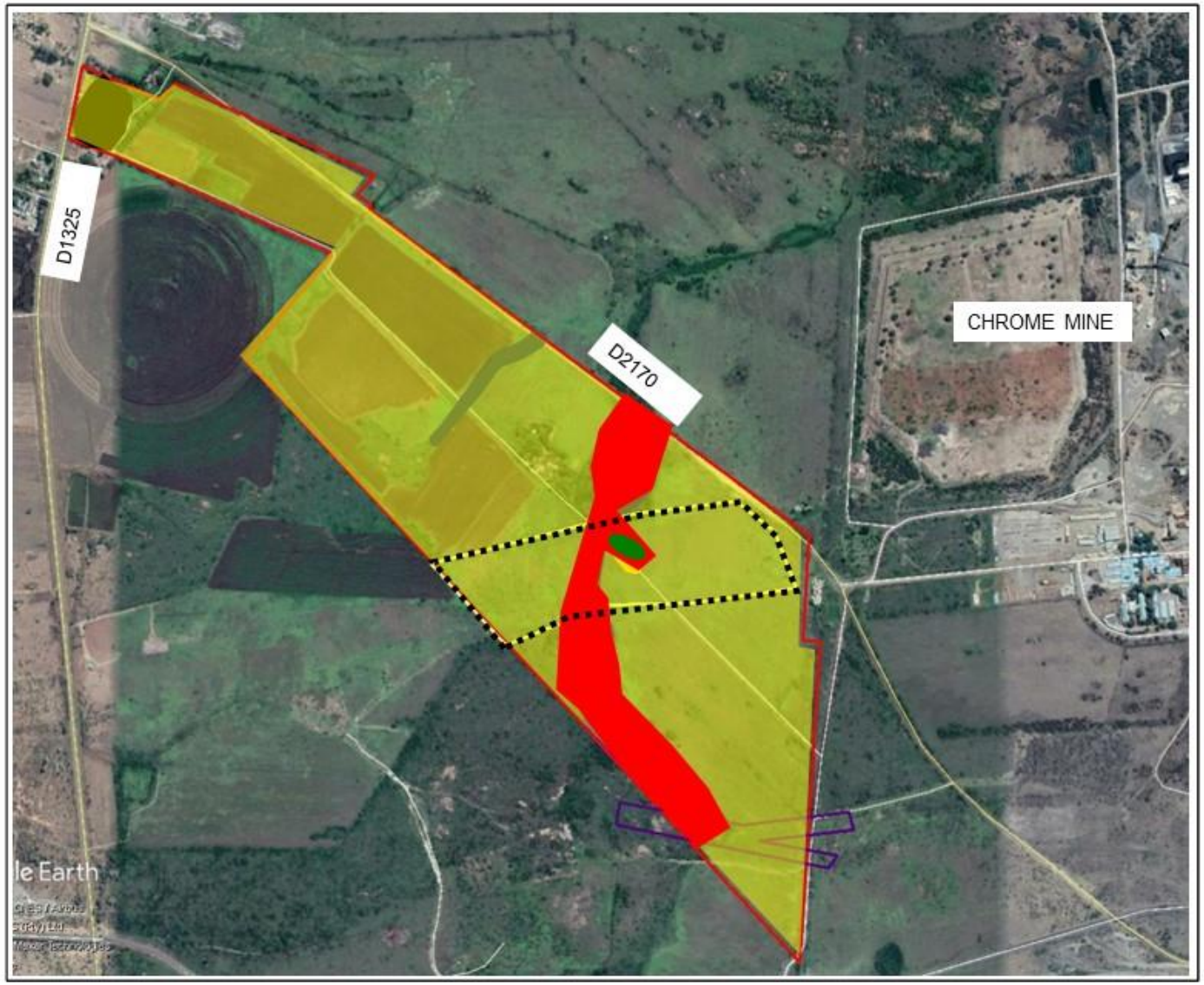
The property mostly does not experience any problems relating to safety and security.

4.6 Site Sensitivity

A composite plan containing all the sensitivities of the site has been compiled, and is shown below and contained in **Appendix 15: Composite Sensitivity Plan**

It is noted from all studies undertaken that the site is not considered to have any features or elements of significance or importance, except for some small rocky outcrops and for the watercourse and its riparian zone, although these areas too have been highly impacted and disturbed from the previous open cast mining activities. The watercourse should be protected and rehabilitated, due the value it serves in hydrological functioning and control and management of stormwater. Furthermore, it can provide an attractive open space area through the development for low scale, low impact recreation activities and leisure. The grave site is also to be retained.

SENSITIVITY PLAN: VARIOUS PORTIONS OF THE FARM ROOIKOPPIES 297-JQ



Legend

- The Site
- High sensitivity
- Low sensitivity
- Rehabilitated open cast mine area
- Graveyard
- Powerline servitude

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Date: 2018-03-19

N
W
E
S

0 350 metres 700m

SEATON THOMSON & ASSOCIATES

5. LEGISLATION, POLICIES & GUIDELINES

5.1 The South African Constitution Act 108 of 1996

The Constitution is the supreme law of South Africa against which all other laws in South Africa are measured. Laws in conflict with it are considered invalid. It protects certain fundamental rights, which are, however, not absolute and may be limited "*in terms of law of general application to the extent that the limitation is reasonable and justifiable in an open and democratic society based on human dignity, equality and freedom*" (Section 36)

One such fundamental right (Section 24 of the Act) provides the basic framework for all environmental policy and legislation and it states

"Everyone has a right –

a) to an environment that is not harmful to their health or well-being; and
b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –

    (i) prevent pollution and ecological degradation
    (ii) promote conservation; and
    (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

Although an activity may be allowed in terms of an Act of parliament or a permit issued under a statute, it may still be declared unlawful if it is harmful to human health or well being

5.2 National Environmental Management Act 107 of 1998

The National Environmental Management Act (NEMA) provides for co-operative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-coordinating environmental functions exercised by organs of the State and to provide for matters connected thereto. Section 2 of the Act establishes a set of principles, which apply to the activities of all organs of State that may significantly affect the environment, which include the following:

- development must be sustainable
- pollution must be avoided or minimised and remedied
- waste must be avoided or minimised, reused or recycled
- negative impacts must be minimised
- responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its life cycle

These principles are taken into consideration when a government department exercises its powers, for example, during the granting of permits and the enforcement of existing legislation or conditions of approval.

Section 24 provides that all activities that may significantly affect the environment and require authorisation by law must be assessed prior to approval

In addition, it provides for the Minister of Environmental Affairs and Tourism or the relevant MEC to identify:

- new activities that require approval
- areas within which activities require approval and
- existing activities that should be assessed and reported on

It also provides for the Minister to make regulations with respect to the manner in which investigations should occur.

Section 28(1) states that "every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring." If such pollution cannot be prevented then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- assessing the impact on the environment
- informing and educating employees about the environmental risks of their work and ways of minimising these risks
- ceasing, modifying or controlling actions which cause pollution/ degradation
- containing pollutants or preventing movement of pollutants
- eliminating the source of pollution and
- remedying the effects of the pollution

The authorities may direct an industry to rectify or remedy a potential or actual pollution problem. If such a directive is not complied with, the authorities may undertake the work and recover the costs from the responsible industry.

Relevance to the application
This activity is listed for development under the current 2014 Environmental Impact Assessment Regulations (and 2017 Amendments) of the National Environmental Management Act (NEMA) (Act 107 of 1998). The application will involve a number of listed activities, which are outlined earlier in the report.

The applicant will ensure that all requirements of NEMA are conformed with. The applicant is obliged under Section 28 to take actions to prevent pollution or degradation of the environment.

5.3 The National Heritage Resources Act 25 of 1999

The National Heritage Resources Act controls the protection and management of South Africa's heritage resources. The enforcing of this act is the South African National Heritage Resources Agency (SAHRA). In terms of the Act, historically important features such as graves, trees and the fossil beds of an area are protected. Similarly, culturally significant symbols, spaces and landscapes are also afforded protection.

In terms of Section 38 of the National Heritage Resources Act, SAHRA can call for an impact assessment. However, the Act also makes provision for the assessment of heritage impacts as part of the EIA process. It indicates such an assessment (as part of an EIA) is deemed adequate and as such, a separate Heritage Impact Assessment (HIA) is not required.

Relevance to the application
Specialist site investigations have indicated that there are generally no features of cultural and historical importance, apart from an important historic cemetery, which will be retained in the development layout.

5.4 National Water Act 36 of 1998

Water use is controlled by the National Water Act and the enforcing authority if the Department of Water Affairs (DWA).

The National Water Act recognises that water is a scarce resource in South Africa and its provisions are aimed at achieving sustainable use of water to the benefit of all users. The provisions of the Act are thus aimed at discouraging pollution and waste of water resources.

In terms of the Act, a land user, owners or occupier on whose land an activity occurs which causes or has the potential to cause pollution from occurring. Non-compliance with this provision constitutes a criminal offence.

Water use can be specifically defined in the Act and can be broadly summarised as the abstraction, consumption and discharge of water. Use of water includes:

- abstraction of water from either the ground water or from surface water
- the discharge of water containing waste into a water resource and
- impeding or diverting the flow of water in a water course

Unless authorised by a General Authorisation, a license is required to use water in this manner.

In terms of discharging water containing waste to a water resource, a General Authorisation is applicable when

- it conforms to a required standard
- the volume is less than 2000m³/ day and
- the discharge is registered with the Department of Water Affairs and Forestry (DWAF)

In addition, irrigation of any land with water containing waste is a controlled activity and a Water Use License is required unless authorised by a General Authorisation.

Should any activities, structures or infrastructure cross into any watercourse, a Water Use Licence must be applied for, which is obtained from the Department of Water and Sanitation (DWS). Water use for “non-consumptive use” such as the building of a bridge or laying of sewer pipe in a watercourse may be covered under

a General Authorization, depending on the risk posed to the watercourse and catchment. Therefore, a separate water use risk assessment and then potential a water use licence application may need to be undertaken.

Relevance to the application
The site is affected by a watercourse and with development occurring on the site, and especially roads and services traversing the watercourse, it is more than likely that a water use license will be required, for traversing the stream, as well as for the discharge of treated water from the waste treatment facility.

5.5 National Forests Act 84 of 1998

The purpose of the National Forest Act is primarily to promote the sustainable use of forests (whether indigenous or plantation forests) to the benefit of all South Africans. Of particular relevance is the protection of indigenous trees and natural forests as set out in Chapter 3: Special Measures to Protect Forests and Trees.

According to the act, no person may cut, disturb, damage or destroy any indigenous tree in or remover or receive any such tree from a natural forest or protected forest areas, except in terms of a license issued by the Minister. The Act also gives power to the Minister to declare any single tree, group of trees, woodland or certain tree species as protected.

Relevance to the application
The site has no remaining indigenous vegetation that is protected by this Act.

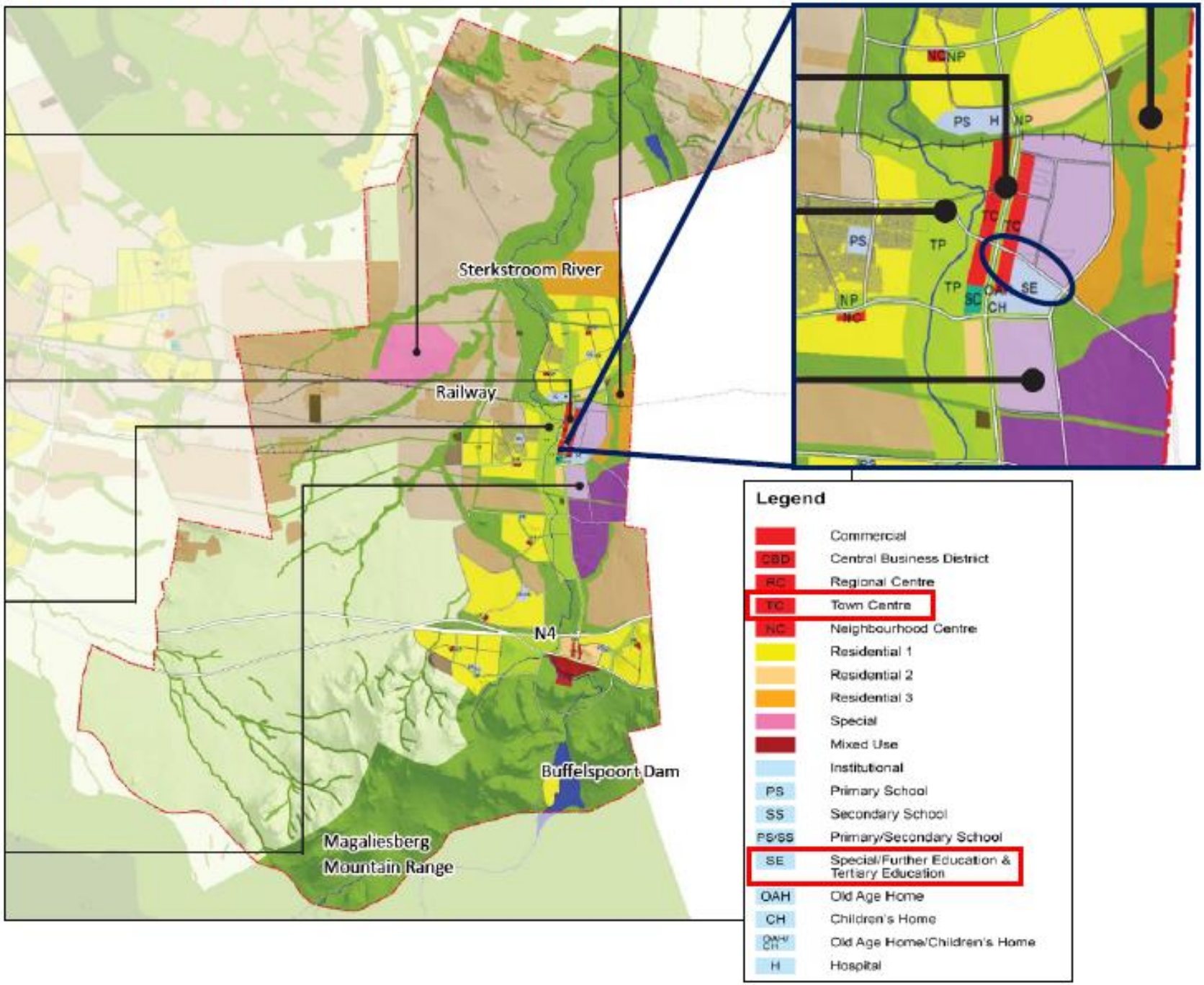
5.6 Integrated Master Plan for Rustenburg Local Municipality, 2015

The proposed township falls within the South East Planning Area which is depicted as the “Rapid Growth Area” by the Rustenburg Local Municipality. The area has been prioritised for urban growth and expansion due to the proximity to Rustenburg City, major transportation routes connecting Johannesburg and Pretoria, and accessibility to the Platinum Mining Belt. The western portion of the site is earmarked as a new town centre. The aim of the new town centre will be an integrated retail, service and public transport centre that will facilitate the development of Marikana Residential and Industrial township.

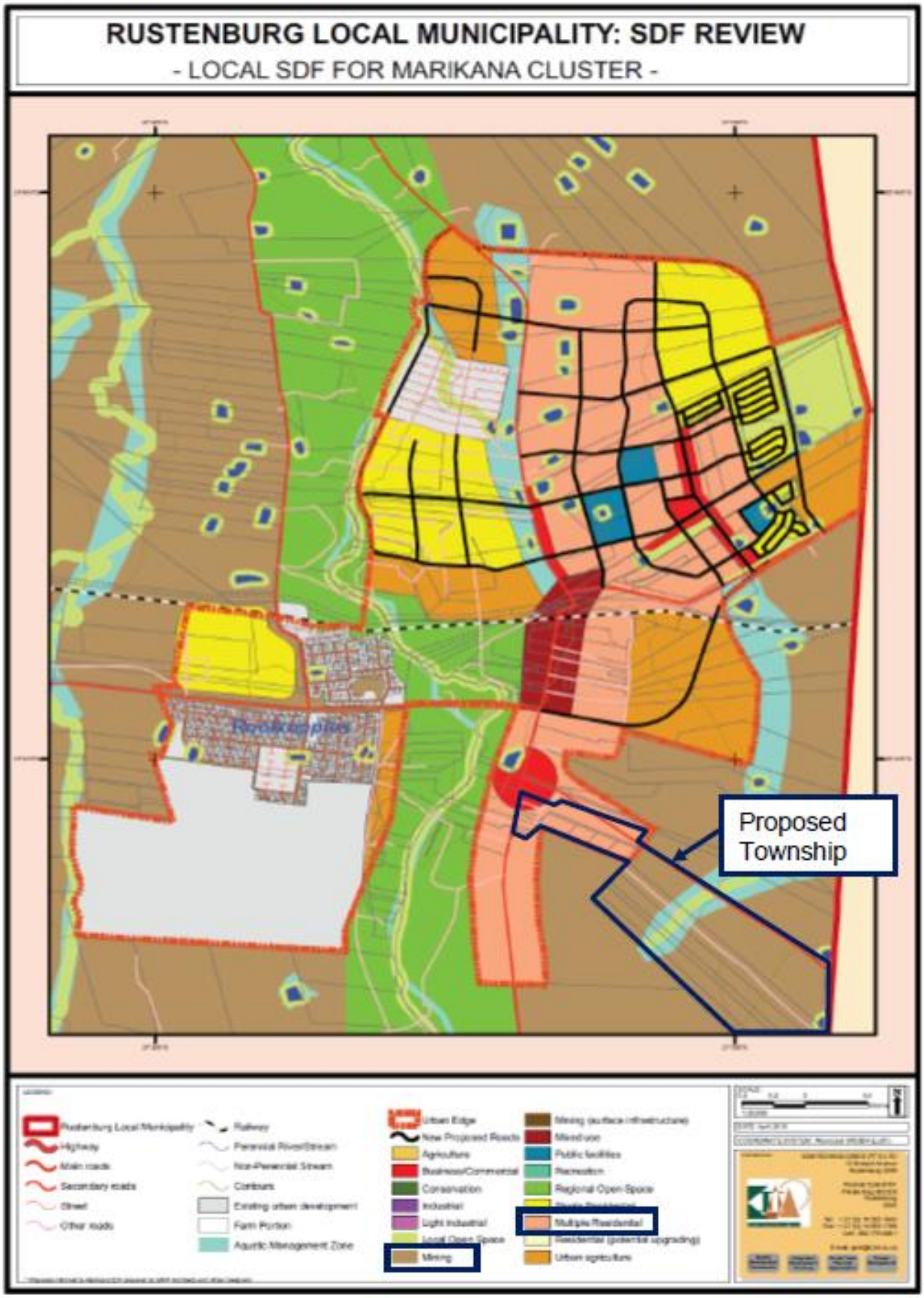
5.7 Rustenburg Local Municipality Spatial Development Framework, 2010

The western portion of the site falls within the Urban Edge and is earmarked for “Multiple Residential”, the remainder of the site is located in a “Mining” area.

Extract from the Integrated Master Plan for Rustenburg Local Municipality, 2015



: Extract from the Rustenburg Local Municipality: Spatial Development Framework, 2010 indicating the Marikana / Rooikoppies cluster.



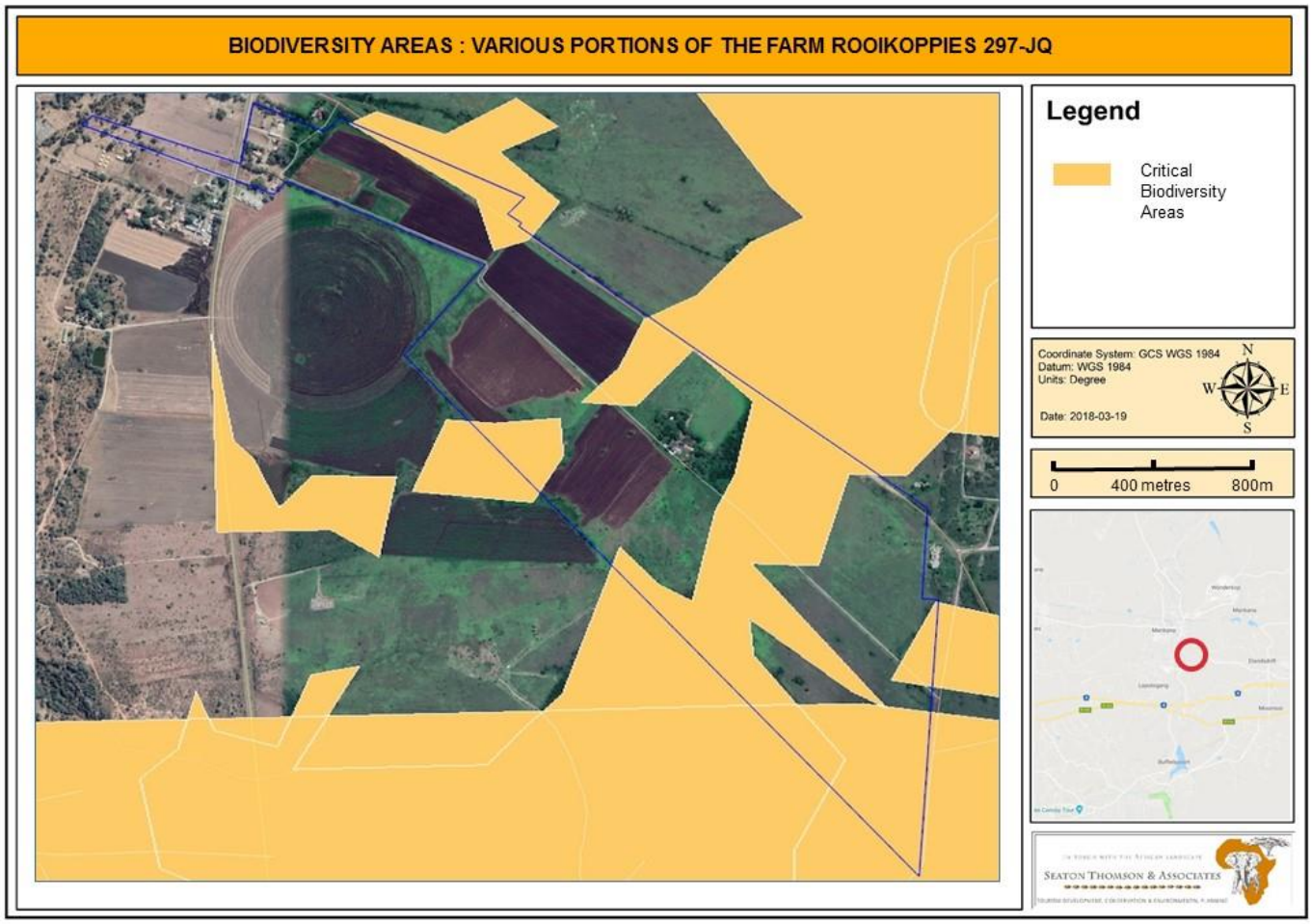
5.8 The North West Biodiversity Sector Plan

The North West Biodiversity Sector Plan (NWBSP) classifies the province according to conservation value in decreasing value, as follows

1. Protected Areas
2. Terrestrial Critical Biodiversity Area Level 1
3. Terrestrial Critical Biodiversity Area Level 2
4. Terrestrial Ecological Support Areas Level 1 and Level 2
5. Other Natural Areas

According to the NWBSP, there are patches on site that fall within CBA 2. The CBA 2 areas are remnants of Marikana Thornveld.

Based on the Provinces Plan, it can be interpreted that most of the remaining vegetation on site is not considered to be important for the conservation of biodiversity in the province, with the exception of any small patches of natural habitat within Marikana Thornveld.



6. PUBLIC PARTICIPATION PROCESS

The public participation process (PPP) is a vital component of the overall Scoping and Environmental Impact Assessment process, and is therefore, critical to the success of the project. ***The purpose of the PPP is to ensure all the views and concerns of interested and affected parties (I&APs) are identified, recorded and addressed during the process***. The PPP is of further importance, as issues are raised by I&AP's that have local and specialist knowledge of the area and of the site.

The PPP to date is set out below, with a full copy of all the public participation process contained in **Appendix 16: Rooikoppies Public Participation Report**.

6.1 Identification of Stakeholders

Stakeholders were identified including relevant government organisations, conservation bodies, NGO groups, local business, etc. A list of the I&AP's forming the initial database, is included in **Appendix 16: Rooikoppies Public Participation Report**Appendix 16: Rooikoppies Public Participation Report**.**

It should also be noted that stakeholders in terms of intended beneficiaries to the housing in the development form of a separate community facilitation process, which has been ongoing for a considerable period of time. Details on this are contained in **Appendix 13: Community Survey Report**

In order to comply with both the legislation the following was undertaken and which is contained also contained in **Appendix 16: Rooikoppies Public Participation Report**

- A notice was published in two local newspapers
- Registered notices were posted to the identified IAP's, as well as surrounding land owners and copies of these letters distributed is contained in the Appendix
- Email notifications were sent to those I&AP's for whom such addresses were available.
- Site notices were posted on the site
- All the notices advised I&AP's that they had 30 days in which to register as an I&AP with the environmental consultant. Submissions made by I&AP's are provided. Certain interested parties did respond and their details have been recorded in a register
- A summary of Issues Raised by I&AP's during the registration and also during both the Draft and Final Scoping Reports phase are tabulated in a Comments and Responses Report, also contained in **Appendix 16: Rooikoppies Public Participation Report.**

6.2 Draft and Final Scoping Reports

Registered IAP's, were notified of the availability of both the Draft and Final Scoping reports and the time within which they have the opportunity to submit further comments and concerns once they have reviewed the reports. Copies of the notices distributed to the I&AP's are in **Appendix 16: Rooikoppies Public Participation Report**

After completion of the public review period within which interested and affected parties had the opportunity to review the Draft Scoping report, the final scoping report was circulated to I&AP. Registered I&APs were notified that the final report was submitted to the competent authority. It was made clear to the I&APs that any additional comments on the FINAL Scoping report must be submitted directly to the competent authority, with a copy to the environmental consultant, as indicated in Regulation 56(6).

It is pointed out that the comment period of the Final Scoping Report was affected by the National Lockdown and regulations promulgated in terms of the Disaster Management Act required that, in these circumstances, extensions of time to comment must be provided. The consultant duly provided notice that the public review and comment period for the Draft Scoping report was extended.

Comments that were received in response to the circulation of both the DRAFT and FINAL Scoping Reports are contained in **Appendix 16: Rooikoppies Public Participation Report**

6.3 Draft Environmental Impact Assessment Report

Since the authorities have provided approval of the Scoping report, a copy of which is contained in **Appendix 16: Rooikoppies Public Participation Report**, the Draft Environmental Impact Assessment report has been prepared, addressing the issues contained in the Plan of Study. This is to be made available to the interested and affected parties for review and further comment.

This report serves as the draft Environmental Impact Report (EIR), which reports on the actual environmental impacts of the proposed development, and the various management and mitigation measures that should be put in place to deal with those various impacts. This draft EIR is then be made available to the interested and affected parties for review and further comment.

6.4 Final Environmental Impact Assessment Report

Once the draft report has completed its circulation period with registered and interested parties, it will be updated, revised and finalised with comments from I&AP's, then recirculated to interested parties and lodged with the authorities. That report will then be the FINAL environmental impact assessment report to be circulated to I&AP's and officially lodged with DEDECT.

7. ASSESSMENT OF POTENTIAL IMPACTS

7.1 Summary of Key Issues

In summary the following conclusions were drawn from the specialist studies undertaken for the Environmental Impact Assessment:

The Proposed Development

- This site has major importance and significance in terms of the ***objectives*** for its development, being for the resettlement of the Mmwaditlhokwa and Lapologang communities, due to their planned and imminent mining activities in the area where these communities are currently located.

- The intent is to establish a formal living environment, to include not only a wide range of residential uses and options, but also to provide all associated community facilities and amenities, such as schools, shops, churches, some business stands, recreation areas, etc. All services and infrastructure will be provided in the development

- It is noted that formal, essential services and infrastructure mostly exist and can be provided with extensions and upgrades.

- The overwhelming key issue, therefore, is one of social significance.

Geology, Soils and Mining

- The geotechnical report notes that there are no problems associated with collapse potential, but that there may be problems associated with heaving within the potentially expansive silty CLAY.

- Of greater significance is the impact of mining, specifically the area of ±20 hectares that was transformed for the purposes of by open cast mining, but was subsequently rehabilitated. The long term potential exists to develop this area of land, once it is appropriately rehabilitated and stabilized for development purposes. This has been indicated as Phase 2 of the development process.

- The agricultural potential of the site has been shown to no longer be viable or economically feasible due to the combined loss of land to mining activities, theft of crops and equipment, burning of crops, inadequate rainfall, contaminated ground and surface water, amongst others.

Vegetation

The specialist vegetation survey notes the following

- The majority of the site is significantly ***impacted by disturbances***, which have resulted from open cast mining, extensive long term agricultural activities and cattle grazing, wood harvesting, etc. This has resulted in little, if any, remaining natural habitat, including a damaged and highly altered watercourse.

- It is also noted that are only remnants of the natural vegetation that can be retained in open spaced area, but generally the long term sustainability of the

habitat on the site is low and based on the aforegoing, the habitat has low sensitivity.

Wetland/ Watercourse
The specialist wetland survey notes the following

- Assessment of the condition of the wetland and associated riparian zone reveals its extreme damage, disturbance and alteration, due to not only past agricultural activities, but more specifically, historic open cast mining activities. It is, as such, no longer in its natural state

- However, the riparian habitat on site can be considered important from both a functional and conservation perspective and should be properly managed and prevented from deteriorating further

- The watercourse itself also has value in terms of its hydrological functioning, for the management of natural stormwater runoff, control of erosion, control of water quality and for reestablishment of ecological and habitat diversity.

- The watercourse, riparian area and a buffer serves as an important open area for low impact recreation leisure to future communities.

Fauna
The site is essentially devoid of any faunal species due to the long term agricultural and mining activities.

Air Quality and Health Impact
The specialist air quality survey notes the following

- The proposed residential development is situated in close proximity to numerous mines, not unlike the entire Marikana settlement area. It is noted that the general ambient conditions in the area are poor and results indicate that from time to time the regulated levels are being exceeded.

- The report notes that there are a wide range of diverse potential health risks associated with residing in close proximity to the mining areas.

- Nevertheless, the specialist recommends that a climate control system with a filter as part of the building design should be considered, as well as other mitigation measures be implemented to assist in mitigating and alleviating these conditions.

Socio-Economic Assessment
- This has been determined to be the most highly significant matter of the project, particularly as the intent of the entire project is to accommodate and resettle existing distressed communities, due to the planned and imminent extension of mining activities in the area where these communities are currently located

- This application is intended to resolve these circumstances and to establish a formal living environment, to include not only residential uses, but all associated

community facilities and amenities. A full package living environment is to be created for the relocated communities

- The development will also result in a major positive economic investment in this area, particularly as the land in its current state provides little investment or value as the agricultural activities have proved unfeasible. The development will also result in a major positive investment in this area in terms of structures and infrastructure

Cultural and Heritage Assessment
The specialist heritage survey notes the following

- The only site of any cultural heritage significance was a **Grave Site** containing a number of unknown stone-packed graves. There are around 20 graves on site, with none of them having any formal The site has been demarcated with large boulders forming a boundary, and the client has indicated that they are prepared to exclude the site from their development and preserve it in situ

Summary of Key Issues
Arising out of the above, the significant key issues and potential impacts as identified and assessed in this Environmental Impact Report include:

- The overall objective of the project, for the purposes of relocating and settling distressed communities affected by mining activities, has ***high significance***

- The availability and provision of infrastructural services, whilst present in the area, require further investigation and are assessed to be of ***medium significance***

- As it has been shown that agricultural activities are no longer viable or economically feasible on the site, loss of the land for this purpose is considered to be of l***ow significance***

- The rehabilitated open cast mining area may require further engineering works to ensure it can become available for Phase 2 of the development and should be considered of ***medium significance.***

- Due to there being little remaining natural or indigenous habitat, loss of further vegetation is considered to be of l***ow significance***

- Additional loss of wetland and impacts to the riparian area has been determined to be of a ***high significance,*** including management of stormwater

- Due to there being little remaining evidence of faunal species on the site, loss of further habitat is considered to be of l***ow significance***

- As the overall objective of the project, is to relocate and settle distressed communities, the socio-economic issues of the project, have ***high significance***

- General cultural and heritage issues are of a low significance, but preservation protection of the grave site has ***high significance.***

7.2 Impact Assessment Methodology

An assessment of the potential impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure, contained in the DEAT Guideline Document. This method provides for an assessment in terms of Nature of the impact, extent, duration, intensity, probability, mitigation, enhancement, reversibility and the determination of significance of the impacts.

The Impact Assessment Methodology is contained in **Appendix 17: Impact Assessment Methodology**

The following characteristics have been identified to assist the assessment of the potential impacts on the surrounding environment:

- ***Nature*****:** which shall include a description of what causes the effect, what will be affected and how it will be affected;
- ***Extent*****:** wherein it will be indicated whether the impact will be local, limited to the immediate surroundings or regional;
- ***Duration*****:** wherein it will be indicated whether the lifetime of the impact will be short, medium, long term or permanent;
- ***Intensity*****:** Is the impact destructive, or benign. Does it destroy the impacted environment, alter it's functioning, or slightly alter it
- ***Probability*****:** which shall describe the likelihood of the impact actually occurring, indicated as improbable, probable, highly probable or definite;
- ***Mitigation*****:** (for a negative impact): is about eliminating, minimizing or compensating for negative impacts
- ***Enhancement*****:** (for positive impact): magnifies the benefit of the project
- ***Reversibility*****:** considers to what extent a negative impact can be reversed
- ***Significance*****:** which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high;
- ***Cumulative Impacts:*** Cumulative impacts result in an additive impact where they add to the impact which is caused by other similar impacts, or an interactive impact i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact

7.3 Impact Assessment

7.3.1 Impact on Physical Nature of the Land - Impact Statement

The development will have an impact in terms of changing the physical land form, its character, visual nature and function of the land, by changing its image, loss of openness, use and appearance.

Description of the Impact

Construction phase

During construction, it will be necessary to clear, level and transform a large area of the site for where the development footprint will be placed. It will also be necessary to stockpile building materials. The major impacts resulting from these activities, is potential soil erosion, dust and increased water runoff, noise and nuisance. There will also be impacts from increased construction traffic, contractors and workers. As the site is almost entirely surrounded by open land and mining activities, impacts and significance to the surrounding areas will be relatively low. Impacts during the construction phase have a high significance, as the transformation will completely and permanently alter the physical character of the property.

	Impact Changed physical nature of the land					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Construction	Clearing, levelling, building	Local	long	High	Definite	High

Operational Phase

During the operational phase of the activity, there will be a changed visual, physical and functional use of land, increased hard surfaces, loss of open land, increased traffic and human presence in the area and a general increased urban footprint. As the site is almost entirely surrounded by open land, the impacts during this phase are of a medium level of significance during the operational period.

	Impact Changed physical nature of the land					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Operation	New residential development	Local	Long	High	Definite	Medium

Significance

The construction and operational elements of the development will have definite, long term significance on the site and on the immediate surrounding areas, during both construction and operational phases. This will be in terms of the changed visual, physical and functional use of the land, with increased hard surfaces, loss of open land, increased traffic and human presence in the area and a general

increased urban footprint. A high (for construction) and medium (for operational) rating is provided, due to the scale of the project and that, in the long term, the implementation of the full development, will result in a considerable transformation of land. It will however, have a low significance on adjoining land, due to its relative "isolation" from other developments and the site being almost entirely surrounded by open land and mining activities.

Management and Mitigation Measures
Due to the very large size of the physical footprint of this development and its associated components, it cannot be easily mitigated in its entirety during the construction and operational phases. The nature of the activities associated with a development of this scale is that it will result in a changed physical appearance and functioning of an area. Mitigation of the total development is significant and, therefore, not possible, to mitigate in its entirety, but mitigation measures can rather be provided for ***individual components*** of the activities, such as for the management of stormwater runoff etc. The various issues will be dealt with in the following relevant sections

Practical mitigation measures are set out in **Appendix 18: Environmental Management Plan**

7.3.2 Impact of Physical Infrastructure – Bulk Services – Impact Statement

Most bulk service infrastructure is existing in the surrounding area for the development to connect into. The implementation of the development will include the provision of new and additional services, which will contribute to uplifting and improving the servicing of the area generally.

Description of the Impact
Construction phase
The construction and installation of any new and additional bulk and internal services will have definite, long term, but a highly (positive) significance on the provision of service infrastructure in the area generally, arising from the need to implement all internal services within the development. Integral to the establishment of the land uses contained in the development, is the provision of roads, water, sewerage and power, which will be implemented as the development is phased in.

The specialist services report addresses both water and sewerage provision and it is noted in respect of the provision of water that, Rand Water is supplier to the area with the nearest connection ±9 000 metres from the site on the western side of the Sterkstroom. Whilst this supply is currently not immediately or directly available to supply the site, upgrades and improvements to the supply will be undertaken prior to activity commencing on the site.

In respect of sewerage the report notes that there is no sewerage treatment or outfall sewer in close proximity to the site, the nearest Wastewater Treatment Plant (WWTP) identified is located at Wonderkop, ±5km from the proposed development. Recommendations on the installation of a package plant have been made and this has been opted as the best solution until bulk connections are

installed in the future and the applicant has undertaken to provide this. Several package treatment technologies exist for the treatment of domestic wastewater in SA and the most common types installed in is an activated sludge/extended aeration plant. The engineers are in the process of further investigating and obtaining relevant further information, volumes and capacities to determine the availability of infrastructure and/ or package plant types to accommodate the needs and demands of the new development

Installation of both the water line and sewerage treatment plant can be expected to have significantly high impacts, due to land clearing, excavation and earthworks. The treatment plant is located at the lowest point on the site, so close to the watercourse and riparian zone, so significance is high and it will be critical to ensure controlled and monitored implementation, as set out in the EMP.

Occupation of the site in phases will only be possible once services have been installed in phases. The impact during construction should not negatively impact on any inhabitants, as it is a greenfields site and almost entirely surrounded by open land. There will, however, be some nuisance, disturbance and noise to certain existing adjoining areas, closest to the phase under construction, during the implementation of the services

	Impact Provision of new and additional services					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Construction	New services in the area	Local	Medium	High	Probable	High

Operational Phase

During the operational phase of the activity and as the various phases are implemented and phased into operation, the volumes and flows will increase, thus optimising the services in the area as they are implemented. The presence of services will be a highly positive contribution to the area and to the development during the operational phases. Significance is highly positive during this long term operational period, as once the services are installed in the early phases of the development, any construction impacts will cease.

Impacts during the operational aspects of the sewerage treatment plant must be considered to be of a high significance, due to the ongoing need to monitor, maintain and service the plant, as necessary, due to the potential for leakage and spillages of sewage and to ensure acceptable water quality standards are met for water released into the environment. Specific measures are contained in the EMP.

	Impact Provision of new and additional services					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Operation	New services in the area	Local	Long	High	Probable	High (positive)

Significance
The provision of all bulk and internal services of the township have a high, but positive significance to both the development, the site and the wider area, as it will ensure the minimisation of any pollution and the efficient functioning of the development during the operational period. The significance of attention to the sewer treatment plant will require constant attention, monitoring and maintenance to ensure discharge meets required standards and is effectively recycled for irrigation purposes on open spaces and gardens and that there are no leakages or breakages that spill into the watercourse. A water use license will need to be obtained for this activity.

Management and Mitigation Measures
Management and mitigation measures should include the following

- Ensure that the provision of all services (water and sewer) is in accordance with Council requirements and accommodates the needs of the site
- That any amendments, upgrading or changes to the infrastructure are approved by the relevant Councils and as contained in the specialist engineering report on water and sewerage
- Ongoing monitoring and maintenance of the sewer treatment plant, to ensure discharge meets required standards and is effectively recycled for irrigation purposes on open spaces and gardens and that there are no leakages or breakages that spill into the watercourse
- Regular water monitoring testing to be done to ensure water quality standards are met.

Practical mitigation measures are set out in **Appendix 18: Environmental Management Plan**

7.3.3 Impact of Surface/Stormwater Runoff - Impact Statement

The development will have an impact on the biological conditions of the area in terms of increased water/ stormwater runoff and potential increased surface and ground water pollution, impacting on the watercourse.

Construction phase
During construction, with the clearing of the site, there will be the potential for further increases in stormwater runoff and potential water pollution, which can cause erosion, impacting on the watercourse and adjoining properties. It is essential that pre-construction resolutions and mediation measures are in place prior to work commencing on site, so that the situation will be limited and controlled to manageable levels. In particular, the design and implementation of a natural

sustainable urban drainage system (SUDS), including attenuation facilities, throughout the development, is strongly recommended, to ensure control and management of water flow ***before*** it is released into the watercourse.

	Impact **Increased runoff, erosion and water pollution**					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Construction	Erosion & pollution of water	Local	medium	Medium	Probable	High

Operational Phase

During the operational phase of the activity, there will be an ongoing increase in stormwater runoff and potential water pollution, which has potential for negative impacts on the watercourse and adjoining properties, unless there is the prior implementation of a SUDS stormwater management plan and attenuation facilities. It will be imperative that the management of the stormwater is fully in accordance with the requirements of the Council, as well as in terms of the conditions laid down in an approved Services Report. Recommendations for the management and control of stormwater with the provision of attenuation facilities, discharge infrastructure, etc. are contained in the EMPr.

The layout of the proposed development should make provision for stormwater attenuation areas to be located in the lowest areas of the site, which accumulate runoff of the site, which will be in close proximity to the riparian zone, preferably in the buffer area. The applicant is encouraged to implement other sustainable urban drainage mechanisms throughout the development, to further manage water collected both on the site. It is recommended that various sustainable stormwater management principles and an engineering Stormwater Management Plan must, as far as possible, be implemented on the site

A number of source, local and regional SuDS controls are proposed for this particular development, which could include, but are not limited to Source controls: Rainwater harvesting; stone filled soakaways, Permeable brick paving for internal roads; Grass block pavers for all parking areas. Local controls: Bio-swale. Regional controls: detention pond

	Impact **Increased runoff, erosion and water pollution**					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Operation	Erosion & pollution of water	Local	Long	Medium	Probable	Medium

Significance

The significance of the impact is expected to be of a high during the construction phase, due to initially being no control measures in place and due to the scale of the development, but with mitigation and the early implementation of stormwater control measures, attenuation and discharge infrastructure as will be proposed in a stormwater engineering report and in accordance with the requirements of the Council, the significance of the impact can be significantly controlled and mitigated.

This is primarily due to the fact that stormwater will be attenuated within detention ponds, the streets, parking areas, open space areas and collected in planned and designed stormwater attenuation facilities, in accordance with the standards and approvals of the relevant authorities. Furthermore, retention and maintenance of the attenuation facilities will contribute positively to the retardation of runoff, prevention of erosion and protection of impacts on the downstream areas and in the watercourse / riparian area. Control mechanisms will also prevent the spread of pollutants, although this is expected to be negligible.

Management and Mitigation Measures
Management and mitigation measures should include the following

- The early installation of stormwater attenuation facilities and stormwater water pipes during construction, will alleviate the potential for runoff and erosion on site.
- All cement or mortar mixing shall be done in already impacted areas, and on trays or sealed areas, to prevent any water pollution. All excess cement must be disposed of off site, at a registered land fill site that accepts discard cement.
- During the operational phase of the township, stormwater to be collected in the internal stormwater system on the site and attenuated in the stormwater ponds, which should be landscaped and regularly maintained
- Other measures for sustainable urban drainage stormwater management systems should be considered for installation and include water harvesting, recycling of grey water, permeable brick paving for internal roads; Grass block pavers for all parking areas, Bio-swales, grass-lined channels, stone filled infiltration ditches, etc
- The Contractors shall take all reasonable measures to ensure that erosion does not occur as a result of any construction related activities. Measures such as cut off trenches, sand bags, haybales and berms must be installed in areas where erosion has or is predicted to take place. This must be done in conjunction with ECO and managed accordingly
- Soil is to be stockpiled around the sides of the site and on the higher ground so that it does not wash away off the site during heavy storms
- Ongoing management and maintenance of the stormwater facilities must be undertaken to prevent blockages, flooding, etc
- Stormwater management must comply with the Local Authority stormwater bylaws and aim to minimise the generation of surface runoff with the adoption of, as far as possible, the principles of WSUDS and SUDS practices, as set out above.

Practical mitigation measures are set out in **Appendix 18: Environmental Management Plan**

7.3.4 Impact on Ecological Processes, Habitat and Biodiversity – Impact Statement

The development will have a potential impact on loss of natural habitat, the ecological diversity on the site, the presence of any faunal populations on the site and the functioning of the watercourse.

Description of the Impact
Construction phase
The construction activities for the development will have definite, long term, but a low significance on loss of flora on the site. This is based on the current long term state of transformation on the site itself, arising from agricultural and farming activities, as well as open cast mining (which has now been rehabilitated), all of which have already caused detrimental impact to the status of the vegetation on the site.

The specialist vegetation survey notes a few small areas of vegetation that have value to be retained in the open space system on the site, including the watercourse through the centre of the site. The long term sustainability of the habitat on the site, is however, low and based on the aforegoing, the habitat has low sensitivity.

The watercourse has been determined to have been significantly impacted from long term mining activities in the catchment, as well as by agricultural uses and the open cast mining. The biodiversity of the riparian area, therefore, is low, but the hydrological importance of the watercourse is high. Construction activities in this area, therefore, must be considered as highly significant

	Impact **Loss of ecological diversity on site and watercourse**					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Construction	Loss of ecological attributes	Local	medium	Low	Probable	Low – vegetation High - watercourse

Operational Phase

During the operational phase of the activity, there will remain a loss of habitat with a changed functional use of land with increased hard surfaces. Remaining areas that can be maintained as naturally as possible and the watercourse and a buffer would be areas set aside for the attenuation of stormwater and a SUDS approach has been recommended for these areas, in an attempt to create some natural habitat, wherever possible. Measures should include recycling of grey water, permeable brick paving for internal roads, grass block pavers for all parking areas, Bio-swales, grass-lined channels, stone filled infiltration ditches, etc, to encourage the establishment of even small habitats where ever possible.

	Impact **Loss of ecological diversity on site and watercourse**					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Operation	Loss of ecological attributes	Local	Long	Low	Probable	Low – vegetation High - watercourse

Significance

The physical size and footprint of the long term development and the individual components will result in the total transformation of the site. Assessment of the habitat and status of the vegetation by the specialist has indicated that this loss will be of a low significance, due the nature and status of the transformed surrounding area, size of the site, lack of linkage and connectivity to other areas. The watercourse, however, has high significance due to it's hydrological properties and role in the management of stormwater.

Management and Mitigation Measures
Development of the site for the intended purposes will result in a loss of vegetation, albeit not significantly due to the long term use of the site for agricultural and the open cast mining. To overcome this loss, it is recommended that the developer and future owners within the development undertake various measures to endeavour to re-establish as much natural vegetation as possible, through landscaping, pavement planting, etc

Management and mitigation measures should include, but not be limited to the following

- Landscaping within the riparian zone and protective buffer should comprise of species indigenous to this habitat
- Landscaping within the development should be all indigenous and large trees should be planted as soon as construction of roads and services is complete
- Limited irrigation through water-wise gardening (use local plants adapted to local conditions).
- Rainwater harvesting should be undertaken and used for garden watering
- Strict fertiliser, pesticide and herbicide control (limited usage of biological friendly products).
- Reduction of weeds and erosion control by minimum tillage gardening practices (use of groundcovers and mulching).
- Strictly monitor for emergence of any exotic/invasive plants within the development, on the outside fringes of the development and along all road – particularly during early spring and summer.
- Remove all exotic and invasive plants in the area (as required), as well as within the road reserves.
- Hydroseed any open areas devoid of vegetation.
- All invasive weeds and exotic plants on the site are to be identified and removed during the construction phase of the project.
- According to the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared aliens that occur on the property must be effectively controlled. In terms of this Act 198 alien species were listed as declared weeds and invaders and ascribed to one of the following categories:

Category 1: Prohibited and must be controlled.
Category 2: (commercially used plants – i.e. the Eucalyptus trees): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
Category 3: (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within flood lines of watercourses and wetlands

Practical mitigation measures are set out in **Appendix 18: Environmental Management Plan.**

7.3.5 Impact on Geological Conditions and Geohydrology – Impact Statement

The development could potentially affect or be affected by the nature of geotechnical and geohydrological conditions, resulting in risks and hazards to the development and future occupants of the site.

Description of the Impact

Construction phase

From a macro point of view, the majority of the site is underlain by potentially expansive highly to completely weathered, silty clay with scattered coarse grained sand in profile, residual norite, which in turn is underlain by fine to medium grained silty and gravelly SAND, interspersed with silty clay lenses over the upper reached in places, residual norite and ultimately by very soft rock and harder norite bedrock with depth.

There are no problems associated with collapse potential foreseen for this development. It is also noted that problems associated with heaving within the potentially expansive silty CLAY with scattered coarse grained sand in profile, residual norite can be expected to occur across the site. No groundwater was encountered in the field work, although groundwater seepage is possible within foundation and service trench excavations especially at the contact of weaker and more competent horizons, normally in the form of a perched groundwater table and especially towards the end of the rainy season, or during a more profound rainy season. It is recommended that proper surface run-off and subsurface drainage including damp proofing form part of the permanent works.

The area of the rehabilitated open casing mining activities will require further geotechnical investigation to determine the suitability for various land use activities and what is required to adequately stabilise the land for such land use activities.

Specific guidelines and recommendations are provided for foundation treatment for the various envisaged uses on the site, which are contained in more detail in the specialist report and the EMPr.

	Impact **Risks or hazards from geotechnical & geohydrological conditions**					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Construction	Risks & hazards	Local	medium	medium	Improbable	medium

Operational Phase

During the operational phase of the activity, the development could be affected by or from the geotechnical conditions of the area, but as mentioned above, conditions are such that significance is considered to be low. The geotechnical report concluded that the ground conditions for residential and associated amenities and facilities can be allowed on the entire site, but this is conditional on adhering to the terms and conditions in the report for the ongoing monitoring and management of the stormwater.

	Impact Risks or hazards from geotechnical & geohydrological conditions					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Operation	Risks & hazards	Local	Long	medium	Improbable	low

Significance
The ground conditions are suitable for the proposed development and that, based on the aforegoing, significance is, therefore, medium, due to the need for continual management and maintenance under these geotechnical and geohydrological conditions.

Management and Mitigation Measures
Mitigation during both the construction and operational phases of the development must be in accordance with any requirements and conditions laid down by the Council and as contained in the specialist geotechnical report. The following additional measures are recommended:

- All geological and structural engineering standards must be adhered to in accordance with the recommendations contained in the specialist geotechnical report, as well as NHBRC and Regulations pertaining to the construction industry, as well as the requirements for temporary fuel tanks at contractor laydown yards.
- Soil stripping should be limited to areas within the sites that the contractors and developers require for services or structures, so as to limit soil disturbance (as well as unnecessary removal of all vegetation).
- All good topsoil exposed will be stockpiled for use in rehabilitation and landscaping. Stockpiles must be on already disturbed areas
- All cement or mortar mixing shall be done in already impacted areas, and on trays or sealed areas (e.g. brick bunded areas), to prevent soil contamination
- Measures such as cut off trenches, sand bags, haybales and berms must be installed in areas where erosion has or is predicted to take place, especially close to the watercourse. This must be done in conjunction with the ECO
- The geotechnical conditions for the implementing of Phase 2 on the rehabilitated open cast mined area, should be further investigated prior to any construction taking place.

These management and mitigation measures are further addressed in **Appendix 18: Environmental Management Plan**

7.3.6 Impact of Increased Pollution – Impact Statement

The development could have an impact on or an increase in pollution, in particular, solid waste, noise pollution, light pollution, water pollution, visual pollution and nuisance. The ambient air quality of the area may be of concern to residents.

Description of the Impact

Construction phase

During the construction and implementation of bulk services phases, clearing and levelling, impacts from dust, noise, waste, emissions and nuisance can be expected, which could affect adjoining areas. Whilst this phase could be short term, such impacts can be of a moderate to a high significance during a phased construction period. The implementing of various measures and mitigation steps are necessary to reduce and eliminate such impacts wherever possible, particularly on any adjoining sensitive land uses.

During this construction phase, the impacts are likely to occur over a short to medium period of time, but will be restricted almost entirely to the site, being of a medium intensity, but high significance. Potential impacts can be managed, mitigated and controlled, which are contained in **Appendix 18: Environmental Management Plan**

	Impact Increase in Pollution in the Area					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Construction	Various forms of pollution	Local	medium	medium	Probable	high

Operational Phase

During the operational phases of the development, all forms of pollution are expected to be of low quantity, quality and low significance, as pollution sources from the construction period will no longer be applicable. Furthermore, as the site will be fully serviced with quality ***infrastructure***, including water, power, sewage and stormwater services, no pollution, leakages, emissions or nuisance of any nature is expected.

Formal development of the site will also prevent any dumping, littering, use of the site for informal toilets, etc., that that may have occurred on the site and also prevent unlawful land invasion and occupation.

The ambient air quality of the area has been determined to be of poor quality, with some exceedance in regulated levels during certain times, this all originating from the surrounding mining activities. The conditions are prevalent in a wide regional area surrounding these mining activities and, including Marikana and surrounds. As an alternative site in close proximity to the beneficiaries existing village and their employment on the mines, is not possible, certain measures to control

contamination in homes should be investigated and implemented, as per the specialists recommendations.

	Impact Increase in Pollution in the Area					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Operation	Various forms of pollution	Local	Long	medium	Probable	Medium

Significance

The implications of various forms of pollution during the construction period will have high significance, due to the physical size and footprint of the development, these being primarily noise, dust and nuisance, construction vehicles, contractors. However, these are temporary and will cease once all construction is completed. As the site is relatively isolated from other developments, there are few sensitive neighbours that can be impacted during the construction period.

Pollution generated from the site during the operational phases that can be anticipated would be those associated with any normal urban area and can be mitigated to acceptable levels. It is considered important that the development will contribute to formal service infrastructure, which prevents sewerage leakages, air emissions (from coal fires) and will prevent any dumping and littering or unmanaged degradation on the site, as well as the possibility of informal settlements. Significance of pollution impacts. therefore, during the operational period will be low as generated from the site.

However, the existing ambient air quality of the entire area, already discussed, is likely to have long term implications on health conditions of people in the area generally. Co-operative measures to manage and mitigate this should be undertaken between the various mining companies and communities. Significance of these conditions will range from medium to low under different weather conditions.

Management and Mitigation Measures

To mitigate and remediate all forms of pollution on site, both pre-construction, during construction and the operational phases, the following management measures are recommended:

- All waste streams (general, solid, liquid, hazardous etc…) must be disposed of adequately by the contractor/ developer.
- Provide general waste bins (and Waste skips) throughout the construction site camp and enforce the use of these by all construction personnel. Litter bins must be equipped with a closing mechanism to prevent their contents from blowing out or being overturned
- Immediately clean any accidental oil or fuel spills or leakages, and clean up and dispose of all general or non-hazardous construction related waste immediately.

- A dedicated waste contractor must be appointed to oversee the entire waste management process during construction
- At source recycling and waste sorting must be undertaken on at the contractors laydown site camp.
- Regularly check vehicles, machinery and equipment operating on site to ensure that none have leaks or cause spills of oil, diesel, grease or hydraulic fluid.
- No vehicles, machinery or equipment with leaks or causing spills may be allowed to operate on the construction site. These must be sent to the maintenance yard or workshop for repair, or must be removed from site.
- Keep any residents/ workers in the area surrounding the site informed of unusually noisy activities, such as for blasting periods.
- Noise suppression measures can be applied to all equipment. Equipment must be kept in good working order, and where appropriate fitted with silencers which are to be kept in good working order.
- Fence off and screen (using shade cloth) the all sides of the development site with 2.4m high fencing and shade cloth, alternatively construct the boundary wall at the commencement of the construction before any internal construction is started. This fencing off and screening (or boundary wall) will assist to shield noise to neighbouring properties.
- The Contractors must dampen exposed soil surfaces on the site with a water bowser or sprinklers, as necessary to minimise dust problems.
- The Contractors will commence rehabilitation of exposed soil surfaces as soon as practical after completion of construction to limit any dust
- A climate control system with a filter as part of the building design should be considered
- Barriers of trees along the east and south boundaries of the proposed residential development to be planted. Higher trees can act as porous bodies which influence local dispersion of pollution and aid the deposition and removal of airborne pollutants

These management and mitigation measures are further addressed in **Appendix 18: Environmental Management Plan** which also makes provision for the management of waste on site and other matters related to pollution.

7.3.7 Impact on Socio Economic Conditions of the Area – Impact Statement

The development will have implications to the social and economic conditions of the area, affecting the livelihoods and amenity of both existing and future communities and work environments.

Construction phase

The construction period will have important, but ***positive implications*** on the social and economic conditions in the area as the development is phased in to its full potential. This relates specifically to a high potential for a diversity of trades, professions, skills and experience for employment and job opportunities during a long construction and development period. Proximity of the site to the extensive, highly populated areas of Marikana and surrounding areas and other in close proximity to the site, where there are high unemployment rates, provides a beneficial opportunity for workers within these areas.

	Impact Impact on the Social and economic conditions of the communities					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Construction	Affect community amenity	Local	Medium	medium	Probable	High (positive)

Operational Phase

The operational phase of the development will also result in ***highly positive implications*** on the social and economic conditions in the area as various completed developments become operational over a long period of time. This relates to meeting the overall objective of the project of providing formal housing and living areas to distressed mining communities and for the resettlement of such communities.

It also can be associated with a high potential for new employment and job opportunities as a diversity of activities are developed in the township (small businesses, schools and other social facilities). This has highly positive implications to the social amenity of the beneficiaries on the site and existing surrounding communities of this area and also the wider area

	Impact Impact on the Social and economic conditions of the communities					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Operation	Affect community amenity	Local	Long	medium	Probable	High (positive)

The development will also result in a significant economic capital investment in this area, particularly as the land in its current state provides no investment or value in the area, specifically as the historic agricultural activities have become unviable. The development will also result in a major positive investment in this area in terms of structures and infrastructure, as well monthly revenue from rates and taxes to the Rustenburg Local Municipality.

Significance

The establishment of formal residential suburbs with associated community facilities and amenities in this mining area of Marikana, provides very positive and beneficial opportunities, socially and economically, to communities in the area, especially as it will address the needs of distressed mining communities seeking resettlement. Significance is high and positive, as a development of this nature contributes to long term sustainability of the area in close proximity to employment on the mines, to transport route and to other nearby communities, etc.

Management and Mitigation Measures
As the significance of the impacts to the social and economic fabric and communities of this area and, indeed to the Province as a whole, are envisaged to be positive, mitigation is not envisaged. Mitigation for the impacts during the construction phases of the development are, however, envisaged and these are contained in the EMP and include:

- As far is practically and reasonably possible, utilise local market - The labour force should largely be recruited from the local communities, where ever possible, including skilled and semi-skilled positions. The Contractors must indicate that recruitment will take place through formal procurement procedures, which will be implemented in conjunction with the local community.
- Training and Education - In order to facilitate training and education, it is recommended that the contractors, where possible, recruits its Employees from previously disadvantaged groups and from low income areas, and not only will they fill certain posts, but for those posts that they are inexperienced in, a mentorship process should be initiated.
- Labour intensive construction methods - Where appropriate, labour intensive construction methods should be utilised to maximize the potential number of employment opportunities whilst mitigating impact on site of machinery
- Communities to be settled should, as a priority, be the distressed mining communities that are to be relocated and resettled.

These management and mitigation measures are further addressed **in Appendix 18: Environmental Management Plan**

7.3.8 Visual Issues – Impact Statement

The development will have implications to the changed visual nature of the site, altering it from a predominantly open site to a developed urban area.

Description of the Impact
Construction phase
During the construction period of the development, which is associated with the clearing, grading and levelling of the land, installation of services and building, constructing and erecting of structures, the site will be seen as a “construction site” with transformation of its openness, resulting in a changed visual image of the site. The images of any construction site are normally short term and eventually result in aesthetically pleasing structures, landscaped gardens, etc. As such, construction periods are short term, although not necessarily attractive.

Various steps and measures can be implemented to alleviate any negative visual image during the construction phase, such as screening / fencing or building walls around the site/s or around individual phases. This also has benefits in terms of increased security during the construction period.

	Impact Changed visual impact and sense of place					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Construction	Changed visual image	Local	medium	High	Probable	High

Operational Phase

During the operational phase of the development and once all construction has terminated, the visual image of the site will become fully transformed to that of a fully developed urban area. This site's visual nature will be that of a predominantly and typically residential area, with associated community facilities and amenities, (schools, shops, churches, open spaces). As it is intended that building of housing will be constructed in phases by complexes, it is expected structures will be architect designed of a pleasing aesthetic nature, with associated landscaped gardens, paved parking and access roads, lighting, signage, etc. This will result in a complete change in the sense of place on the site.

Whilst change, and especially during the construction of various phases, always brings both positive and negative implications and impacts, in the long term, there is generally acceptance of and adaptation to the changes as people become used to the new environment. Whilst there will be loss of openness, the positive implications will be the provision of a formal living area with associated amenities to the distressed community beneficiaries.

	Impact Changed visual impact and sense of place					
Development Phase	**Nature**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Operation	Changed visual image	Local	Long	High	Probable	High

Significance

The alteration of the site from a currently open site to a fully developed urban area, will have a high significance in terms of the altered sense of place and visual image. However, the implementation of architect designed residential complexes and other structures, the establishment of gardens, attractive tree-lined and planted pavements, colours, textures and lighting, can contributed to high visual impression within the development, improving its urban-ness and creating a new sense of place.

Management and Mitigation Measures

The implementation of a large residential development with associated facilities and amenities, cannot be mitigated in its entirety, although the use of harmonious architectural themes, colour co-ordination, attractive lighting, indigenous landscaping and planting, etc., contributes to creating an aesthetically pleasing urban environment and the establishment of a new sense of place.

Furthermore, the practise of retaining as much of the existing vegetation (where ever possible), the implementation of landscaping along public roads, in open spaces, along the riparian area, can further contribute to a development of acceptable aesthetic value. Recommendations and suggestions are contained in the EMP, which include the following:

- Landscaping should be environmentally sensitive and should meet the following requirements:
- Limited irrigation through water-wise gardening (use local plants adapted to local conditions).
- Rainwater harvesting should be undertaken and used for garden watering
- Strict fertiliser, pesticide and herbicide control (limited usage of biological friendly products).
- Reduction of weeds and erosion control by minimum tillage gardening practices (use of groundcovers and mulching).
- Strictly monitor for emergence of any exotic/invasive plants within the development, on the outside fringes of the development and along all road – particularly during early spring and summer.
- Remove all exotic and invasive plants in the area (as required), as well as within the road reserves.
- Re-vegetate/ plant area with indigenous plants where necessary, especially along the watercourse and buffer area.
- Hydroseed any open areas devoid of vegetation.

Practical mitigation measures in this regard are set out in **Appendix 18: Environmental Management Plan**

7.3.9 Concerns of I&AP's

A full public participation process has been followed, in accordance with the minimum requirements contained in the Regulations and all processes, issues, notifications and responses are included in **Appendix 16: Rooikoppies Public Participation Report.**

Furthermore, there has been a long and ongoing community facilitation process undertaken, which commenced prior to the commencement of the Environmental Impact Assessment, which has specifically been dealing with the needs, concerns and issues of the affected beneficiary communities. A report by the involved consultants is included in **Appendix 13: Community Survey Report.**

7.3.10 Key Findings of the Environmental Impact Assessment

Physical
It is intended to establish a development for mixed residential and supportive facilities and amenities, with the specific intent to accommodate distressed communities that need resettlement due to mining activities in the area. The development will be inclusive of all associated infrastructural services (power, water, sewage and stormwater). These activities will have an ***important and highly positive significant impact*** in the area in terms of the overall objective of the project. This will result in the creation of a significant new settlement area in

the Marikana area, which is highly accessible and close to the mines where people are employed, close to Marikana where there are existing accessible transport facilities and other amenities, etc.

Due to the site's proximity to the existing village of Marikana, development of the site can be viewed as an extension of the village and provide a further settlement area in close proximity to existing employment opportunities in both Marikana and on the mines.

Alternatives were considered, which essentially considered alternative land uses, all of which are generally considered reasonably viable and realistic for development of the site and within the context of the surrounding area and with view to still meeting the overall intent of the project. One alternative considered considerably higher densities, but the provision of significantly higher residential densities for the communities of this area is NOT considered a preferred, or good or strong alternative as it does not appeal to, nor is desirable to the communities here. The provision of high density in this area close to Marikana is also considered out of scale with the area and would be visually incompatible with nature of the surrounding area.

The other alternative considered the land for mining purposes, as historically, the site forms part of a much wider area which has been the subject of mining activities for many decades and although use of the land for mining is not considered a realistic option by the Mining company initiating the project, it must be pointed out that if the land is not proactively developed and settled, it is feasible that mining could be undertaken on the property. Furthermore, this option, having potentially highly significant environmental impacts in close proximity to existing residential areas of Marikana and established businesses, would not be considered suitable.

Therefore, the alternative to establish a development for mixed residential and supportive facilities and amenities, with the specific intent to accommodate distressed communities must be considered sound, viable and will meet the needs and demands of housing and resettlement in the area.

Biophysical Environment

It has been determined that there has been considerable disturbance over most of the site, which has resulted from open cast mining, extensive long term agricultural activities and cattle grazing, wood harvesting, etc. This has resulted in little, if any, remaining natural habitat, including a damaged and highly altered watercourse. It is also noted that are only remnants of the natural vegetation that can be retained in open spaced area, but generally the long term sustainability of the habitat on the site is low and based on the aforegoing, the habitat has low sensitivity.

Assessment of the condition of the wetland and associated riparian zone reveals its extreme damage, disturbance and alteration, due to not only past agricultural activities, but more specifically, historic open cast mining activities. It is, as such, no longer in its natural state. It is, however, considered important in terms of its hydrological functioning, for the management of natural stormwater runoff, control of erosion, control of water quality and for reestablishment of ecological and habitat diversity and, therefore should be properly managed and prevented from

deteriorating further. The development layout ensures that the watercourse and riparian area and a protective buffer, are free from structures and that it will be retained as an open space in the development.

The development is situated in close proximity to numerous mines, not unlike the entire Marikana settlement area and it is noted that the general ambient conditions in the area are poor and results indicate that from time to time the regulated levels are being exceeded. There are a wide range of diverse potential health risks associated with residing in close proximity to these mining areas. Nevertheless, recommendations have been made that a climate control system with a filter as part of the building design should be considered, as well as other mitigation measures be implemented to assist in mitigating and alleviating these conditions.

Socio-Economic Issues
The development will result in a major change to the social and economic conditions of the area, as it will create a positive, but socially significant impact in the area, as the intent of the entire project is to accommodate and resettle existing distressed communities, due to the planned and imminent extension of mining activities in the area where these communities are currently located.

The entire project is intended to resolve these circumstances and to establish a formal living environment, to include not only residential uses, but all associated community facilities and amenities. The location of the development is prime, as it is close to the existing Marikana villages and to the mining areas where many of the communities already have employment.

The development will also result in a major positive economic investment in this area, particularly as the land in its current state provides little investment or value as the agricultural activities have proved unfeasible. The development will also result in a major positive investment in this area in terms of structures and infrastructure.

7.3.11 Comparative Assessment of Positive and Negative Implications of the Activity

Positive Implications
The most significant and ***positive*** impact of development, is that the entire project will meet the urgent and desperate need to accommodate and resettle existing distressed communities, due to the planned and imminent extension of mining activities in the area where these communities are currently located. The project provides a “full package” development of mixed residential uses with all supportive social amenities and facilities and all infrastructural services.

The biophysical environment has been determined to not be significantly sensitive, valuable or of conservation worthy value, apart from the watercourse and riparian area, which will be protected with a buffer. The development will, therefore, not contribute to significant loss of valuable habitat.

Other positive implications associated with the activity include primarily the fact that there will be a major physical and economic investment into the area. Not only

will it provide for housing needs, but there will be the creation of a large number of new employment opportunities, both during construction and the long term operational period. There will also be a significant injection of capital into the area, resulting in major investment and added economic value to the land and the local area.

Negative Implications
There are some ***negative*** implications associated with the implementation of the activity. Primarily the development will result in the loss of open land, both physically and visually. It will result in the loss of agricultural land, although this has been determined to no longer be sustainable or viable.

Furthermore, other negative implications include the impacts and associated nuisance during the construction period and during the operational period, the increased use of resources, such as water, sewerage and power, an increase in traffic generation and people into the area. There have been challenges identified with the provision of services, although ongoing engineering investigations will provide the required solutions.

The ambient air quality of the entire surrounding Marikana area has been determined to be poor, due to the long term mining activities. This is associated with potential health problems of workers and residents in the area. Various remedial and mitigation measures have been raised to address this, not least the need for the engagement of the mines to endeavor to address the problem.

Summary
The environmental assessment undertaken for the Scoping and Environmental impact assessment phase has revealed that there are ***no major significant*** environmental assets or features associated with most of the site. The proposed activities will result in the loss of open land, but will not cause the loss of important or highly valuable habitat or features of conservation worthy importance, particularly as the watercourse will be preserved.

The potential for impacts of the development on flora and general habitat have, therefore, been determined to be of low-moderate significance.

The activities proposed in the application, however, will have an impact on the area as a whole in terms of the changed functioning of the area, use of the site, visual nature of the area and on the social and economic conditions of the wider area. Many of these are of a positive nature, as the activity will contribute to accommodating and resettling distressed communities.

Potential impacts can also be expected during both the construction and operational phases, however, these impacts can be mitigated to acceptable levels so that there is no continued environmental degradation on the site.

7.4 The Environmental Management Plan (EMP)

An EMPr has been prepared and is contained in **Appendix 18: Environmental Management Plan.** The plan provides detailed steps and mitigation measures to be undertaken during ***both*** the ***pre-planning, pre-construction, construction and operational phases***. Implementation of this EMP will ensure a high degree of management of the site, whilst still achieving the social and economic objectives of the development.

7.5 Conclusions and Recommendations

Based on the findings, summary and conclusion in the report, the consultant is of the opinion that the proposed implementation of the Preferred Alternative, will have some negative impacts that range from medium to low in significance, mainly during the construction period, but that the ***highly positive implications*** considerably outweigh the negative implications. Furthermore, the activity will not lead to substantial detrimental impacts on the environment that cannot be effectively mitigated, managed and reduced with the implementation of the EMP and that any potential impacts can be mitigated to acceptable levels that will ensure the principles of NEMA are achieved. This is conditional on the implementation of the EMP.

The development will, however, contribute to substantial socio-economic benefits in respect of the creation of new homes and associated amenities, to accommodate and resettle distressed communities, to some job creation both in the short and long term, both during the construction and operational periods, as well as a significant capital investment into this area and will contribute to new infrastructural services in the area.

The consultant is, therefore, of the opinion that the activities as applied for, should be authorised, with the condition that terms, conditions and guidelines contained the EMP be effectively, efficiently and professionally implemented.

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9. Appendix 1: Seaton Environmental Company Profile

10. Appendix 2: Rooikoppies Locality Plan

11. Appendix 3: Rooikoppies Site Plan.

12. Appendix 4: Rooikoppies Preliminary Development Layout Plan

13. Appendix 5: Rooikoppies Services Report

14. Appendix 6: Rooikoppies Electrical Supply Report

15. Appendix 7: Rooikoppies Roads and Traffic Report

16. Appendix 8: Geotechnical Investigation Report

17. Appendix 9: Rooikoppies Mining Rehabilitation Report

18. Appendix 10: Rooikoppies Vegetation Survey

19. Appendix 11: Rooikoppies Wetland Delineation and Assessment

20. Appendix 12: Baseline Air Quality & Health Risk Assessment for Rooikoppies

21. Appendix 13: Community Survey Report

22. Appendix 14: Heritage Impact Assessment

23. Appendix 15: Composite Sensitivity Plan

24. Appendix 16: Rooikoppies Public Participation Report

25. Appendix 17: Impact Assessment Methodology

26. Appendix 18: Environmental Management Plan