



**ENVIRONMENTAL IMPACT ASSESSMENT  
REPORT**

**SPITZ LAND MIXED USE HOUSING  
DEVELOPMENT**

**GDARD REF #: GAUT 002/11-12/E0248**

**REVISION #; 5**

**MAY 2018**

# SPITZ LAND MIXED USE HOUSING DEVELOPMENT

## ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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## EXECUTIVE SUMMARY

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Geo Soil and Water CC (hereafter referred to as GSW) was appointed as the independent Environmental Assessment Practitioner (EAP) by Copper Moon Trading 631 (Pty) Ltd (hereafter referred to as the applicant) to amend the previously submitted Environmental Impact Report (EIR) and Environmental Management Programme (EMPR). The previously submitted and rejected reports were compiled by Marsh Environmental Services (Pty) Ltd (Hereafter referred to as Marsh).

The report compiled by Marsh was rejected by the Gauteng Department of Agriculture and Rural Development (GDARD) on 24 November 2015 on the basis that it lacked information necessary to make an informed decision. On 31 March 2016, Marsh was granted a request for extension by GDARD to re-submit the revised report on 31 September 2016.

In August 2016, the applicant approached GSW to oversee and compile the revised report. Unfamiliar with the report, GSW undertook a detailed review of the report to determine how best to amend it to meet the GDARD's requirements.

Post review of the report, GSW, on instruction from the applicant submitted a further extension application to GDARD which was subsequently approved, and a new submission date of 11 November 2016 was stipulated. On the 10<sup>th</sup> November 2016 the final EIR, as amended with the GDARD requirements was submitted.

In March 2017 GDARD refused Environmental Authorization based on the failure of the applicant to submit a final report addressing further issues of concern to the GDARD. This decision was appealed successfully, and a letter was received by the MEC in November 2017, referring the matter back to the GDARD HoD for reconsideration. Consequently, meetings were held with the GDARD and a defined way forward was agreed. On the basis of these discussions the following key items and actions were agreed in order to revise and conclude a final EIR:

- Update relevant environmental, Health and Safety constraint zones incl:
  - Air quality- Nuisance dust and PM10: The air dispersion model and impact assessment to be verified and updated.
  - Radiation safety- Existing study to be reviewed and updated where necessary.
  - Contaminated land- Existing contaminated land study to be utilised to develop and constraint zones.
  - Land stability and safety (incl subsidence, tailing slope failure, old mine shafts) - existing geotechnical study to be utilised to define and map constraint zones.
  - Biodiversity- Existing biodiversity study and CPLAN data to be used to define constrain zones.
- Prepare development layout alternatives/ options applicable to the following scenarios:

- **Development Parcel 1:** Concurrent remining of TSF1 and TSF2. This is the worst-case scenario in terms of potential air quality impacts.
- **Development Parcel 2:** Post remining of TSF1; remining of TSF2.
- **Development Parcel 3:** The post remining of the both TSF1 and TSF2- i.e. the constraint zones (if any) once the tailings are removed.
- **Development Parcel 4:** The post remining of the both TSF1 and TSF2- i.e. the constraint zones (if any) once the tailings are removed and assuming 75% revegetation of TSF3 and TSF4.
- Apply sensitivity map opportunities and constraints to identify available alternatives, e.g.:
  - Phasing options;
  - Inclusion of development options on the tailings sites (e.g. solar facility).
- Prepare qualitative comparative assessment of the alternatives.
- Prepare Addendum Report, containing:
  - Update significance rating sections of EIR and EMPR- amend where necessary and ensure consistency
  - Present sensitivity map and associated layout options.
  - Present available alternatives and comparative assessment.
  - Prepare high-level sustainability appraisal.
  - Present existing S53 Approval from DMR.
  - Present existing NNR Clearance Certificate.
  - Present updated TSF Rehabilitation schedules.
- Compile consolidated addendum report (place for 30 days review to registered I&AP's).

The inclusion of this information is at the behest of GDARD and serves to confirm that the land is suitable for the development of a mixed-use township. It is the opinion of the EAP that the proposed development project be authorized as long as the proposed EIA mitigation measures are adhered to and all identified no-go constraint zones are avoided. It is recommended that approval be granted for phased development parcels.

A breakdown of changes to the EIA report is provided in **Table 1**.

**Table 1: Breakdown of major changes to the May 2018 revised report:**

Description of Change	Location in Report
NEMA 2014 Regulations: Listed Activities triggered by the project.	Table 9
Updated Alternative Analysis Section focusing on phased development approach	Section <b>Error! Reference source not found.</b>

Updated Consolidated Sensitivity Mapping	Section <b>Error! Reference source not found.</b>
Updated EIA Impact Assessment - Air Quality Impact Section	Section 7
Updated EMPR	Appendix L
Updated Radiation Assessment based on updated air dispersion model	Appendix D2
Updated Air Quality Assessment with updated air dispersion model which considers remining of Tailings Storage Facilities	Appendix H2
Latest DMR Section 53 Approval Letter	Appendix W
High-level sustainability appraisal	Section 3.1.14

## 1 INTRODUCTION

Geo Soil and Water CC (hereafter referred to as GSW) was appointed as the independent Environmental Assessment Practitioner (EAP) by Copper Moon Trading 631 (Pty) Ltd (hereafter referred to as the applicant) to amend the previously submitted Environmental Impact Report (EIR) and Environmental Management Programme (EMPR). The previously submitted and rejected reports were compiled by Marsh Environmental Services (Pty) Ltd (Hereafter referred to as Marsh).

The report compiled by Marsh was rejected by the Gauteng Department of Agriculture and Rural Development (GDARD) on 24 November 2015 on the basis that it lacked information necessary to make an informed decision. On 31 March 2016, Marsh was granted a request for extension by GDARD to re-submit the revised report on 31 September 2016.

In August 2016, the applicant approached GSW to oversee and compile the revised report. Unfamiliar with the report, GSW undertook a detailed review of the report in order to determine how best to amend it to meet the GDARD's requirements.

Post review of the report, GSW, on instruction from the applicant submitted a further extension application to GDARD which was subsequently approved and a new submission date of 11 November 2016 was stipulated. As such, this document represents the revised EIR and EMPR reports amended with consideration of comment provided by GDARD in a meeting held on 23 August 2016.

## 2 BRIEF PROJECT DESCRIPTION

The proposed project is located on the Remaining Extent of Portion 14 of the farm Roodepoort 237 IQ with an extent of approximately 300 hectares (ha). At present, the site constitutes defunct mining land located within the Main Reef Mining Belt and was historically mined by DRD Gold.

The proposed project aims to develop the site as a mixed use, residential township in the affordable to middle income bonded housing market. The proposed development will include a residential component of varying market and density ranges including educational, commercial

and social land uses. Details of the proposed land use and area of development is outlined in Table 1 below:

**Table 2: Proposed land use and area of development**

Zoning	Land Us	# of Stands	Total Area of stands and streets	Percentage of area
Residential 1	Residential 180m <sup>2</sup>	1, 367	25.42	9.46
	Residential 300m <sup>2</sup>	382	12.24	7.34
	Residential	213	5.54	5.24
Business 1	Business	1	3.30	1.23
Institutional	Community Facility	3	1.09	0.41
	Primary School	1	2.65	0.99
	Secondary School	1	4.68	1.75
S.A.R	Railway Line	3	13.15	4.89
P.O.S	Park	32	98.95	36.83
Undetermined	Undetermined	10	40.34	15.01
Provincial Roads	Gautrans	N/A	5.75	2.14
<b>Total</b>		<b>2,013</b>	<b>268,65</b>	<b>100</b>

The proposed township layout plan is attached to this report as Appendix A and the Engineering Services Report as Appendix M.

## 2.1 SITE LOCATION

The proposed development is located south west of the Roodepoort Central Business District, directly west of the Durban Roodepoort Deep Gold Mine, within the City of Johannesburg Municipality. Currently access to the site is from Randfontein Road which traverses the site towards the north and through Sol Plaatjes to the south. No existing access roads exists though the adjacent residential areas (Goudrand and Matholesville). Future access is proposed through Matholesville from the south and Sol Plaatjes from the north. The figures below provide a regional locality map, site locality map and site boundary map. The site boundary map also indicates the Remaining Extent of Portion 14 of the farm Roodepoort 237 IQ.



**Figure 1: Regional Locality map**



**Figure 2: Site locality map**



**Figure 3: Site boundary**

## 2.2 ACTIVITIES FOR WHICH ENVIRONMENTAL AUTHORISATION IS REQUIRED

Information regarding the receiving environment and the proposed development was assessed to determine the applicability of activities listed in terms of the National Environmental Management Act (NEMA) 107 of 1998 and for which environmental authorisation is required.

Activities listed in Government Notice 544 and R 545 in terms of the 2010 Environmental Impact Assessment Regulations promulgated in terms of Section 24 and 24D of the National Environmental Management Act 107 of 1998 which require authorisation from the competent decision making authority (GDARD) before commencement are included in Table 2 below:

**Table 3: Listed activities which require environmental authorisation**

Notice	Activity #	Description of listed activity
GNR 545 (Listing Notice 2)	15	Physical alteration of undeveloped , vacant or derelict land to residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more
GNR 544 (Listing Notice 1)	11	The construction of canals, channels, bridges, dams, weirs, bulk storm water outlet structures, marinas, jetties, slipways, building or infrastructure or structures (covering 50 square meters or more) where such construction occurs within a watercourse or within 32 m of a watercourse, excluding where such construction will occur behind the development setback line.

It is important to note, that original application for environmental authorisation was submitted to GDARD in 2012 and as such, the listed activities described above and report are to be adjudicated on in terms of the previous regulations namely, Government Notice 544 and R 545

of the 2010 Environmental Impact Assessment Regulations promulgated in terms of Section 24 and 24D of the NEMA (Act No.107 of 1998).

## 2.3 DETAILS OF THE APPLICANT/PROJECT PROPONENT

The applicant and project proponent is Copper Moon Trading 631 (Pty) Ltd, who, on analysis of the housing market has identified the need for the proposed development. Upon obtaining the necessary development approvals and authorisations as well as observation of the necessary legal requirements specific to the proposed residential development, it is the applicants' intention to transfer the property to property development entities. The applicant will therefore not be responsible for the installation of services or the construction of top-structures. Any conditions of township approval (including conditions of an environmental authorisation and the Environmental Management Programme) shall be applicable to any future developers and including as part of the transaction.

## 2.4 DETAILS AND EXPERIENCE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

The original EAP was Marsh Environmental Services, a division of Marsh (Pty) Ltd. The report, specifically the Environmental Impact Report (EIR) has been revised as per the requirements of GDARD by Geo Soil and Water (GSW) CC. GSW is a geological and environmental consultancy with over 15 years' experience in environmental management across various industry sectors (Appendix Y. The consultants responsible for revising this report are listed below:

**Table 4: Details of EAP**

Name	Relevant Experience
Adri Joubert - Supervising Principle	Adri Joubert is the director of GSW and has in excess of 20 years' experience in the environmental management field. Adri is a registered professional natural scientist and has undertaken and completed assessments on behalf of Continental Coal, Mashala Hendrina Coal, Resgen, BHP and Exxaro. In addition, Adri has a wealth of experience that also includes environmental auditing, due diligence and environmental aspect monitoring.
Khalid Patel – Senior Consultant	Khalid is a senior consultant at GSW and has 10 years' experience. Khalid is currently completing his MSc at the University of the Witwatersrand where he is focussing on ecosystem services. Khalid has experience across several sectors and industries including housing, mining, exploration and production and agriculture. Khalid has also undertaken numerous environmental audits, due diligence exercises and environmental monitoring on behalf of numerous clients.

## 2.5 TERMS OF REFERENCE

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The environmental impact assessment is compiled in accordance with the provisions of the Environmental Impact Assessment Regulations (August 2010) promulgated in terms of Chapter 5 of the National Environmental Management Act 107 of 1998. The content of this report is prescribed by Regulation 28 of Government Notice R543 of the afore-mentioned Environmental Impact Assessment Regulations.

## 2.6 PROJECT SCOPE AND METHODOLOGY

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As part of the scoping and environmental impact assessment process the following project activities were undertaken:

### **Scoping Phase:**

During the scoping phase of the project the following project activities were completed:

1. An assessment of the baseline conditions to determine the current environmental and social conditions which may be influenced or impacted on by the proposed development project;
2. The identification of specialist investigation to be undertaken as part of the process to verify baseline conditions, assess the anticipated impacts and determine its significance;
3. Stakeholder consultation as a part of a process to identify potential social and environmental impacts;
4. The identification of alternatives for further investigation during the impact assessment phase, and
5. The description of the assessment methodology and plan of study for impact assessment.

The Scoping Report was submitted to the Gauteng Department of Agriculture and Rural Development in March 2012 and approved in June 2012. The letter of approval is attached as Appendix B.

### **Environmental Impact Assessment Phase:**

A Plan of Study for Environmental Impact Assessment, which set out the proposed approach to the environmental impact assessment phase (second phase), was approved by the Gauteng Department of Agriculture and Rural Development in June 2012. The approved plan of study outlines:

1. The tasks to be undertaken as part of the environmental impact assessment process, including any specialist investigations or specialised processes;
2. An indication of the stages at which the competent authority will be consulted;
3. The proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity;
4. The particulars of the public participation process conducted during the environmental impact assessment process;
5. Any specific information required by the competent authority; and
6. Any other matters required in terms of Sections 24(4)(a) and (b) of the Act.

In accordance with the approved plan, the following activities were undertaken and the findings included in the Environmental Impact Assessment Report.

**Table 5: Activities undertaken as part of the environmental impact assessment**

Aspect	Description
Specialist studies	Specialist studies of aspects regarded to have a significant impact on the receiving environment were undertaken. The scoping process identified aspects that required further in-depth assessment to determine the nature, extent, duration, probability and significance of the potential impact on the receiving environment, or potential environmental impacts imposed on the proposed development.
Competent authority consultation	As the competent authority, GDARD was consulted as follows: <ul style="list-style-type: none"> <li>• Submission of the draft Scoping Report (March 2012);</li> <li>• Submission of the final Scoping Report (April 2012);</li> <li>• Receipt of Acceptance of Plan of Study for Environmental Impact Assessment and to clarify specialist studies to be provided in the Environmental Impact Assessment Report;</li> <li>• Submission of the draft Environmental Impact Assessment (April, 2014);</li> <li>• Request for extension from GDARD for final Environmental Impact Assessment (June 2014);</li> <li>• Submission of final Environmental Impact Assessment (January 2015);</li> <li>• GDARD rejects final Environmental Impact Assessment (April 2015);</li> <li>• Submission of final amended Environmental Impact Assessment (October 2015);</li> <li>• GDARD rejects final amended Environmental Impact Assessment (November 2015);</li> <li>• Request for extension for amended Environmental Impact Assessment (April 2016); and</li> <li>• Request for further extension (August 2016).</li> </ul>
Public participation process	The Draft Environmental Impact Assessment Report was made available to registered stakeholders for review and comment. The findings of all investigations and findings of specialist studies were presented in this draft report. The objective of the consultation process was to ensure that all issues and concerns are adequately addressed, that all anticipated project impact are identified and that these impacts can be effectively managed and mitigated through the implementation of the Environmental Management Plan. Information regarding the consultation process is provided in Section 5 of this report.
Alternative investigation	Alternatives identified during the Scoping Phase are further investigated as part of this environmental impact assessment. The purpose of the alternatives investigation process is to ensure that the best practical environmental options are considered as part of a method to avoid, and where avoidance is not possible, minimise environmental and social impacts associated with the proposed development project.
Impact assessment methodology	Based on the findings of the in depth studies, environmental impacts have been identified and rated in terms of their: <ul style="list-style-type: none"> <li>• Cumulative impacts;</li> <li>• The nature of the impact;</li> <li>• The extent and duration of the impact;</li> <li>• The probability of the impact occurring;</li> <li>• The degree to which the impact can be reversed;</li> <li>• The degree to which the impact may cause irreplaceable loss of resources; and</li> <li>• The degree to which the impact can be mitigated.</li> </ul>

	The impact assessment is based on the National Department of Environmental Affairs's Guideline Document: Environmental Impact Assessment Regulations. The assessment considers the impact during the planning, construction and the operational phases of the proposed development.
Preparation of an environmental impact statement	<p>An environmental impact statement is included in the Environmental Impact Report and contains:</p> <ul style="list-style-type: none"> <li>• A summary of the key findings of the environmental impact assessment;</li> <li>• A comparative assessment of the positive and negative implication of the proposed activity and identified alternatives; and</li> <li>• A reasoned opinion as to whether the proposed activity should not be authorised and any conditions in respect of such an authorisation.</li> </ul>
Draft Environmental Management Programme	A Draft Environmental Management Programme has been prepared in accordance with Regulation 33 of the Environmental Impact Assessment Regulations. The Draft Environmental Management Programme provides mitigation and management measures for the identified environmental impacts.

### Specialist studies and terms of reference:

The table below includes a description of the specialist investigation undertaken and specifies the terms of reference for each.

**Table 6: Specialist studies conducted and terms of reference**

Aspect	Description	Terms of reference
Flora, fauna, sensitive features including ridges and irreplaceable sites as per the Gauteng C-Plan	Biodiversity Assessment	<p>Report on the floral and faunal conditions of the site including:</p> <ul style="list-style-type: none"> <li>• Identification of preliminary floristic and faunal habitat variation;</li> <li>• Assessment of observed ecological status of habitat units;</li> <li>• Assessment of floristic and faunal Red Data Species habitat viability;</li> <li>• Identification of areas of high sensitivity; and</li> <li>• Description and maps of preliminary habitat units</li> </ul>
Radiation and pollution	Radiological Safety and Contaminated Land Assessment	A survey of the developable areas of the site (excluding mine residue deposits) was undertaken to determine radiological activity levels of the developable areas. The Draft Environmental Impact Assessment Report and specialist study has been submitted to the NNR as part of the stakeholder consultation process and an NNR clearance certificate obtained (Appendix U).
Undermining and safe founding conditions	Geotechnical Survey	An investigation of subsoil conditions to inform the founding requirements for the proposed developable areas of the site. The survey was sent through to the Council of Geoscience for comment (Appendix C)
Wetlands	Wetland Delineation and Impact Assessment	A wetland delineation study (as an extension of the preliminary information provided in the scoping phase) was undertaken to define wetlands on the site which may be affected by the proposed development project.

Surface water flows post-development	Stormwater Management Plan	A stormwater management plan to address the interference of the natural discharge of stormwater and additional flows from impermeable surfaces which will emanate from the proposed development project.
Air Quality	Dust and Particulate Matter	Ambient particulate matter monitoring was undertaken by Royal Haskin DHV for the project to determine potential exceedances in residential dustfall limits. An air quality assessment was undertaken to determine the feasibility of a housing development within the Roodepoort area, and to determine whether the baseline air quality in the area, is such that the residents within the development are not impacted upon to the extent where health may become a concern. Particular focus was given to the mine residues that occur on site as pollution sources.
Risk posed by Tailings Facilities	Tailings Facility Risk Assessment	A risk assessment of the tailings facility to determine the safe development buffer distance considering future mining of the tailings facilities, dust fallout, vegetative status and stability of the slopes.
Impact on Community Subsistence Agriculture	Agriculture	Based on the comments received from the Sol Plaatjie Youth and Mandela Crisis Centre, the developer/proponent agreed to consider the offset of perceived economic displacement related to the existing affected subsistence farmers through a financial contribution to the Mandela Crisis Centre. A valuation of the economic displacement has not been undertaken as part of the environmental impact assessment process and further negotiations will be undertaken once environmental authorisation has been granted.
Impact on Heritage Sites	Heritage Impact Assessment	A Phase 1 Heritage Impact Assessment was undertaken in accordance with the National Heritage Resources Act. The assessment and findings has been submitted to the South African Heritage Resource Agency for review and comment.
Bulk services & urban infrastructure	Bulk engineering services investigation	The requirements for bulk services and infrastructure were determined to verify the capacity to accommodate the proposed development for water, sewer, waste management and electricity.
Traffic impacts	Traffic Impact Study	The capacity of the existing road network was assessed to verify whether the network can accommodate the proposed development at the proposed densities and recommendations for impact mitigation were made.
Tailings Risk	Contaminated Land Assessment	The principal objective of the study was to identify the presence of absence of soil/groundwater contamination associated with the mine residues and to determine the associated risk to the proposed development and human health.
	Mine Residue Deposit Stability	The principle requirement of the assessment was to determine the stability of the sand and slimes dams within the project area and the risk they pose to the proposed development.

## 2.7 PROPOSED METHOD FOR IMPACT ASSESSMENT

The impacts identified are rated in terms of the criteria indicated in Table 6 below:

**Table 7: Impact rating methodology**

Rating	Description
<b>Extent</b>	
High	Widespread, Far beyond site boundary, Regional / national / international scale.
Medium	Beyond site boundary, Local area.
Low	Within site boundary.
<b>Duration</b>	
High (long term)	Permanent, Beyond decommissioning, Long term (more than 15 years).
Medium (medium term)	Reversible over time, Lifespan of the project, Medium term (5-15 years).
Low (short term)	Quickly reversible, Less than the project lifespan, Short term (0-5 years).
<b>Probability Rating</b>	
A High likelihood	Greater than 50:50 chance of occurrence ( $P > 0.5$ )
B Low likelihood	Less than or equal to a 50:50 chance, but at least a 1:20 chance or occurrence ( $P \leq 0.5$ , but $> 1:20$ )
C Negligible	Less than 1:20 chance of occurrence ( $P < 0.05$ )
<b>Impact Magnitude and Significance Rating</b>	
High	Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. In the case of beneficial impacts, the impact is of a substantial order within the bounds of impacts that could occur.
Medium	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly possible. Social cultural and economic activities of communities are changed but can be continued (albeit in a different form). Modification of the project design or alternative action may be required. In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.
Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural, and economic activities of communities can continue unchanged. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming.
No Impact	Zero Impact

### 3 LEGISLATIVE BACKGROUND

This section provides a description of the relevant environmental legislation, guidelines and policies observed and considered during the environmental impact assessment process.

#### 3.1 APPLICABLE ENVIRONMENTAL LEGISLATION

##### 3.1.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT 107 OF 1998)

According to Section 24 of the National Environmental Management Act 107 of 1998, a development activity which may have a substantial detrimental impact on the environment

requires environmental authorisation from the relevant competent authority prior to the commencement of such activities proposed by an applicant or developer.

Activities considered as having a substantial detrimental impact on the environment are listed in Government Notice 544 and Government Notice 545 of the Environmental Impact Assessment Regulations promulgated under the Act. The following listed activities are applicable to the project proposal:

**Table 8: NEMA listed activities originally applied for in 2011**

Notice	Activity #	Description of listed activity
GNR 545 (Listing Notice 2)	15	Physical alteration of undeveloped, vacant or derelict land to residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more
GNR 544 (Listing Notice 1)	11	The construction of canals, channels, bridges, dams, weirs, bulk storm water outlet structures, marinas, jetties, slipways, building or infrastructure or structures (covering 50 square meters or more) where such construction occurs within a watercourse or within 32 m of a watercourse, excluding where such construction will occur behind the development setback line.

**Table 9: NEMA 2014 Regulations listed activities triggered by the project**

Notice	Activity #	Description of listed activity	Applicability
GNR 983 (Listing Notice 1)	12	<p>The development of—</p> <p><del>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</del></p> <p>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs—</p> <p><del>(a) within a watercourse;</del></p> <p><del>(b) in front of a development setback; or</del></p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —</p> <p>excluding—</p> <p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</p> <p>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</p> <p>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</p> <p>(dd) where such development occurs within an urban area;</p> <p>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</p>	Development of housing and infrastructure with a footprint of over 100 square meters will occur within 32m of a watercourse

		(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	
GNR 983 (Listing Notice 1)	26	Residential, retail, recreational, tourism, commercial or institutional developments of 1 000 square metres or more, on land previously used for mining or heavy industrial purposes; excluding (i) where such land has been remediated in terms of part 8 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or (ii) where an environmental authorisation has been obtained for the decommissioning of such a mine or industry in terms of this Notice or any previous NEMA notice; or (iii) where a closure certificate has been issued in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) for such land.	Development of housing in land previously used for mining
GNR 985 (Listing Notice 3)	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres in a. <del>Gauteng</del> <del>i. A protected area identified in terms of NEMPAA, excluding conservancies;</del> <del>ii. National Protected Area Expansion Strategy Focus Areas;</del> <del>iii. Gauteng Protected Area Expansion Priority Areas;</del> iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans; <del>v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004);</del> <del>vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority;</del> <del>vii. Sites identified as high potential agricultural land in terms of Gauteng Agricultural Potential Atlas;</del> <del>viii. Important Bird and Biodiversity Area (IBA);</del> <del>ix. Sites or areas identified in terms of an international convention;</del> <del>x. Sites managed as protected areas by provincial authorities, or declared as nature reserves in terms of the Nature Conservation Ordinance (Ordinance 12 of 1983) or the NEMPAA;</del> <del>xi. Sites designated as nature reserves in terms of municipal Spatial Development Frameworks; or</del> <del>xii. Sites zoned for conservation use or public open space or equivalent zoning.</del>	Roads will be required and a section of the site falls within a CBA area. It is likely that roads will traverse a CBA area.

<p>GNR 985 (Listing Notice 3)</p>	<p>14</p>	<p>The development of—</p> <p><del>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or</del></p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs—</p> <p><del>(a) within a watercourse;</del></p> <p><del>(b) in front of a development setback; or</del></p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; in:</p> <p>c. Gauteng</p> <p><del>i. A protected area identified in terms of NEMPAA, excluding conservancies;</del></p> <p><del>ii. National Protected Area Expansion Strategy Focus Areas;</del></p> <p><del>iii. Gauteng Protected Area Expansion Priority Areas;</del></p> <p>iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans;</p> <p><del>v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004);</del></p> <p><del>vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority;</del></p> <p><del>vii. Sites or areas identified in terms of an international convention;</del></p> <p><del>viii. Sites managed as protected areas by provincial authorities, or declared as nature reserves in terms of the Nature Conservation Ordinance (Ordinance 12 of 1983) or the NEMPAA;</del></p> <p><del>ix. Sites designated as nature reserves in terms of municipal Spatial Development Frameworks; or</del></p> <p><del>x. Sites zoned for conservation use or public open space or equivalent zoning.</del></p>	<p>Development of housing and infrastructure with a footprint of over 10 square meters will occur within 32m of a watercourse within a area identified as a CBA.</p>
<p>GNR 985 (Listing Notice 3)</p>	<p>18</p>	<p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometer in;</p> <p>c. Gauteng</p> <p><del>i. A protected area identified in terms of NEMPAA, excluding conservancies;</del></p> <p><del>ii. National Protected Area Expansion Strategy Focus Areas;</del></p> <p><del>iii. Gauteng Protected Area Expansion Priority Areas;</del></p> <p>iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans;</p>	<p>Existing roads may be widened or lengthened. A section of the site falls within a CBA area. It is likely that roads will traverse a CBA area.</p>

		v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004); vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority; vii. Sites identified as high potential agricultural land in terms of Gauteng Agricultural Potential Atlas; viii. Sites or areas identified in terms of an international convention; ix. Important Bird and Biodiversity Area (IBA); x. Sites managed as protected areas by provincial authorities, or declared as nature reserves in terms of the Nature Conservation Ordinance (Ordinance 12 of 1983) or the NEMPAA; xi. Sites designated as nature reserves in terms of municipal Spatial Development Frameworks; or xii. Sites zoned for conservation use or public open space or equivalent zoning.	
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The environmental impact assessment process is undertaken in accordance with the requirements outlined in Government Notice 543.

### 3.1.2 ENVIRONMENTAL RIGHTS: S24 OF THE CONSITUTION OF RSA

In accordance with Section 24 of the Constitution of the Republic of South Africa Act 108 of 1996, the environmental impact assessment was undertaken with a view to ensure that all person's rights to an environment that is not harmful to their health or well-being are protected. The approach to impact identification, management and mitigation is intended to safeguard the environment for the benefit of present and future generations.

### 3.1.3 GENERAL ENVIRONMENTAL MANAGEMENT PRINCIPLES: S2 OF NEMA

The environmental impact assessment gives due consideration to the environmental management principles set out in the National Environmental Management Act 107 of 1998.

The principles are as follows:

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental and cultural and social interests equitably (Section 2(2)).
- Pollution and degradation of the environment must be avoided, or, where they cannot be altogether avoided, are minimised and remedied (Section 2(4)(ii)).
- The use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource (Section 2(4)(v)).
- A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions (Section 2(4)(vii)).
- The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective

participation, and participation by vulnerable and disadvantaged persons must be ensured (Section 2(4)(f)).

- Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge (Section 2(4)(g)).
- The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment (Section 2(4)(i)).

### 3.1.4 DUTY OF CARE: S28(1) OF NEMA AND NWA

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The duty of care principle is overtly regulated in Sections 28 (1) and (3) of the National Environmental Management Act of 1998, and the National Water Act 36 of 1998, Section 1. Section 28(1) and (3) of the National Environmental Management Act 107 of 1998 states that:

- (1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.
- (3) The measures required in terms of subsection (1) may include measures to-
  - Investigate, assess and evaluate the impact on the environment;
  - Inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;
  - Cease, modify or control any act, activity or process causing the pollution or degradation;
  - Contain or prevent the movement of pollutants or the cause of degradation;
  - Eliminate any source of the pollution or degradation;
  - Remedy the effects of the pollution or degradation, or
  - Remedy the effects of any disturbance to the bed and banks of a watercourse.

Section 28 is applicable to all areas of pollution and environmental impact and the requirements of this section of the act have been borne in mind when assessing any impact evaluated in subsequent sections.

### 3.1.5 POLLUTION PREVENTION: S19 OF THE NWA

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In terms of Section 19 of the National Water Act measures must be taken to:

- Cease, modify or control any act or process causing pollution;
- To contain or prevent the movement of pollutants; and
- To remedy the effects of pollution.

This section of the National Water Act 56 of 1998 calls for a precautionary approach which includes the identification of development activities which may result in water pollution and the adoption of a management hierarchy of avoidance, and where avoidance is not possible, the mitigation of impacts.

### 3.1.6 WATER USE: S21 OF THE NWA

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For the purposes of this Act, water use includes:

- a) Taking water from a water resource (e.g. abstraction boreholes or taking water from a river or stream);
- b) Storing water (e.g. dams, reservoirs to a volume greater than 50,000 m<sup>3</sup>);
- c) Impeding or diverting the flow of water in a watercourse;
- d) Engaging in a controlled activity identified as such in Section 37 (1), including the intentional recharging of an aquifer with any waste or water containing waste;
- e) Irrigating land with waste or water containing waste generated through any industrial activity or by a waterworks ("waterworks" includes any borehole, structure, earthwork or equipment installed or used for in connection with water use);
- f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- g) Disposing of waste in a manner which may detrimentally impact on a water resource (e.g. pollution of groundwater and storm water through seepage and run-off from on-site waste disposal facilities);
- h) Disposing in a manner of water which contains waste from, or which has been heated in, any industrial or power generation process; and
- i) Altering the bed, banks, course or characteristics of a watercourse, and
- j) Using water for recreational purposes.

The proposed township layout plan includes the crossing of a water course with internal roads. The resultant water crossing, will require a water use license (WUL) in terms of Section 21 (c) and 21 (i) of the Act. Furthermore, the installation of services, and/or any other structures which will affect the flow of water would also require an application for WUL. Any additional requirements for a WUL will be considered and applied for on receipt of a RoD/ EA issued by the GDARD and prior to construction.

### 3.1.7 WASTE MANAGEMENT: S26 OF THE NEMWA

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In terms of Section 26 of the National Environmental Management Waste Act (NEMWA, Act No. 59 of 2008), no person may dispose of waste, or knowingly or negligibly cause or permit waste to be disposed of, in or on, land, waterbodies or at any facility unless disposal of that waste is authorised by law. In addition, no person may dispose of waste in a manner that is likely to cause pollution of the environment or harm to health and well-being.

### 3.1.8 BIODIVERSITY

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The Conservation of Agricultural Resources Act (CARA, Act no. 43 of 1983) specifies that certain plants are declared weeds and invader plants which must be controlled or eradicated. These species are divided into three categories, and the control measures applicable to the respective categories are as follows:

- Category 1: Invader plants which have been declared weeds and which may not be allowed to occur on land or in inland water surfaces (other than in biological control reserves);
- Category 2: Invader plants that may only occur in areas that have been specifically demarcated for this purpose; and
- Category 3: Invader plants that may continue to grow where they already exist. However, no propagating, new planting or trade is allowed and such plants may not occur within 30 metres of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland.

In addition to CARA, the National Environmental Management: Biodiversity Act (NEMBA, Act No. 10 of 2004) also regulates biodiversity. The Act specifies that a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Section 7 of the Act.

### 3.1.9 GAUTENG NOISE CONTROL REGULATIONS (GNR 5479)

These regulations prohibit causing disturbing noise which is defined as “a noise level that causes the ambient noise level to rise above the designated zone level, or if no zone level has been designated, the typical rating levels for ambient noise in districts “. These levels are indicated in Table 10 below of SANS 10103:

**Table 10: SANS 10103-2004 Acceptable noise ratings**

Type of district	Equivalent continuous rating for noise (Dba) - Outdoors	
	Day-time (06h00 – 22h00)	Night-time (22h00-06h00)
<b>Residential District</b>		
Rural District	45	35
Suburban district with road traffic	50	40
Urban district	55	45
<b>Non-Residential District</b>		
Urban district with some workshops, business premises and main roads	60	50
Central business district	65	55
Industrial district	70	60

### 3.1.10 CONTRACTORS AND TENANTS

The National Environmental Management Act 107 of 1998, Section 28(1) states that reasonable measures must be taken to prevent pollution or degradation of the environment. Section 28(2) states that the persons on whom subsection (1) imposes an obligation to take reasonable measures include an owner of land or premises, a person in control of land or premises or a person who has a right to use the land or premises.

Section 154(a) of the National Water Act 36 of 1998 states that; *whenever an act or omission by an employee or agent constitutes an offence in terms of this Act, and takes place with the express or implied permission of the employer or principal, as the case may be, the employer or principal, as the case may be, is, in addition to the employee or agent, liable to conviction for that offence.*

The developer / proponent would be considered the employer or principal, the employee or agent being the tenant or contractor. A developer / proponent is therefore responsible for ensuring that contractors and tenants are compliant with the legislation where it affects the site. The developer / proponent may be liable for any illegal discharges, spills or accidents caused by these contractors or tenants (in addition to these contractors or tenants being liable).

The developer / proponent can also not escape liability to third parties in terms of an agreement between themselves and a contractor. Such an agreement is not binding on third parties. A third party will still be able to hold the developer / proponent liable. It is possible for a developer / proponent to join the contractor as a defendant in legal proceedings, alternatively, recover the damages (or part thereof) paid to the third party from the contractor on a contractual basis.

The agreement between a developer / proponent and the contractor must at least state that the contractor is aware of all the applicable environmental legislation pertaining to his tasks and that the contractor will strictly adhere to this legislation. The Developer / Proponent must take reasonable measures to ensure that contractors/stakeholders on site are aware of their responsibility on site and the environmental legal requirements associated with the contractors/stakeholders activities.

This section applies to any contractor working on site or tenant on the property controlled by the Developer / Proponent.

### 3.1.11 COMMON LAW

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Common law principles form the basis of current neighbour law and the law of nuisance. It protects an individual's use and enjoyment of property, but limits the use of property so such use does not interfere with the rights of other people (i.e. neighbours).

#### **Delict, nuisance and neighbour law.**

Nuisance and neighbour law are both fall under the law of delict. Nuisance law means to cause a disturbance to another person. This means that the requirements for a successful delict as outlined below apply to neighbour law and the law of nuisance. The common law rules of delict, nuisance and neighbours can be used to protect any person's environmental rights relating to:

- Noise pollution;
- Air pollution; and
- Water pollution

#### **The law of delict – action of other people that cause harm.**

The common law of delict allows an individual to claim compensation from someone who does something that causes harm.

#### **Requirements for a successful delictual claim**

For such a claim to succeed, the person making the claim (claimant) must prove:

- That the action of the other person was wrong;
- That the person doing the action was negligent, i.e. that the other person was at fault;
- That the claimant suffered a loss which can be given a monetary value;
- That the action of the negligent person caused the monetary loss; and
- The requirements of wrongfulness and negligence must be proven.

#### **Was the action wrong?**

In deciding whether an action was wrong the law attempts to define which actions are seen as wrong by the community as a whole. The action must be wrong because it violates a legal duty to take care (e.g. the National Environmental Management Act 107 of 1998, Section 28: 'Duty of Care') or because it results in an unjustified infringement of the legally protected rights of another person. Generally speaking it is wrong to cause harm to another person or their property through negligent conduct

### **Was the action negligent?**

A person's liability to pay a claim usually depends on whether or not the court finds that they were at fault – i.e. whether they acted negligently or not. In order to test whether the person doing the action was negligent, the courts apply the test of the "reasonable man". In applying this test the court asks:

- Would the reasonable man, in the position of the person doing the action, have foreseen that the action would cause harm?
- Would the reasonable man have taken steps to avoid the harm?
- The court may find the action of a person caused the damage to the claimant and he or she will have to pay the claimant a sum of money equal to the amount of damage that the claimant suffered to compensate the claimant for his loss, if the court finds:
  - That the reasonable person would have foreseen that the action would cause harm;
  - That the reasonable person would then have taken steps to avoid the harm; and
  - That the person who actually did the action did not take steps to avoid the harm.

### **The law of nuisance**

The law of nuisance is divided into three categories:

- Public nuisance – where someone's action causes an inconvenience to the general public;
- Private nuisance – where an action by one person interferes with another person in the ordinary use of his or her property; and
- Statutory nuisance – where a legislative authority declares an action or process to be a nuisance.

### **The law of private nuisance**

The law of private nuisance recognises the right of an owner of land to enjoy their land in physical comfort, convenience and well-being without unreasonable interference from others. Due to the fact that we have to make some allowances for the actions of the people with whom we share our society, each landowner must be prepared to put up with some interference with their right to enjoy their land. It is therefore possible for this right to enjoy land to be interfered with by smoke, gas, fumes or noise generated by another person, as long as it is not unreasonably interfered with. If the interference is unreasonable then the landowner can take legal action to protect his right to enjoy his land under the law of private nuisance. In the case

of private nuisance the person who is usually liable is the person who owns the land from which the nuisance originates. The following people may be liable:

- The owner or occupier of the land who actually causes the nuisance; and
- The person who did not cause the nuisance in the first place, but who has control of the land or has taken over control of the land.

The person who has taken over the land is only liable if that the nuisance is on-going, he or she became aware of the nuisance, and failed to take reasonable steps to stop or limit the nuisance.

### **The law of neighbours**

It is a general rule of our law that a landowner may not use his or her property in a way that causes harm to another person. This means that a landowner's right to use the property is limited and that there is an obligation on him or her not to act in a way that will infringe the rights of a neighbour.

The test of whether the landowner's use of his property fails to comply with this obligation is one of reasonableness and fairness. This principle of reasonableness is relevant to all forms of polluting activities.

### **3.1.12 NATIONAL HERITAGE RESOURCES ACT (ACT NO.125 OF 1999)**

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The South African Heritage Resources Agency (SAHRA) must be notified during the early stages certain planned activities (barriers, bridges, change of site character). Certain permit and reporting requirements apply for heritage sites, structures older than 60 years, archaeological, palaeontological and meteorite findings, burial grounds and graves and public monuments and memorials.

### **3.1.13 CONTAMINATED LAND**

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**The construction of buildings on potentially contaminated land: National Building Regulations promulgated in terms of the National Building Regulation and Building standards Act no. 103 of 1977) (GNR 574, GG31084 of 30 May 2008).**

The regulations incorporate a new provision relating to Geotechnical Site and Environmental Conditions, which replaced the existing Regulation F3. The section deals with buildings to be erected on land considered to be *inter alia* contaminated, unstable, etc. In such cases, the local authority can require the applicant for the erection of a building on such site to undertake a geotechnical site investigation. This information will be used in determining whether approval will be given for the development of the building.

**Nuclear authorisation: National Nuclear Regulator (Act No, 47 of 1999).**

The South African scope of regulatory control with respect to Radioactive Material is entrenched in Government Notice No. R28755 (dated 28 April 2006), which makes reference

to the level below which a nuclear authorization is not necessary. This level is specified as 500 becquerel (per nuclide) / kilogram for naturally occurring radioactive nuclides. The National Nuclear Regulator is the regulatory authority responsible for the implementation of Notice 28755.

### 3.1.14 SUSTAINABILITY APPRAISAL

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New building regulations require energy efficient buildings to be constructed for any new development as of September 2011. The aim of the regulations was to bring down the energy consumption of buildings so as to reduce pressure on the national grid and reduce carbon emissions, and as a general contribution to environmental sustainability.

These are the new SANS 10400-XA: Energy Usage in Buildings, and SANS 204: Energy Efficiency in buildings. SANS 10400-XA provides the 'deemed-to –satisfy' requirements for compliance with the National Building Regulations with regards energy usage, and SANS 204 specifies the design requirements to achieve the required levels of energy efficiency. These regulations apply to all new buildings, and there are some differences in detail depending on where the building is situated. There are six climatic zones in South Africa based on the climate characteristics of the area. The Spitz Land development will comply with the relevant regulations in this regard.

## 4 THE BASELINE/RECEIVING ENVIRONMENT

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This section of the report provides a description of the physical, biophysical and socio-economic receiving environment. The following aspects are addressed:

- Topography and land use;
- Geology and undermining;
- Surface impacts from mining;
- Soils and agricultural potential;
- Site hydrology and wetlands;
- Flora;
- Fauna;
- Sensitive environments;
- Air quality;
- Noise;
- Human settlement;
- Traffic; and
- Heritage

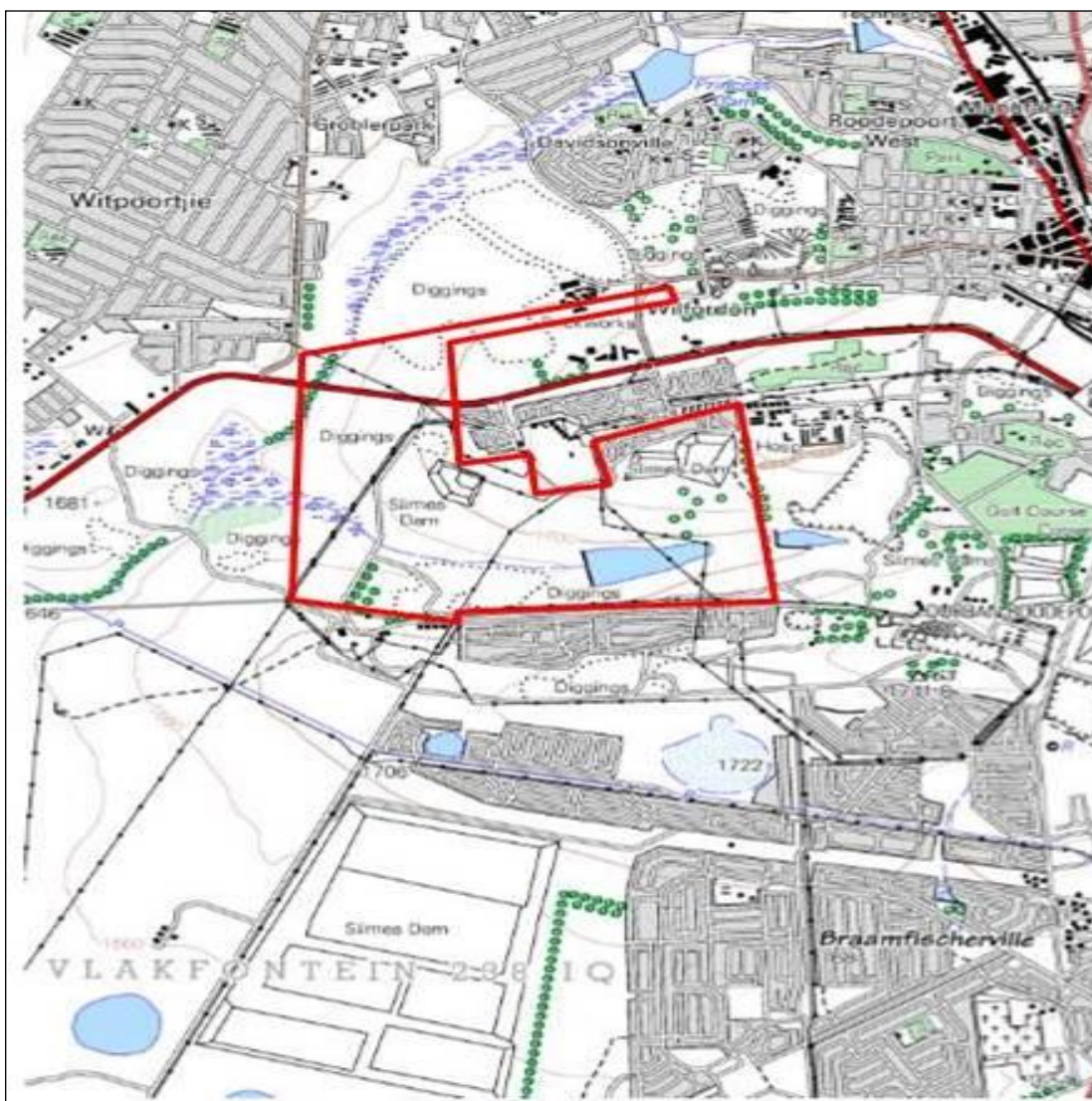
## 4.1 TOPOGRAPHY AND LAND USE

An overview of the site elements and land use is provided in Table 11 below. A detailed description of the findings of the specialist studies as it relates to site elements are included in the relevant sections of this report.

**Table 11: Site elements**

Aspect	Description
Current land use	<ol style="list-style-type: none"> <li>1. The site constitutes defunct mining land located within the Main Reef Mining Belt and was historically mined by DRD Gold;</li> <li>2. Three old mine residue deposits measuring approximately 100 ha are located on the property and are not fully rehabilitated;</li> <li>3. An informal settlement (Dunusa) is located towards the north-east extent of the property;</li> <li>4. Subsistence farming is undertaken in the south eastern section of the site;</li> <li>5. Randfontein road crosses the property towards the northern boundary;</li> <li>6. The following servitudes occur over the site: <ol style="list-style-type: none"> <li>a. Eskom servitude for overhead powerlines;</li> <li>b. Transnet pipeline servitude for conveyance of petrochemicals; and</li> <li>c. Railway line.</li> </ol> </li> <li>7. The Princess Substation switching yard is located in the central area of the site but is excluded from the proposed development area.</li> </ol>
Surrounding land use	<ol style="list-style-type: none"> <li>1. The following adjacent land uses are evident on site: <ol style="list-style-type: none"> <li>a. Residential settlement to the north (Matholesville and Goudrand);</li> <li>b. Residential settlement to the south (Sol Plaatjies); and</li> <li>c. Residential settlement to the north west (Witpoortjie)</li> </ol> </li> <li>2. Open space in the north of Randfontein Road;</li> <li>3. Sand winning to the east of the site adjacent to a mine residue deposit;</li> <li>4. Natural open space to the west of the site; and</li> <li>5. Mining uses north of Randfontein Road.</li> </ol>
Water features on and surrounding the property	<ol style="list-style-type: none"> <li>1. A non-perennial watercourse and wetland areas traverse the proposed development area;</li> <li>2. The river and wetland area extends beyond the site boundary towards the west.</li> </ol>
Vegetation type and current state	<ol style="list-style-type: none"> <li>1. The site is located within an area identified as Soweto Highveld Grassland vegetation unit;</li> <li>2. In accordance with the Gauteng Conservation Plan Version 3.3., portions of the proposed development area are identified to be in critical biodiversity and ecological support areas.</li> </ol>
Heritage features	<ol style="list-style-type: none"> <li>1. None identified</li> </ol>
Other environmental features	<ol style="list-style-type: none"> <li>1. A ridge has been identified on the proposed development site.</li> </ol>
Topography	<p>The site topography is summarised as follows:</p> <ol style="list-style-type: none"> <li>1. Major surface disturbances associated with past mining uses have significantly altered the topography of the site;</li> <li>2. A ridge occurs on the site;</li> <li>3. In the western section of the site, the site slopes gradually from north to south – elevation of 1,685 meters above sea level at Randfontein Road and 1,672 meters above sea level at the valley bottom;</li> </ol>

4. In the eastern section, the site slopes steeply from north to south – 1,775 meters above sea level at the hospital slimes dams highest point and 1,775 meters above the sea level at valley bottom;
5. In the southern section of the site (south of the wetland), the site slopes gradually from east to west.



**Figure 4: Topographical map of area**

As part of the impact assessment process the baseline information as provided by the Gauteng Conservation Plan Version 3, Edition 3 (Gauteng C-Plan 3.3) was reviewed and considered during the environmental impact assessment. The following information was obtained from the South African National Biodiversity Institute's website which hosts the Gauteng C-Plan 3.3.

- National Wetlands: Two wetland systems are shown to affect the proposed development area (Figure 5). A wetland delineation was undertaken as part of the environmental impact assessment to verify the extent of the wetlands;
- National Land cover: The available land cover information (Figure 6) is consistent with the land use and land cover identified during the site investigation; and
- Critical Biodiversity and Ecological Support Areas: According the C-Plan, the study site includes mostly critical biodiversity areas and small footprints of ecological support areas (Figure 7). Extensive transformed and severely degraded areas are included in the Critical Biodiversity Areas and Ecological Support Areas. The C-Plan categories that are spatially represented in the study area include:
  - Confirmed orange list plant taxa;
  - Primary vegetation; and
  - Red list plant habitat/vegetation communities.

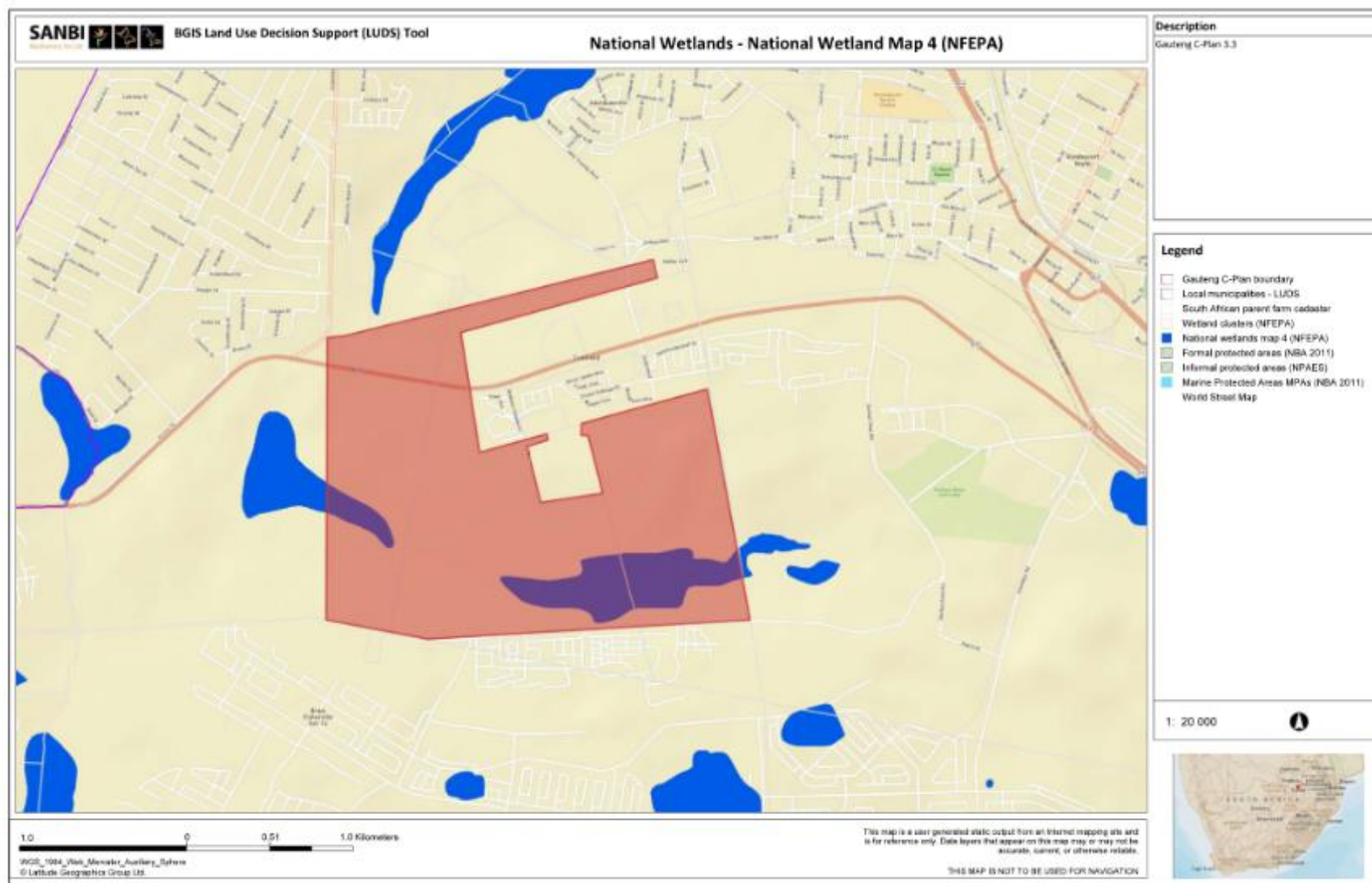
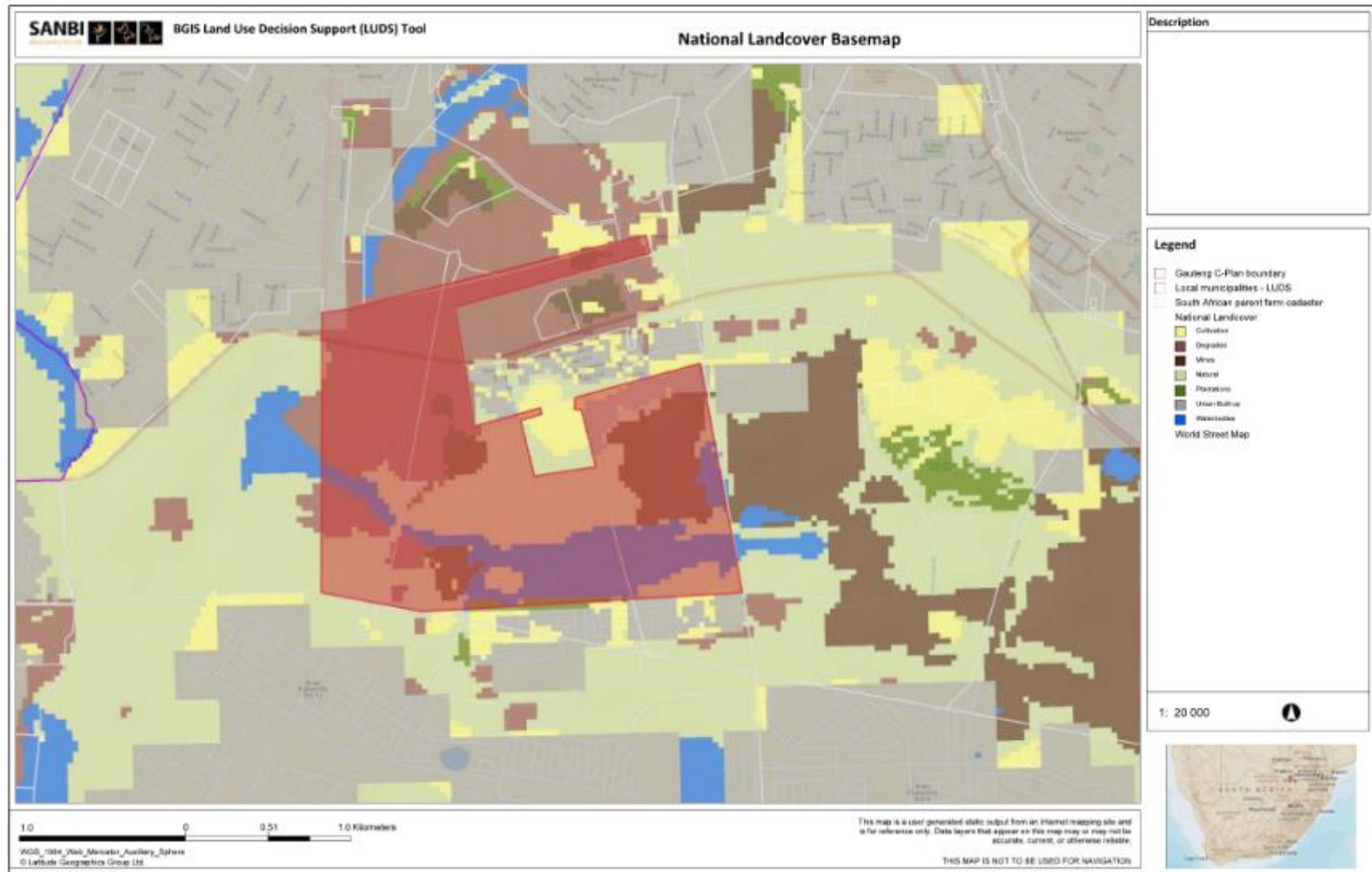


Figure 5: BGIS Land Use Decision Support Tool – National Wetlands



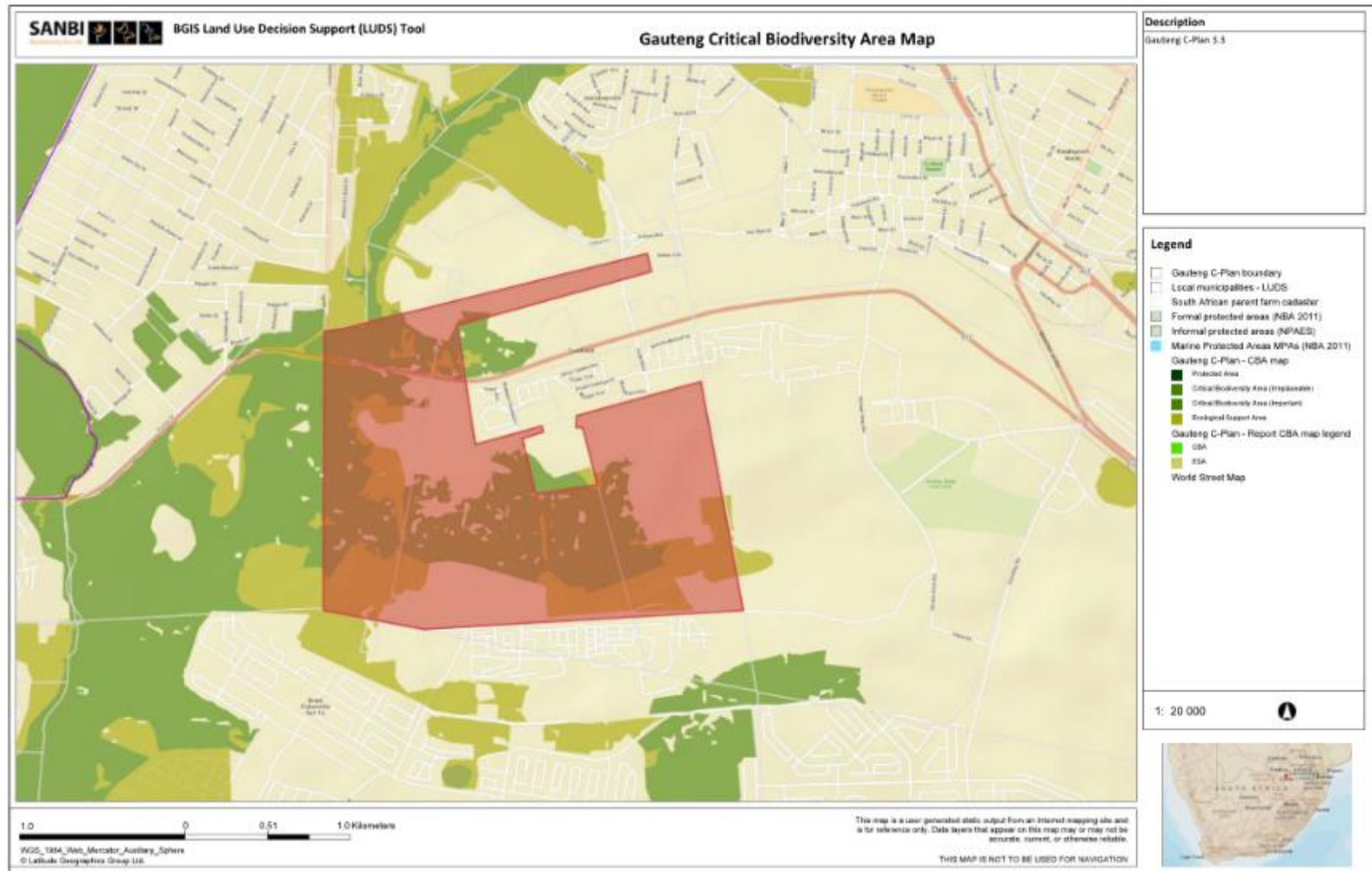


Figure 7: BGIS Land Use Decision Support Tool – Critical Biodiversity and Ecological Support Areas

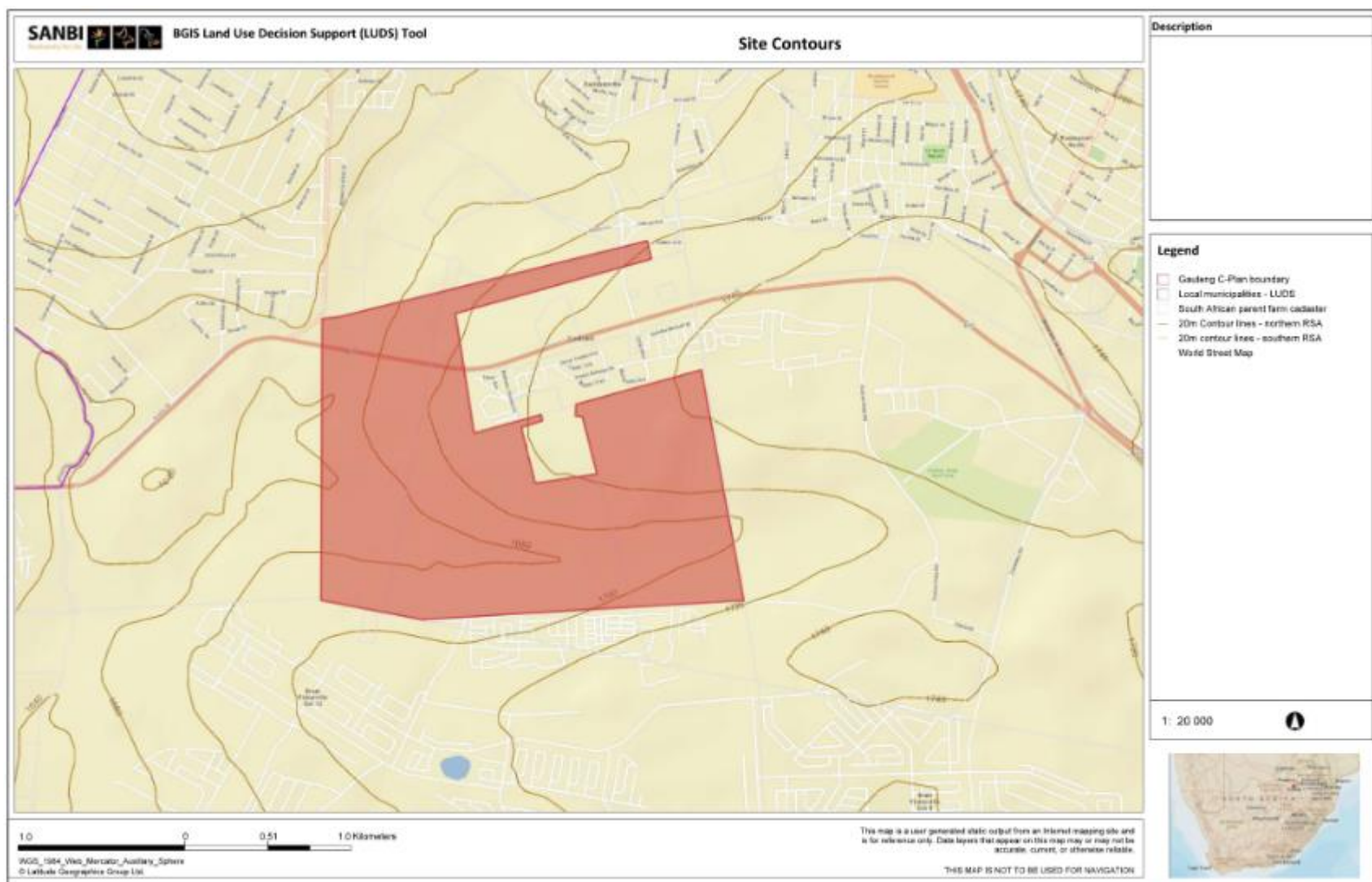


Figure 8: BGIS Land Use Decision Support Tool - Contours

## 4.2 GEOLOGY AND UNDERMINING

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The general site area is underlain by sedimentary rocks of the Witwatersrand Supergroup and it is in these strata that gold is found. A few north-west striking faults run through the area. Undermined ground is generally categorised into the following zones:

1. Outcrop Zone: This zone extends from 3 m on the footwall side of the stope to points where the depth of mining, measured vertically is 25 m;
2. Shallow Zone: This zone extends from the outcrop zone where mining depth, measured vertically is 25 m, to points where the depth measured is 200 m;
3. Deep Zone: This zone includes all areas where the mining depth measured vertically is greater than 200 m; and
4. Special Zones: All ground within 5 m of the perimeter of shafts and winzes, including the openings themselves and within 5 m of the significant dyke or fault contacts. Dykes themselves may also be included in special zones.

Based on the above, an analysis of the site is provided below:

1. Dip of reefs: the dip of the reef in the area is approximately 37° which is considered to be fairly steep. As such, any material that has collapsed from the hanging wall will tend to travel down the stopes, especially if water flows into the old mine workings. As a result, there is a fair chance of sinkholes developing where stopes are fairly shallow and the hanging wall is incompetent;
2. Stopping width: The Main Reef and the South Reef were mined separately and the stopes are a maximum of 2,0 meters high;
3. Extent of mining: Most of the site has been undermined as shown on the undermining plan in Figure 9 below. Limited areas, where igneous intrusives have disrupted the strata have been left unmined; and
4. Number of reefs mined: The Main and South Reef have been mined under the site while the Bird Reef was mined but to a limited extent in terms of both underground and opencast operations near the Mona Liza Adit;

As a result of the geotechnical analyses undertaken, the majority of the site is located within the Deep Zone and has been mined to depths greater than 240 meters. Furthermore, the data obtained provided no indication of the presence of a Shallow Zone on site. Although no Outcrop Zone is present, the rocks overlying the shallow mined areas are not considered to be competent and there is a fair chance that sinkholes may develop in these areas. This zone includes all areas where mining has taken place at depths of less than 30 meters and all shafts that have been identified, including the 5 meters buffer around shafts. As such, no development should take place within the delineated Outcrop Zone and it should be reserved for open space. The remaining areas of the site that fall within the Deep Zone is free to be developed with no geotechnical restrictions. The geotechnical report prepared by Bear Geo-Consultants is attached as Appendix C.

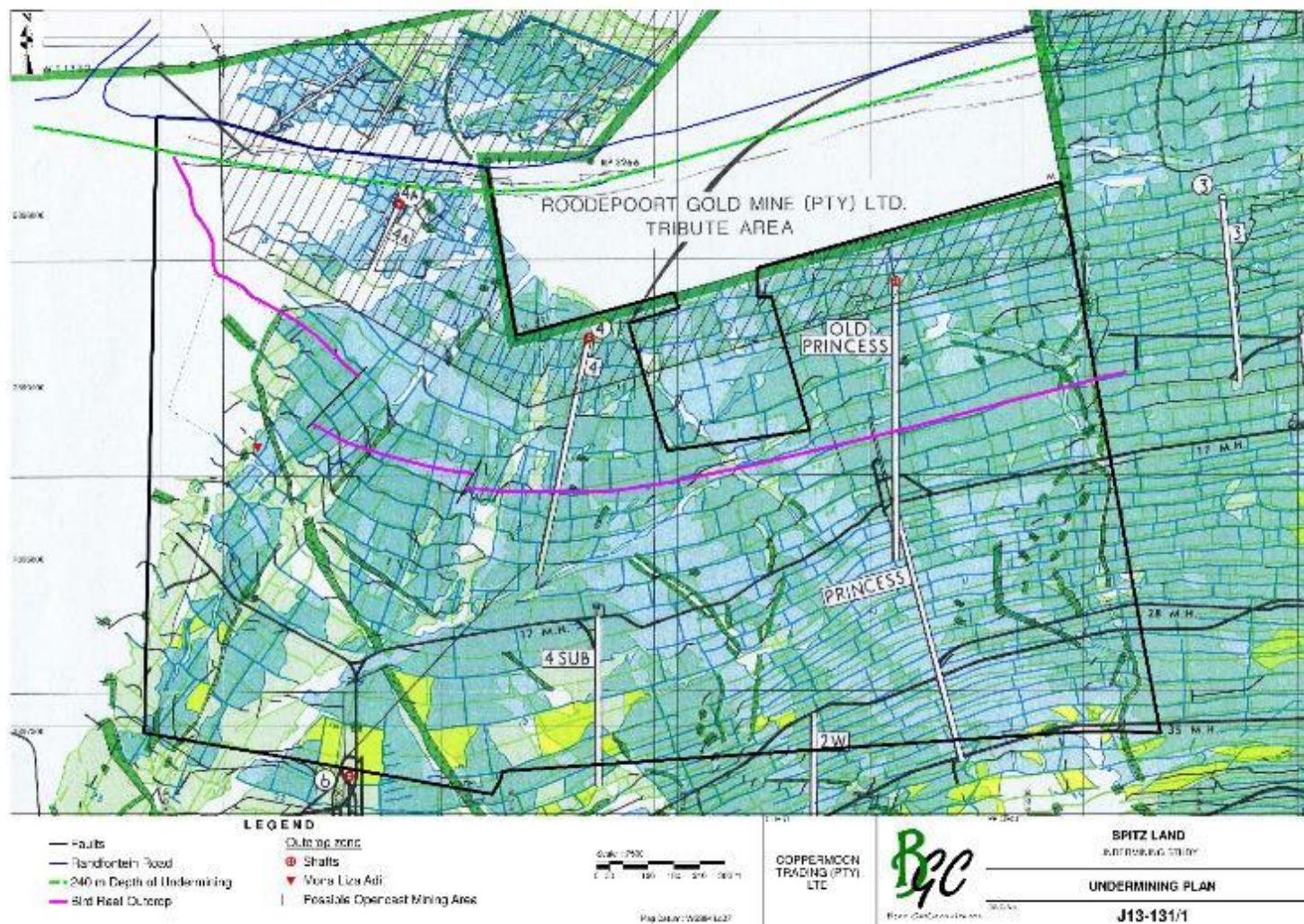


Figure 9: Undermining plan

## 4.3 SURFACE MINING IMPACTS

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The site was historically mined by DRD Gold and mineralised waste deposited in three locations on the site. As such, sections of the site are considered to be contaminated due to the occurrence of these mine residue deposits or slimes/tailings dams (Figure 10). Environmental, health and safety risks are associated with these deposits and are described in the relevant sections below:

### 4.3.1 RADIOLOGICAL HAZARDS

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Gold deposits on the Witwatersrand basin are known to contain pyrite ( $\text{Fe}_2\text{S}$ ) and uranium, as well as a number of other metals, metalloids and naturally occurring radioactive materials. A radiological field survey was undertaken of the proposed development site ascertain if the specific activity levels on this site are below or above the set regulatory limits (500 becquerel (per nuclide) / kilogram). Malepa Holdings CC was appointed to undertake a Radiological Hazard Assessment (Appendix D) of the proposed site and determined the following:

1. Of the 6,586 readings, no readings were found to be above the 500 becquerel / kilogram limit with the highest Uranium activity recorded on the entire site being 210 becquerel / kilogram whilst the average for the site was 47 becquerel/Kg and the 90th percentile being 86 becquerel / kilogram. The activity map for the site is presented in Figure 11 and it should be noted that the three mine residue deposits were neither surveyed nor sampled as it falls outside the proposed development footprint;
2. The survey conducted on the accessible areas of the Spitz Land site indicates that 0% of the site requires remediation since the results are well below the reference level of 500 becquerel / kilogram for which a nuclear authorisation is not necessary. As previously mentioned, the highest uranium activity recorded on the entire site was 210 becquerel / kilogram whilst the 90th percentile uranium activity was 86 becquerel / kilogram;
3. The maximum dose from external exposure to soil contaminated to various extents is below 0.1 microsievert / year. Furthermore, the maximum internal exposure due to inhalation of contaminated air and ingestion of crops planted in this site is less than 96.9 microsievert / year. Thus the total potential exposure (internal and external) is 97 microsievert / year. Therefore, it may safely be indicated that the surveyed area does not indicate the presence of radioactivity requiring rehabilitation for unrestricted release; and
4. In terms of the radiological risk, the individual risk for this site is  $3.87 \times 10^{-11}$  fatalities.person-1.annum-1 (i.e. effective dose X mortality risk coefficient 2). This value complies with the risk limits prescribed by the National Nuclear Regulator in the Safety Standards and Regulatory Practices Regulations.

As such an application for land clearance for development on the site was submitted to the NNR and clearance obtained from the regulator on 13 June 2016 which confirmed that the site conformed to the required safety standards (Appendix U).

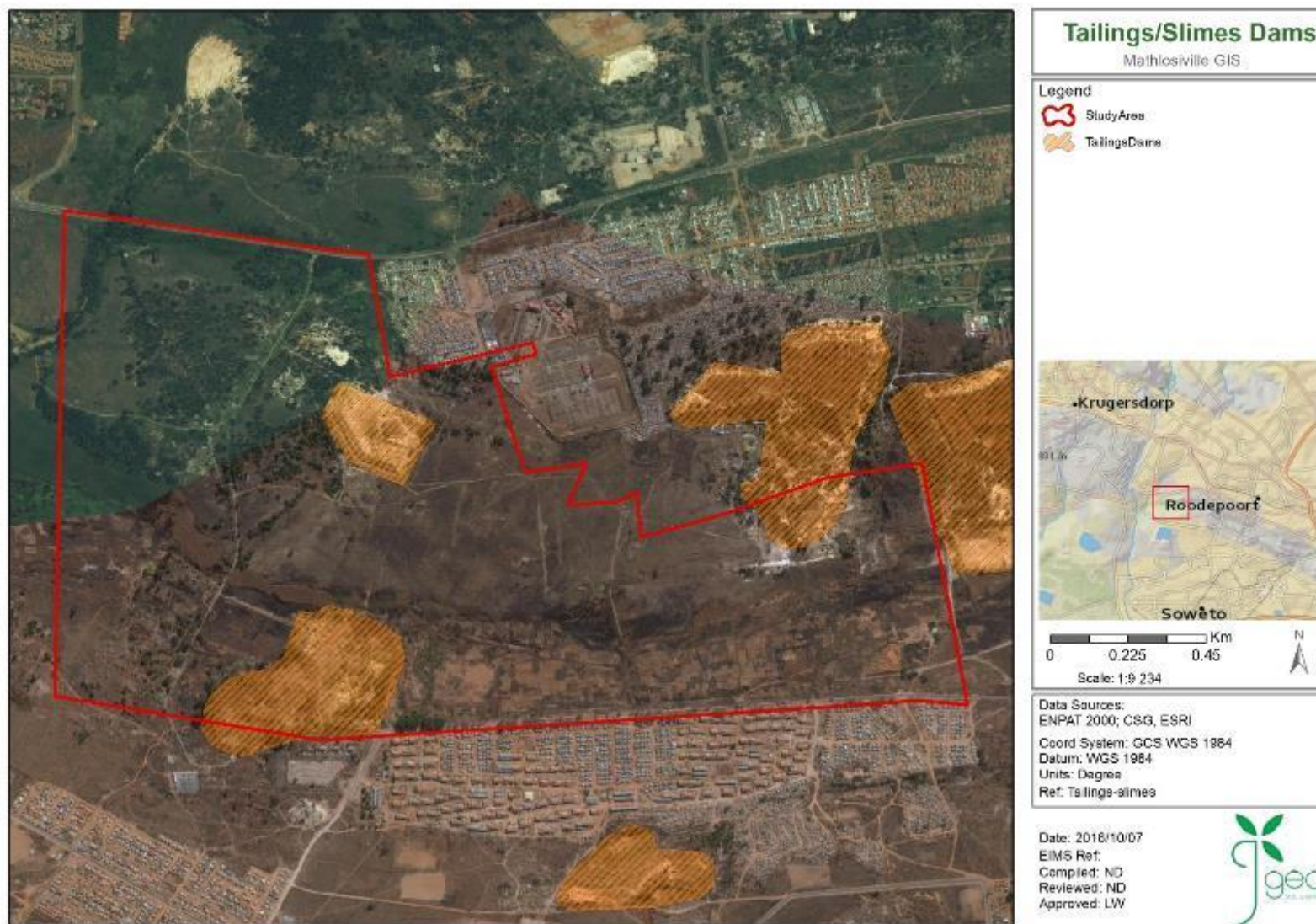


Figure 10: Location of mine residues



Figure 11: Radiological hazard assessment activity map

#### 4.3.2 ENVIRONMENTAL HEALTH & SAFETY RISK

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As part of the Radiological Hazard Assessment, the specialist consultant (Malepa Holdings CC) reported that the mine residue deposits pose a risk to the members of the public who would reside in the area through the following five environmental pathways:

- The release of gaseous radon-222 ( $^{222}\text{Rn}$ ) to the atmosphere and subsequent inhalation;
- Possible dust loading of contaminants from the residues due to natural wind conditions;
- The localised effect of direct external gamma radiation exposure from the residues;
- Groundwater seepage and subsequent contamination of local aquifers, potentially affecting water supply; and
- Dam failure due to erosion or natural disasters.

Additionally, a common known pollution source from tailings deposits is acid mine drainage. Acid mine drainage is a chemical weathering process by which sulphates in the residue deposits are exposed to air and water, resulting in hydrogen ion release - acidity, sulphate ions, and soluble metal ions. The effects of acid mine drainage may be severe and can significantly impact on the ecological systems, water quality and ultimately, human health. While no evidence of acid mine drainage at surface was observed during the site visit conducted by Marsh, water quality, leachate characteristics and pollution concentrations, Acid Potential (AP) and Neutralising Potential (NP) of the mine residue material was not assessed.

Based on the above, ENVIRON Africa was appointed to undertake a Contaminated Land Assessment (Appendix N) of the proposed development site. The results of the study are summarised below:

- Laboratory results confirmed impact to soils immediately adjacent to and down gradient of the slimes dams situated on-site. Elevated concentrations of sulphates and arsenic detected towards the western portion of the site exceeded screening criteria applicable to a residential exposure scenario. The detected concentrations of these contaminants are considered to be directly related to the slimes dams situated near-by. The risk of soil conditions to potential future residential receptors towards the north-western portion of the site is assessed as low if proper mitigation measures are implemented;
- Informal dumping has and continues on site and residents surrounding the site use it for dumping building rubble, domestic wastes and any materials. Furthermore, informal mining and reworking of the tailings dams was taking place along the river bisecting the site. It is considered that the development of the site would halt these activities thereby reducing the potential for further contamination spread as the result of these activities; and
- Pesticides were detected during the site investigation in the samples collected but these were not present in significant concentrations to pose risk to end users.

With regards to the residue deposits stability, DRD Gold undertook a slimes dam stability report (Appendix O). The results of the report are summarised below (Figure 12):

- The north-eastern slimes dam, at the time of mine closure was contained within paddocks on all sides including a lower storm water catchment area. The lower storm water catchment area however shows signs of an erosion breakage and spillage into the adjacent southern and south western areas marked 'B' and 'C' respectively. Area 'B' will require restoration of the catchment dam wall in two places with the installation of a storm water decanting pipe allowing for a freeboard of one and a half metres. Area 'C' slime will need to be replaced into the containment paddock walls. In the area marked 'A', there has been a storm water overspill of the single paddock into a contained area which ensured the separation of the drainage waters and the natural food waters. This lower area needs to be deposited onto the paddock walls for added freeboard; and
- The western slimes dam, at the time of mine closure, was also contained with paddocks on all sides including a surrounding storm water canal which also shows no sign of erosion or spillage into the adjacent areas. The slime has consolidated to a hard outer crust with sparse vegetation and no erosion of the side slopes. It can be safely termed a low hazard entity. This dam will require some amelioration and vegetation techniques to ensure a diverse and sustainable vegetation cover mitigating any possible future nuisance dust problems.

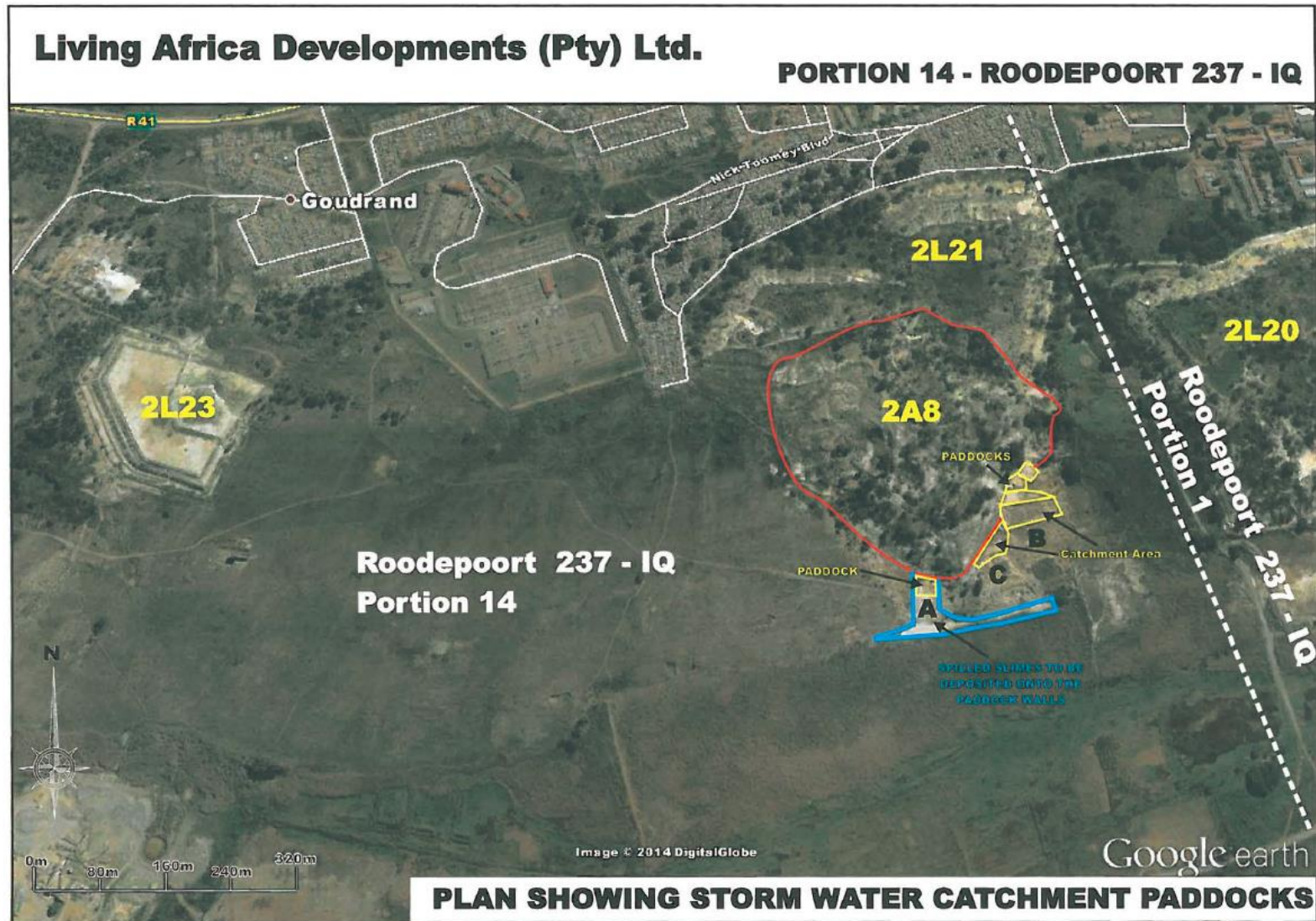


Figure 12: Residue deposits (slimes dam) stability report

The management of the mine residue deposits is regulated by the Mineral and Petroleum Resources Development (MPRDA, Act no. 28 of 2002) and applicable the regulations as well as the Regulations on Water Use for Mining and Related Activities, promulgated in terms of the National Water Act 36 of 1998 and falls outside the ambit of this environmental impact assessment. The provisions are noted and the requirements are included in Table 10 below:

**Table 12: MPRDA and regulation on water use for mining and related activities**

Aspect	Legislation	Description
Disposal of mine waste	S 42 of MPRDA	Requires that residue stockpiles and deposits be managed in a manner as prescribed; Restricts placement/disposal of residue stockpiles and deposits in any area other than areas approved through the EMPR
Responsibility for any environmental liability, pollution or ecological degradation until mine closure is achieved.	S 63 and 69 of MPRDA	Sets out the principles and prescribes the requirements for the disposal of mining waste.
Management of residue stockpiles	S 73 of MPRDA	Includes the provision for the assessment and management of stockpiles through a process of characterisation to determine the risk, the appropriate siting and management thereof.
Statutory health and safety obligations	Mandatory code of practise on mine residue deposits (2000)	Guides the employer through the process of compiling a mandatory code of practise for mine residue deposits which if properly implemented and complied with will help to ensure that the employers statutory health and safety obligations are met. To reduce as far as reasonably practicable the risk of death, injury and health damages to persons, and damage to property arising from Mine Residue Deposits while at the same time being consistent with measures to reduce pollution of the environment.
Principles of mine closure	S 56 of MPRDA	Outlines the principles for mine closure that must be adhered to by the holder of a prospecting permit, mine right, retention permit or mining permit.
Transfer of environmental liabilities	S 58 and 59 MPRDA	Provides regulations for the application and the qualification regarding transfer of environmental liabilities.
Environmental Risk Report as part of an application for Mine Closure	S 60 of MPRDA	Outlines the requirements for the development of an environmental risk report to be submitted as part of an application for mine closure.
Closure Objectives and Closure Plans	S 61 and 62 of MPRDA	Sets the objectives for closer and prescribes the content of the closure plan.
Pollution control and waste management	S 64,66,67,68,69,70,71 & 73	Describes standards for air quality, noise, blasting, vibration, waste, pollution, soil quality, sanitation and management of residue stockpiles or deposits.
Capacity requirement of clean and dirty water systems	Regulation 6 of GNR 704	Provides the requirements for the design of a stormwater management system.
Water pollution	Regulation 6 of GNR 704	Prohibits and outlines the requirements for water pollution prevention.
Access control	Regulation 6 of GNR 704	Provides for access control measures to impoundment or dam containing any poisonous, toxic

		or injurious substance and in any area used for the stockpiling or disposal of any residue.
Design of new water systems	Regulation 6 of GNR 704	Required that the plans, specifications and design reports be approved by a professional engineer.

Although not the responsibility of the applicant, Upward Spiral 1471 has been contracted by Mintails to re-process the tailings and rehabilitate two smaller residues located to the north and south of the site (Appendix S). The residues contain 9000 and 112000 tonnes respectively and will be removed through to use of the following:

- 2 x 300 ton excavator;
- 2 x 25 ton articulated dump trucks;
- 3 x front end loaders;
- 1 x Finlay screen; and
- 120 000 litre water bowzer

An estimated 7500 tonnes will be removed month and complete removal of the residues is estimated at 18 to 22 months. No occupation of any of the residential units will occur until both the residues are removed and the land subject to a further radiological and contaminated land assessment.

At present no plans are in place for removal of the larger residue deposit in the north-east corner of the site. In the event that the residue is not removed, it will be vegetated in accordance with an approved vegetation plan (Appendix T) prior to the commencement of any development. As such, the area has been removed from the site layout and an amended site layout is provided below. Approval for the residue removal has been obtained from the DMR (Appendix W) and a clearance certificate obtained from the NNR (Appendix U).

Unclosed mine shafts also occur on site. Shaft 8 is an unclosed mine shaft and is in close proximity to the human settlement of Matholesville. Both unclosed shafts and residues are a potential health and safety risk to human settlements. In accordance with the requirements of the Mine Health and Safety Act 29 of 1996, health and safety risks provide for protection of the health and safety of employees and other persons at mines. Any requirements as it relates to health and safety matters must be complied with by the owner of the mine and associated infrastructure. The health and safety risks associated with Shaft 8 are therefore not addressed in this environmental impact assessment.

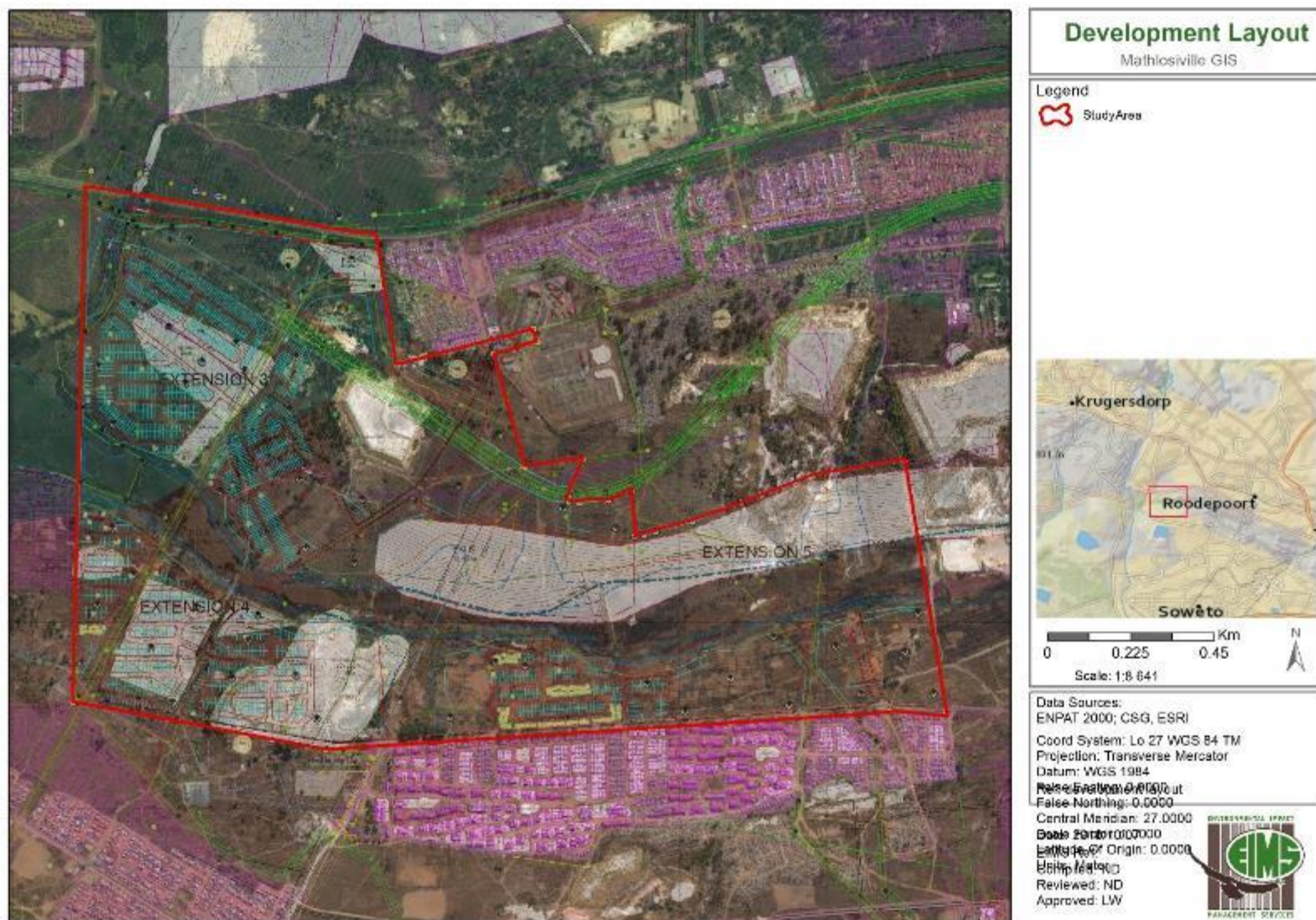


Figure 13: Amended layout (Please note the exclusion of the larger north east dump)

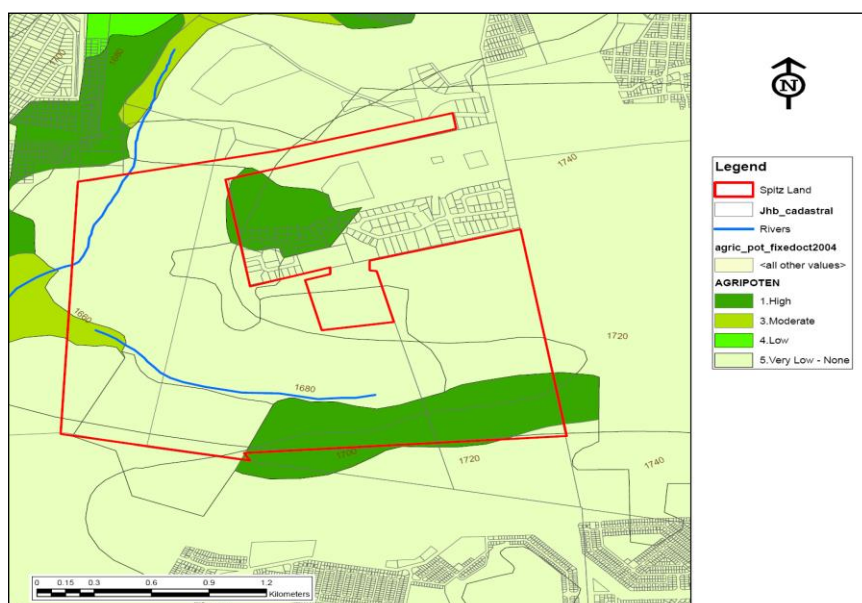
## 4.4 SOILS AND AGRICULTURAL POTENTIAL

In the southern-most section of the site, an area of approximately 40 hectares is currently being utilised by residents of the adjacent Sol Plaatjes community for subsistence agriculture. It was acknowledged by Ikemisetseng Poultry Agricultural Primary Co-operative during the public participation process that the area of high agricultural potential is currently under informal cultivation by its members who are residents of Sol Plaatjes.

Actively managed plots or allotments yielding maize and other crops are present in this area with small informal plots occurring in other areas of the site (refer to Figure 14). The larger subsistence farming area in the south of the site is ascribed a “high agricultural potential” description according to the Gauteng C-Plan Database (refer to 15). The remainder of the site is ascribed to have a “very low – none” agricultural potential with a small section of “moderate” potential in the west of the site.



**Figure 14: Subsistence crops planted in the southern section of the site by Sol Plaatjes residents**



**Figure 15: Agricultural potential (C-Plan)**

The feasibility of the cultivation of areas identified to have high potential agricultural soil was not addressed in this environmental impact assessment. It should be noted that the land is used for agriculture without the consent of the current land owner. During the stakeholder consultation process, the representatives from the Mandela Crisis Centre (Sol Plaatjes, the Ikemiseseng Co-operative as well as the “Sol Plaatjes Youth” highlighted the need for alternatives and / or off-sets for the loss of the agricultural land that will result from the proposed development project. Information in this regard is included in the public participation section of this report.

## 4.5 WATER RESOURCES

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The site is situated in quaternary catchment area C22A. Two non-perennial streams of the Kliprivier traverse the proposed development site:

- The stream flowing east to west dissects the site, along which is situated an attenuation dam. A clearly defined valley bottom wetland is associated with this stream; and
- A stream flowing north to south intersects the north western corner of the site.

### 4.5.1 WETLANDS

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A desktop investigation was undertaken by INDEX (Pty) Ltd to determine the extent of wetlands occurring on the site. Approximately 70 hectares of the 300 hectares (23%) site can be classified as “wet” areas, made up of the following:

- Wetland areas associated with the non-perennial stream located on the site (43 hectares). This system is located within the Kliprivier catchment;
- Ponding resulting from sand winning (2,6 hectares);
- Seep resulting from storwater discharge from switch yard (6,9 hectares); and
- Localised sewage spill (3,8 hectares).

Subsequently, INDEX was requested by Marsh Environmental Services to undertake a wetland delineation study on a portion of land known as the Spitz Land situated on the Remaining Extent of Portion 14 of the farm Roodepoort 237-IQ. The report was prepared based on a site visits in June 2011 and a repeat visit in July 2012. Areas with typical hydrophyte plant communities confirmed by soils with qualifying colours were mapped after boundaries were determined by soil auger and plotted by GPS and the interpolation of the individual augur holes. Although not typical wetland, the areas with riparian vegetation that are seasonally inundated and forms part of the floodplain system were included in the wetland zone.



**Figure 16: Riparian area situated on the site (north western section) and picture of existing road through wetland**

All wetlands including a 32 meter buffer zone identified in the wetland delineation will be observed and such areas are to be treated as sensitive environments and excluded from the development footprint. The extent of the wetland areas and the associated buffer zones are shown in Figure 17 below and the Wetland Report is attached as Appendix E.

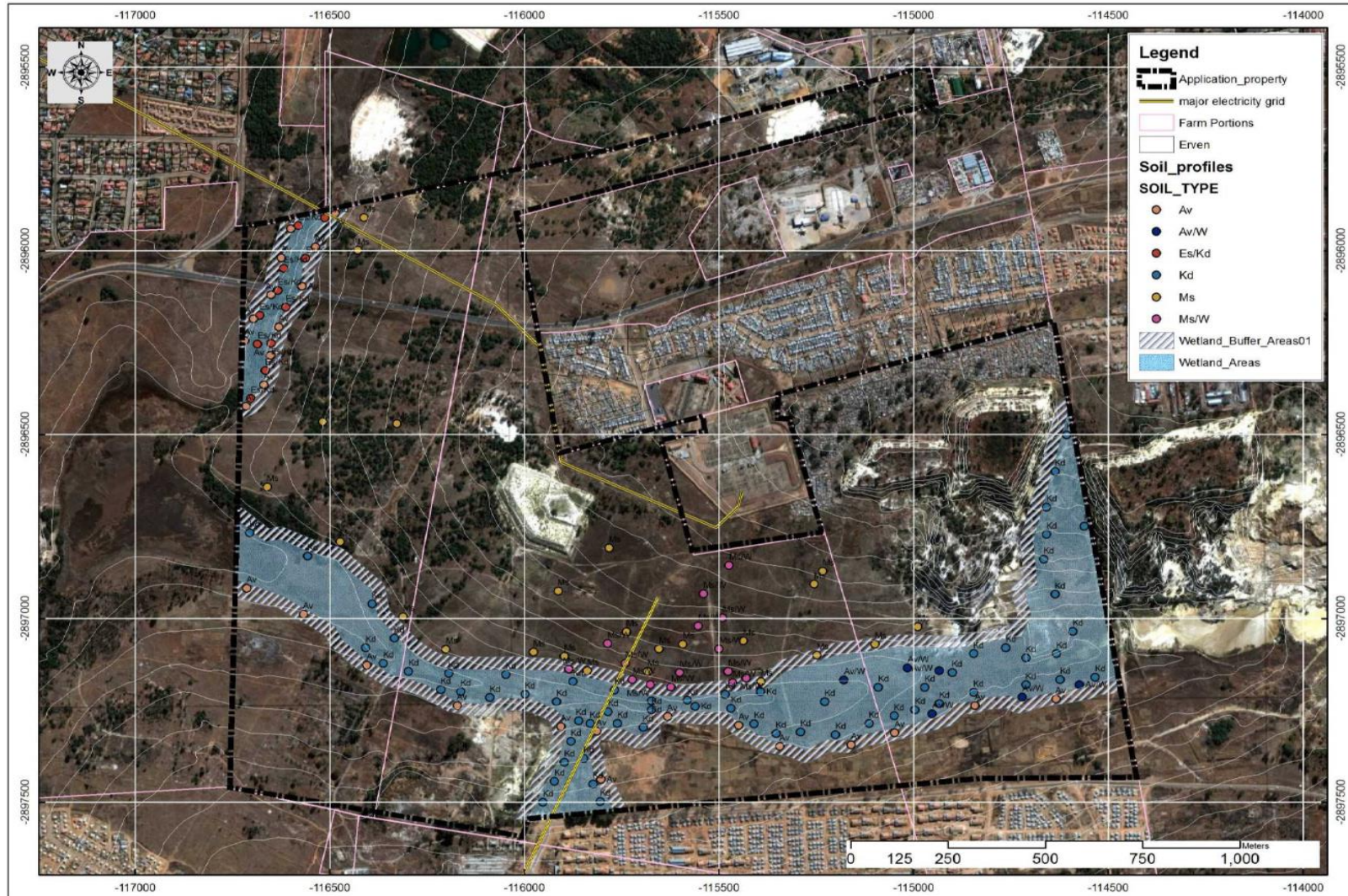


Figure 17: Wetlands occurring on the site (Index (Pty) Ltd, Wetland delineation - Remaining Extent of Portion 14 of the farm Roo-depoort 237-IQ, November 2011)

#### 4.5.2 STORMWATER MANAGEMENT

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It is a requirement of the City of Johannesburg Metropolitan Municipality that a detailed Storm Water Management Plan be prepared on properties that are in the process of being developed in the municipality. The policy that has been adopted and is aimed at managing the negative impacts associated with increased stormwater flow resulting from new development activities. WSP Group Africa (Pty) Ltd was appointed to prepare a storm water report which deals with the determination of parameters and proposed infrastructure for the management of storm water run-off from the proposed development site. The key findings included in the report are as follows:

- The pre-development run-off from the contributing catchments of the site is  $10.81\text{m}^3/\text{s}$  and the post-development run-off from the contributing catchments is  $40.03\text{m}^3/\text{s}$ . An attenuation pond is required to attenuate the runoff from the catchment and release the flow at a maximum rate of  $10.81\text{m}^3/\text{s}$ ;
- The attenuation pond facility which is proposed for this site should comprise the following:
  - The construction of a holding basin with a footprint of approximately  $54\,808\text{m}^2$  and a depth of 2.4m;
  - The construction of an outlet structure in brickwork at the lower end of the basin which will incorporate a 2.4m x 1.8 box culvert to allow total drainage of the basin to take place;
  - The outlet structure will only allow a discharges at a rate of approximately  $10.9\text{m}^3/\text{s}$ ; and
  - The pond is required to have a volume of  $84,439\text{m}^3$  in order to store the volume of water generated from a 1 in 25 year storm event on the site.
- The terminal discharge from the pond will be through a 2.4m x 1.8m box culvert at a rate less than the 1 in 5 year storm event. The discharge in excess of a 1 in 25 year storm event will overtop through an emergency spillway through to the wetland; and
- The controlled release of the attenuated storm water flow from the major portion of the stand and from out of the proposed attenuation pond facilities has satisfied the requirements whereby the total rate of release of the storm water into a downstream Municipal drainage system under a 1 in 25 year storm condition does not exceed the rate of discharge from a 1 in 5 year storm event determined for a pre-developed site condition.

The Stormwater Management Plan Report is attached as Appendix F.

#### 4.6 BIODIVERSITY

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The site is located within the Soweto Highveld Grassland regional vegetation unit within the Grassland Biome. Soweto Highveld Grassland is associated with gently to moderately undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of

other grasses such as *Elionurus muticus*, *Eragrostis racemosa*, *Heteropogon contortus* and *Tristachya leucothrix*. In places not disturbed, only scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover. Soweto Highveld Grassland's conservation status is endangered. It is statutorily conserved in only a few places, almost half of the area already transformed by cultivation, urban sprawl, mining and building of road infrastructure.

Very few areas of natural vegetation remain on the site with surface disturbances from mining and agricultural uses having contributed to this status. Extensive informal dumping over many areas of the site also leads to fragmentation of the indigenous vegetation. Stands of Black Wattle are situated in the remaining natural grasslands in the north western section of the site however species diversity in this area is estimated to be high. As part of the scoping phase of the project the ridge affecting the proposed development area was identified a Class 2 ridge though during the execution of the biodiversity assessment, referred to in the following section, the ridge was reclassified as a Class 3 ridge.



**Figure 18: Rocky outcrop amidst grasslands with black wattle in background and view from mining impacted area. Plant species located on site**

Bathusi Environmental Consulting CC was appointed as independent ecologists to conduct an ecological investigation of the study area and compile an impact rating report for the terrestrial biodiversity component of this project. The following sections provide the key finding.

The study area is located in the Mesic Highveld Grassland Bioregion, more specifically defined by Mucina and Rutherford as the Egoli Granite Grassland ('Endangered'). The vegetation type occurs on moderately undulating plains and low hills supporting tall, usually *Hyparrhenia hirta* dominated, grassland with some woody species on rocky outcrops or rock sheets.

Approximately 911 species are known to occur within the 2627BB ¼- degree grid that is sympatric to the study site (POSA, 2009). Typically, the grass sward is physiognomically dominant with a high diversity of forbaceous taxa. Indigenous trees and shrubs occur sporadically, but exotics colonised many areas where anthropogenic impacts occurred. Transformed and degraded areas are characterised by the substitution of vegetation with a plant composition of a weedy disposition. A total of 115 plant species were recorded during the field investigation. This recorded phytodiversity and the physiognomy of certain parts of the site

is regarded representative of the regional vegetation type, exhibiting a dominant and diverse herbaceous layer with scattered shrubs and low trees occurring as clumps. The woody diversity is represented by seven tree species, but comprises mostly exotics that are frequently associated with transformed areas. A well-developed herbaceous stratum is represented by 60 forbs and 27 grass species. The floristic diversity comprises 41 families, dominated by *Poaceae* and *Asteraceae*.

Data records (POSA, 2009), indicate the presence of 11 conservation important plant taxa within the 2627BB ¼-degree grid that is sympatric to the study site. Gauteng Department of Agriculture and Rural Development records indicated a further 3 species that could potentially persist within the boundaries of the site, namely:

1. *Habenaria mossii*;
2. *Gnaphalium nelsonii*; and
3. *Delosperma leendertziae*.

A Red Data assessment indicates that only 1 Orange Listed species (*Hypoxis hemerocallidea*) is moderately likely to persist in the natural grassland areas of the study site. Results of the photo analysis and site investigation revealed the presence of the following macro habitat types within the study area:

1. Degraded Grasslands (low floristic sensitivity);
2. Grassland/ Rocky Outcrops (high & medium-high floristic sensitivity);
3. Linear Infrastructure (low floristic sensitivity);
4. Mine Land (low floristic sensitivity);
5. Residential Areas (low floristic sensitivity);
6. Riparian Habitat (medium-high floristic sensitivity);
7. Stands of Exotics/ Degraded Grassland (low floristic sensitivity); and
8. Subsistence Farming (low floristic sensitivity).

The Class 3 ridge that is indicated to be present on Spitz Land is not a typical ridge in the true sense of the word, but rather resembles a low outcrop of subsurface rocks in localised areas of the site. Floristic indicators furthermore reflect a typical rocky grassland environment, rather than the characteristic vegetation associated with ridges of Gauteng. Therefore, although this area is indicated to comprise a Class 3 ridge, the status of the ridge is not considered typical of a ridge environment. Floristic characteristics recorded within this habitat type is nonetheless regarded typical of the regional vegetation type (Egoli Granite Grassland) and the conservation / preservation of the ridge as a natural open space as part of the proposed development is recommended.

Surrounding land uses and impacts have resulted in significant deterioration of the remaining grasslands, particularly the smaller portions. The larger portion of the natural grassland (Unit 1.1, refer Figure 19) of the study site (also comprising the ridge) is regarded floristically sensitive as it exhibits a high endemic phytodiversity. Based on this high endemic phytodiversity, the resemblance to the endangered regional vegetation and a moderate likelihood of Orange listed species persisting in these areas, a high floristic sensitivity is

ascribed to the Class 3 ridge and surrounding areas of natural grassland. It is therefore recommended that these areas be excluded from transformative activities and managed as natural open spaces within the development.

Remaining (smaller) portions of grassland vegetation of the study site exhibit moderate to severe levels of degradation and transformation and low endemic phytodiversity. Infestation by exotic trees and weeds and the effects of dumping and littering are particularly evident throughout the site. Flora of the wetland habitat of the study site is regarded degraded. The original floristic character of the wetlands has been entirely compromised and the river and tributaries are infested with dense stands of *Phragmites* reedbeds and other exotic trees. In addition, informal mining activities are contributing to the poor status of the wetlands, with severe effects on water quality.

Specialist biodiversity studies pertaining to faunal attributes were requested to investigate the following aspects:

- Wetlands; and
- Ridges

As required by Gauteng Department of Agriculture and Rural Development Requirements for Biodiversity Assessments Version 2 (Department of Agriculture and Rural Development, Directorate of Nature Conservation, June 2012), all wetland habitats were surveyed for the following mammal species:

- *Chrysospalax villosus* Smith, 1833 (Rough-haired Golden Mole);
- *Mystromys albicaudatus* Smith, 1834 (White-tailed Mouse);
- *Lutra maculicollis* Lichtenstein, 1835 (Spotted-necked Otter);
- *Amblysomus septentrionalis*, Roberts 1913 (Highveld Golden Mole); and
- *Dasymys incomptus* Sundevall, 1847 (African Marsh Rat).

Extensive degradation of the wetlands is evident within the site and immediate surrounds. Poor water quality and the extensive dominance of *Phragmites australis* results in poor wetland habitat quality. Survey results yielded low faunal diversity numbers, with particular reference to birds. These poor habitat quality levels effectively imply that no suitable habitat is available for any conservation important mammal species to persist.

Nonetheless, the implementation of significant management activities is likely to result in improved wetland conditions that will affect a higher diversity of animal taxa persisting in these areas. It is unlikely that conservation important faunal taxa would re-populate these areas in the absence of a regional conservation/ improvement programme and particularly in view of the sustained pressure from development and habitat loss and degradation of the region.

Ridges were surveyed for any mammals, birds, reptiles, amphibians and invertebrates. In terms of faunal habitat, the ridge present in the study area is regarded ill defined:

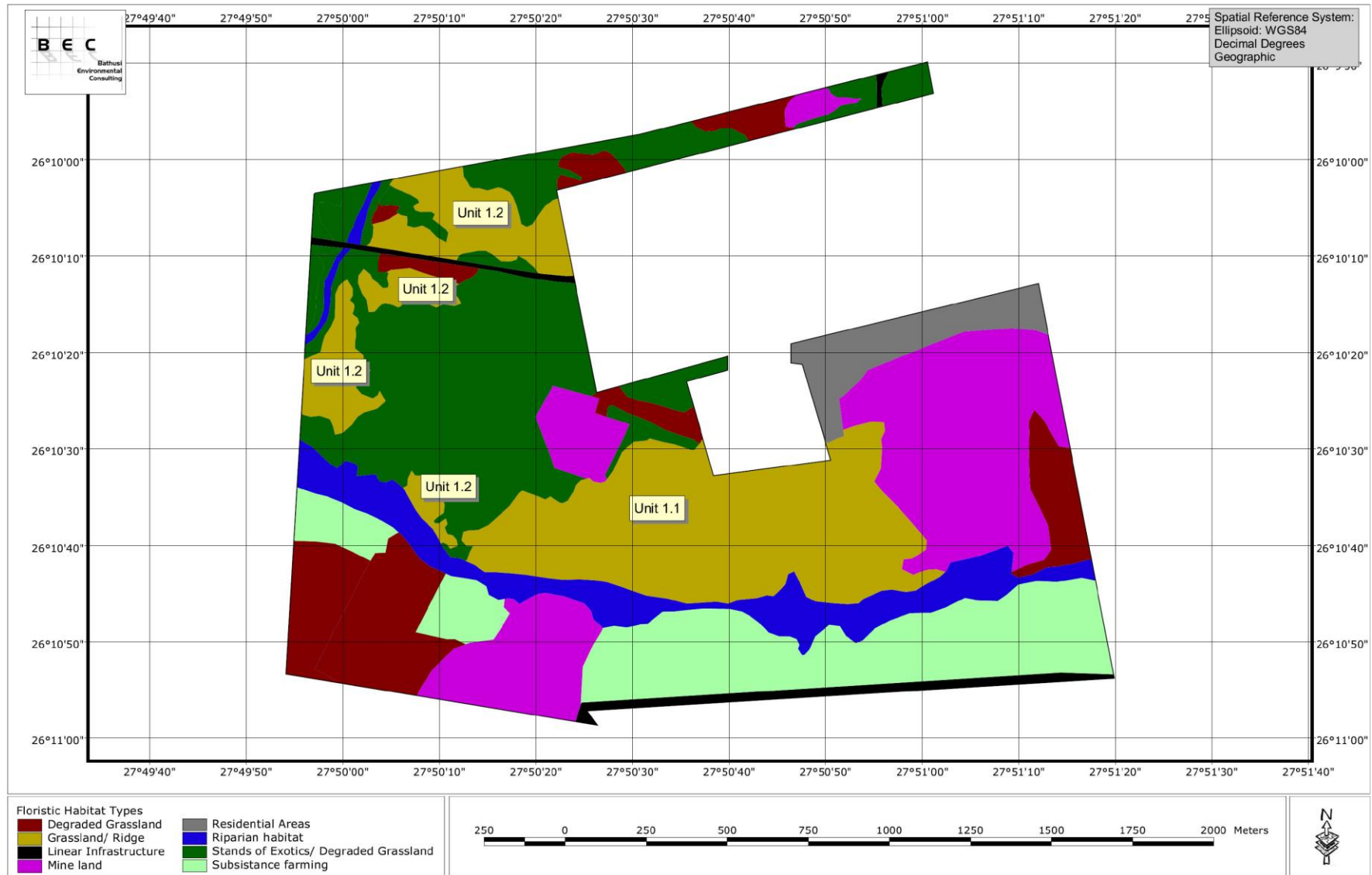
- The ridge area has been degraded (as has most of the study area); and

- The ridge (surface outcrops) does not include any significant ridge habitat characteristics: there is only a very low level of surface rock present. Furthermore, the ridge area is characterised by a gentle slope and vegetation of the ridge is not representative of the significant ridges found in the region (such as the Krugersdorp and Roodepoort ridges).

Vegetation of the ridge includes mostly species representative of natural grassland of the region; it is therefore considered a fragment of natural grassland situated in a matrix of mostly transformed and degraded land and not a typical ridge habitat. Common grassland animals recorded within this area include:

- Common Mole-rat (*Cryptomys hottentotus* Lesson, 1826);
- Scrub Hare (*Lepus saxatilis* F. Cuvier, 1823);
- Rufous-naped Lark (*Mirafra africana* Smith, 136);
- Common Myna (*Acridotheres tristis* Linnaeus, 1766);
- Helmeted Guineafowl (*Numida meleagris* Linnaeus, 1758);
- Neddicky (*Cisticola fulvicapilla* Vieillot, 1817);
- Bokmakierie (*Telophorus zeylonus* Linnaeus, 1766);
- Common Fiscal (*Lanius collaris* Linnaeus, 1766);
- African Pipit (*Anthus cinnamomeus* Rüppell, 1840); and
- Brown-veined White (*Belenois aurota* Fabricius, 1793).

No unique, or conservation important, animal species were recorded during the survey period. The lack of typical ridge habitat characteristics (i.e. significant surface rock, steep slopes etc.) suggests the unlikely presence of ridge-specific animal taxa. 'Ridge species', such as the Flat Rock Scorpion (*Hadogenes gunning* Purcell, 1899), Gauteng Burrowing Scorpion (*Opisthophthalmus pugnax* Thorell, 1876), the Rare South African Fruit Chafer (*Ichneustoma stobbiai* Holm, 1992), the Natal Long-fingered Bat (*Miniopterus natalensis* Heller, 1912) or other sensitive Gauteng ridge species, are unlikely to persist within the study site due to the lack of suitable habitat. Preservation/ conservation recommendations for this area would mostly be aimed at preserving this portion of rocky grassland as a remnant of the regional habitat and as a potential 'stepping stone' for migrating species. A copy of the Biodiversity Assessment Report is attached as Appendix G.



**Figure 19: Floristic habitat types of the study area**

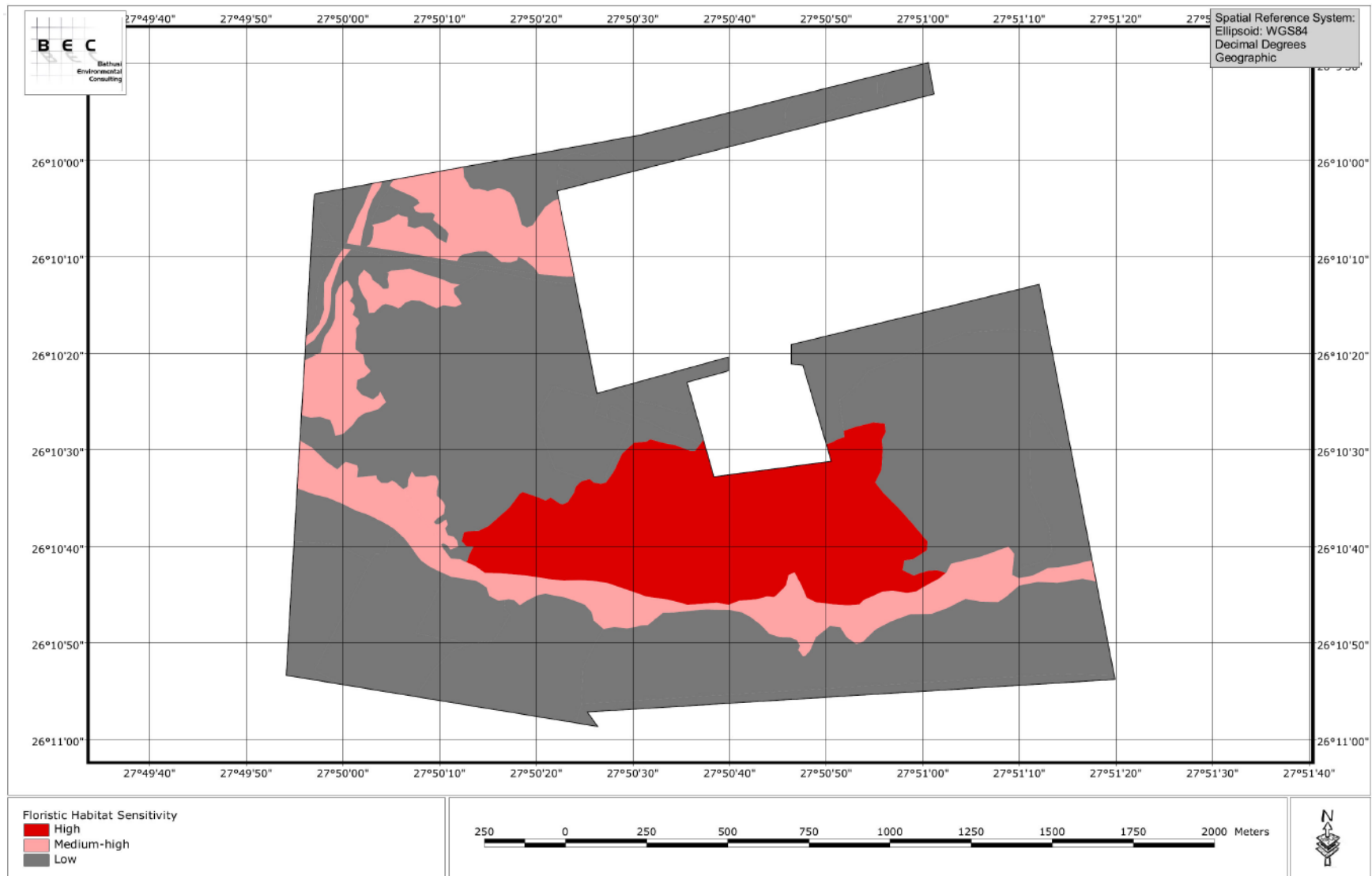


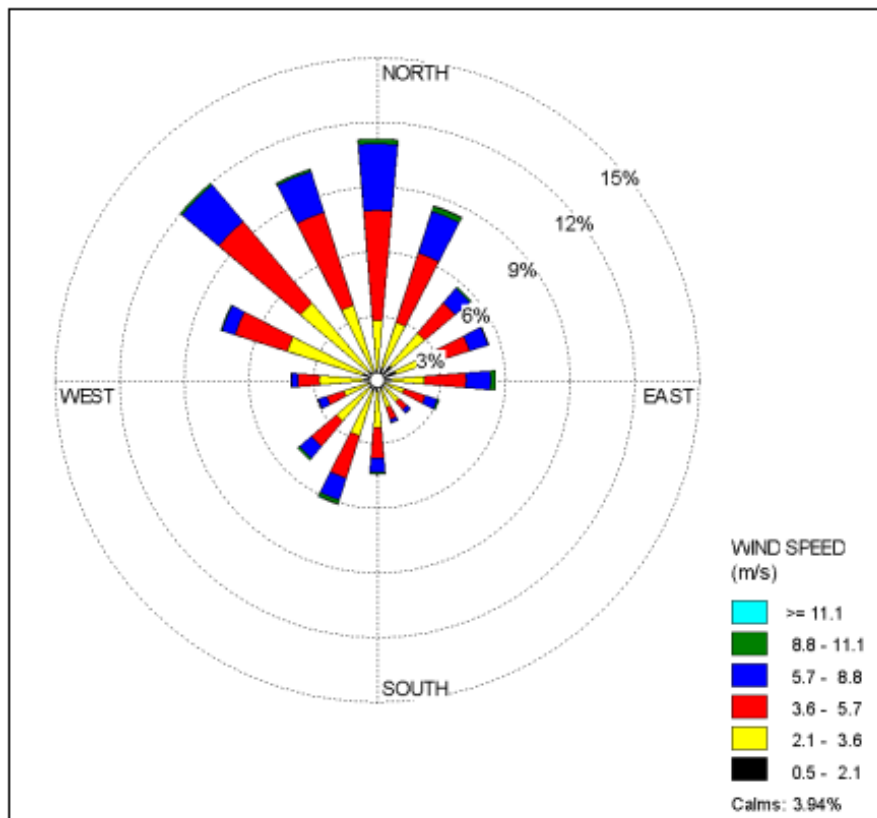
Figure 20: Botanical sensitivity of the study area



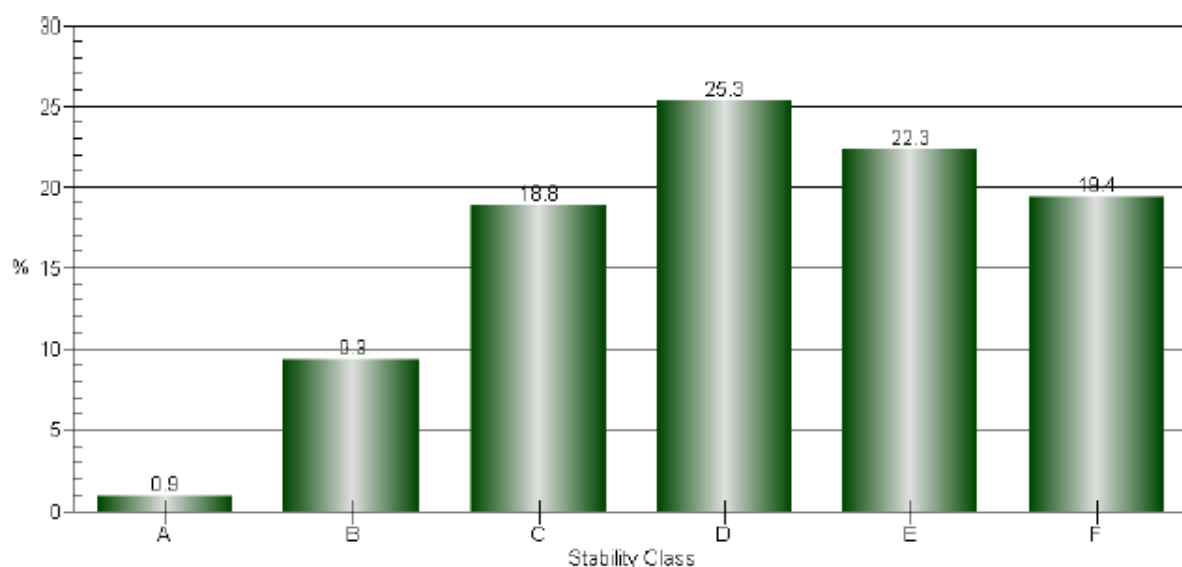
**Figure 21: View to the north of ridge and transformed section of ridge**

## 4.1 AIR QUALITY

The Roodepoort area is not an area prone to high wind speeds on average. In the area, 45,8% of the time, calm conditions are experienced. The highest frequency of wind speeds lie between 0,5 to 2,1 m/s which occurred for 42,8% of the time. The second highest wind class ( 2m1 – 3,6 m/s) occurs 9,4% of the time (refer to figure 22 and 23 below).



**Figure 22: Period wind rose for the site, 2010 – 2012**



**Figure 23: Wind class frequency distribution for the site 2010-2012**

The site is affected by the following air pollution sources:

- Three on site mine residue deposits;
- Off-site mine residue deposits to the east (Durban Roodepoort Deep); and
- Mine residue deposits located to the south (Brakfontein).

Furthermore, the Marie Louise Landfill site and other polluting industries are located outside a 5 km radius from the site. Pollution sources include dust from mines, particularly apparent in informal settlements which are presently located in the peripheral areas, and the smoke emanating from this township areas trap the dust particles blowing from the mines. The primary pollutant emitted from the mining and process operations is particulate matter (PM), radon and nuisance dust.

The site is considered to be mining contaminated land due to the past mining activities and the occurrence of the mine residue deposits in two areas of the site. The mine residue deposits entail the storage of sludge and wet mining by-products. They are used to dispose of fine material containing chemicals used in the mining process and pose a major air pollution and health problem if not managed properly. It is also important to note that the existing of Mathollesville and Goudrand Townships are located in close proximity to the deposits.

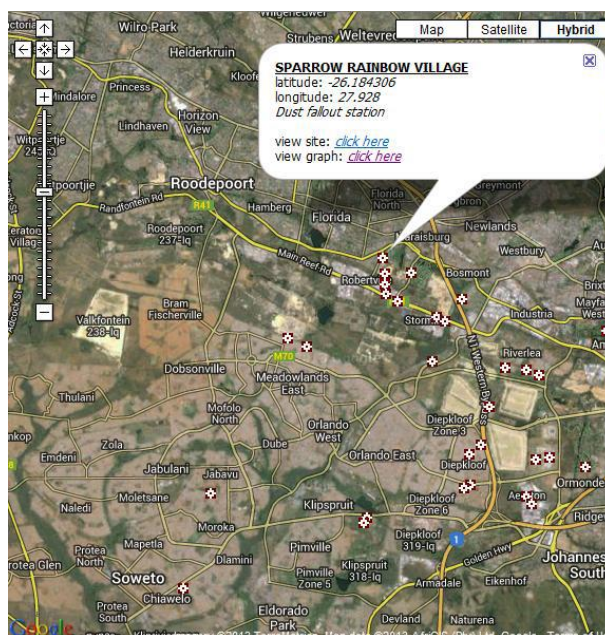
Mintails Limited owns the rights to process and extract gold from mine residue deposits within the "Soweto Complex". The removal of the deposits will ultimately result in an overall improvement of environmental quality and air quality. Consequently, exposed land (previous deposit footprints) may become available for development.

Royal HaskoningDHV (Pty) Ltd was appointed by Marsh Africa to undertake an Air Quality Impact Assessment and Ambient Particulate Matter Monitoring for the Spitz Land Housing Development Project to determine the feasibility of a housing development within the Roodepoort area, and to determine whether the baseline air quality in the area, is such that the

residents within the development are not impacted upon to the extent where health may become a concern.

As part of the air quality assessment, a baseline assessment was undertaken through a review of available meteorological data. The emissions from surrounding gold tailings have been calculated through material characteristics and US-EPA AP42 emission factors, to determine the potential impacts that these emissions may have on the site identified for the housing development.

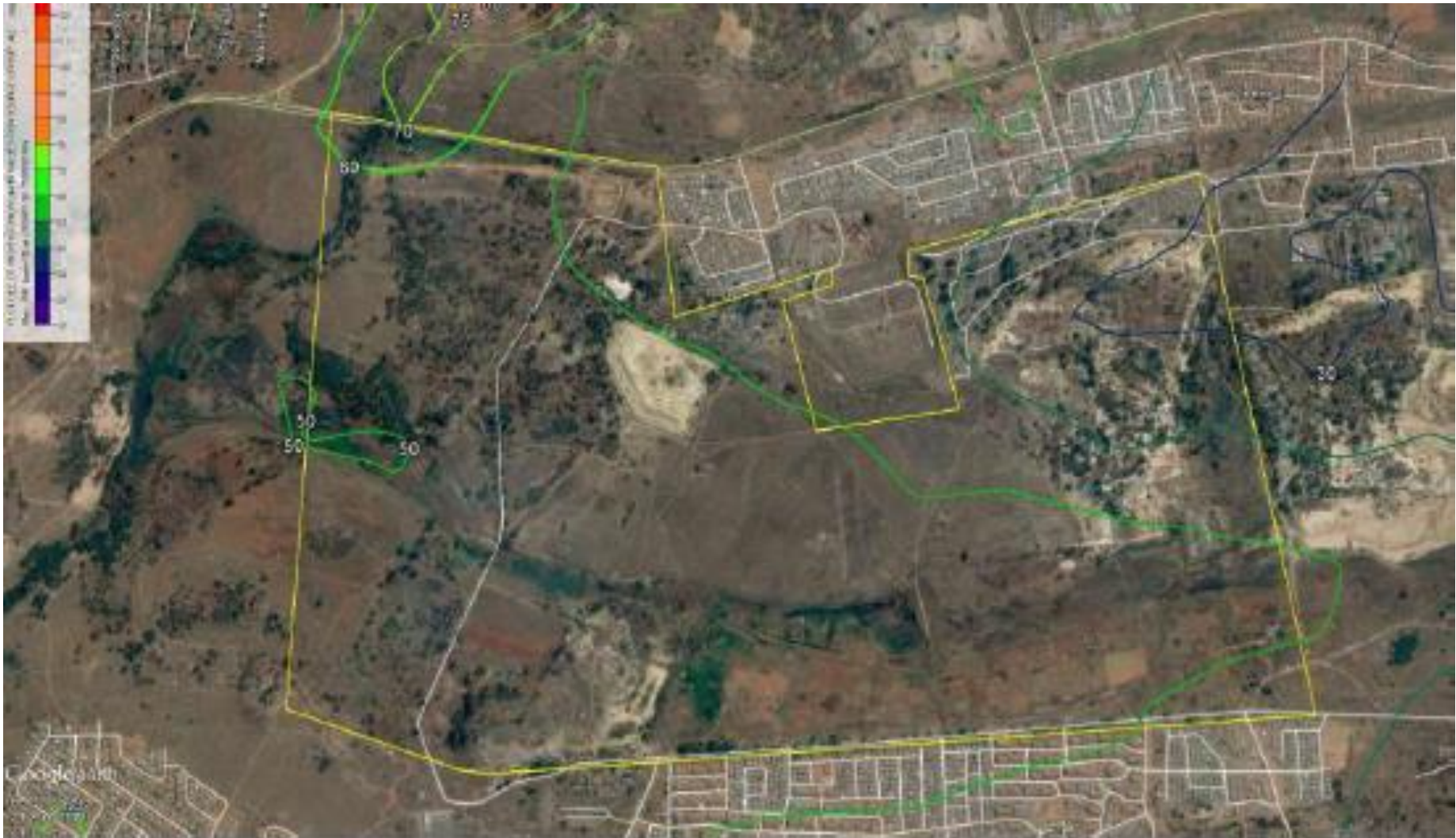
Emissions from the mine residue deposits were evaluated through the compilation of an emissions inventory and subsequent dispersion modelling simulations using the AERMOD dispersion model. Comparison with the South African ambient air quality standards was made to provide an indication of the potential for human health impacts, and determine at which point concentrations fell below legal standards. Baseline conditions were identified through the South African Air Quality Information System network of monitoring stations, with the closest monitoring site to the development being at Sparrow Rainbow Village.



**Figure 24: Map indicating location of ambient monitoring stations**

Dispersion modelling simulations were undertaken to determine the potential air quality impacts associated with emissions from the surrounding mine residue deposits. Results are presented graphically as isopleth plots and as grid point concentrations in the figures below. Isopleth plots reflect gridded contours which represent zones of impact at various distances from the contributing sources; whereas the grid point information is the actual concentration across a uniform grid covering the site. The patterns generated by the contours are representative of the maximum predicted ground level concentrations for the averaging period being represented. Comparison with the relevant National ambient air quality standards is made to determine compliance. The predicted daily particulate matter (PM<sub>10</sub>) concentrations are provided in Figure 25 and 26 below. These results provide an indication of the maximum ground level

concentrations, as a result of mine residues in the area. Figure 27, also below indicates the modelled dust deposition rates for the site. The results of the study indicate that the predicted daily and annual PM<sub>10</sub> concentrations do not exceed the standards for human health. In addition, predicted fallout dust levels also do not exceed the gazaetted standard for 600 mg/m<sup>2</sup> / day for residential areas. The only exceedance relates to PM<sub>10</sub> and only in the north west, outside the site boundary. As such, the layout of the proposed amendment has been developed and specifically excludes the north west section. Furthermore, the study concluded that the existing buffer of 250 m from mine residues is adequate for development. A copy of the updated Air Quality Assessment Report is attached as Appendix H1. The air quality assessment was revised in May 2018 to assess the development layout alternatives/ options applicable to the four identified development parcel scenarios. The 250 buffer zone is no longer applicable and various constraint zones applicable to four possible development parcel scenarios was provided (Figure 45 - Figure 48) This updated report is included as Appendix H2.



**Figure 25: Predicted daily maximum concentrations for PM10**



Figure 26: Predicted annual maximum concentration for PM 10



**Figure 27: Predicted dust deposition rates**

## 4.2 NOISE

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In accordance with the Gauteng Noise Control Regulations (GN 5479), Regulation 8, promulgated under the Environment Conservation Act of 1989 the production of disturbing noise is prohibited. The proposed development includes the development of a formal residential township(s) across the entire spectrum of the housing market and makes provision for different housing typologies (single and multiple), at varying densities, including supportive social, educational and commercial land uses. These activities are not regarded as activities that will significantly impact on the ambient noise levels of the general area. Ambient Noise Levels might, however, increase and cause a nuisance during the construction phase of the proposed development, such disturbances are not anticipated to be significant. The expected response by the community (based on changes to ambient noise levels) is based on SANS 10103: 2008 and these standards must be adhered to and is included in the Environmental Management Programme.

## 4.3 DEVELOPMENT FRAMEWORKS

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The site is located within a significant development corridor in the Roodepoort area, The East-West- Development-Corridor. This corridor is also known as the Mining Belt because of all the mining activity that took place along this reef. The City of Johannesburg has marked this corridor as a mixed land use and commercial strip. High density residential dwelling units, commercial, industrial and businesses are supported by the City of Johannesburg along this corridor because of its location in relation to Main Reef Road that stretches from the West Rand, Soweto and Roodepoort to the Johannesburg Central Business District. The approval of this proposed development will strengthen the purpose and plans of the City of Johannesburg in relation to this corridor.

## 4.4 HUMAN SETTLEMENTS

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The Goudrand and Matholesville settlements occur to the north of the site. Informal extensions of these residential areas (Dunusa) have spilled onto the site fronting onto the Hospital Slimes Dam. The Dunusa informal settlement located on the site is currently at risk given their proximity to mine residue deposit. Sol Plaatjes is situated to the south of the site. This area is primarily made up of subsidised housing with limited access to services. The Witpoortjie residential areas are located to the north-west. These communities form part of the lower income earning segment and while their position places them within the polluted gold mining belt, their proximity to economic opportunities is improved.

## 4.5 SOCIO-ECONOMIC OPPORTUNITIES

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The proposed development is likely to generate jobs during the construction phase with sustainable job opportunities to be provided through the provision of business, community and school sites. Due to the location of the site within the mining belt within close proximity to the Roodepoort Central Business District, access to goods and services to beneficiaries / homeowners will be improved.

## 4.6 TRAFFIC

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No access to the site from Randfontein Road is currently possible as the old mining access roads have been abandoned and are in disrepair. Access via the existing residential areas (Goudrand and Matholesville) is also not possible. Access is best obtained via Sol Plaatjes to the south of the site. Future access to the site via Randfontein Road is most preferred. The

movement of people into the area is likely to result in additional traffic impacts during the operational phase of the development. However the actual significance of this is not anticipated to be great given the income segment to which the development will cater. WSP Traffic Engineering Services were appointed to undertake a Traffic Impact Study covering the following aspects:

- Traffic surveys and data;
- Trip distribution and assignment;
- Assessment of operational conditions on the surrounding road network;
- Mitigation measures;
- Public transport and pedestrians; and
- Conclusions and recommendations.

#### 4.6.1 EXISTING ROAD NETWORK

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The roads in the vicinity of the site are classified as follows:

- Randfontein Road is a class 2 road (major arterial) which runs in an east-west direction and divides the site into two sections. The proposed provincial K198 route will follow the horizontal alignment of Randfontein Road in the vicinity of the development;
- Nick Toomey Boulevard is a class 3 road (minor arterial) providing access to the north of Randfontein Road via a signalized intersection. A gravel road extends to the south of the intersection of Randfontein Road and Nick Toomey Blvd., providing access to the residential areas to the south of Randfontein Road. The gravel road is also referred to as Nick Toomey Blvd. for the purpose of this study;
- Mathew Goniwe Road is a class 3 road (minor arterial) which forms the southern boundary of the Spitz Land site. To the east Mathew Goniwe Road intersects with Durban Deep Road;
- Durban Deep Road is a class 3 road (minor arterial) running in a north-south direction and it links Mathew Goniwe Road and Cemetery Road; and
- Cemetery Road is a class 3 road (minor arterial) which intersects with Randfontein Road to the north and the M77 (class 2 road) to the south. The future K102 will roughly follow the horizontal alignment of Cemetery Road in the vicinity of the site.

#### 4.6.2 FUTURE PROVINCIAL ROAD NETWORK

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The Gauteng Strategic Road Network (Vela VKE, 2006) indicates the proposed K198 traverses the Spitz Land site to the north. The basic planning drawings suggests that allowance has been made for access off the K198 at the existing intersection of Randfontein Road (K198) and Nick Toomey Boulevard., as well as an access approximately 770m to the west of the aforementioned intersection. The latter intersection coincides with Intersection 2 at which traffic counts were conducted as part of this study. The future PWV5 to the west of the site and PWV12A to the south of the site will form lines of no access in the future. The majority of Spitz Land's trips are therefore expected to be distributed to the K198 and K102

### 4.6.3 FUTURE PRASA RAIL LINE

A proposed PRASA commuter rail line traverses the proposed development site. Liaison with PRASA regarding the design of this rail line revealed that only basic planning has been done for this particular rail line. In terms of the basic planning, Station 8 will be located on the Spitz Land site. The station locations were determined to satisfy the minimum required distance of 1.8 km between stations.

### 4.6.4 TRAFFIC COUNTS, TRIP GENERATION AND DISTRIBUTION

Twelve hour (06:00 – 18:00) manual, classified traffic counts were carried out on Tuesday, 23 July 2013. The morning and afternoon peak hour traffic volumes are shown in Figure 28 and Figure 29. A background traffic growth rate of 3% per annum has been assumed in estimating future traffic volumes.

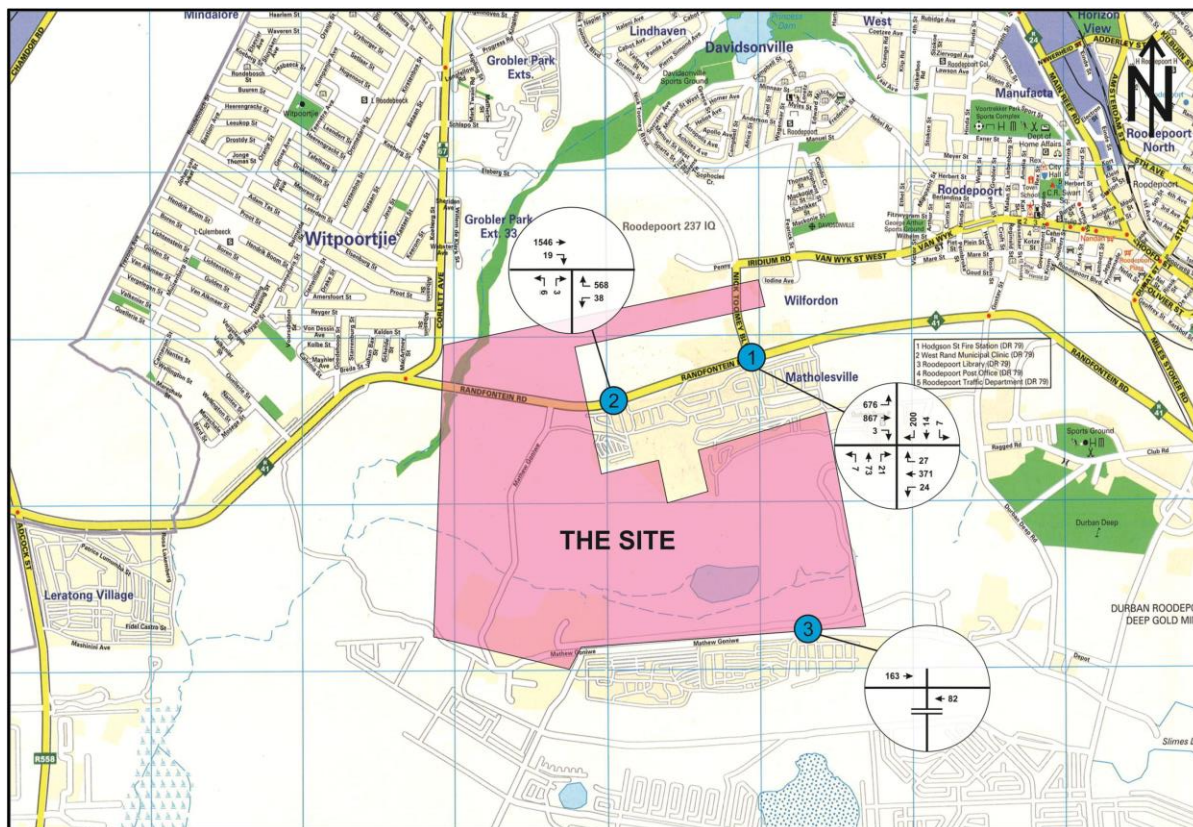
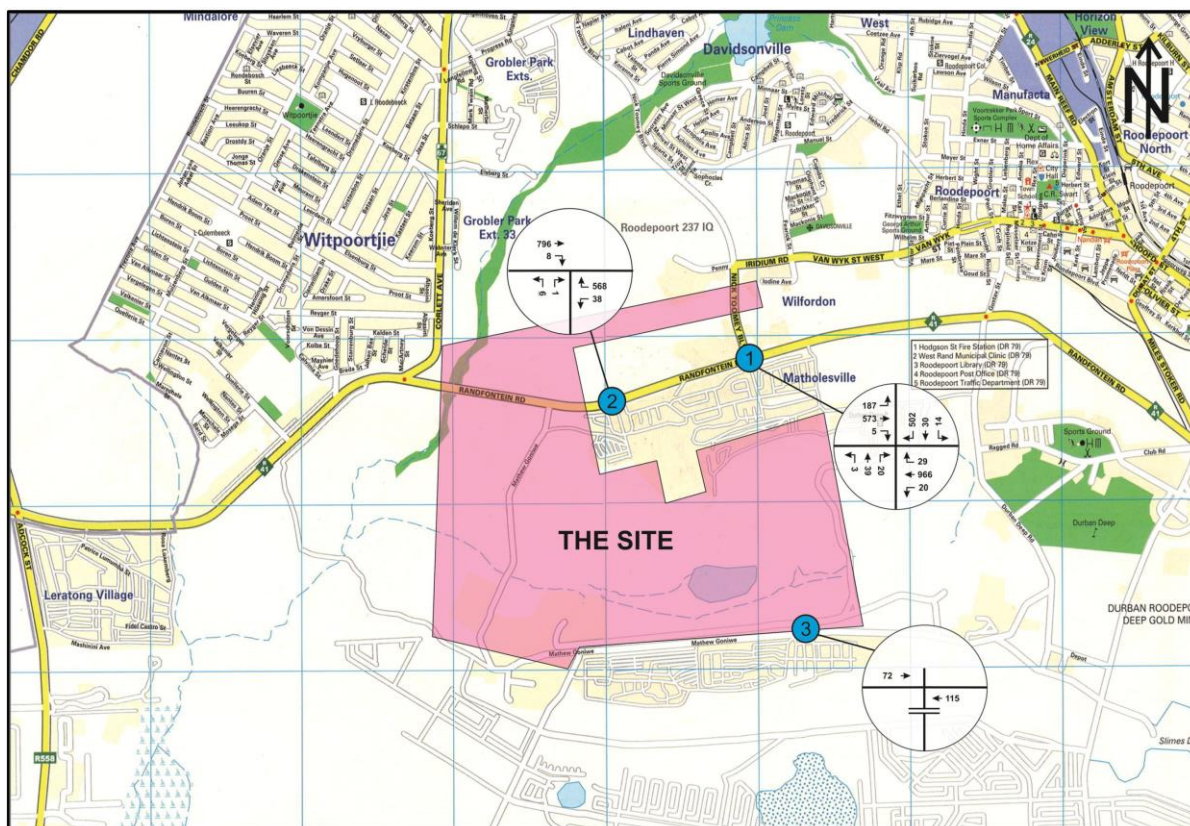


Figure 28: Existing morning peak hour traffic volumes



**Figure 29: Existing afternoon peak traffic hour volumes**

The new South African Trip Data Manual (2) (by the Committee of Transport Officials) trip generation rates were adopted for the study. The external trip generation calculated is reflected below in Figure 30.

The planned K198 and rail line, will affect the internal road network of Spitz Land significantly. Taking the K198 planning into account the main access to Spitz Land is proposed via the intersection of Randfontein Road and Nick Toomey Boulevard. It is proposed that the gravel road which currently provides access to the south of the Nick Toomey Boulevard Intersection be extended to the south (to form Nick Toomey Extension) and should be upgraded to form the main access to the development. A bridge will be required to provide access across the PRASA rail line. The exact location of the bridge will be determined by the topography. Nick Toomey Extension can link up with the existing residential developments to the south of Spitz Land. The intersection to the west of Nick Toomey Boulevard Intersection, i.e. Intersection 2, will be a secondary access to certain portions of Spitz Land. The future PWV5 to the west of the site and PWV12A to the south of the site will form lines of no access in the future. The majority of Spitz Land's trips are therefore expected to be distributed via the K198 the K102).

Area Number	Land Use	AM Peak Hour		Midday Peak Hour		PM Peak Hour		Saturday Peak Hour	
		In	Out	In	Out	In	Out	In	Out
<b>A</b>	Residential 1	103	309	0	0	288	123	103	103
	Retail	3	2	0	0	12	12	17	17
	Clinic	39	26	23	23	26	39	38	46
	Secondary School	38	38	16	19	13	13	0	0
<b>Sub-Total A:</b>		<b>182</b>	<b>374</b>	<b>38</b>	<b>42</b>	<b>339</b>	<b>187</b>	<b>157</b>	<b>166</b>
<b>B</b>	Residential 1	147	441	0	0	412	176	147	147
	Residential 3	26	77	0	0	72	31	28	28
		30	89	0	0	83	35	28	28
	Retail	5	3	0	0	24	24	31	31
	Creché	3	3	1	1	2	2	0	0
	Primary School	38	38	16	19	15	15	0	0
<b>Sub-Total B:</b>		<b>247</b>	<b>650</b>	<b>17</b>	<b>20</b>	<b>607</b>	<b>283</b>	<b>233</b>	<b>233</b>
<b>C</b>	Residential 3	94	282	0	0	263	113	101	101
		108	325	0	0	304	130	101	101
<b>Sub-Total C:</b>		<b>202</b>	<b>607</b>	<b>0</b>	<b>0</b>	<b>567</b>	<b>243</b>	<b>202</b>	<b>202</b>
<b>D</b>	Residential 3	36	108	0	0	101	43	39	39
		42	125	0	0	116	50	39	39
<b>Sub-Total D:</b>		<b>78</b>	<b>233</b>	<b>0</b>	<b>0</b>	<b>217</b>	<b>93</b>	<b>78</b>	<b>78</b>
<b>E</b>	Residential 3	14	43	0	0	41	17	16	16
		17	50	0	0	47	20	16	16
<b>Sub-Total E:</b>		<b>31</b>	<b>94</b>	<b>0</b>	<b>0</b>	<b>87</b>	<b>37</b>	<b>31</b>	<b>31</b>
<b>F</b>	Residential 3	50	151	0	0	141	60	54	54
		58	174	0	0	163	70	54	54
	Retail	1	0	0	0	3	3	4	4
<b>Sub-Total F:</b>		<b>109</b>	<b>325</b>	<b>0</b>	<b>0</b>	<b>307</b>	<b>133</b>	<b>113</b>	<b>113</b>
<b>G</b>	Residential 3	40	121	0	0	113	48	43	43
		46	139	0	0	130	56	43	43
<b>Sub-Total G:</b>		<b>87</b>	<b>260</b>	<b>0</b>	<b>0</b>	<b>242</b>	<b>104</b>	<b>87</b>	<b>87</b>
<b>TOTAL:</b>		<b>936</b>	<b>2 542</b>	<b>55</b>	<b>62</b>	<b>2 366</b>	<b>1 081</b>	<b>901</b>	<b>910</b>

**Figure 30: External trip generation calculated**

The development trips were distributed as follows:

- All trips to/from Areas A and C will be distributed via Intersection 3, with 80% to/from the north (Randfontein Road/K198) via Intersections 1 and 4; 15% to/from the east (Cemetery Road/K102) and 5% to/from the south;
- All trips to/from Area B will be distributed via Intersection 4, with 80% to/from the north (Randfontein Road/K198) via Intersection 1 and the remaining 20% were distributed to/from the east (18%) and south (2%) via Intersection 3;
- 80% of the trips to/from Area D will be distributed to the north (Randfontein Road/K198) via Intersections 1 and 4. The remaining 20% were distributed to/from the east (18%) and south (2%) via Intersection 3;
- All trips to/from Area E will be distributed via the southern leg of Intersection 1;
- All trips to/from Area F will be distributed via the southern leg of Intersection 2;
- All trips to/from Area G will be distributed via the northern leg of Intersection 2; and
- Trips via Intersections 1 and 2 will be distributed in the same proportions as the existing traffic on Randfontein Road and Nick Toomey Blvd.

The resulting trip generation and distribution during the morning and afternoon peak hours are shown in Figure 31 and Figure 32. The future traffic (2023) at full development of the site is shown in Figure 33 and Figure 34 below.



Figure 31: Morning peak hour traffic trips



Figure 32: Afternoon peak hour trips

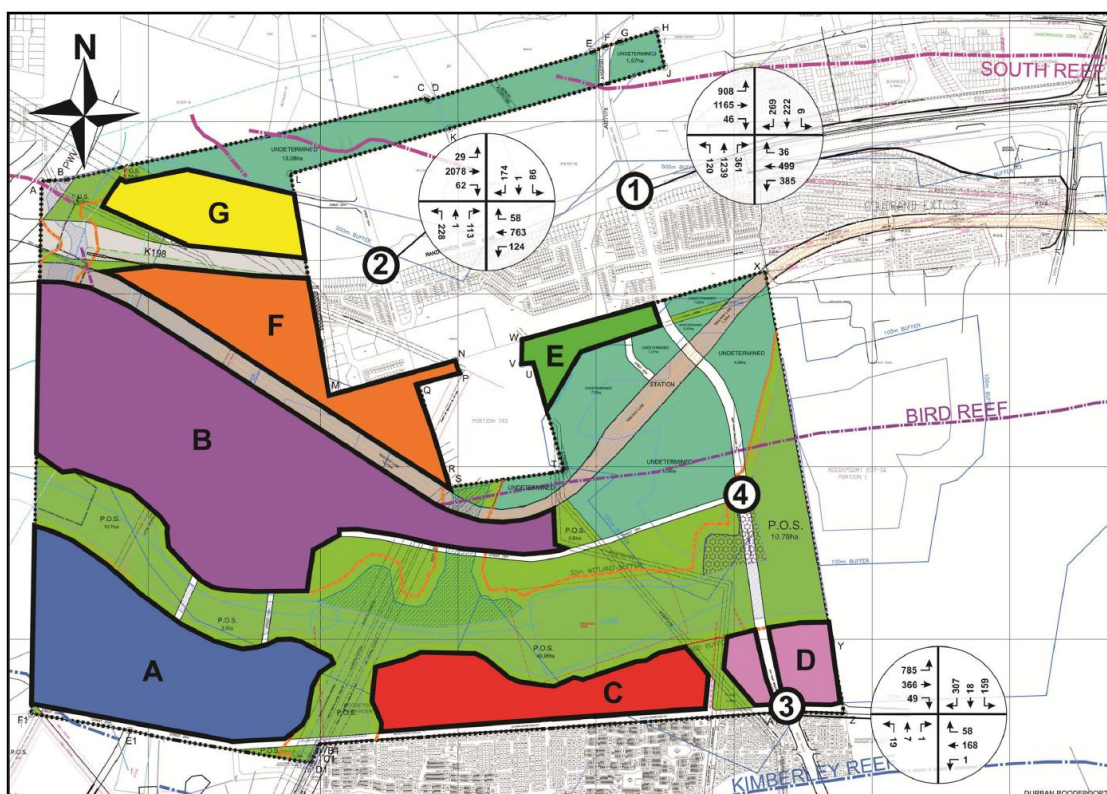


Figure 33: Morning peak hour trips (full development)

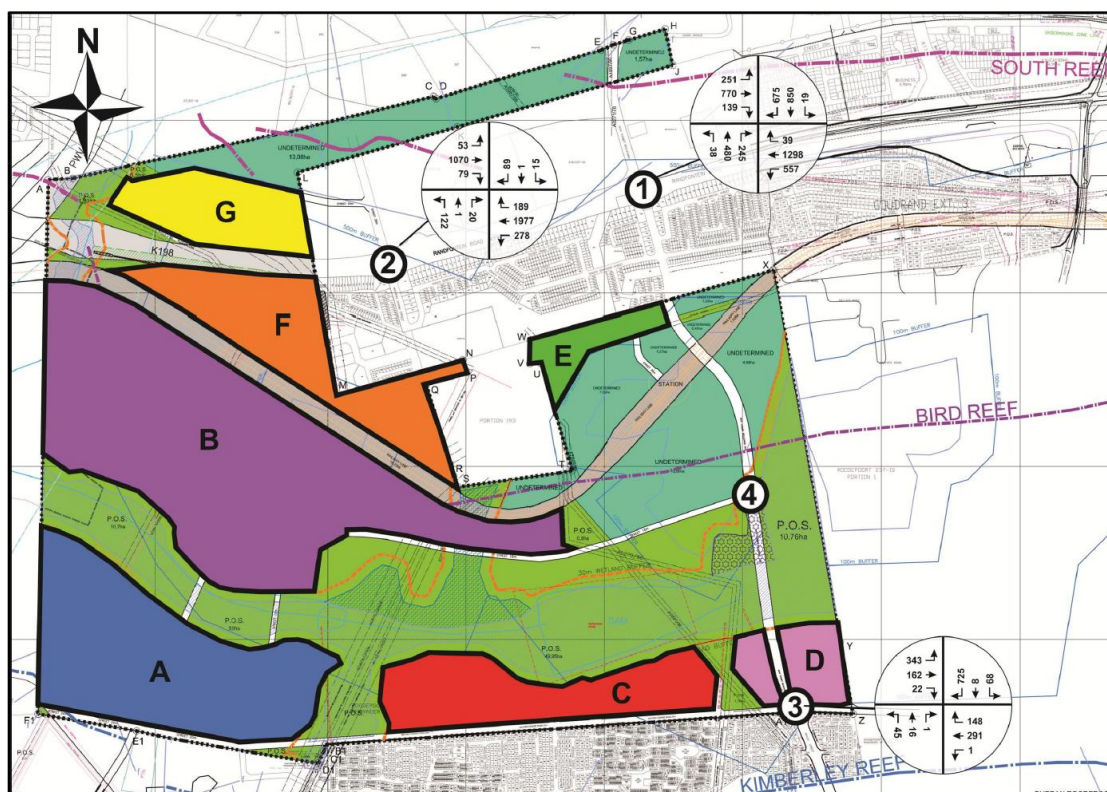


Figure 34: Afternoon peak hour trips (full development)

#### 4.6.5 OPERATIONAL ASSESSMENT

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Analysis of the operational conditions has been undertaken using SIDRA 5.1 Software. The most significant output from the SIDRA analysis is the average delay per vehicle (v/c ratio) and the level of service. A level of service between A and D is considered to be acceptable and the v/c ratio should be below 0.950, which indicates spare capacity. The detailed results from the SIDRA analysis are included in the detailed Traffic Impact Study attached as Appendix I. Based on the result of the operational assessment, the mitigation measures (upgrades) are proposed. Detailed information regarding the proposed upgrades is included in the Traffic Impact Study attached to this document as Appendix I.

From the results of the analyses, the following can be concluded:

- The proposed development will have a significant impact on the surrounding road network;
- The impacts of the development can be successfully mitigated by the intersection upgrades proposed in the Traffic Report; and
- Pedestrians and public transport facilities need to be provided as part of the development.

#### 4.7 HERITAGE

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As per the provisions of the National Heritage Resources Act 25 of 1999, a Phase 1 Heritage Impact Assessment was undertaken to determine the potential impact of the proposed development on any remaining heritage resources. Heritage Contracts and Archaeological Consulting CC was contracted by Marsh Environmental Services to conduct a Phase 1 Heritage Impact Assessment for the proposed mixed use residential township development.

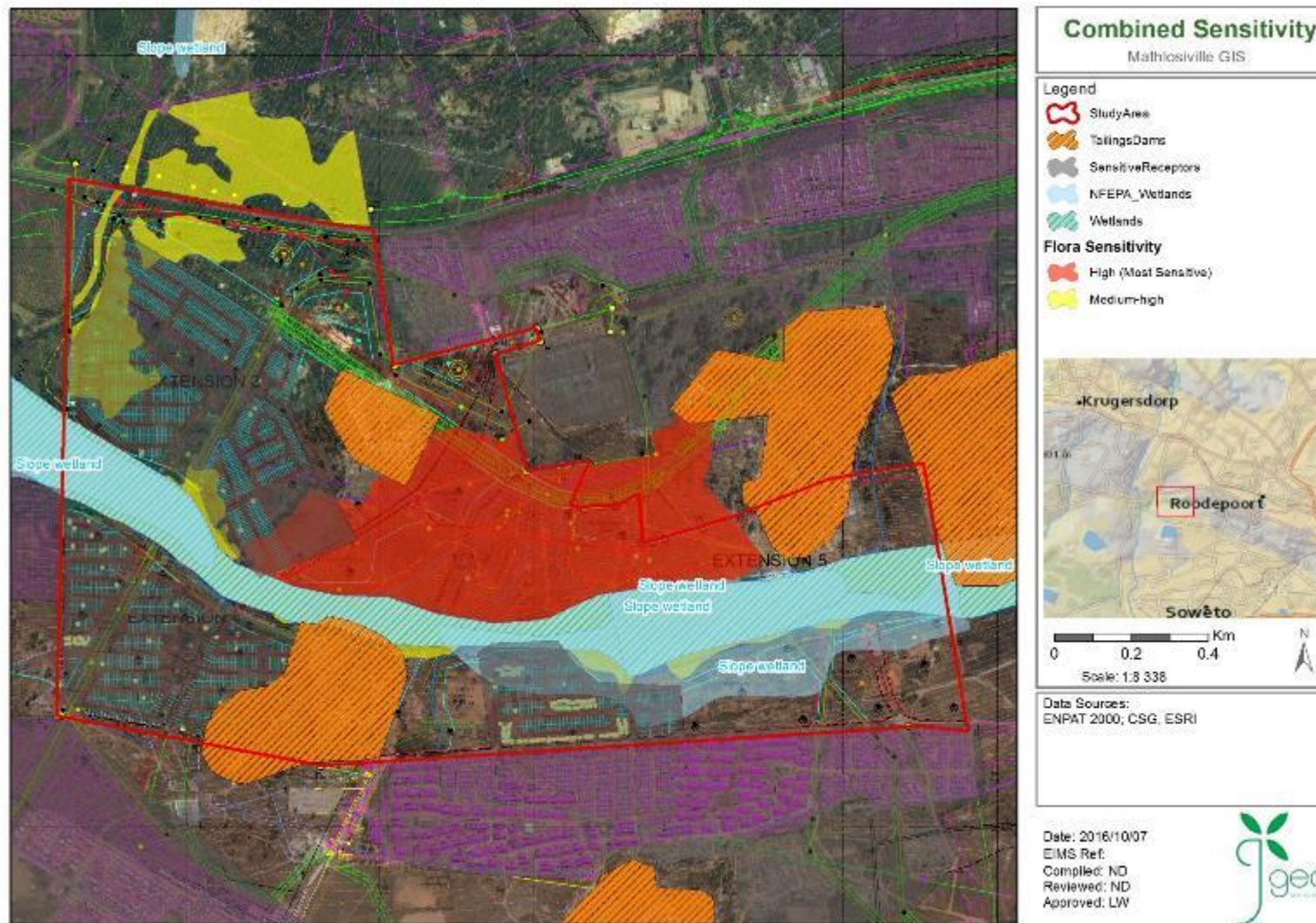
According to the assessment done most of the infrastructure and associated buildings on site related to the gold mining legacy have been decommissioned or destroyed. No archaeological, grave sites or structures older than 60 years were identified and there are no fatal flaws in terms of the archaeological component to the project. The study noted that the area is renowned for unmarked graves relating to mine workers on the west rand and some management actions will be required to ensure the correct procedures are followed in the case of accidental discovery. There is from an archaeological point of view (subjected to approval from South African Heritage Resource Agency) there is no reason why the development cannot commence work.

Due to the subsurface nature of archaeological material and unmarked graves the possibility of the occurrence of unmarked or informal graves and subsurface finds cannot be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find. A copy of the full Heritage Impact Study is attached to this report as Appendix J.

## 4.8 COMBINED SENSITIVITY MAPPING

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As a result of the baseline assessment undertaken, a sensitivity map of the area has been drafted. The sensitivity includes the consolidated sensitivity rankings of features on site as well as the new, amended site layout.



**Figure 35: Combined sensitivity map and amended township layout**

## 5 PUBLIC PARTICIPATION PROCESS

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The Public Participation Process forms an integral component of the environmental impact assessment process by providing Interested and Affected Parties an opportunity to comment on the application and assist the Environmental Assessment Practitioner and applicant in identifying potential fatal flaws and project alternatives. It thereby provides Interested and Affected Parties a means of influencing the decision making process.

### 5.1 SCOPING PHASE

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The following public participation actions were undertaken during the Scoping Phase:

- A newspaper advertisement was placed in the body of the Roodepoort Record and in the legal section of the Sowetan on 1 March 2012;
- Regulation size (A2) site notices were placed at five locations;
- Background information documents were distributed to residents and occupiers of land within 100m of the boundaries of the proposed development site extending an invitation to participate in the Scoping & environmental impact assessment process;
- Stakeholders including authorities and organs of state that have jurisdiction in the area were notified;
- A meeting between the Environmental Assessment Practitioner, Ward Councillor and members of City of Johannesburg Housing Department was held on 1 March 2011;
- A register of Interested and Affected Parties was opened and maintained; and
- A copy of the Draft Scoping Report was made available for public review and comment.
- Comments on the Draft Scoping Report were incorporated into the Final Scoping Report before submission to Gauteng Department of Agriculture and Rural Development for review.

#### 5.1.1 NEWSPAPER ADVERTISEMENTS

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A newspaper advertisement was placed in the body of the Roodepoort Rekord and the legal section of The Sowetan on 1 March 2012. Copies of the advertisement text and newspaper clippings are provided in Appendix K.

#### 5.1.2 SITE NOTICES

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Seven weather proof regulation size (A2) site notices were placed at six locations in English and Sesotho at the following locations (refer to Figure 38 – Figure 40 below):

- Two notices on the southern site boundary adjacent to Sol Plaatjes;
- On the southern site boundary at the Sol Plaatjes community hall;
- Two notices on the northern boundary at the Matholesville Skills Development Centre;
- On the northern boundary at the entrance Dununsa informal settlement; and
- At the access road to Witpoortjie suburbs along Randfontein Drive.



**Figure 36: Site notices placed at southern boundary of of site at Sol Plaatjes**



**Figure 37: Site notices placed at Sol Plaatjes and Matholesville community centre**



**Figure 38: Site notices posted at Witpoortjie suburbs and Dunusa informal settlement (at police hostel)**

### 5.1.3 DISTRIBUTION OF BACKGROUND INFORMATION DOCUMENTS

Two hundred (200) copies of the Background Information Document were printed and distributed to businesses and residents within 100m of the boundaries of the proposed development site (Sol Plaatjes, Matholesville and Dunusa informal settlement) extending an invitation to participate in the scoping & environmental impact assessment process. A copy of the Background Information Document is included in Appendix K.

## 5.1.4 MEETINGS HELD DURING THE STAKEHOLDER ENGAGEMENT PROCESS

### Meeting with City of Johannesburg Region C Officials

A meeting was held on 1 March 2012 between the Environmental Assessment Practitioner, the ward councillor and representatives of City of Johannesburg Region C Housing Department. The Environmental Assessment Practitioner presented the proposal to the officials. The comments received from the officials were in respect to the future of the Dunusa informal settlement. The Environmental Assessment Practitioner stated that according to the draft layout plan the Dunusa area (Matholesville extensions) is being considered for development but that the area is directly adjacent to the Hospital Slimes Dam. The environmental feasibility of development in this area of the site would have to be further assessed.

### Public Participation Meeting

The Background Information Document, site notice and newspaper advertisement requested individuals to register as Interested and Affected Parties before details of the public meeting could be provided. As no significant registration of private individuals in the study area occurred, no public meeting was scheduled with the general public. Discussions with community leaders on the day on the distribution of the Background Information Document did however occur.

## 5.1.5 REGISTRATION OF INTERESTED AND AFFECTED PARTIES

A stakeholder identification process was undertaken and a register of interested and affected parties was opened and maintained (Table 13). Persons/organisations included are adjacent landowners, mining rights holders, servitude holders, and relevant ward councillors, authorities who have a stake in the development and private individuals.

**Table 13: I&AP contact details**

Stakeholder/I&AP	Contact Person	Tel	Fax	Email
<b>Adjacent landowners and mining right holders</b>				
DRD Gold	N Lane	(011) 470 2600	(011) 470 2618	Neville.lane@za.drdgold.com
Mintails Limited	P Walters	(011) 660 9638	(011) 660 8132	Peter.walters@mintailssa.co.za
	S Blaauw			Schalk.blaauw@mintailssa.co.za
West Wits Mining	J Doman	(011) 026 6005	086 528 6412	jdoman@westwitsmining.com
Johannesburg Social Housing Company	J Maluleke	(011) 406 7300	(011) 404 2504	info@joshco.co.za
Rand Leases Properties	O Jones	(011) 463 7000	-	ojones@randleases.co.za
<b>City of Johannesburg Region C</b>				
Ward 27 – Ward Councillor (project area)	Sabelo Ngcana	072 955 2045	-	sabeloN@joburg.org.za sabelo31@yahoo.com
COJ Region 3 Ward Governance	N Sithole	-	-	Nonhlanhla@joburg.org.za
Ward 71 – Ward Councillor	G Niemand	078 743 9681	-	ticket@polka.co.za
<b>Authorities</b>				

Stakeholder/I&AP	Contact Person	Tel	Fax	Email
Department of Mineral Resources (DMR) – Mine Health & Safety*	P Kelley	011 358 9700	011 339 1858	peter.kelly@dmr.gov.za
National Nuclear Regulator (NNR)**	P Mohajane	012 674 7130 082 882 5652	086 588 4834	PEMohajane@nnr.co.za
Department of Water Affairs (DWA)*	P Khwinana	012 392 1536	-	khwinap@dwa.gov.za
City of Johannesburg Environmental Impact Management**	D Sibeko	(011) 587 4238	(011) 587 4200	dumisanes@joburg.org.za
Johannesburg Roads Agency*	-	-	(011) 298 5178	-
Servitude Holders				
Eskom*	Servitude management			-
Transnet Pipelines*	Servitude manager M.T Hadebe	(013) 361 1454	(013) 361 1534	saret.knoetze@transnet.net
Other/Private				
Ikemisetseng Poultry Agricultural Primary Co-operative***	J Letjoko W Honono G Molapo	073 067 1907 073 741 6183 078 675 8008	-	-
Akme Development Agency***	-	011 764 5918 072 998 6631	086 663 6331	wisdom@akme.co.za
Andre du Toit Town and Regional Planners***	A du Toit	014 576 2293	086 671 6588	adt@mweb.co.za
Roodepoort Chamber of Commerce and Industry*	-	-	-	rocci@rocci.org
RBA Housing*	J Maluleke	-	(011) 403 3326	
Sol Plaatjes community leader***	N Mgxaji	082 485 7440	-	waxen@webmail.co.za
Individual***	T A Skhosana	073 845 8407	-	mcc8@webmail.co.za
Individual***	S Ngwenya	076 387 7097	-	43743870@mylife.unisa.ac.za

### 5.1.6 DISTRIBUTION OF DRAFT SCOPING REPORT TO I&AP'S

The draft Scoping Report was placed at the following locations from 1 March 2012 to 1 April 2012 to facilitate Interested and Affected Parties review:

- The Roodepoort library;
- Matholesville Skills Development Centre;
- Sol Plaatje Community Hall; and
- Electronic copies of the document were forwarded via email to Interested and Affected Parties with email access on request.

The draft Scoping Report was circulated to the following stakeholders during PPP (proof of receipt is attached in Appendix K):

- Department of Mineral Resources;
- Department of Water Affairs;
- City of Johannesburg Environmental Section;
- National Nuclear Regulator;
- Gauteng Department of Agriculture and Rural Development.

Comments received from the National Nuclear Regulator are attached in Appendix K. In addition, comment from the Council of Geoscience was obtained, specifically with regard to the geotechnical study undertaken (Appendix C).

### 5.1.7 COMMENTS AND RESPONSES

**Table 14: Scoping report comments and responses**

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
Ward Councillor and COJ Region C officials	1 March 2012 Comment from meeting on 1 March 2012: What will the impact be on the Dunusa informal settlement?	According to the draft layout plan the Dunusa area (Matholesville extensions) is being considered for development or formalisation of services. However the area is directly adjacent to the Hospital Slimes Dam. The feasibility of development in this section of the site will require further assessment during the environmental impact assessment phase.	During the environmental impact assessment, specialist studies related to radiation and air quality were conducted to determine the risks and impacts associated with the mine residue deposits. The risks / impacts are discussed in the Section 3 of this report.
City of Johannesburg Environmental Infrastructure Services Department	4 April 2012  Guidelines and policies According to RSDF 2010-2011 for Region C, sub area	  Guidelines and policies Aspects concerning sustainable and integrated human	  Guideline and policies As part of the environmental impact assessment, a traffic

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	<p>15, one of the objectives is to upgrade infrastructure to create sustainable and integrated human settlements. The proposed development is in line with the residential character of the area. In addition the RSDF requires that development applications for densification and intensification must ensure provision of the following:</p> <ul style="list-style-type: none"> <li>Storm water drainage system</li> <li>Paved pedestrian lanes</li> <li>Pedestrian bridge where necessary</li> <li>Walkable distances to transport amenities</li> <li>Parking for both cars and bicycles</li> <li>Kerp ramps</li> <li>Wheel chair access</li> </ul> <p>Alternatives Site alternatives must be considered in the environmental impact assessment</p> <p>Environmental issues Environmental issues were considered in the report and studies for environmental impact assessment are recommended.</p> <p>Mitigation measures Mitigation measures must be addressed in the Environmental Impact Assessment Report</p>	<p>settlements in terms of the RSDF to be considered by the project planning professionals for inclusion in the Environmental Impact Assessment Report.</p> <p>Alternatives Noted.</p> <p>Environmental issues Specialist studies to be undertaken as per the Plan of Study for Environmental Impact Assessment</p> <p>Mitigation measures Noted.</p> <p>Wetlands and water uses</p>	<p>impact study was undertaken to determine the impact of the proposed development project on a regional scale.</p> <p>Additionally; a stormwater management plan was developed which includes management measures for the mitigation of impacts identified with in the anticipated increased stormwater flow associated with the development project. Additional requirements as it relates to site specific design elements to address the requirements of the RSDF have been included in the Environmental Management Programme.</p> <p>Alternatives Alternatives have been investigated as part of the environmental impact assessment. Site alternatives were not considered as the development site is owned by the proponent and was acquired with the view to develop the property. Other alternatives have been discussed.</p> <p>Environmental issues Suitably qualified specialist were appointed during the environmental impact assessment phase to undertake the specialist studies as identified during the scoping phase of the project.</p> <p>Mitigation measures Mitigation measures for the identified impact are included in the Environmental Impact Assessment Report and detailed in the</p>

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	<p>Recommendations: Wetlands and water uses A wetland delineation is required</p> <p>A water use license must be obtained for roads crossing water resources The layout plan must reflect certified floodplains, wetlands and 30m wetland buffer zones</p> <p>Open space Provision of recreational parks to be in line with JMOSS</p> <p>Stormwater management A stormwater management plan must be submitted to this department and the Johannesburg Roads Agency for comment. Stormwater management must ensure sustainability of wetlands on the site</p> <p>Space for stormwater management must be provided and the principles of WSUDS and SUDS applied to minimise surface runoff and maintain water quality</p> <p>Biodiversity and conservation issues Protection of the sensitive environments identified and ecological support and linkage functions to be accommodated.</p>	<p>Wetland study to be conducted as per the Plan of Study for Environmental Impact Assessment.</p> <p>Open space To be considered by the project planning professionals for inclusion in the Environmental Impact Assessment Report.</p> <p>Stormwater management To be considered by the project planning professionals for inclusion in the Environmental Impact Assessment Report.</p> <p>Biodiversity and conservation issues A specialist biodiversity study must be undertaken in accordance with the Plan of Study for Environmental Impact Assessment.</p> <p>Rehabilitation and radioactivity Refer to correspondence from NNR below.</p>	<p>Environmental Management Programme.</p> <p>Wetlands and water uses Wetlands were delineated and the requirements to obtain a water use license are discussed in the Section 3 of this report.</p> <p>Open space Open space area has been provided for in accordance with the recommendations of the wetland and biodiversity specialist recommendations.</p> <p>Stormwater management A detailed stormwater management plan has been prepared by WSP Engineering Services. The proponent / applicant will be advised with regard to the requirements for the submission of the plan to the City of Johannesburg Municipality.</p> <p>Biodiversity and conservation issues As Biodiversity Assessment was undertaken during the environmental impact assessment. The findings and recommendation of the assessment is included in Section 7 <b>Error! Reference source not found..</b></p>

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	<p>The Bio-regional plan for Johannesburg indicates the presence of critical biodiversity areas and ecological support areas on the site. A specialist biodiversity study must be undertaken.</p> <p>Rehabilitation and radioactivity The level of rehabilitation on site, inclusive of levels of radioactive post reclamation must be suitable for residential land use.</p>		<p>Rehabilitation and radioactivity A Radiological Survey of the site was undertaken by a specialist consultant. The findings and recommendations of the assessment are included in Section <b>Error! Reference source not found.</b></p>
Department of Water Affairs	<p>11 April 2012</p> <p>Clarify if water will be abstracted. Activities within 100m of water resource and 500m of wetland requires a Water Use License Municipality confirmation of water and waste disposal services is required Stormwater management measures are to be implemented Hazardous waste to be stored such that it does not contaminate ground or surface water Diesel and oil spillage to be cleaned immediately and pollution of water incidents to be reported to DWA Stormwater management plan to be provided for comment to DWA</p>	<p>No water will be intentionally abstracted from development activities A Water Use License for activities within 500m of wetlands and possibly a Section 21 (C) and (i) application for construction within a watercourse (bridge/culverts) will be undertaken A DWA approved stormwater management plan will be prepared the principles of WSUDS and SUDS applied to minimise surface runoff and maintain water quality</p> <p>Hazardous wastes will be stored appropriately in accordance with the management plan</p>	<p>The requirement to obtain a water use license in discussed in Section <b>Error! Reference source not found.</b> of this report. A detailed stormwater management plan has been prepared by WSP Engineering Services. The proponent / applicant will be advised with regard to the requirements for the submission of the plan to the City of Johannesburg Municipality. Mitigation and management measures as it relates to hazardous waste and dangerous goods are included in the Environmental Management Programme.</p>
National Nuclear Regulator	<p>27 March 2012</p> <p>The applicant is required to apply for the certificate of</p>	<p>Noted. These comments will be directly</p>	<p>A Radiological Survey of the site was undertaken by a specialist consultant.</p>

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	<p>registration for any source of radiation found on the site</p> <ul style="list-style-type: none"> <li>An Authorisation change request must be submitted by DRD Gold</li> <li>Acceptance of liability for nuclear damage is required from the applicant</li> </ul> <p>Application for release of radioactive contaminated land is required from the applicant</p>	addressed by the applicant.	<p>The findings and recommendations of the assessment are included in this report.</p> <p>Any additional application, agreements and requirements as it between the applicant / proponent and the mining company falls outside the ambit of the environmental impact assessment. The applicant / proponent has been advised on the comments received.</p>
West Wits Mining	<p>March 2012</p> <p>We wish to analyse the project and assess its potential impact on our potential mining activities in the area. Copy of Scoping Report Requested.</p>	Noted. Copy of Scoping Report provided.	In addition, a copy of the Environmental Impact Assessment Report has been provided.
Mintails Limited	<p>2 March 2012</p> <p>The area has been drilled with a view to mining the Bird/White reef which strikes West/East through the centre of the Spitz demarcation. In addition, the surface slimes dams will also be mined and therefore the majority of the area will be for mining purposes.</p> <p>Kindly make contact with West Wits Mining urgently as they hold the Surface Right permits as well as the Prospecting and Mineral Rights via DRD Gold.</p>	<p>The proposed mining uses on portions of the site where mining rights occur are acknowledged.</p> <p>There are plans by Mintails to mine the "Soweto Cluster" of which the Hospital Slimes Dam located on the site forms a part of. Future plans by West Wits Mining to</p>	<p>The intention to re-mine the residue deposits is noted.</p> <p>It is also noted that while a mining company has rights to mine the Bird Reef in the centre of the site, the intent to mine the reef has not been communicated to the</p>

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
		undertake underground mining of the Bird Reef remain unspecified. Further consultation with West Wits Mining will be undertaken.	applicant by the mining company. In terms of Section 53 of the Mineral and Petroleum Resources Development Act 28 of 2002, any person who intends to use the surface of any land in any way which may be contrary to any object of this Act or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner. The proponent / applicant is therefore required to submit an application for approval. Such an application falls outside the ambit of the environmental impact assessment though the requirements are noted.
Ikemisetseng Poultry Agricultural Primary Co-operative	<p>5 March 2012 Registered co-operative with 25 members in Sol Plaatjes. Small scale farmers currently using a section of the site for agricultural food gardens without landowner consent</p> <p>Tried to trace previous owner of the land but were unsuccessful</p> <p>Applied to minister of agriculture and rural development and land reform in 2011 in attempt to trace land owner</p> <p>Wish to meet with landowner and government departments</p> <p>Wish landowner to consider leasing or transferring land to co-operative for food security and poverty alleviation</p>	Noted. Alternatives for use of the affected portion of land adjacent to Sol Plaatjes for continued agricultural use will be assessed during the environmental impact assessment phase.	Further discussion regarding alternatives is initiated during the public participation process undertaken during the environmental impact assessment phase.
Rand Leases Properties	<p>March 2012</p> <p>Requested to be registered as an</p>	Registered on I&AP database	All registered interested and affected parties are now afforded the opportunity to review the draft Environmental Impact Assessment

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	I&AP as nearby landowner		Report and provide further comments and / or raise issues and concerns.
Andre du Toit Town and Regional Planners	27 March 2012 Requested to be registered as an I&AP	Registered on I&AP database	
S Ngwenya	6 March 2012 Requested to be registered as an I&AP	Registered on I&AP database	
Akme Development Agency	29 March 2012 Requested to be registered as an I&AP	Registered on I&AP database	
N Mgxaji	1 March 2012 Informal discussion concerning proposed development (no written correspondence)	-	
T A Skhosana	1 March 2012 Informal discussion concerning proposed development (no written correspondence)	-	
Ward Councillor and COJ Region C officials	1 March 2012 Comment from meeting on 1 March 2012: What will the impact be on the Dunusa informal settlement?	According to the draft layout plan the Dunusa area (Matholesville extensions) is being considered for development or formalisation of services. However the area is directly adjacent to the Hospital Slimes Dam. The feasibility of development in this section of the site will require further assessment during the environmental impact assessment phase.	During the environmental impact assessment, specialist studies related to radiation and air quality were conducted to determine the risks and impacts associated with the mine residue deposits. The risks / impacts are discussed in this report.
City of Johannesburg Environmental Infrastructure Services Department	4 April 2012 Guidelines and policies According to RSDF 2010-2011 for Region C, sub area 15, one of the objectives is to upgrade infrastructure to create sustainable and integrated human settlements. The proposed development is in	Guidelines and policies Aspects concerning sustainable and integrated human settlements in terms of the RSDF to be considered by the project planning professionals for inclusion in the Environmental Impact Assessment Report.	Guideline and policies As part of the environmental impact assessment, a traffic impact study was undertaken to determine the impact of the proposed development project on a regional scale.  Additionally; a stormwater management plan was

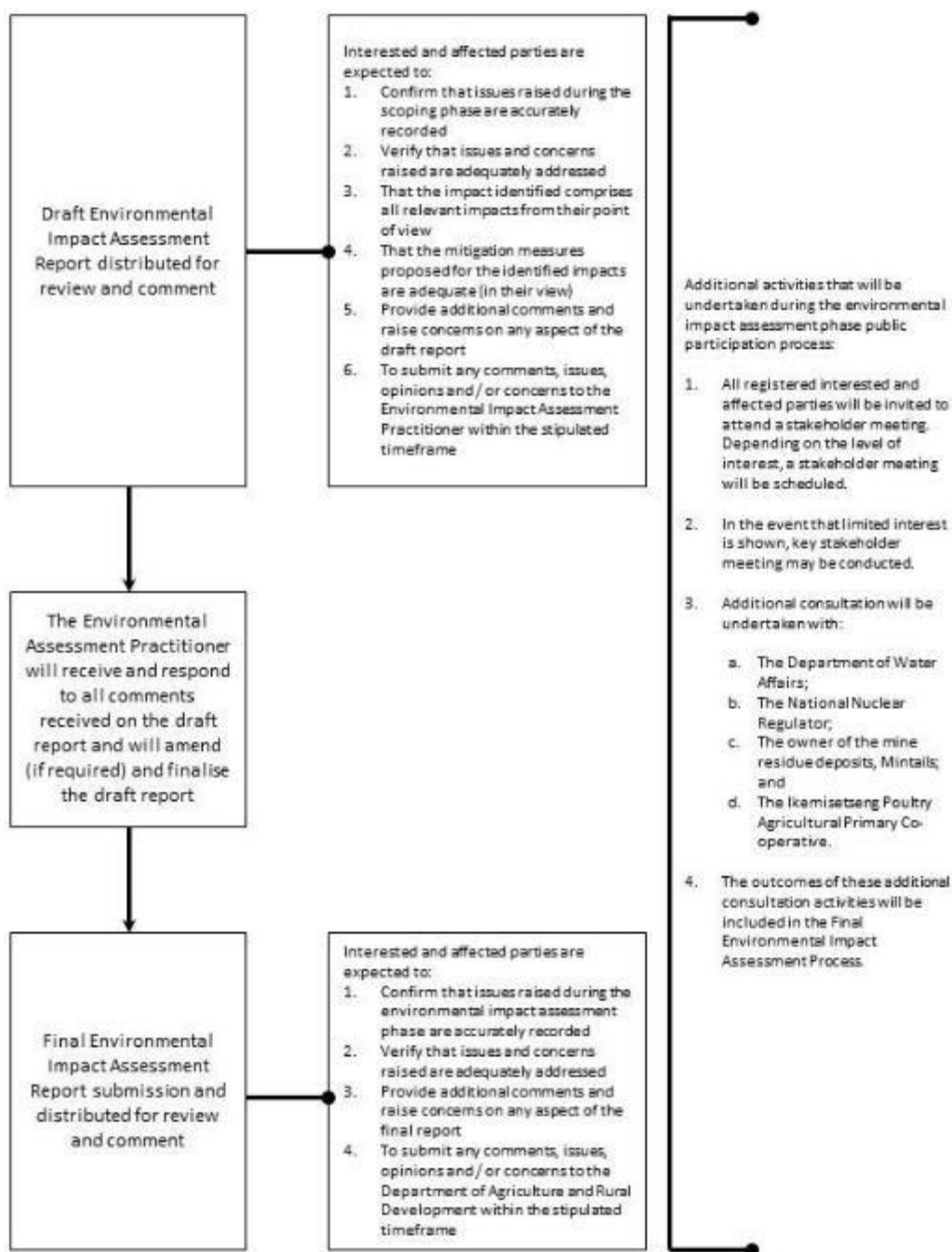
Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	<p>line with the residential character of the area. In addition the RSDF requires that development applications for densification and intensification must ensure provision of the following:</p> <ul style="list-style-type: none"> <li>Storm water drainage system</li> <li>Paved pedestrian lanes</li> <li>Pedestrian bridge where necessary</li> <li>Walkable distances to transport amenities</li> <li>Parking for both cars and bicycles</li> <li>Kerp ramps</li> <li>Wheel chair access</li> </ul> <p>Alternatives Site alternatives must be considered in the environmental impact assessment</p>	<p>Alternatives Noted.</p> <p>Environmental issues Specialist studies to be undertaken as per the Plan of Study for Environmental Impact Assessment</p>	<p>developed which includes management measures for the mitigation of impacts identified with in the anticipated increased stormwater flow associated with the development project.</p> <p>Additional requirements as it relates to site specific design elements to address the requirements of the RSDF have been included in the Environmental Management Programme.</p> <p>Alternatives Alternatives have been investigated as part of the environmental impact assessment. Site alternatives were not considered as the development site is owned by the proponent and was acquired with the view to develop the property. Other alternatives have been discussed.</p>
	<p>Environmental issues Environmental issues were considered in the report and studies for environmental impact assessment are recommended.</p> <p>Mitigation measures Mitigation measures must be addressed in the Environmental Impact Assessment Report</p> <p>Recommendations: Wetlands and water uses</p> <ul style="list-style-type: none"> <li>A wetland delineation is required</li> <li>A water use license must be</li> </ul>	<p>Mitigation measures Noted.</p> <p>Wetlands and water uses Wetland study to be conducted as per the Plan of Study for Environmental Impact Assessment.</p> <p>Open space To be considered by the project planning professionals for inclusion in the</p>	<p>Environmental issues Suitably qualified specialist were appointed during the environmental impact assessment phase to undertake the specialist studies as identified during the scoping phase of the project.</p> <p>Mitigation measures Mitigation measures for the identified impact are included in the Environmental Impact Assessment Report and detailed in the Environmental Management Programme.</p> <p>Wetlands and water uses Wetlands were delineated and the requirements to obtain a water use license are discussed in the Section 3 of this report.</p>

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	<p>obtained for roads crossing water resources</p> <ul style="list-style-type: none"> <li>The layout plan must reflect certified floodplains, wetlands and 30m wetland buffer zones</li> </ul> <p>Open space Provision of recreational parks to be in line with JMOSS</p> <p>Stormwater management A stormwater management plan must be submitted to this department and the Johannesburg Roads Agency for comment. Stormwater management must ensure sustainability of wetlands on the site Space for stormwater management must be provided and the principles of WSUDS and SUDS applied to minimise surface runoff and maintain water quality</p> <p>Biodiversity and conservation issues Protection of the sensitive environments identified and ecological support and linkage functions to be accommodated.</p> <p>The Bio-regional plan for Johannesburg indicates the presence of critical biodiversity areas and ecological support areas on the site. A specialist</p>	<p>Environmental Impact Assessment Report.</p> <p>Stormwater management To be considered by the project planning professionals for inclusion in the Environmental Impact Assessment Report.</p> <p>Biodiversity and conservation issues A specialist biodiversity study must be undertaken in accordance with the Plan of Study for Environmental Impact Assessment.</p> <p>Rehabilitation and radioactivity Refer to correspondence from NNR below.</p>	<p>Open space Open space area has been provided for in accordance with the recommendations of the wetland and biodiversity specialist recommendations.</p> <p>Stormwater management A detailed stormwater management plan has been prepared by WSP Engineering Services. The proponent / applicant will be advised with regard to the requirements for the submission of the plan to the City of Johannesburg Municipality.</p> <p>Biodiversity and conservation issues As Biodiversity Assessment was undertaken during the environmental impact assessment. The findings and recommendation of the assessment is included in Section <b>Error! Reference source not found..</b></p> <p>Rehabilitation and radioactivity A Radiological Survey of the site was undertaken by a specialist consultant. The findings and recommendations of the assessment are included in this report.</p>

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	<p>biodiversity study must be undertaken.</p> <p>Rehabilitation and radioactivity The level of rehabilitation on site, inclusive of levels of radioactive post reclamation must be suitable for residential land use.</p>		

## 5.2 ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The environmental impact assess public participation process was initiated through affording all registered interested and affected parties the opportunity to comment on this Draft Environmental Impact Assessment Report. The process is outlined in the diagram below.



**Figure 39: Consultation process for EIA phase**

## 5.2.1 DISTRIBUTION OF DRAFT EIA REPORT FOR REVIEW & COMMENT

All registered interested and affected parties were notified of the availability of the Draft Environmental Impact Assessment Report for review and comment. Copies of the Draft Environmental Impact Assessment and Environmental Management Programme were available from the 4th of April 2014 at the:

- The Roodepoort Library;
- The Matholeville Skills Development Centre; and
- The Sol Plaatjie Community Hall.

Interested and affected parties were requested to indicate whether they would prefer to receive electronic copies of the report. Electronic versions of the Draft Environmental Impact Assessment and the relevant specialist studies were provided to the following individual via “dropbox”.

The review and comment period started on 3 April 2014 and was extended to account for the public holidays in April 2014. The comment period ended on 9 May 2014. In instances where key stakeholders did not provide comment within the stipulated timeframe, an additional opportunity to submit comments until the 14<sup>th</sup> of May 2014 was allowed for.

## 5.2.2 2018 RESUBMISSION OF EIA REPORT

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In March 2017 GDARD refused Environmental Authorization based on the failure of the applicant to submit a final report addressing further issues of concern to the GDARD. This decision was appealed successfully, and a letter was received by the MEC in November 2017, referring the matter back to the GDARD HoD for reconsideration. Consequently, meetings were held with the GDARD and a defined way forward was agreed. On the basis of these discussions the following key items and actions were agreed in order to revise and conclude a final EIR:

- Update relevant environmental, Health and Safety constraint zones incl:
  - Air quality- Nuisance dust and PM10: The air dispersion model and impact assessment to be verified and updated.
  - Radiation safety- Existing study to be reviewed and updated where necessary.
  - Contaminated land- Existing contaminated land study to be utilised to develop and constraint zones.
  - Land stability and safety (incl subsidence, tailing slope failure, old mine shafts) - existing geotechnical study to be utilised to define and map constraint zones.
  - Biodiversity- Existing biodiversity study and CPLAN data to be used to define constrain zones.
- Prepare development layout alternatives/ options applicable to the following scenarios:
  - **Development Parcel 1:** Concurrent remining of TSF1 and TSF2. This is the worst-case scenario in terms of potential air quality impacts.
  - **Development Parcel 2:** Post remining of TSF1; remining of TSF2.
  - **Development Parcel 3:** The post remining of the both TSF1 and TSF2- i.e. the constraint zones (if any) once the tailings are removed.
  - **Development Parcel 4:** The post remining of the both TSF1 and TSF2- i.e. the constraint zones (if any) once the tailings are removed and assuming 75% revegetation of TSF3 and TSF4.

- Apply sensitivity map opportunities and constraints to identify available alternatives, e.g.:
  - Phasing options;
  - Inclusion of development options on the tailings sites (e.g. solar facility).
- Prepare qualitative comparative assessment of the alternatives.
- Prepare Addendum Report, containing:
  - Update significance rating sections of EIR and EMPR- amend where necessary and ensure consistency
  - Present sensitivity map and associated layout options.
  - Present available alternatives and comparative assessment.
  - Prepare high-level sustainability appraisal.
  - Present existing S53 Approval from DMR
  - Present existing NNR Clearance Certificate- ([existing certificate issued!- discuss NNR disclaimer](#))
  - Present updated TSF Rehabilitation schedules.

Compile consolidated addendum report (place for 30 days review to registered I&AP's)

The inclusion of this information is at the behest of GDARD and serves to confirm that the land is suitable for the development of a mixed-use township. It is the opinion of the EAP that the proposed development project be authorized as long as the proposed EIA mitigation measures are adhered to and all identified no-go constraint zones are avoided. It is recommended that approval be granted for phased development parcels as indicated in

### 5.2.3 MEETINGS HELD DURING THE STAKEHOLDER ENGAGEMENT PROCESS

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The Environmental Practitioner specifically requested key stakeholder meetings with the Ikemisetseng Poultry Agricultural Primary Co-operative and Mintails Limited. The meeting scheduled with Mintails did not take place. A copy of the Draft Environmental Impact Assessment was provided to Mintails for review and comment. A meeting was scheduled with the Ikemisetseng Poultry Agricultural Primary Co-operative though the representatives did not show up. The Environmental Practitioner proceeded to the Mandela Crisis Centre where Ms Nozipho Dlamini agreed to undertake the discussions of behalf of the community and the Ikemisetseng Poultry Agricultural Primary Co-operative. The minutes of the meeting are summarised below:

#### **Table 15: Comments and Responses**

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
Sol Plaatjes Youth (Boy Sikhakhane and Tshepiso Rampudu)	This letter serves as a part of comments and ideas of Solplaatje youth regarding the developments in our area.	Noted	N/A
	Housing Sol Plaatje is a very difficult place to live at present, The structure of housing doesn't suit a young person who is still doing matric for example: "if a neighbour is playing his sound, the child could never get a chance to study because the houses are too close to each other". Nevertheless, we think that if we had proper leadership in this place some of the issues would have been properly addressed.	Noted	N/A
	We are desperately in need of a library for students; not mentioning a proper school structure on its own.	Noted	The comments have been submitted to the developer / proponent for consideration.
	Sports  As a young person growing in Solpaatje, crime, drugs, HIV & AIDS and teenage pregnancy is the order of the day. We have got a lot of talented young people roaming around the streets the whole day because we've got no sports fields, We have got a lot of teams who participate in soccer but all that talent is wasted, We need at least 6 grounds both gender balanced.	Noted	The comments have been submitted to the developer / proponent for consideration.
	Health  Working together with the NPO's around our area we noticed that we got a high risks of	As part of the environmental impact assessment process an Air Quality Assessment was undertaken to verify the expected impacts from pollution sources. The	The potential air quality impacts were identified and mitigation and management measures proposed in the Draft Environmental Management

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	health hazards. TB is on the rise based on the studies we are receiving. We got STONECRUSHERS CO mining in our area, Those chemicals and dust that is happening there put people in a severe risk of TB and other illnesses; especially those who are on treatment.	results of this assessment are in included in this report.	Programme. The management of the impacts associated with Stone Crushers CC falls outside the scope of this assessment.
	<p>Sustainability</p> <p>Most people in our area are unemployed, most of us when we go to the government for aid, They tell us that we need to group ourselves and form CO-OPERATIVES and initiate projects. The projects that comes out of our minds needs enough space to operate. Senior citizens use that land to grow vegetables and maize there. We also as young people we need that land for projects such as recycling and cleaning projects.</p>	Noted	The comments have been submitted to the developer / proponent for consideration.
	<p>Steps taken</p> <p>We engaged the councillor for some time now pleading with him that we need transparency when dealing this kind of issues because we feel as though no one is looking up for young people in our area..</p> <p>The issue of MR JACK as we once engaged with him on how is he going to leave something that will benefit us as a community?</p> <p>To our amazement without any consultation –there is a soup kitchen that</p>	Noted	The comments have been submitted to the developer / proponent for consideration.

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	<p>benefit only some few favoured families and a skill centre that is yet to be built while we are having matriculants and graduates every year since 2012.</p> <p>We got NPO's that could run a soup kitchen all we need is something that will empower young people in Solpaatje for life.</p> <p>Together with elders who are farming in that area we spoke to the councillor seeking at least a lease agreement for that land to utilise so that we could have boreholes and JoJo tanks installed for agricultural projects.</p>		
	<p>Conclusion</p> <p>Overall we are asking for MR SPITZ to come and meet with us and the stakeholders in that place and give us an induction or a clue of what is going to happen in our area so that he could also hear our views of what is really going to be a common ground for everyone.</p>	<p>A meeting was scheduled for the 2<sup>nd</sup> of May 2014 with the Ikemisetseng Poultry Agricultural Primary Co-operative though the representatives did not show up. Mr Sikhakhane was invited to attend the meeting. The Environmental Practitioner proceeded to the Mandela Crisis Centre where Ms Nozipho Dlamini agreed to undertake the discussions of behalf of the community and the Ikemisetseng Poultry Agricultural Primary Co-operative.</p>	<p>The written comments received have been forwarded to the developer / proponent for consideration.</p>
	<p>There is lot to be said but for now let us just say thank you for your concern. It is highly appreciated to be listened to as young people.</p>	Noted	N/A
Mandelaville Crisis Centre (NPO 032-547) – Comments received during a meeting held with Ms Nozipho Dlamini on the 2nd of May 2014	<p>It is recognised that the use of the land for subsistence farming is in the absence of a lease / other agreement with the current land owner.</p>	Noted	N/A
	<p>The activities on the land involve subsistence farming and include the</p>	Noted	N/A

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	cultivation of food crops such as maize and vegetables.		
	This is undertaken as an initiative to supplement the existing Government Food Programme in terms of which 800 of the 2,500 households are supported.	Noted	N/A
	A feasible alternative to the use of the land would include the development of backyard gardens.	Noted	The comments received have been forwarded to the developer / proponent for consideration.
	The past 10 years were extremely important in agricultural subsistence farming in Durban deep. The foundations were set during these years by the use of Spitz land mentioned in the report (page 32 para 3.4) for Subsistence farming our organization made efforts to establish a commercial farm through a Sol-Plaatje Project Cooperative limited an initiative of Mandela Crisis Centre( MCC).	Noted	N/A
	The major obstacle was lack of permission to use the land for agriculture as suggested on the report that about 40 hectares of the land adjacent to Sol-Plaatje Township has a potential for agricultural use.	Noted	N/A
	We are asking the land owner to make available at least 2500 square meters to Mandela Crisis Centre (MCC), this land will be used a job creation centre for a number of project outlined below	Noted	The comments received have been forwarded to the developer / proponent for consideration.
	We are requesting assistance in our skills development	Noted	The comments received have been forwarded to the developer /

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	<p>project aimed at diverting the reliance on subsistence farming to establish a brick making project, Baking and Sewing project in the same community and these project will absorb the most of the people who were doing the subsistence farming and will create much needed jobs our organization has the support and systems to incubate and sustain the project due to it track record, but the capital social investment has been the challenge.</p>		<p>proponent for consideration.</p>
	<p>MCC was founded to pursue Job creation and community development in our community and create jobs all in effort to assist in the war against poverty, essentially to uplift and develop the local people and by empowering men and women in surrounding disadvantaged communities Sol-Plaatjie, Matholesville and Braamfischerville. Many of these women have had no experience or training on agriculture themselves, or any training in this work. To date, Mandela Crisis Centre has successfully impacted upon in excess of 100 men and women trained in conjunction with the Department of Agriculture by training and empowering the locals with skills certificates and specific skills related to agriculture, these group will continue with the homestead farming and small scale food gardens.</p>	<p>Noted</p>	<p>N/A</p>

Stakeholder/I&AP	Comment	Response	Activities undertaken during the EIA Phase
	To address the root cause of the unemployment, we need to support small-scale initiatives, for further details on the project you can contact our office.	Noted	N/A

Based on the comments received (from the Sol Plaatjes Youth and the Mandela Crisis Centre), the developed / proponent agreed to consider the offset of perceived economic displacement related to the existing affected subsistence farmers through a financial contribution to the Mandela Crisis Centre. A valuation of the economic displacement has not been undertaken as part of the environmental impact assessment process and further negotiations will be undertaken once environmental authorisation has been granted.

No comments were received from Mintails South Africa.

Comment received from the City of Johannesburg Metropolitan Municipality (COJ) was received after the close of the comment period. The comments were however considered and additional information document was submitted to GDARD on 20 June 2014. This information document is attached to the report as Appendix R.

Subsequent to the site investigation, referred to in Section 1 of this report, the COJ submitted a second comment which states that they are not in support of the proposed development.

A response from the revised report was received from GDARD on 08 April 2015. The response is attached as Addendum R. The GDARD raised a number of reasons for the rejection of the EIR. This included:

- a) There are three mine residues on the proposed site which are fully rehabilitated and the health effects associated with those are deemed adverse.

Although not the responsibility of the applicant, Upward Spiral 1471 has been contracted by Mintails to re-process the tailings and rehabilitate two smaller residues located to the north and south of the site (Appendix S). The residues contain 9000 and 112000 tonnes respectively and will be removed through to use of the following:

- 2 x 300 ton excavator;
- 2 x 25 ton articulated dump trucks;
- 3 x front end loaders;
- 1 x Finlay screen; and
- 120 000 litre water bowser

An estimated 7500 tonnes will be removed monthly and complete removal of the residues is estimated at 18 to 22 months. No occupation of any of the residential units will occur

until both the residues are removed and the land subject to a further radiological and contaminated land assessment.

At present no plans are in place for removal of the larger residue deposit in the north-east corner of the site. In the event that the residue is not removed, it will be vegetated in accordance with an approved vegetation plan (Appendix T) prior to the commencement of any development. As such, the area has been removed from the site layout and an amended site layout is provided below. Furthermore a buffer of 250 meters from the larger north east residue is included in the revised layout and has been determined to be appropriate by the updated air quality study undertaken (Appendix H). Approval for the residue removal has been obtained from the DMR (Appendix W) and a clearance certificate obtained from the NNR (Appendix U).

- b) The Radiological Hazard Assessment indicated that the mine residue deposit pose a risk to members of the public who reside in the area.

In terms of the radiological risk, the individual risk for this site is  $3.87 \times 10^{-11}$  fatalities.person-1 annum-1 (i.e. effective dose X mortality risk coefficient 2). This value complies with the risk limits prescribed by the National Nuclear Regulator in the Safety Standards and Regulatory Practices Regulations. As such an application for land clearance for development on the site was submitted to the NNR and clearance obtained from the regulator on 13 June 2016 which confirmed that the site conformed to the required safety standards (Appendix U).

- c) Mintails Limited have plans to mine the Soweto cluster dumps of which Hospital slimes located on the site forms part of. During the re-mining process, people residing on the proposed development will be exposed to intensified pollution of dust, acid mine drainage and radiological pollution.

Although not the responsibility of the applicant, Upward Spiral 1471 has been contracted by Mintails to re-process the tailings and rehabilitate two smaller residues located to the north and south of the site (Appendix S). The residues contain 9000 and 112000 tonnes respectively and will be removed through to use of the following:

- 2 x 300 ton excavator;
- 2 x 25 ton articulated dump trucks;
- 3 x front end loaders;
- 1 x Finlay screen; and
- 120 000 litre water bowser

An estimated 7500 tonnes will be removed month and complete removal of the residues is estimated at 18 to 22 months. No occupation of any of the residential units will occur until both the residues are removed and the land subject to a further radiological and contaminated land assessment.

At present no plans are in place for removal of the larger residue deposit in the north-east corner of the site. In the event that the residue is not removed, it will be vegetated in accordance with an approved vegetation plan (Appendix T) prior to the commencement of any development. The remaining mine residue deposit will be fully rehabilitated by the developer by vegetating it in accordance with an approved vegetation plan prior to commencement of the development. Any entity that intends mining that material at a future date will be required to implement mitigating measures to ensure no adverse effects on local communities during the mining process. In addition the proposed development will be in excess of 200 metres from the remaining mine residue deposit.

- d) The NNR requirements as outlined in the letter dated 27 March 2012 is not addressed. In terms of the radiological risk, the individual risk for this site is  $3.87 \times 10^{-11}$  fatalities.person-1.annum-1 (i.e. effective dose X mortality risk coefficient 2). This value complies with the risk limits prescribed by the National Nuclear Regulator in the Safety Standards and Regulatory Practices Regulations.As such an application for land clearance for development on the site was submitted to the NNR and clearance obtained from the regulator on 13 June 2016 which confirmed that the site conformed to the required safety standards (Appendix U).
- e) Although an Air Quality specialist study has been conducted, it is based on the results of a non-verfied modeeling as no PM monitoring is availbale for the area.

Particulate Matter (PM<sub>10</sub>) counts have now been performed on the site and the Air Quality Assessment amended to include the results thereof. The PM counts support the findings of the original models and is attached as Appendix H.

The above additional information was requested by the GDARD during a meeting conducted on 26 August 2015. The notes of the discussions held are attached as Appendix V. Furthermore it was agreed the following additional information was to be included in the amended EIR and EMP documents:

- f) An approval letter from the DMR and Section 53 approval for the rehabilitation plan.

Approval has been granted from the DMR regarding the clean-up operation and removal of certain mining equipment. Similarly comments required in terms of the Section 53 of the MPRDA have been provided (Appendix W). The development has a S53 approval and therefore the mine would need to consider the development in any of its future planning

- g) Updates to the rehabilitation plan

The Rehabilitation Plan was to be amended to include *inter alia* how long vegetation would last once an area was vegetated and whether ongoing maintenance of the vegetation was required. Refer to Appendix T.

h) Certificate of Exemption and Clearance Certificate from the NNR.

In terms of the radiological risk, the individual risk for this site is  $3.87 \times 10^{-11}$  fatalities.person-1.annum-1 (i.e. effective dose X mortality risk coefficient 2). This value complies with the risk limits prescribed by the National Nuclear Regulator in the Safety Standards and Regulatory Practices Regulations.As such an application for land clearance for development on the site was submitted to the NNR and clearance obtained from the regulator on 13 June 2016 which confirmed that the site conformed to the required safety standards (Appendix U). It is recommended that a new NNR clearance certificate be applied for once remining is completed on the current existing tailings.

In March 2017 GDARD refused Environmental Authorization based on the failure of the applicant to submit a final report addressing further issues of concern to the GDARD. This decision was appealed successfully, and a letter was received by the MEC in November 2017, referring the matter back to the GDARD HoD for reconsideration. Consequently, meetings were held with the GDARD and a defined way forward was agreed. On the basis of these discussions the following key items and actions were agreed in order to revise and conclude a final EIR:

**Table 16: Concerns Raised by GDARD**

Concern raised	Where addressed in report
<p><b>Update relevant environmental, Health and Safety constraint zones incl:</b></p> <ul style="list-style-type: none"> <li><b>Air quality- Nuisance dust and PM10: The air dispersion model and impact assessment to be verified and updated.</b></li> <li><b>Radiation safety- Existing study to be reviewed and updated where necessary.</b></li> <li><b>Contaminated land- Existing contaminated land study to be utilised to develop and constraint zones.</b></li> <li><b>Land stability and safety (incl subsidence, tailing slope failure, old mine shafts) - existing geotechnical study to be utilised to define and map constraint zones.</b></li> </ul>	<p>The relevant constraint zones are presented in Section 6.2. The Air Quality Assessment was updated to consider the remining of the TSFs. The updated Air Quality assessment is presented in Appendix H2. The radiological assessment was also updated based on the updated air quality dispersion model. The updated radiological assessment is presented in Appendix D2.</p> <p>A new consolidated sensitivity map was compiled for this 2018 EIA report based on the following sensitivities and constraints:</p> <ul style="list-style-type: none"> <li>Areas delineated as wetlands and associated buffer zones (Figure 41).</li> <li>Biodiversity sensitivities: High sensitivity ecological areas including grassland and C-Plan areas identified in the biodiversity specialist study (Figure 42).</li> <li>Sensitivities identified in the geo-technical report: both absolute no-go areas and areas identified as "restricted" where additional geotechnical work is required to be completed before construction can commence in that area (Figure 43).</li> <li>Restricted zones include:</li> </ul>

<ul style="list-style-type: none"> <li><b>Biodiversity- Existing biodiversity study and CPLAN data to be used to define constrain zones.</b></li> </ul> <p><b>Apply sensitivity map opportunities and constraints to identify available alternatives</b></p>	<ul style="list-style-type: none"> <li>The Bird Reef which may be developed if further investigation takes places and the depth and extent of mining is determined.</li> <li>The tailings area and ash dump cannot be developed unless the tailings dam is cleared.</li> <li>The Adit zone where further work required to determine depth.</li> <li>Disturbed ground / terrace where fill should be removed and replaced with inert gravel.</li> </ul> <p>Air quality constraint zones were overlaid and development layout alternatives/ options applicable to the following scenarios were mapped:</p> <ul style="list-style-type: none"> <li><b>Development Parcel 1:</b> Concurrent remining of TSF1 and TSF2. This is the worst-case scenario in terms of potential air quality impacts.</li> <li><b>Development Parcel 2:</b> Post remining of TSF1; remining of TSF2.</li> <li><b>Development Parcel 3:</b> The post remining of the both TSF1 and TSF2- i.e. the constraint zones (if any) once the tailings are removed.</li> <li><b>Development Parcel 4:</b> The post remining of the both TSF1 and TSF2- i.e. the constraint zones (if any) once the tailings are removed and assuming 75% revegetation of TSF3 and TSF4.</li> </ul> <p>These are modelled in Section 6.2.4. Consolidated sensitivity maps for each scenario are provided in Figure 49 - Figure 51.</p>
<b>Prepare qualitative comparative assessment of the alternatives</b>	Section 6 has been revised to present the comparative assessment.
<b>Update significance rating sections of EIR and EMPR- amend where necessary and ensure consistency</b>	Section 7
<b>Present sensitivity map and associated layout options.</b>	<b>Consolidated sensitivity maps for each scenario are provided in Figure 49 - Figure 51.</b>
<b>Prepare high-level sustainability appraisal.</b>	Section 3.1.14
<b>Present existing S53 Approval from DMR</b>	<b>Appendix W</b>
<b>Present existing NNR Clearance Certificate</b>	Appendix U2
<b>Present updated TSF Rehabilitation schedules.</b>	<b>Appendix S</b>

## 6 ALTERNATIVE ANALYSES

In terms of the environmental impact assessments regulations, it is a requirement that feasible alternatives be identified in the Scoping Report and further investigated as part of the Environmental Impact Assessment. The criteria for selecting or eliminating the alternatives during the scoping phase were based on ecological/biophysical, social and economic considerations. As part of the Environmental Impact Assessment, the identified alternatives were investigated as a means to avoid and/or minimise environmental impact. The following alternatives, as identified in the Scoping Report, and supplemented through the EIA Phases, were investigated as part of this assessment.

### 6.1 ALTERNATIVES IDENTIFIED FOR ACHIEVING DEVELOPMENT OBJECTIVES

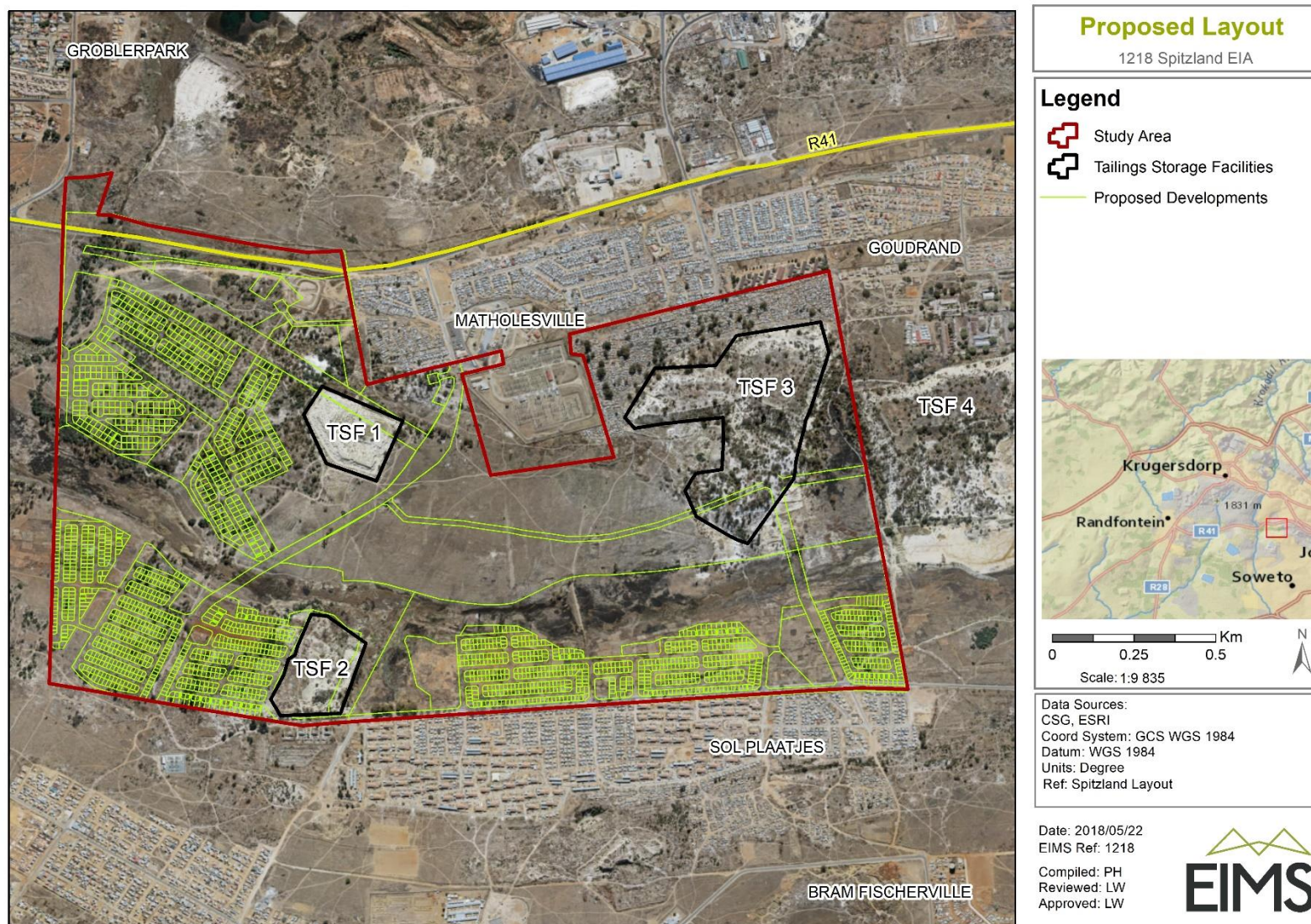
**Table 17: Alternative assessment**

Aspect	Summary of potential issues	Alternatives investigated during assessment
<b>Radioactive/contaminated land</b>	The potential occurrence of radioactivity and pollutants of concern on developable areas of the site due to historic gold mining activities	<ol style="list-style-type: none"> <li>1. Exclusion of radioactive sites above regulatory limits from development; and</li> <li>2. Inclusion of radioactive sites above regulatory limits following clean-up of affected site.</li> </ol>
<b>Air quality and associated buffers</b>	Mine residue facilities present a potential health and safety risk (structural risk and dust fallout risk)	<ol style="list-style-type: none"> <li>1. Exclusion of the 100 m minimum health buffer zone around residue deposit facilities from the development;</li> <li>2. Inclusion of the 100 m minimum health buffer zone for development and application of mitigation measures; and</li> <li>3. Inclusion of all areas of the site on which the residue deposit facilities are situated for development assuming processing and removal by Mintails in the short-medium term.</li> </ol>
<b>Agricultural potential</b>	Loss of high potential agricultural soils on the site to development currently used by the Sol Plaatjes community for subsistence farming.	<ol style="list-style-type: none"> <li>1. Exclusion of the subsistence farming areas in the south eastern section from the development and assigning agricultural zoning; and</li> <li>2. Inclusion of subsistence farming areas in the south eastern section for development.</li> </ol>

<b>Sensitive environments</b>	Sensitive environment located on the site in terms of the C-Plan including the Class 3 ridge and irreplaceable areas in the western section of the site.	1. Exclusion of sensitive environments from development; and 2. Inclusion of sensitive areas for development and application of mitigation measures.
<b>Informal settlement</b>	Potential human settlement issues due to existence of the Dunusa informal settlement within the site boundary.	Alternatives to be investigated.

In addition to the above alternatives, three separate development layout alternatives/ options were also assessed as part of this 2018 update to the EIA report. Each of the development alternatives relate to the sequence of the remining of the existing Tailings Storage Facilities (TSFs) on the site and each phasing option would entail difference constraint zones based on the findings of the revised specialist reports. The following three phasing scenarios were assessed:

- **Development Parcel 1:** Concurrent remining of TSF1 and TSF2. This is the worst-case scenario in terms of potential air quality impacts.
- **Development Parcel 2:** Post remining of TSF1; remining of TSF2.
- **Development Parcel 3:** The post remining of the both TSF1 and TSF2- i.e. the constraint zones (if any) once the tailings are removed.
- **Development Parcel 4:** The post remining of the both TSF1 and TSF2- i.e. the constraint zones (if any) once the tailings are removed and assuming 75% revegetation of TSF3 and TSF4.



**Figure 40: Location of the Tailings Storage Facilities in relation to the original development layout**

## 6.2 ALTERNATIVE INVESTIGATION

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### 6.2.1 RADIOACTIVE/CONTAMINATED LAND AND AIR QUALITY

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Malepa Holdings CC was appointed to undertake a Radiological Hazard Assessment of the proposed development site. The mine residue deposits were excluded from this survey. Based on the findings of the assessment 0% (0 readings) was found to be above the 500 becquerel/Kg limit with the highest Uranium activity recorded on the entire site being 210 becquerel/Kg whilst the average for the site was 47 becquerel/Kg and the 90th percentile being 86 becquerel/Kg. The survey conducted on the accessible areas of the Spitz Land site indicates that 0% of the site requires remediation since the results are well below the reference level of 500 becquerel/kg for which a nuclear authorisation is not necessary. Regardless, an application for a clearance certificate was made and obtained from the NNR confirming the results of the study.

As part of the Radiological Hazard Assessment, the specialist consultant (Malepa Holdings CC) reported that the mine residue deposits pose a risk to the members of the public who would reside in the area through the following five environmental pathways:

- The release of gaseous radon-222 ( $^{222}\text{Rn}$ ) to the atmosphere and subsequent inhalation;
- Possible dust loading of contaminants from the impoundments due to natural wind conditions;
- The localized effect of direct external gamma radiation exposure from the tailings impoundment;
- Ground seepage and subsequent contamination of local aquifers, which has the potential to affect the water supply; and
- Dam failure due to erosion or natural disasters.

It should be noted that the management of the mine residue deposits is regulated by the Mineral and Petroleum Resources Development Act 28 of 2002 (and applicable the regulations) as well as the Regulations on Water Use for Mining and Related Activities, promulgated in terms of the National Water Act 36 of 1998 and falls outside the ambit of this environmental impact assessment. Management measures have been included in the Environmental Management Programme and relates to the requirements for the involvement of the future ward councillors, the municipality and community members to confirm that the deposits are managed in accordance with the regulations.

A 100m buffer was initially established around all mine residue deposits. Accordingly, Royal HaskoningDHV were appointed to confirm the adequacy of the proposed buffer as it relates to windblown dust emissions and the potential impacts on persons living in close proximity the

deposits. In accordance with the modelling done by Royal HaskoningDHV, the existing buffer zones developed around tailings within the development are adequate but have been increased to 250 m in order to further reduce any potential impact.

An updated radiological assessment based on updates to the Air Quality Study dispersion modelling has been included as Appendix D2. The 2018 updated radiological assessment did not identify any restrictions applicable to the development layout.

Upward Spiral 1471 has been contracted by Mintails to re-process the tailings and rehabilitate two smaller residues located to the north and south of the site (Appendix S). The residues contain 9000 and 112000 tonnes respectively and will be removed through to use of the following:

- 2 x 300 ton excavator;
- 2 x 25 ton articulated dump trucks;
- 3 x front end loaders;
- 1 x Finlay screen; and
- 120 000 litre water bowzer

An estimated 7500 tonnes will be removed month and complete removal of the residues is estimated at 18 to 22 months. No occupation of any of the residential units will occur until both the residues are removed and the land subject to a further radiological and contaminated land assessment.

At present no plans are in place for removal of the larger residue deposit in the north-east corner of the site. In the event that the residue is not removed, it will be vegetated in accordance with an approved vegetation plan (Appendix T) prior to the commencement of any development. As such, the area has been removed from the site layout and an amended site layout is provided below. Furthermore a buffer of 250 meters from the larger north east residue is included in the revised layout and has been determined to be appropriate by the updated air quality study undertaken (Appendix H)

The alternative investigation provided consideration for the township layout as a result of:

- The results from the Radiological Survey confirmed that that 0% of the site requires remediation and is well below the limits for exposure. Confirming these results, a clearance certificate from the NNR was also obtained;
- The management of mine residue deposits remain the responsibility of the owner and is regulated by the MPRDA as well as regulations pertaining to water use for mining and related activities;
- Upward spiral has been appointed to remove the two smaller residues and the larger residue will either be removed or re-vegetated; and
- Updated air quality study which included the modelling of PM<sub>10</sub> concentrations (refer to Section 6.2.4) .

### 6.2.2 AGRICULTURAL LAND

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It should be noted that the land is used for agriculture without the consent of the current land owner. Based on the comments received (from the Sol Plaatjes Youth and the Mandela Crisis Centre), the developer / proponent agreed to consider the offset of perceived economic displacement related to the existing affected subsistence farmers through a financial contribution to the Mandela Crisis Centre. A valuation of the economic displacement has not been undertaken as part of the environmental impact assessment process and further negotiations will be undertaken once environmental authorisation has been granted.

### 6.2.3 DEVELOPMENT CONSTRAINT ZONES

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As part of the environmental impact assessment process, a biodiversity study was undertaken to identify any areas that may be regarded to have high biodiversity value. Recommendations with regard to the protection of these areas were made and the township layout was adjusted to include these areas in as open space. The following additional changes to the layout plan were affected in response to the findings of the specialist studies:

- A small outcrop of the Kimberley Reef intersecting the south western corner of the site, where residential development has been excluded in accordance with the proposed buffer.

A new consolidated sensitivity map was compiled for this 2018 EIA report based on the following sensitivities and constraints:

- Areas delineated as wetlands and associated buffer zones (Figure 41).
- Biodiversity sensitivities: High sensitivity ecological areas including grassland and C-Plan areas identified in the biodiversity specialist study (Figure 42).
- Sensitivities identified in the geo-technical report: both absolute no-go areas and areas identified as “restricted” where additional geotechnical work is required to be completed before construction can commence in that area (Figure 43).
- Restricted zones include:
  - The Bird Reef which may be developed if further investigation takes place and the depth and extent of mining is determined.
  - The tailings area and ash dump cannot be developed unless the tailings dam is cleared.
  - The Adit zone where further work required to determine depth.
  - Disturbed ground / terrace where fill should be removed and replaced with inert gravel.

This updated consolidated sensitivity map is presented in Figure 44.

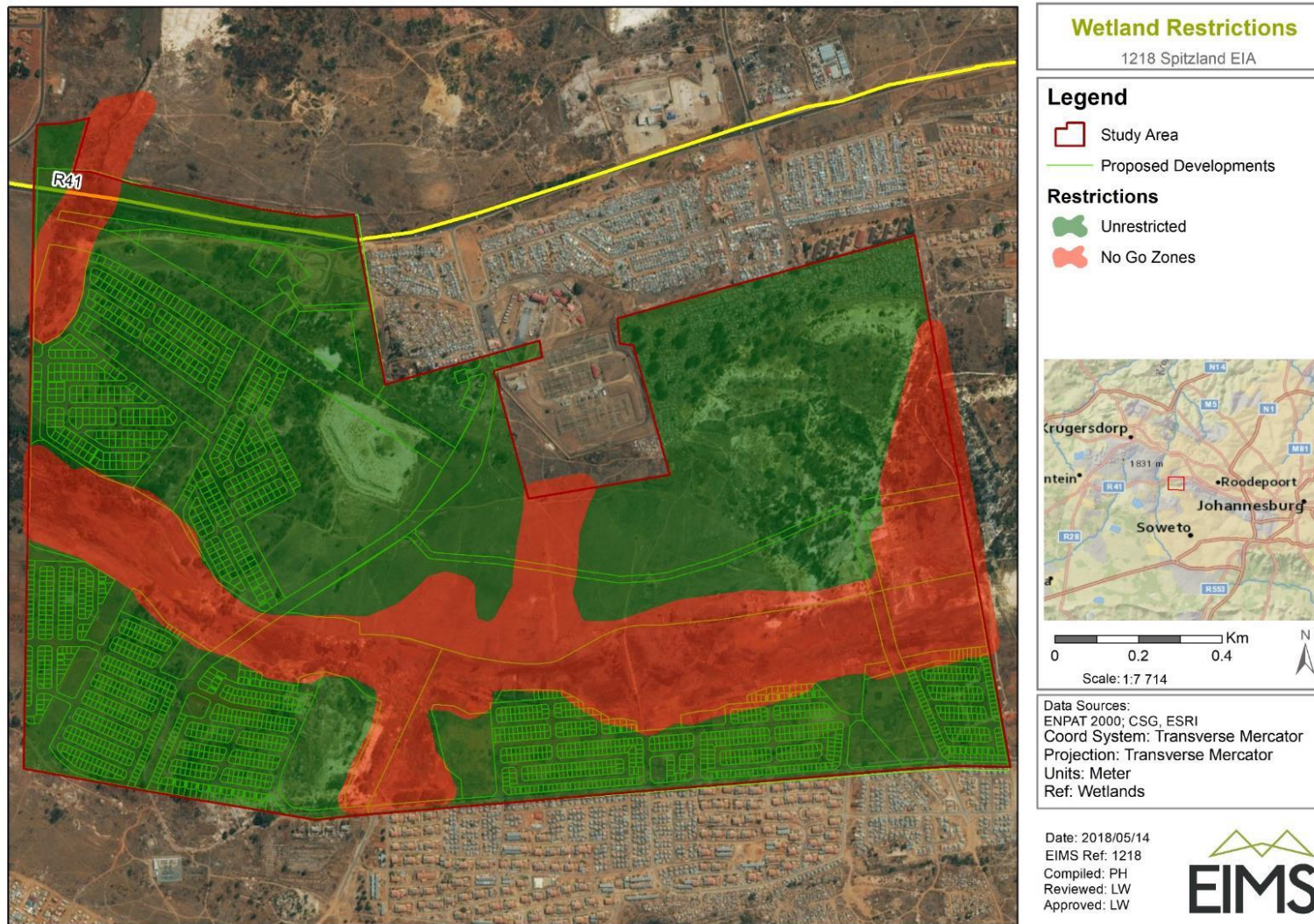


Figure 41: Wetland constraint zones

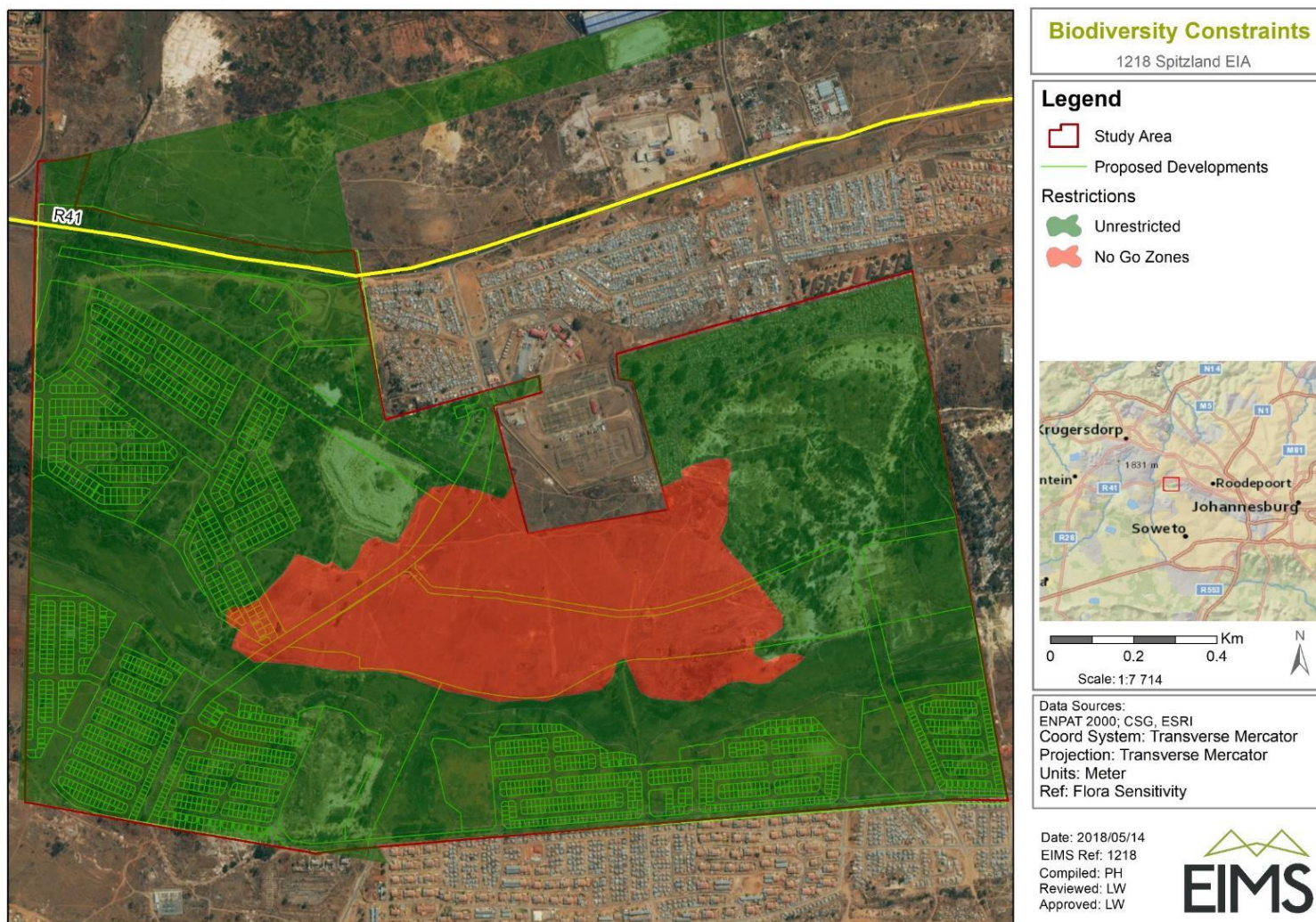


Figure 42: Biodiversity constraint map

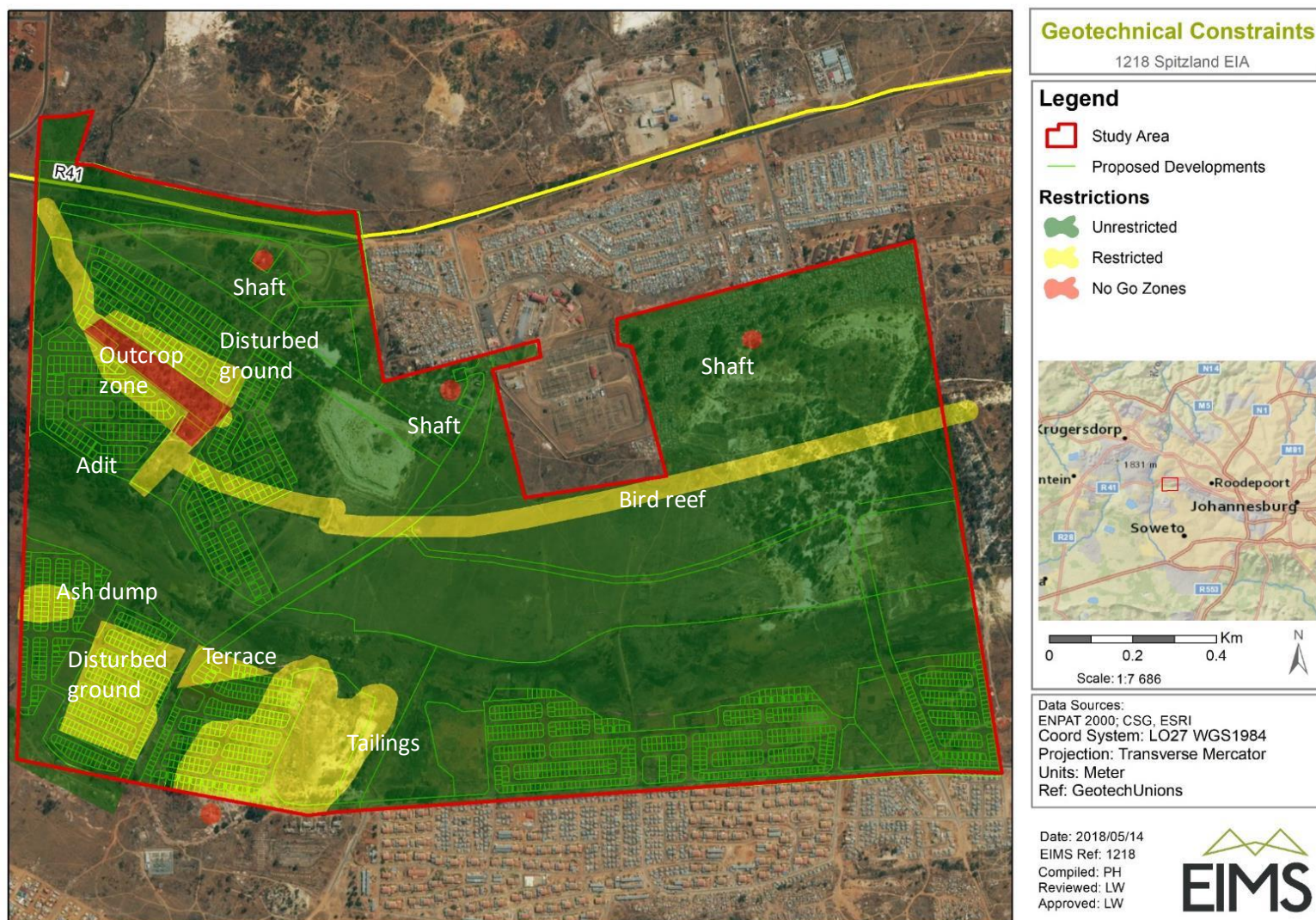


Figure 43: Geotechnical constraint map

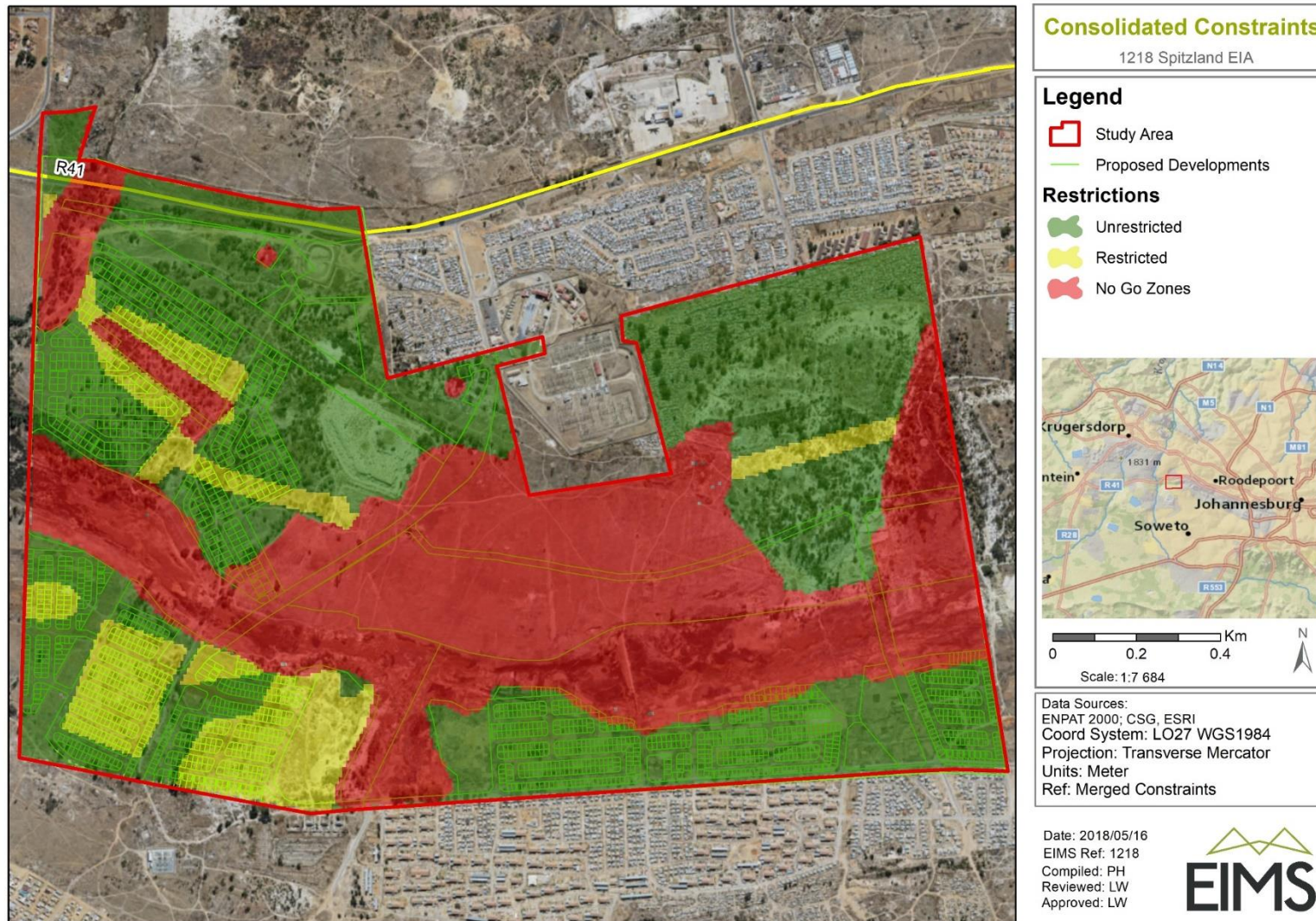


Figure 44: Updated consolidated sensitivity map

## 6.2.4 AIR QUALITY RESTRICTION ZONES

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The proximity of the development to numerous tailings facilities results in the need to accurately define and consider the likely impacts from these facilities on the proposed residential land use. An updated and revised specialist air quality impact assessment (refer to Appendix H2) was undertaken to attempt to define the likely impacts of the TSF on the proposed land use.

Pollutants with the potential to result in human health impacts, and consequently assessed in the air quality study, include PM<sub>2.5</sub> and PM<sub>10</sub>. Although the proposed development will not add to the existing baseline ambient PM<sub>10</sub> levels (with the exception of the short-term construction phase), it should be noted that the proposed development will be located in an area with already elevated ambient levels.

The maximum simulated annual average and highest daily PM<sub>2.5</sub> and PM<sub>10</sub> impacts were modelled. PM<sub>10</sub> exclusion zones were defined for the following specific development parcel scenarios/ phases:

- **Development Parcel 1:** Active remining of TSF1 and TSF2 (Figure 45).
- **Development Parcel 2:** Post remining of TSF1; remining of TSF2 (Figure 46).
- **Development Parcel 3:** The post remining of the both TSF1 and TSF2 (Figure 47).
- **Development Parcel 4:** The post remining of the both TSF1 and TSF2- i.e. the constraint zones (if any) once the tailings are removed and assuming 75% revegetation of TSF3 and TSF4 (Figure 48).

Areas that fall within the restriction zones for each development parcel must consequently be excluded from the identified development parcels/ phases.

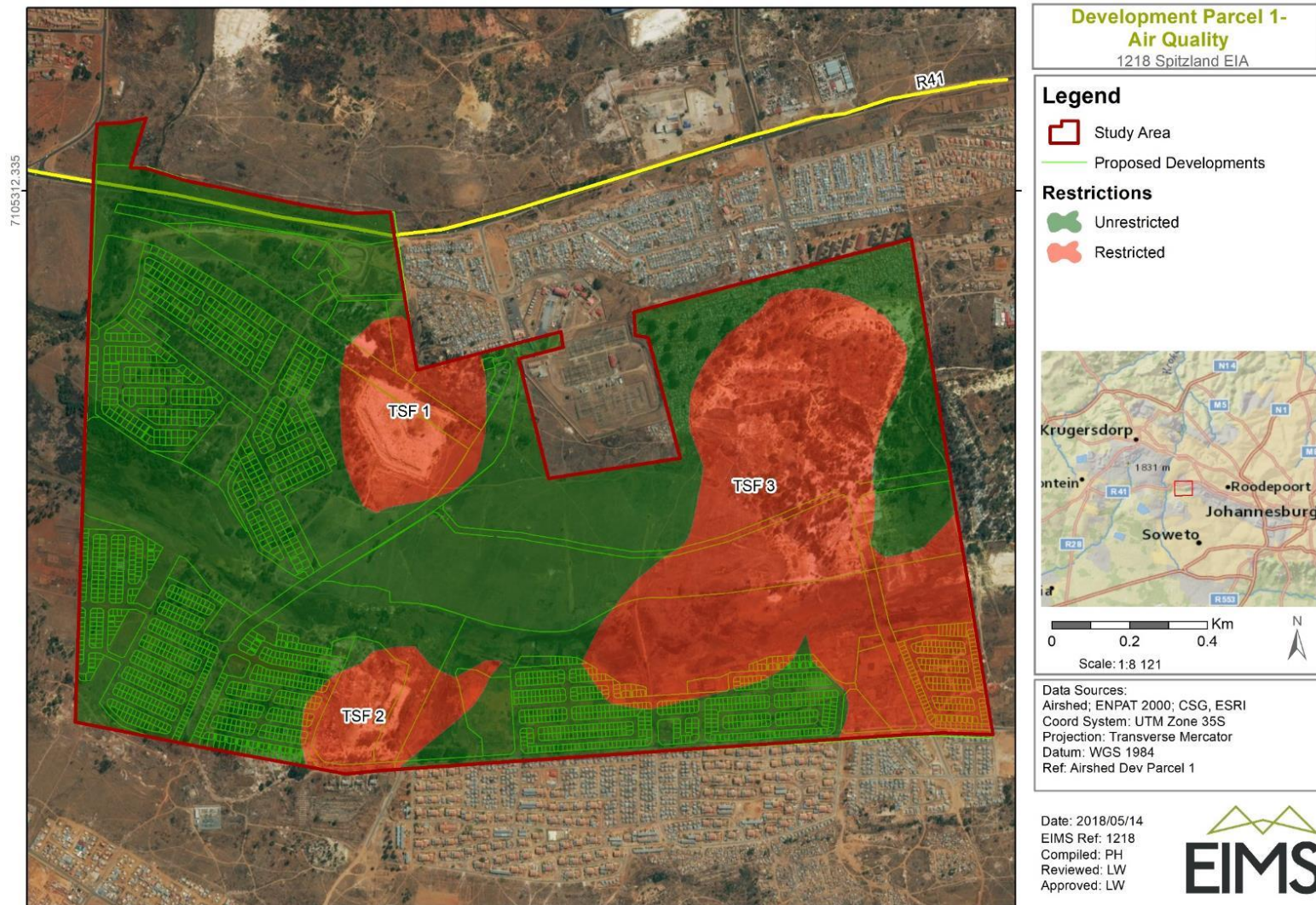


Figure 45: Air Quality Constraint Zones for Development Parcel 1

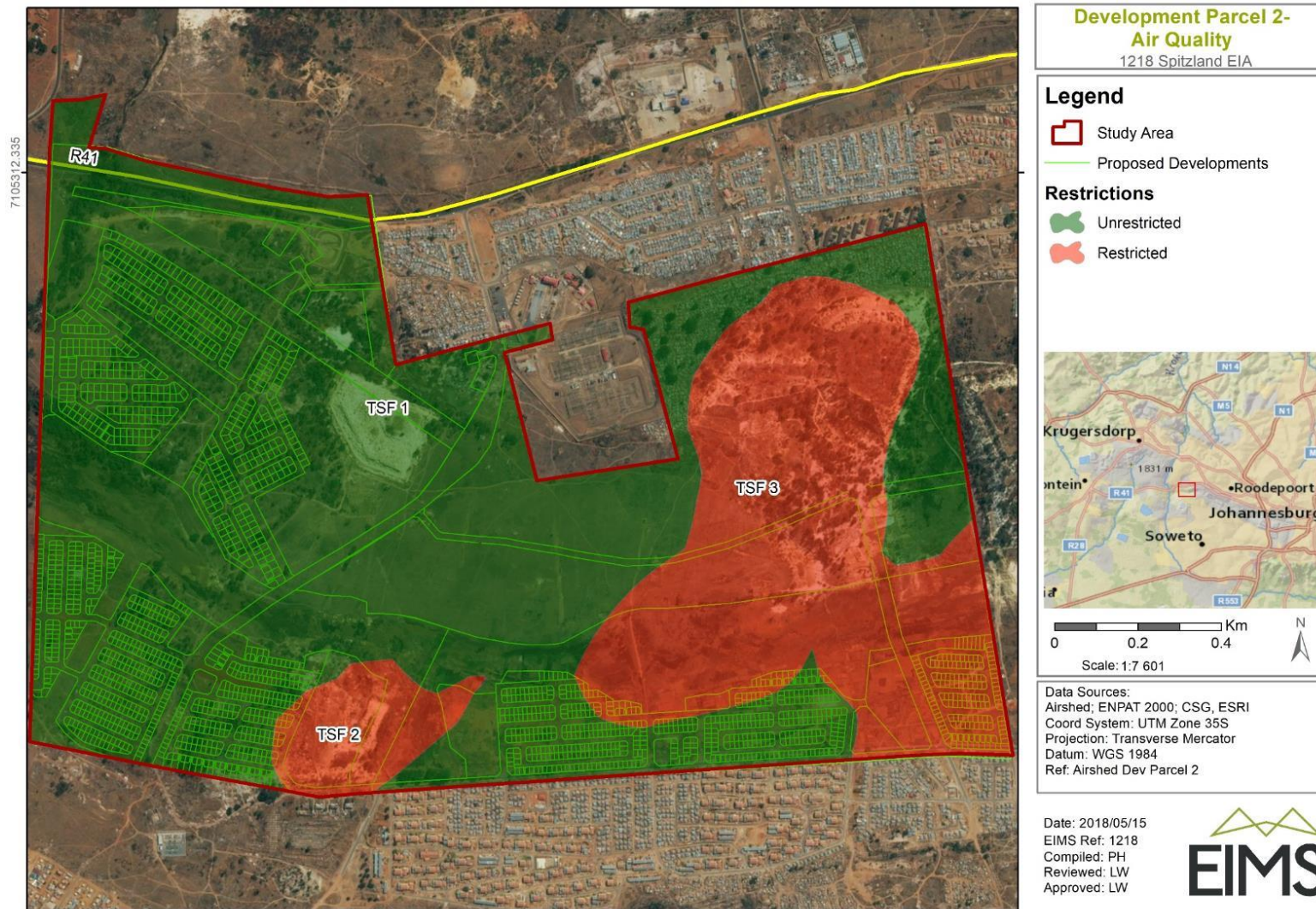


Figure 46: Air Quality Constraint Zones for Development Parcel 2

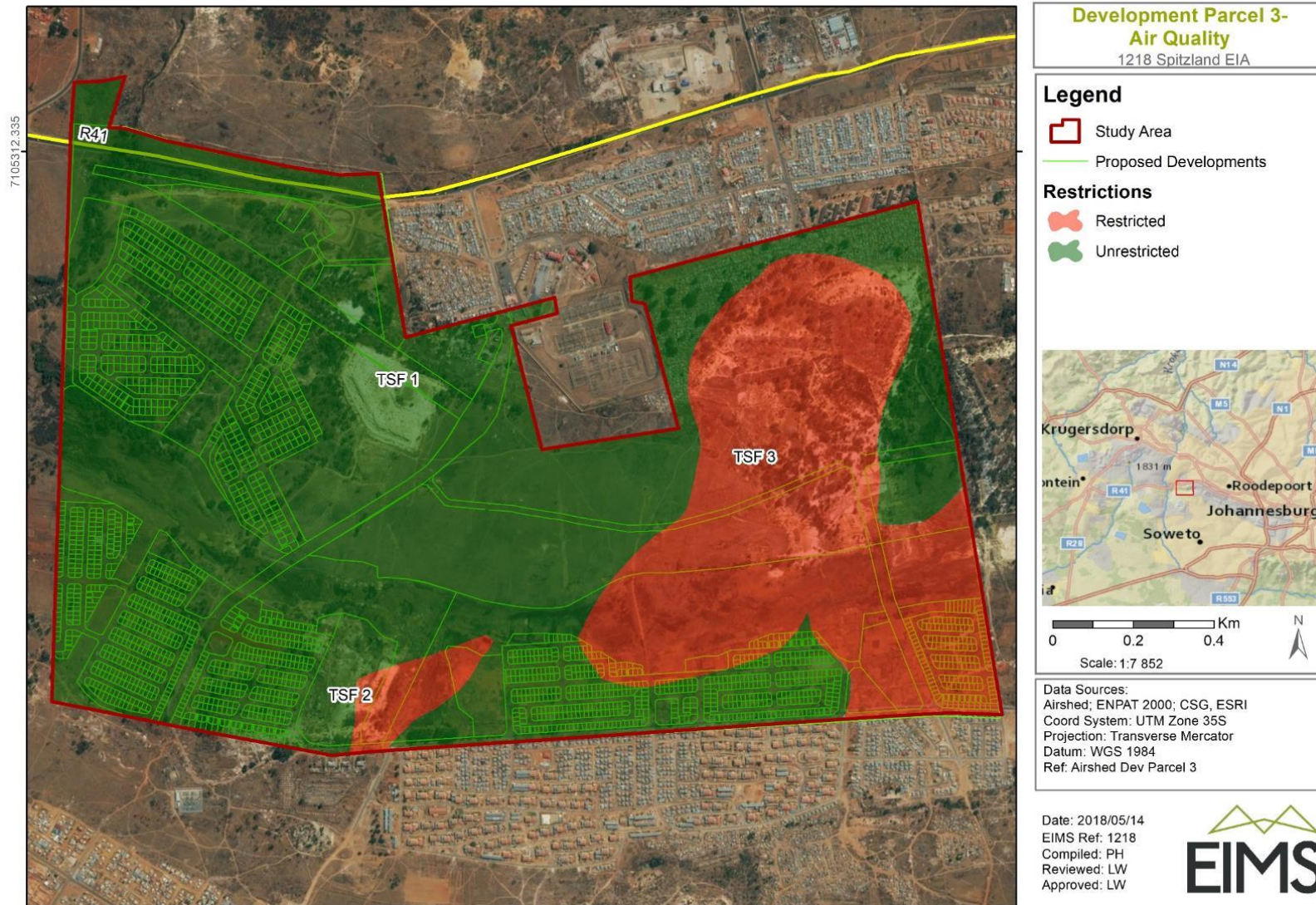
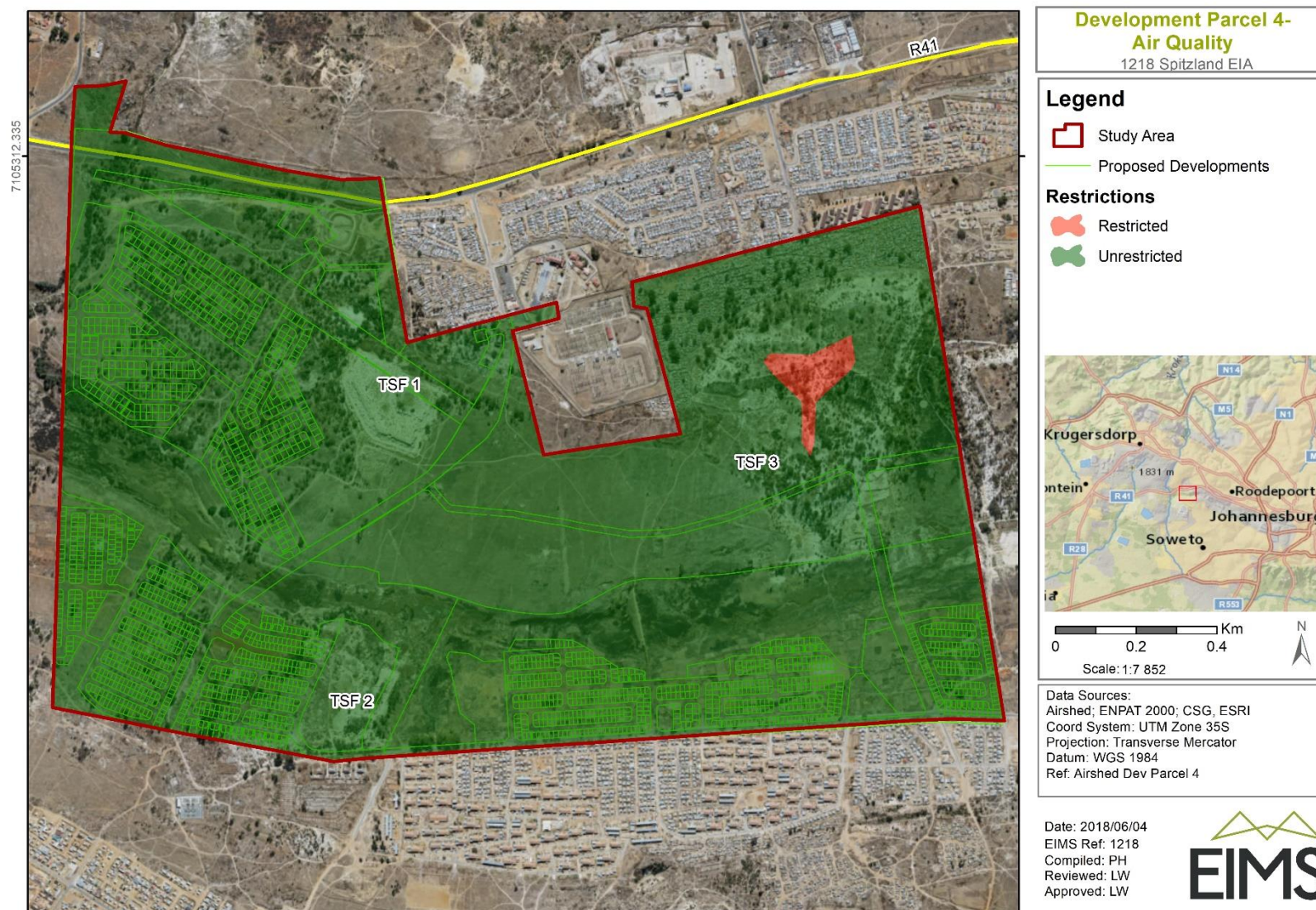


Figure 47: Air Quality Constraint Zones for Development Parcel 3



**Figure 48: Air Quality Constraint Zones for Development Parcel 4**

It is evident from Figure 45 - Figure 48 that the TSFs will have an impact on air quality. The duration will last for the lifespan of the TSFs. The health impacts due to PM10 and PM2.5 emissions are considered to be of medium significance. If the mitigation proposed by the air quality specialist is implemented, the significance rating could be reduced to low for all scenarios / development parcels.

It is the specialists opinion that the proposed development may be authorised, however it is recommended that the development area is adjusted to exclude the most eastern section directly adjacent to TSF4 unless TSF4 can be mitigated (vegetation would significantly reduce the impacts) and the development occurs in parcels or phases as presented in Figure 45 to Figure 47Figure 48.

The modelled Air Quality Impacts (PM10) constraint zones for each development parcel were superimposed onto the consolidated sensitivity map. This consolidated sensitivity maps for the three development parcels are presented in Figure 49 - Figure 52.

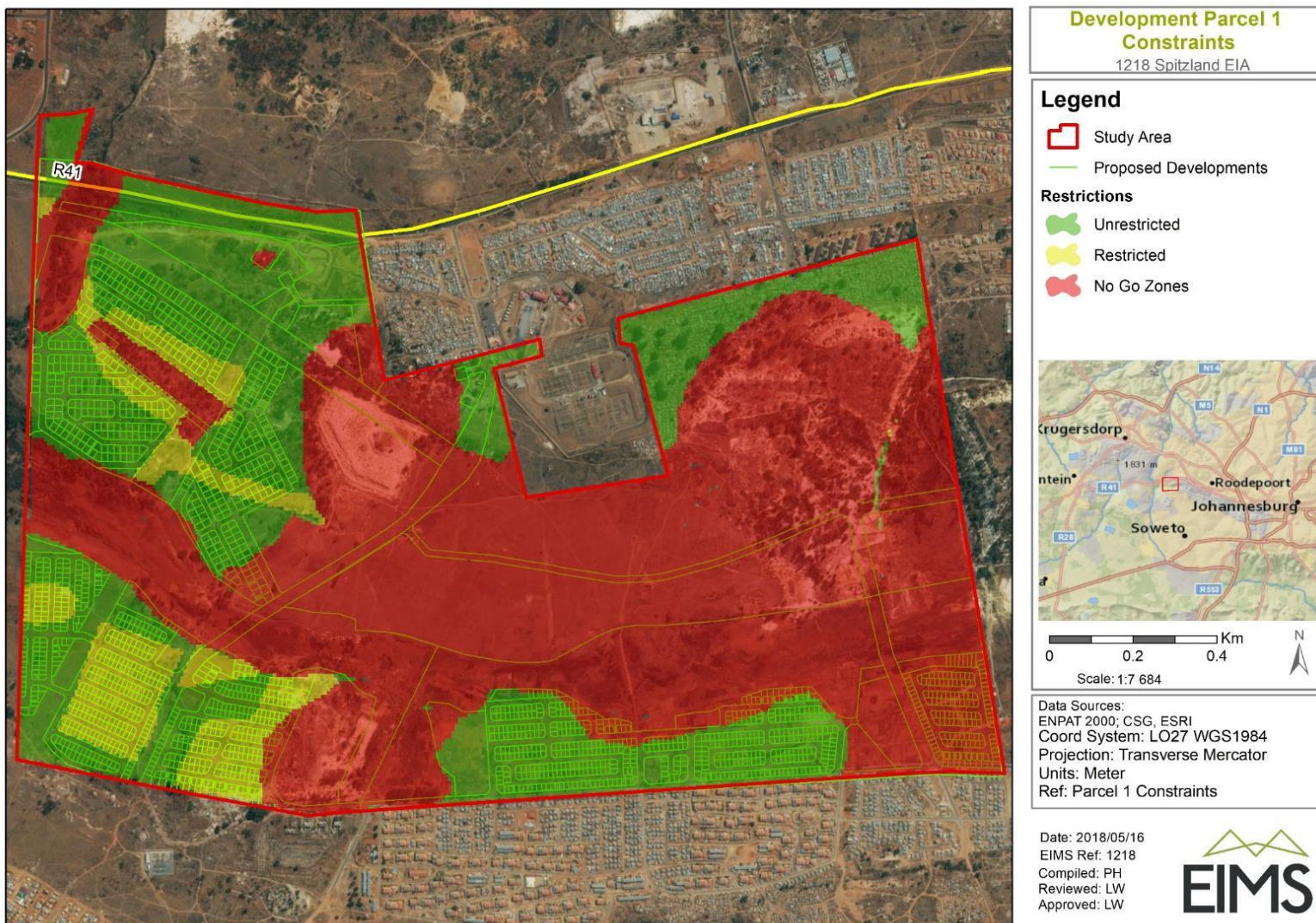


Figure 49: Consolidated constraint map for Development Parcel 1

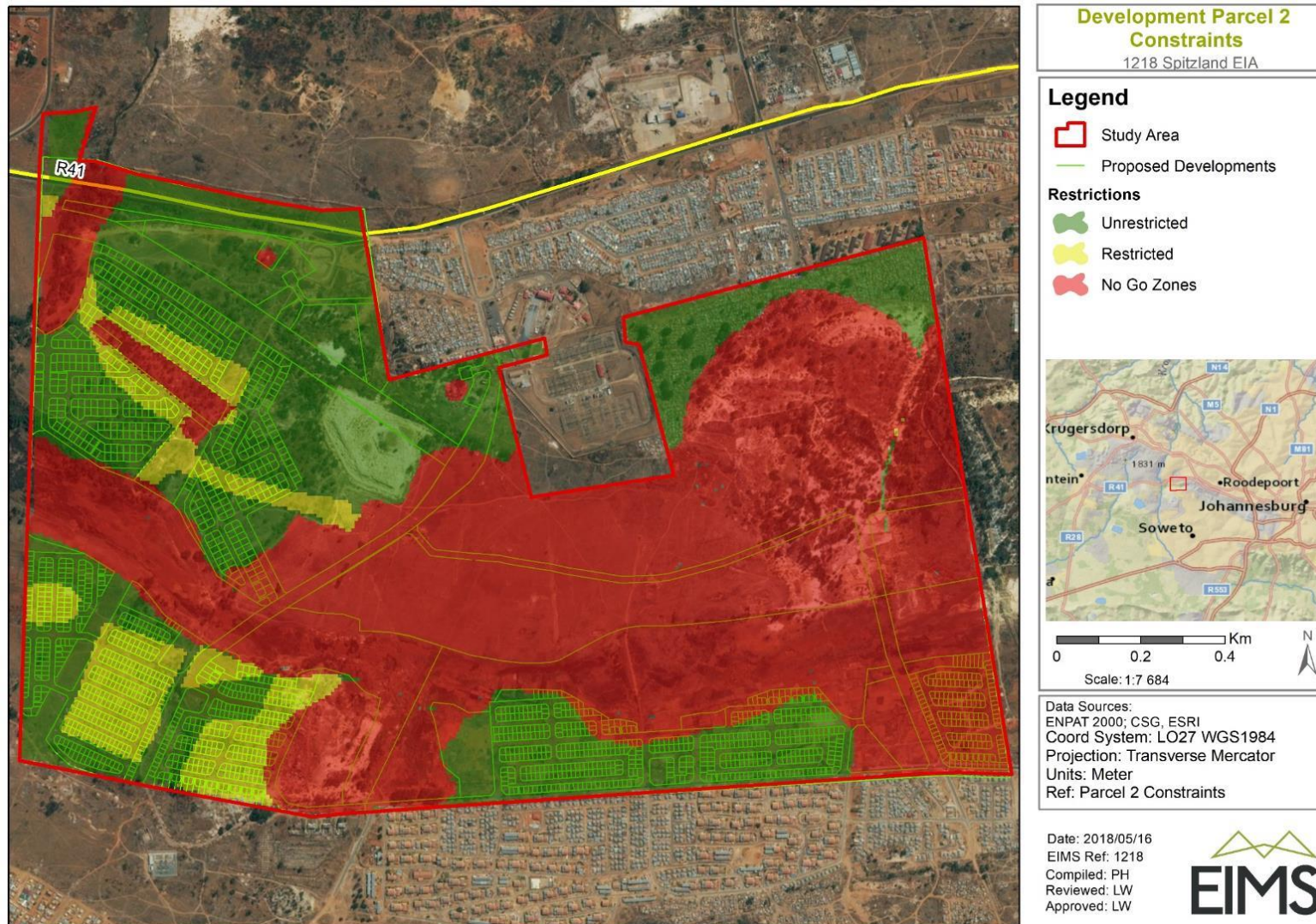


Figure 50: Consolidated constraint map for Development Parcel 2

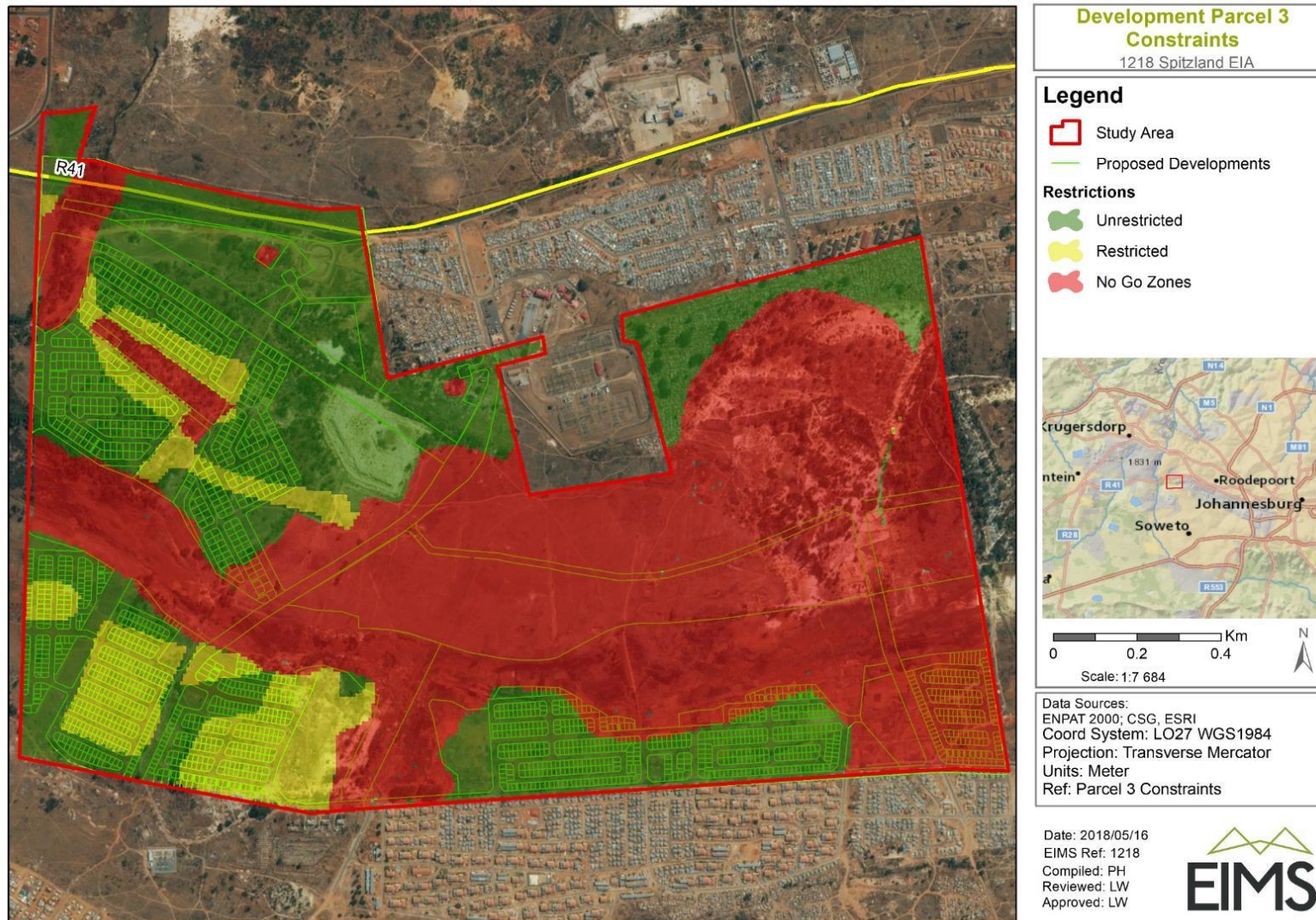


Figure 51: Consolidated constraint map for Development Parcel 3

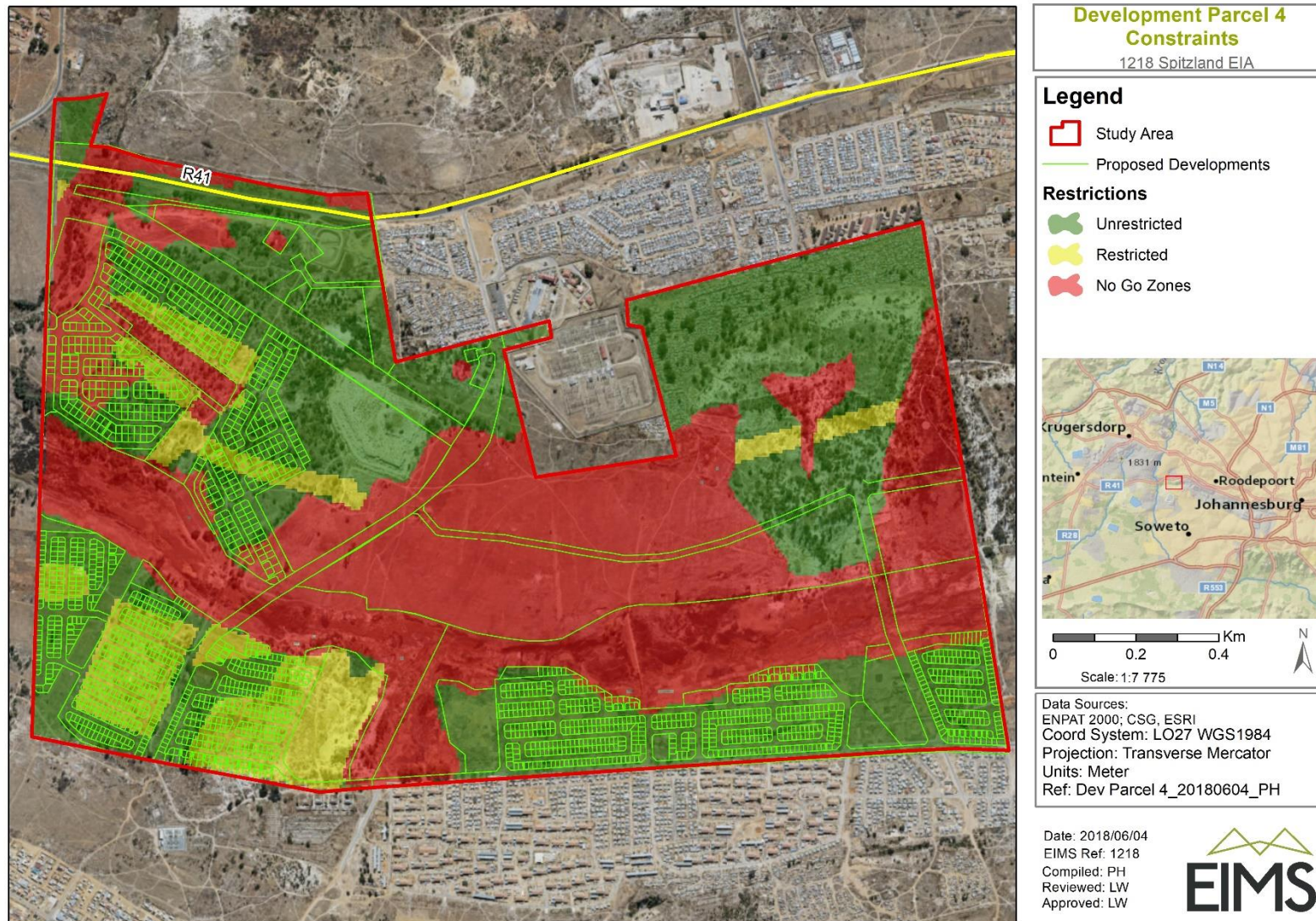


Figure 52: Consolidated constraint map for Development Parcel 4

It is the opinion of the EAP that the proposed development project be authorized as long as the proposed EIA mitigation measures are adhered to and all identified no-go constraint zones are avoided as per the consolidated sensitivity maps in Figure 49 - Figure 52. It is suggested that conditional approval for the phased development parcels be authorized in line with the constraint zones identified in Figure 49 - Figure 51.

## 6.2.5 NO-GO ALTERNATIVE

The No-Go alternative assumes continuation of the current land use of the proposed development site, implying the absence of any development. The No-Go alternative is used as a baseline to determine the significance of impacts associated with the proposed development. The absence of the proposed development will result in positive and negative impact. An impact comparison (development versus no development) is presented in Table 18 below. The impact comparison includes discussions on air quality, biodiversity, water quality, resource use and socio-economic aspects.

**Table 18: No-Go alternative impact comparison**

Impact categories and resultant impacts associated with the development project	Impact categories and resultant impact associated with the no development alternative
<b>Air quality and human health</b>	
Air quality impacts resulting from fallout dust and PM <sub>10</sub> concentrations from mine residues may impact on human health and affect new residents. The impact can be mitigated through the establishment of a suitable buffer and removal/rehabilitation of the mine residue deposits.	Air quality impacts resulting from fallout dust and PM <sub>10</sub> concentrations from mine residues may impact on human health affecting existing residents in the informal settlement. The impact can be mitigated through the establishment of a buffer around all mine residue deposits.
Cumulative impacts affecting air quality may result from vehicle entrained dust emissions and engine emissions. These impacts may occur during both the construction phase and as a result of increased traffic flows resulting from higher trip generation (during the operational phase when the township is occupied).	
<b>Natural resources (high potential agricultural land)</b>	
The loss of agricultural soils and the displacement of person currently cultivating the land	The continuation of agricultural activities would require landowner consent. Land acquisition and /or leasing may have financial impacts on persons currently cultivating the land.
<b>Biodiversity and ecosystem functioning</b>	
The proposed development project will result in the loss of a portion of the areas identified to be critical biodiversity areas as well as ecological support areas. The	It may be assumed that informal township area will extent further onto the property will result in the loss of a portion of the areas identified to be critical biodiversity areas as well as ecological support

Impact categories and resultant impacts associated with the development project	Impact categories and resultant impact associated with the no development alternative
<b>wetland, ridge and the majority of the area identified to have a high biodiversity value will be incorporated in the township's open space area and is likely to be maintained.</b>	areas. The wetland, ridge and the majority of the area identified to have a high biodiversity value may be affected in the absence of a formal township layout plan.
<b>Surface water quality</b>	
<b>Minimal surface water impact is associated with the proposed development project. Additional stormwater runoff will be generated through the establishment of impermeable surfaces and may impact on watercourses. During the construction phase of the project, soil erosion, the storage of dangerous goods (including any accidental spills) and temporary ablution facilities may impact on surface water features if not managed appropriately.</b>	Inadequate management of sewage and waste within the informal settlement may result in surface water impacts. The potential expansion of the informal settlements may exacerbate this negative impact. Expanding development in the general region may result in an increased stormwater flow over the property resulting in soil erosion affecting surface water quality.
<b>Resource use</b>	
<b>The proposed development project will result in an increased demand for municipal service provision</b>	Service provision for the existing informal settlement will be required in future. The demand is likely to be less but may be equal to that of the proposed development project depending on the future extent of the informal settlement.
<b>Socio-economic</b>	
<p><b>The development project is aimed at addressing a specific housing need within the local and regional area. The development will result in limited job opportunities during the construction phase and may positively impact on local business during the operational phase.</b></p> <p><b>The displacement of persons living in the informal settlement within the boundaries of the proposed development area is regarded as a significant negative impact. Relocation alternatives must be discussed with local municipality and residents.</b></p>	The informal settlement currently located within the boundary of the property is likely to expand. Formal services will have to be provided by the local municipality to ensure adequate living conditions.

Based on the above impact comparison discussion, it may be concluded that the proposed development project is desirable in the event that adequate agreements and mitigation with regard to the following can be implemented:

- Environmentally sensitive areas must be incorporated in township open space;
- Agreement must be reached with the local municipality and affected persons regarding the relocation of persons resident in the informal settlement within the boundaries of the property;
- A resolution must be reached with regard to the method of offset as it relates to the economic displacement of persons currently cultivating agricultural land within the boundaries of the property;

- Adequate management measures must be included in the Environmental Management Programme for all impacts associated with the construction and operational phases of the proposed development project.

## 7 ENVIRONMENTAL IMPACT ASSESSMENT

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The key environmental issues listed in this section have been determined by way of desktop analyses, site visits, specialist studies, expertise conducting environmental assessments on mining impacted land and from inputs from interested and affected parties.

This the amended report contains the following revisions as stipulated by GDARD in follow up correspondence received on 02 September 2016 as well as the way forward presented in the January 2018 meeting:

- Inclusion of a geotechnical report confirming that the majority of the area is situated in the “Deep Zone “ and is appropriate for development (Appendix C);
- Proof of submission and comment from the Council of Geosciences on the appropriateness of the report and its findings (Appendix C);
- Confirmation of the method and proposed timeline for the removal of the two smaller mine residue facilities by Upward Spiral (Appendix S);
- Revegetation plan for the larger mine residue facility located in the north eastern section of the site;
- Updated Air Quality Study utilising AEROMOD air dispersion modelling to predict both fallout dust and PM<sub>10</sub> counts which has been used to confirm that the previously stipulated 100 m buffer is sufficient;
- National Nuclear Regulator Clearance Certificate confirming that the land is below radiological thresholds and suitable for development (Appendix U); and
- A revised layout plan on a combined sensitivity map of the project area (Appendix X).
- Updated radiological assessment based on updates to the Air Quality Study dispersion modelling (Appendix D2).
- Updated EMPR in line with the methodology and impacts described in the EIA report.
- Updated EIA report with updated qualitative comparative assessment of the alternatives, updated sensitivity map with latest constraints areas added and updated significance rating section.

### 7.1 PRESSURES EXTENDING TO THE PROPOSED DEVELOPMENT

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Potential environmental issues **exerting pressures onto proposed development** were investigated and these issues have been addressed through the EIA. These investigations included the following:

- The potential health risk and safety risk posed to development by mine residue (tailings) facilities and old mining areas (including unclosed mine shafts) currently situated on the site;
- The potential occurrence of radioactivity and pollutants of concern across the site due to activities relating to gold mining; and
- The potential future mining activities by holders of mining rights on the property (Mintails and West Wits Mining).

## 7.2 PRESSURES RESULTING FROM THE PROPOSED DEVELOPMENT

Issues identified in this report deemed to be potentially significant **resulting as a consequence of the proposed development** and where further input or investigation is required include the following:

- The potential impact on flora and fauna and the remaining natural areas of the site deemed sensitive in terms of the C-Plan;
- The potential impact on the ridge located on the site;
- The potential impact on the wetland systems;
- The potential impact of increased stormwater flows into the watercourses and wetlands;
- The potential loss of viable agricultural areas of the site used for subsistence agriculture;
- The potential impact on residents of Dunusa informal settlement (Matholesville X4);
- Traffic impacts associated with construction activities as well as an influx in residents;
- The potential impact on bulk services and pressures placed on urban infrastructure; and
- The potential impact on servitudes registered over the site.

## 7.3 IMPACT IDENTIFICATION

Through the assessment of the receiving environment, consultation with interested and affected parties, consultation with specialist consultants and based on the experience of the Environmental Assessment Practitioner; the environmental and social impact expected from the proposed development project has been identified. The impacts are listed in Table 19 per project phase and project activity as follows:

**Table 19: Presentation of impacts identified**

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted
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<p><b>Planning, construction and operational phases. The decommissioning phase of the township is not foreseen and therefore not addressed as part of the environment impact assessment</b></p>	<p>A description of the activity that will be undertaken as part of the project phase.</p>	<p>A description of the anticipated impacts associated with the project activities</p>	<p>The status of the impacts – negative or positive.</p>	<p>The identification of the environmental aspect that will be impacted on</p>
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**Table 20: Impacts associated with the development phases per activity**

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted
<b>Planning – Township layout and service planning</b>				
Residential, commercial, business and institutional stands, road layout and associated services	Layout planning	Safety risks associated with undermining affecting the south west corner of the proposed development site	N	Public Health and Safety
		Radiological risk associated historic mining land-use	N	Public Health and Safety
		Gaseous radon emissions, contaminated dust emissions, gamma radiation exposure, water pollution and dam failure risks posed by the existing mine residue deposits	N	Public Health and Safety
		Loss of high potential agricultural land located to the south on the proposed development area	N	Natural resource (high potential agricultural land)
		Economic displacement of persons currently undertaking informal subsistence farming activities	N	Socio-economic
		The destruction of watercourses, wetlands, wetland habitats affecting ecological functioning	N	Biodiversity and ecosystem functioning
		Increased storm water flow affecting watercourses resulting in erosion and the alteration of ecosystems	N	Biodiversity, ecosystem functioning and surface water quality
		Loss of biodiversity, destruction and alteration of floral communities affecting faunal habitats and ecosystem functioning	N	Biodiversity and ecosystem functioning
		Loss of orange listed species ( <i>Hypoxis hemerocallidea</i> )	N	Biodiversity and ecosystem functioning
		The introduction of alien invasives and non-endemic plant species as a result of landscaping activities resulting in the alteration of ecosystem functioning and the possible transformation of habitats associated with watercourses and ridge	N	Biodiversity and ecosystem functioning
		Land development and occupation providing incentives for the eradication of alien invasives and weeds currently affecting watercourses and natural areas	N	Biodiversity and ecosystem functioning

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted
		Ambient dust exceeding the areas to the north west of the site will exceed the 2015 standard of 75µg/m³ impacting on human health	N	Air quality and human health
		Dust emissions from existing mine residue deposits affecting human health	N	Air quality and human health
		Relocation and re-settlement of informal settlement located to the north east on a portion of the proposed development site	N	Socio-economic
Construction - Construction of temporary office building and associated facilities including temporary worker ablution facilities, worker cooking and eating facilities, fuel and chemical storage facilities, vehicle maintenance areas and material storage and handling areas.				
Site establishment	Site access via access road through Sol Plaatjes Township area and site access roads	Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	N	Traffic and public safety
		Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	N	Air quality (PM, nuisance dust and vehicle emissions) and human health
		Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	N	Biodiversity and ecosystem functioning
		Increased ambient noise levels form construction and delivery vehicle movement resulting in nuisance noise impacts	N	Ambient noise levels
	Removal of vegetation for erection of temporary office building	Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	N	Biodiversity and ecosystem functioning
		Increased risk of soil erosion and windblown dust emissions resulting from the removal of vegetation cover impacting of air quality and total suspended solids in surface water	N	Air Quality (PM & nuisance dust) and surface water quality
	Earthworks to create platform for the erection of the temporary office building	Increased dust emissions resulting from earthmoving activities affecting human health and resulting in nuisance dust fallout	N	Air Quality (PM & nuisance dust)
	Erection of temporary office building and associated facilities	Visual impacts caused by the construction camp and site activities	N	Visual disturbance

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted
<b>Construction – Construction activities</b>				
Construction of roads and services installation	Daily contractor's access via access road through Sol Plaatjes Township area and site access roads	Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	N	Traffic and public safety
		Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	N	Air quality (PM, nuisance dust and vehicle emissions) and human health
		Destruction and / disturbance of identified sensitive vegetation and faunal habitats resulting from land clearing activities	N	Biodiversity and ecosystem functioning
		Increased ambient noise levels resulting in nuisance noise impacts	N	Ambient noise levels
	Presence and movement of contractors and construction workers on site	Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	N	Biodiversity and ecosystem functioning
		Influx of casual jobseekers resulting in increased incidents of crime	N	Socio-economic
		Opportunistic poaching and harvesting of plant species	N	Biodiversity and ecosystem functioning
		Increased risk of fire resulting from construction activities and open fires for cooking and heating	N	Biodiversity, ecosystem functioning and public safety
		Surface water pollution resulting from temporary on site ablution facilities	N	Surface water quality, ecosystem functioning and human health
		Soil and water pollution resulting from general waste generated (refer waste management section below)	N	Surface water quality, ecosystem functioning and human health
	Earthworks and trench excavation (services installation)	Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	N	Air quality (PM, nuisance dust and vehicle emissions) and human health
		Dust emissions impacting of human health and resulting in nuisance dust outfall	N	Air Quality (PM & nuisance dust)
		Increased risk of soil erosion and windblown dust emissions resulting from the removal of vegetation cover impacting of air quality and total suspended solids in surface water	N	Air Quality (PM & nuisance dust) and surface water quality

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted
		Increased ambient noise levels resulting in nuisance noise impacts	N	Ambient noise levels
	Road kerb installation and road surfacing (asphalt)	Soil and water pollution resulting from concrete mixing and the use of asphalt as road surfacing material	N	Surface water quality, ecosystem functioning and human health
	Construction materials transport, receipt and storage	Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	N	Air quality (PM, nuisance dust and vehicle emissions) and human health
		Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	N	Traffic and public safety
		Destruction and / disturbance of identified sensitive vegetation, faunal habitats and wetland areas resulting from land clearing activities to establish storage areas	N	Biodiversity and ecosystem functioning
	Storage of dangerous goods (diesel fuel, oils and lubricants)	Soil and water pollution resulting from the on-site storage of dangerous goods and chemicals affecting water quality and ecosystems	N	Surface water quality, ecosystem functioning and human health
	Construction vehicle maintenance and repair	Soil and water pollution resulting from the on-site vehicle maintenance and repairs affecting water quality and ecosystems	N	Surface water quality, ecosystem functioning and human health
	Waste management	Soil and water pollution resulting from the generation of general and hazardous waste affecting water quality and ecosystems	N	Surface water quality, ecosystem functioning and human health
	Employment opportunities	The employment of local labour and the use of local service providers affecting socio-economic conditions	P	Socio-economic
<b>Operational – Mixed use township</b>				
Occupation of mixed use township	Occupation	Dust emissions from mine residue deposits affecting human health	N	Air Quality (PM & nuisance dust) and human health
		Increased traffic flows as a result of higher trip generation resulting from mixed uses	N	Traffic
		Increased ambient noise levels resulting from mixed uses and increased traffic flows	N	Ambient noise levels

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted
		Increased municipal services demand (including electricity and water)	N	Resource use
		Provision of mixed use township to address housing demand	N	Socio-economic
		Employment opportunities	P	Socio-economic
		Increased use of local service providers	P	Socio-economic
		Development and occupation resulting in a reduction of incidents of crime related to uncontrolled open land	P	Socio-economic

### 7.3.1 POTENTIAL CUMULATIVE IMPACTS

The identified cumulative impacts are included in Table 21 below:

**Table 21: Identified cumulative impacts**

Aspect	Impacts	Description
<b>Climate</b>	Release of greenhouse gas emissions.	<ol style="list-style-type: none"> <li>1. The release of greenhouse gasses and other contaminants to the atmosphere is expected as a result of land based vehicle activity.; and</li> <li>2. The clearing of vegetation negatively affects carbon sequestration efficiency and increase emissions resulting from decomposition. These impacts are regarded as insignificant in terms of contribution, however, the risks are recognised as a cumulative impact</li> </ol>
<b>Soils</b>	Loss of natural resource (topsoil)	<ol style="list-style-type: none"> <li>1. The loss of topsoil as a natural resource, as a result of soil contamination and erosion negatively affecting land capability.</li> </ol>
<b>Hydrology</b>	Surface water pollution	<ol style="list-style-type: none"> <li>1. Surface water quality impacts may extend beyond the boundary of the site if not managed appropriately.</li> </ol>
<b>Geohydrology</b>	Groundwater pollution	<ol style="list-style-type: none"> <li>1. Groundwater contamination, if it occurs, is regarded as a cumulative impact. Impacts may result from incidents of surface water.</li> </ol>
<b>Biodiversity (flora, fauna and avifauna)</b>	Loss of biodiversity and disruption of existing ecosystem functioning	<ol style="list-style-type: none"> <li>1. The cumulative impacts relate to land transformation resulting in the loss of habitat.</li> </ol>
<b>Visual</b>	Visual disturbance and change of landscape character.	<ol style="list-style-type: none"> <li>1. The cumulative impacts relate to visual disturbance is regarded to impact the regional "sense of place".</li> </ol>
<b>Traffic</b>	Increased traffic	<ol style="list-style-type: none"> <li>1. The increase in traffic flow may have an impact on local, regional and national roads in the area.</li> </ol>

## 7.4 IMPACT SIGNIFICANCE

The impacts identified are rated in terms of the criteria indicated in Table 22 below:

**Table 22: Impact rating methodology**

<b>Extent</b>	
High	Widespread, Far beyond site boundary, Regional / national / international scale.
Medium	Beyond site boundary, Local area.
Low	Within site boundary.
<b>Duration</b>	
High (long term)	Permanent, Beyond decommissioning, Long term (more than 15 years).
Medium (medium term)	Reversible over time, Lifespan of the project, Medium term (5-15 years).
Low (short term)	Quickly reversible, Less than the project lifespan, Short term (0-5 years).
<b>Probability Rating</b>	
A High likelihood	Greater than 50:50 chance of occurrence ( $P > 0.5$ )
B Low likelihood	Less than or equal to a 50:50 chance, but at least a 1:20 chance or occurrence ( $P \leq 0.5$ , but $> 1:20$ )
C Negligible	Less than 1:20 chance of occurrence ( $P < 0.05$ )
<b>Impact Magnitude and Significance Rating</b>	
High	Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. In the case of beneficial impacts, the impact is of a substantial order within the bounds of impacts that could occur.
Medium	Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly possible. Social cultural and economic activities of communities are changed but can be continued (albeit in a different form). Modification of the project design or alternative action may be required. In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.
Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural, and economic activities of communities can continue unchanged. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming.
No Impact	Zero Impact

**Table 23: Impact assessment (unmitigated)**

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted	Extent	Duration	Probability	Significance
<b>Planning – Township layout and service planning</b>								
Residential, commercial, business and institutional stands, road layout and associated services	Layout planning	Safety risks associated with undermining affecting the south west corner of the proposed development site	N	Public Health and Safety	M	H	C	M
		Radiological risk associated historic mining land-use	N	Public Health and Safety	M	L	B	M
		Gaseous radon emissions, contaminated dust emissions, gamma radiation exposure, water pollution and dam failure risks posed by the existing mine residue deposits	N	Public Health and Safety	M	L	B	M
		Loss of high potential agricultural land located to the south on the proposed development area	N	Natural resource (high potential agricultural land)	L	M	A	M
		Economic displacement of persons currently undertaking informal subsistence farming activities	N	Socio-economic	M	L	A	M
		The destruction of watercourses, wetlands, wetland habitats affecting ecological functioning	N	Biodiversity and ecosystem functioning	M	L	A	M
		Increased storm water flow affecting watercourses resulting in erosion and the alteration of ecosystems	N	Biodiversity, ecosystem functioning and surface water quality	M	L	A	M
		Loss of biodiversity, destruction and alteration of floral communities affecting faunal	N	Biodiversity and ecosystem functioning	M	L	B	M

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted	Extent	Duration	Probability	Significance
		habitats and ecosystem functioning						
		Loss of orange listed species ( <i>Hypoxis hemerocallidea</i> )	N	Biodiversity and ecosystem functioning	M	L	B	M
		The introduction of alien invasives and non-endemic plant species as a result of landscaping activities resulting in the alteration of ecosystem functioning and the possible transformation of habitats associated with watercourses and ridge	N	Biodiversity and ecosystem functioning	M	L	B	M
		Land development and occupation providing incentives for the eradication of alien invasives and weeds currently affecting watercourses and natural areas	N	Biodiversity and ecosystem functioning	L	M	A	M
		Ambient dust exceeding the areas to the north west of the site will exceed the 2015 standard of 75µg/m <sup>3</sup> impacting on human health	N	Air quality and human health	M	L	A	M
		Dust emissions from existing mine residue deposits affecting human health	N	Air quality and human health	M	L	A	M
		Relocation and re-settlement of informal settlement located to the north east on a portion of the proposed development site	N	Socio-economic	M	L	A	M
<b>Construction - Construction of temporary office building and associated facilities including temporary worker ablution facilities, worker cooking and eating facilities, fuel and chemical storage facilities, vehicle maintenance areas and material storage and handling areas.</b>								

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted	Extent	Duration	Probability	Significance
Site establishment	Site access via access through road through Sol Plaatjes Township area and site access roads	Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	N	Traffic and public safety	M	L	B	M
		Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	N	Air quality (PM, nuisance dust and vehicle emissions) and human health	M	L	B	M
		Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	N	Biodiversity and ecosystem functioning	L	M	A	M
		Increased ambient noise levels from construction and delivery vehicle movement resulting in nuisance noise impacts	N	Ambient noise levels	M	L	C	L
	Removal of vegetation for erection of temporary office building	Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	N	Biodiversity and ecosystem functioning	M	H	A	H
		Increased risk of soil erosion and windblown dust emissions resulting from the removal of vegetation cover impacting of air quality and total suspended solids in surface water	N	Air Quality (PM & nuisance dust) and surface water quality	M	M	A	M
	Earthworks to create platform for the erection of the	Increased dust emissions resulting from earthmoving activities affecting human health and resulting in nuisance dust fallout	N	Air Quality (PM & nuisance dust)	M	L	A	M

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted	Extent	Duration	Probability	Significance
	temporary office building							
	Erection of temporary office building and associated facilities	Visual impacts caused by the construction camp and site activities	N	Visual disturbance	M	H	C	M
<b>Construction – Construction activities</b>								
Construction of roads and services installation	Daily contractor's access via access road through Sol Plaatjes Township area and site access roads	Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	N	Traffic and public safety	M	L	B	M
		Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	N	Air quality (PM, nuisance dust and vehicle emissions) and human health	M	L	B	M
		Destruction and / disturbance of identified sensitive vegetation and faunal habitats resulting from land clearing activities	N	Biodiversity and ecosystem functioning	L	M	A	M
		Increased ambient noise levels resulting in nuisance noise impacts	N	Ambient noise levels	M	L	C	L
	Presence and movement of contractors	Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	N	Biodiversity and ecosystem functioning	L	M	A	M

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted	Extent	Duration	Probability	Significance
	and construction workers on site	Influx of casual jobseekers resulting in increased incidents of crime	N	Socio-economic	M	L	C	L
		Opportunistic poaching and harvesting of plant species	N	Biodiversity and ecosystem functioning	L	L	C	L
		Increased risk of fire resulting from construction activities and open fires for cooking and heating	N	Biodiversity, ecosystem functioning and public safety	H	H	B	H
		Surface water pollution resulting from temporary on site ablution facilities	N	Surface water quality, ecosystem functioning and human health	M	L	C	L
		Soil and water pollution resulting from general waste generated (refer waste management section below)	N	Surface water quality, ecosystem functioning and human health	M	L	B	M
	Earthworks and trench excavation (services installation)	Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	N	Air quality (PM, nuisance dust and vehicle emissions) and human health	M	L	B	M
		Dust emissions impacting of human health and resulting in nuisance dust outfall	N	Air Quality (PM & nuisance dust)	M	L	A	M
		Increased risk of soil erosion and windblown dust emissions resulting from the removal of vegetation cover impacting of air quality and total suspended solids in surface water	N	Air Quality (PM & nuisance dust) and surface water quality	M	L	B	M

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted	Extent	Duration	Probability	Significance
		Increased ambient noise levels resulting in nuisance noise impacts	N	Ambient noise levels	M	L	C	L
	Road kerb installation and road surfacing (asphalt)	Soil and water pollution resulting from concrete mixing and the use of asphalt as road surfacing material	N	Surface water quality, ecosystem functioning and human health	M	L	A	M
	Construction materials transport, receipt and storage	Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	N	Air quality (PM, nuisance dust and vehicle emissions) and human health	M	L	B	M
		Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	N	Traffic and public safety	M	L	B	M
		Destruction and / disturbance of identified sensitive vegetation, faunal habitats and wetland areas resulting from land clearing activities to establish storage areas	N	Biodiversity and ecosystem functioning	L	M	A	M
	Storage of dangerous goods (diesel fuel, oils and lubricants)	Soil and water pollution resulting from the on-site storage of dangerous goods and chemicals affecting water quality and ecosystems	N	Surface water quality, ecosystem functioning and human health	M	L	A	M
	Construction vehicle maintenance and repair	Soil and water pollution resulting from the on-site vehicle maintenance and repairs affecting water quality and ecosystems	N	Surface water quality, ecosystem functioning and human health	M	L	A	M

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted	Extent	Duration	Probability	Significance
	Waste management	Soil and water pollution resulting from the generation of general and hazardous waste affecting water quality and ecosystems	N	Surface water quality, ecosystem functioning and human health	M	L	A	M
	Employment opportunities	The employment of local labour and the use of local service providers affecting socio-economic conditions	P	Socio-economic	M	L	B	M
<b>Operational – Mixed use township</b>								
Occupation of mixed use township	Occupation	PM10, PM2.5 and dustfall impacts due to TSFs 1, 2 and 3 – Development Parcel (no mitigation)	N	Air Quality (PM & nuisance dust) and human health	M	M	C	M
		PM10, PM2.5 and dustfall impacts due to TSFs 1, 2 and 3 – Development Parcel 2 (no mitigation)	N	Air Quality (PM & nuisance dust) and human health	M	M	C	M
		PM10, PM2.5 and dustfall impacts due to TSFs 1, 2 and 3 – Development Parcel 3 (no mitigation)	N	Air Quality (PM & nuisance dust) and human health	L	L	L	L
		PM10, PM2.5 and dustfall impacts due to all 6 TSFs – Development Parcel 1, 2 and 3 (no mitigation)	N	Air Quality (PM & nuisance dust) and human health	M	M	C	M
		PM10, PM2.5 and dustfall impacts due to all 6 TSFs – Development Parcel 4 (with 75% vegetation cover mitigation on TSF3 and TSF4)	N	Air Quality (PM & nuisance dust) and human health	L	M	L	L
		Increased traffic flows as a result of higher trip generation resulting from mixed uses	N	Traffic	M	H	C	M

Phase	Activities	Potential Impacts	Status	Environmental Aspect Impacted	Extent	Duration	Probability	Significance
		Increased ambient noise levels resulting from mixed uses and increased traffic flows	N	Ambient noise levels	L	H	C	M
		Increased municipal services demand (including electricity and water)	N	Resource use	M	H	A	H
		Provision of mixed use township to address housing demand	P	Socio-economic	M	H	A	H
		Employment opportunities	P	Socio-economic	M	H	C	M
		Increased use of local service providers	P	Socio-economic	M	H	C	M
		Development and occupation resulting in a reduction of incidents of crime related to uncontrolled open land	P	Socio-economic	M	H	C	M

## 7.5 CUMULATIVE IMPACT RATING

**Table 24: Cumulative impact ratings**

Aspect	Impacts	Description	Status	Duration	Probability	Significance before mitigation
<b>Climate</b>	Release of greenhouse gas emissions.	1. The release of greenhouse gasses and other contaminants to the atmosphere is expected as a result of land based vehicle activity.; and	N	L	C	L
		1. The clearing of vegetation negatively affects carbon sequestration efficiency and increase emissions resulting from decomposition. These impacts are regarded as insignificant in terms of contribution, however, the risks are recognised as a cumulative impact	N	L	C	L
<b>Soils</b>	Loss of natural resource (topsoil)	2. The loss of topsoil as a natural resource, as a result of soil contamination and erosion negatively affecting land capability.	N	L	C	L
<b>Hydrology</b>	Surface water pollution	1. Surface water quality impacts may extend beyond the boundary of the site if not managed appropriately.	N	L	C	L

<b>Geohydrology</b>	Groundwater pollution	1. Groundwater contamination, if it occurs, is regarded as a cumulative impact. Impacts may result from incidents of surface water.	N	L	C	L
<b>Biodiversity (flora, fauna and avifauna)</b>	Loss of biodiversity and disruption of existing ecosystem functioning	1. The cumulative impacts relate to land transformation resulting in the loss of habitat.	N	L	C	L
<b>Visual</b>	Visual disturbance and change of landscape character.	1. The cumulative impacts relate to visual disturbance is regarded to impact the regional "sense of place".	N	L	C	L
<b>Traffic</b>	Increased traffic	1. The increase in traffic flow may have an impact on local, regional and national roads in the area.	N	L	C	L

## 7.6 IMPACT MITIGATION

Table 25 below outlines the proposed mitigation measures for the impacts identified and assessed. The mitigation measures are incorporated in the Environmental Management Programme.

**Table 25: Impacts and proposed mitigation measures**

Phase	Activities	Potential Impacts	Proposed Mitigation Measures
<b>Planning – Township layout and service planning</b>			
Residential, commercial, business and institutional stands, road layout and associated services	Layout planning	Gaseous radon emissions, contaminated dust emissions, gamma radiation exposure, water pollution and dam failure risks posed by the existing mine residue deposits	<p>Risks and impact associated with the mine residue deposits are regulated by the Mineral and Petroleum Resources Development Act 28 of 2002 and the Regulations on Water Use for Mining and Related Activities, promulgated in terms of the National Water Act 36 of 1998. All legal requirements as it relates to the management of mine residue deposits must be complied with by the owner of the deposits (as well as any other persons who may be regarded to have a responsibility for the management of such deposits).</p> <p>Restoration of the catchment dam on the north-eastern slimes dam in two places with the installation of a storms water decanting pipe allowing for a freeboard of one and a half meters.</p> <p>Storm water spill over to be deposited into the paddock walls on the north-eastern slimes dam for added freeboard.</p> <p>Removal or stripping of areas immediately adjacent to and down gradient of the slimes dams situated on site where sensitive developments will occur (i.e. in gardens or recreational areas)</p> <p>Amelioration and diverse and sustainable vegetation cover required on the slimes dam to prevent possible dust emissions. A suitably qualified professional will be appointed to develop a rehabilitation plan and oversee the implementation thereof.</p> <p>Sampling of surface water and groundwater.</p>
		Loss of high potential agricultural land located to the south on the proposed development area	No mitigation proposed.
		Economic displacement of persons currently undertaking informal subsistence farming activities	<p>Informal subsistence farming is being undertaken in the absence of landowner consent. The developer acquired the property with a view to develop the land for residential and mixed use purposes.</p> <p>Based on the comments received (from the Sol Plaatjes Youth and the Mandela Crisis Centre), the developed / proponent agreed to consider the offset of perceived economic displacement related to the existing affected subsistence farmers through a financial contribution to the Mandela Crisis Centre. A valuation of the economic displacement has not been undertaken as part of the environmental impact assessment process and further negotiations will be undertaken once environmental authorisation has been granted.</p>
		The destruction of watercourses, wetlands, wetland habitats affecting ecological functioning	A 32 meter buffer zone around all identified watercourses and wetland will be excluded from the development area and designated as open space. If required, the watercourse buffer and / or wetland area will be fenced to minimise further impact.

Phase	Activities	Potential Impacts	Proposed Mitigation Measures
			In the event that these areas are impacted on by construction and / or associated activities, the persons responsible for such impact will be responsible for the rehabilitation of the disturbance. A suitably qualified professional will be appointed to develop a rehabilitation plan and oversee the implementation thereof.
		Increased storm water flow affecting watercourses resulting in erosion and the alteration of ecosystems	Stormwater management will be implemented in accordance with the storm water management plan (WSP Group Africa (Pty) Ltd, Storm Water Management Plan Report, October 2013).
		Loss of biodiversity, destruction and alteration of floral communities affecting faunal habitats and ecosystem functioning	Highly sensitive floristic habitat as identified through the Biodiversity Assessments (Bathusi Environmental Consulting, December 2012) will be excluded from the development footprint and designated as open space (Figure 42).
		Loss of orange listed species ( <i>Hypoxis hemerocallidea</i> )	
		The introduction of alien invasives and non-endemic plant species as a result of landscaping activities resulting in the alteration of ecosystem functioning and the possible transformation of habitats associated with watercourses and ridge	Restriction regarding landscaping activities within the 32m buffer of watercourses will be imposed through conditions imposed. These open spaces shall be maintained in its natural state and / or where appropriate be rehabilitated. Any rehabilitation plan will be developed by a suitably qualified professional and in consultation with a biodiversity specialist.
		Land development and occupation providing incentives for the eradication of alien invasives and weeds currently affecting watercourses and natural areas	Refer above
		Ambient dust will exceed the 2015 standard of 75µg/m <sup>3</sup> impacting on human health in certain areas of the site.	The north west section of the property which will be affected by dust outfall exceeding the regulatory limit will be excluded from the development footprint. The no-go constraint areas identified for each development scenario must be avoided (Figure 45 - Figure 48)
		Dust emissions from existing mine residue deposits affecting human health	The two smaller residue deposits will be removed prior to occupation. The remaining larger residue deposit will be re-vegetated or removed. Dust monitoring will be undertaken until such time as it has been confirmed that dust emission from the mine residue deposits does not result in the exceedance of the regulatory limits. Dust monitoring will be undertaken in the event that any of the mine residue deposits are re-mined, moved and or altered.

Phase	Activities	Potential Impacts	Proposed Mitigation Measures
			No-go constraint areas identified for each development scenario must be avoided (Figure 45 - Figure 48Figure 47)
		Relocation and re-settlement of informal settlement located to the north east on a portion of the proposed development site	The developer will agree with the City of Johannesburg Metropolitan Municipality on the process of community relocation.
<b>Construction - Construction of temporary office building and associated facilities including temporary worker ablution facilities, worker cooking and eating facilities, fuel and chemical storage facilities, vehicle maintenance areas and material storage and handling areas.</b>			
Site establishment	Site access via access through road through Sol Plaatjes Township area and site access roads	Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	The contractor will ensure that all own and / or contracted drivers have a valid driver's licence. All drivers will be trained in road use principles as it relates to site access points. All vehicles will be roadworthy and inspected on a regular basis. Limit construction vehicle movement on public roads to avoid peak traffic hours (7h00 – 8h00 and 16h00 - 18h00)
		Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	Vehicle speeds on unpaved roads will be restricted to a speed of 40km / hr All vehicles will be roadworthy and in a good condition
		Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	Biodiversity areas identified / allocated for conservation must be demarcated and, if required, temporarily or permanently fenced. Site clearing activities will be kept to a minimum in all instances. Any area where land clearing will be undertaken for the constructions of roads and services will be surveyed by an appropriately qualified biodiversity specialist in order to identify any red / orange data species. All identified species will be marked, disturbance to such sites will be avoided, and where avoidance is not possible, red and orange data species will be relocated to a suitable site. The developer and / or contractor shall inform the South African National Biodiversity Institute of the identification of such plants species, the proposed procedure for avoidance and / or relocation and will obtain any relevant approvals for the planned activities.
		Increased ambient noise levels from construction and delivery vehicle movement resulting in nuisance noise impacts	All construction and delivery vehicles shall be in good working order and inspected for regular maintenance. Vehicles shall be fitted with silencers.
	Removal of vegetation for erection of	Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	Clearing of vegetation shall be limited to the footprint of the office building and supporting areas (i.e. parking and access areas).

Phase	Activities	Potential Impacts	Proposed Mitigation Measures
	temporary office building		<p>Areas that are to be protected (and which will be included in the township as public open space) shall be clearly indicated on all construction drawings.</p> <p>No construction activities will be undertaken within these demarcated protected areas. Additionally, no persons (contractors, their staff and all other permanent and temporary workers) will be allowed to undertake any other activities within the areas earmarked for protection.</p> <p>The contractor, his / her staff and all other permanent and temporary workers shall be informed of this restriction.</p> <p>If deemed necessary, the wetland and natural areas earmarked for protection shall be fenced to prevent any disturbance.</p>
		Increased risk of soil erosion and windblown dust emissions resulting from the removal of vegetation cover impacting of air quality and total suspended solids in surface water	<p>The removal of vegetation shall be kept to a minimum. Only areas necessary to be cleared for the effective continuation of construction work shall be cleared of vegetation.</p> <p>If required, wet and / or chemical dust suppression shall be undertaken based on the extent of windblown dust emissions.</p> <p>Any instances of soil erosion will be corrected through soil shaping (the construction of berms) and if required mechanical erosion control measures will be implemented.</p> <p>Any disturbed areas will be re-vegetation as soon as is practicable. Re-vegetation will be done through the use of an approved hydroseed mix to be specific by a suitably qualified professional. Care will be taken to avoid the use of any plant species that may result in adversely affect wetland systems and / or natural area.</p>
	Earthworks to create platform for the erection of the temporary office building	Increased dust emissions resulting from earthmoving activities affecting human health and resulting in nuisance dust fallout	<p>If required, wet and / or chemical dust suppression shall be undertaken based on the extent of windblown dust emissions.</p> <p>Any disturbed areas will be re-vegetation as soon as is practicable. Re-vegetation will be done through the use of an approved hydroseed mix to be specific by a suitably qualified professional. Care will be taken to avoid the use of any plant species that may result in adversely affect wetland systems and / or natural area.</p>
	Erection of temporary office building and associated facilities	Visual impacts caused by the construction camp and site activities	No mitigation proposed.
<b>Construction – Construction activities</b>			

Phase	Activities	Potential Impacts	Proposed Mitigation Measures
Construction of roads and services installation	Daily contractor's access via access road through Sol Plaatjes Township area and site access roads	Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	The contractor will ensure that all own and / or contracted drivers have a valid driver's licence. All drivers will be trained in road use principles as it relates to site access points. All vehicles will be roadworthy and inspected on a regular basis. Limit construction vehicle movement on public roads to avoid peak traffic hours (7h00 – 8h00 and 16h00 - 18h00)
		Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	Vehicle speeds on unpaved roads will be restricted to a speed of 40km / hr All vehicles will be roadworthy and in a good condition
		Destruction and / disturbance of identified sensitive vegetation and faunal habitats resulting from land clearing activities	The removal of vegetation shall be kept to a minimum. Only areas necessary to be cleared for the effective continuation of construction work shall be cleared of vegetation. Any area where land clearing will be undertaken for the constructions of roads and services will be surveyed by an appropriately qualified biodiversity specialist in order to identify any red / orange data species. All identified species will be marked, disturbance to such sites will be avoided, and where avoidance is not possible, red and orange data species will be relocated to a suitable site. The developer and / or contractor shall inform the South African National Biodiversity Institute of the identification of such plants species, the proposed procedure for avoidance and / or relocation and will obtain any relevant approvals for the planned activities.
		Increased ambient noise levels resulting in nuisance noise impacts	All construction and delivery vehicles shall be in good working order and inspected for regular maintenance. Vehicles shall be fitted with silencers. If any activities regarded to be particularly noisy is to be undertaken during the construction phase, any persons, businesses and / or other parties which may be affected by such noise, will be informed of the duration and extent of the activities one week prior to the initiation thereof.
	Presence and movement of contractors and construction workers on site	Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	In additional to the mitigation measures as described in other sections. Contractors, their staff and / or other temporary and permanent employees will be restricted from entering areas earmarked from protection (except in the case of emergency such as escape). No person (as referred to above) may collect vegetation, trap and or interfere with animals which may be encountered on site.
		Influx of casual jobseekers resulting in increased incidents of crime	Regardless of a provision for the use of local labour, recruitment will not be undertaken on site.

Phase	Activities	Potential Impacts	Proposed Mitigation Measures
			A system for the identification and possible employment of local labour will be undertaken through the implementation of a rational method that will be agreed with the local council and relevant ward councillors and other parties who might have an interest or mandate in this regard.
		Opportunistic poaching and harvesting of plant species	In addition to the mitigation measures included in other sections. Any person (the contractor, his / her staff and all other permanent and temporary workers) found to poach animals encountered on site or harvest any plants shall be subject to a fine.
		Increased risk of fire resulting from construction activities and open fires for cooking and heating	Open cooking and heating fires will only be allowed in designated areas. Such areas shall be made safe as far as is practicable to eliminate the risk of the uncontrolled spread of fire. Firefighting equipment must be provided in case of an emergency. An emergency preparedness plan and emergency response procedure will be developed and the contractor, his / her staff and all other permanent and temporary workers will be trained on the content thereof. If required, practice drills will be undertaken on regular intervals.
		Surface water pollution resulting from temporary on site ablution facilities	Temporary chemical toilets will be provided on site. These facilities will be in good working order and inspected for leaks on a daily basis. The contractor and / or appointed service provider will empty these facilities on a regular basis. All chemical toilets will be emptied completely before being moved or removed from site to avoid the risk of spills
		Soil and water pollution resulting from general waste generated (refer waste management section below)	Refer to "waste management".
	Earthworks and trench excavation (services installation)	Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	Vehicle speeds on unpaved roads will be restricted to a speed of 40km / hr All vehicles will be roadworthy and in a good condition
		Dust emissions impacting of human health and resulting in nuisance dust outfall	The removal of vegetation shall be kept to a minimum. Only areas necessary to be cleared for the effective continuation of construction work shall be cleared of vegetation. If required, wet and / or chemical dust suppression shall be undertaken based on the extent of windblown dust emissions. Any disturbed areas will be re-vegetation as soon as is practicable. Re-vegetation will be done through the use of an approved hydroseed mix to be specific by a suitably qualified professional. Care will be taken to avoid the use of any plant species that may result in adversely affect wetland systems and / or natural area.

Phase	Activities	Potential Impacts	Proposed Mitigation Measures
		Increased risk of soil erosion and windblown dust emissions resulting from the removal of vegetation cover impacting of air quality and total suspended solids in surface water	In addition to the mitigation measures as outlined in other sections. Any instances of soil erosion will be corrected through soil shaping (the construction of berms) and if required mechanical erosion control measures will be implemented.
		Increased ambient noise levels resulting in nuisance noise impacts	All construction and delivery vehicles shall be in good working order and inspected for regular maintenance. Vehicles shall be fitted with silencers.
	Earth shaping and compaction (roads and services)	Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	Vehicle speeds on unpaved roads will be restricted to a speed of 40km / hr All vehicles will be roadworthy and in a good condition
	Road kerb installation and road surfacing (asphalt)	Soil and water pollution resulting from concrete mixing and the use of asphalt as road surfacing material	Concrete mixing will be undertaken on an impermeable surface and any watery effluent from the mixing process will be contained. In the event that concrete and / cement is spilled, the affected area will be cleaned and the material will be disposed of at a suitably licensed landfill site.
	Construction materials transport, receipt and storage	Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	Vehicle speeds on unpaved roads will be restricted to a speed of 40km / hr All vehicles will be roadworthy and in a good condition
		Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	The contractor will ensure that all own and / or contracted drivers have a valid driver's licence. All drivers will be trained in road use principles as it relates to site access points. All vehicles will be roadworthy and inspected on a regular basis. Limit construction vehicle movement on public roads to avoid peak traffic hours (7h00 – 8h00 and 16h00 - 18h00)
		Destruction and / disturbance of identified sensitive vegetation, faunal habitats and wetland areas resulting from land clearing activities to establish storage areas	Clearing of vegetation shall be limited to the footprint of the office building and supporting areas (i.e. parking and access areas). Areas that are to be protected (and which will be included in the township as public open space) shall be clearly indicated on all construction drawings. No construction activities will be undertaken within these demarcated protected areas. Additionally, no persons (contractors, their staff and all other permanent and temporary workers) will be allowed to undertake any other activities within the areas earmarked for protection.

Phase	Activities	Potential Impacts	Proposed Mitigation Measures
			<p>The contractor, his / her staff and all other permanent and temporary workers shall be informed of this restriction.</p> <p>If deemed necessary, the wetland and natural areas earmarked for protection shall be fenced to prevent any disturbance.</p>
	Storage of dangerous goods (diesel fuel, oils and lubricants)	Soil and water pollution resulting from the on-site storage of dangerous goods and chemicals affecting water quality and ecosystems	<p>All fuel and chemical storage areas will be constructed to be impermeable and have a bund wall which can contain 110% of the total volume of the materials stored.</p> <p>Any spills within the contained bund will be collected and the effluent will be disposed of at a suitably licensed landfill site.</p> <p>All chemical and fuel storage tanks will be labelled and material safety data sheets will be available at the location of the storage tank.</p> <p>All contractors, their staff and all other permanent and temporary workers will be trained on the content of the safety sheets.</p> <p>An emergency preparedness plan and emergency response procedure for spills and other emergency incidents will be developed and the contractor, his / her staff and all other permanent and temporary workers will be trained on the content thereof.</p>
	Construction vehicle maintenance and repair	Soil and water pollution resulting from the on-site vehicle maintenance and repairs affecting water quality and ecosystems	<p>Vehicle maintenance shall be undertaken off site where practicable. In the event of on-site vehicle maintenance activities, care shall be taken to eliminate the risk of hydrocarbon spills. This may be achieved through the use of drip trays, plastic sheeting and / or other methods that will prevent the spills of hydrocarbons onto soil.</p> <p>On-site vehicle maintenance shall not be undertaken in areas that are to be protected (and which will be included in the township as public open space) and which have been indicated on the construction drawings and township layout plans.</p> <p>If any spills do occur, the total extent of the affected soil will be removed, placed in containers and disposed of at a suitably licensed landfill site.</p>
	Waste management	Soil and water pollution resulting from the generation of general and hazardous waste affecting water quality and ecosystems	<p>Waste separation will be undertaken on-site and separate marked waste bins for general waste and hazardous waste will be provided.</p> <p>Waste will be removed from site weekly, or at an appropriate frequency.</p> <p>All waste bins will be fitted with lids to prevent rainwater from entering the bins and all bins will be inspected to ensure that they do not leak.</p> <p>The site will be inspected for litter on a daily basis and litter clean-up will be done if required.</p>
	Employment opportunities	The employment of local labour and the use of local service providers affecting socio-economic conditions	The principle contractor will, as part of his tender, allow for the use of local labour and other service providers within the Roodepoort area.

Phase	Activities	Potential Impacts	Proposed Mitigation Measures
<b>Operational – Mixed use township</b>			
Occupation of mixed use township	Occupation	Dust emissions from mine residue deposits affecting human health	<p>Amelioration and diverse and sustainable vegetation cover required on the slimes dam to prevent possible dust emissions. A suitably qualified professional will be appointed to develop a rehabilitation plan and oversee the implementation thereof.</p> <p>The Mineral and Petroleum Resources Development Act 28 of 2002, allocates the responsibility for any environmental liability, pollution or ecological degradation, and the management thereof to the holder of a prospecting right, mining right, retention permit or mining permit, until the Minister has issued a closure certificate to the holder concerned.</p> <p>The management of the mine residue deposits therefore lies with the current owner. As part of the township management, the ward councillor / home owners committee / local council / and / or another organisation shall be made responsible for liaising with the current owner of the mine residue deposits to verify the risks and management of such risks to ensure the effective control of any impacts that may affect residents.</p>
		Increased traffic flows as a result of higher trip generation resulting from mixed uses	The recommendations of the Traffic Impact Assessment as it relates to the upgrade of road infrastructure and intersections must be implemented. No further mitigation and management measures are proposed.
		Increased ambient noise levels resulting from mixed uses and increased traffic flows	No mitigation proposed.
		Increased municipal services demand (including electricity and water)	<p>Incentives for electricity and water use reduction and initiatives for reducing waste, waste separation at source and recycling is usually promoted and implemented by service providers and the local municipality.</p> <p>Where practicable, energy and water efficiency technologies will be considered by developers during the design and building of houses and other facilities.</p>
		Provision of mixed use township to address housing demand	The development must address the specific housing need and be based on a needs and desirability analysis to ensure that the requirements of the local and regional housing market is met.
		Employment opportunities	No mitigation and / management measures are proposed. It is expected that local employment opportunities will be generated by the township.
		Increased use of local service providers	No mitigation and / management measures are proposed. It is expected that local service providers will benefit from increased demand.
		Development and occupation resulting in a reduction of incidents of crime related to uncontrolled open land	No mitigation and / management measures are proposed.

## 7.1 IMPACT SIGNIFICANCE AFTER MITIGATION

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
<b>Planning – Township layout and service planning</b>								
Residential, commercial, business and institutional stands, road layout and associated services	Layout planning	Safety risks associated with undermining affecting the south west corner of the proposed development site	Undermined area excluded from the proposed developable area	M	L	L	C	L
		Gaseous radon emissions, contaminated dust emissions, gamma radiation exposure, water pollution and dam failure risks posed by the existing mine residue deposits	Restoration of the catchment dam on the north-eastern slimes dam in two places. Storm water spill over to be deposited into the paddock walls on the north-eastern slimes dam. Amelioration and diverse and sustainable vegetation cover required on the slimes dams. Rehabilitation of the dams to be maintained by a management plan. Sampling of surface water and groundwater. All legal requirements as it relates to the management of mine residue deposits must be complied with by the owner of the deposits	M	L	L	C	L
		Loss of high potential agricultural land located to the south on the proposed development area	Based on the comments received (from the Sol Plaatjes Youth and the Mandela Crisis Centre), the developed / proponent agreed to consider the offset	H	M	H	B	M

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
			<p>of perceived economic displacement related to the existing affected subsistence farmers through a financial contribution to the Mandela Crisis Centre. A valuation of the economic displacement has not been undertaken as part of the environmental impact assessment process and further negotiations will be undertaken once environmental authorisation has been granted</p> <p>In addition much of the high potential agricultural land falls within open space areas that will not be affected by the development. .</p>					
		<p>Economic displacement of persons currently undertaking informal subsistence farming activities</p>	<p>Informal subsistence farming is being undertaken in the absence of landowner consent. The developer acquired the property with a view to develop the land for residential and mixed use purposes.</p> <p>Based on the comments received (from the Sol Plaatjes Youth and the Mandela Crisis Centre), the developed / proponent agreed to consider the offset of perceived economic displacement related to the existing affected subsistence farmers through a financial</p>	H	L	L	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
			contribution to the Mandela Crisis Centre. A valuation of the economic displacement has not been undertaken as part of the environmental impact assessment process and further negotiations will be undertaken once environmental authorisation has been granted.					
		The destruction of watercourses, wetlands, wetland habitats affecting ecological functioning	A 32 meter buffer zone around all identified watercourses and wetland will be excluded from the development area and designated as open space. If required, the watercourse buffer and / or wetland area will be fenced to minimise further impact.  In the event that these areas are impacted on by construction and / or associated activities, the persons responsible for such impact will be responsible for the rehabilitation of the disturbance. A suitably qualified professional will be appointed to develop a rehabilitation plan and oversee the implementation thereof.	H	L	M	C	L
		Increased storm water flow affecting watercourses resulting in erosion and the	Stormwater management will be implemented in accordance with the storm water management plan	H	M	M	B	M

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		alteration of ecosystems	(WSP Group Africa (Pty) Ltd, Storm Water Management Plan Report, October 2013).					
		Loss of biodiversity, destruction and alteration of floral communities affecting faunal habitats and ecosystem functioning	Highly sensitive floristic habitat as identified through the Biodiversity Assessments (Bathusi Environmental Consulting, December 2012) will be excluded from the development footprint and designated as open space.	H	L	H	B	M
		Loss of orange listed species ( <i>Hypoxis hemerocallidea</i> )		M	L	H	C	M
		The introduction of alien invasives and non-endemic plant species as a result of landscaping activities resulting in the alteration of ecosystem functioning and the possible transformation of habitats associated with watercourses and ridge	Restriction regarding landscaping activities within the 32m buffer of watercourses will be imposed through conditions imposed. These open spaces shall be maintained in its natural state and / or where appropriate be rehabilitated. Any rehabilitation plan will be developed by a suitably qualified professional and in consultation with a biodiversity specialist.					
		Land development and occupation providing incentives for the eradication of alien invasives and weeds currently affecting watercourses and natural areas	Refer above	L	L	M	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		Ambient dust exceeding the areas to the north west of the site will exceed the 2015 standard of 75µg/m <sup>3</sup> impacting on human health	The north west section of the property which will be affected by dust outfall exceeding the regulatory limit will be excluded from the development footprint.	M	L	M	C	L
		Dust emissions from existing mine residue deposits affecting human health	<p>The north west section of the property which will be affected by dust outfall exceeding the regulatory limit will be excluded from the development footprint.</p> <p>The two smaller residue deposits will be removed within 18 months and prior to occupation. The remaining larger residue deposit will be re-vegetated or removed.</p> <p>Dust monitoring will be undertaken until such time as it has been confirmed that dust emission from the mine residue deposits does not result in the exceedance of the regulatory limits.</p> <p>Dust monitoring will be undertaken in the event that any of the mine residue deposits are re-mined, moved and or altered.</p>	M	L	M	C	L
		Relocation and re-settlement of informal settlement located to the north east on a	The developer will agree with the City of Johannesburg Metropolitan Municipality on the process of community relocation.	H	M	L	A	M

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		portion of the proposed development site						
<b>Construction - Construction of temporary office building and associated facilities including temporary worker ablution facilities, worker cooking and eating facilities, fuel and chemical storage facilities, vehicle maintenance areas and material storage and handling areas.</b>								
Site establishment	Site access via access through road through Sol Plaatjes Township area and site access roads	Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	The contractor will ensure that all own and / or contracted drivers have a valid driver's licence. All drivers will be trained in road use principles as it relates to site access points.  All vehicles will be roadworthy and inspected on a regular basis.  Limit construction vehicle movement on public roads to avoid peak traffic hours (7h00 – 8h00 and 16h00 - 18h00)	M	M	L	C	L
		Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	Vehicle speeds on unpaved roads will be restricted to a speed of 40km / hr All vehicles will be roadworthy and in a good condition	M	M	L	C	L
		Destruction and / disturbance of identified sensitive	Biodiversity areas identified / allocated for conservation must be demarcated and, if	M	L	M	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		vegetation and faunal habitats (wetlands and ridge)	<p>required, temporarily or permanently fenced.</p> <p>Site clearing activities will be kept to a minimum in all instances.</p> <p>Any area where land clearing will be undertaken for the constructions of roads and services will be surveyed by an appropriately qualified biodiversity specialist in order to identify any red / orange data species.</p> <p>All identified species will be marked, disturbance to such sites will be avoided, and where avoidance is not possible, red and orange data species will be relocated to a suitable site.</p> <p>The developer and / or contractor shall inform the South African National Biodiversity Institute of the identification of such plants species, the proposed procedure for avoidance and / or relocation and will obtain any relevant approvals for the planned activities.</p>					
		Increased ambient noise levels from construction and delivery vehicle movement resulting in nuisance noise impacts	<p>All construction and delivery vehicles shall be in good working order and inspected for regular maintenance.</p> <p>Vehicles shall be fitted with silencers.</p>	L	L	L	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
	Removal of vegetation for erection of temporary office building	Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	<p>Clearing of vegetation shall be limited to the footprint of the office building and supporting areas (i.e. parking and access areas).</p> <p>Areas that are to be protected (and which will be included in the township as public open space) shall be clearly indicated on all construction drawings.</p> <p>No construction activities will be undertaken within these demarcated protected areas. Additionally, no persons (contractors, their staff and all other permanent and temporary workers) will be allowed to undertake any other activities within the areas earmarked for protection.</p> <p>The contractor, his / her staff and all other permanent and temporary workers shall be informed of this restriction.</p> <p>If deemed necessary, the wetland and natural areas earmarked for protection shall be fenced to prevent any disturbance.</p>	H	L	M	C	L
		Increased risk of soil erosion and windblown dust emissions resulting from the removal of vegetation cover impacting of air	The removal of vegetation shall be kept to a minimum. Only areas necessary to be cleared for the effective continuation of construction	M	L	L	B	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		quality and total suspended solids in surface water	<p>work shall be cleared of vegetation.</p> <p>If required, wet and / or chemical dust suppression shall be undertaken based on the extent of windblown dust emissions.</p> <p>Any instances of soil erosion will be corrected through soil shaping (the construction of berms) and if required mechanical erosion control measures will be implemented.</p> <p>Any disturbed areas will be re-vegetation as soon as is practicable. Re-vegetation will be done through the use of an approved hydroseed mix to be specific by a suitably qualified professional. Care will be taken to avoid the use of any plant species that may result in adversely affect wetland systems and / or natural area.</p>					
	Earthworks to create platform for the erection of the temporary office building	Increased dust emissions resulting from earthmoving activities affecting human health and resulting in nuisance dust fallout	<p>If required, wet and / or chemical dust suppression shall be undertaken based on the extent of windblown dust emissions.</p> <p>Any disturbed areas will be re-vegetation as soon as is practicable. Re-vegetation will be done through the use of an approved hydroseed</p>	M	L	L	B	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
			mix to be specific by a suitably qualified professional. Care will be taken to avoid the use of any plant species that may result in adversely affect wetland systems and / or natural area.					
	Erection of temporary office building and associated facilities	Visual impacts caused by the construction camp and site activities	No mitigation proposed.	M	M	H	C	M
<b>Construction – Construction activities</b>								
Construction of roads and services installation	Daily contractor's access via access road through Sol Plaatjes Township area and site access roads	Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	The contractor will ensure that all own and / or contracted drivers have a valid driver's licence. All drivers will be trained in road use principles as it relates to site access points. All vehicles will be roadworthy and inspected on a regular basis. Limit construction vehicle movement on public roads to avoid peak traffic hours (7h00 – 8h00 and 16h00 - 18h00)	M	M	L	C	L
		Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting	Vehicle speeds on unpaved roads will be restricted to a speed of 40km / hr. All vehicles will be roadworthy and in a good condition	M	M	L	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		human health and resulting in nuisance dust outfall						
		Destruction and / disturbance of identified sensitive vegetation and faunal habitats resulting from land clearing activities	<p>The removal of vegetation shall be kept to a minimum. Only areas necessary to be cleared for the effective continuation of construction work shall be cleared of vegetation.</p> <p>Any area where land clearing will be undertaken for the constructions of roads and services will be surveyed by an appropriately qualified biodiversity specialist in order to identify any red / orange data species.</p> <p>All identified species will be marked, disturbance to such sites will be avoided, and where avoidance is not possible, red and orange data species will be relocated to a suitable site.</p> <p>The developer and / or contractor shall inform the South African National Biodiversity Institute of the identification of such plants species, the proposed procedure for avoidance and / or relocation and will obtain any relevant approvals for the planned activities.</p>	M	L	M	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		Increased ambient noise levels resulting in nuisance noise impacts	<p>All construction and delivery vehicles shall be in good working order and inspected for regular maintenance. Vehicles shall be fitted with silencers.</p> <p>If any activities regarded to be particularly noisy is to be undertaken during the construction phase, any persons, businesses and / or other parties which may be affected by such noise, will be informed of the duration and extent of the activities one week prior to the initiation thereof.</p>	L	L	L	C	L
	Presence and movement of contractors and construction workers on site	Destruction and / disturbance of identified sensitive vegetation and faunal habitats (wetlands and ridge)	<p>In additional to the mitigation measures as described in other sections.</p> <p>Contractors, their staff and / or other temporary and permanent employees will be restricted from entering areas earmarked from protection (except in the case of emergency such as escape).</p> <p>No person (as referred to above) may collect vegetation, trap and or interfere with animals which may be encountered on site.</p>	M	L	M	C	L
		Influx of casual jobseekers resulting in	Regardless of a provision for the use of local labour,	L	L	L	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		increased incidents of crime	recruitment will not be undertaken on site. A system for the identification and possible employment of local labour will be undertaken through the implementation of a rational method that will be agreed with the local council and relevant ward councillors and other parties who might have an interest or mandate in this regard.					
		Opportunistic poaching and harvesting of plant species	In addition to the mitigation measures included in other sections. Any person (the contractor, his / her staff and all other permanent and temporary workers) found to poach animals encountered on site or harvest any plants shall be subject to a fine.	L	L	L	C	L
		Increased risk of fire resulting from construction activities and open fires for cooking and heating	Open cooking and heating fires will only be allowed in designated areas. Such areas shall be made safe as far as is practicable to eliminate the risk of the uncontrolled spread of fire. Firefighting equipment must be provided in case of an emergency. An emergency preparedness plan and emergency response procedure will be	H	L	M	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
			developed and the contractor, his / her staff and all other permanent and temporary workers will be trained on the content thereof. If required, practice drills will be undertaken on regular intervals.					
		Surface water pollution resulting from temporary on-site ablution facilities	Temporary chemical toilets will be provided on site. These facilities will be in good working order and inspected for leaks on a daily basis. The contractor and / or appointed service provider will empty these facilities on a regular basis.  All chemical toilets will be emptied completely before being moved or removed from site to avoid the risk of spills	L	L	L	C	L
		Soil and water pollution resulting from general waste generated (refer waste management section below)	Refer to "waste management".	M	L	L	C	L
	Earthworks and trench excavation (services installation)	Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	Vehicle speeds on unpaved roads will be restricted to a speed of 40km / hr  All vehicles will be roadworthy and in a good condition	M	M	L	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		Dust emissions impacting of human health and resulting in nuisance dust outfall	<p>The removal of vegetation shall be kept to a minimum. Only areas necessary to be cleared for the effective continuation of construction work shall be cleared of vegetation.</p> <p>If required, wet and / or chemical dust suppression shall be undertaken based on the extent of windblown dust emissions.</p> <p>Any disturbed areas will be re-vegetation as soon as is practicable. Re-vegetation will be done through the use of an approved hydroseed mix to be specific by a suitably qualified professional. Care will be taken to avoid the use of any plant species that may result in adversely affect wetland systems and / or natural area.</p>	M	L	L	C	L
		Increased risk of soil erosion and windblown dust emissions resulting from the removal of vegetation cover impacting of air quality and total suspended solids in surface water	<p>In addition to the mitigation measures as outlined in other sections.</p> <p>Any instances of soil erosion will be corrected through soil shaping (the construction of berms) and if required mechanical erosion control measures will be implemented.</p>	M	L	L	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		Increased ambient noise levels resulting in nuisance noise impacts	All construction and delivery vehicles shall be in good working order and inspected for regular maintenance. Vehicles shall be fitted with silencers.	L	L	L	C	L
	Earth shaping and compaction (roads and services)	Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	Vehicle speeds on unpaved roads will be restricted to a speed of 40km / hr All vehicles will be roadworthy and in a good condition	M	M	L	C	L
	Road kerb installation and road surfacing (asphalt)	Soil and water pollution resulting from concrete mixing and the use of asphalt as road surfacing material	Concrete mixing will be undertaken on an impermeable surface and any watery effluent from the mixing process will be contained. In the event that concrete and / cement is spilled, the affected area will be cleaned and the material will be disposed of at a suitably licensed landfill site.	M	L	L	C	L
	Construction materials transport, receipt and storage	Vehicle entrained dust and engine through combustion emissions resulting in air quality impacts affecting human health and resulting in nuisance dust outfall	Vehicle speeds on unpaved roads will be restricted to a speed of 40km / hr All vehicles will be roadworthy and in a good condition	M	M	L	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		Increased construction and delivery vehicle movement affecting traffic flow and increasing the risk of road accidents	<p>The contractor will ensure that all own and / or contracted drivers have a valid driver's licence. All drivers will be trained in road use principles as it relates to site access points.</p> <p>All vehicles will be roadworthy and inspected on a regular basis.</p> <p>Limit construction vehicle movement on public roads to avoid peak traffic hours (7h00 – 8h00 and 16h00 - 18h00)</p>	M	M	L	C	L
		Destruction and / disturbance of identified sensitive vegetation, faunal habitats and wetland areas resulting from land clearing activities to establish storage areas	<p>Clearing of vegetation shall be limited to the footprint of the office building and supporting areas (i.e. parking and access areas).</p> <p>Areas that are to be protected (and which will be included in the township as public open space) shall be clearly indicated on all construction drawings.</p> <p>No construction activities will be undertaken within these demarcated protected areas. Additionally, no persons (contractors, their staff and all other permanent and temporary workers) will be allowed to undertake any other activities within the areas earmarked for protection.</p>	M	L	M	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
			<p>The contractor, his / her staff and all other permanent and temporary workers shall be informed of this restriction.</p> <p>If deemed necessary, the wetland and natural areas earmarked for protection shall be fenced to prevent any disturbance.</p>					
	Storage of dangerous goods (diesel fuel, oils and lubricants)	Soil and water pollution resulting from the on-site storage of dangerous goods and chemicals affecting water quality and ecosystems	<p>All fuel and chemical storage areas will be constructed to be impermeable and have a bund wall which can contain 110% of the total volume of the materials stored.</p> <p>Any spills within the contained bund will be collected and the effluent will be disposed of at a suitably licensed landfill site.</p> <p>All chemical and fuel storage tanks will be labelled and material safety data sheets will be available at the location of the storage tank.</p> <p>All contractors, their staff and all other permanent and temporary workers will be trained on the content of the safety sheets.</p> <p>An emergency preparedness plan and emergency response procedure for spills and other emergency incidents will be developed and the contractor, his / her staff and all other permanent</p>	M	M	L	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
			and temporary workers will be trained on the content thereof.					
	Construction vehicle maintenance and repair	Soil and water pollution resulting from the on-site vehicle maintenance and repairs affecting water quality and ecosystems	Vehicle maintenance shall be undertaken off site where practicable. In the event of on-site vehicle maintenance activities, care shall be taken to eliminate the risk of hydrocarbon spills. This may be achieved through the use of drip trays, plastic sheeting and / or other methods that will prevent the spills of hydrocarbons onto soil.  On-site vehicle maintenance shall not be undertaken in areas that are to be protected (and which will be included in the township as public open space) and which have been indicated on the construction drawings and township layout plans.  If any spills do occur, the total extent of the affected soil will be removed, placed in containers and disposed of at a suitably licensed landfill site.	M	L	L	C	L
	Waste management	Soil and water pollution resulting from the generation of general and hazardous waste affecting water quality and ecosystems	Waste separation will be undertaken on-site and separate marked waste bins for general waste and hazardous waste will be provided.	M	L	L	C	L

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
			Waste will be removed from site weekly, or at an appropriate frequency. All waste bins will be fitted with lids to prevent rainwater from entering the bins and all bins will be inspected to ensure that they do not leak. The site will be inspected for litter on a daily basis and litter clean-up will be done if required.					
	Employment opportunities	The employment of local labour and the use of local service providers affecting socio-economic conditions	The principle contractor will, as part of his tender, allow for the use of local labour and other service providers within the Roodepoort area.	M	M	L	A	M
<b>Operational – Mixed use township</b>								
Occupation of mixed use township	Occupation	Dust emissions from mine residue deposits affecting human health	Amelioration and diverse and sustainable vegetation cover required on the slimes dam to prevent possible dust emissions. A suitably qualified professional will be appointed to develop a rehabilitation plan and oversee the implementation thereof. The Mineral and Petroleum Resources Development Act 28 of 2002, allocates the responsibility for any environmental liability, pollution or ecological	H	L	H	C	M

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
			<p>degradation, and the management thereof to the holder of a prospecting right, mining right, retention permit or mining permit, until the Minister has issued a closure certificate to the holder concerned.</p> <p>The management of the mine residue deposits therefore lies with the current owner. As part of the township management, the ward councillor / home owners committee / local council / and / or another organisation shall be made responsible for liaising with the current owner of the mine residue deposits to verify the risks and management of such risks to ensure the effective control of any impacts that may affect residents.</p>					
		Increased traffic flows as a result of higher trip generation resulting from mixed uses	The recommendations of the Traffic Impact Assessment as it relates to the upgrade of road infrastructure and intersections must be implemented. No further mitigation and management measures are proposed.	H	M	H	C	M
		Increased ambient noise levels resulting	No mitigation proposed.	M	L	H	C	M

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
		from mixed uses and increased traffic flows						
		Increased municipal services demand (including electricity and water)	<p>Incentives for electricity and water use reduction and initiatives for reducing waste, waste separation at source and recycling is usually promoted and implemented by service providers and the local municipality.</p> <p>Where practicable, energy and water efficiency technologies will be considered by developers during the design and building of houses and other facilities.</p> <p>The engineering services study (Appendix M) indicates there is sufficient existing municipal water and sewer infrastructure for the proposed development to proceed.</p>	M	M	H	C	M
		Provision of mixed use township to address housing demand	The development must address the specific housing need and be based on a needs and desirability analysis to ensure that the requirements of the local and regional housing market is met.	H	M	H	A	H
		Employment opportunities	No mitigation and / management measures are proposed. It is expected that local employment	M	M	H	C	M

Phase	Activities	Potential Impacts	Summary of mitigation measures	Significance prior to mitigation	Extent	Duration	Probability	Significance post mitigation
			opportunities will be generated by the township.					
		Increased use of local service providers	No mitigation and / management measures are proposed. It is expected that local service providers will benefit from increased demand.	M	M	H	C	M
		Development and occupation resulting in a reduction of incidents of crime related to uncontrolled open land	No mitigation and / management measures are proposed.	M	M	H	C	M

## 7.2 ADDITIONAL PROPOSED MITIGATION MEASURES

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### 7.2.1 MINE RESIDUE REMOVAL

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Upward Spiral 1471 has been contracted by Mintails to re-process the tailings and rehabilitate two smaller residues located to the north and south of the site (Appendix S). The residues contain 9000 and 112000 tonnes respectively and will be removed through to use of the following:

- 2 x 300 ton excavator;
- 2 x 25 ton articulated dump trucks;
- 3 x front end loaders;
- 1 x Finlay screen; and
- 120 000 litre water bowzer

An estimated 7500 tonnes will be removed month and complete removal of the residues is estimated at 18 to 22 months. No occupation of any of the residential units will occur until both the residues are removed and the land subject to a further radiological and contaminated land assessment.

At present no plans are in place for removal of the larger residue deposit in the north-east corner of the site. In the event that the residue is not removed, it will be vegetated in accordance with an approved vegetation plan (Appendix T) prior to the commencement of any development. As such, the area has been removed from the site layout.. Approval for the residue removal has been obtained from the DMR (Appendix W) and a clearance certificate obtained from the NNR (Appendix U).

### 7.2.2 DELINEATION AND DEMARCATION OF UNDERMINED LAND

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The township layout plan was amended to exclude the undermined area identified. Thick fill was encountered in the 180 m long trench that crosses the Bird Reef Outcrop. That area, the zone marked as Outcrop Zone will require further investigation before development in that area can take place. The area north of the Mona Liza Adit will also require further investigation as little detail of the adit is available. The dip and therefore depth, as well as the direction of the adit is unknown. It is also recommended that a 25 m no-go buffer zone around each shaft be excluded from the development. These exclusion zones are indicated on Figure 43 as well as all the consolidated sensitivity maps which appear in Section 6 of this report.

### 7.2.3 CONSTRAINT ZONES

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It is the opinion of the EAP that the proposed development project be authorized as long as the proposed EIA mitigation measures are adhered to and all identified no-go constraint zones are avoided as per the consolidated sensitivity maps in Figure 49 - Figure 52. It is suggested that

conditional approval for the phased development parcels be authorized in line with the constraint zones identified in Figure 49 - Figure 52..

The radiation doses to adults due to deposited dust are depicted in in the Radiological Assessment (Appendix D2) are considered insignificant and no constraint zones were identified.

In the event that any of the mine residue deposits are re-mined, moved and or altered dust monitoring should be undertaken until such time as it has been confirmed that dust emission from the mine residue deposits does not result in the exceedance of the regulatory limits.

#### **7.2.4 CONTRACTUAL ARRANGEMENT**

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The proponent / applicant will appoint an independent environmental control officer for the duration of the construction phase to oversee compliance with the Environmental Management Programme, the conditions of any environmental authorisations, licenses and permits and general environmental legal compliance.

The principle contractor will as part of his tender allow a financial provision for the implementation of the Environmental Management Programme, including the training of staff and workers, the appointment of an environmental officer and will ensure compliance (including compliance by any appointed sub-contractors) with the requirements of the Environmental Management Programme, the conditions of any environmental authorisations, licenses and permits and general environmental legal compliance

The principle contractor will, as part of his tender, allow for the use of local labour and other service providers within the Roodepoort area.

Based on the comments received (from the Sol Plaatjes Youth and the Mandela Crisis Centre), the developed / proponent agreed to consider the offset of perceived economic displacement related to the existing affected subsistence farmers through a financial contribution to the Mandela Crisis Centre. A valuation of the economic displacement has not been undertaken as part of the environmental impact assessment process and further negotiations will be undertaken once environmental authorisation has been granted.

#### **7.2.5 TOPSOIL AND SOIL STOCKPILES**

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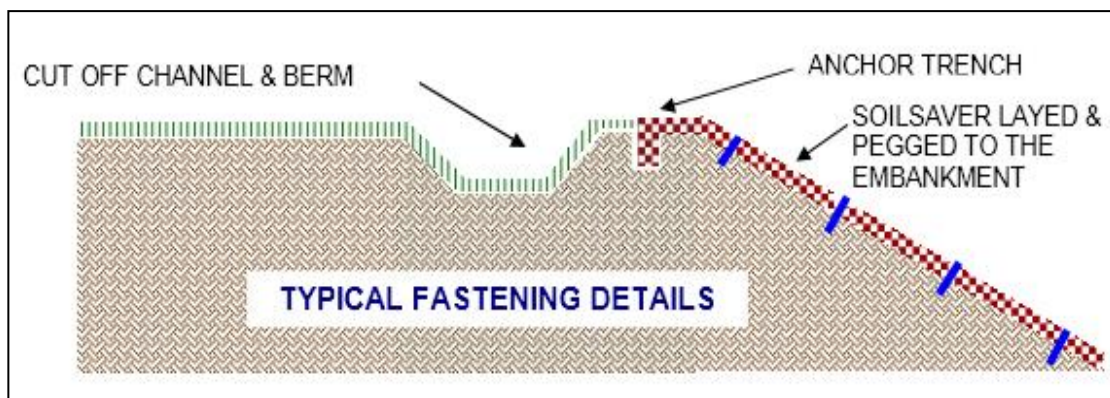
Topsoil shall be stripped in all areas to be cleared for construction activities to a depth of 10cm. Topsoil will be stockpiled in an area that will not interfere with other construction work and / or activities. Stockpiles will be no higher than 1m.

#### **7.2.6 EROSION PREVENTION AND MECHANICAL STABILISATION OF SLOPES**

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The use of mechanical erosion control methods must be implemented if required. This may include the use of geotextiles such as Kaytech SoilSaver ©. An example of such an erosion control textile is provided in Figure 53.

The installation of erosion control blankets should be undertaken in instances where soil erosion is severe and the cost of installation regarded as viable for the effective mitigation of impacts associated with soil erosion.



**Figure 53: Erosion control textile**

## 7.2.7 DEVELOPMENT OF PROCEDURES AND CHECKLISTS

The following procedures will be developed and all the staff and workers will be adequately trained on the content and implementation thereof.

### **Emergency Preparedness and Response**

The procedure will be developed to specifically include risk identification, preparedness, response measures and reporting. The procedure will specifically include spill and fire risk, preparedness and response measures. The appropriate emergency control centers (fire department, hospitals) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation with all potentially affected landowners.

In the event that risks are identified which may affected adjacent landowners (or other persons), the procedure will include the appropriate communication strategy to inform such persons and provide response measures to minimize the impact.

### **Incident Reporting Procedure**

Incident reporting will be undertaken in accordance with an established incident reporting procedure to (including but not limited to):

- Provide details of the responsible person including any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control when the incident occurred;
- Provide details of the incident (time, date, location);
- The details of the cause of the incident;
- Identify the aspects of the environment impacted;
- The details corrective action taken, and

- The identification of any potential residual or secondary risks that must be monitored and corrected or managed.

#### **Environmental and Social Audit Checklist**

An environmental audit checklist will be established to include the environmental and social mitigation and management measures as developed and approved as part of the Environmental Management Programme. Non-conformances will be identified and corrective action taken where required.

## **8 ENVIRONMENTAL MANAGEMENT PROGRAMME**

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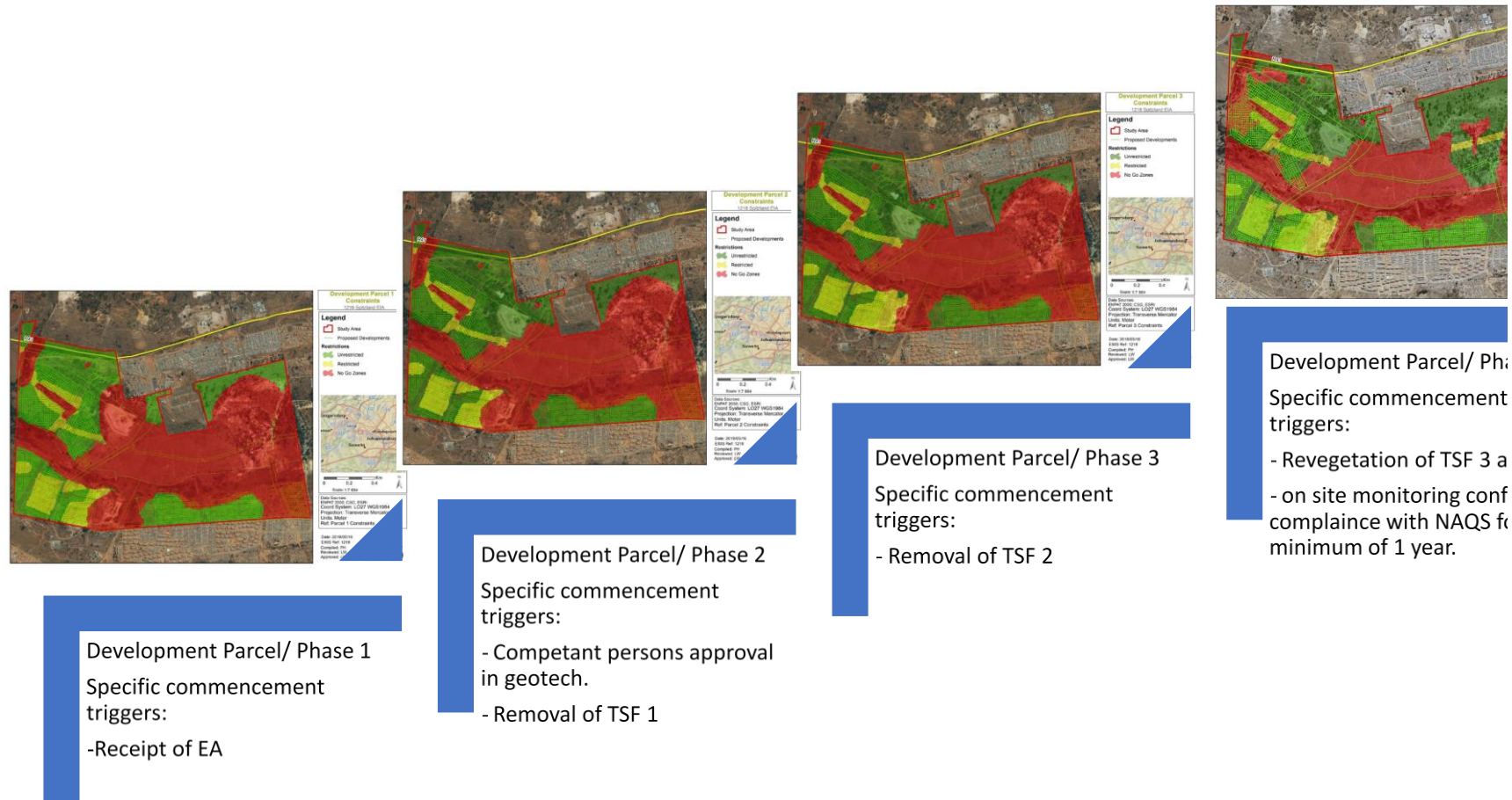
The Environmental Management Programme is attached as Appendix L.

## **9 CONCLUSION AND RECOMMENDATIONS**

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It is the opinion of the EAP that the proposed development project be authorized as long as the proposed EIA mitigation measures are adhered to and all identified no-go constraint zones are avoided as per the consolidated sensitivity maps in Figure 49 - Figure 52. It is suggested that conditional approval for the phased development parcels be authorized in line with the constraint zones identified in Figure 49 - Figure 52.

A phasing diagram is shown in Figure 54 to illustrate the phasing options and identified development parcels graphically.



**Figure 54: Phasing diagram for identified development parcels**

The following additional recommendations are made:

- All environmentally sensitive areas (no-go areas / constraint zones) must be incorporated in township open space and avoided from development;
- Management measures included in the EIA report and EMPR for all impacts associated with all phases of the proposed development project must be adhered to; and
- Additional geotechnical work is required in all restricted geotechnical areas identified in the geotechnical report prior to construction commencing in that area.