FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

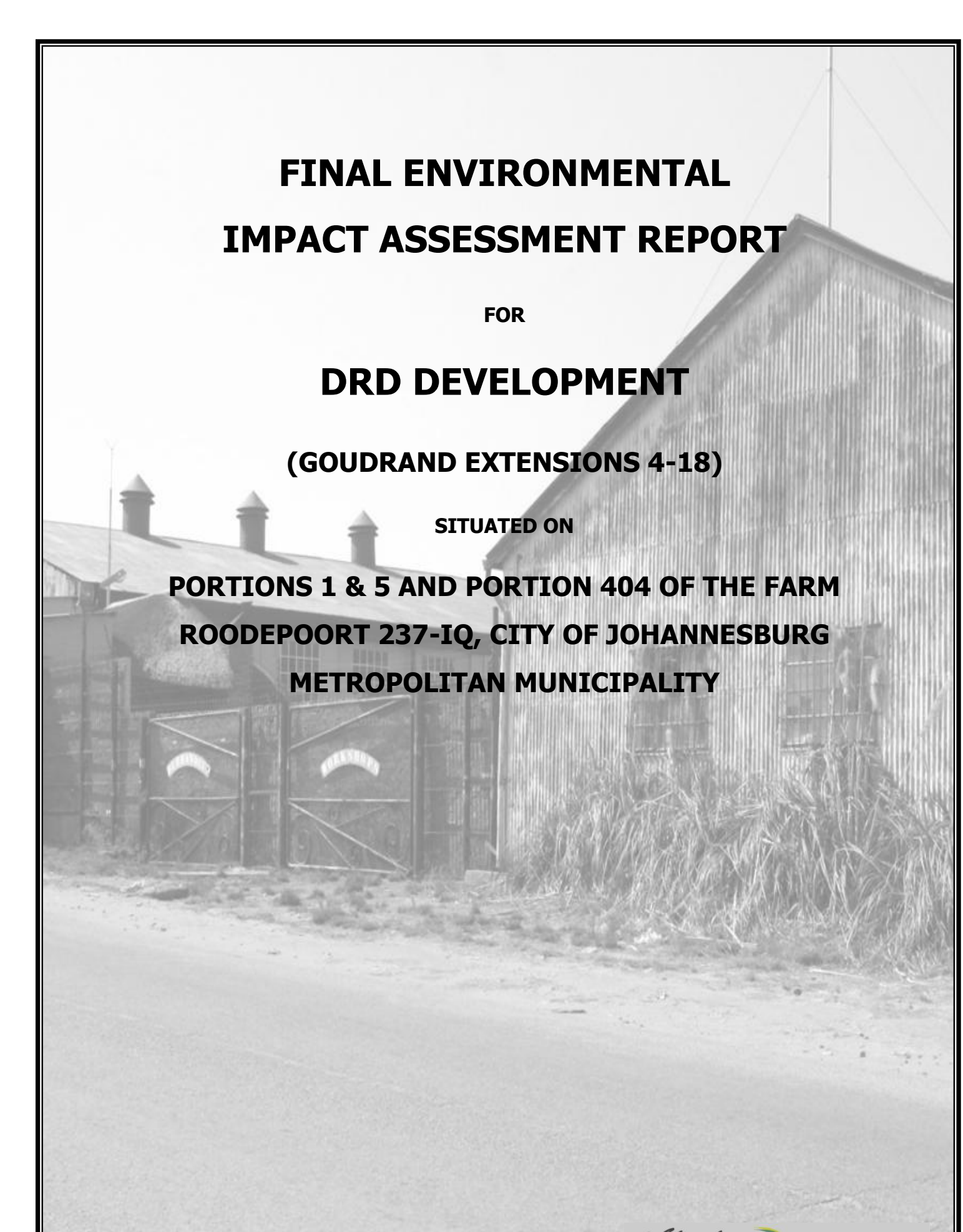
FOR

DRD DEVELOPMENT

(GOUDRAND EXTENSIONS 4-18)

SITUATED ON

PORTIONS 1 & 5 AND PORTION 404 OF THE FARM ROODEPOORT 237-IQ, CITY OF JOHANNESBURG METROPOLITAN MUNICIPALITY



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ACRONYMS

B
BID - Background Information Document
C
CBD - Central Business District
D
GDARD - Gauteng Department of Agriculture and Rural Development
DRD - Durban Roodepoort Deep Gold Mine
E
EAP - Environmental Assessment Practitioner
EIA - Environmental Impact Assessment
EIAR - Environmental Impact Assessment Report
EMPR - Environmental Management Plan / Programme

G - Gauteng Department of Agriculture and Rural Development

I
I&AP - Interested and Affected Party
I&APs - Interested and Affected Parties
J
JRA - Johannesburg Roads Agency
N
NEMA - National Environmental Management Act (Act 107 of 1998)
NWA - National Water Act, 36 of 1998
P
PPP - Public Participation Process
S
RSDF - Regional Spatial Development Framework

1. EXECUTIVE SUMMARY

This report contains a description of the current status of the property and the potential impact of the proposed development on the physical and bio-physical aspects of the property. The evaluation took place in the context of the larger surrounding environment. The Environmental Impact Assessment process was undertaken in accordance with the guidelines and stipulations of the Environment Conservation Act, 73 of 1989 and the application was submitted to the Gauteng Department of Agriculture and Rural Development (GDARD). The findings described in the Scoping Report were included in this Finalt Environmental Impact Assessment Report (EIAR) which will be submitted to GDARD to obtain approval for submission of the Final EIA Report. The Gauteng Department of Agriculture and Rural Development will then evaluate the report in order to grant authorisation for the proposed project.

Main role players, stakeholders, and the Interested and Affected Parties were consulted long before and also during the public participation process. Surrounding land owners as well as all the tenants and occupants of houses on the site were notified of the proposed development. The reaction on the notification to the people living on the property was overwhelming in the sense that a list of more than five hundred names were prepared of people who wanted to put their name on a list for housing. No complaints or objections have been received against the proposed development and the only concern expressed by people was if housing will be available to them in the new development. The developer will accommodate the existing tenants as far as possible on either a full ownership, rental or credit linked basis. The success of the project will to a large extent depend on the way the developer can satisfy the needs of existing tenants and accommodate them in the development

All other aspects that could potentially be impacted on by the proposed development were evaluated in terms of the criteria prescribed by GDARD. Specialists' studies have been undertaken on almost every aspect of potential impact and are included with this report as annexures. It was found that the proposed development will have a low impact on the biological, physical and socio-economic environment. Potentially impacted areas or aspects could be mitigated and managed in terms of an Environmental Management Programme for the proposed development. It was concluded that in most instances, the development could have a positive impact on the environment. It is therefore recommended that the project be authorised by the Gauteng Department of Agriculture and Rural Development.

2. INTRODUCTION

Dino Properties (Pty) Ltd appointed Singisa Environmental cc to conduct an Environmental Impact Assessment (EIA) on site and obtain authorisation from the Gauteng Department of Agriculture and Rural Development (GDARD) in terms of the National Environmental Management Act, 1998, in order to commence with the re-development of the decommissioned DRD mining property in Roodepoort. The development will include the upgrading of the existing houses which have been identified as structurally sound and of historical significance and the construction of a large number of new residential units on the vacant land portions between the existing houses and the old golf course. The new houses will be constructed to cater for various price categories and options to rent or to buy. Erven in the project will be allocated and zoned for community facilities and amenities by means of the township establishment process. The development will take place on selected land parcels on the Remaining Extent of Portions 1 & 5, and Portion 404 of the Farm Roodepoort 237-IQ (Proposed townships Goudrand Extensions 4-18). The development will take place on land parcels which are not subject to the restrictions of shallow undermining (**Annexure A**).

The Environmental Impact Assessment procedure to be followed in terms of the provisions of Regulation 545 of 2010, entails the submission of an application, a Draft and Final Scoping report. These were reviewed by GDARD and confirmation was received to proceed with the environmental impact assessment process (**Annexure C**). Issues mentioned in the Scoping Report will be addressed in this Environmental Impact Assessment Report.

3. TERMS OF REFERENCE

The terms of reference for the study included compiling a Environmental Impact Assessment Report for the proposed development activity, as required by the National Environment Management Act, 1998 (Act No. 107 of 1998).

The specific contents of an Environmental Impact Assessment Report, according to the NEMA Regulations, must include:

- Details of:
  - The EAP who prepared the report;
  - The expertise of the EAP to carry out scoping procedures;

- Detailed description of the proposed activity;
- A description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is:
  - A linear activity, a description of the route of the activity;
  - An ocean-based activity, the coordinates where the activity is to be undertaken;
- Description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;
- Details of the public participation process conducted in terms of Regulation 54, including:
  - Steps that were taken to notify potentially interested and affected parties of the application;
  - Proof that notice boards, advertisements and notices notifying potential interested and affected parties of the application have been displayed, placed or given;
  - A list of all the persons or organisations that were identified and registered in terms of Regulation 55 as interested and affected parties in relating to the application;
  - A summary of comments received from, and a summary of issues raised by interested and affected parties, the date of receipt of these comments and the response of the EAP to those issues;
- A description of the need and desirability of the proposed activity;
- A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;
- An indication of the methodology used in determining the significance of potential environmental impacts;
- A description and comparative assessment of all alternatives identified during the environmental impact assessment process;
- A summary of the finding and recommendations of any specialist report or report on a specialised process;
- A description of all environmental issues that were identified during the

environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;

- An assessment of each identified potentially significant impact, including:
  - Cumulative impacts;
  - The nature of the impact;
  - The extent and duration of the impact;
  - The probability of the impact occurring
  - The degree to which the impact can be reversed;
  - The degree to which the impact may cause irreplaceable loss of resources; and
  - The degree to which the impact can be mitigated.
- A description of any assumptions, uncertainties and gaps in knowledge;
- A reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- An environmental impact statement which contains-
  - A summary of the key findings of the environmental impact assessment; and
  - A comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;
- A draft environmental management programme containing the aspect contemplated in Regulation 33;
- Copies of any specialist report and reports on specialised processes complying with Regulation 32;
- Any specific information that may be required by the competent authority; and
- Any other matters required in terms of Section 24(4)(a) and (b) of the Act.
- Any specific information required by the competent authority.

4. ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

The EIA Report was compiled by Nico Botha of Singisa Environmental cc. Nico Botha qualified as a Town Planner at the Potchefstroom University in 1970. In 2006 he obtained his Masters Degree in Environmental Management at the University of Johannesburg. He has extensive experience in the property market and has been involved in the assessment of numerous development projects from town planning as well as environmental aspects. (refer to CV in **Annexure B**).

Nico Botha prepared the Draft Environmental Impact Assessment Report for the proposed re-development and development on Remaining Extent of Portions 1 & 5 and Portion 404 of the Farm Roodepoort 237-IQ, City of Johannesburg Municipality, also referred to as Goudrand Extensions 4-18.

5. DETAILED DESCRIPTION OF PROPOSED ACTIVITY

5.1. Existing development on the land

The land on which the development will take place is de-proclaimed mining land. Durban Roodepoort Deep (DRD) Gold Mine, the previous owner of the land, established gold mining activities on the land. The mining activities included the development of a large number of dwelling houses on the property for mine management and staff. A golf course with nine fairways was one of the recreational facilities provided. Other surface structures included offices, shops, hostel or compound, shaft gear and slime dumps. The existing development includes a planned township layout with proper infrastructure services such as tarred roads, electricity, water and sewerage.

Since the mining activities ceased in 1998, the existing houses were rented out and certain mining structures, such as the shaft infrastructure, were demolished and capped. The metallurgic plants were partially demolished and rehabilitated and the open cast voids have been demolished and rehabilitated. The shaft areas and slime dumps have also been rehabilitated in terms of the detailed Closure Plan.

Currently, most of the houses are occupied on a rental basis, but there are several structures that are not occupied which were vandalised and damaged to such an extent that it will have to be demolished. The golf course has not been used or maintained and is merely overgrown vacant or derelict land.

5.2. Details of proposed activity

The proposed development consists of the re-development and formalising of the housing component of the mine houses, new residential developments, employment nodes with commercial and industrial uses, community facilities, roads and open space areas for formal recreation (**Annexure A**).

The proposed development will comprise of various zonings and land uses. The Table 1 gives an indication of uses and areas, but please note that numbers could change as a result of inputs and comments during the township application process.

Table 5.1 Land Use and Areas

Zoning	Land Use	No of Stands	Area (ha)	%
"Residential 1"	Bonded units	1039	27.99	13.49
	Credit linked units	1604	30.0	14.48
"Residential 2"	Cluster erven	4	3.17	1.53
"Residential 3"	High Density development	14	32.1	15.49
"Business 1"	Business	4	9.7	4.67
"Industrial 1"	Industrial 1	7	5.2	2.5
"Educational"	Education	3	9.9	4.76
"Institutional"	Church	8	2.10	1.02
	Crèche	6	2.8	1.34
	Hospital	1	3	1.4
"Cemetery"	Cemetery	1	2.60	1.25
"Special"	1. Substation and such uses as Council will permit	1	0.22	0.10
	2. Such uses as Council will permit	1	0.66	0.32
	3. Community facilities, College, Adult training and Educational	1	1.12	0.54
	4. Medical consulting rooms, Stepdown clinic and related uses	2	0.87	0.42
	5. Such uses as Council will permit	1	13.8	6.65
"Public Open Space"	Public Open Space	64	17.81	8.58
Public Street	Street	-	44.25	21.34
TOTAL:		**2763**	**207.43 ha**	**100%**

The total area of the developable land on the farm portions under consideration is 207,43 hectares. Approximately 234 hectare is excluded from development at this stage as a result of undermining. It is anticipated that more than 10 000 residential units of various types could be accommodated on this land.

The proposed project entails the following land uses:

- Residential 1: Approximately 1 039 erven for bonded units and 1 604 erven for credit linked units will be created to allow for the erection of free standing residential dwellings. The average stand size of 250m².
- Residential 2: Approximately four cluster erven has been planned. The units to be erected on these erven will be designed as an entity to allow for the best utilisation of the erven. The architectural design of these units will take into consideration the visual quality of the surrounding environment. At a density of 60 units per hectare it will be possible to erect approximately 190 units.
- Residential 3: The proposed layout makes provision for 14 erven on which high density residential development will take place. This will allow for a density of 240 units per hectare. Approximately 7711 could be erected on the erven provided.

- Business 1: Four Business erven with a total permissible floor area of 58 200m².
- Industrial 1: Seven Industrial erven with a total area of 5,2 hectare.
- Educational: Three Educational erven with a total area of 9,9 hectare.
- Institutional Erven: Eight erven for Churches, six erven for Créche, one erf for Hospital.
- Cemetery: One erf to accommodate the existing cemetery.
- Special Zoned Erven: For substation and such uses as Council will permit; for Community Facilities, College, Adult Training and Educational, medical consulting rooms, step-down clinic and related uses.
- Public Open Space: 64 Public Open Space erven.
- Public Streets: As per Township Layout Plan.

5.3. Relevant Phases of Development

Pre-Construction and Planning Phase

During this phase market surveys, heritage research of existing buildings, land survey, geotechnical surveys, air quality assessment, ecological studies, and several other specialists' studies will be undertaken. This will be followed by Public Participation, the EIA and township applications as well as the more detailed Design and Site Development Plans. Services arrangements with the municipality and the determination of development contributions will form part of the township proclamation process.

Construction Phase

This phase will entail the demolishing of unsafe or unwanted building structures, removal of alien vegetation, upgrading and installation of township services, construction of roads, construction of residential units and the landscaping of the Open Space areas.

Operational Phase

The third phase of the project will be the operational phase where there will be less involvement by the developer and more of the managing body and owners. It will involve the maintenance of the Open Space area as well as township services. It will also be important to monitor the effectiveness of the stormwater management systems that have been implemented and to improve the systems where necessary.

5.4. Estimated time frames for construction

There are no specific time frames for construction and this will depend to a large extent on the authorisation process and approval of the township application. Once all applications have been dealt with and approved in terms of environmental and town planning requirements, construction will commence. The construction phase is anticipated to last for approximately 24-36 months, depending on the market conditions.

5.5. Town Planning Aspects

An application has been submitted for the establishment of one large township. This is the preferred way to provide the bigger picture of the proposed development and lay down the basic principles of development. The township will at a later stage be subdivided into a possible 15 smaller townships. The smaller townships will then be used as a method of phasing the development. The township application/s will be made in terms of the Town Planning and Townships Ordinance, No. 15 of 1986.

5.6. Services

5.6.1. Access and Road Network

Access to the development will be primarily from Main Reef Road (K-198). Internal roads will provide access to houses and other facilities. Where necessary, existing roads will be upgraded and incorporated in the design process. The proposed K-102 Route along the eastern perimeter of the property will provide access to possible future developments within the area which has been excluded from the current development proposal as a result of shallow undermining. Two other access points from the Old Main Reef Road will service the development from the northern side. The proposed main North-South link Road will connect the development with Bram Fischerville along the southern boundary of the township.

5.6.2. Electricity

Debcon Electrical and Mechanical Engineers evaluated the supply of electricity to the proposed development. Their findings were that electricity supply is available from City Power's Roode Town or Roodepoort sub-station. The existing mine intake point can be upgraded to make capacity available for the initial development requirements. An alternative supply point is also possible at the ROCLA cement works. Two satellite switching stations will be required and these satellite stations will then be connected with miniature

substations and bulk metering for large consumers. The developers will be required to make development contributions and/or to install certain main lines and equipment. Notwithstanding, the important aspect is that electricity supply to the proposed development can be made available. The internal reticulation in the township and connections to the individual properties will be provided by the developer.

5.6.3. Water

Existing Rand Water pipelines run along the Main Reef Road. Three water supply connection points are servicing the property south of Main Reef Road. These connections consist of two 300mm diameter connections and one 150mm diameter connection which will be sufficient to supply the northern portions of the proposed townships with water.

The southern portions of the proposed development can obtain water from the Johannesburg Water reticulation system servicing Bram Fischerville, immediately south of the proposed development.

5.6.4. Sewer Reticulation

There are existing sewer pipelines within and in the vicinity of the proposed development area which connect to the municipal sewer network. The proposed development can be divided into five drainage zones, namely;

- The sewer network for the north-western zone of the proposed development can connect to the existing sewer network of Goudrand Ext 3 and Motholisville.
- A small northern drainage zone can connect to the existing sewer draining towards Roodepoort.
- The existing sewer pipeline within the north-eastern zone drains towards the Florida main outfall sewer. The proposed sewer network for this development zone can connect to this existing pipeline. The existing mining village is currently connected to this pipeline.
- The eastern zone of the proposed southern development slopes in a southerly direction towards the adjacent Bram Fischerville township. The sewer of this portion can be connected to the Bram Fischerville system.
- The western zone of this area will drain towards the Sol Plaatjies development and can be accommodated in the existing network. If necessary, a link sewer line will be constructed to connect into the bulk sewerline servicing the area.

5.6.5. Waste Disposal

Provision will be made in the development for solid waste collection and removal to an approved waste disposal site. The method of storage and removal of rubble, especially during the construction phase, will be described in the Environmental Management Programme.

6. PROPERTY PARTICULARS

6.1. Description

The development will take place on selected land parcels on the Remaining Extent of Portions 1 & 5, and Portion 404 of the Farm Roodepoort 237-IQ (**Annexure A**). The selected development land parcels are not subjected to the restrictions of shallow undermining.

6.2. Registered owner

Remaining Extent of Portion 1 of the Farm Roodepoort 237-IQ: Dino Properties (Pty) Ltd held under Title Deed Number T77946/2012.

Remaining Extent of Portion 5 of the Farm Roodepoort 237-IQ: Dino Properties (Pty) Ltd held under Title Deed Number T77946/2012.

Portion 4 of the Farm Roodepoort 237-IQ: Dino Properties (Pty) Ltd held under Title Deed Number 68448/2013.

6.3. Title Deed conditions

Conditions of Title will be dealt with as part of the township proclamation process. New conditions will be added and conditions not applicable will be removed.

6.4. Location of site

The proposed development will be known as Goudrand Extension 4 township, which is located on Remainders of Portions 1 & 5 and Portion 404 of the Farm Roodepoort 237-IQ, in the Johannesburg Municipal area. The land is located on the old and well known DRD mining village and golf course, south of the Roodepoort central business area and Main Reef Road. On the southern side the land borders on Bram Fischerville, Soweto. Several new residential townships, Davidsonville Extension 2, Matholesville and Goudrand Extension 3 are in the

process of being developed in the nearby surrounding area. Industrial and commercial activities are predominant land uses along Main Reef Road, a main access route to this development

A large area on the old mining village will be excluded from the development as a result of restrictions related to undermining and soil stability. The land areas of the existing mine dumps will also be excluded from development, although these dumps will be removed in the future. This will be done under strict supervision and in terms of specific conditions and requirements of the Department of Minerals and Energy.

7. RECEIVING ENVIRONMENT

7.1. PHYSICAL ENVIRONMENT

7.1.1. Climate

The site is located within the Highveld Climatic Zone which experiences cool to cold winters and warm and wet summers. Wind speeds are generally low and extreme weather conditions not the norm. The figure below gives an overall view of general pleasant weather conditions in this region.

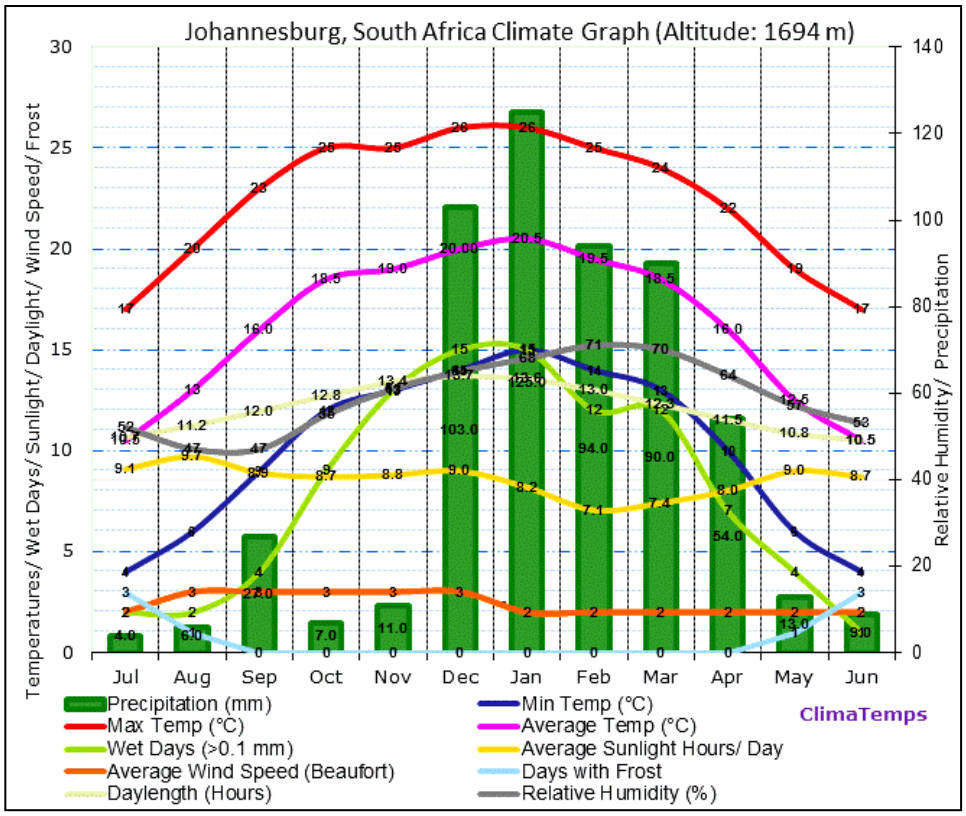

Figure 7.1 Climate Graph for Johannesburg

7.1.2. Rainfall

Summer precipitation occurs in the form of convectional thundershowers with a mean annual precipitation of 543mm. The majority of rain falls in the summer months of, December to March. The winter months of July and August usually receive on average less than 9mm of rain (Weather for Johannesburg: www.johannesburg.climatetemps.com).

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual
Average Rainfall in (mm)	4	6	27	7	11	103	125	94	90	54	13	9	543
Number of Wet Days (probability of rain on a day)	2 (6%)	2 (6%)	4 (13%)	9 (29%)	13 (43%)	15 (48%)	15 (48%)	12 (42%)	12 (39%)	7 (23%)	4 (13%)	1 (3%)	96 (26%)
Percentage of Sunny Daylight Hours	86	87	75	69	66	66	61	55	61	71	84	84	73

Figure 7.2 Average Annual Rainfall for Johannesburg

7.1.3. Temperature

Over the course of a year, the temperature typically varies from 3°C to 25°C and is rarely below -0°C or above 28°C. Average daily temperatures range from 25,5°C in the summer months to a minimum of 10,5°C. Summer temperatures reach an average maximum of 27.0°C in January. The average winter minimum is in the region of 4°C in June and July. Extreme weather conditions include thundershowers, hail and fog. Snowfall is rare.

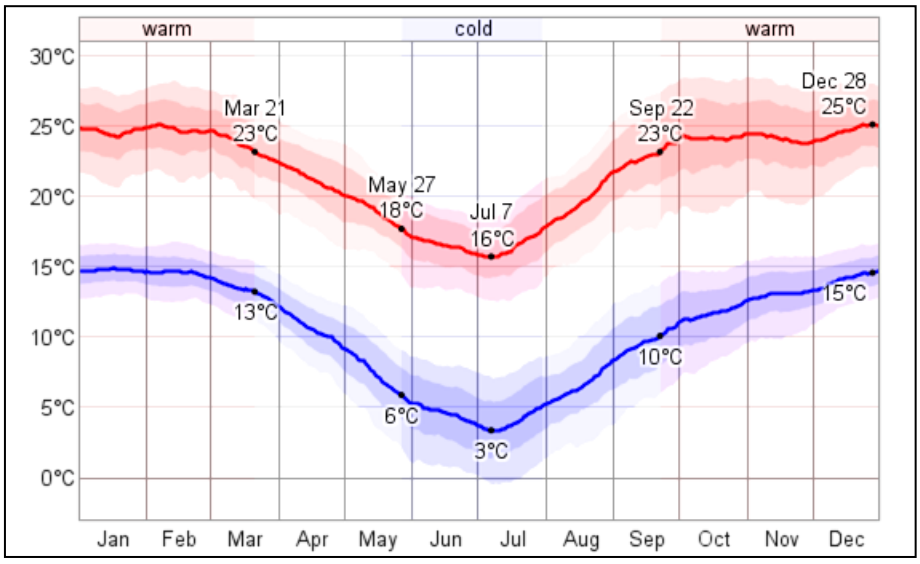

Figure 7.3 Daily High and Low Temperature

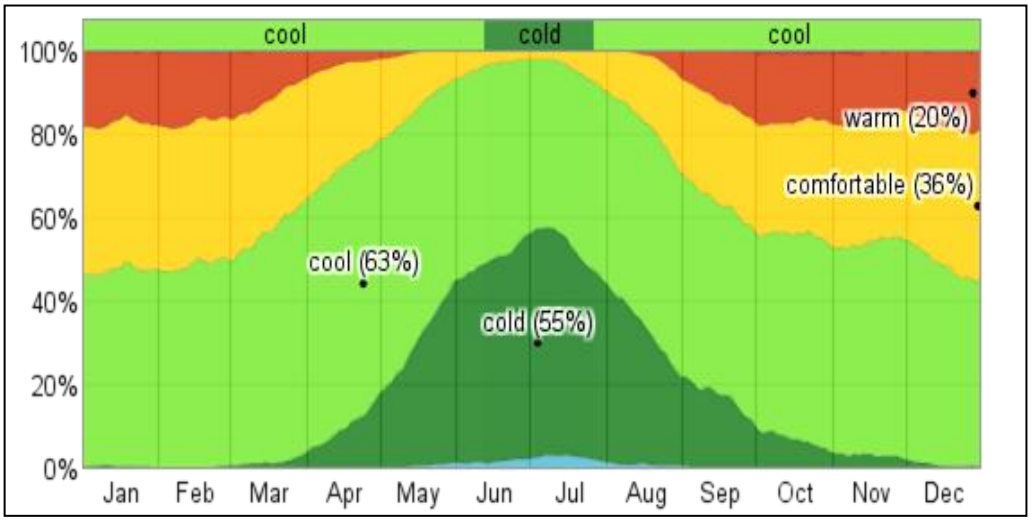

Figure 7.4 Fraction of Time Spent in Various Temperature Bands

Note:The average fraction of time spent in various temperature bands: frigid (below -9°C), freezing (-9°C to 0°C), cold (0°C to 10°C), cool (10°C to 18°C), comfortable (18°C to 24°C), warm (24°C to 29°C), hot (29°C to 38°C) and sweltering (above 38°C).

7.1.4. Wind

The highest wind speeds are recorded during the months of October to January with north-west being the predominant direction. This pattern is directly associated with a typical Highveld storm system that build up during the day and bring rain in the afternoon. The wind is most often out of the *north* (23% of the time), *north-west* (18% of the time), and *east* (11% of the time). The wind is least often out of the south east (5% of the time).

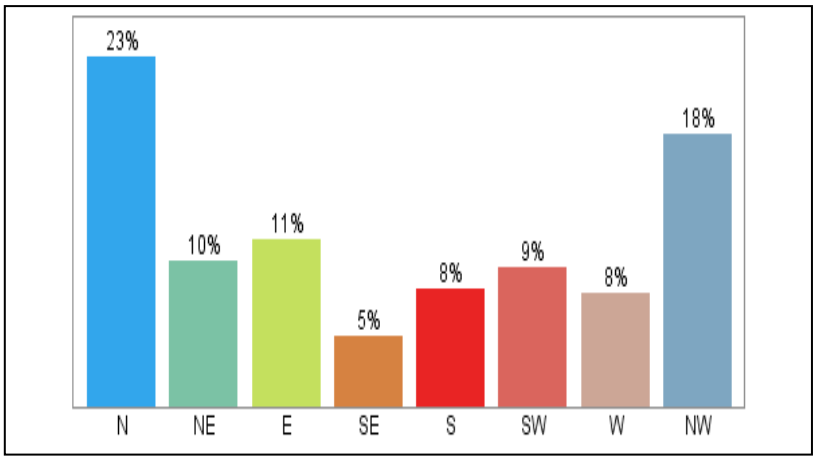

Figure 7.5 Wind Directions Over the Entire Year

From the figure below it is clear that the prevailing winds are from a northerly and north-westerly direction. Wind speeds are generally low and because the wind direction is undefined when the wind speed is zero, the values in the figure do not necessary total 100%.

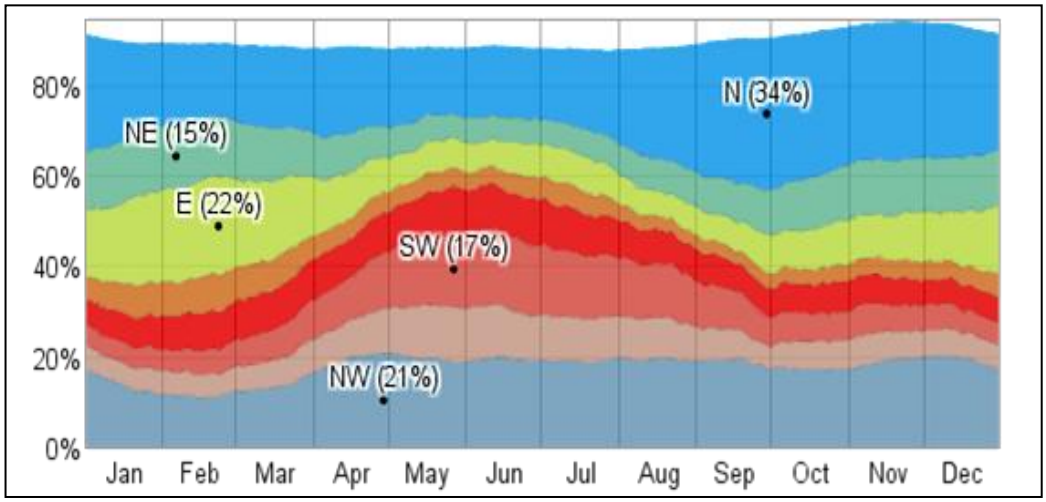

Figure 7.6 Fraction of Time Spent with Various Wind Directions

7.1.5. Topography

As a result of the previous mining activities in the area, the site can be divided into two separate developable areas. The northern portion slopes at a gentle gradient of 2% down to the south and large areas are also occupied by disused mine infrastructure such as workshops, offices, residential- and recreational facilities. A small man-made off-stream dam is located in the north-eastern corner of the property. The southern portions are almost level with a very gentle gradient down towards the southwest. This area is largely undeveloped and characterised by typical infested urban grasslands.

The topography of the land has been drastically transformed by the previous mining activities and large slimes dumps have been constructed on low lying ground. Most of these areas have now been excluded from the township application as it is also subject to shallow undermining. Although the slimes dumps are in the process of being removed, a 100 metre buffer strip has been provided around the footprint of the dumps.

7.1.6. Geology and Soils

An area of approximately 234 hectare has been excluded from the proposed township development, mainly as a result of the outcome of detailed investigations and drilling to confirm the depth of undermining. With further studies and research into the stability of the undermined areas and also the removal of the slimes dumps, certain areas may become available for township development at a future date (**Annexure A**).

The geological classification indicates that the proposed new township development can be divided into three areas. Two of the areas have been developed with the old mining structure, staff housing and recreational facilities, whereas the third area is currently still undeveloped.

Based on the findings of the geotechnical investigation, no constraints were identified that will preclude the proposed township development on the site. The entire area is largely underlain by quartzite formations belonging to the Johannesburg and Turffontein sub-groups of the Central Rand Group, Witwatersrand Supergroup. The northern portions of the site are underlain by the Luipaardsvlei Quartzite formation, and the outcrop of the auriferous Bird Reef. The southern parts of the property are completely underlain by quartzite of the Elsburg Quartzite formation. Outcrops of the Kimberly Conglomerate formation occurs within the portions of the property.

7.1.7. Hydrology

<u>Surface Water</u>

Rain water from the surface will naturally drain towards the low lying areas in the central part of the land from where a section will drain towards the west and another section towards the east. The natural drainage line has been disturbed by the mining activities and is weakly defined. In the proposed development the water from normal rainfall will be accommodated in the underground stormwater drainage system for the proposed development. The flow into the natural drainage systems will be managed to avoid erosion.

<u>Wetlands</u>

The property area is not affected by a wetland system. Wetland areas have been defined around the man-made dam utilised in the mining process. The dam and buffer area around it has been set aside as open space in the proposed new townships. The other wetland areas identified on the land are outside the proposed township development boundaries. A large section of the identified wet areas are a result of seepage from the slime dumps. The

wet areas around the slimes dumps will disappear when the dumps have completely been removed. There are no well-defined watercourses of significance on the land.

Stormwater Management

There is no existing stormwater infrastructure within the development area. The proposed development will require an underground pipeline system to be routed through attenuation dams and then to discharge in to the catchment area situated between the northern and southern development areas.

In stormwater management a distinction can be made between two types of storms, namely storms of low and high severity. For storms of low severity, which occur frequently, a pipe or channel system will be provided to avoid the frequent problems resulting from overland flow. This system is termed the minor system. By considering the effects of the less frequent storms, a major system will be identified to support the minor system.

The major system may include larger conduits and natural or artificial channels. This major system would frequently make use of the road system to convey excess water to suitable points of discharge. A Stormwater Management Plan is predominantly concerned with the minor system and storms of low severity but high frequency. However, it will take into account abnormal flow patterns.

The City of Johannesburg requires stormwater run-off to be controlled via attenuation facilities. The run-off can mainly be managed with one or a combination of the following methods:

- Sheet flow: Stormwater is allowed to flow undisturbed;
- Pipe: Stormwater is conveyed by means of an underground pipe system;
- Roads: Stormwater is conveyed using the roads; and
- Open channels: Stormwater is conveyed using open channels.

Stormwater management will be introduced as an integral part of the development. The flow of stormwater will be managed by means of stormwater attenuation areas that will be created for the specific purpose to manage the flow of water into the drainage system. Natural vegetation will be utilised in the attenuation areas and in flow channels to reduce the flow speed of stormwater.

7.1.8. Conservation / Open Spaces

The proposed development is located on de-proclaimed mining land. It is not located in, or near a natural open space system, or in a conservation area. Open space areas will be provided in the township development for formal recreational purposes and stormwater management. Consideration will be taken of the impact of the development on the drainage areas which are located outside the current township boundaries.

7.1.9. Air quality

The proposed development on the site will have no negative impact on the existing air quality. The existing slimes dumps have been rehabilitated and vegetated to such an extent that possible dust pollution from the slimes dumps is considered as insignificant. The prevailing wind direction is also away from the proposed development. On completion of the removal of the dumps, there will be no impact on the air quality in the area.

7.1.10. Noise

The proposed development of primarily residential units will not have a significant impact on noise levels in the area. Noise generated from the proposed development can be associated with normal urban activities and noise levels will be within acceptable limits.

7.1.11. Adjacent land uses

The site is located south of the Roodepoort central business area and adjacent to Main Reef Road. On the southern side that land borders on Bram Fischerville, Soweto. North of the land is the residential townships of Goudrand Ext 3, Roodepoort Ext 2 and Georginia and to the west is Matholesville. Industrial development occurs along Main Reef Road with a potential of many job opportunities. The proposed development has been planned to fit in with the surrounding land uses and to improve the quality and character of the area.

7.2. BIOLOGICAL ENVIRONMENT

7.2.1. Vegetation and Flora

An Ecological assessment was conducted by Prism Environmental Management Services. Their findings were that the vegetation cover on the land has extensively been transformed. The indigenous biodiversity appears to be poorly represented and no sensitive species are likely to be found on the site. The entire site, including drainage lines is considered to be of a very low sensitivity. Even the wetland areas, which are normally considered as sensitive, would require intensive rehabilitation to restore some integrity. Changes in the soil substrata will make the restoration of natural vegetation unlikely and not feasible. The proposed development will not cause a loss of habitat or connectivity.

7.2.2. Fauna

As a result of the removal of the natural floral component on the site, the faunal life on the site is very limited and no suitable habitat exists to sustain any Red Data species. No faunal species of conservation priority was recorded during the site visit by the faunal specialists. This can be ascribed to the severely degraded state of the site as a result of the mining activities that took place on the land over many years. This situation could only improve with the development of the land and the introduction of indigenous vegetation.

7.3. SOCIO-ECONOMIC ENVIRONMENT

The need for more affordable housing in the entire Gauteng area needs no confirmation. The land under consideration is well located in relation to industrial and commercial areas where there are large job opportunities. The Roodepoort Central Business Area (CBD) is in close proximity to the proposed development. This business area is further supported by industrial development to the northwest, which increase the employment opportunities for residents in the proposed new development. On the other hand it can be said that the new development will provide housing close to the workplace of people already employed in the surrounding industrial and commercial areas.

The development of the site with residential and other supporting mixed land uses are likely to positively impact directly on the socio-economic foundation in terms of job creation, especially during the construction phase and to a lesser extent during the operational phase. In general, the development of the land will have a positive impact on the social and economic qualities of the surrounding communities and business activities.

7.3.1. Visual Qualities

The visual quality of the property has to a large extent being impacted on by the mining activities, and especially the slime dumps. The large trees on the site slightly soften these unnatural topographical features. The vegetation cover on the slime dumps also improves the visual quality of the land. The proposed development will impact on the visual characteristics of the area in the sense that the disturbed and deteriorated visual state will change to a developing urban environment. This is considered as a positive aspect which is fully compatible with the surrounding urban environment. The removal of the slimes dumps will further improve the visual quality of the area.

7.3.2. Traffic

The existing road network will be upgraded in order to accommodate the additional traffic generated by the proposed development. Traffic Engineers determined the desired and safe access points and road widths. Major roads are located on the northern and eastern boundary of the property and an additional arterial link road will be constructed as part of the development. The internal road network will provide access to the individual residential erven, community facilities, commercial and industrial premises.

7.3.3. Safety / Security

Crime affects people in different parts of the country in different ways. This has significant implications on the way of living and the type of accommodation required. Secure living is a premium and with the densification of residential areas there is some comfort with neighbours in close proximity. Controlled access to the higher density residential units will provide a safer living environment.

7.3.4. Property Values

With the degraded state of the de-commissioned mining site and also the poor condition of many of the dwelling houses on the land, it can be expected that current property values are low. The re-development of the land to incorporate existing houses on individual erven with full township services, will improve the value of these properties. The area is well located in terms of places of employment and main transportation routes. This will also contribute to secure property values. It can be concluded that the proposed development will have a positive impact on property values in the area.

7.3.5. Sense of place

The concept of 'a sense of place' does not equate simply to the creation of picturesque landscapes or pretty buildings, but to recognise the importance of a sense of belonging. In terms of the human made environment, quality of place recognises that there are points where elements of settlement structure come together to create places of special significance. The proposed development will have a distinct character with historical elements which will make it unique. This could create this sense of belonging which in essence create unique 'sense of place' value.

7.3.6. Employment Opportunities

Land for the development of various types of job creation activities will be provided for in the development. Opportunities will be created in the business sector, industries, community facilities, education and in the hospital. The job opportunities created by the proposed development could be seen as a positive attribute for people living in the new township and also for workers in the surrounding areas.

7.4. CULTURAL ENVIRONMENT

7.4.1. Archaeological Value

A Heritage Impact Assessment was undertaken by PGS Heritage & Grave Relocation Consultants. No items or signs of features with archaeological value were found on the property. However, should any archaeological sites or artefacts of cultural importance be found during the construction phase, the South African Heritage Resource Agency (SAHRA) will be contacted to undertake proper scientific investigations of the findings.

7.4.2. Cultural / Historical Value

PGS Heritage Consultant also investigated the historical value of the site. The study was undertaken by ways of detailed aerial mapping and field work. All the existing buildings on the site were photographed and assessed in terms of historical value, structural stability, uniqueness and conservation value. Architectural styles were identified and where possible buildings of similar styles and architecture were grouped in clusters and incorporated in the township layout plan. A set of guidelines will be prepared for the restoration or upgrading of the old houses to be included in the residential component of the project. The Heritage Architect has been instructed to prepare regulatory guidelines for the upgrading and development of the various clusters, not only to blend in with the new development, but also to add to the viability of the preservation process. The houses will be sold and occupied by individuals, with a firm set of conditions and guidelines on maintenance and appearance.

There is an existing cemetery on the site. This cemetery will be preserved and has been incorporated in the township design as an erf with a 'Cemetery' zoning. Should any other graves or burial ground be found during the course of the construction phase of the project, the developer will comply with Section 12(2B)(e) of the National Monuments Act, 1969 (Act 28 of 1969), which requires the authorisation and issuing of a permit before any graves can be moved.

8. PUBLIC PARTICIPATION PROCESS

8.1. INTRODUCTION

Public Participation is a cornerstone of any Environmental Impact Assessment. The principles of the Regulations in terms of the National Environmental Management Act, 1998 (No. R. 385) govern many aspects of Environmental Impact Assessments, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment and ensuring that their participation and input are recognised.

Effective public involvement is an essential component of many decision-making structures, and effective community involvement is the only way in which the power given to communities can be used efficiently. The public participation process is designed to provide sufficient and accessible information to Interested and Affected Parties (I&AP's) in an objective manner to assist them to:

- Raise issues of concern and suggestions for enhanced benefits;
- Verify that their issues have been captured;
- Verify that their issues have been considered by the technical investigations; and
- Comment on the findings of the EIA.

The results described below have been collected following the processes and procedures as prescribed in Section 54 of the EIA Regulations of the National Environmental Management Act (NEMA),1998.

8.2. PROCESS OF ENGAGEMENT

The scoping that was undertaken by Singisa Environmental served to inform adjacent land owners and other interested and/or affected parties, which included the relevant authorities and community forums, on the proposed scale, nature and extent of the development and to provide these parties with the opportunity to comment on the proposed development.

8.2.1. Notification

The following process has been used to inform interested and/or affected parties of the proposed development:

- The project was registered with the Gauteng Department of Agriculture and Rural Development on 16th January 2013;
- A notice advertising the proposed development appeared in The Star newspaper on 1 March 2013;
- A notice advertising the proposed development appeared in Roodepoort Record on 1 March 2013;
- Ten site notice boards were erected at visible locations surrounding the site;
- Background Information Documents (BID) were distributed to the landowners living on the current farm portions as well as surrounding land owners, authorities as well as other potential I&AP's informing them of the proposed development;
- Parties were requested to register as I&AP's with Singisa Environmental before or on 1 April 2013.

8.2.2. Interested and Affected Parties

Documentation and notice of the proposed development, including a Background Information Document (BID), were distributed to approximately 350 households and other possible Interested and Affected Parties. This was done by way of an inclusion with the monthly rental account payable by all legal residents. In addition, ten site notices were displayed at various prominent places on the grounds. Registered letters were sent to identified Interested and Affected Parties and stakeholders. Table 8.1 shows the parties that were provided with a BID and notified of the proposed development by registered mail.

Table 8.1 Interested and Affected Parties contacted

Surrounding Landowners	Comment
All existing residents/tenants were notified of the proposal.	BID Document distributed as part of the monthly rental account to all legal tenants living on the DRD property.
Most of the adjacent properties are also owned by the mine.	Registered letters sent. No comment.
Service Providers	
Eskom	No comment
Rand Water	No comment

Surrounding Landowners	Comment
SAHRA	Heritage assessment report will be submitted to SAHRA
Gautrans	No comment. Negotiations via Traffic Engineers.
Department of Public Works	No comment
Department of Minerals and Energy	Comments received prior to the Public Participation process
National Nuclear Regulator	Comments received prior to the Public Participation process
Department of Water Affairs	No comment
Ward Councilor	
Councillor Sabelo Nscang	The Ward Councillor had two meetings with residents during which they were informed of the development proposal.
Municipalities	
Mogale City Local Municipality: Environmental Section	Registered as Interested and Affected Party.
Mogale City Local Municipality: The Municipal Manager	No comment.
City of Johannesburg Local Municipality: Environmental Section	Liaison process with City of Johannesburg Metropolitan Municipality on-going for the past six years.

8.2.3. Comment Report

No formal comments regarding possible environmental issues have been received from Interested and Affected Parties. The environmental Public Participation process was done at the same time as the Town Planning Public Participation process and many people completed EIA registration form under the impression that it was a name list for housing. All these forms have been analysed for possible environmental issues and comments.

Table 8.2 Comment Report

Surrounding Landowners	Comment	Response
Existing residents of DRD	Comments from residents relate to the provision of housing. The residents generally welcomed the development and asked for rental houses and houses to buy.	Details of parties handed to developers who will liaise with each party on an individual basis regarding available housing.

Surrounding Landowners	Comment	Response
Service Providers		
Eskom	No comment on EIA process	
Rand Water	No comment on EIA process	
SAHRA	No comment on EIA process	
Gautrans	No comment on EIA process	
Department of Public Works	No comment on EIA process	
Department of Minerals and Energy	No comment on EIA process	
National Nuclear Regulator	No comment on EIA process	
Department of Water Affairs	No comment on EIA process	
Ward Councilor		
Councillor Sabelo Nscang	No comment on EIA process. However, the councillor is very involved and already had two information meetings with residents.	
Municipalities		
Mogale City Local Municipality: Environmental Section	11 March 2013 I&AP. Singisa to provide hard copy of all Reports. No comment on Draft EIA.	
Mogale City Local Municipality: The Municipal Manager	No comment on EIA process	
City of Johannesburg Local Municipality: Environmental Section	No comment on EIA process or Draft EIA Report submitted to the Municipality. Singisa will provide copy of the Final EIA Report to the Environmental Section.	

8.2.4. Register of Interested and Affected Parties

Interested and Affected Parties that registered it terms of environmental guidelines and requirements

Table 8.3 Register of Interested and Affected Parties

Name	Address
Mogale City Local Municipality	PO Box 94, Krugersdorp, 1740 Tel: 011 951 2113 E-mail: koogan.naidoo@mogalecity.gov.za Contact Name: Koogan Naidoo
City of Johannesburg Local Municipality: Environmental Section	118 Jorrison Street, Braamfontein
Residents occupying rental housing units. Numerous persons completed a form what appears to be a perception to be a registration form for a new or upgraded house within the project. Al these people will be again informed of the process and the availability of the scoping report for any positive or negative environmental input.	DRD Village, Roodepoort

8.2.5. Critical Issues

The proposed re-development of the de-commissioned mining land will have an impact on the people currently residing on the land and on the surrounding environment. A number of issues which are considered as significant have been identified during the planning stages of the project. These issues are listed as so-called 'critical issues' in the table hereunder. The issues are listed in alphabetical order and will be addressed in detail in the assessment process. Where relevant and practical, mitigation and management procedures will be prescribed for incorporation in the Environmental Management Programme (EMPR).

Table 8.4 Key issues identified on comments received during the scoping phase

Issue	Nature of Issue
○ Air Quality	Dust from slimes dumps during the removal process

Issue	Nature of Issue
○ Heritage structures	There are a number of old houses on the site. The heritage architect wants to keep a number of these houses as a typical example of the architectural style of that time period.
○ Housing	The major concern of the existing tenants is how the transition process will work when houses are demolished and new houses are built. Where will they be housed?
○ Radon Levels	Possible danger to humans as a result of radioactive materials in the waste materials.
○ Services Capacities	The existing infrastructure services will not be adequate for the proposed development. This will have to be upgraded and improved.
○ Stormwater Management	Management of rainwater flow from slimes dumps and within the proposed development.
○ Undermined areas	The site was the location of an old gold mine. Certain areas have been mined at shallow depths and are not suitable for township development and construction of houses.
○ Vegetation	To improve the quality of vegetation in the area

8.2.6. Review of Scoping Report by I&AP's

All issues and concerns of I&AP's must be addressed and should form an integral part of the Environmental Impact Assessment. The Environmental Scoping Report was made available to registered Interested and Affected Parties from 30 April 2013 to 31 May 2013 for commentary purposes. I&AP's had 30 days in which to provide comments. No comments or objections were received. All other minor issues as identified during the Scoping phase have been incorporated in the assessment process and where necessary, mitigatory measures prescribed. The management of all aspects during the construction period will be dealt with in detail in the Environmental Management Programme.

8.3. Comments from Interested & Affected Parties on EIA Report

This Final Environmental Impact Assessment Report was circulated/or made available to I&AP's for comment. No comments or objections were received on the draft Environmental Impact Assessment Report.

9. NEED AND DESIRABILITY

9.1. Need of proposed development/alternatives

The DRD site under consideration has been mined for more than 100 years. This resulted in a complete transformation of the environmental character of the land and also the topography as a result of the mine dumps and slimes dams. Housing and recreational facilities were provided and infrastructure installed. The gold mine company provided a number of dwelling houses and other forms of residential units for their staff on this land, close to the mining area and related mining activities. In addition, recreational and sport facilities were also provided by the mine.

Until mining activities ceased in 1998 this was a well developed and maintained mining village. The slimes dumps have been rehabilitated to a large extent and the residential area within the mining area was considered as a safe and stable environment. The existing houses and some of the residential units are being rented, but in general the absence of continuous maintenance resulted in the deterioration of the area and the appearance and structural stability of the houses.

Since 1998 a certain degree of rehabilitation of the mining activities took place, mainly the demolition of mining structures and plants. The mine dumps and slimes dams have been sold as separate entities and the deposits of these dumps are in the process of being removed. This process falls under the jurisdiction of the Department of Mineral Resources and is accordingly managed in terms of approved Management and Rehabilitation Plans.

The aim of the proposed development is to assist with fulfilling the greater need for housing in this area. This development will provide more than 10 000 housing units, comprising individual houses, cluster houses, flats and credit linked units in order to cater for a wide range of needs and income brackets.

The proposed development is highly desirable as the local communities will be benefited through opportunities to obtain housing in a new and improved urban environment. Employment opportunities will also be available as a result of the anticipated development. The long term employment opportunities include service industries, employment in schools as well as employment in commercial centres and business nodes.

9.2. Desirability of proposed development/alternatives

In terms of the approved Regional Spatial Development Framework (RSDF) of 2010/2011 (RSDF C, Sub-Area 12), the site under discussion falls inside the urban development boundary of the City of Johannesburg Metropolitan Municipality and is earmarked for residential infill or densification of existing development. Subject to the availability of services and infrastructure services, development of the said portions of land is in line with Council's vision, planning principles, strategies and policies for the area. Guidelines for development are amongst others the provision of a range of an affordable housing mix, the provision of social services and the development of sustainable human settlements.

9.3. Advantages and Disadvantages of proposed activity/alternatives

9.3.1. Proposed activity

A number of alternative development options have been considered over the past years. Specialists have been appointed to analyse market trends and aspects applicable to this site. Various other aspects have been considered in formalising a development proposal. These include a detailed heritage assessment, services availability and connection points, socio-economic research and inputs from local residents via several meetings, geo-technical constraints as a result of previous mining activities, existing infrastructure and traffic flow patterns.

The development proposal is a result of the evaluation of various alternatives, which included alternative housing types and densities, alternative land uses such as industrial, the redevelopment of the existing golf course with exclusive housing or a commercial development. The long planning process that took place was indeed an evaluation of various development alternatives. Various aspects and alternatives have been assessed for the past seven years which resulted in detail investigations of aspects such as the depth of the undermining, the removal of the mine dumps, the structural stability of existing building structures and the functionality of existing infrastructure services.

The development proposal includes elements of all these uses and investigations, but focuses primarily on the provision of housing and associated community facilities, such as schools, crèches, recreation, shops, churches, hospital and medical consulting rooms. It can therefore be concluded that many alternatives were considered and that the best possible solution was adapted as a workable and viable alternative for the re-development of the property.

9.3.2. Alternatives

For the purpose of this report, some of the alternatives of development which were considered during the planning process will be discussed. The Alternatives to be addressed in the assessment process are:

- The re-development of the golf course and the establishment of a golf estate with residential units incorporated in the golf course design.
- To demolish all the existing dwelling houses and to develop an industrial township, covering the entire developable area.

9.3.3. The No Go Alternative

The property under consideration has been developed as a mining village with many houses, but also large opens spaces. The property is therefore susceptible to unauthorised occupation which could pose problems for the land owners as well as for legal residents. The proposed development of the land is necessary as it will optimise the use of existing infrastructure and improve the condition of the natural environment. Housing will be provided to a wide range of income groups in an area located close to amenities and places of employment. Under a "no go" scenario, the area will degrade over time.

The "No Go" alternative is not feasible within the socio-economic context as there is a great demand for housing in the area. In addition, the existing infrastructure services and facilities will be utilised. The proposed development will have a positive impact on the environment and will improve the living qualities of many people. The proposed development will be in harmony with the surrounding land uses that is predominantly characterised by residential and commercial functions. The "No Go" option is not an alternative to consider.

10. CONSIDERATION OF PROJECT ALTERNATIVES

Alternatives are different means of meeting the general purpose and need of the proposed activity. The role of alternatives is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts. Potential alternatives are discussed hereunder.

10.1. Location Alternatives

During the initial planning stages of this development, the developer considered a number of project alternatives before going ahead with the negotiations to tie up the land for development. Subsequent to deciding to purchase the land, other fundamental issues of sustainability have caused the applicant to consider and reconsidered numerous aspects of the development proposal in order to seek the most acceptable solution regarding the biophysical, social, economic, historical, cultural and political environments.

Location criteria considered by the applicant for the development proposal were:

- The location of existing dwelling houses on the land;
- The demand for additional housing in this area;
- The accessibility of the property;
- The availability of township services to the proposed development;
- The opportunity to rehabilitate the de-commissioned mining site; and
- The opportunity to preserve sensitive historical buildings.

10.2. Activity Alternatives

10.2.1. Development Proposal

The proposed project will primarily be a densification of the existing residential component by the construction of additional residential units as well as the provision of a wide range of associated and supporting land uses. The development proposal took into consideration the character of the immediate surrounding environment and also the existing development on the property. Bordering the property on the northern, western and southern sides are residential land uses. On the southern side is the Bram Fiscerville township in Soweto, to the west is Matholesville residential township. North is Goudrand Extension 3, Roodepoort Extension 2 and Georginia residential townships. On the eastern side Dobsonville Road is

segregating the industrial development along Main Reef Road from the residential land uses on the property and adjoining the property under consideration. The existing character of the area surrounding the DRD property is predominantly residential.

A detailed Heritage Assessment was undertaken by specialists' heritage consultants and a heritage architect. The distinct character and architecture of the residential buildings on the property were evaluated and a number of residential buildings to be preserved were indentified. These buildings will form part of residential clusters with distinct architecture. The existing buildings on the property to be re-developed comprises mainly of dwelling houses, spread out over a large area. The residential buildings must be retained on the property as a result of the heritage value. It will be undesirable to introduce an industrial land use between the residential uses. The proposed residential land uses will be a continuation of the surrounding residential developments and communities. This alternative will be referred to as the Development Proposal.

10.2.2. Industrial Development

As alternative to this activity, the use of the entire available land to develop industrial properties was considered. The introduction of an industrial component within the existing residential units will be a conflicting land use and is not considered as desirable. It will be possible to introduce more industrial land uses once the mine dumps have been removed. The area of land now taken up by the mine dumps could then be planned and developed as industrial areas which will operate as separate entities which will not intrude into the residential areas. This could be undertaken as a future phase of the development.

The introduction of an industrial component will imply that many of the existing dwelling units will have to be demolished to make place for large factory buildings. However, new factories will create job opportunities for many people. This activity alternative will be referred to as Industrial Development.

10.2.3. Golf Estate

A further alternative that has been considered was the re-development of the golf course site as a golf estate with exclusive residential units incorporated in the golf course design. This activity alternative will be referred to as the Golf Estate Development.

The golf course that used to be on the land was built next to the houses, but on standards drastically different from current golf course designs. In addition, the old golf course only had nine fairways which took up half the space of a full size 18-hole golf course. Should the redevelopment of the golf course be considered, it will be essential to construct a proper 18-hole golf course, based on current standards and requirements. This will require much more land than what is currently vacant and available for redevelopment.

The reconstruction of a golf course will be an acceptable recreational facility in terms of current trends and requirements. The proposed residential use and the community which will be housed in the anticipated development will be better served by other forms of recreational facilities and open spaces, which will take-up less space. The implementation of this alternative will provide housing for the higher income brackets. The alternative use of the land by redeveloping the old golf course is acceptable, but will come at price which will not be to the benefit of the wider community.

10.3. Design Alternatives

Design alternatives could involve numerous aspects. For the purpose of this study the design alternative will be considered as the primary aspects associated with the location of the property. The macro township design was determined by the road system and access points. Topographical aspects and historical features on the property restricts and guide the macro design process. One of the main restrictions on the design of layout of the township is the presence of undermined areas. Altogether the development constraints and firm guidelines on the macro design possibilities resulted in a baseline design which offers little scope for the consideration of viable alternatives.

Micro scale design, for the purposes of this report, includes physical design elements such as the layout of individual erven, road surfaces, building materials and architectural features. Because the proposed development is still at design stage the micro scale design alternatives have not been assessed. Nevertheless, recommendations for the mitigation of anticipated impacts at this design level have been included.

10.4. The No-Go Option

In essence, the No-Go Alternative would ultimately mean that the state of the environment would be retained as it is presently, with obvious advantages and/or disadvantages to the natural environment. An objective assessment is provided in the table below for the

advantages and disadvantages for the No-Go alternatives of the proposed project, should the development not take place.

Planning proposals and development policies are instruments used by City Planners and Engineers guide development and to plan for the provision of infrastructure services. The ratepayers' money is used to install and upgrade services which will accommodate planning proposals. Municipal policies are in line with the aims and objectives of the Development Facilitations Act to strive for a more compact city and to optimise the use of available infrastructure services. The No-Go alternative will be in contradiction with these objectives and will lead to further degradation of the area.

10.5. Comparison advantage and disadvantage

The advantages and disadvantages of the development proposal and the two main possible alternatives which have been identified are summarised in the table below. The disadvantages of the No-Go alternative are also summarised in the table.

Table 10.1 Summary of potential alternatives to the proposed activity, with advantages and disadvantages of each alternative

Alternative	Advantages	Disadvantages
Development Proposal	• The development proposal has been planned over many years to find the optimum solution in the mix of land uses to provide. The proposed township will preserve the existing residential character and at the same tine include associated and complimentary uses to provide for community facilities and amenities. • Places of employment will be created in the provision of certain land uses categories. There is a large business component and also industrial erven along a main traffic route. Hospital facilities will include a number of job opportunities. • A number of buildings, representing a specific era of architecture have been identified by heritage consultants to be preserved and incorporated in the town design. The advantage of the mixed use township design is that most of the selected building could be accommodated in the distribution of the various types of land uses provided for in the development proposal. • The development could be phased in order to accommodate existing residents in new residential units, either on a rental basis or full ownership.	• Existing buildings restricted the free design of the development. Adjustments had to be made to accommodate existing structures and features. • People currently living in rented houses will have to be relocated during the phase of development when these houses will either be renovated or demolished.

Alternative	Advantages	Disadvantages
Activity 1: Industrial	• The development of the entire land area for industrial premises will create large numbers of new job opportunities, but people will have to travel from other residential areas to this workplace.	• A large number of dwelling houses, some of which with significant historical or architectural value will be demolished to make place for factory buildings. • Industrial uses right next to existing residential township will not be compatible and will have a negative impact on the quality of the living environment. • The industrial uses will generate heavy vehicle traffic on roads which was intended for normal residential traffic. • There are several industrial properties and large industries along the Main Reef Road which have developed over many years. The zoning of more than 200 hectares for industrial purposes will be an oversupply of industrial land which again will result in vacant or undeveloped land portions. • Industrial premises will require a much higher supply of electricity than residential uses. The current power supply network to this area will have to be upgraded to such an extent that it will negatively impact on the viability of the project.
Activity 2: Golf Estate	• The new golf estate will provide for houses in a selected price category which will generally tend to increase the property values in this area. • The golf estate will provide greater safety and security for the people living in the estate.	• The old golf course was only a 9-fairway course. To develop a golf estate will mean that a full 18-hole golf course must be designed on the land. This will imply that more of the existing houses will have to be demolished. • Golf estate development is more exclusive and will only cater for a very small sector of the community who will be able to afford the dwelling units in the estate. • The golf estate will utilise a large portion of the land and associated land uses will not be provided. • The development of a golf estate will not be in the best interest of the community as many people will have to find suitable accommodation elsewhere.
No-Go alternative	• People residing on the land will not have to be re-located.	• The ecological quality of the site is already in a poor state. This condition will continue and will deteriorate even further. • As a result of a lack of maintenance the condition of the dwelling houses on the land will get worse. • No new houses will be provided and vacant land will be occupied illegally. • Infrastructure in the area will not be improved. • No new job opportunities will be created. • No rehabilitation will take place which will lead to unsafe and unhealthy living conditions.

11. SUMMARY OF FINDINGS - SPECIALIST STUDIES

11.1. Archaeological Assessment

PGS Heritage & Grave Relocation Consultants completed an assessment of building structures and its cultural historic value **(Annexure M)**. Their findings played a significant role in the township design where clusters of dwellings with a specific style and architecture were identified and incorporated in the township layout. Other historically significant buildings and features were also identified and specific guidelines and conditions must be incorporated in the township proclamation conditions.

11.2. Radiological Survey

Nuclear Liabilities Management Division, NECSAA completed an assessment of possible Radon levels as a result of the slimes dumps on the property **(Annexure K)**. This aspect was considered as a possible issue and for that reason the specialists were appointed to conduct the survey. Their findings indicated insignificant low radon levels with no risk to the health of humans or animals.

11.3. Wetland Delineation Assessment

Prism Environmental Management Services undertook an assessment of possible wetland areas on the site **(Annexure H)** . A wetland area in the north-eastern section of the land was identified around the man-made dam. The dam was previously utilised for the storage of water used in the mining processes and the quality of the water is not good. It may be possible to improve the quality of the water over years and for this reason the dam with a buffer strip around it has been included as a wetland area. This area has been incorporated as open space in the township layout plan.

A valley bottom wetland has been identified in the central western part of the property. This wetland falls outside the developments area, on the undermined land. The seepage wetland areas, in particular around the slimes dump in the western section of the land, also falls outside the development area or within the 100 metre buffer area which have been provided around the slimes dumps.

Identified wetland areas have either been incorporated in the township design or fall outside the boundaries of the proposed development project.

11.4. Vegetation and Red Data Flora Assessment

Prism Environmental Management Services undertook an Ecological Assessment of the floral and faunal life on the property **(Annexure G)**. Their findings were that the historical mining activities had a severe impact on the ecology of the site. Because of the lack of indigenous vegetation, there is also an absence of faunal habitat. Illegal dumping had a further negative impact on the ecology of the site.

It can be concluded that the development of the property and the removal of the alien plant species could only improve the ecological situation on the land. The introduction of indigenous vegetation with the development will improve the bird life on the property. There are no ecological reasons why the development should not be supported.

11.5. Traffic Impact Study

Mariteng Management Solutions, Traffic Engineers, conducted a traffic assessment and the impact of the proposed development **(Annexure N)**. Three main access routes have been identified and assessed in terms of anticipated traffic volumes. Recommended road widths have been incorporated in the township design. Several additional facilities must be provided to improve the accessibility to public transport facilities and to improve road safety. The Traffic Engineers approved the township layout plan and made specific recommendations regarding the provision for Public Transport. These recommendations must be incorporated in the final road designs.

11.6. Electrical Services Report

Debcon Electrical and Mechanical Engineers evaluated the supply of electricity to the proposed development **(Annexure I)**. Their findings were that electricity supply is available from City Power's Roode Town or Roodepoort sub-station. The existing mine intake point can be upgraded to make capacity available for the initial development requirements. An alternative supply point is also possible at the ROCLA cement works. Two satellite switching stations will be required and these satellite stations will then be connected with miniature substations and bulk metering for large consumers.

The developers will be required to make development contributions and/or to install certain main lines and equipment. Notwithstanding, the important aspect is that electricity supply to the proposed development can be made available.

11.7. Civil Services Report

SCIP Engineering Group (Pty) Ltd was appointed as Consulting Engineers for the civil services of the proposed development **(Annexure J)**.

Water: Existing Rand Water pipelines run along the Roodepoort/Randfontein Road with three water supply connection points servicing the mining estate south of Main Reef Road. Rand Water supply conditions will require Johannesburg Water to provide on-site storage capacity. The implementation thereof may have to be financed by the proposed development and off-set against bulk contributions. The southern extensions of the proposed development can obtain water from the Johannesburg Water reticulation system servicing the municipal residential area, Bram Fisherville, just south of the proposed development. This existing water network is served fro

the existing Bram Fisherville Reservoir which has adequate storage capacity.

Sewerage: There are existing sewer pipelines within and in vicinity of the proposed development area which connect to the municipal sewer network. The influence that the proposed development will have on the existing network will be evaluated and upgrading must be implemented where applicable.

Roads: There are several existing access roads to the area, all connecting to the Main Reef Road. Primary access to the northern part of the proposed development can be obtained from Main Reef Road. A new link road or upgrading of the existing Cemetery Road is proposed between Bram Fisherville and Main Reef Road in order to provide second primary access to the proposed development. This road is deemed to be a regional road and the implementation thereof may have to be financed by the development and off-set against bulk contributions. The southern part of the proposed development can obtain access from the existing Bram Fischerville area.

Stormwater: A watercourse exists between the northern and southern part of the proposed development, however the development is not affected by a floodline. There is no existing stormwater infrastructure in the old mining village. This proposed development requires an underground pipeline system which will be routed through attenuation dams and then to discharge in to the floodline area situated between the northern and southern development areas.

11.8. Geotechnical Report

African Exposed Consulting Engineering Geologists conducted a geotechnical investigation and drilled sixty four test holes throughout the proposed township development area

(Annexure L). The area where the land under consideration is located is largely underlain by quartzite formations belonging to the Witwatersrand Supergroup. The gold bearing reefs are indicated on the township layout plan and the Department of Mineral Resources (DMR) has accurate records of the mining activities along these reefs. The Department advised the developer the site is subject to undermining and indicated the areas where no development will be permitted at this stage. The Department laid down development height restrictions for buildings in certain zones relating to the depth of undermining. The depth of the undermining extends from shallow in the north to deep in the south.

The plan indicating the undermining was prepared based on the information received from DRD, Global Geomatics Land Surveyors and Africa Exposed Consulting Engineering Geologists. The position and undermining depths for the Main Reef Outcrop and the Bird Reef Outcrop was determined by mapping. The Kimberly Reef Outcrop details were determined by percussion drilling, done by Messrs. Water Reus Drilling. None of the boreholes that were drilled intersected old mining workings. This therefore implies that the Kimberly Reef dips at a minimum angle of 42º from the surface to a depth of at least 120m below surface.

Soil conditions are generally favourable for the construction of dwelling houses and larger buildings. Certain areas of the site are subject to a seasonal perched ground water table in the rainy season as a result of the composition of the soils in these areas. The relatively shallow water levels will often give rise to seepages on surface in response to intense rainfall events. However, this seasonal characteristic can be managed and will not restrict development in affected areas.

11.9. Town Planning Memorandum

Hunter Theron Inc. Town & Regional Planners have been involved with the project for a number of years and played a leading role in the management of the planning process **(Annexure F)**. The relevant specialists have been appointed under their guidance and the fact that critical information was available provided them with an opportunity to prepare a comprehensive township layout plan. The planning proposals take into account the current social and economic conditions and make provision for a range of land uses, allocated in such way that the uses are complimentary and compatible with each other. Changes to the macro design will be minimal due to the fact that the layout has been presented and discussed with authorities, stakeholders and main decision-makers. Micro design changes will not impact on the main design principles and changes to the township layout plan are expected to be minimal.

12. METHODOLOGY IN DETERMINING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS

As a means of determining the significance of the various impacts that can or may be associated with the proposed project, a series of assessment criteria were used for each impact. These criteria include an examination of the nature, extent, duration, intensity and probability of the impact occurring, and assessing whether the impact will be positive or negative for the natural as well as biophysical environments at, and surrounding, the site.

The overall aim of an ecologically sound development project is to minimise the negative impacts of the project on the environment, thus limiting the ecological footprint of the project while moving towards greater sustainability over the longer term.

12.1. Nature

This is an appraisal of the type of effect the activity would have on the affected environment. This description includes what is being affected and how.

12.2. Extent

This indicates the spatial area that may be affected by the impact and further describes the possibility that adjoining areas may be impacted upon. This includes four classes that are listed as follows:

- Local (extending only as far as the site);
- Limited (limited to the site and it's immediate surrounds);
- Regional (extending beyond immediate surrounds to affect a larger area); and
- National or international.

12.3. Duration

This refers to the period of time that the impact may be operative for (i.e. the lifetime of the impact). This includes the following four classes that are listed as follows:

- Short (i.e. 0 - 5 years);
- Medium (i.e. 5 - 15 years);
- Long (i.e. > 15 years and/or where natural processes will return following the cessation of the activity or following human intervention);
- Permanent (i.e. where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient).

12.4. Intensity

This indicates whether the impact is likely to be destructive or have a lesser effect. Three such classes of intensity are defined and these are listed as:

- Low (i.e. where natural, cultural and social functions and processes are not affected by the development);
- Medium (i.e. where the natural, cultural and/or social functions and processes are affected by the development but can continue in a modified way);
- High (i.e. where natural, cultural and/or social functions or processes are altered to the extent that it will temporarily or permanently cease).

12.5. Probability

This refers to the likelihood of the impact actually occurring. The following four classes are used to describe the probability of the impact:

- Improbable (i.e. low possibility of the impact);
- Probable (i.e. a distinct possibility exists that the impact will occur);
- Highly probable (i.e. more than likely that the impact will occur);
- Definite (i.e. the impact will occur regardless of any preventative mitigation/measures).

12.6. Reversibility

The proposal under consideration could almost be considered as a rehabilitation project in an attempt to rectify or reverse the environmental impacts of the previous mining activities. The nature of the proposed activity will be permanent and will positively change the heavily impacted environment. The reversibility of the proposed activity is not an option as the changes to the environment will be in accordance with current policies and development guidelines and therefore permanent.

12.7. Degree to which impact can be mitigated

The following criteria have been taken into account in determining the mitigation potential of an environmental issue:

- The existence of legislation, norms and standards intending to safeguard the particular issue;
- Whether mitigation can be achieved through design of the development;
- Whether mitigation can be achieved through management of the development.

Utilising the above mitigation potential criteria the following rating will be applied:

- High – all three mitigation criteria apply;
- Moderate – two mitigation potential criteria apply;
- Low – one mitigation potential criterion applies.

12.8. Significance

The significance of the impact (i.e. whether it will lead to a marked change in the environment or not) is determined though a synthesis of the aspects produced in terms of their nature, duration, intensity, extent and probability. Four classes of significance exist including:

- None - the impact will not have an influence on the decision and requires no mitigation;
- Low - the impact will have a limited influence on the decision and requires mitigation to manage the environment;
- Medium - it is likely to have an influence on the decision and requires mitigation;
- High - mitigation is required and this may not be sufficient to ensure that the environment is not detrimentally affected by the proposed development.

12.9. Cumulative Effects

It is important to assess the natural environment using a systems approach that will consider the cumulative impact of various actions. Cumulative impact refers to the impact on the environment, which results from the incremental impact of the actions when added to other past, present and reasonably foreseeable future actions regardless of what agencies or persons undertake such actions. Cumulative impacts can result from individually minor but collectively significant actions or activities taking place over a period of time. Cumulative effects can take place so frequently in time that the effects cannot be assimilated by the environment.

An assessment of the impact that the proposed development may have on the environment includes evaluating the impact according to a series of assessment criteria. This has been undertaken by considering the effects that may result should the impact occur. This was evaluated according to the inputs received from I&AP's and on the basis of experience gained from similar projects.

13. ENVIRONMENTAL ISSUES

Table 13.1 below indicates the relevance of the various environmental aspects that may be affected by the proposed development. This section deals with the requirements of GN R543, Sub-regulation 31 (2)(k) with respect to the description of environmental issues that were identified during the Environmental Impact Assessment process. An assessment is made of the significance of each issue with an indication of the extent to which the issue could be addressed by the adoption of mitigation measures.

Table 13.1 List of Environmental Issues with possible relevance to project

Environmental Issue	Mitigation Potential	Significance	Associated Impacts
Ecological/Biological			
Damage to the ecology of the property	Moderate	Low	Ecological systems
			Vegetation
			Fauna
			Water run-off from slimes dumps
Physical Environment			
Contamination of air, soil and water resources. Undermining	Moderate to high	Medium to low	Air Quality – dust pollution
			Geology – undermining
			Soil – suitability for construction
			Stormwater Management
			Wetlands
			Pollution of water
			Topography
			Visual Impact
			Waste and Litter
			Cumulative impacts
Socio-Economic			
Change of the social and economic structure of the area	Moderate	Medium	Housing provision– Public Response
			Employment opportunities
			Health – Radon levels
			Heritage – preservation of structures
			Essential township services
			Land Use
Cumulative Impacts	Moderate to high	Low	Combined impact of environmental issues

The issues have each been assessed taking into account information obtained from the applicant, I&AP's and specialist's inputs. The issues of significance are discussed in more detail below and mitigation measures are proposed for the meaningful management and monitoring thereof. This section of the report should also be read hand in hand with the Environmental Management Programme attached hereto as **Annexure N**.

14. ASSESSMENT OF SIGNIFICANCE

During the Scoping phase a number of key issues have been identified. These issues have been listed in Table 13.1. Sub-regulation 31(2)(l) requires that an assessment of each identified potentially significant impact, together with an indication of the nature, the extent and duration, the intensity, the probability and the degree to which the impact can be mitigated. An environmental issue does not equate to an environmental impact and for this reason the possible impacts associated with the issues will be assessed.

14.1. Aspects of Potential Impact

14.1.1. Ecological Systems – Floral and Faunal Abundance and Diversity

- **Impact Statement**

  The ecological systems on the site have been destroyed due to mining activities that took place on the land over a very long period. During the construction phase alien vegetation will be removed and indigenous plants planted. The impact will be that certain bird species nesting in the alien trees will relocate.
- **Discussions**

  The proposed development project will not reverse the natural habitats to its earlier natural state. However, the removal of alien vegetation and the rehabilitation of open space areas will create limited habitats with minor ecological systems.
- **Significance Rating of Potential Impact**

  Table 14.1 below indicates the significance rating ecological systems on the site. Prior to mitigation measures being implemented, the impact significance is **Low – Negative**, while after the implementation of mitigation measures it has been reduced to a **Low – Positive** significance.

Table 14.1: Ecological Impact

IMPACT DESCRIPTION : Ecological Systems				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Medium	The removal of alien vegetation and planting of indigenous plants will be an on-going process. High impact during construction phase.	Consequence: Beneficial	Significance: Low - negative
Extent	Local	The activity will only relate to the site.		
Intensity	Medium	Bird species will return to the site with the planting of indigenous trees.		
Probability	Definite	Large alien trees must be removed to accommodate the densification of the residential area and the construction of new homes.		
MITIGATION: <u>Construction Phase:</u> • Remove large alien trees only as development progresses. This will allow for the relocation of birds. • Do not remove any alien vegetation from the rehabilitated slime dumps. • The developer to plant indigenous trees on pavements and open spaces in the re-developed areas. Allow only indigenous trees to be planted on new individual erven. <u>Operational Phase:</u> • Continue to create awareness with new owners and occupants of houses to plant only indigenous trees. • Monitor vegetation growth in open space areas.				
POST-MITIGATION				
Duration	Long	As for pre-mitigation	Consequence: Highly beneficial	Significance: Low - positive
Extent	Local	As for pre-mitigation		
Intensity	Medium	Mitigation will improve ecology on the site		
Probability	Definite	Mitigation will improve the ecological qualities of the area.		

14.1.2. Vegetation

- **Impact Statement**

  The quality of vegetation on the site is in a very poor state and comprises mainly of large alien trees and heavily infested grassland on the vacant land. The gardens of the mining houses are generally in a poor state of maintenance.

- **Discussions**

  It is the intention of the developers to demolish many of the houses as part of the re-development program. This will imply that existing vegetation in these areas will also be removed. This will be positive as most of the significant trees are alien species.

- **Significance Rating of Potential Impact**

  Table 14.2 below indicates the significance rating for vegetation on the site. Prior to mitigation measures being implemented, the impact significance is **Medium**, while after the implementation of mitigation measures it has been reduced to a **Low** significance.

Table 14.2: Vegetation

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Vegetation</th></tr>
<tr><td>Predicted for project Phase:</td><td>Pre-construction</td><td>Construction</td><td>Operational</td><td>Decommissioning</td></tr>
<tr><td>Dimension</td><td>Rating</td><td colspan="3">Motivation</td></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Medium</td><td>The removal of alien vegetation and planting of indigenous plants will be an on-going process.</td><td rowspan="3">Consequence: Beneficial</td><td rowspan="4">Significance: Medium</td></tr>
<tr><td>Extent</td><td>Local</td><td>The activity will only relate to the site.</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>Bird species will return to the site with the planting of indigenous trees.</td></tr>
<tr><td>Probability</td><td>Definite</td><td colspan="2">Large alien trees must be removed to accommodate the densification of the residential area and the construction of new homes.</td></tr>
<tr><td colspan="5">MITIGATION:
<u>Construction Phase:</u>
• Remove large alien trees only as development progresses. This will allow for the relocation of birds.
• Do not remove any alien vegetation from the rehabilitated slime dumps.
• The developer to plant indigenous trees on pavements and open spaces in the re-developed areas. Allow only indigenous trees to be planted on new individual erven.</td></tr>
</table>

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Vegetation</th></tr>
<tr><td colspan="5">Operational Phase:
• Continue to create awareness with new owners and occupants of houses to plant only indigenous trees.
• Monitor vegetation growth in open space areas.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>As for pre-mitigation</td><td rowspan="3">Consequence: Beneficial</td><td rowspan="4">Significance: Low</td></tr>
<tr><td>Extent</td><td>Local</td><td>As for pre-mitigation</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>Mitigation will improve ecology on the site</td></tr>
<tr><td>Probability</td><td>Highly probable</td><td colspan="2">Mitigation will improve the vegetation qualities in the proposed township</td></tr>
</table>

14.1.3. Fauna

- **Impact Statement**

  Mining activities on the site almost totally destroyed faunal habitats. Large alien trees are often used by avi-faunal species to nest and it is therefore important not to remove all these trees at the same time. The removal in phases of development will give the birds a chance to relocate. Faunal habitat in wetland and opens space areas could improve with controlled development and monitoring of open spaces.

- **Discussions**

  The proposed development makes provision for open space areas which could be utilised by certain faunal species as habitat. However, most of the open spaces will be used as formal parks, associated with urban living. The wetland areas could offer a wider range of habitat for faunal species when development takes place and illegal occupants in these areas are removed.

- **Significance Rating of Potential Impact**

  Table 14.3 below indicates the significance rating faunal habitat on the site. Prior to mitigation measures being implemented, the impact significance is **Medium**, while after the implementation of mitigation measures it has been reduced to a **Low** significance.

Table 14.3: Fauna

IMPACT DESCRIPTION : Fauna				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Medium	The removal of alien trees and planting of indigenous trees. Bird species will relocate.	Consequence: Beneficial	Significance: Medium
Extent	Limited	The activity will only relate to the site and surrounding areas.		
Intensity	Medium	Bird species will return to the site with the planting of indigenous trees.		
Probability	Definite	Large alien trees must be removed to accommodate the new developments.		
MITIGATION: Construction Phase: • Control the removal of large alien trees and phase it to coincide with the development stages. • Relocate species found on site during construction. Operational Phase: • Manage opens space areas to prevent human interference with faunal life.				
POST-MITIGATION				
Duration	Long	As for pre-mitigation	Consequence: Highly beneficial	Significance: Low
Extent	Local	As for pre-mitigation		
Intensity	Medium	Mitigation will improve the faunal habitat in certain areas of the site		
Probability	Highly probable	Mitigation will improve the habitat quality of a limited number of faunal species		

14.1.4. Water Run-off from Slimes Dumps

- **Impact Statement**

  Rain storms could cause damage to the side-walls of the slimes dumps. The dumps are stable and have been rehabilitated to almost a complete vegetation cover. There appears to be attempts to commence with the removal of one of the dumps, but the scale of the activity is low. Currently, slime materials are illegally removed from the

dumps and re-processed by individuals. This illegal removal of materials could cause damage to the vegetation cover of the dumps.

- **Discussions**

  The removal of vegetation from the slime dumps will impact on the surrounding areas due to the fact that unprotected slime materials could be subject to water and wind erosion. If not rehabilitated in time, serious erosion of the side-walls could occur.

- **Significance Rating of Potential Impact**

  Table 14.4 below indicates the significance rating the water run-off from the slimes dumps. Prior to mitigation measures being implemented, the impact significance is **Medium.** Mitigation by means of continuous monitoring and rehabilitation of the vegetation cover on the slimes will change the significance of the impact of this aspect to **Low**.

Table 14.4: Water Run-off from Slimes Dumps

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Water Run-off from Slimes Dumps</th></tr>
<tr><td>Predicted for project Phase:</td><td>Pre-construction</td><td>Construction</td><td>Operational</td><td>Decommissioning</td></tr>
<tr><td>Dimension</td><td>Rating</td><td colspan="3">Motivation</td></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Medium</td><td>Equal to period of removal of the slimes dumps</td><td rowspan="3">Consequence: Detrimental</td><td rowspan="4">Significance: Medium</td></tr>
<tr><td>Extent</td><td>Local</td><td>The water run-off from the slimes dumps will occur on the property</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>The vegetation on the side walls of the slimes dumps must be kept in place</td></tr>
<tr><td>Probability</td><td>Highly probable</td><td colspan="2">Without vegetation cover on the side-walls of the slime dumps, the environment will be negatively impacted on.</td></tr>
<tr><td colspan="5">MITIGATION:
<u>Construction Phase:</u>
• Restrict access of workers to the slimes dumps.
• Do not remove any materials from the side-walls of the slime dumps.
• Rehabilitate vegetation cover where damaged by water run-off.

<u>Operational Phase:</u>
• As for the Construction Phase.</td></tr>
</table>

IMPACT DESCRIPTION : Water Run-off from Slimes Dumps				
POST-MITIGATION				
Duration	Medium	Equal to period of removal of the slimes dumps	Consequence: Detrimental	Significance: Low
Extent	Local	The water run-off from the slimes dumps will occur on the property		
Intensity	Medium	The vegetation on the side walls of the slimes dumps must be kept in place		
Probability	Highly probable	The vegetation cover on the side-walls of the slime dumps will limits the possibility of erosion on the side-walls.		

14.1.5. Air quality – Dust Pollution

- **Impact Statement**

  The quality of air in the area is reasonably good and the localised air pollution occurs only with veld fires in the area. The slimes dumps have been rehabilitated and air pollution from this source is limited. Management measures have been prescribed for the removal of the slimes dumps. Uncontrolled removal of protection vegetation layer could result in dust pollution. The prevailing wind direction is from a north-westerly direction with no residential units in the possible effected zone.

- **Discussions**

  The removal of the slimes dumps will take place under the jurisdiction of the DMR. The removal of dump material is not part of this project and will be undertaken by an approved company, specialising in the field of the reclamation of gold dust from old slimes dumps. Management measures are prescribed by the DMR.

- **Significance Rating of Potential Impact**

  Table 14.5 below indicates the significance rating dust pollution. Mitigation measures for the removal of dump material will be implemented under the authority of the DRM and will not form part of this project. However, the vegetation cover on the dumps will be monitored during the construction and operational phases. The potential impact significance of the removal of the protective vegetation layer is considered as **Low**, whilst with the implementation of mitigation measures it will be rectified and therefore remains as a **Low** significance.

Table 14.5: Air Quality – Dust Pollution

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Air quality – Dust Pollution</th></tr>
<tr><td>Predicted for project Phase:</td><td>Pre-construction</td><td>Construction</td><td>Operational</td><td>Decommissioning</td></tr>
<tr><td>Dimension</td><td>Rating</td><td colspan="3">Motivation</td></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>Will continue until dumps have completely been removed</td><td rowspan="3">Consequence: Slightly detrimental</td><td rowspan="4">Significance: Low</td></tr>
<tr><td>Extent</td><td>Local</td><td>Will occur on the site but outside the development area</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>An occurrence will not cause the project to stop</td></tr>
<tr><td>Probability</td><td>Probable</td><td colspan="2">Mitigation is important to prevent an escalation of the impact</td></tr>
<tr><td colspan="5">MITIGATION:
<u>Construction Phase:</u>
• Restrict illegal access to slimes dumps.
• Monitor protective vegetation cover on slimes dumps and repair where damaged.
<u>Operational Phase:</u>
• Restrict illegal access to slimes dumps.
• Monitor protective vegetation cover on slimes dumps and repair where damaged.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>Will continue until dumps have completely been removed</td><td rowspan="3">Consequence: Slightly detrimental</td><td rowspan="4">Significance: Low</td></tr>
<tr><td>Extent</td><td>Local</td><td>Will occur on the site but outside the development area</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>An occurrence will not cause the project to stop</td></tr>
<tr><td>Probability</td><td>Probable</td><td colspan="2">Mitigation is important to prevent an escalation of the impact</td></tr>
</table>

14.1.6. Geology

- **Impact Statement**

  Undermining areas played an important role in determining the developable land portions. The undermining areas were confirmed by the drilling of boreholes. The development will exclude the undermined area, although these areas will relate closely to the development on surface level.

- **Discussions**

  The undermining took place at depths where it will not pose any danger to the property on ground level. The area excluded from development at this stage will still be managed to ensure a safe and pleasant environment. Site inspections will be carried out during construction to determine correct foundation methods.

- **Significance Rating of Potential Impact**

  Table 14.6 below indicates the significance rating for the undermined area on the site. Prior to mitigation measures being implemented, the impact significance is **High**, while after the implementation of mitigation measures it has been reduced to a **Low** significance.

Table 14.6: Geology - Undermining

IMPACT DESCRIPTION : Geology - Undermining				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Long	The undermining is permanent and unlikely to be reversed by infilling	Consequence: Very detrimental	Significance: High
Extent	Local	Undermining occur in the central parts of the site and has been demarcated		
Intensity	High	No building structures will be permitted on the undermined areas		
Probability	Definite	Development restrictions have been placed on the undermined areas, which restrict the development project to a smaller portion of the land		
MITIGATION: <u>Construction Phase:</u> • No development permitted of the undermined areas. • Where a property in the development abuts on the undermined area, the property must be fenced properly along the affected boundary line.				

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Geology - Undermining</th></tr>
<tr><td colspan="5">• Prevent dumping and littering on the undermined land.
• Remove declared weeds and invader plants.

<u>Operational Phase:</u>
• No development of the undermined areas permitted.
• Where a property in the development abuts on the undermined area, the property must be fenced properly along the affected boundary line.
• Prevent dumping and littering on the undermined land.
• Remove declared weeds and invader plants.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>The development area where building will be erected is geologically stable</td><td rowspan="3">Consequence: Very detrimental</td><td rowspan="4">Significance: Low</td></tr>
<tr><td>Extent</td><td>Local</td><td>Development area safe for development</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>Undermining will not affect development</td></tr>
<tr><td>Probability</td><td>Probable</td><td colspan="2">Building will not be affected by the undermining</td></tr>
</table>

14.1.7. Soil

- **Impact Statement**

  Certain areas of the site are subject to a seasonal perched ground water table in the rainy season as a result of the composition of the soils in these areas. The relatively shallow water levels will often give rise to seepages on surface in response to intense rainfall events.

- **Discussions**

  The seasonal wet areas can be managed and will not restrict development in these areas. Soil conditions are generally favourable for the construction of dwelling houses and larger buildings.

- **Significance Rating of Potential Impact**

  Table 14.7 below indicates the significance rating soil conditions on the site. Prior to mitigation measures being implemented, the impact significance is **Low.** After the implementation of mitigation measures it will remain to be of a **Low** significance.

Table 14.7: Soil Suitability for Construction

IMPACT DESCRIPTION : Soil Suitability for Construction				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Long	Soil formations are of such nature that seepage will always occur in rainy seasons	Consequence: Slightly detrimental	Significance: Low
Extent	Local	The affected area is only a small land parcel in the southern section of the site		
Intensity	Medium	The occurrence of seepage over short periods will not place restrictions on construction.		
Probability	Probable	The geologist confirmed that this phenomena during the rainy season		
MITIGATION: <u>Construction Phase:</u> • Install drainage lines to take seepage water away from buildings. • Plant trees and other vegetation in the wet areas. <u>Operational Phase:</u> • Install drainage lines to take seepage water away from buildings. • Plant trees and other vegetation in the wet areas.				
POST-MITIGATION				
Duration	Long	Sub-surface drainage lines will direct water away from buildings	Consequence: Slightly detrimental	Significance: Low
Extent	Local	The affected area is only a small land parcel in the southern section of the site.		
Intensity	Medium	The occurrence of seepage over short periods will not place restrictions on occupation.		
Probability	Probable	This area may dry out over years with the installation of proper drainage lines and vegetation		

14.1.8. Stormwater Drainage

- **Impact Statement**

  Rain water from the surface will naturally drain towards the low lying areas in the central part of the land from where a section will drain towards the west and another section towards the east. The natural drainage line has been disturbed by the mining activities and is weakly defined. There is no existing stormwater infrastructure within the development area.

- **Discussions**

  In the proposed development the water from normal rainfall will be accommodated in the underground stormwater drainage system for the proposed development. The underground pipeline system must be routed through attenuation areas and discharge into the catchment area situated between the northern and southern development areas. The flow into the natural drainage systems will have to be managed to avoid erosion.

- **Significance Rating of Potential Impact**

  Table 14.8 below indicates the significance rating of the surface water flow. Prior to mitigation measures being implemented, the impact significance is **Medium –**, while after the implementation of mitigation measures it has been reduced to a **Low** significance.

Table 14.8: Stormwater Drainage

IMPACT DESCRIPTION : Stormwater Drainage				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Long	The development will permanently change the environment	Consequence: Detrimental	Significance: Medium
Extent	Limited	The impact will primarily be on the site, but it could impact on adjacent low-lying land		
Intensity	Medium	Uncontrolled flow of stormwater could cause inconveniences or damage		
Probability	Highly probable	Stormwater flow will occur during thunderstorms		

IMPACT DESCRIPTION : Stormwater Drainage				
MITIGATION: Construction Phase: • Direct underground stormwater flow towards retention ponds in open space areas. • Retention ponds to be natural features and must be as large as possible and shallow. • The flow of stormwater into the natural drainage area must be dissipated over a large grassed area. • Flow from roofs of buildings should be directed to lawns or into water tanks on the property. Operational Phase: • Maintain and improve retention areas where necessary. • Encourage water retention on individual erven.				
POST-MITIGATION				
Duration	Long	The development will permanently change the environment	Consequence: Beneficial	Significance: Low
Extent	Limited	The impact will primarily be on the site, but it could impact on adjacent low-lying land		
Intensity	Low	Mitigation will manage the flow of stormwater and allow for infiltration		
Probability	Highly probable	Stormwater flow will occur during thunderstorms		

14.1.9. Wetlands

- **Impact Statement**

  The development area is not affected by a wetland system. Isolated and small wetland areas have been defined around the man-made dam in the north-eastern section of the property. This dam was previously utilised in the mining process. The dam and buffer area around it has been set aside as open space in the proposed new township. The other wetland areas identified on the land are outside the proposed township development boundaries. A large portion of the identified wet areas are a result of seepage from the slime dumps.

- **Discussions**

  The seepage wet areas around the slimes dumps will disappear when the dumps have completely been removed. The quality of the water in the man-made dam in poor and by means of proper management the condition of the dam and the surrounding wetland area will improve. The seepage wet areas around the slimes dumps are located outside the proposed township boundaries.

- **Significance Rating of Potential Impact**

  Table 14.9 below indicates the significance rating of existing wetland areas on the land. Prior to mitigation measures being implemented, the impact significance is **Medium – Low**, while after the implementation of mitigation measures it has been reduced to a **Low** significance.

Table 14.9: Wetlands

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Wetlands</th></tr>
<tr><td>Predicted for project Phase:</td><td>Pre-construction</td><td>Construction</td><td>Operational</td><td>Decommissioning</td></tr>
<tr><td>Dimension</td><td>Rating</td><td colspan="3">Motivation</td></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Medium to long</td><td>The seepage wet areas around the slimes dumps will disappear when the dumps have been removed, whilst the man-made dam will remain in the development</td><td rowspan="3">Consequence: Slightly detrimental</td><td rowspan="4">Significance: Medium to Low</td></tr>
<tr><td>Extent</td><td>Local</td><td>The development will impact primarily on the local wet areas</td></tr>
<tr><td>Intensity</td><td>Medium to low</td><td>The development will have a small impact on the wetland areas</td></tr>
<tr><td>Probability</td><td>Probable</td><td colspan="2">The removal of the slimes dumps will impact on the seepage wetlands and the open space area around the dam will improve the quality of this wetland</td></tr>
<tr><td colspan="5">MITIGATION:
<u>Construction Phase:</u>
• Restrict access to the sensitive wetland vegetation around the dam.
• Manage the inflow of rainwater into the dam by means of pre-retention and litter traps.
• Prevent water from seepage wetland area to flow into development area by the construction of berm walls.

<u>Operational Phase:</u>
• Restrict access to the sensitive wetland vegetation around the dam.
• Manage the inflow of rainwater into the dam by means of pre-retention and litter traps. Clean litter after rain storms.
• Prevent water from seepage wetland area to flow into development area by the construction of berm walls. Monitor and rehabilitate berm walls on a regular basis.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td>Medium to long</td><td>The seepage wet areas around the slimes dumps will disappear when the dumps have been removed, whilst the man-made dam will remain in the development</td><td>Consequence: Slightly detrimental</td><td>Significance: Low</td></tr>
</table>

IMPACT DESCRIPTION : Wetlands				
Extent	Local	The development will impact primarily on the local wet areas		
Intensity	Medium to low	The development will have a small impact on the wetland areas		
Probability	Probable	The removal of the slimes dumps will impact on the seepage wetlands and the open space area around the dam will improve the quality of this wetland.		

14.1.10. Pollution of Water

- **Impact Statement**

  There are several possible sources of water pollution on the property under consideration. One possible source is from water coming from the slimes dumps, either from seepage or from run-off after rain storms. The maintenance of the water containment paddocks at the foot of the dumps is therefore of great importance. Another possible source of water pollution is from leaks or blockages of the sewer system which will overflow into the stormwater drainage system. The contamination of water flowing into the dam or watercourse by means of litter and oil on road surfaces is another possible source of pollution.

- **Discussions**

  The potential sources of water pollution can successfully be managed with the necessary management measures are in place. Specific attention must be given in the design of the stormwater management system to collect litter and sediment before releasing the water into water bodies or systems.

- **Significance Rating of Potential Impact**

  Table 14.10 below indicates the significance rating of the possibility of water pollution. Prior to mitigation measures being implemented, the impact significance is **Medium**, while after the implementation of mitigation measures it has been reduced to a **Low** significance.

Table 14.10: Pollution of Water

IMPACT DESCRIPTION : Pollution of Water				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Long	The development will permanently alter the environment	Consequence: Detrimental	Significance: Medium
Extent	Limited	The impact will primary be restricted to the site, but could impact on adjoining properties		
Intensity	Medium	The pollution of water will affect the environment, but the situation could be rectified		
Probability	Probable	During initial years of operation it is unlikely to have blockages or overflows of the sewer system. Pollution by means of litter and oil leakages are more likely.		
MITIGATION: <u>Construction Phase:</u> • The design of stormwater retention structures should make provision in capacity to accommodate unforeseen blockages and spills. • Litter traps to be incorporated in the stormwater design and particular near the inflow into the dam. • The functionality of township services should be monitored on a regular basis for possible problems in the systems. <u>Operational Phase:</u> • The effectiveness of stormwater retention structures should be monitored in terms of capacity to accommodate rainstorms. • Litter traps must be cleaned regularly. • The functionality of township services should be monitored on a regular basis for possible problems in the systems.				
POST-MITIGATION				
Duration	Long	The development will permanently alter the environment	Consequence: Detrimental	Significance: Low
Extent	Limited	The impact will primary be restricted to the site, but could impact on adjoining properties		
Intensity	Low	The pollution of water will be limited by the introduction of mitigation measures		
Probability	Probable	During initial years of operation it is unlikely to have blockages or overflows of the sewer system. Pollution by means of litter and oil leakages are more likely.		

14.1.11. Topography

- **Impact Statement**

  The proposed development will not alter the topography of the site. However, the slimes dumps are currently topographical features reflected on the GDARD data base as ridges. The dumps are in fact temporary of nature and when removed it will no longer have current impacts on the environment. The remaining area of the site has no distinct topographical features.

- **Discussions**

  The only change to the topography will be the removal of the slimes dumps. The dumps are outside the proposed development area. The gentle slopes of the remainder of the land lend itself to good planning and servicing of properties.

- **Significance Rating of Potential Impact**

  Table 14.11 below indicates the significance rating of the topography of the site. Prior to mitigation measures being implemented, the impact significance is **Low**, while after the implementation of mitigation measures it has been reduced to a **Low – Insignificant** significance.

Table 14.11: Topography

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Topography</th></tr>
<tr><td>Predicted for project Phase:</td><td>Pre-construction</td><td>Construction</td><td>Operational</td><td>Decommissioning</td></tr>
<tr><td>Dimension</td><td>Rating</td><td colspan="3">Motivation</td></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>The development will not alter the topography of the site</td><td rowspan="3">Consequence: Beneficial</td><td rowspan="4">Significance: Low</td></tr>
<tr><td>Extent</td><td>Local</td><td>Restrict to the site</td></tr>
<tr><td>Intensity</td><td>Low</td><td>No alteration envisaged</td></tr>
<tr><td>Probability</td><td>Improbable</td><td colspan="2">Unlikely to occur</td></tr>
<tr><td colspan="5">MITIGATION:
<u>Construction Phase:</u>
• Activities for the removal of the slimes dumps should not encroach in the township area.
• Once all the slimes materials have been removed the surface should be rehabilitated to prevent dust pollution.
• Drainage lines to be adapted when dumps have been removed.</td></tr>
</table>

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Topography</th></tr>
<tr><td colspan="5">Operational Phase:
• Activities for the removal of the slimes dumps should not encroach in the township area.
• Once all the slimes materials have been removed the surface should be rehabilitated to prevent dust pollution.
• Drainage lines to be adapted when dumps have been removed.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>The development will not alter the topography of the site</td><td rowspan="3">Consequence: Beneficial</td><td rowspan="4">Significance: Low to insignificant</td></tr>
<tr><td>Extent</td><td>Local</td><td>Restrict to the site</td></tr>
<tr><td>Intensity</td><td>Low</td><td>No alteration envisaged</td></tr>
<tr><td>Probability</td><td>Improbable</td><td colspan="2">Unlikely to occur</td></tr>
</table>

14.1.12. Visual Impact

- **Impact Statement**

  The visual quality of the property has to a large extent been impacted on by the mining activities, and especially the slime dumps. The large trees on the site slightly soften these unnatural topographical features. The vegetation cover on the slime dumps also improves the visual quality of the land. The proposed development will impact on the visual characteristics of the area in the sense that the disturbed and deteriorated visual state will change to a developing urban environment. The removal of the slimes dumps will improve the visual quality of the area.

- **Discussions**

  The slimes dumps are significant aesthetical features which play a major role in the visual qualities of the area. The removal period is the worse because during this time a large section of the vegetation cover is removed and the bare slimes materials are exposed. It is important that the period of removal be as short as possible to avoid consequential negative impacts as a result of the exposed dump material. Unfortunately, this is an aspect which fall under the control of the DMR and the best the developer can do is to manage the possible impacts.

- **Significance Rating of Potential Impact**

  Table 14.12 below indicates the significance rating of the visual qualities of the development. Prior to mitigation measures being implemented, the impact significance is **Medium**, while after the implementation of mitigation measures it has been reduced to a **Low** significance.

Table 14.12: Visual Impact

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Visual Impact</th></tr>
<tr><td>Predicted for project Phase:</td><td>Pre-construction</td><td>Construction</td><td>Operational</td><td>Decommissioning</td></tr>
<tr><td>Dimension</td><td>Rating</td><td colspan="3">Motivation</td></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Short</td><td>The removal of the slimes dumps has a significant impact on the property but fall outside the development area. The construction phase of the development will be short.</td><td rowspan="3">Consequence: Detrimental</td><td rowspan="4">Significance: Medium</td></tr>
<tr><td>Extent</td><td>Local</td><td>Visual impacts will relate primarily to the site itself</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>Construction will affect the visual environment</td></tr>
<tr><td>Probability</td><td>Definite</td><td colspan="2">The visual character of the development area will be changed permanently.</td></tr>
<tr><td colspan="5">MITIGATION:
<u>Construction Phase:</u>
• Remove only the trees and vegetation in the section where building activities are taking place.
• Builders rubble and waste materials to be removed from the development area on a regular basis.
• The construction site must be clearly demarcated and kept clean from litter.
• No temporary accommodation to be permitted on the site for construction labourers.

<u>Operational Phase:</u>
• Commence with the planting of trees, grass and shrubs as soon as possible after construction of the houses.
• Maintain public areas until take-over by municipality.</td></tr>
</table>

IMPACT DESCRIPTION : Visual Impact				
POST-MITIGATION				
Duration	Short	As for construction phase	Consequence: Beneficial	Significance: Low
Extent	Limited	Visual impacts will relate primarily to the area of development. The visual qualities from main roads may improve		
Intensity	Medium	Construction will affect the visual environment		
Probability	Definite	The visual character of the development area will be changed permanently.		

14.1.13. Waste and Litter

- **Impact Statement**

  Construction activities will generate waste materials and litter. In addition, more waste will be generated from the demolition of buildings. Selective waste materials should be used for foundation filling during the construction period. The storage of waste materials on the site could have a visual and health impact.

- **Discussions**

  It would be advisable to use as much or the rubble generated from demolished buildings for foundation filling. Storage of waste material on the construction site should only take place on a temporary basis and should be removed from site as soon as possible.

- **Significance Rating of Potential Impact**

  Table 14.13 below indicates the significance rating the impact of waste and litter on the construction site. Prior to mitigation measures being implemented, the impact significance is **Medium – Low**, while after the implementation of mitigation measures it has been reduced to a **Low** significance.

Table 14.13: Waste and Litter

IMPACT DESCRIPTION : Waste and Litter				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Short	Waste materials will be primarily for the construction phase and litter more during the operational phase	Consequence: Detrimental	Significance: Medium to low
Extent	Local	Will be restricted to the site		
Intensity	Medium	Medium		
Probability	Highly Probable	There will definitely be waste materials and litter during the construction period. In the operational phase the focus will be more on litter		
MITIGATION: Construction Phase: • Utilise builders' rubble for foundation filling. • Demarcate waste storage areas. • Remove excess waste from the construction site. • Supply litter bins to construction sites and clean regularly. Operational Phase: • Monitor illegal dumping on the vacant land outside the township area. • Collect litter and remove to an approved disposal site.				
POST-MITIGATION				
Duration	Short	Waste materials will be primarily for the construction phase and litter more during the operational phase	Consequence: Beneficial	Significance: Low
Extent	Local	Will be restricted to the site		
Intensity	Medium to low	Medium		
Probability	Highly Probable	There will definitely be waste materials and litter during the construction period. In the operational phase the focus will be more on litter.		

14.1.14. Housing

- **Impact Statement**

  The provision of housing has been identified as one of the most critical issues associated with the project. The concerns stated during the Public Participation Process were how and where people will be housed when buildings are demolished or upgraded. Will the current tenants be able to afford the new rental accommodation? This is an aspect that will require intense communication and negotiations and could have a major impact on the success of the project.

- **Discussions**

  It is anticipated that during initial phases of the development that current tenants could cause problems for the developer. However, once the people realise the purpose and magnitude of the project, the situation should improve and the new forms of accommodation be accepted.

- **Significance Rating of Potential Impact**

  Table 14.14 below indicates the significance rating of housing provision. Prior to mitigation measures being implemented, the impact significance is **Medium – High**, while after the implementation of mitigation measures it has been reduced to a **Low** significance.

Table 14.14 Housing

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Housing</th></tr>
<tr><td>Predicted for project Phase:</td><td>Pre-construction</td><td>Construction</td><td>Operational</td><td>Decommissioning</td></tr>
<tr><td>Dimension</td><td>Rating</td><td colspan="3">Motivation</td></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>Dwelling units constructed will be of a permanent nature</td><td rowspan="3">Consequence: Detrimental</td><td rowspan="4">Significance: Medium to High</td></tr>
<tr><td>Extent</td><td>Local</td><td>Restricted to the site and current residents on the property</td></tr>
<tr><td>Intensity</td><td>Medium to High</td><td>This is a very important aspect for the current tenants on the site</td></tr>
<tr><td>Probability</td><td>Highly Probable</td><td colspan="2">It is most likely that there will be unhappiness when people are evicted for renovations or demolition</td></tr>
</table>

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Housing</th></tr>
<tr><td colspan="5">MITIGATION:
<u>Construction Phase:</u>
• Communication with affected tenants is vital.
• Make every attempt to accommodate current tenant.
• Phase constructed in such way that alternative rental accommodation will be available when the rental contract is terminated as a result of alterations or demolition.

<u>Operational Phase:</u>
• During this phase people would have accepted the new types of accommodation, but on-going information sessions are important to resolve possible issues</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>Dwelling units constructed will be of a permanent nature</td><td rowspan="3">Consequence: Beneficial</td><td rowspan="4">Significance: Low</td></tr>
<tr><td>Extent</td><td>Local</td><td>Restricted to the site and current residents on the property</td></tr>
<tr><td>Intensity</td><td>Medium to High</td><td>This is a very important aspect for the current tenants on the site</td></tr>
<tr><td>Probability</td><td>Highly Probable</td><td colspan="2">It is most likely that there will be unhappiness when people are evicted for renovations or demolition.</td></tr>
</table>

14.1.15. Employment Opportunities

- **Impact Statement**

  Large numbers of employment opportunities will be created with the construction of new houses. During the initial phases of the project the focus will be on construction workers. During the operational phase of the project job opportunities will be in the new businesses, the hospital, the industries, the associated community facilities and also for domestic worker. The project will impact on employment opportunities.

- **Discussions**

  The planning of the proposed development has been done with the aims and objectives to upgrade the current poor state of the environment in and around the old mining village. The project offers the opportunity to provide accommodation to a large number people in a wide range of accommodation types and price brackets. In addition, different categories of employment opportunities will be created in close proximity to the accommodation.

- **Significance Rating of Potential Impact**

  Table 14.15 below indicates the significance rating of employment opportunities. Prior to mitigation measures being implemented, the impact significance is **Medium – Positive**, while after the implementation of mitigation measures it has been reduced to a **Low – Positive** significance.

Table 14.15: Employment Opportunities

IMPACT DESCRIPTION : Employment Opportunities				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Short to long	Employment during the construction phase will be for a limited period, whilst employment in new facilities created in the development will be long term	Consequence: Highly beneficial	Significance: Medium - positive
Extent	Regional	People with skills from outside the immediate surrounding area could be employed		
Intensity	Medium	New work opportunities will have a positive impact		
Probability	Definite	The proposed development will require people to do the work.		
MITIGATION: Construction Phase: • Attempt to provide employment to people on the property and immediate surrounding area. Operational Phase: • Attempt to provide employment to people on the property and immediate surrounding area.				
POST-MITIGATION				
Duration	Short to long	Employment during construction phase will be for a limited period. Employment in new facilities in development will be long term	Consequence: Beneficial	Significance: Low- positive
Extent	Regional	People with skills from outside the immediate surrounding area could be employed		
Intensity	Medium	New work opportunities will have a positive impact.		
Probability	Definite	The proposed development will require people to do the work.		

14.1.16. Health – Radon Levels

- **Impact Statement**

  Possible emissions from radio-active materials due to the presence of uranium could have a significant impact on the health of people living in close proximity to the slimes dumps. It was therefore of vital importance to appoint specialists in that field to conduct detailed investigations and tests in order to determine the possible Radon levels and the possible impact of this aspect on the proposed development.

  Discussions

  Although the impact would only be for the time when the dumps remain on the property, it was considered as important to conduct the surveys and assessment. This aspect was one of the most critical issues identified in the decision-making process whether or not to proceed with the project.

- **Significance Rating of Potential Impact**

  Table 14.16 below indicates the significance rating of emissions from radio-active materials. Prior to mitigation measures being implemented, the impact significance is **Low**, whilst after the implementation of mitigation measures it will remain of a **Low** significance.

Table 14.16: Health – Radon Levels

IMPACT DESCRIPTION : Health - Radon Levels				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Long	The test results indicated no impact on health	Consequence: Beneficial	Significance: Low
Extent	Local	Possible impact related to site only		
Intensity	Low	The environment is not affected by possible radon exposure		
Probability	Improbable	The possibility of radon exposure is unlikely		

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Health - Radon Levels</th></tr>
<tr><td colspan="5">MITIGATION:
<u>Construction Phase:</u>
• No mitigation necessary due to low risk of exposure.

<u>Operational Phase:</u>
• Conduct tests again when dumps have been removed.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>The test results indicated no impact on health</td><td rowspan="3">Consequence: Beneficial</td><td rowspan="4">Significance: Low</td></tr>
<tr><td>Extent</td><td>Local</td><td>Possible impact related to site only</td></tr>
<tr><td>Intensity</td><td>Low</td><td>The environment is not affected by possible radon exposure</td></tr>
<tr><td>Probability</td><td>Improbable</td><td colspan="2">The possibility of radon exposure is unlikely</td></tr>
</table>

14.1.17. Heritage – Preservation of Structures

- **Impact Statement**

  The impact of structures with significant heritage values is considered of importance. Architectural styles were identified and buildings of similar styles and architecture were grouped in clusters and incorporated in the township layout plan. The preservation of historical building and other structures had a major impact on the design of the township.

- **Discussions**

  A set of guidelines will be prepared for the restoration or upgrading of the old houses to be included in the residential component of the project. The houses will be sold and occupied by individuals, with a firm set of conditions and guidelines on maintenance and appearance.

- **Significance Rating of Potential Impact**

  Table 14.17 below indicates the significance rating of heritage structures. Prior to mitigation measures being implemented, the impact significance is **Medium**, while after the implementation of mitigation measures it has been reduced to a **Low – Positive** significance.

Table 14.17: Heritage

IMPACT DESCRIPTION : Heritage – Preservation of structures				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Long	Heritage building structures will be incorporated in the tow design	Consequence: Beneficial	Significance: Medium
Extent	Local	Restricted to the site only		
Intensity	Medium	The location of structures to be preserves had a major impact on the township layout		
Probability	Highly probable	The structures are physical features of value and will be retained		
MITIGATION: <u>Construction Phase:</u> • Renovate and restore historical features of significance. • Apply architectural guidelines and specifications for the restoration of each individual structure. • Protect structures against vandalism and removal of materials. • Demolition of existing structures to be approved by the heritage architect and relevant authorities. <u>Operational Phase:</u> • Monitor and control maintenance to identified structures.				
POST-MITIGATION				
Duration	Long	Heritage building structures will be incorporated in the tow design	Consequence: Beneficial	Significance: Low - positive
Extent	Local	Restricted to the site only		
Intensity	Medium	The location of structures to be preserves had a major impact on the township layout		
Probability	Highly probable	The structures are physical features of value and will be retained		

14.1.18. Township Services

- **Impact Statement**

  The existing township services are not sufficient to accommodate the proposed development. The upgrading of the services will impact on the land as a result of the large amount of trenching that will take place and also access routes which will be closed or diverted during the construction period. Interruption may also be experienced.

- **Discussions**

  The installation of bulk and internal services will be take place during the initial stages of the project and will mark the start of the project. This will cause some inconvenience to residents and it will be important to communicate any proposed activities which could cause inconvenience before the activity is commenced with.

- **Significance Rating of Potential Impact**

  Table 14.18 below indicates the significance rating the provision of services. Prior to mitigation measures being implemented, the impact significance is **Medium**, while after the implementation of mitigation measures it has been reduced to a **Low –** significance.

Table 14.18: Township services

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Health – Township Services</th></tr>
<tr><td>Predicted for project Phase:</td><td>Pre-construction</td><td>Construction</td><td>Operational</td><td>Decommissioning</td></tr>
<tr><td>Dimension</td><td>Rating</td><td colspan="3">Motivation</td></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Short</td><td>Impact will be for construction phase only</td><td rowspan="3">Consequence: Beneficial</td><td rowspan="4">Significance: Medium</td></tr>
<tr><td>Extent</td><td>Limited</td><td>Impact will mainly be on the site, but could affect adjoining properties</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>Inconveniences and dangers of open trenched will affect the residents</td></tr>
<tr><td>Probability</td><td>Highly Probable</td><td colspan="2">It is essential to provide the services and the activity will definitely take place</td></tr>
<tr><td colspan="5">MITIGATION:
<u>Construction Phase:</u>
• Communicate activity to possible affected residents in time.
• Make sure that the existing services are not damaged by the trenching.
• Put warning signs and tape around open trenches.</td></tr>
</table>

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Health – Township Services</th></tr>
<tr><td colspan="5">• Secure dangerous areas and equipment.

<u>Operational Phase:</u>
• Maintain services which have been installed.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td>Short</td><td>Impact will be for construction phase only</td><td rowspan="3">Consequence: Beneficial</td><td rowspan="4">Significance: Low</td></tr>
<tr><td>Extent</td><td>Limited</td><td>Impact will mainly be on the site, but could affect adjoining properties</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>Inconveniences and dangers of open trenched will affect the residents</td></tr>
<tr><td>Probability</td><td>Highly Probable</td><td colspan="2">It is essential to provide the services and the activity will definitely take place</td></tr>
</table>

14.1.19. Land Use

- **Impact Statement**

  The introduction of additional land uses in the proposed development will change the existing character of the area. This could lead to initial problems with traffic flow, especially during the construction phase of development. The people living in the area adapt and accept the change of land use as a positive change.

- **Discussions**

  The development of the land is considered as necessary due to the fact that the land has been de-proclaimed as mining land. The unidentified current land use of the site is not desirable and resulted in the current poor state of the property.

- **Significance Rating of Potential Impact**

  Table 14.19 below indicates the significance rating of the change of land use. Prior to mitigation measures being implemented, the impact significance is **Medium**, while after the implementation of mitigation measures it has been reduced to a **Low - Positive** significance.

Table 14.19: Land Use

IMPACT DESCRIPTION : Land Use				
Predicted for project Phase:	Pre-construction	Construction	Operational	Decommissioning
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Long	The change will be permanent	Consequence: Very Beneficial	Significance: Medium
Extent	Local	Changes will be limited to the site		
Intensity	Medium	Changes will be significant and will change the character of the site completely		
Probability	Definite	The development is necessary and must take place		
MITIGATION: <u>Construction Phase:</u> • The proposed change of land use must be communicated to current residents and all affected parties. <u>Operational Phase:</u> • None				
POST-MITIGATION				
Duration	Long	The change will be permanent	Consequence: Very Beneficial	Significance: Low - positive
Extent	Local	Changes will be limited to the site		
Intensity	Medium	Changes will be significant and will change the character of the site completely		
Probability	Definite	The development is necessary and must take place		

14.1.20. Cumulative Impacts

- **Impact Statement**

  Cumulative impacts refer to the combined interaction of impacts that on their own may not be significant, but when these impacts occur together, then their impact is manifested. Impacts could interact together to contribute a more significant impact. Cumulative impacts during the construction phase would relate to uncontrolled or poorly co-ordinated construction activities.

- **Discussions**

  Proper management is essential for a project of this nature. During the operational phase, the cumulative impact of the proposed new project on the environment and surrounding area will be positive.

- **Significance Rating of Potential Impact**

  Table 14.20 below indicates the significance rating of all the impacts together. Prior to mitigation measures being implemented, the impact significance is **Medium**, while after the implementation of mitigation measures it has been reduced to a **Low – Positive** significance.

Table 14.20: Cumulative Impacts

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Cumulative Impacts</th></tr>
<tr><td>Predicted for project Phase:</td><td>Pre-construction</td><td>Construction</td><td>Operational</td><td>Decommissioning</td></tr>
<tr><td>Dimension</td><td>Rating</td><td colspan="3">Motivation</td></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>The development proposal will permanently change the environment</td><td rowspan="3">Consequence: Highly beneficial</td><td rowspan="4">Significance: Medium</td></tr>
<tr><td>Extent</td><td>Regional</td><td>The impact will primarily be localised, but could impact positively on the wider region</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>The impact of the project on the local and surrounding environment will be significant and positive</td></tr>
<tr><td>Probability</td><td>Highly Probable</td><td colspan="2">There are no major restriction on the proposed development and it is most likely that the development will take place</td></tr>
</table>

<table>
<tr><th colspan="5">IMPACT DESCRIPTION : Cumulative Impacts</th></tr>
<tr><td colspan="5">MITIGATION:
<u>Construction Phase:</u>
• As prescribed for each individual impact.

<u>Operational Phase:</u>
• As prescribed for each individual impact.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td>Long</td><td>The development proposal will permanently change the environment.</td><td rowspan="3">Consequence: Highly beneficial</td><td rowspan="4">Significance: Low – positive</td></tr>
<tr><td>Extent</td><td>Regional</td><td>The impact will primarily be localised, but could impact positively on the wider region</td></tr>
<tr><td>Intensity</td><td>Medium</td><td>The impact of the project on the local and surrounding environment will be significant and positive</td></tr>
<tr><td>Probability</td><td>Highly Probable</td><td colspan="2">There are no major restriction on the proposed development and it is most likely that the development will take place</td></tr>
</table>

15. ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The magnitude of the proposed development required the developer to evaluate every possible aspect which could impact on the viability and acceptability of the project. The decision-making process necessitated absolute certainties based on scientific research and investigations. Specialists have been appointed each in their specific field of expertise and decisions were made on the findings and recommendations of these specialists. The only aspect of uncertainty is the timeline for the removal of the slimes dumps. For this reason the possible development areas occupied by the dumps, plus a 100 metres wide buffer strip around the dumps, have been excluded from the development.

The information contained in this report and the specialists' reports attached as annexures are factually correct and comprehensive. The assessment of the information contained in the specialists report, field surveys, public input and other observations is an objective representation of the advantages, disadvantages and impacts of the development proposal. The report contains sufficient information for the Gauteng Department of Agriculture and Rural Development to make an informed decision and to authorise the proposed development.

16. OPINION TO AUTHORISE AND CONDITIONS OF AUTHORISATION

The development of the proposed township on de-commissioned mining land is desirable and will improve the quality of the physical environment and also the socio-economic status of the people in the area. The degraded state of the property will be positively changed with the development of large numbers of residential accommodation that will be provided in the development, together with a range of amenities, community facilities and other complimentary land uses.

Another important aspect of the proposal is that new job opportunities will be created during the construction phase. In addition, long-term employment opportunities will be created in the planned business and industrial premises and also the community facilities, such as the hospital, library, clinics and crèches. The development as proposed will be a positive change of the character of the current undeveloped land parcels between the existing houses and will create a new sense-of-place where people can belong.

Potential environmental impacts can be mitigated and managed to such an extent that negative impacts could change to positive. The development will optimize the use of available infrastructure services and will upgrade and also improve the bulk supply services in the area. In general the project is considered by all the involved parties and stakeholders as a positive contribution to housing and the upgrading of de-commissioned mining land.

In view of the positive reaction to the proposed development it is submitted that the Gauteng Department of Agriculture and Rural Development (GDARD) should authorize the project, subject to the mitigation recommendations and stipulations of the Environmental Management Programme (EMPR).

17. ENVIRONMENTAL IMPACT STATEMENT

17.1. Summary of key findings

Taking into consideration all the potential impacts which the proposed development may have on the surrounding urban environment, it is clear that the development as proposed by the applicant will be the most suitable future land use for the site. The project will have a significant positive impact on almost every single aspect. This can be ascribed to the current degraded state on this land, mainly as a result of the decommissioning of the mining activities on the land. Although the project will have a number of potential impacts

during the construction phase, most of these impacts can be mitigated and managed to such an extent that it will have an insignificant negative impact on the surrounding environment. In fact, most aspects related to the proposed development will become positive with the development.

A significance rating has been determined for each impact based on an assessment of the impact, the intensity, the duration and the probability thereof. Mitigation measures recommended to manage and limit the potential impact will result in a reduction of the significance rating the impact. A low significance rating has been calculated for Ecological Systems, Vegetation, Fauna, Water run-off from slimes dumps, Air Quality, Geology, Soil, Stormwater drainage, Wetlands, Pollution of water, Topography, Visual Quality, Waste and Litter, Housing, Employment Opportunities, Health, Heritage, Township Services and Land Use. The impact of these aspects will to a large extent be as a result of construction activities and will therefore be limited to the construction phase. Where the impact will extent to the operational phase the impact will be managed to such an extent that it will have no significant impact. Should any issues arise, it will be mitigated and management in terms of the Environmental Management Programme.

The proposed development is in line with the planning and development guidelines and planning principles for the area. The development proposal provides for a large number of new residential units, ranging from individual dwelling houses to residential apartments. Provision has also been made for the development of industries, businesses and community facilities. The proposed development conforms to the principles of the Johannesburg Regional Spatial Development Framework for this area and will provide affordable housing close to places of employment and community facilities.

The cumulative effect of the potential impacts associated with the development will be LOW to INSIGNIFICANT. The development will have an overall POSITIVE impact on the biological, the physical and the socio-economic environment of the area.

17.2. Comparative Assessment of positive and negative implications of proposed activity and identified alternatives

The table below shows a comparative assessment of the identified possible development alternatives. The implication of the associated impacts for the alternatives has been indicated as Positive or Negative.

Table 17.1 Comparative assessment of proposed activity and alternatives

Environmental Issue	Associated Impacts	Proposal	Alternative 1 Industrial	Alternative 2 Golf Estate
Ecological/Biological				
Damage to the ecology of the property	Ecological systems	Positive	Negative	Positive
	Vegetation	Positive	Negative	Positive
	Fauna	Positive	Negative	Positive
	Water run-off from slimes dumps	Positive	Positive	Positive
Physical Environment				
Contamination of air, soil and water resources. Undermining	Air Quality – dust pollution	Positive	Negative	Positive
	Geology – undermining	Positive	Positive	Positive
	Soil – suitability for construction	Positive	Positive	Positive
	Stormwater Management	Positive	Positive	Positive
	Wetlands	Positive	Positive	Positive
	Pollution of water	Positive	Negative	Positive
	Topography	Positive		Positive
	Visual Impact	Positive	Negative	Positive
	Waste and Litter	Positive	Negative	Positive
Socio-Economic				
Change of the social and economic structure of the area	Housing provision– Public Response	Positive	Negative	Negative
	Employment opportunities	Positive	Positive	Positive
	Health – Radon levels	Positive	Positive	Positive
	Heritage – preservation of structures	Positive	Negative	Negative
	Essential township services	Positive	Positive	Positive
	Land Use	Positive	Negative	Negative
Cumulative Impacts	Combined impact of environmental issues	**All Positive**	**Mostly Negative**	**Some Negative**

18. CONCLUSION

The nature and extent of the potential environmental impacts attributable to the proposed development are generally low in both extent and severity. The significance of the potential impacts is considered to be low and should therefore not require any further investigations. The impacts that may have significance, are manageable, and in most cases, positive in nature and direction.

The cumulative impact of the issues presented could be reduced to acceptable levels by means of mitigation measures over and above those prescribed within the direct impact assessment. The mitigation and management measures outlined in this Report with respect to potential impacts or issues should result in limited negative impacts on the natural environment.

The potential environmental impacts recorded for this project will be managed in terms of the Environmental Management Programme, which will be an integral part of the construction contract. It is therefore submitted that the development of the project as proposed will not only be to the benefit of the local community, but will also have a much wider positive impact in the region. This authorisation should be made with the terms of the conditions and requirements of this report and managed in terms of the Environmental Management Programme.