



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

Draft for Public Review and Comment

Please ensure that comments are submitted on or before the **15th February 2021** to the Environmental Assessment Practitioner listed on Page 1 Section 3(a)(i).

Please note that certain sections of this report can **only** be completed / updated after the public review and commenting period. These sections are highlighted in yellow.

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED)

DMR REFERENCE NO: GP 30/5/1/1/2 10679 PR
APPLICANT: Crushco (Pty) Ltd
PROJECT: Prospecting Right Application
MINERALS: Sand, Clay, Aggregate and Stone Aggregate
PHYSICAL ADDRESS: Re Extent of Portion 1 Tweefontein No. 19 IR
Ekurhuleni Metropolitan Municipality, Gauteng

The format of this report follows the template provided by the competent authority (The Department of Mineral Resources) obtained from www.dmr.gov.za.

REVIEW RECORD

DRAFTING AND REVIEW OF REPORT

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ACCEPTANCE OF REPORT FOR FINAL DISTRIBUTION

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APPLICANT			

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EXECUTIVE SUMMARY

Crushco (Pty) Ltd (herein after referred to as Crushco) has applied for a prospecting right with the objective being to investigate the availability of the target minerals (sand, clay, stone and stone aggregate) on the land to the south of the existing Crushco operations as part of future planning for the mine. Umhlaba Environmental Consulting CC has been appointed by the applicant to undertake the application process for an environmental authorization in terms of the National Environmental Management Act (NEMA), No. 107 of 1998, as amended and the EIA Regulations, 2017 (GN R 326). This draft report is being provided in order for the public to have the opportunity to review and provide input into the application process, which will be used when finalising the report for submission to the authorities for a decision.

Should you wish to submit comments on the contents of this report please refer to the Background Information Document (BID) accessible online at <http://www.umhlaba.co.za/public-participation/> or contact the Environmental Assessment Practitioner at the details provided on Page 1 Section 3(a)(i) of this report. Please ensure that your comments are submitted on or before the 15th February 2021.

Site Location and Proposed Activities

The application area covers 576.47 Ha of a portion of the Remaining Extent of Portion 1 of the Farm Tweefontein 191R, located 12km north-east of the Kempton Park CBD in the Magisterial District of Kemptonpark, Gauteng Province. The proposed prospecting campaign will be for five years and will be undertaken in four (4) phases:

Phase 1 (non-invasive): The initial prospecting activities will involve an aerial survey and extensive desktop studies to gather and consolidate all historical mineral and other information concerning the prospecting area. This will aid in confirming possible drill sites which will be finalised in agreement with the relevant landowner.

Phase 2 & 3 (invasive drilling, decommissioning and rehabilitation): Five (5) boreholes will be drilled and the core analysed. The final location of the drill sites is to be determined during the Phase 1 activities above. When drilling is undertaken, the following procedure is proposed:

- Buffer restrictions to be implemented.
- Existing access tracks to be used where possible.
- Photographs to be taken of the identified access route and drill pad area prior to any physical impact.
- A drill pad of approximately 20 x 20m to be scraped, levelled and demarcated with a temporary fence. Topsoil to be stored adjacent to the drill site
- Two sumps to be dug per drill site and lined with plastic
- A temporary storage area to be demarcated within the drill pad location
- Infill drilling to be undertaken and samples sent to an approved laboratory for analysis

Once drilling is completed, all equipment will be removed. The plastic lining taken out of the sump and the sump refilled. The boreholes will be plugged as per required standards and the impacted area will be re-covered with the soil that was removed. Photographs will be taken of the rehabilitated sites and landowner acceptance of the rehabilitation will be obtained.

Phase 4 (non-invasive): If the results of the drilling campaign are positive, the information gained from drilling and sampling will be used to support the development of a resource statement and implementation of both a pre-feasibility and feasibility study. These studies may involve the commissioning of various specialists to determine the viability of future mining. The information gained during this phase will be used to compile a mining right application.

Environmental Authorisations Triggered

The following environmental authorisations are required to facilitate all the proposed activities;

- Listing Notice 1: Activity 20 – Application for a prospecting right.
- Listing Notice 1 Activity 22 – The decommissioning of any activity requiring a closure certificate.
- Listing Notice 3: Activity 12 – The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation within critical biodiversity areas identified in bioregional plans.

These activities require that a Basic Assessment process (BA) contemplated in Regulations 19 and 20 of the 2014 EIA regulations (as amended) must be followed.

Need and Desirability

The site is located mostly within Zone 3 of the Gauteng Environmental Management Framework (2014) which is categorised as being dominated by areas that are sensitive to development activities and in several cases also have specific values that need to be protected. When specifically considering the activity of mining within this zone, mining is considered to be undesirable however existing legal mining operations should be allowed to continue in this zone provided that it meets the relevant legal requirements in terms of emissions, effluent and noise.

Should prospecting activities prove that there are economically viable minerals available to allow for mining over the application area, this will extend the life of mine of the existing Crushco operation and therefore secure a continued resource for the building and construction industry which would also support priority development within Ekurhuleni as identified in the IDP.

Current Landuse and Environmental Sensitivity

The majority of the site has been ploughed for crop production. Various pans are located within the application area which include grasslands around the pans and the corridors between the cultivated lands which are considered to be sensitive habitats. Some of the grassland areas include stands of exotic trees.

Infrastructure within the proposed prospecting area is mostly that associated with farming. This includes a homestead and a barn/workshop located in the northern section of the application area. A fairly extensive network of gravel roads exists throughout the area to facilitate crop production and harvesting with all roads being well-maintained. Eskom transmission lines traverse horizontally across the northern section of the application area.

The Gauteng Conservation Plan classifies that the proposed prospecting area comprises:

- Protected areas (0%)
- Critical biodiversity area ($\pm 20\%$)
- Ecological support area ($\pm 80\%$)

While the remaining critical biodiversity areas (grassland) and pans have been largely avoided by recent agricultural activities, the ecological support areas have been historically transformed by cultivation.

Assessment of Impacts

The **key findings** from the environmental impact assessment can be summarised as follows;

The most significant positive impacts, ranked as **Medium** prior to consideration of management measures, includes;

- **Socio-economic** – Prospecting will be undertaken legalally and responsibly as determined through the application process and granting of an environmental authorisation.
- **Reversing of impacts** - Successful implementation of the decommissioning and rehabilitation plan stipulated in the Environmental Management Programme will reverse the temporary impacts associated with the prospecting activities.

The most significant negative impacts, ranked as **Medium** prior to consideration of management measures is;

- **Water** - Hydrocarbon spills / spills from chemical toilets entering a water course / wetland resulting in water pollution.
- **Fauna / flora (Ecology)** - Stripping of flora and impacting on habitats when clearing a drill pad area or creating a new access track resulting in destruction of flora and habitats.
- **Agriculture** - Stripping of crops when clearing a drill pad area or creating a new access track causing a loss of crop yield.

All negative impacts can be either avoided, managed or mitigated with the implementation of controls such as engineering, procedural, training and monitoring/maintenance (see Impacts Assessment in Appendix A4). The significance of the impact on water, ecology and agriculture is reduced to Low-Medium if the relevant controls are implemented.

Rehabilitation Plan

After drilling has been completed in one area, the drilling team will ensure the site is reverted back to its pre-drilling state by carrying out the following:

- Removing all infrastructures, including the drill rig, the temporary shack, the mobile diesel tank, the mobile water tank and the chemical toilet.
- Plugging the boreholes as per legal requirements.
- Ensuring that no foreign matter is left behind on the drill site.
- Refilling the sump required for the drilling activities. Initially the plastic lining will be removed and disposed on in a registered landfill site and the soil returned to effectively fill in the sump.
- Inspecting the whole drill site for any signs of hydrocarbon pollution. Any identified soil which has been polluted as a result of the drilling activities will be removed and disposed of in a registered landfill site.
- Loosening compacted areas as a result of the drill rig and any ruts created by accessing or leaving the site for the drilling activity must be filled in to ensure that no future erosion shall emanate from the site.
- Confirming the the success of the rehabilitation to the landowners satisfaction.

Financial Provision for Rehabilitation

The cost of rehabilitating the site after drilling is calculated at R50 000 and will be provided in the form of a bank guarantee.

Assessors Opinion

It is the author's opinion that this application **should** be authorised for the following reasons:

- The proposed activities are limited and temporary in nature.
- The impact assessment has indicated that negative impacts from the proposed activities can be controlled to an acceptable level through appropriate mitigation and management measures.
- The proposed project fits with activities already taking place on the adjacent property (existing Crushco operation).
- The proposed site is itself already transformed from its natural state through historical activities of agriculture.
- The positive result of the proposed project will extend the life of the existing Crushco operation which will secure a building product that will support local development, including IDP projects in nearby communities which are identified as priority areas.

Conditions that must be included in the Authorisation

The implementation of the environmental management measures contained within this report must form part of the condition of the authorisation. Crushco must not conduct any invasive activities within sensitive habitats or within the following buffer zones:

- 100m from the Eskom powerlines.
- 100m from the closest edge of any water course.
- 100m from any identified pan / wetland
- 50m away from any other structures / heritage sites

The landowner must be reconsulted at least 1 month prior to implementing any invasive activities. Any reasonable concerns from the landowner must be considered.

TABLE OF CONTENTS

1.	IMPORTANT NOTICE	5	
2.	OBJECTIVE OF THE BASIC ASSESSMENT PROCESS	5	
<u>PART A: SCOPE OF ASSESSMENT AND BASIC IMPACT ASSESSMENT REPORT1</u>			
3.	CONTACT PERSON AND CORRESPONDENCE ADDRESS	1	
	a) Details of	1	
	b) Location of the Overall Activity.....	1	
	c) Locality Map	2	
	d) Description of the Scope of the Proposed Overall Activity	3	
	e) Policy and Legislative Context	7	
	f) Need and Desirability of the Proposed Activities	9	
	g) Motivation for the Preferred Site, Activities and Technology Alternative	9	
	h) Full Description of the Process Followed to Reach the Preferred Alternatives within the Site..	9	
	i) Full Description of the Process Undertaken to Identify, Assess and Rank the Impacts and Risks the Activity will Impose on the Preferred Site (in Respect of the Final Site Layout Plan) through the Life of the Activity	33	
	j) Assessment of Each Identified Potentially Significant Impact and Risk	35	
	k) Summary of Specialist Reports.....	36	
	l) Environmental Impact Statement.....	36	
	m) Proposed Impact Management Objectives and the Impact Management Outcomes for Inclusion in the EMPr.....	38	
	n) Aspects for Inclusion as Conditions of Authorisation.....	39	
	o) Description of any Assumptions, Uncertainties and Gaps in Knowledge	39	
	p) Reasoned Opinion as to whether the Proposed Activity Should or Should Not be Authorised	39	
	q) Period for which the Environmental Authorisation is Required.....	40	
	r) Undertaking.....	40	
	s) Financial Provision	40	
	t) Specific Information Required by the Competent Authority.....	41	
	u) Other Matters Required in Terms of Section 24(4)(a) and (b) of the Act.....	41	
<u>PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT.....</u>			43
1.	DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME	43	
	a) Details of the EAP	43	
	b) Description of the Aspects of the Activity.....	43	
	c) Composite Map	43	
	d) Description of Impact Management Objectives Including Management Statements	43	
	e) Impact Management Outcomes.....	44	
	f) Impact Management Actions	44	
	i) Financial Provision	49	
	Monitoring Protocols and Minimum Requirements	52	
	l) Indicate the Frequency of the Submission of the Performance Assessment Report	56	
	m) Environmental Awareness Plan	56	

n) Specific Information Required by the Competent Authority	59
2. UNDERTAKINGS.....	60
<u>REFERENCES.....</u>	<u>61</u>
<u>APPENDICES FOR PART A</u>	<u>62</u>
APPENDIX A1: CV OF EAP	62
APPENDIX A2: SITE LAYOUT PLAN	70
APPENDIX A.3: RECORD OF PUBLIC PARTICIPATION DURING THIS BASIC ASSESSMENT PROCESS.	71
APPENDIX A.4: IMPACT ASSESSMENT REGISTER.....	72
APPENDIX A5: SITE MAP.....	73
APPENDIX A6: SOCIO-ECONOMIC ASSESSMENT	74
APPENDIX A7: HERITAGE ASSESSMENT	74
APPENDIX A8: MOTIVATION WHERE NO ALTERNATIVES ARE CONSIDERED.....	74
APPENDIX A9: BIRD SPECIALIST STUDY.....	75
<u>APPENDICES FOR PART B</u>	<u>76</u>
APPENDIX B1: COMPOSITE MAPS SHOWING ENVIRONMENTAL SENSITIVITY.....	76
APPENDIX B2: IMPLEMENTATION PLAN.....	77

LIST OF TABLES

Table 1: Summary of issues raised and the EAP's response. [To be completed after the consultation period has concluded]	12
Table 2: Priority Red Data bird species habitat assessment (Randell, 2007).....	16
Table 3: List of red data mammals occurring in the quarter degree square 2628AB (IUCN (2001).	17
Table 4: List of red data amphibians occurring in the quarter degree square 2628AB (IUCN (2001).	18
Table 5: Extreme weather occurrences.....	18
Table 6: Issues raised and possible mitigation measure.	33

LIST OF FIGURES

Figure 1: Locality Map.	2
Figure 2: Local setting of the application area in relation to surrounding land uses.	13
Figure 3: General geological map of the application area.....	14
Figure 4: Soil forms	15
Figure 5: Bird study sensitivity map and buffer zones (Randell, 2007).	17
Figure 6: Location of the application area within Ward 100 of the City of Ekurhuleni.....	20
Figure 7: Archaeological and Cultural Heritage sensitivity (Department of Environment, 2017)	21
Figure 8: Paleontological sensitivity (Department of Environment, 2017).	22
Figure 9: Environmental and Infrastructure features within the application area.	25
Figure 10: Land Use map indicating the current land uses within and surrounding the proposed prospecting right area (South African National Biodiversity Institute, 2018).	26
Figure 11: Environmental sensitivity map indicating sensitive areas as identified by the Gauteng Conservation Plan (South African National Biodiversity Institute, 2018).	27
Figure 12: Example of the drilling process and subsequent rehabilitation activities to be undertaken.....	50

ABBREVIATIONS

Abbreviations	Definition
BAR	Basic Assessment Report
CV	Curriculum Vitae
dBA	A-weighted decibel
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental impact assessment
EIR	Environmental Impact Report
EMF	Environmental Management Framework
EMPr	Environmental Management Programme Report
GN	General Notice
Ha	Hectares
I&APs	Interested and/or affected parties
MPRDA	Mineral and Petroleum Resources Development Act
NEMA	National Environmental Management Act
SANS	South African National Standards
WULA	Water Use License Application

1. IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (MPRDA), No. 28 of 2002 as amended, the Minister must grant a prospecting or mining right if among others the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment”.

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment (EIA) and an Environmental Management Programme (EMP) report in terms of the National Environmental Management Act (NEMA), No. 107 of 1998, it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of Regulation 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of Regulation 17(1)(c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template.

Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

The objective of the basic assessment process is to, through a consultative process —

- a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- b) identify the alternatives considered, including the activity, location, and technology alternatives;
- c) describe the need and desirability of the proposed alternatives,
- d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focussed on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within the sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
 - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - (ii) the degree to which these impacts—
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be managed, avoided, or mitigated;
- e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
 - (i) identify and motivate a preferred site, activity and technology alternative;
 - (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and
 - (iii) identify residual risks that need to be managed and monitored.

PART A:
SCOPE OF ASSESSMENT AND BASIC IMPACT ASSESSMENT REPORT

Crushco (Pty) Ltd (Crushco) hold an existing mining right (GP 141 MR) for sand, clay, aggregate and stone aggregate on a portion of the Remaining Extent of Portion 1 of the Farm Tweefontein 191R. As part of future planning, for the existing mine, Crushco wish to investigate (via prospecting activities) the availability of sand, stone and clay resources on the land to the south of their existing operations. Historically the landowner had a prospecting right (GP 194 PR) over the same portion of land, which expired many years ago. Crushco have liaised with the landowner who has verbally consented to the current prospecting right application and has indicated that the information gathered through their historical prospecting activities could be used by Crushco. The land is currently used for agricultural purposes.

3. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) DETAILS OF

(i) Details of the EAP

Lead EAP:	Andrew Nicholson	Assistant EAP:	Greg Coates
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Fax No.:	011 791 3384	Fax No.:	011 791 3384
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(ii) Expertise of the EAP

(1) *The qualifications of the EAP*

<p>Andrew Nicholson:</p> <ul style="list-style-type: none"> • BSc Hons Biological Sciences • Post Graduate Degree in Natural Resource Management • EAPASA Registration: 2019/716 	<p>Greg Coates:</p> <ul style="list-style-type: none"> • BSc Wildlife Science • MSc Zoology
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(2) *Summary of the EAP's past experience*

(In carrying out the Environmental Impact Assessment Procedure).

- Mr Nicholson and Mr Coates have over 19 years and 7 years of experience respectively in the field of environmental management for the mining industry of South Africa.
- See **Appendix A.1** for a full CV and list of projects completed.

b) LOCATION OF THE OVERALL ACTIVITY

Farm Name:	A portion of the Remainder of Portion 1 of the Farm Tweefontein 191R
Application Area (Ha);	576.47 Ha
Magisterial District:	Kemptonpark
Distance and Direction from Nearest Town:	<p>The prospecting right area is close to OR Tambo international airport and is located approximately:</p> <ul style="list-style-type: none"> • 12km north-east of Kempton Park; • 12km south-east of Tembisa; and • 5km south-west of Bapsfontein. <p>See Figure 1.</p>
21 Digit Surveyor General Code for each Farm Portion:	T01R00000000001900001

c) LOCALITY MAP

(Show nearest town, scale not smaller than 1:250000).

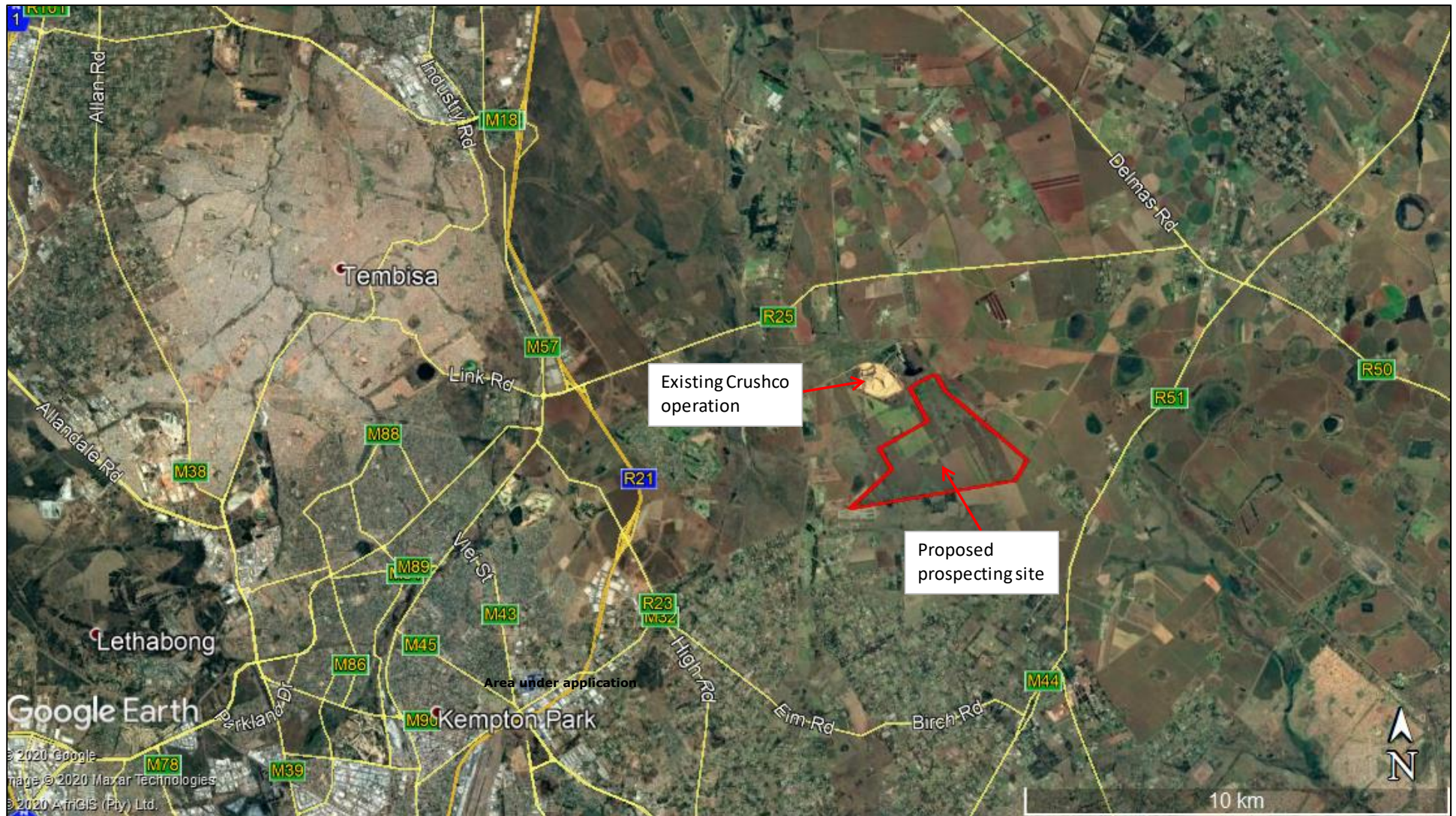


Figure 1: Locality Map.

d) DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

(i) Listed and specified activities

NAME OF ACTIVITY	AERIAL EXTENT	LISTED ACTIVITY	LISTING NOTICE
(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc...etc...etc	Ha or m ²	(Mark with an X where applicable or affected).	GNR 324, GNR 325, GNR 327 (as amended)
Phase 1: Non-invasive prospecting:			
<ul style="list-style-type: none"> Aerial survey and digital terrain model Obtaining and evaluating existing literature Planning infill drilling campaign 	576.47 Ha	X	GNR 327: Activity 20
Phase 2: Invasive prospecting:			
<ul style="list-style-type: none"> Access roads (3m x1km) from existing farm roads Site establishment (drill pad 20x20m) Drilling and Sampling (5 drill sites) 	< 1 Ha	X	GNR 327: Activity 20 GNR 324: Activity 12
Phase 3: Decommissioning and rehabilitation:			
<ul style="list-style-type: none"> Removing all mobile equipment and inspecting for signs of pollution Filling in drill holes and sumps; Ripping compacted areas (drill pads and access roads) Establishment of indigenous vegetation; Removal of alien vegetation 	< 1 Ha	X	GNR 327: Activity 22
Phase 4: Feasibility Study			
<ul style="list-style-type: none"> Environmental specialist studies Feasibility study Preparation of legal authorisation processes to incorporate the prospecting area into the adjacent mining right 	576.47 Ha	X	GNR 327: Activity 20

(i) Description of the activities to be undertaken

(Describe methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity).

The overall goal of the prospecting activities are to investigate the economic viability of the target minerals throughout the prospecting area under application. This will be achieved through implementing phase 1 – 4 as described below.

Phase 1 (Non invasive Prospecting / Planning):

An aerial photograph with the capacity to digitise to determine topographical alterations of 1m will be taken of the prospecting area using a fixed wing aircraft. This photograph will not only be studied by the geologist but will also aid in the planning of a future mine. In addition to the aerial photograph the following literature will be reviewed to confirm the accuracy of the current geological map:

1. Geological map: 2628 East Rand, Scale 1:250 000, 1986, Government Printer, Geological Survey.
2. Geological field map: 2628 AB Benoni, Scale 1:50 000, Unpublished geological map, Geological Survey / Council for Geoscience, Pretoria.
3. Geotechnical map: 2628 AB Benoni, Scale 1:50 000, 2001. Published geotechnical map, Council for Geoscience, Pretoria.

4. Aeromagnetic survey: 2628 AB Benoni (Nov 1976 – May 1977), Scale 1:50 000, Geological Survey, Pretoria.
5. Tolmay Inc Consulting Geologist (1984): Notes on sand prospecting on the farm Tweefontein 413.
6. Airborne satellite photography (ASTER) Satellite Application Centre, CSIR 2002/2003.
7. Orthophoto Map Series: 2628 AB2 Elandsfontein, 2628 AB3 Cilvale, 2628 AB7 Bredell and 2628 AB8 Sesfontein, Fourth Edition 1996, published by Chief Directorate, Surveys and Mapping, Private Bag X10, Mowbray. Map series based on Photography 498/333.
8. Topocadastral map: 2628 AB Benoni, Fifth edition 1995, Scale 1:50 000, Published by Chief Directorate, Surveys and Mapping, Private Bag X10, Mowbray.
9. All historical prospecting information ascertained from the landowner.

All available information from geological maps will be transferred to a new base map. The information obtained from airborne geophysical maps (1:50 000) will also be used to demarcate any geological lineaments, structures or geological contacts. Aerial photographs (old and recent) will be annotated for lithological contacts and geological lineaments (faults, dykes etc), which may influence the distribution and continuity of exploitable sand reserves. From the aerial maps and literature survey, the final proposed positioning of the infill drilling will be determined.

Phase 2 (Invasive Drilling):

In order to understand in detail the location and possibility of future mining of the sand / clay and aggregate and infill drilling campaign will be implemented. The infill drilling campaign will be planned in phase 1 of prospecting. Once geological ideal positions of the boreholes have been identified, an environmental specialist will be requested to confirm that all the boreholes are suitably positioned away from any environmentally sensitive feature (such as a pan). A reputable geological services company with extensive experience in the industry will be responsible for managing the infill drilling programme. It is anticipated that five boreholes will be drilled to a maximum depth of 50m. Access to the borehole sites will be along existing farm tracks. When drilling is undertaken, the following generic procedure will be followed:

- The final drill position will be confirmed between a geologist, environmental specialist and the landowner. The drill position will adhere to the buffer restrictions contained within the management plan.
- Photographs will be taken of the identified access route and drill pad area prior to any physical impact.
- An area of approximately 20 x 20m will be scraped, levelled and demarcated with a temporary fence. Any topsoil removed will be stored adjacent to the drill site
- Two sumps will be dug and lined with plastic
- A temporary storage area will be demarcated within the drill pad location
- Infill drilling will be implemented
- Core will be taken to the a dedicated core shed for cutting and processing
- Samples will be sent to an approved laboratory for analysis. A total of 20 samples will be budgeted for. Sampling includes assay cost, mineralogical costs and other metallurgical tests to determine the grades and ore characteristics essential for the planning of the future mine.
- Once drilling is completed, the drill site will be decommissioned and rehabilitated as per Phase 3..
- Existing accommodation within the area will be used for the drillers.

In addition to the drill rig at a drill site there will be

- a temporary shack,
- a water tanker
- a chemical toilet
- a mobile diesel tank

Photographs 1 and 2 below provide a visual indication of a typical drill site.

Phase 3 (Decommissioning and Rehabilitation):

After drilling has been completed in one area, the drilling team will ensure the site is reverted back to its pre-drilling state by carrying out the following:

- Removing all infrastructures, including the drill rig, the temporary shack, the mobile diesel tank, the mobile water tank and the chemical toilet.
- Plugging the boreholes as per legal requirements.

- Ensure that no foreign matter is left behind on the drill site.
- Refilling the sump required for the drilling activities. Initially the plastic lining will be removed and disposed on in a registered landfill site and the soil returned to effectively fill in the sump.
- The whole drill site will be inspected for any signs of hydrocarbon pollution. Any identified soil which has been polluted as a result of the drilling activities will be removed and disposed of in a registered landfill site.
- Any area compacted as a result of the drill rig will be loosened and any ruts created by accessing or leaving the site for the drilling activity will be filled in to ensure that no future erosion shall emanate from the site.
- Applicable landowner will be requested to inspect the success of the rehabilitation.

Phase 4 (Feasibility Study):

If the results of the preceding phases are positive, all information gathered during the prospecting activities will be summarized in a feasibility report which will document the viability of extending the existing Crushco operation into the prospecting area to extend the life of the current mine. The feasibility study will provide all the information required to generate a mine works programme for a S102 application to extend the existing Cruscho mining right. At this point in time an assessment for all potential legal triggers will be completed and the relevant applications will be compiled.

Based on the environmental screening assessment the area is sensitive for both aquatic and terrestrial biodiversity. A number of small pans have been noted on the 1 in 50 000 map of the area. The relevant specialist studies will be commissioned to determine the sensitivity of the site in relation to possible future mining activities as part of the feasibility study.



Photograph 1: Indication of a typical drill pad area with a drill rig.



Photograph 2: Indication of the sumps required for a typical drilling operation.

e) POLICY AND LEGISLATIVE CONTEXT

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATION CONTEXT?
Constitution of South Africa, specifically every one has a right; <ul style="list-style-type: none"> a. to an environment that is not harmful to their health or well-being; and b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that <ul style="list-style-type: none"> i. prevent pollution and ecological degradation; ii. promote conservation; and iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. 	Entire document	The prospecting activities will only proceed after effective consultation. This proposed prospecting operation will create minimal employment opportunities. Positive benefits mainly lie with the landowner and the applicant.
Minerals and Petroleum Development Resources Act, Act 28 of 2002 (MPRDA) and the MPRDA Amendment Act, Act 49 of 2008	Entire document	The conditions and requirements attached to the granting of the prospecting will apply to the prospecting activities.
National Environmental Management Act, Act 107 of 1998 (as amended)(NEMA)	Entire document	The appropriate environmental authorisation will be obtained before proceeding with any prospecting activities. Measures will be implemented to prevent any pollution occurring during the prospecting activities.
Environmental Impact Assessment Regulations: GNR 324, 325, 326 & 327 of 7 April 2017	Entire document	Listed activities as per the NEMA EIA Regulations have been considered and authorisation is thus required with regards to the triggering activities.
National Water Act, Act 36 of 1998 (NWA)	N/A	A water use license is not required for this application. Water requirements for the proposed operation will be sourced legally and brought to site using a water truck or mobile container.
Regulation 704 (GN704) (Government Gazette 20118, 4 June 1999).	Management measures	Prospecting activities will not take place within 100m of a recognised water course or wetland.
National Environmental Management: Air Quality Act, Act 39 of 2004 (NEMAQA)NEM:AQA	Management measures	Appropriate dust suppression measures will be included in the management plan.
National Environmental Management: Waste Act, Act 59 of 2008 (NEMWA)NEM: WA	Management measures environmental	Although listed activities as per the 2013 NEM:WA Regulations have been considered, it has been determined that a waste licence is not required.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATION CONTEXT?
	awareness plan	All waste generated as a result of the prospecting activities will be disposed of appropriately. Proof of legal disposal will be maintained on site. In addition, the generation of potential waste will be minimised through ensuring employees are subjected to the appropriate environmental awareness campaign before commencement of prospecting activities.
National Heritage Resources Act, 25 of 1999 (“NHRA”)	N/A	Given that this Act has been put into place to protect and conserve heritage resources, the prospecting activities will be halted and a suitably qualified specialist will be contacted if anything of heritage importance is found on the proposed site.
Mine Health and Safety Act	N/A	The employer needs to manage his/her staff and crew in strict accordance with the Mine Health and Safety Act in order to prevent injuries to the staff.
SANS 10103:2008 The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and to Speech Communication	Management / monitoring measures	Used to set the standard allowable for noise generation during the prospecting activities.
SANS 1929:2005 Edition 1.1 – Ambient Air Quality Limits for Common Pollutants	Management / monitoring measures	Used to set the standard for dust generation during the prospecting activities.
South African National Biodiversity Institute – BGIS Landuse Decision Support Tool	Baseline Environment	Used to obtain environmental baseline information about the area.
Ekurhuleni Metropolitan Municipality – Approved Integrated Development Plan 2018/2019	Needs and desirability	Used to identify socio-economic information and spatial development information within which the area falls under.
Guideline on Need and Desirability in terms of the EIA Regulations. Integrated environmental management guideline series 9.	Needs and desirability	Considered when completing the sections on need and desirability.
Gauteng Environmental Management Framework, 2014	Application process, needs and desirability.	Considered when completing the sections on need and desirability.
National Environmental Screening Tool	Baseline Environment	Considered when completing the baseline environmental conditions.

f) NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

The site is located mostly within Zone 3 of the Gauteng Environmental Management Framework (2014) which is categorised as being dominated by areas that are sensitive to development activities and in several cases also have specific values that need to be protected. When specifically considering the activity of mining within this zone, mining is considered to be undesirable however existing legal mining operations should be allowed to continue in this zone provided that it meets the relevant legal requirements in terms of emissions, effluent and noise.

Should prospecting activities prove that there are economically viable minerals available to allow for mining over the application area, this will extend the life of mine of the existing Crushco operation and therefore secure a continued resource for the building and construction industry which would also support priority development within Ekurhuleni as identified in the IDP.

g) MOTIVATION FOR THE PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE

Preferred site: The area applied for is located directly adjacent to the existing Crushco operation and is ideally situated to allow for further expansion of the current operation should future mining be feasible. Prospecting has already been historically undertaken on the same property which suggested a potentially viable resource.

Activities: The prospecting programme as described in Section D of this report is the only option considered to determine the potential unmined resource within the prospecting area covered by this application.

Technological Alternative: Implementing a drilling and sampling campaign are considered by the applicant to be the most effective technology for this particular project to determine a viable resource and therefore no alternatives are considered.

h) FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PREFERRED ALTERNATIVES WITHIN THE SITE

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

(i) Details of the development footprint alternatives considered

With reference to the site plan provided as Appendix A2:, and the location of the individual activities on site, provide details of the alternatives considered with respect to:

(a) The property on which or location where it is proposed to undertake the activity

No development footprint alternative was considered as it is necessary for any expansion of the existing mine to move in the direction of the proposed prospecting area.

(b) The type of activity to be undertaken

The proposed prospecting campaign is standard practice and therefore considered to be the only option that is feasible to achieve the goals of the project.

(c) The design or layout of the activity

The design of the drilling equipment and procedure is standard and therefore no design alternatives are considered. The layout of the drill sites will only be determined during the phase 1 (non-invasive) activities and alternative drill locations will be considered to ensure potential impacts on sensitive areas are first avoided, and then minimised and mitigated.

(d) **The technology to be used in the activity**

Infill drilling is considered by industry to be the most effective technology for this particular project to determine a viable resource and therefore no alternatives are considered.

(e) **The operational aspects of the activity**

Alternative operational aspects could include;

- The timing and duration of implementing the drilling programme is not set. If necessary certain drill sites can be timed to take place when it is more convenient or less impactful.
- Ideally drill activities will occur continuously until such time the hole is completed. If necessary certain holes can be drilled for a 12 hour day and no drilling occurring during the night.

These alternative operational aspects will be considered and finalised after receiving I&AP input from the consultation process.

(f) **The option of not implementing the activity**

Prospecting, including drilling activities in this case, is required in order to generate a SAMREC compliant mineral resource. There is no potential for any future investment in a potential mine without the confirmation of the mineral resources, which can only be obtained from prospecting / exploration activities.

Should the prospecting right be refused, effectively a potential sand, clay and aggregate resource will be sterilised, and the existing Crushco operation will have to close when its current resource is depleted resulting in a loss of product for the local construction industry and the employment associated with the operation.

(ii) Details of the public participation process followed

This section describes the proposed process to be implemented to identify and consult with interested and affected parties and will be updated with specific detail of the process that was actually achieved. Details of the documentation provided and evidence of implementation of the consultation process will be presented in the Appendices of the final document.

Electronic communication will be favoured as the primary form of communication as it is a faster means of communication considering the limited time frames that the application process allows.

Notification of I&APs:

1. I&APs will be identified and where possible e-mail addresses obtained (or postal addresses).
2. Notification letters will be sent via e-mail (or registered mail if specifically requested) [written notification as per Regulation 41(2)(b)] and a Background Information Document (BID) will be sent by e-mail. I&AP will be requested to confirm if they wish to be involved in the process.
3. Site notices will be erected at suitable locations close to the proposed prospecting application site which will be utilised [as per Regulation 41(2)(a)] and include the details described in Regulation 41(3) and comply with the details described in Regulation 41(4).
4. A Newspaper advertisement will be placed in a relevant local newspaper [as per Regulation 41(2)(c)].

Consultation with I&APs:

1. An I&AP register will be maintained as per Regulation 42.
2. Public Meeting: In light of the Covid-19 Pandemic, electronic communication is preferred. If necessary, one on one meetings with I&AP's can be arranged on request.
3. One on One Consultation: The landowner will be consulted through one on one consultation. This option of consultation will be available to any other interested party who requests.
4. Request for Comments: All I&APs will be encouraged and/or requested to indicate their feedback in writing and comment forms will be provided for this purpose.

Particulars of Public Participation Process:

1. The draft Basic Assessment Report [report as per Regulation 19(1)] will be made available for I&AP to review for a period of 30 days [as per Regulation 19(1)], electronically via the Umhlaba web site, and I hard copy at a local library. E-mail and sms notification of the availability of the document will be sent to registered I&AP only.

2. Once the final Basic Assessment Report is completed all registered I&AP will be notified and provided access to the submitted report via the Umhlaba web site. E-mail notification of the availability of the document will be sent to registered I&AP.

The following information will be requested from interested and affected parties;

- To provide information on how they consider that the proposed activities will impact on them or their socio-economic conditions
- To provide written responses stating their suggestions to mitigate the anticipated impacts of each activity
- To provide information on current land uses and their location within the area under consideration
- To provide information on the location of environmental features on site to make proposals as to how and to what standard the impacts on site can be remedied.
- To make proposals as to how the potential impacts on their infrastructure can be managed, avoided or remedied.

(iii) Summary of issues raised by I&APs

A summary of the issues raised by interested and affected parties will be provided in the Table below once this is received by the end of the allocated consultation period. All original feedback received (which will be summarised below) will be provided in the Appendices of the final document.

Table 1: Summary of issues raised and the EAP's response. [To be completed after the consultation period has concluded]

I&AP AND MEANS OF CONSULTATION		DATE	ISSUE RAISED	EAP'S RESPONSE (AS MANDATED BY MINING RIGHT HOLDER)	SECTION OF REPORT IN WHICH ISSUE IS ADDRESSED
<i>Person consulted</i>	<i>Codes in footer¹</i>	<i>Date on which I&AP response was received.</i>	<i>Summary provided below, written feedback provided in Appendix A.5., where available</i>		
Landowner / Lawful Occupiers of Land					
Lawful Occupiers of Adjacent Properties					
Municipality					
Municipal Councillor					
Organs of State & Other Competent Authorities Affected					
Communities					
Other I&AP					

¹ RM=Registered mail, E=Email, M=One on one Meeting, PM=Public Meeting, T=Telephone

(iv) The environmental attributes associated with the development footprint alternatives

(The environmental attributes described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects).

(1) **Baseline Environment**

(a) Type of environment affected by the proposed activity

(Its current geographical, physical, biological, socio-economic, and cultural character).

Local Setting

The application area is located in a gentle flowing landscape which peaks on the eastern side of the prospecting area and gently slopes downward to the western side of the prospecting area. The slope reaches the valley floor on the adjacent property to the west.

Figure 2 shows that the surround landuses include the existing Crushco quarry and future mining area to the north, predominantly agriculture to the east and south, residential to the south-east, and chicken farms to the east.

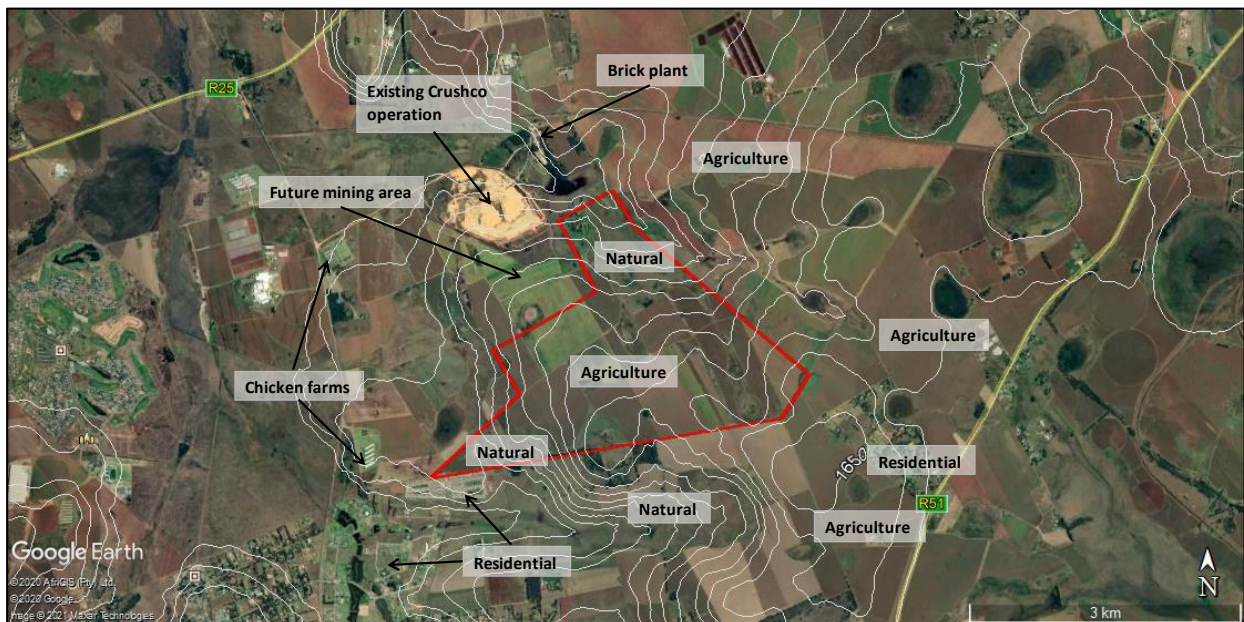


Figure 2: Local setting of the application area in relation to surrounding land uses.

Geology and Soils

The following geological information is extracted from the Prospecting Works Programme submitted as part of the current application.

The quarter degree square (2628AB) in which the prospecting application is located, is underlain by a variety of lithologies, including Swazium granite. Swazian Granite is the oldest sequence of rock which occurs in the vicinity of Glen Marais and North of Benoni. Smaller outcrops are found in the northern portion of the map-sheet area on the farm Tweefontein, extending southwards to the area east of Que Sera.

The overlying Transvaal Supergroup is subdivided into the Black Reef Formation, the Chuniespoort Group in which the Malmani Subgroup occurs and the Pretoria group. The Black Reef Formation consists of conglomerate, quartz arenite and carbonaceous shale. Scattered outcrops occur on the farms Tweefontein, Elandsfontein, Witfontein and Rietfontein. The Malmani subgroup consists of alternating bands of chert bearing and chert-free dolomite with some occurrences of carbonaceous shale and quartz. The overlying Pretoria Group comprises mainly clastic rocks and is characterised by three quartzite units and a volcanic unit, respectively named the Rooihooft, Timeball Hill, Boshhoek and Hekpoort Formations. These rocks occur on the farm Elandsfontein and southward to Tweefontein. The

Timeball Hill Formation is characterised by ferruginous shale giving an erratic magnetic response along magnetic field traverse lines.

The Karoo Supergroup overlies the Transvaal Supergroup. It is subdivided into the Dwyka and Ecca Groups. Glacier activities during the Carboniferous age gave rise to a reworked landscape and a succession known as the Dwyka group comprising of diamictite, with subordinate shale and mudstone containing pebbles gravel and conglomerate. The Ecca Group consist of the Vryheid Formation, which is composed of sandstone and alternating beds of soft sandy shale and some coal seams. The glacier activity (Carboniferous age) removed the geological overburden and exposed relatively weathered granite on the farm Tweefontein. Remnants, and in places a thin veneer of Karoo Supergroup rocks, overlie Swazium Granite on the Farm Tweefontein.

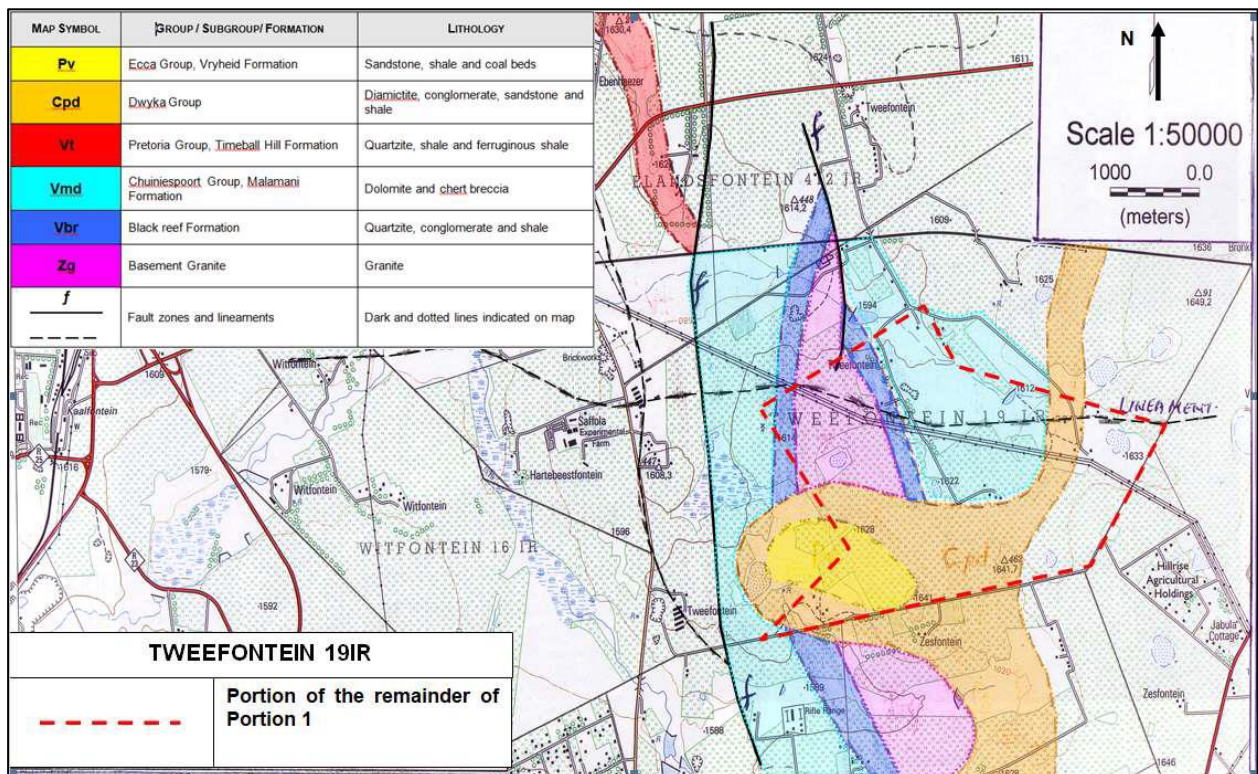


Figure 3: General geological map of the application area.

The following soils information is extracted from the EMP (2006) submitted by the landowner as part of a historical prospecting right application.

The application area is characterised by deep and moderately deep Hutton and Shortlands soil forms, consisting of sandy to loamy soil overlying granite, dolomite and Karoo sediments. Shallower Avalon soil consisting of red sandy loam occurs primarily on the dolomite whilst Katspruit (clayey silt) occurs along the lower lying areas on the Karoo sediments. Figure 3 has been extrapolated from a 1:50 000 soil series map which provides an indication of the soil types expected on the prospecting area. The codes for the various soil forms include:

- Hu – Hutton soil forms
- Ka – Katspruit
- Av – Avalon
- Wa – Wasbank
- Sd – Shortland

In addition to the 1: 50 000 soil series map, the landowner has historically had a full pedological study undertaken on the farm that maps the various soil types and provides the landowner with an indication of the soil

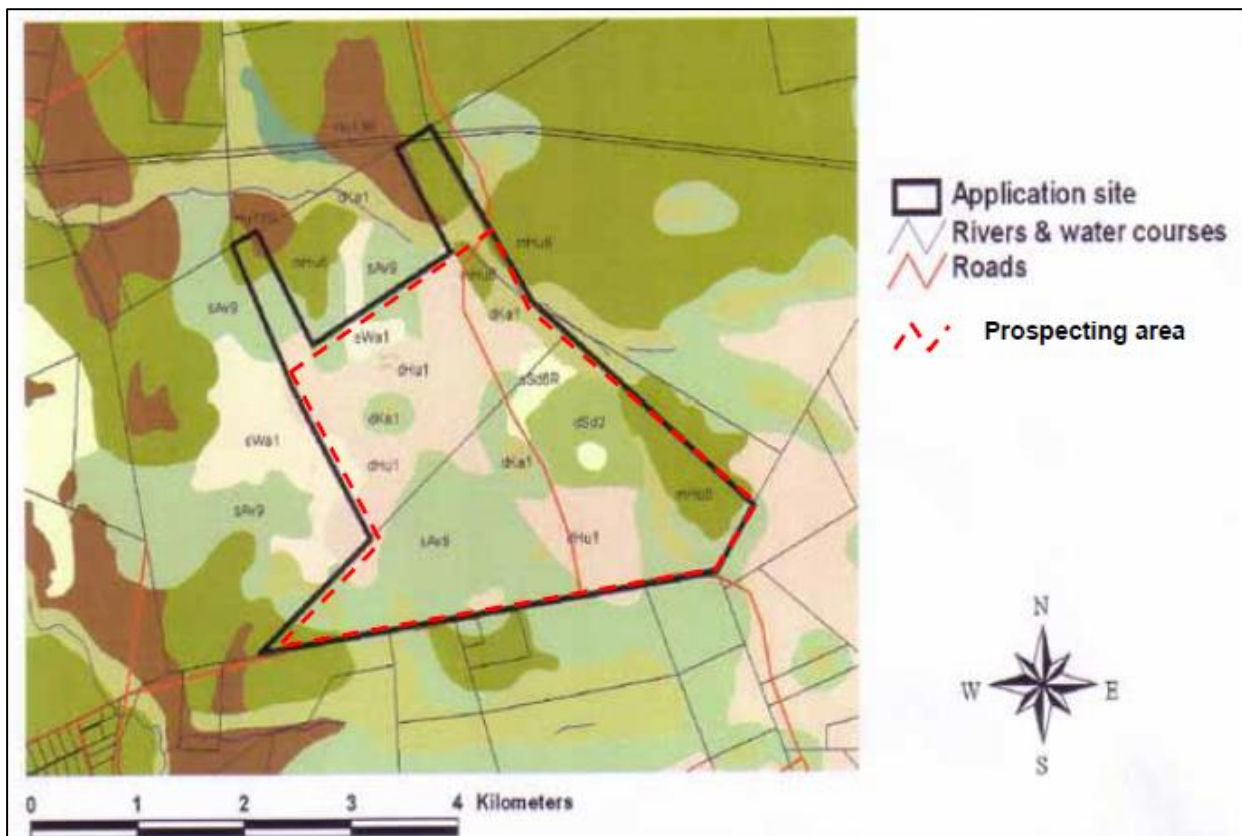


Figure 4: Soil forms

Ecology

Historically the application area has been used for crop production and therefore the natural vegetation over the majority of the application area (>80%) has been transformed from its natural state. The proposed prospecting area is situated in the **Grassland Biome**, and in particular in Acock's *Cymbopogon-Themeda* Veld Type (A48). The following describes what the vegetation in the area would be like if it was not disturbed by the existing land uses.

Synonyms: Moist Cool Highveld Grassland; *Themeda triandra* – *Eragrostis curvula* grassland.

Statistics: 48 959km²; ±72% transformed; 0.29% conserved.

Locality & Physical Geography: This grassland is widespread, covering the central-eastern part of the Highveld in the Free State, as well as the southern and eastern parts of Gauteng. Altitude varies from 1400m to 1600m.

Vegetation: In pristine condition Redgrass (*Themeda triandra*) dominates entirely, and a few other species occur, particularly dicotyledonous forbs. Other grasses often encountered include: Broom Needlegrass (*Triraphis andropogonoides*), Sawtooth Lovegrass (*Eragrostis superba*), Velvet Signalgrass (*Brachiaria serrata*), *Elionurus muticus*, *Heteropogon contortus*, *Cymbopogon plurinodis* and *Setaria spacelata*. Forbs include: Fishbean (*Tephrosia semiglabra*), Wild Petunia (*Ipomoea obscura*), Brown Saffronbush (*Sutera atropurpurea*), *Deverra burchellii*, *Helichrysum rugulosum*, *H. caespitium*, *H. dregeanum*, *Crabbea acaulis*, *Hermannia depressa* and *Rhynchosia totta*. When overgrazed, Weeping Lovegrass (*Eragrostis curvula*) replaces Redgrass (*Themeda triandra*) and becomes dominant. When in poor condition, other elements invade, including: karroid shrubs such as Bitterkaroo (*Pentzia globosa*), Bankruptbush (*Stoebe vulgaris*), Small Bietou (*Osteospermum scariosum*) and *Walafrida densiflora*; woody dwarf shrubs such as Dwarf Buffalothorn (*Ziziphus zeyheriana*) and Elephant's Root (*Elephantorrhiza elephantina*); pioneer grass species such as Tassel Bristlegrass (*Aristida congesta*), Couchgrass (*Cynodon dactylon*), *Eragrostis obtuse*, *Aristida canescens*, *Microchloa caffra* and *Tragus berteronianus*; and forbs such as *Chamaesyce prostate*, Bladderweed (*Hibiscus trionum*) and Rattlebush (*Blepharis integrifolia*).

There are at least four pans within the application area (see Figure 9). Although the pans themselves have not been cultivated, the upper catchments of all pans have either recently been cultivated (fields of harvested maize) or has been cultivated in the past (grassland and alien invasive species). There is also varying degrees of disturbance within the catchments and within the pans.

Little remaining wildlife occurs in the area due to the historical agricultural activities. Commonly occurring species are likely to be restricted to birds and rodents. Previously, a specialist bird survey (Randell, 2007) was commissioned by the landowner for a Prospecting Right Application over the same property. Although the study was conducted some time ago it is considered to still be relevant as activities on the property have not changed since the study and the extent of habitats identified in the study area appear to be unchanged as confirmed by the EAP during a site inspection in January 2021. The landowner has consented that the information gathered through their historical prospecting activities could be used by Crushco for this application.

The commissioning of the survey was outlined as part of the prospecting activities in the approved Environmental Management Plan (EMPlan) at the time and the purpose of the study was to assess the habitat on-site and determine whether it is suitable for foraging, roosting and / or breeding habitat for the sixteen Gauteng's Priority Red Data bird species. The habitats available on-site were evaluated based on their suitability for bird species (focusing on habitat structure) and not based on their floral species composition. Using this evaluation, the site was divided into three habitat types which are listed below:

- Cultivated Lands.
- Grasslands.
- Pans and Wetlands.

A summary of the findings of the study is given below and in Table 2. Reference should also be made to Figure 5.

Impact: Habitat disturbance through excavation of pits and drilling of boreholes.

- In the cultivated lands, the impacts are considered to be of LOW significance and potential impact on Lesser Kestrel, Blue Crane, and Secretary bird.
- In the grasslands, the impacts are considered to be of LOW significance and potential impact on Lesser Kestrel, Blue Crane, and Secretary bird.
- In the wetlands, HIGH to LOW significance, depending on the time of year when activities are undertaken. Species most likely to be impacted include African Marsh Harrier, African Grass-owl, Greater Flamingo, and Lesser Flamingo.

Management: Management of impacts on wetlands.

- Delineate buffers in conjunction with a wetland survey in order to protect both the habitat required by the priority bird species and those required for the continued functioning of the wetlands. At no time may prospecting activities take place within the areas marked as HIGH sensitivity.
- Prospecting in the vicinity of the "wetland" habitat (outside of the areas of HIGH sensitivity) must be undertaken between September and February (outside the African Grass-owl breeding period).

Table 2: Priority Red Data bird species habitat assessment (Randell, 2007).

Priority Species	Potential for Occurrence On-site	Potential Use of Habitat		
		Foraging	Roosting	Breeding
<i>Gorsachius leuconotus</i> White-backed Night Heron	very LOW			
<i>Gyps coprotheres</i> Cape Vulture	very LOW			
<i>Polemaetus bellicosus</i> Martial Eagle	very LOW			
<i>Cirrus ranivorus</i> African Marsh Harrier	MEDIUM to HIGH	HIGH		
<i>Falco naumanni</i> Lesser Kestrel	LOW to MEDIUM	LOW to MEDIUM	LOW	LOW
<i>Anthropoides paradiseus</i> Blue Crane	LOW			
<i>Podica senegalensis</i> African Finfoot	very LOW			
<i>Eupodotis senegalensis</i> White-bellied Korhaan	very LOW			
<i>Tyto capensis</i> African Grass-Owl	HIGH	HIGH	HIGH	HIGH
<i>Ciconia nigra</i>	very LOW			

Black Stork				
<i>Phoenicopterus ruber</i>	HIGH	HIGH		
Greater Flamingo				
<i>Phoenicopterus minor</i>	HIGH	HIGH		
Lesser Flamingo				
<i>Sagittarius serpentarius</i>	LOW to HIGH	MEDIUM		
Secretarybird				
<i>Alcedo semitorquata</i>	very LOW			
Half-collared Kingfisher				
<i>Mirafra cheniana</i>	very LOW			
Melodious Lark				
<i>Buphagus erythrorhynchus</i>	very LOW			
Redbilled Oxpecker				

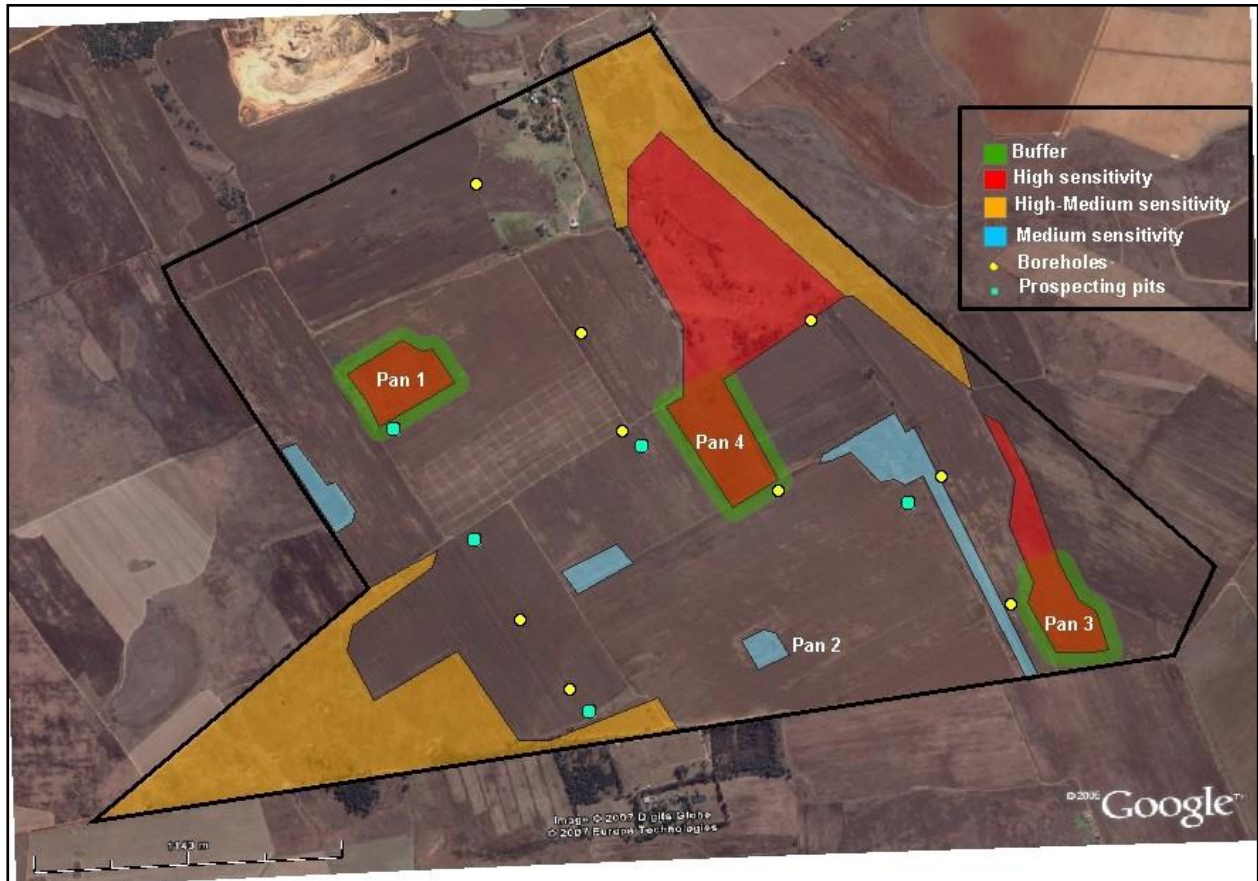


Figure 5: Bird study sensitivity map and buffer zones (Randell, 2007).

Table 3 and Table 4 present the red data mammal and amphibian species occurring in the quarter degree square within which the application area is located. An indication of habitat suitability within the application area to support these species, and the probability of these species being present is also given. It is important to note that this is a desktop survey of the potential red data species that could occur in the quarter degree square and a qualitative assessment whether the site has the suitable habitat to support the red data species.

Table 3: List of red data mammals occurring in the quarter degree square 2628AB (IUCN (2001)).

Scientific Names	Common Names	SARDB	Habitat suitability on site	Probability of occurrence on site
Mammals				
<i>Mystromys albicaudatus</i>	White-tailed rat	EN	Yes	Yes
<i>Ourebia ourebi</i>	Oribi	EN	No	No
<i>Neamblysomus julianae</i>	Juliana's golden mole	VU	No	No
<i>Rhinolophus blasii</i>	Peak-saddle horseshoe bat	VU	No	No
<i>Amblysomus septentrionalis</i>	Highveld golden mole	NT	No	No
<i>Atelerix frontalis</i>	South African hedgehog	NT	Yes	Yes
<i>Dasymys incomtus</i>	Water rat	NT	No	No
<i>Hyaena brunnea</i>	Brown hyaena	NT	No	No
<i>Leptailurus serval</i>	Serval	NT	No	No
<i>Lutra maculicollis</i>	Spotted-necked otter	NT	No	No
<i>Mellivora capensis</i>	Honey badger	NT	Yes	Yes
<i>Miniopterus schreibersii</i>	Schreiber's long-fingered bat	NT	No	No
<i>Myotis tricolor</i>	Temminck's hairy bat	NT	No	No
<i>Myotis welwitschii</i>	Welwitsch's hairy bat	NT	No	No
<i>Pipistrellus rusticus</i>	Rusty bat	NT	No	No
<i>Rhinolophus clivosus</i>	Geoffroy's horseshoe bat	NT	No	No
<i>Rhinolophus darlingi</i>	Darling's horseshoe bat	NT	No	No

Table 4: List of red data amphibians occurring in the quarter degree square 2628AB (IUCN (2001).

Scientific Names	Common Names	SARDB	Habitat suitability on site	Probability of occurrence on site
<i>Pyxicephalus adspersus</i>	Giant bullfrog	NT	Yes	Yes

Climate

The following weather information is taken from the revised EIAr by Gouws (2011) compiled for the Crushco S102 application on the property adjacent to the current application area.

The climate of the project area can best be described as semi-arid to dry. It is typically hot during the summer months with occasional very cold conditions in winter, often with severe frost. The average daily temperature variation is 15°C. The annual rainfall, which is mainly in the form of thunderstorms, is typically between 500 to 650 mm but can vary between 290 to 840 mm. The rainy season occurs between November and March with a peak in February. Between 50 and 80 rainy days can be expected. In 12% of all years, there are severe drought conditions.

The wind statistics for O R Tambo was as taken as representative of the area. Summer winds are normally mild and blow from the northwest, except during short spells prior to thunderstorms or a change in weather conditions when it blows from the south. During winter cold southerly winds blow as a result of cold fronts. Black frost occurs periodically during such conditions.

The evaporation for the area is taken as similar to that experienced at OR Tambo International Airport where a total of 2 160 mm evaporates from an American Class-A pan.

Table 5: Extreme weather occurrences

Weather feature	Incidence
Frost	Frequently from mid-April and occur as late as September
Hail	4 to 6 times per year
High winds above 40km per hour:	16 days per year
Drought	Occurs periodically

Socio-economic

The purpose of this section is to provide the baseline social and economic information of the area in which the application area is located. The study area is therefore defined as the Ekurhuleni Metropolitan Municipality and the data used is from the 2011 census (Statistics SA, 2011) and the approved IDP (City of Ekurhuleni Metropolitan Municipality, 2018/2019). More specifically, the application area is situated within Ward 100 as indicated in Figure 6.

The City of Ekurhuleni emerged over seventeen years ago as a key Metropolitan Municipality in Gauteng comprising of approximately two million inhabitants living in an agglomeration of nine small towns and seventeen townships. The amalgamation of two existing regional entities, namely Kyalami Metropolitan and the Eastern Gauteng Services Council served as the beginning of the now large City that accommodates a population of about 3.5 million inhabitants. At the heart of the City's plans and service delivery operations are the communities of, Tembisa, Katlehong, Vosloorus, Duduza, Daveyton and Thokoza that collectively house over 68% of the City's total population.

The City's population has grown exponentially since its establishment in the year 2000. The population has nearly doubled in the last seventeen years from an estimated 2 368 283 in the year 2000 to 3379104 in 2016. The City's population growth rate is steady at 2.47% per annum, coming down from a high of 4% per annum in the period between 1996 and 2001. The current population represents over 6% of the total population of South Africa. An important feature of growth in the Ekurhuleni population is the net migration into the City. Ekurhuleni, together with Tshwane and Johannesburg are the largest recipients of in-migration in the country.

The structure of the City of Ekurhuleni's economy is dominated by four sectors: manufacturing, finance and business services, community services and general government and to a lesser extent the trade and hospitality sector. Over the past 15 years, major structural shifts have occurred in the structure of the economy principally involving the decline of the dominance of the manufacturing sector which dropped from 30.3% in 2000 to 22.7% in 2015 and a comparable increase of the contribution of the finance and business services sector which increased its share from 14.8% in 2011 to 21.3% in 2015. The continuing decline of the manufacturing sector is a big challenge for the municipality and for that reason the revitalization of the manufacturing sector is a key strategic focus area for the municipality.

The City has a median age of 30 and 66% of the population is between the ages of 18-64, 18% is below the age of 18 and 6% is above the age of 65. The city has a relatively young population which is about the same rate as that of Gauteng Province. In terms of employment, there are about 1,6 million economically active individuals (i.e. those who are employed or unemployed but looking for work) residing within the municipality. Of these, 28,8% are unemployed. When the youth (15–34 years) are considered, there are about 840 000 economically active individuals, 36,9% of whom are unemployed.

Key statistics for the City of Eurhuleni include:

Total population	3,178,470	Growth rate	2,47% (2001-2011)
Young (0-14)	24,3%	Population density	1609 persons/km ²
Working Age (15-64)	71,7%	Number of households	1,015,465
Elderly (65+)	4%	Number of Agricultural households	69,013
Dependency ratio	39,4	Average household size	2,9
Sex ratio	105	Formal dwellings	77,4%
Unemployment rate	28,8%	Housing owned/paying off	44%
Youth unemployment rate	36,9%	Flush toilet connected to sewerage	85%
No schooling aged 20+	3,6%	Weekly refuse removal	88,4%
Higher education aged 20+	14,6%	Piped water inside dwelling	57,2%
Matric aged 20+	35,4%	Electricity for lighting	82,2%
Female headed households	31,3%		

Archaeological, Cultural Heritage and Paleontological

To the knowledge of the landowner and Crushco, there are no archaeological, cultural heritage and paleontological sites of interest within the application area. Figure 7 and Figure 8 give the respective sensitivities according to the National Screening Tool (Department of Environment, 2017) which indicates high sensitivities in mainly the areas identified as sensitive habitats in previous sections of this report (see Figure 9). No invasive prospecting activities will be permitted within sensitive habitats or within the respective buffer zones illustrated in Appendix B1 which means that any artefacts potentially in these areas will not be disturbed.

Given that the remainder of the application area is already disturbed by cultivation, it is likely that if any artefacts were present in these areas, they would have already been destroyed. Therefore, it is considered that the likelihood of discovering any artefacts is low and no specialist study was commissioned.

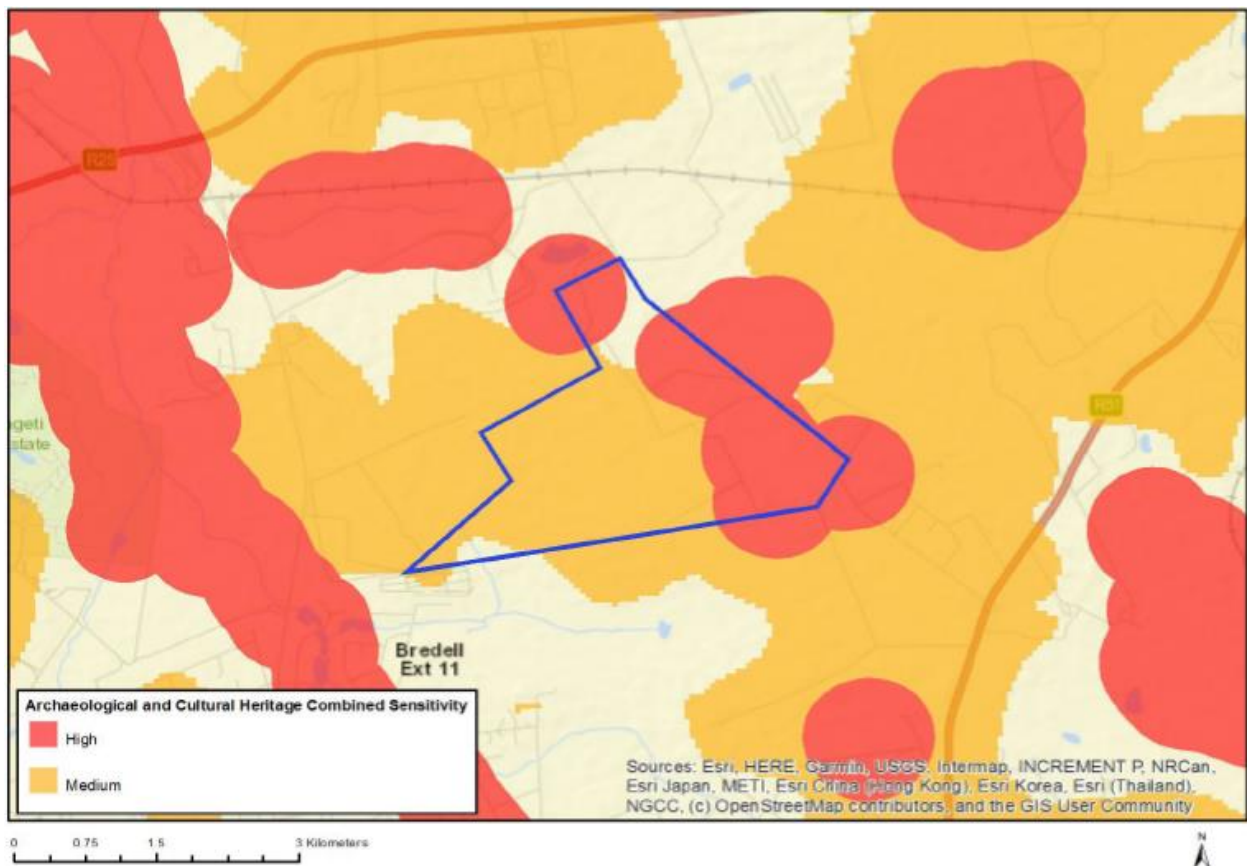


Figure 7: Archaeological and Cultural Heritage sensitivity (Department of Environment, 2017)

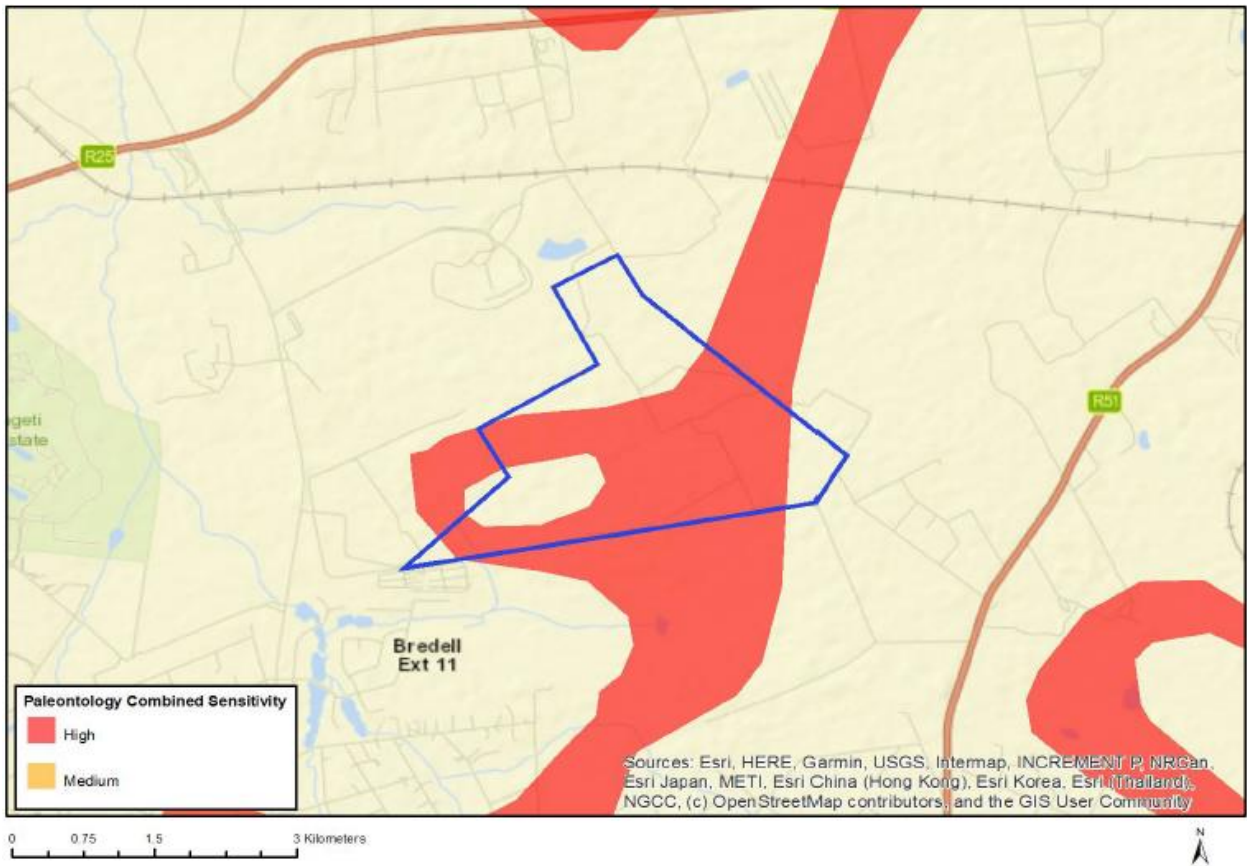


Figure 8: Paleontological sensitivity (Department of Environment, 2017).

(b) Description of the current land uses

The majority of the site has been ploughed for the cultivation of crops (Photo 1 and Figure 10). Areas that have not been cultivated are grassland areas around the pans and the corridors between the cultivated lands. Some of the grassland areas include stands of exotic trees.



Photo 1: Indication of the two crop types currently being cultivated (A. Nicholson, Jan 2021).

(c) Description of specific environmental features and infrastructure on the site

Infrastructure within the proposed prospecting area is mostly that associated with farming. This includes a homestead and a barn/workshop located in the northern section of the application area (see Figure 9). A fairly extensive network of gravel roads exists throughout the area to facilitate crop production and harvesting with all roads being well-maintained. Eskom transmission lines traverse horizontally across the northern section of the application area.

Figure 11 presents the Gauteng Conservation Plan (South African National Biodiversity Institute, 2018) which classifies that the proposed prospecting area comprises:

- Protected areas (0%)
- Critical biodiversity area ($\pm 20\%$)
- Ecological support area ($\pm 80\%$)

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services.

The primary purpose of a map of Critical Biodiversity Areas and Ecological Support Areas is to guide decision-making about where best to locate development. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. It is the biodiversity sector's input into multi-sectoral planning and decision-making processes.

Some natural pans exist within the application area and while the remaining critical biodiversity areas and pans have been largely avoided by recent agricultural activities, the ecological support areas have been historically transformed by cultivation (Figure 10). Photo 2 and Photo 3 give an indication of the grassland habitats and pans still existing within the application area.



Photo 2: Indication of the grassland habitats within the application area (A. Nicholson, Jan 2021).



Photo 3: Indication of a typical pan area (A. Nicholson, Jan 2021).



Figure 9: Environmental and Infrastructure features within the application area.

(d) *Environmental and current land use maps*

(Show all environmental, and current land use features).

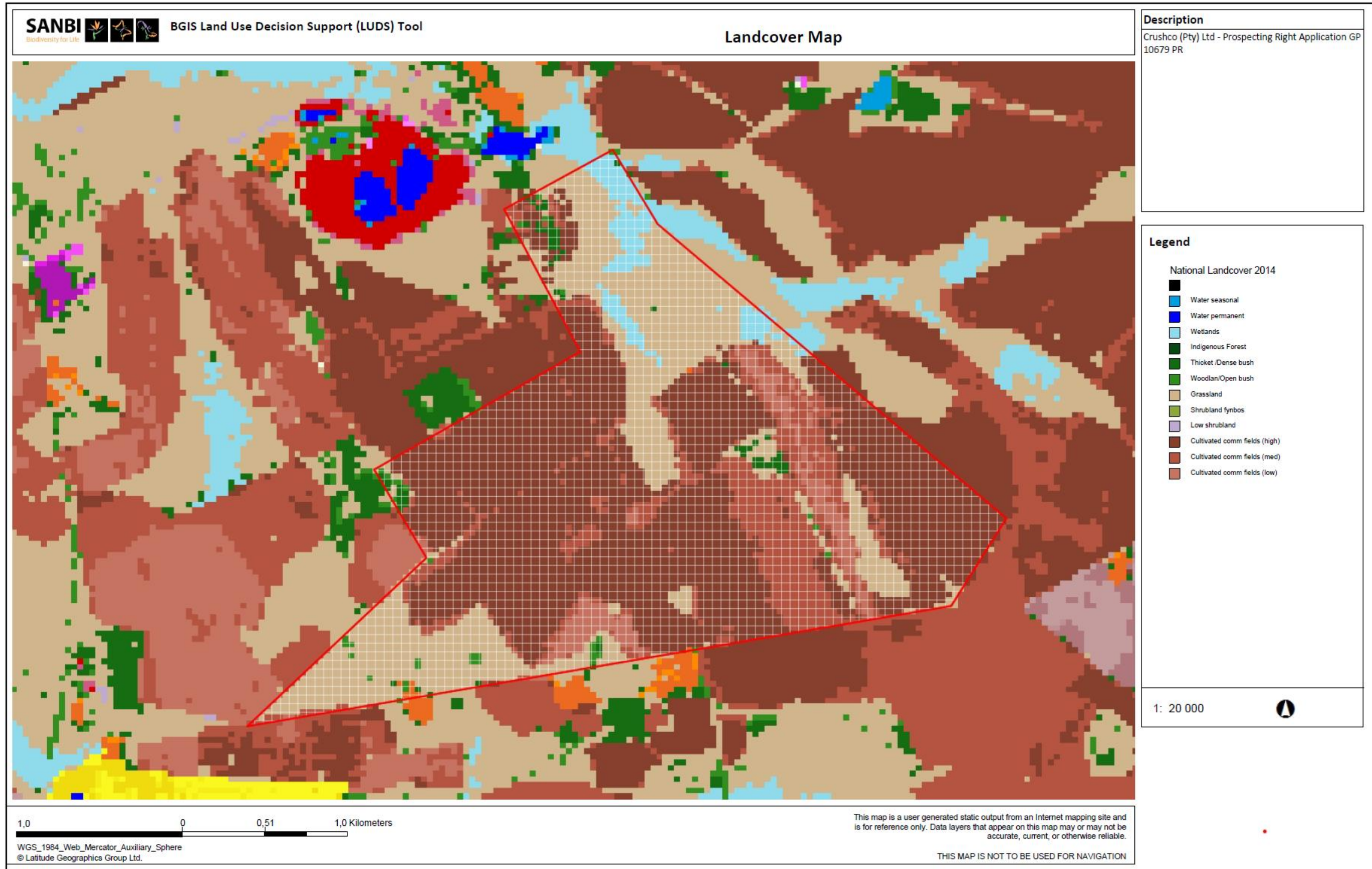


Figure 10: Land Use map indicating the current land uses within and surrounding the proposed prospecting right area (South African National Biodiversity Institute, 2018).

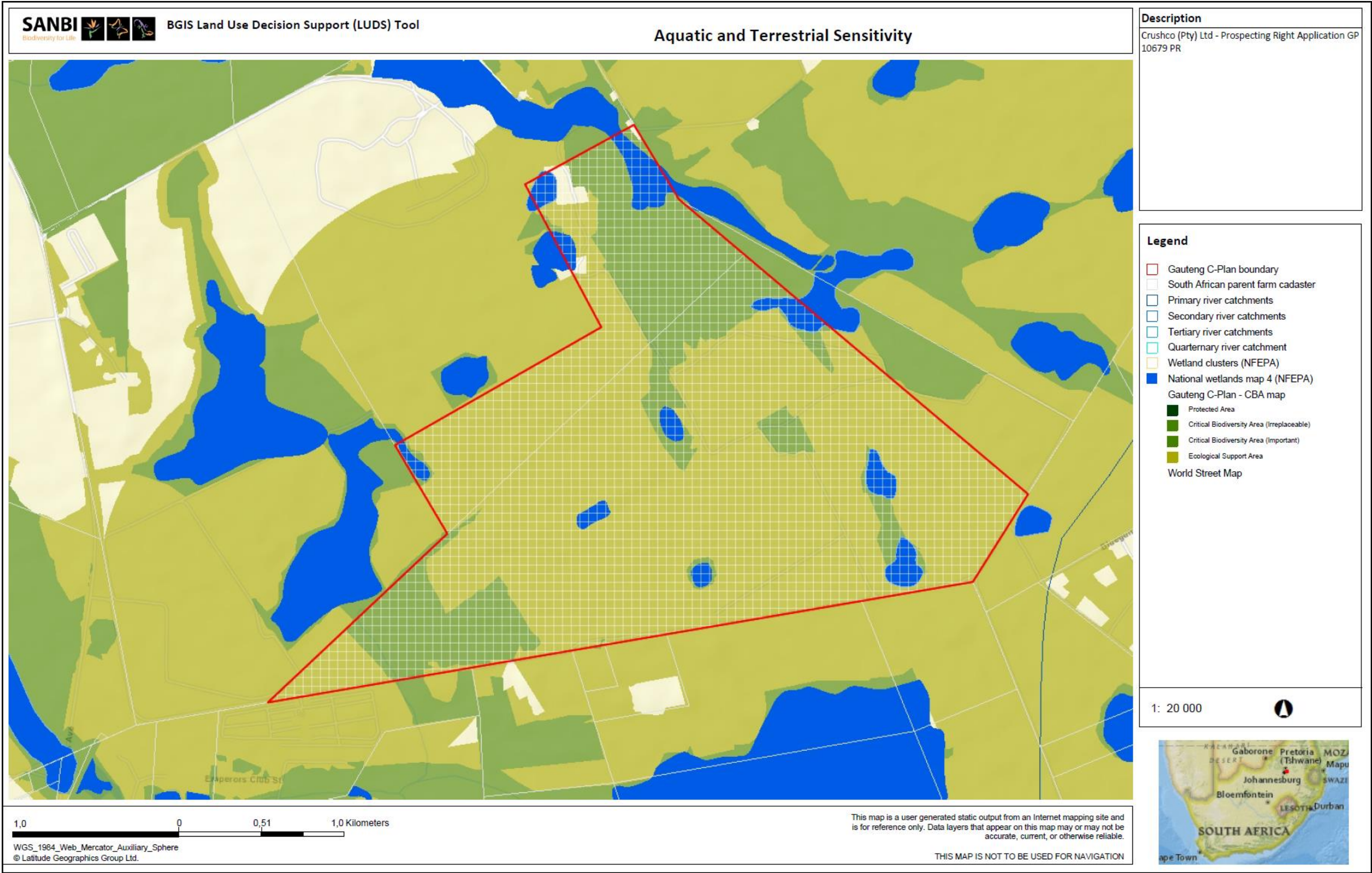


Figure 11: Environmental sensitivity map indicating sensitive areas as identified by the Gauteng Conservation Plan (South African National Biodiversity Institute, 2018).

(v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

The table below will be updated based on the feedback received from Interested and Affected Parties during the consultation process.

Phase	Activity <i>Description of the physical activities that will cause the impacts</i>	Aspect	Source / Cause <i>Description as to how the activity may cause the impact</i>	Impact <i>A description of the impact that may result from the activity</i>	Consequence				Probability	External Factors		Ranking <i>Significance (WITHOUT controls)</i>	Reverability of impact	NEMA Hierarchy <i>Avoid / Manage / Mitigate (Definitions on page 6.1)</i>	
					Nature	Extent	Duration	Frequency		I&AP	Cumulative				
Application for Authorisations	Basic Assessment: - GNR 327 Activity 20 - application for a prospecting right - GNR 327 Activity 22 - decommissioning - GNR 324 Activity 12 - clearing more than 300sqm of natural vegetation	Socio-economic	Application in terms of EIA regulations to NEMA	Legal and responsible prospecting	Pos	Medium	Local	Medium	Annually or less	High	No	No	Medium	Yes - impact ceases when prospecting stops.	Manage
Non-Invasive Prospecting	• Aerial survey and digital terrain model • Obtaining and evaluating existing literature • Planning infill drilling campaign	Socio-economic	Commencing with non-invasive prospecting activities over the application area.	Potential decrease in property values Altering of the sense of place of the local area.	Neg	Low	On-site	Medium	6 Monthly	Low	No	No	Low	Yes - impact reverses when prospecting ceases	Manage
Invasive Prospecting	• Access roads (3m x1km) from existing farm roads • Site establishment (drill pad 20x20m) • Drilling and Sampling (5 drill sites)	Air quality	Dust generation from stripping activities, using dirt access tracks, implementing drilling and exhaust emissions	Increased local dust fallout	Neg	Low-Med	Neighbouring	Very short	Monthly	Low	No	Yes	Low-Medium	Yes - impact reverses when drilling stops	Manage
		Noise nuisance	Noise generated from vehicle / drilling operations	Increased ambient noise levels	Neg	Low-Med	Neighbouring	Very short	Monthly	Low	No	Yes	Low-Medium	Yes - impact reverses when drilling stops	Manage & Mitigate
		Visual	Drill rig temporarily visible	Sense of place altered by visible drill rigs	Neg	Low-Med	Neighbouring	Very short	Monthly	Low	No	Yes	Low-Medium	Yes - impact reverses when drilling stops	Manage
		Water	Hydrocarbon spills / spills from chemical toilets entering a water course / wetland	Pollution of a water resource	Neg	Medium	Local	Short	Monthly	Medium	No	Yes	Medium	Yes - impact reverses when pollution source is removed.	Avoid, Manage & Mitigate
		Soil	Soil is not stored for rehabilitation requirements / soil is altered through hydrocarbon spills, compaction or erosion	Degradation of soil quality effecting the ease to implement rehabilitation activities	Neg	Med-High	On-site	Medium	Monthly	Low	No	Yes	Low-Medium	Yes - impact reverses once drill sites are rehabilitated.	Manage
		Fauna / flora (Ecology)	Stripping of flora and impacting on habitats when clearing a drill pad area or creating a new access track.	Destruction of flora and impact on habitats	Neg	Med-High	On-site	Medium	Monthly	Medium	No	Yes	Medium	Yes - impact reverses once drill sites are rehabilitated.	Avoid & Manage
		Agriculture	Stripping of crops when clearing a drill pad area or creating a new access track.	Loss of crop yield	Neg	Low-Med	On-site	Medium	Monthly	Medium	No	Yes	Medium	Yes - impact reverses once drill sites are rehabilitated.	Manage
		Heritage	Clearing of area for the drill pad may effect a heritage resource.	Loss of a heritage resource	Neg	High	On-site	Permanent	Annually or less	Improbable	No	No	Low	Yes - impact reverses when invasive prospecting ceases.	Avoid
		Social	Unauthorised access to land. Lack of consideration of landowners requests. Not rehabilitating land.	Unhappy landowners / land occupiers	Neg	Med-High	On-site	Long	Monthly	Improbable	No	Yes	Low-Medium	Yes - impact reverses when invasive prospecting ceases.	Avoid & Manage
Decommissioning and Rehabilitation	Concurrent rehabilitation of drill pads upon completion of drilling activities	All environmental aspects and socio-economic impacts on interested and affected parties	Implementation of successful concurrent rehabilitation activities	Reverse the temporary negative impacts associated with the drilling activities.	Pos	Medium	On-site	Medium	Monthly	High	No	No	Medium	N/A	Manage
Mining Feasibility	Resource statement Prefeasibility study Specialist studies Bankable feasibility study Preparation for Mining Authorisation	All environmental aspects and socio-economic impacts on interested and affected parties	Specialist requiring access to properties to complete various studies	Social impacts	Neg	Low-Med	On-site	Very short	6 Monthly	Low	No	No	Low	Yes - impact reverses when invasive prospecting ceases.	

(vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

The Umhlaba Impact Ranking Tool is a quantitative manner of investigating, assessing and evaluating the potential impacts / risks resulting from the activities associated with the proposed activity on the receiving environment; i.e. the biophysical, socio-economic and cultural heritage environment.

Legal Requirements:

The Umhlaba Impact Ranking Tool has been developed taking cognisance of the requirements of the MPRDA, The 2014 EIA regulations of the NEMA and the requirements of ISO 14001.

Regulation 50(c) of GNR 527 to the MPRDA, stipulates that the Environmental Impact Assessment (EIA) must include “an assessment of the **nature, extent, duration, probability** and **significance** of the identified potential environmental, social and cultural impacts of the mining operation, including the **cumulative** environmental impacts”.

Appendix 3, (3)(j) of GNR 982 of NEMA stipulates that the “assessment of each identified potentially significant impact and risk, including – (i) **cumulative** impacts, (ii) the **nature**, significance and consequence of the impact and risk, (iii) the **extent** and **duration** of the impact and risk, (iv) the **probability** of the impact and risk occurring, (v) the **degree** to which the impact and risk can be **reversed**, (vi) the **degree** to which the impact and risk may cause **irreplaceable loss of resources**; and (vii) the **degree** to which the impact and risk can be **mitigated**”.

ISO 14001, Section 4.3.1 Environmental Aspects stipulates that “the organisation shall establish, implement and maintain a procedure

- a) to identify the environmental aspects of its activities, products and services within a defined scope of the environmental management system that it can control and those that it can influence taking into account planned or new developments, or new or modified activities, products and services, and
- b) to determine those aspects that have or can have significant impacts on the environment”

When considering the above requirements and the purpose of this report, the significance of impacts / risks will be determined through the implementation of the Umhlaba Impact Ranking Tool as described below.

Definitions: The terms “environment”, “activity”, “aspect” and “impact” will be used technically throughout this document, and so it is important to explain what is meant by each term in the context of the Impact Assessment.

- **Environment (as defined in NEMA):** The **surroundings within which humans exist and that are made up of;**
 - the land, water and atmosphere of the earth;
 - micro-organisms, plant and animal life;
 - any part or combination of the above, and the interrelationships among and between them; and
 - the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing;
- **Activity:** A specific deed, action or function, that takes place at the Operation, such as;
 - Drilling
 - Vehicle movement on site
 - Breaking up concrete foundations.
- **Aspect:** Considered to be a direct effect of an *activity*, which has an influence on the *environment* (and is neither categorised as positive or negative), such as;
 - Drilling will results in noise, the noise being the *aspect* of the *activity*.
- **Impact:** The end-result of an *aspect* that occurred due to an *activity*, resulting in an influence on the *environment*, which is either categorised as positive or negative (a subjective categorisation), such as;
 - Drilling will results in noise (*aspect*) which can be a nuisance to surrounding I&AP (the *impact*).

Criteria to Consider when Determining Significance: The ranking of impacts / risks (also known as determination of significance) is estimated using two criteria, namely *Consequence* and *Probability*. These consider the contributing factors / criteria listed in the legislation. The definitions of each are provided below. The **Consequence** of an impact resulting from an aspect is expressed as a combination of:

Nature of impact: An indication of the extent of the damage (negative impacts) or benefit (positive impacts) the impact inflicts on natural, cultural, and/or social functions (environment).

Extent of impact: A spatial indication of the area impacted (i.e. how far from activity the impact is realised).

Duration of impact: A temporal indication of the how long the effects of the impact will persist, assuming the activity creating the impact ceases. For example, the impact of noise is short lived (impact ceases when activity ceases) whereas the impact of removing topsoil exists for a much longer period of time.

Frequency of the aspect occurring: An indication of how often an aspect, as a result of a particular activity, is likely to occur. Note that this does not assess how often the impact occurs. It applies only to the aspect. For example blasting takes place monthly and haulage daily while the resultant frequency of the impacts occurring will vary based on a number of factors.

The **Probability** of an impact resulting from an aspect is expressed as:

- **Probability** of impact occurring: An estimated indication of the potential for an impact to occur.

The **Significance** of an impact: Considering Consequence and Probability (defined above), Significance is an indication of how serious a negative impact is anticipated to be and how beneficial a positive impact may be. Significance is considered to be High, Medium-High, Medium, Low-Medium or Low. A description of the ranking process is provided below.

It must also be noted that the final significance ranking of an impact will take cognisance of other aspects specified in the legislation, such as:

- Cumulative impacts
- Impacts / Issues raised by interested and affected parties (I&AP).

How these are incorporated in the ranking is explained below.

Significance Ranking of Impact / Risk:

Consequence and Probability

Using the criteria listed in the legislation, scores are assigned to each the criteria, as outlined in the table below. The scoring range in the table has been selected to represent the scale in which varying impacts can occur. The combination of scores is then used to determine the **Consequence** and **Probability**, as described below.

- Consequence is expressed as the sum of all criteria in order to get a score out of 100.
- Probability of the impact occurring is expressed as a score out of 100.

Scoring for environment impact assessment criteria.

CONSEQUENCE	NATURE OF IMPACT:		
	Low	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are not affected.	1
	Low-Medium	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are affected insignificantly.	5
	Medium	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are altered.	10
	Medium-High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are severely altered.	15
	High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes will temporarily or permanently cease.	25
	EXTENT OF IMPACT:		
	On-site	Impact occurs on-site (within the boundary of the application area).	1
	Neighbouring	Impact occurs within a 5km radius of the site.	5
	Local	Impact occurs within a 20km radius of the site.	10
	Regional	Impact occurs within a 100km radius of the site.	15
	National	Impact occurs within South Africa.	25
	DURATION OF IMPACT:		
	Very Short-term	The impact will cease within 1 week if the activity is stopped.	1
	Short-term	The impact will cease within 6 months if the activity is stopped.	5
Medium-term	The impact will cease within 1 years if the activity is stopped.	10	
Long-term	After the operational life of the operation.	15	
Permanent	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.	25	
FREQUENCY OF OCCURRENCE OF THE ACTIVITY:			
Annually or less	Activity occurs at least once in a year or less frequently.	1	
6 months	Activity occurs at least once in 6 months.	5	
Monthly	Activity occurs at least once a month.	10	
Weekly	Activity occurs at least once a week.	15	
Daily	Activity occurs daily.	25	
PROBABILITY	PROBABILITY OF POTENTIAL OCCURRENCE OF THE IMPACT:		
	Improbable	The possibility of the impact materialising is very low either because of design or historic experience.	10
	Low	The possibility of the impact materialising is low either because of design or historic experience.	30
	Medium	There is a possibility that the impact will occur.	60
	High	There is a distinct possibility that the impact will occur.	80
	Definite	The impact will occur regardless of any prevention measures.	100

The **final significance** ranking of an impact will also take cognizance of;

- Impacts / Issues raised by **Interested and Affected Parties**: For new and existing operations, I&AP will be consulted, either during the compilation of the impact assessment (for new operations) or part of an existing / on-going consultation process (for existing operations). During this consultation process, I&AP will identify concerns relating to impacts resulting from activities associated with the operation. Impacts identified by I&AP's will be assigned additional scoring.
- **Cumulative Impacts**: Cumulative Impacts will be considered where an off-site activities (not related to the operation being evaluated) will result in the same impact at the receptors being considered.

Below is a summary of the influence of external factors on final significance scoring:

EXTERNAL FACTOR	DESCRIPTION	POINTS TO ADDED
Concern raised by I&AP	Unresolved Impact rasied as a concern by an I&AP	100
Cumulative impact	Impact can be considered cumulatively with off site impacts	50

The final significant ranking takes cognisance of the initial scoring plus any additional score associated with allocating an external factor. At no time can the sum total of all the scores exceed 1000.

The significance of an impact is considered to be classified into one of the following; High, Medium-High, Medium, Low-Medium or Low. Each of the classified impact has a scoring band into which it falls. The band has been determined by a combination of 25 years of experience of Umhlaba employees. The definition of each classification is provided below and focuses on the need for mitigation or management.

Low (4 – 60)	Management measures may not be necessary, but in some instances are encouraged to ensure that the impact remains of Low significance.
Low-Medium (61-200)	Management measures are usually encouraged to ensure that the impacts remain of Low-Medium significance.
Medium (201-400)	Management measures are required to ensure, at minimum, the significance of the impact does not increase.
Medium-High (401-650)	Management measures are required to reduce the significance of the impact to, at least, Medium significance.
High (>651)	Impact should be avoided, or if not possible, managed to reduce the significance of the impact to, at least, Medium significance (where possible).

Additional Factors that do not contribute to the Significance of an Impact

After completing the determination of significance of an impact, there are additional factors, which in terms of NEMA which need to be considered. NEMA stipulates that the impact assessment must consider the following for “each identified potentially **significant impact**”; namely;

- “the degree to which the impact can be reversed”,
- “the degree to which the impact may cause irreplaceable loss of resources”, and
- “the degree to which the impact can be mitigated.”

The Umhlaba tool regards a “significant impact” as one with an initial ranking of medium or higher.

Although these factors are important in the evaluation of the impacts (particularly for new developments), they will not be applicable to all impacts and hence, may not influence the significance rating of an impact (explained below).

- **Degree to which the Impact can be Reversed:** An indication to the degree to which the impact can be reversed will be provided. Three categories have been allocated:
 - **Not possible:** Once the impact has occurred it will be permanent and cannot be reversed.
 - **Potentially:** With appropriate management and mitigation measures there is a potential the impact can be reduced / reversed.
 - **Likely:** With appropriate management and mitigation measures there is a good likelihood that the impact can be reduced / reversed.
- **Degree to which the Impact can be Mitigated:** This requirement is essentially achieved by determining significance before consideration of controls and then the significance after the consideration of management controls. The difference between the before and after controls is an indication of the “degree to which the impact can be mitigated”.
- **Degree to which the Impact may cause Irreplaceable Loss of Resources:** Aspects that need to be considered in terms of irreplaceable loss of resources should be discussed at the beginning of the impact assessment. An example is the removal of geological material.

(vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties).

No alternatives have been considered. The impacts identified with this application have been presented in Section v above.

(viii) The possible mitigation measures that could be applied and the level of risk

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

This section can only be completed after receiving I&AP feedback at the end of the consultation period.

Table 6: Issues raised and possible mitigation measure.

COMMENTS RECEIVED ON THE DRAFT & REVISED SCOPING REPORT	
I&AP COMMENTS RAISED	POSSIBLE MITIGATION MEASURES TO ADDRESS I&AP COMMENTS

(ix) Motivation where no alternative sites were considered

There is no layout alternative for a drill site. The final positioning of a drill site can be slightly altered to accommodate landowner requirements (within reason).

(x) Statement motivating the alternative development location within the overall site.

(Provide a statement motivating the final site layout that is proposed).

No alternate development locations have been considered at this time as the final drill sites will only be determined during phase of prospecting. The final positioning of a drill site can be slightly altered to accommodate landowner requirements (within reason).

i) FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE (IN RESPECT OF THE FINAL SITE LAYOUT PLAN) THROUGH THE LIFE OF THE ACTIVITY

(Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures).

The below process was followed for a screening level impact assessment in order to determine the potential impacts of the proposed activities to be assessed in more detail during the Basic Assessment process. The full process undertaken to assess and rank impacts is outlined in Section 3(g)(vi) and the complete results of the assessment is given in Appendix A.4.

Considering the baseline environment, the proposed activities were evaluated against all the below environmental attributes to identify potential impacts / risks.

Environmental Attributes (presented alphabetically):	
• Aesthetics / Visual affects	• Sites of heritage & cultural interest
• Air Quality / Dust	• Soil
• Ecology / Fauna and Flora	• Socio-economic
• Geological features / subsidence	• Surface water
• Ground water	• Topography
• Noise / Sound levels	• Vibration
• Sensitive receptors	• Safety

All potential impacts were then categorised as follows:

The “informed by” section in the table below, were categorised into;

- Known impact (an impact that is known by experience)
- Identified by I&AP’s
- Identified by Specialist (if applicable)

The probability of the impacts were then categorised into;

- Improbable
- Probable and
- Definite

The duration of the impact were then categorised into;

- Short term (impact will cease within 6 months)
- Medium term (impact will cease within 5 years)
- Permanent

Using the above definitions, the identified impacts were classified as either potentially significant or insignificant;

- Insignificant impacts / risks were described but not assessed any further.
- Potentially significant impacts / risks were subjected to further assessment during the Basic Assessment process to determine the significance of the impact / risk in order to assign the appropriate management measures.

Impacts deemed to be potentially significant were assessed further using the Umhlaba Impact Assessment tool as outlined in Section (vi) above and mitigation measures developed accordingly.

j) ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

The following assessment is the proposed potentially significant impacts based on current knowledge. Should further information be provided by I&AP's that requires inclusion / amendment to the assessment below, this will be updated after the consultation process has been completed.

The complete supporting impact assessment conducted by the EAP is attached as Appendix A.4.

Phase	Activity	Aspect	Source / Cause	Impact	Ranking	Controls / Management Measures Implemented				Significance (WITH controls)	
						Significance (WITHOUT controls)	Effective Engineering	Effective Procedural	Effective Training		Effective Monitoring / Maintenance
Application for Authorisations	Basic Assessment: - GNR 327 Activity 20 - application for a prospecting right - GNR 327 Activity 22 - decommissioning - GNR 324 Activity 12 - clearing more than 300sqm of natural vegetation	Socio-economic	Application in terms of EIA regulations to NEMA	Legal and responsible prospecting	Pos	Medium	No	No	No	No	Medium
Non-Invasive Prospecting	• Aerial survey and digital terrain model • Obtaining and evaluating existing literature • Planning infill drilling campaign	Socio-economic	Commencing with non-invasive prospecting activities over the application area.	Potential decrease in property values Altering of the sense of place of the local area.	Neg	Low	No	No	No	Yes	Low
Invasive Prospecting	<ul style="list-style-type: none"> • Access roads (3m x1km) from existing farm roads • Site establishment (drill pad 20x20m) • Drilling and Sampling (5 drill sites) 	Air quality	Dust generation from stripping activities, using dirt access tracks, implementing drilling and exhaust emissions	Increased local dust fallout	Neg	Low-Medium	No	Yes	No	Yes	Low-Medium
		Noise nuisance	Noise generated from vehicle / drilling operations	Increased ambient noise levels	Neg	Low-Medium	No	Yes	Yes	Yes	Low-Medium
		Visual	Drill rig temporarily visible	Sense of place altered by visible drill rigs	Neg	Low-Medium	No	No	Yes	Yes	Low-Medium
		Water	Hydrocarbon spills / spills from chemical toilets entering a water course / wetland	Pollution of a water resource	Neg	Medium	No	Yes	Yes	Yes	Low-Medium
		Soil	Soil is not stored for rehabilitation requirements / soil is altered through hydrocarbon spills, compaction or erosion	Degradation of soil quality effecting the ease to implement rehabilitation activities	Neg	Low-Medium	No	Yes	No	Yes	Low-Medium
		Fauna / flora (Ecology)	Stripping of flora and impacting on habitats when clearing a drill pad area or creating a new access track.	Destruction of flora and impact on habitats	Neg	Medium	Yes	No	No	No	Low-Medium
		Agriculture	Stripping of crops when clearing a drill pad area or creating a new access track.	Loss of crop yield	Neg	Medium	Yes	No	No	No	Low-Medium
		Heritage	Clearing of area for the drill pad may effect a heritage resource.	Loss of a heritage resource	Neg	Low	No	Yes	Yes	Yes	Low
Social	Unauthorised access to land. Lack of consideration of landowners requests. Not rehabilitating land.	Unhappy landowners / land occupiers	Neg	Low-Medium	Yes	Yes	Yes	No	Low		
Decommissioning and Rehabilitation	Concurrent rehabilitation of drill pads upon completion of drilling activities	All environmental aspects and socio-economic impacts on interested and affected parties	Implementation of successful concurrent rehabilitation activities	Reverse the temporary negative impacts associated with the drilling activities.	Pos	Medium	No	No			Medium
Mining Feasibility	Resource statement Prefeasibility study Specialist studies Bankable feasibility study Preparation for Mining Authorisation	All environmental aspects and socio-economic impacts on interested and affected parties	Specialist requiring access to properties to complete various studies	Social impacts	Neg	Low	No	Yes	Yes	Yes	Low

k) SUMMARY OF SPECIALIST REPORTS

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form).

Due to the nature of the proposed activities and the relative environmental and socio-economic sensitivities identified in the receiving environment (see Section 3(iv)), no specialist studies have been commissioned for this application. Previously, a specialist bird survey (Randell, 2007) was commissioned by the landowner for a Prospecting Right Application over the same property. Although the study was conducted some time ago it is considered to still be relevant as activities on the property have not changed since the study and the extent of habitats identified in the study area appear to be unchanged as confirmed by the EAP during a site inspection in January 2021. The landowner has consented that the information gathered through their historical prospecting activities could be used by Crushco for this application.

The impact assessment has otherwise been largely informed by existing information from the established Crushco operation, land use decision making tools such as the South African National Biodiversity Institute's BGIS and the National Environmental Screening Tool. The Integrated Development Plan for the City of Ekurhuleni was also used.

Due to the nature of prospecting activities, any sensitive areas noted on site, such as pans, can easily be avoided through the implementation of the buffers committed to within this report.

Based on the environmental screening assessment the area is sensitive for both aquatic and terrestrial biodiversity. Should the prospecting campaign be successful in identifying a viable resource, the relevant specialist studies will be commissioned to determine the sensitivity of the site in relation to possible future mining activities.

l) ENVIRONMENTAL IMPACT STATEMENT

(xi) Summary of the key findings of the environmental impact assessment

The **key findings** from the environmental impact assessment can be summarised as follows;

The most significant positive impacts, ranked as **Medium** prior to consideration of management measures, includes;

- **Socio-economic** – Prospecting will be undertaken legally and responsibly as determined through the application process and granting of an environmental authorisation.
- **Reversing of impacts** - Successful implementation of the decommissioning and rehabilitation plan stipulated in the Environmental Management Programme will reverse the temporary impacts associated with the prospecting activities.

The most significant negative impact, ranked as **Medium** prior to consideration of management measures is;

- **Water** - Hydrocarbon spills / spills from chemical toilets entering a water course / wetland resulting in water pollution.
- **Fauna / flora (Ecology)** - Stripping of flora and impacting on habitats when clearing a drill pad area or creating a new access track resulting in destruction of flora and habitats.
- **Agriculture** - Stripping of crops when clearing a drill pad area or creating a new access track causing a loss of crop yield.

All negative impacts can be either avoided, managed or mitigated with the implementation of controls such as engineering, procedural, training and monitoring/maintenance (see Impacts Assessment in Appendix A4). The significance of the impact on water, ecology and agriculture is reduced to Low-Medium if the relevant controls are implemented.

(xii) Final site map

(Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. Attach as Appendix A5:).

The site map attached in Appendix A5. provides an indication of the proposed extent of the prospecting area. The final locations of the drill sites will be determined during phase 1 of the prospecting campaign.

(xiii) Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives

No alternatives have been considered. The positive and negative impacts listed above are applicable to the proposed activity.

m) PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR

(Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPR as well as for inclusion as conditions of authorisation).

The following management measures are the proposed measures based on current knowledge and assessment. Should further information be provided by I&AP's that requires inclusion / amendment to the proposed management measures below, this will be updated after the consultation process has been completed.

Activity		Aspect	Source / Cause	Impact		Reverability of impact	NEMA Hierarchy
Phase	Description of the physical activities that will cause the impacts		Description as to how the activity may cause the impact	A description of the impact that may result from the activity			Avoid / Manage / Mitigate (Definitions on page 6.1)
Application for Authorisations	Basic Assessment: - GNR 327 Activity 20 - application for a prospecting right - GNR 327 Activity 22 - decommissioning - GNR 324 Activity 12 - clearing more than 300sqm of natural vegetation	Socio-economic	Application in terms of EIA regulations to NEMA	Legal and responsible prospecting	Pos	Yes - impact ceases when prospecting stops.	Manage
Non-Invasive Prospecting	<ul style="list-style-type: none"> Aerial survey and digital terrain model Obtaining and evaluating existing literature Planning infill drilling campaign 	Socio-economic	Commencing with non-invasive prospecting activities over the application area.	Potential decrease in property values Altering of the sense of place of the local area.	Neg	Yes - impact reverses when prospecting ceases	Manage
Invasive Prospecting	<ul style="list-style-type: none"> Access roads (3m x1km) from existing farm roads Site establishment (drill pad 20x20m) Drilling and Sampling (5 drill sites) 	Air quality	Dust generation from stripping activities, using dirt access tracks, implementing drilling and exhaust emissions	Increased local dust fallout	Neg	Yes - impact reverses when drilling stops	Manage
		Noise nuisance	Noise generated from vehicle / drilling operations	Increased ambient noise levels	Neg	Yes - impact reverses when drilling stops	Manage & Mitigate
		Visual	Drill rig temporarily visible	Sense of place altered by visible drill rigs	Neg	Yes - impact reverses when drilling stops	Manage
		Water	Hydrocarbon spills / spills from chemical toilets entering a water course / wetland	Pollution of a water resource	Neg	Yes - impact reverses when pollution source is removed.	Avoid, Manage & Mitigate
		Soil	Soil is not stored for rehabilitation requirements / soil is altered through hydrocarbon spills, compaction or erosion	Degradation of soil quality effecting the ease to implement rehabilitation activities	Neg	Yes - impact reverses once drill sites are rehabilitated.	Manage
		Fauna / flora (Ecology)	Stripping of flora and impacting on habitats when clearing a drill pad area or creating a new access track.	Destruction of flora and impact on habitats	Neg	Yes - impact reverses once drill sites are rehabilitated.	Avoid & Manage
		Agriculture	Stripping of crops when clearing a drill pad area or creating a new access track.	Loss of crop yield	Neg	Yes - impact reverses once drill sites are rehabilitated.	Manage
		Heritage	Clearing of area for the drill pad may effect a heritage resource.	Loss of a heritage resource	Neg	Yes - impact reverses when invasive prospecting ceases.	Avoid
		Social	Unauthorised access to land. Lack of consideration of landowners requests. Not rehabilitating land.	Unhappy landowners / land occupiers	Neg	Yes - impact reverses when invasive prospecting ceases.	Avoid & Manage
Decommissioning and Rehabilitation	Concurrent rehabilitation of drill pads upon completion of drilling activities	All environmental aspects and socio-economic impacts on interested and affected parties	Implementation of successful concurrent rehabilitation activities	Reverse the temporary negative impacts associated with the drilling activities.	Pos	N/A	Manage
Mining Feasibility	Resource statement Prefeasibility study Specialist studies Bankable feasibility study Preparation for Mining Authorisation	All environmental aspects and socio-economic impacts on interested and affected parties	Specialist requiring access to properties to complete various studies	Social impacts	Neg	Yes - impact reverses when invasive prospecting ceases.	Manage

n) ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

(Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation).

The implementation of the environmental management measures contained within this report must form part of the condition of the authorisation. Crushco must not conduct any invasive activities within sensitive habitats or within the following buffer zones (see Appendix B1):

- 100m from the Eskom powerlines.
- 100m from the closest edge of any water course.
- 100m from any identified pan / wetland
- 50m away from any other structures / heritage sites

The landowner must be reconsulted at least 1 month prior to implementing any invasive activities. Any reasonable concerns from the landowner must be considered

o) DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

(Which relate to the assessment and mitigation measures proposed).

When considering the uncertainties in this assessment it is important to note that EIA processes are not an exact science and impacts can only be evaluated on the information that is currently available and through past experience. Due to the fact this application **only** allows for drilling, the physical impacts are anticipated to be restricted and the majority of impacts and appropriate mitigations measures are known.

Whilst no specialist studies have been conducted it is proposed that the available literature and guidance sourced for the baseline section of this report provides enough certainty to evaluate potential impacts on the receiving environment sufficiently. Therefore no knowledge gaps are identified at this time.

p) REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

(i) Reasons why the activity should be authorized or not

It is the author's opinion that this application **should** be authorised for the following reasons:

- The proposed activities are limited and temporary in nature.
- The impact assessment has indicated that negative impacts from the proposed activities can be controlled to an acceptable level through appropriate mitigation and management measures.
- The proposed project fits with activities already taking place on the adjacent property (existing Crushco operation).
- The proposed site is itself already transformed from its natural state through historical activities of agriculture.
- The positive result of the proposed project will extend the life of the existing Crushco operation which will secure a building product that will support local development, including IDP projects in nearby communities which are identified as priority areas.

(ii) Conditions that must be included in the authorisation

(1) Specific conditions to be included into the compilation and approval of EMPr

The following conditions should form part of the authorisation;

The implementation of the environmental management measures contained within this report must form part of the condition of the authorisation. Crushco must not conduct any invasive activities within sensitive habitats or within the following buffer zones (see Appendix B1):

- 100m from the Eskom powerlines.
- 100m from the closest edge of any water course.
- 100m from any identified pan / wetland
- 50m away from any other structures / heritage sites

The landowner must be reconsulted at least 1 month prior to implementing any invasive activities. Any reasonable concerns from the landowner must be considered.

(2) **Rehabilitation requirements**

After drilling has been completed in one area, the drilling team will ensure the site is reverted back to its pre-drilling state by carrying out the following:

- Removing all infrastructures, including the drill rig, the temporary shack, the mobile diesel tank, the mobile water tank and the chemical toilet.
- Plugging the boreholes as per legal requirements.
- Ensuring that no foreign matter is left behind on the drill site.
- Refilling the sump required for the drilling activities. Initially the plastic lining will be removed and disposed on in a registered landfill site and the soil returned to effectively fill in the sump.
- Inspecting the whole drill site for any signs of hydrocarbon pollution. Any identified soil which has been polluted as a result of the drilling activities will be removed and disposed of in a registered landfill site.
- Loosening compacted areas as a result of the drill rig and any ruts created by accessing or leaving the site for the drilling activity must be filled in to ensure that no future erosion shall emanate from the site.
- Confirming the the success of the rehabilitation to the landowners satisfaction.

q) PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

This application is for an Environmental Authorisation of Five years for prospecting activities. If prospecting has not be completed within the 5 year period the applicant will have the opportunity to renew the right for a further 3 years providing for an 8 year time period maximum.

r) UNDERTAKING

(Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic assessment report and the Environmental Management Programme report).

An undertaking to meet the requirements of this section is provided at the end of this EMPr.

s) FINANCIAL PROVISION

(State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation).

Rehabilitation costs have been calculated and budgeted for as per the Prospecting Works Programme. As decommissioning and rehabilitation will be done concurrently the majority of this cost is catered for as an operational expense. A preliminary estimate for final rehabilitation is approximately **R 50 000**.

(i) Explain how the aforesaid amount was derived

In reality the rehabilitation requirements of a drill pad forms part of the contractual arrangement between Crushco and the drilling company employed to implement drilling activities. However in order to adhere to the financial provision requirements of the DMRE a financial allocation has been provided for rehabilitation requirements of the drill pads. The allocation was calculated based on the split provided in the Table below.

Aspect requiring rehabilitation	Financial allocation
Capping borehole; and Loosening area compacted by drill rig (5 boreholes @ R 4000.00 each)	R 20 000.00
Removing infrastructure (5 boreholes @ R 500.00 each)	R 2 500.00
Filling sump (5 boreholes @ R 1000.00 each)	R 5 000.00
Cleaning up potential spillages (5 boreholes @ R 2000.00 each)	R 10 000.00
Fixing ruts (5 boreholes @ R 500.00 each)	R 2 500.00
Total	R 40 000.00
Contingency	R 10 000.00

Aspect requiring rehabilitation	Financial allocation
Total for prospecting programme (5 drill sites)	R 50 000.00

(ii) Confirm that this amount can be provided for from operating expenditure

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

The calculated financial provisioning amount has been provided for as an operational cost in the Prospecting Works Programme submitted as part of the application process.

t) SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

(i) Compliance with the provisions of sections 24(4)(a) and (b) read with section 24(3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998), the EIA report must include the:-

(1) Impact on the socio-economic conditions of any directly affected person

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an Appendix A6: Socio-Economic Assessment.

No specialist investigation was conducted for this application however socio-economic impacts are considered in the impact assessment register based on the information obtained from the Integrated Development Plan for the City of Ekurhuleni. **Should specific socio-economic impacts be raised by I&AP's during the consultation period these will be included in the updated assessment of impacts already identified when finalising the report.**

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix A7: Heritage Assessment and confirm that the applicable mitigation is reflected in ~~2.5.3, 2.11.6. and 2.12.~~ the EMP Report² herein).

Eskom has powerlines traversing the northern section of the application area which will be avoided completely by adhering to a 50m buffer from the powerlines. No known cultural or heritage interests have been identified within the application area however management measures have been included to avoid or mitigate any cultural or heritage interests that may be discovered during the implementation of the proposed activities.

u) OTHER MATTERS REQUIRED IN TERMS OF SECTION 24(4)(A) AND (B) OF THE ACT

(The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as an Appendix A8: Motivation).

² The template provided on the DMR website has reference to numbered sections of this report that do not exist and hence have been crossed out and amended by underlined text.

With reference to Section 24(4)(b)(i), no alternatives have been considered as the site layout proposed in Appendix A2 is defined by the available geological information and historical prospecting results pertaining to the application area.

PART B:
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

This environmental management programme report have been compiled in line with the template provided by the Department of Minerals and Resources and Energy. However to assist in the implementation of the required management measures, an implementation plan which only provides the mitigation measures is contained in **Appendix B2**

a) DETAILS OF THE EAP

(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section ~~1(a)~~3(a)³ herein as required).

The requirement for the provision of the details and expertise of the EAP are already included in PART A, Section 3(a).

b) DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (3)(h) herein as required d).

The requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, Section 3(d).

c) COMPOSITE MAP

(Provide a map (attached in Appendix B1: composite maps showing Environmental Sensitivity) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers).

A composite map illustrating the environmental sensitivity of the site is given in Appendix B.1.

d) DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

(i) Determination of closure objectives

(Ensure that the closure objectives are informed by the type of environment described in the baseline environment herein).

The closure objectives for the activities contained within this application is to revert any land impacted by drilling activities to the same condition prior to drilling having taken place .

(ii) Volumes and rate of water use required for the operation

A water use license will not be required for the implementation of a drilling campaign. All water required for drilling will be obtained from a pre-existing legal source.

(iii) Has a water use licence been applied for?

A water use license will not be required for the implementation of a drilling campaign. All water required for drilling will be obtained from a pre-existing legal source.

³ The template provided on the DMR website has an error in the reference to a former section of this report. This has been crossed out and amended by underlined text.

(iv) Impacts to be mitigated in their respective phases

(Measures to rehabilitate the environment affected by the undertaking of any listed activity).

And

e) IMPACT MANAGEMENT OUTCOMES

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph (b));

And

f) IMPACT MANAGEMENT ACTIONS

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) (d) and (e)⁴ will be achieved).

Phase	Activity	Aspect	Source / Cause	Impact		Reverability of impact	NEMA Hierarchy	Impact Management Actions	Impact Management Outcomes	Timeframe	Compliance
	Description of the physical activities that will cause the impacts		Description as to how the activity may cause the impact	A description of the impact that may result from the activity			Avoid / Manage / Mitigate (Definitions on page 6.1)	Appendix 4(1)(f)(i): Actions to be implemented in order to achieve Impact Management Objectives	Appendix 4(1)(d): A description of the impact management outcomes.	Appendix 4(1)(l): Time period for Implementation of Impact Management Actions	Appendix 4(1)(ii): Environmental Management Standards / Practices
Application for Authorisations	Basic Assessment: - GNR 327 Activity 20 - application for a prospecting right - GNR 327 Activity 22 - decommissioning - GNR 324 Activity 12 - clearing more than 300sqm of natural vegetation	Socio-economic	Application in terms of EIA regulations to NEMA	Legal and responsible prospecting	Pos	Yes - impact ceases when prospecting stops.	Manage	A Basic Assessment process must be undertaken by an independent and competent person, that adheres to the requirements of the EIA regulations. Once authorised, the conditions of the EA must be strictly adhered to.	The proposed activities are legally authorised and are implemented in a manner that minimises impacts on the natural, social and economic environments.	Throughout planning, operational and decommissioning phases	EIA Regulations
Non-Invasive Prospecting	<ul style="list-style-type: none"> Aerial survey and digital terrain model Obtaining and evaluating existing literature Planning infill drilling campaign 	Socio-economic	Commencing with non-invasive prospecting activities over the application area.	Potential decrease in property values Altering of the sense of place of the local area.	Neg	Yes - impact reverses when prospecting ceases	Manage	<p>No invasive activities are to be planned or undertaken within any sensitive habitats. The following buffer zones must also be respected during planning:</p> <ul style="list-style-type: none"> 100m from the Eskom powerlines. 100m from the closest edge of any water course. 100m from any identified pan / wetland 50m away from any other structures / heritage sites <p>Prior to commencing any invasive activities a photographic gallery of the current state of the area to be subjected to disturbance must be recorded. Photographs should be taken of:</p> <ul style="list-style-type: none"> Each proposed drill pad The status of existing access routes The status of the environment of planned new access tracks. Any other area subjected to invasive activities. These photographs will be used to prove effective rehabilitation. <p>Existing accommodation in the area to be used for the drillers</p> <p>Only security to be allowed to stay at drill sites on a permanent basis</p>	Optimal planning for invasive prospecting that minimises impacts on the natural, social and economic environments.	Throughout planning phase	NA
Invasive Prospecting	<ul style="list-style-type: none"> Access roads (3m x1km) from existing farm roads Site establishment (drill pad 20x20m) Drilling and Sampling (5 drill sites) 	Air quality	Dust generation from stripping activities, using dirt access tracks, implementing drilling and exhaust emissions	Increased local dust fallout	Neg	Yes - impact reverses when drilling stops	Manage	Ensure that the (drill) equipment used has appropriate dust suppression systems. Do not undertake invasive activities if high winds taking dust offsite.	Off-site dust fallout rates are below the residential / non-residential standard (as applicable) On-site dust fallout rates are below the site specific target	Throughout operational phase	NEM:AQA, GN827
		Noise nuisance	Noise generated from vehicle / drilling operations	Increased ambient noise levels	Neg	Yes - impact reverses when drilling stops	Manage & Mitigate	<ul style="list-style-type: none"> When drilling occurs in an area that can be heard by surrounding residents, drilling activities will be restricted to daylight hours (unless permission to drill for longer is obtained from the closest community). Documented proof of this permission must be maintained. Staff will be supplied with the appropriate PPE. The timing of implementing drilling programme is not set. If necessary certain drill sites can be timed to occur when receptors are less likely to be impacted. This will be confirmed during the pre-drilling consultation. 	Noise levels emanating from prospecting activities are kept below the acceptable standard	Throughout operational phase	ECA, NEM:AQA, SANS 10103

⁴ The template provided on the DMR website has an error in the reference to a former section of this report. This has been crossed out and amended by underlined text.

	Visual	Drill rig temporarily visible	Sense of place altered by visible drill rigs	Neg	Yes - impact reverses when drilling stops	Manage	<ul style="list-style-type: none"> The drill site must be organised with good housekeeping practices being implemented at all times. Drill site must be completed timeously with possible delays avoided through good management and contingencies in place. 	The visual appearance of the drilling sites is kept neat and tidy during drilling and the site is returned back to its former state as soon as possible.	Throughout operational phase	NA
	Water	Hydrocarbon spills / spills from chemical toilets entering a water course / wetland	Pollution of a water resource	Neg	Yes - impact reverses when pollution source is removed.	Avoid, Manage & Mitigate	<ul style="list-style-type: none"> Chemical toilets to be provided at the drill site for sanitation requirements. Only well maintained drill rigs with a service history to be used during the drilling campaign At each drill site the drill equipment will be positioned on a plastic lining when not in use to prevent possible spillages. Only biodegradable lubricants will be used during the drilling operations. All chemicals required for the duration of the surface drilling operation will be stored in a sealed container within the established drill site. Spillages of hydrocarbon liquids will be cleaned up immediately and placed in a sealed container and disposed of appropriately. Diesel container / bowser will be housed on a plastic lined area when on site. 	Hydrocarbons entering any water source is limited or avoided altogether	Throughout operational phase	NWA, GN 704
	Soil	Soil is not stored for rehabilitation requirements / soil is altered through hydrocarbon spills, compaction or erosion	Degradation of soil quality effecting the ease to implement rehabilitation activities	Neg	Yes - impact reverses once drill sites are rehabilitated.	Manage	<p>Drill sites: The following topsoil management measures are applicable for the drill sites and drilling;</p> <ul style="list-style-type: none"> Each site will only be developed a maximum time of 1 week prior to it being used and only once drilling in the area is confirmed. No drill sites to be created unnecessarily. The topsoil from the area to be drilled will be moved aside and stored next to the drilling operation. Topsoil (top 50cm) and overburden will be kept separate (if applicable). The drill equipment will be on a plastic lining when not in use to ensure that no unnecessary soil pollution will occur. Upon completion of the drilling programme the soil will be returned to the exact area that it was moved from. Overburden will be replaced first followed by topsoil. If a sump is required - the soil moved to dig the sump will be located next to the sump. The sump will be lined with plastic. After completion of drilling, the plastic lining will be removed from the sump and disposed of in a registered landfill site and the soil moved to generate the sump will be replaced. Any chemicals stored at the drill site which could pollute soil if spilt will either be stored within a protected container or in the case of a diesel container on a plastic lined area. The plastic lining must be large enough to cope with minor spillages and leaks. Any soil polluted as a result of a hydrocarbon spill will be dug up and disposed of as hazardous waste. <p>Maintenance: The following will be applicable with regards to the carrying out of maintenance;</p> <ul style="list-style-type: none"> Only minor maintenance may occur on-site with use of drip trays and / or on a plastic lining. Major maintenance activities must be undertaken off-site. Any chemical spillages must be cleaned up immediately and be dealt with as hazardous waste. 	Compaction and degradation of soils are limited. Hydrocarbons entering the soil is limited or avoided altogether.	Throughout operational phase	CARA
	Fauna / flora (Ecology)	Stripping of flora and impacting on habitats when clearing a drill pad area or creating a new access track.	Destruction of flora and impact on habitats	Neg	Yes - impact reverses once drill sites are rehabilitated.	Avoid & Manage	<ul style="list-style-type: none"> The areas identified as sensitive habitats and pans in this report must be avoided for invasive activities unless further studies suggests otherwise. Buffer zones must be respected and no invasive activities must take place within these zones Drill pads must be no larger than 20m x 20m and must be demarcated physically to ensure physical impacts are restricted. Once drilling is completed at a site, concurrent rehabilitation will be implemented. 	Sensitive areas are identified before invasive activities are undertaken and these areas are avoided. Areas disturbed by invasive activities are restored to resemble the area before activities commenced.	Throughout operational phase	NA
	Agriculture	Stripping of crops when clearing a drill pad area or creating a new access track.	Loss of crop yield	Neg	Yes - impact reverses once drill sites are rehabilitated.	Manage	<ul style="list-style-type: none"> Invasive activities may only commence in cultivated areas after crop harvesting has been completed in that area for that season. Drill pads must be no larger than 20m x 20m and must be demarcated physically to ensure physical impacts are restricted. Once drilling is completed at a site, concurrent rehabilitation will be implemented. 	Loss of crop yield is minimised. Areas disturbed by invasive activities are restored to allow for continued cultivation.	Throughout operational phase	NA
	Heritage	Clearing of area for the drill pad may effect a heritage resource.	Loss of a heritage resource	Neg	Yes - impact reverses when invasive prospecting ceases.	Avoid	Should archaeological artefacts or skeletal material be revealed in the area during invasive activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place .	No cultural / heritage site is destroyed or damaged by prospecting activities.	Throughout operational phase	NHRA

		Social	Unauthorised access to land. Lack of consideration of landowners requests. Not rehabilitating land.	Unhappy landowners / land occupiers	Neg	Yes - impact reverses when invasive prospecting ceases.	Avoid & Manage	<ul style="list-style-type: none"> 1 month prior to implementing any drilling the applicable landowner/developer must be re-consulted. Record of consultation must be kept on file. Reasonable requests from the landowner must be considered and where possible addressed. 	Prospecting activities are undertaken in agreement with the landowner so as not to jeopardise current or future landuses. Good relations maintained landowners.	Throughout operational phase	NA
Decommissioning and Rehabilitation	Concurrent rehabilitation of drill pads upon completion of drilling activities	All environmental aspects and socio-economic impacts on interested and affected parties	Implementation of successful concurrent rehabilitation activities	Reverse the temporary negative impacts associated with the drilling activities.	Pos	N/A	Manage	<p>After invasive prospecting is complete, the land will be reverted back to its original condition.</p> <ul style="list-style-type: none"> (New) Access routes: Will be rehabilitated with the aim to return the road to its original state. Existing access routes will be left in the same state they were found. Drill pads: After drilling has been completed in one area, the drilling team will ensure the site is reverted back to its original by: <ul style="list-style-type: none"> Removing all infrastructures, such as the drill equipment and the chemical toilet. Infilling the boreholes as per legal requirements. Ensure that no foreign matter (waste) is left behind on the drill site. Refilling the sump required for the drilling activities (if applicable). Initially the plastic lining will be removed and disposed of in a registered landfill site and the soil returned to effectively fill in the sump. The whole drill site will be inspected for any signs of hydrocarbon pollution. Any identified soil which has been polluted as a result of the drilling activities will be removed and disposed of in a registered landfill site. Any area compacted as a result of the drill rig will be tilled. Upon completion of the drilling programme another set of photographs of the access route and the individual drill site after the implementation of concurrent rehabilitation will act as proof of rehabilitation to its original state / improvement to the original state. These photographs will be maintained on file. The landowner will be requested to inspect the rehabilitated drill sites and if willing sign off acceptance of rehabilitation. Upon completion of the drilling activities, each site will be monitored for the next year on a bi-annual basis to ensure that no environmentally related problems resulting from the drilling activities has occurred and that the drill sites are re-vegetating naturally. 	The drill sites are returned to a state that will support a predetermined future use.	Throughout operational and decommissioning phases.	NEM:BA, CARA
Mining Feasibility	Resource statement Prefeasibility study Specialist studies Bankable feasibility study Preparation for Mining Authorisation	All environmental aspects and socio-economic impacts on interested and affected parties	Specialist requiring access to properties to complete various studies	Social impacts	Neg	Yes - impact reverses when invasive prospecting ceases.	Manage	<ul style="list-style-type: none"> Prior to commencing with the site visit of any specialist study, the affected landowner needs to be re-consulted. During this re-consulting the landowner needs to be made aware of the following; <ul style="list-style-type: none"> Date that the specialist intends to access the land Duration that the specialist will require on the land Details of any person who will form part of the specialist team Details of the activity the specialist will undertake on the property All reasonable requests from the landowner (during the consultation) must be implemented The landowner should be provided / informed of the outcomes of the specialist study once completed. 			
General Requirements	- Administration	Documentation	Management of legally required documents	Legal compliance (in terms of record keeping)	Pos	Have all necessary environmental authorisations on-site that are applicable to the activities being undertaken	Manage	<p>Ensure valid copies of the following documents / authorisations are available on request (list provided below):</p> <ul style="list-style-type: none"> The registered prospecting right and associated documents A copy of the regulation 2(2) plan depicting the prospecting area. A copy of the approved EMP Copy of the latest Environmental Performance Audit. Any EIA authorisation and associated conditions of approval Records of waste registrations (service providers) and disposal. Records of implementing concurrent rehabilitation. Records of required photographic gallery Records of all environmental awareness training Complaint book A copy of the weekly inspection reports Records of consultation with interested and affected parties Records of non-conformances Vehicle inspection check sheets and vehicle/equipment maintenance records 	Valid environmental authorisations applicable to the activities being undertaken on-site	While the prospecting right is valid.	As per authorisation

		Handling complaints	Interested and affected parties	Poor relations between Crushco and interested and affected parties.	Neg			<p>All complaints received by the mine must be recorded. The information recorded must include, but is not limited to:</p> <ul style="list-style-type: none"> • Date of complaint. • Name and contact details of complainant. • Nature / Description of the complaint. • A description as to how the complaint will be addressed. • A proposed target date for rectifying the complaint. • Date when corrective action was implemented (if necessary). • Confirmation / Explanation of feedback provided to the complainant. • A list of any monitoring or follow-up work that is required, including target dates. 	Active communication with I&AP's resulting in potential issues being solved timeously.	Throughout operational phase	NA
		Ongoing consultation with I&AP's	Interested and affected parties	Maintaining a relation between Crushco and interested and affected parties.	Pos			<ul style="list-style-type: none"> • Maintain a proactive open door policy with all interested and affected parties. • Provide the landowner an opportunity to discuss the environmental performance of the project (at least annually) and maintain a record of all communication. 	Active communication with I&AP's resulting in potential issues being solved timeously.	Throughout operational phase	NA
		Training	Training undertaken as per the Environmental Awareness Plan	Improved environmental awareness resulting in reduced impacts due to the occurrence of fewer environmental incidents / correct response to incidents	Pos	Make staff aware of the environmental risks associated with their jobs and how to manage the risks	Avoid & Manage	<ul style="list-style-type: none"> • Prior to the implementation of drilling activities the drilling contractors will undergo environmental awareness training to inform drillers of the sensitivity of: <ul style="list-style-type: none"> - The sensitivity of pans, wetlands and other ecological features such as termite mounds. - The need to avoid pollution of the soil by ensuring hydrocarbon spills are minimized or if they do occur they are cleaned up. - The need to implement effective waste management (separation of domestic & hazardous waste) - Do not unnecessarily disturb any wildlife - Good behavior in terms of interaction with the land owner and local community when implementing drilling 	Effective environmental awareness resulting in reduced impacts due to the occurrence of fewer environmental incidents / correct response to incidents	As per the EAP	NEMA
Emergency Incidents	General				Neg	Avoid emergency incidents	Manage & Mitigate	<ul style="list-style-type: none"> • All assembly points must be: <ul style="list-style-type: none"> - Clearly labelled, - Documented, and - Communicated to all employees. • Emergency numbers to be displayed at all assembly points. • Conduct emergency drills / mock exercises of environmental emergency incidents to practice and perfect response. This will minimise the safety and environment impacts of real emergencies. If this identified deficiencies in the management actions, the relevant procedures will be amended • Relevant government / municipal departments will be contacted within 14 days of an emergency incident which has resulted in environmental impacts / pollution. Notifications will be as per the relevant legislation: i.e.: <ul style="list-style-type: none"> - As per Section 30 of NEMA, and - As per Section 20 of the NWA and Regulation 2(d) of GN704 for impacts on water quality. 	Facilitate a fast response to an emergency incident	Throughout operational and decommissioning phases.	NEMA, S30 NWA, S20
	Non conformances		Unplanned incidents	Varied depending on the incident.	Neg			<p>Should an environmental impact occur which is outside the normal operating environmental conditions of the mine (and is not considered an environmental emergency), it can be raised as a non-conformance. Non-conformances can be raised by any employee, customer or interested and affected party. If a non-conformance is raised the mine will:</p> <ul style="list-style-type: none"> • Record the non-conformance and undertake the following actions <ul style="list-style-type: none"> - Implement corrective action if required. - Identify the root cause of the non-conformance. - Identify and implement preventative actions to ensure that it does not re-occur. - Once all actions and investigations have been completed, it can be documented and signed off. 	Effective management of any impacts that are not specifically managed by mitigation measures specified in the EMPr.	Throughout operational phase	NA
	Hydrocarbon spills	Pollution of soil, surface and ground water	Large scale spills of hydrocarbons resulting from a ruptured tank	Pollution of soils and potentially off-site water bodies (if storm water flows into water courses) / ground water if spills remain in the soils for extended periods	Neg	Minimise the extent of the spill and clean up spills promptly to limit the scale of the incident	Manage & Mitigate	<ul style="list-style-type: none"> • Stop the source of the spill • Contain the spill (utilising fine material on-site or material from the spill kits), • Lift all contaminated "soils", and dispose (at a licenced hazardous disposal facility) or bioremediation (at a licenced facility) contaminated "soils" 	Pollution is confined to the incident area	Immediately stop source Within 24 hours of incident Within 14 days of incident	NEMA, S30 NWA, S20

	Fire	Air quality Assets	Smoke emissions from a fire. Damage from flames.	Air pollution as a result of smoke emissions. Loss / damage to assets (crops , equipment, buildings).	Neg	Minimise the potential for the spread of fires	Avoid & Manage	<ul style="list-style-type: none"> • The potential for the spread of veld fires will be reduced by: - Cutting vegetation within the drill site - Safely storing flammable fluids within the drill site - Having a no smoking policy within the drill site - Informing contractors that no open fires are permitted at the drill site. <ul style="list-style-type: none"> • Maintained fire extinguishers will be available within the drill site. • Awareness training will include procedure required to operate fire extinguishers and alert emergency services. 	Fires that start as a result of prospecting activities will be contained.	Throughout operational and decommissioning phases.	Veld fire act
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i) FINANCIAL PROVISION⁵

(1) Determination of the amount of Financial Provision

- (a) ***Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22(2)(d) as described in 2-4 Part A, (3)(q)(iv)(1)⁶ herein.***

The current closure **objective** for the activities contained within this application is to **rehabilitate the disturbed land back to the state it was found prior to undertaking any drilling.**

- (b) ***Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties***

Landowners and I&AP's have the opportunity to review the sections of this report pertaining to closure and rehabilitation and to provide their comments thereon. Any comments received specifically relating to closure and rehabilitation will be addressed in these sections when finalising the report after the consultation period has concluded.

- (c) ***Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure***

Figure 12 shows a typical example of the drilling process and subsequent rehabilitation activities that the proposed drilling programme will comprise of. After drilling has been completed in one area, the drilling team will ensure the site is reverted back to its pre-drilling state by carrying out the following:

- Removing all infrastructures, including the drill rig, the temporary shack, the mobile diesel tank, the mobile water tank and the chemical toilet.
- Plugging the boreholes as per legal requirements.
- Ensuring that no foreign matter is left behind on the drill site.
- Refilling the sump required for the drilling activities. Initially the plastic lining will be removed and disposed on in a registered landfill site and the soil returned to effectively fill in the sump.
- Inspecting the whole drill site for any signs of hydrocarbon pollution. Any identified soil which has been polluted as a result of the drilling activities will be removed and disposed of in a registered landfill site.
- Loosening compacted areas as a result of the drill rig and any ruts created by accessing or leaving the site for the drilling activity must be filled in to ensure that no future erosion shall emanate from the site.
- Confirming the the success of the rehabilitation to the landowners satisfaction.

- (d) ***Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives***

The rehabilitated land will represent the pre-drilling landuse. Figure 12 provides a visual indication of the drilling process from site establishment to final rehabilitation.

⁵ The template provided on the DMR website does not have headings for numbers "g" and "h". Numbering has been maintained as per the template.

⁶ The template provided on the DMR website has an error in the reference to a former section of this report. This has been crossed out and amended by underlined text.

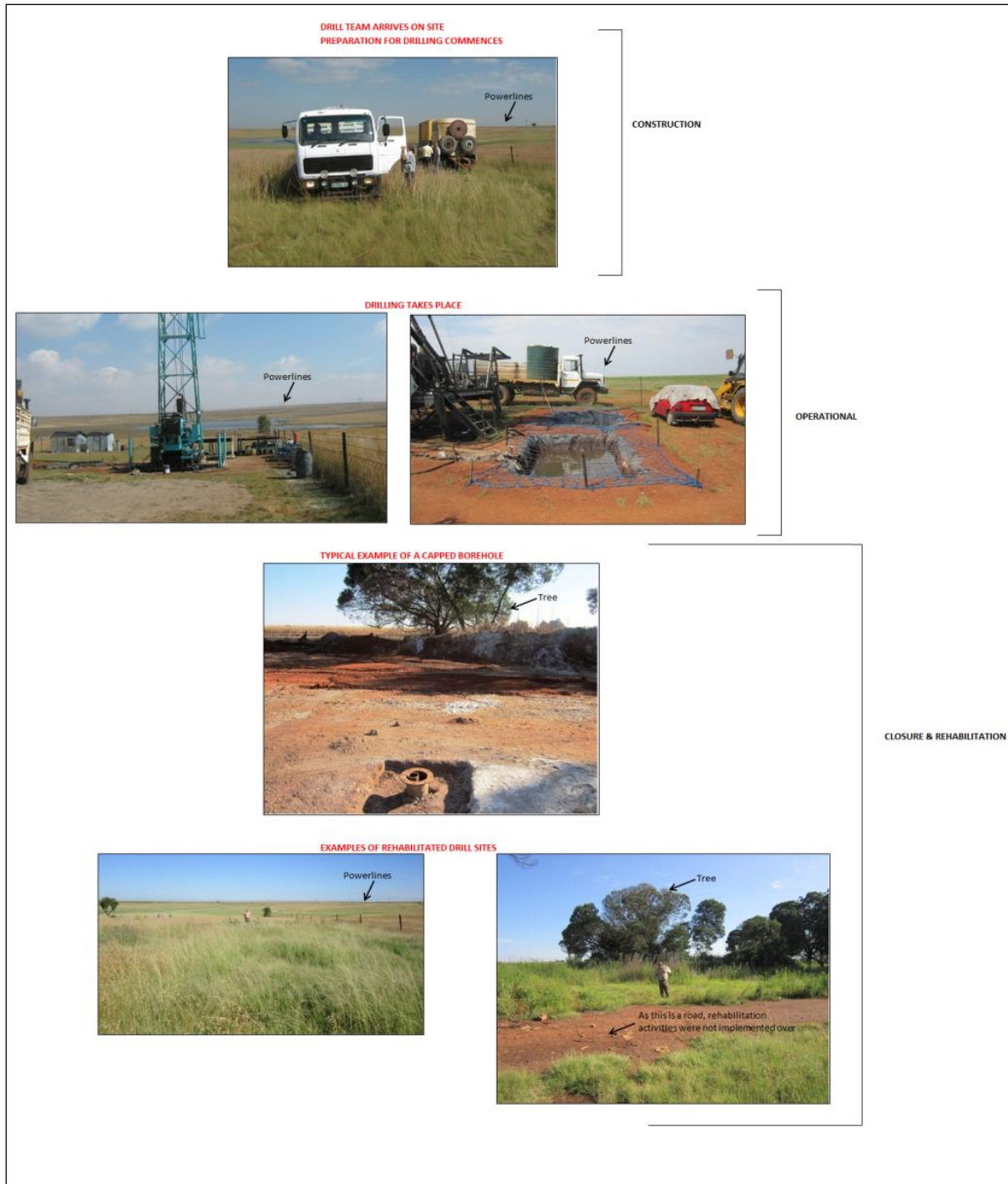


Figure 12: Example of the drilling process and subsequent rehabilitation activities to be undertaken.

(e) **Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline**

R 50 000 has been proposed for financial provision purposes. Please refer to Section 3(s).

(f) **Confirm that the financial provision will be provided as determined.**

The amount calculated above will be provided for in the form of a financial guarantee.

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including:

Based on the Environmental Impact Assessment (see Appendix A.4), no environmental monitoring is expected to be required.

If there are specific complaints / or specific incidents around the invasive drilling activities the following monitoring network may be established.

IMPACTS	SOURCE ACTIVITY	FUNCTIONAL REQUIREMENTS	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY
Dust Fallout	<ul style="list-style-type: none"> • Stripping of topsoil • Drilling • Vehicle entrainment • Exposed surfaces (access roads, drill pads etc) 	See minimum requirements below	Monitoring by an independent service provider and results scrutinised by the mine manager.	Monthly
Surface water quality	<ul style="list-style-type: none"> • Hydrocarbon spill from vehicles / bowser potentially impacting on a surface water feature etc 	See minimum requirements below	Monitoring by an independent service provider and results scrutinised by the mine manager.	Quarterly

Monitoring Protocols and Minimum Requirements

The need for monitoring is to ensure good environmental performance and compliance to legal requirements. It is not expected that Crushco will need to implement any environmental monitoring linked to the limited proposed invasive prospecting activities.

If, due to either significant complaints from interested and affected parties or specific incidents occurring, Crushco will expand their existing monitoring network which includes both dust fallout and water quality to incorporate possible impacts from the invasive prospecting activities.

The existing monitoring networks are guided by monitoring protocols which include the following;

- Objectives of the monitoring programme.
- Location of monitoring points (GPS co-ordinates), a map illustrating the location of the sampling points relative to mine infrastructure and pollution sources. This must be accompanied by the motivation for the site selections.
- Method of monitoring.
- Frequency of monitoring – supported to reference to SANS where possible.
- List of parameters to monitor for and the reason why these parameters have been selected. I.e. linked to pollution sources at the mine.
- What guidelines and / or standards will be used as performance indicators. The reason(s) for using these standards or guidelines. This is particularly important for water sample analysis as guidelines are used as indicators and these will vary depending on a number of site-specific factors.
- Details concerning how the results will be presented. The presentation of the results must be in a manner that easily highlights when guidelines have been exceeded. The results must be presented in such a way that trends can be established and monitored. Historic results should be presented at the same time as presenting the new results.
- How the results will be used to provide guidance to the mine. An explanation as to how exceedances of standards or guidelines will be highlighted and how the probable cause for the exceedance will be identified. A commitment to presenting guidance regarding what action to be taken in the event of the appropriate standards or guidelines being exceeded. It must be noted that in the event of an exceedance of standards or guidelines and / or permit conditions, a report must be submitted to the relevant authorities in writing within 14 days. This report must include:
 - Details of the incident that caused the exceedance.
 - Corrective action plan to clean up / avoid recurrence.
 - Time frame / schedule for implementation of corrective action.
 - Where the results will be stored.

The protocol will be updated if additional monitoring points are introduced as a result of the prospecting activities.

A **guideline** covering the minimum requirements for each monitoring campaign has been provided below, with site specific information provided where necessary. ***It must be stressed that these protocols are only a guide and that they are likely to change during the life of a mine depending on a number of factors, such as; advice for service providers, input from specialists, input from the authorities, analysis of monitoring results, changes in neighbouring land use, change in on-site activities and/ or changes in monitoring requirements (i.e. SANS).***

Minimum requirements for air quality (dust fallout) monitoring.

DUST FALLOUT MONITORING		
Applicable Legislation:	<ul style="list-style-type: none"> • National Environmental Management Act, Act No 107 of 1998 (NEMA), particularly Section 28. • National Environmental Management: Air Quality Act, Act No. 39 of 2004 (NEM:AQA), particularly Section 12. • South African National Standard - SANS 1929. 	
Parameters:	<ul style="list-style-type: none"> • Dust Fallout / Deposition. 	
Monitoring Method:	Single or directional fallout monitors, following the American Society for Testing and Materials standard method for collection and analysis of dustfall (ASTM D1739). An open topped cylinder (bucket) not less than 150mm in diameter with a height not less than twice the diameter and suspended 2m above the ground (<i>fixed point monitoring</i>). The bucket must be exposed for a <i>continuous</i> period of 30 days (± 2 days). The dust is dissolved in water which is returned to the laboratory, filtered and the residue dried before the insoluble dust is weighed. Results are expressed as mg/m ² /day.	
Site Selection Parameters:	<p>Monitoring sites should be located within 2km of the mining area (background sites can be further away) and must consider:</p> <ul style="list-style-type: none"> • <i>Wind direction</i>: Monitoring stations should be located downwind of the mining site. (Ensure monitoring point recording dust fallout downwind of all prominent wind directions.) • <i>Receptors</i>: Monitoring points must be located at all sensitive receptors (residential area, schools, ecologically sensitive habitats, etc.) within 2km of the mine. • <i>Other sources of pollution in the vicinity</i>: If the mining site is located downwind of another dust source, locate a directional unit between the mining site and the off-site source. 	
Recommended Sites:	The fallout buckets need to be placed along the boundary of the quarry in at least the four main wind directions.	
Monitoring Interval:	<ul style="list-style-type: none"> • <i>Monthly (on-going)</i>: Sampler should be exposed for a continuous period of 30 days (± 2 days), results expressed as mg/m²/day. 	
Evaluation of Results:	Performance Indicators:	<ul style="list-style-type: none"> • SANS 1929. • On-site – target of below Industrial limit. • Site boundary – Industrial limit. • Previous monitoring results.
	Reporting:	<p>It is advisable to store all results in a spread sheet and project the results graphically in order to determine:</p> <ul style="list-style-type: none"> • Exceedances of the SANS, which should be presented on the graphs. • Trends with previously monitored results.
	Environmental Management:	<p>When exceedances of performance indicators are recorded, the following steps must be taken and documented:</p> <ul style="list-style-type: none"> • Determine the source of the pollution and prevailing winds. • If pollution is from the mine, determine if it is as a result of a once off incident or a routine event. • Determine how the incident / event can be prevented, or how it can be managed in future. Implement appropriate mitigation measures. • The success of mitigation must be confirmed through continued routine monthly sampling. • If pollution continues after two months of monitoring, alternative preventative / mitigation measures must be implemented. The success must once again be confirmed through the routine monthly monitoring.

Minimum requirements for water quality monitoring

WATER QUALITY MONITORING	
Applicable Legislation and Guidelines:	<ul style="list-style-type: none"> • National Water Act, Act No. 36 of 1998. • GN704. • Water Monitoring Systems (DWSF, 2007).
Monitoring Method:	<p>The following must be ensured when undertaking sample collection:</p> <ul style="list-style-type: none"> • Containers: It is preferable to use containers provided by the laboratory. Samples for chemical analysis must be collected in clean bottles. Samples for biological analysis must be collected in sterile bottles. • Sampler: Sampling should be undertaken by the same two people to minimise variation in collection points and collection methods. • Collection: Rinse bottles and lids three times with water being collected. Ensure sufficient volume (for analysis) is collected. • Time of sample collection: Collect samples on the same day of the week and at approximately the same time of day. • Storage: Samples must not be stored for longer than 24 hours and must be stored in a cool dark place. <p>Surface water:</p> <ul style="list-style-type: none"> • Location of sampling point: Always collect from the same point. • Location of sample collection: Water body samples must be taken from at least 2m away from the edge of the water body. • Groundwater: • Sampler: It is strongly recommended that sampling is undertaken by a contractor who has the equipment to do the necessary on-site tests. • Wells to be purged (using a submersible pump) to chemical stabilisation based on temperature, pH, dissolved oxygen (DO) and electrical conductivity (EC) or a minimum of 3 well volumes. Should there be insufficient recharge in the well the well must be purged of the standing volume of water in well. • The well should be allowed to recover prior to sampling. • Record on a sampling sheet a) monitoring point status, b) purge data and c) important site specific observations that may affect water quality.
Site Selection Parameters:	<p>The following must be considered when making the site selections:</p> <ul style="list-style-type: none"> • Point of entry. Sample from the watercourse as it enters the zone of influence of the mining site to obtain baseline data. • Pollution / Discharge points. Sample downstream of the point where water and / or effluents are discharged to determine if the mine is releasing polluted water. • Point of exit. Sample from the watercourse where it exits the zone of influence of the mining site to determine if the mine has polluted the watercourse. • "Standing" water. Sample from standing water within the mining area (if not being discharged).
Recommended Sites:	<p>Site locations can change based on input from specialists, the authorities, monitoring results, as a result of a change in monitoring requirements, etc. A water quality monitoring protocol should also be available and updated to aid new service providers.</p>
Determinant (guideline):	<p>The monitoring constituents will be selected based on the following factors:</p> <ul style="list-style-type: none"> • Pollution sources on-site: i.e. monitor for suspended solids where water flows over exposed surfaces. • Type of mineral being mined: Exposing sub-surface rock may result in chemical reactions that will change the water quality of run-off. • Authority requirements: i.e. The DWS regional office and / or the catchment management agency (CMA). • Downstream receptors / users: Use quality requirements of downstream receptors / users in order to determine compliance.

WATER QUALITY MONITORING		
Monitoring Determinants: and Intervals:	<p>These should be included in the water quality monitoring protocol</p> <p>As a guide, most determinants are monitored on a <i>monthly</i> basis, with an ICP scan recommended to occur <i>annually</i>. However, these intervals may change based on input from specialists, the authorities, monitoring results, as a result of a change in monitoring requirements, etc.</p>	
Evaluation of Results:	Performance Indicators:	<ul style="list-style-type: none"> • For in-stream sampling points: The in-stream water quality guidelines provided by DWS. • For all <i>monitoring points</i>: Previous monitoring results.
	Reporting:	<p>It is advisable to store all results in a spread sheet and project the results graphically in order to determine:</p> <ul style="list-style-type: none"> • Exceedances of the DWS guidelines (presented on the graphs). • Trends with previously monitored results.
	Environmental Management:	<p>When exceedances of performance indicators are recorded, the following steps must be taken and documented:</p> <ul style="list-style-type: none"> • Determine if the source of the pollution is as a result of mining activities. • If yes determine if this is a once off incident or as a result of routine events. • If the exceedances are severe, report the incident to the DWS as per Regulation 2(1)(c) of GN704 of the NWA⁷. • Determine how the incident can be prevented / managed in future and appropriate mitigation measures to be implemented (BATNEEC⁸). If exceedance was severe, this must be undertaken in consultation with DWS. • The success of mitigation measures must be confirmed through monthly sampling or an interval stipulated by DWS (for severe exceedances). • If it is observed that pollution continues after two months of monitoring, alternative preventative / mitigation measures must be implemented (after consultation with DWS in the case of severe exceedances). Confirm success of management measures through the routine monthly monitoring.
Storage and Availability of Data	<ul style="list-style-type: none"> • All monitoring results are stored on-site at Crushco Quarry offices. • Monitoring results are available for review at the mine offices provided prior arrangement is made 	

⁷ National Water Act, Act No. 36 of 1998

⁸ Best Available Technology Not Entailing Excessive Cost.

I) INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT REPORT⁹

As the proposed duration of the right is five years, it is proposed that the environmental audit be undertaken every two years and submitted to the DMRE in accordance with Regulation 34 of GNR 982 of the National Environmental Management Act, Act No. 107 of 1998, as amended.

m) ENVIRONMENTAL AWARENESS PLAN

(1) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

Crushco recognises the importance of environmental training and is committed to implementing training to its employees. As part of this commitment, Crushco recognises the importance of making all employees and subcontractors aware of the potential environmental impact that could result from conducting their jobs and how this potential can be minimised through effective training.

Based on the impact assessment the most important environmental management issues relating to Crushco are:

- Recognising the **importance of sensitive areas (such as pans)** and avoiding such areas when implementing invasive prospecting activities
- Recognising the importance of **managing dust emissions.**
- Recognising the importance of **managing nuisance noise**
- Recognising the importance of **good relationship with landowner**
- Being aware of the potential for **surface and groundwater to be impacted by hydrocarbon spills.**

It is important to note that the environmental awareness programme is a living document and should be reviewed regularly to ensure that relevant environmental concerns are discussed and the potential impacts of such concerns are minimised. The syllabus to be taught to employees has been determined through identification of the major environmental concerns raised in the impact assessment of this report.

Employees will be informally trained prior to the start of undertaking invasive prospecting activities where various environmental topics will be addressed. Training will be implemented in the following forums:

- Induction training / Environmental talks
- On the job training / EMP training
- Training on an incident.

Induction training / Environmental talks:

Prior to the implementation of drilling activities the drilling contractors will undergo environmental awareness training to inform drillers of the sensitivity of;

- The need to use existing tracks and minimize their impact on the environment
- The need to keep the drill pad disturbance to a minimum.
- The need to avoid pollution of the soil
- The need to avoid the infrastructure in close proximity to the drilling area.
- The need to respect buffer zones
- The need to implement effective waste management (separation of domestic & hazardous waste)
- Do not unnecessarily disturb any wildlife or pristine vegetation.
- Good behavior in terms of interaction with the local community when implementing drilling.

⁹ The template provided on the DMR website does not have headings for numbers "j" and "k". Numbering has been maintained as per the template.

On the Job training / EMP training:

- Prior to the implementation of drilling activities the drilling contractors will undergo environmental management plan training to inform drillers of the environmental requirements. These requirements have been summarised in Appendix B2 as an implementation plan.

Training on incidents:

If an environmental incident occurred the next day, the following topics will be discussed (this is not an exhaustive list):

- How and why the incident occurred.
- How the incidents was cleaned up (if applicable).
- Evaluation of the clean-up or response by staff.
- Can the clean-up or response be improved.
- What preventative measures should be implemented / what can be done to reduce the likelihood of the incident recurring.

A record of all training implemented will be maintained at the registered office.

(2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

Managing Non-Conformances:

Management & Mitigation	Timeframes
<p>1. Non-Conformances:</p> <ul style="list-style-type: none"> • Should an environmental impact occur which is outside the normal operating environmental conditions of the mine (and is not considered an environmental emergency), it must be raised as a non-conformance. • Non-conformances may be raised by any employee, customer or interested and affected party. If a non-conformance is raised the mine: <ul style="list-style-type: none"> - Record the non-conformance and undertake the actions described below. <ul style="list-style-type: none"> • For reported non-conformances, the applicable responsible person must: - Implement corrective action if required. - Identify the source of the non-conformance. - Identify and implement preventative actions to ensure that it does not re-occur. - Once all actions and investigations have been completed, it be documented and signed off. - Retain all documents pertaining to the non-conformance to be made available for inspection. 	LoM

Managing Emergency Incidents:

Emergency incidents / accidents can be defined as incidents / accidents having the following criteria:

- The likelihood of these incidents / accidents occurring is considered to be very low or may never take place during the life of the mine.
- The environmental impacts associated with these incidents / accidents may be significant.
- It is essential that the mine personnel know how to respond in the event of an environmental emergency situation in order to avoid significant environmental degradation / impacts or injury to human health.

Ideally such incidents should not occur if all necessary management measures are implemented. However, despite the best intentions and the best environmental management practices, it is impossible to ensure that no incidents / accidents ever occur on a mining site. Therefore, it is vital to ensure that all personnel are aware of the management measures to be undertaken in the event of an accident.

Overall Management

Although there are emergency specific management measures to be implemented (discussed separately for each identified emergency incident), there are also common management measures that must be applied throughout.

Management & Mitigation	Timeframes
<ul style="list-style-type: none"> Assembly points must be: <ul style="list-style-type: none"> Clearly labelled. Documented. Communicated to all employees. 	LoM.
<ul style="list-style-type: none"> Emergency numbers are to be prominently displayed. 	LoM.
<ul style="list-style-type: none"> Conduct emergency drills / mock exercises of emergency incidents to practice and perfect response. This will minimise the safety and environment impacts of real emergency. 	Annually.
<ul style="list-style-type: none"> If this identifies deficiencies in the management actions, amend relevant procedures 	Within a week.
<ul style="list-style-type: none"> Report any emergency incidents to the relevant government / municipal departments within 14 days of the incident. 	When an incident occurs
<ul style="list-style-type: none"> General environmental incidents must be reported to environmental authorities, as required in Section 30 of the NEMA. 	When an incident occurs

Large Hydrocarbon Spills (spills resulting in a surface pollution spread of greater than 2m²).

Goals and Objectives: Prevent extensive pollution as a result of a hydrocarbon spill. In the event that a spill occurs (despite management measures), immediate **clean up** steps should be taken as described below, followed by the **reporting** of the incident.

Clean up Procedures	Timeframes
<p>Prevention Steps:</p> <ul style="list-style-type: none"> Prevent vehicles that are in a state of disrepair (leaking diesel or oil) from operating. Ensure that the diesel bowser is maintained in a good condition and does not leak. Train employees on fuel dispensing techniques to minimise the potential of a spills. Implement daily vehicle checks for oil leaks. 	LoM
<p>Clean-up Steps:</p> <ul style="list-style-type: none"> The source of the spill must be stopped and the spill must be contained. 	In the event of a spill.
<ul style="list-style-type: none"> All contaminated material must be lifted and stored in containers that do not leak (the type of container will be determined by the volume of contaminated material to be stored). 	
<ul style="list-style-type: none"> Dispose of contaminated material as hazardous waste. 	LoM
<ul style="list-style-type: none"> Keep a record of the collection. Retain proof of disposal (waste manifest documents) from the hazardous waste disposal company that this waste was disposed of at a suitably licensed facility. 	LoM
<p>Reporting:</p> <ul style="list-style-type: none"> Report the incident as per the requirements in Section 30 of the NEMA. 	Within 14 days.

Fire

Goals and Objectives: Prevent the spread of fires.

Management & Mitigation	Timeframes
<p>Vehicle/equipment Fires:</p> <ul style="list-style-type: none"> Fire extinguishers to be available in all vehicles and must be checked on a monthly basis. 	LoM.
<ul style="list-style-type: none"> Fire extinguishers to be checked by a qualified person. 	Annually.

Management & Mitigation	Timeframes
<ul style="list-style-type: none"> If the fire cannot be controlled by the person who discovers the fire, it will be reported to the emergency services. 	Immediately.
<p>Training:</p> <ul style="list-style-type: none"> Selected employees who form the fire fighting team will undergo fire drill training. Records of training must be retained. 	Annually.

n) SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

(Among others, confirm that the financial provision will be reviewed annually).

The implementation of the environmental management measures contained within this report must form part of the condition of the authorisation. Crushco must not conduct any invasive activities within sensitive habitats or within the following buffer zones (see Appendix B1):

- 100m from the Eskom powerlines.
- 100m from the closest edge of any water course.
- 100m from any identified pan / wetland
- 50m away from any other structures / heritage sites

It is also imperative that landowner is reconsulted at least 1 month prior to implementing any invasive activities in order to maintain good relations. Any reasonable concerns from the landowner must be considered.

Crushco must commission an independent consultant to undertake an Environmental Audit of the EMPr every two years and submit it to the DMRE.

2. UNDERTAKINGS

THE EAP HEREWITH CONFIRMS

- a) The Correctness of the Information Provided in the Reports
- b) The Inclusion of Comments and Inputs from Stakeholders and I&Ap's, where relevant
- c) The Inclusion of Inputs and Recommendations from the Specialist Reports, where Relevant
- d) That the Information Provided by the EAP to Interested and Affected Parties and any Responses by the EAP to Comments or Inputs made by Interested and Affected Parties are Correctly Reflected herein, where relevant

Signature of the EAP: _____

Name of company: _____

Date: _____

UNDERTAKING BY APPLICANT

(To be signed on approval by the DMR)

I, _____, representative for Crushco (Pty) Ltd, hereby declare that the information regarding the prospecting process in this document is true, complete and correct and that I undertake to implement the measures as described in this Environmental Management Programme report. In addition to the implementation of the Environmental Management Programme report, I understand that this undertaking is legally binding and that failure to give effect hereto will render me liable for prosecution. I am also aware that the Regional Manager may, at any time but after consultation with me, make such changes to this programme as he/she may deem necessary.

Signed on this _____ day of _____, 20____ at _____

Signature: _____

DMRE APPROVAL

I, _____ [on behalf of the Department of Mineral Resources and Energy] hereby approve the Environmental Management Programme for Crushco (Pty) Ltd compiled in accordance with the requirements of *Appendix 4 of GNR 982 – The Environmental Impact Assessment Regulations, 2014 – to the National Environmental Management Act, Act No. 107 of 1998 as amended.*

Signed on this _____ day of _____, 20____ at _____

Signature: _____

REFERENCES

City of Ekurhuleni Metropolitan Municipality, 2018/2019. Approved Integrated Development Plan. Available at: <https://www.ekurhuleni.gov.za/council/public-engagements/idp.html>

Department of Environment, 2014. Gauteng Environmental Management Framework. Available at: <https://egis.environment.gov.za/GPEMF>

Department of Environment, 2017. The National Environmental Screening Tool. Available at: <https://screening.environment.gov.za/screeningtool/index.html#/pages/welcome>

Gouws, E (2011). Revised Environmental Impact Assessment. Section 102 Application for Crushco (Pty) Ltd. Index. PO Box 96023, Waterkloof Village, 0145.

IUCN (2001). IUCN Red Data List categories and criteria: Version 3.1. IUCN Species Survival Commission: Gland, Switzerland.

Randell, L (2007). Red Data Bird Habitat Assessment. Specialist study for A Portion of the Remainder of Portion 1 of the Farm Tweefontein 19IR. Umhlaba Environmental Consulting CC. PO Box 731504, Fairland, 2030.

Statistics SA, 2011. Census 2011. Available at: http://www.statssa.gov.za/?page_id=4286&id=11387

South African National Biodiversity Institute, 2018. BGIS Land Use Decision Support Tools. Available at: <https://bgis.sanbi.org/MapView>

APPENDICES FOR PART A

APPENDIX A1: CV OF EAP

PERSONAL DETAILS:

First names	Andrew Charles
Surname	Nicholson
ID number	740103 5108 086
Contact details:	Business telephone (011) 791 3389
	Business cell 084 840 6316
	E-mail andrew@umhlaba.co.za
Home language	English

EDUCATION:

Degrees:

BSc Honours Biological Sciences (1992-1995).

Leicester University, Leicester, England. Grade: Upper Second

Post Graduate Diploma Natural Resources Management (1996-1997)

Leicester University, Leicester, England. *Research post / Environmental consulting:*
Scandioconsult, Box 5343, Gotenburg 40227, Sweden.

Registration:

Registered Environmental Assessment Practitioner Reg No: 2019 -716

Recent Courses and Workshops Attended:

Carbon tax workshop

June 2019 – Presented by Imbewu Sustainability Legal Specialists (Pty) Ltd, Johannesburg

Mine closure and recent case law workshop

June 2019 – Presented by Imbewu Sustainability Legal Specialists (Pty) Ltd, Johannesburg

Compliance with and enforcement of the Waste Act workshop

April 2018 – Presented by Imbewu Sustainability Legal Specialists (Pty) Ltd, Johannesburg

Environmental law update workshop

August 2017 – Presented by Imbewu Sustainability Legal Specialists (Pty) Ltd, Johannesburg

Technical orientation on IFC's Performance

October 2014 – Johannesburg

GRI Course and workshop on sustainability reporting

September 2013 – Presented by Environmental & Sustainability Solutions, Johannesburg

Mining law workshop

May 2013 – Presented by Imbewu Sustainability Legal Specialists (Pty) Ltd, Johannesburg

Contaminated land workshop

October 2012 – Presented by Imbewu Sustainability Legal Specialists (Pty) Ltd, Johannesburg

Air Quality Training

July 2010 – Presented by Imbewu Sustainability Legal Specialists (Pty) Ltd, Johannesburg

Mine project planning and control

September 2009 – University of Witwatersrand, Johannesburg

Waste Laws workshop

August 2009 – C.S Environmental Services

Third International Seminar on Mine Closure

October 2008 - Johannesburg

Writing and Reviewing Environmental Impact Assessments and Environmental Management Programmes

August 2006 – IAIA Conference, Pilanesberg, North West Province

ISO 14001 Bridging Course from 1996 to 2004 version. SABS Training

June 2006.

Environmental Law for Environmental Managers. Overall score: 86%

August 2005 - North West University

Five-day Institute of Environmental Management and Assessment (IEMA) Approved Environmental Management System (ISO14001) Implementation & Internal Auditor course.

May 2002 - Walmsley, Johannesburg.

Example of recent Environmental Impact Assessments I have worked on:

Bundu Mining (Pty) Ltd – Expansion of mining right footprint

Brief project description: Undertaking a full scoping and environmental impact assessment process in order to expand an existing mine into an area which was not part of the original mining right or covered in the approved environmental authorisation. The project included commissioning a number of specialist studies, implementing a public participation process and compiling a Scoping report followed by an Environmental Impact Assessment report (EIAR).

Status of project: Final Environmental Impact Assessment Report submitted to the DMR for a decision in November 2018. Still awaiting the decision on the submitted application.

Role: Leading environmental assessment practitioner.

Prime Spot Trading – Mining Right Application

Brief project description: Undertaking a full scoping and environmental impact assessment process in order to apply for a new mining right for a small open cast quarrying operation. The project included commissioning a number of specialist studies, implementing a public participation process and compiling a Scoping report followed by an EIAR.

Status of project: Final environmental impact assessment report submitted to the DMR for a decision in July 2017. Positive decision received in July 2019 and notification process of the decision to the registered I&AP's has occurred.

Role: Leading environmental assessment practitioner.

Far East Gold (SPV) – Expansion of mining right footprint

Brief project description: Undertaking a full scoping and environmental impact assessment process in order to expand an existing mine to incorporate 4 adjacent prospecting rights. The project included commissioning a number of specialist studies, implementing a public participation process and compiling a Scoping report followed by an EIAR.

Status of project: Final environmental impact assessment report submitted to the DMR for a decision in October 2016. Positive decision received in May 2019 and notification process of the decision to the registered I&AP's has occurred.

Role: Leading environmental assessment practitioner.

AfriSam Properties (Pty) Ltd – Jukskei Quarry EMPr amendment

Brief project description: Amending the mining right area through a combination of a S102 application through the Mineral Petroleum Resources Development Act, Act 28 of 2002 as amended (MPRDA), an EMPr amendment in accordance with part 2 amendments of Section 32 of the 2014 EIA regulations and a closure application in line with Regulation 43 of the MPRDA.

Status of project: All final submissions for the various application lodged with the DMR by May 2017. Awaiting the decision on the applications.

Role: Leading environmental assessment practitioner.

West Wits mining right application

Brief project description: Assisting a land owner on ensuring their concerns are raised with regards to the West Wits mining right application. This involved understanding the landowners concerns followed by evaluating then commenting on the draft Scoping report, a number of specialist studies and the draft EIAR.

Status of project: Final comments on the draft EIA submitted in July 2019. Notification of the decision yet to be received.

Role: Environmental consultant advising a landowner.

Aquila Thabazimbi Mining Right application

Brief project description: Assisting a community (Rooiberg Bewaria) on ensuring their concerns and comments are raised with regards to the Aquila mining right application to mine iron ore from the Meletse Mountain. This involved understanding the communities concerns followed by evaluating then commenting on the draft Scoping report, a number of specialist studies and the draft EIA.

Status of project: No longer involved in the project, but believe the application was refused.

Role: Environmental consultant advising a community.

Raumix Aggregates (Pty) Ltd

Various: Assisting six quarries with completing environmental audits, compiling financial provision calculations and implementing environmental monitoring (dust, noise and water). Providing general environmental advise to their operations.

Status of project: Most recent environmental audits were completed in June 2019

Role: Consultant advising Raumix Aggregates.

EMPLOYMENT HISTORY:

Environmental Consultant

Umhlaba Environmental Consulting CC

January 2004 to present (15+ years)

I am one of the Founding Members of Umhlaba and my responsibilities include work such as:

- Managing the company and ensuring its continued success.
- Environmental authorisation applications (both Basic Assessments and Full EIA's) for mines.
- Amending existing Environmental Management Programme Reports to compile with the 2014 EIA Regulations.
- Environmental auditing of Environmental Management Programme Reports and water use licenses.
- Environmental compliance audits
- Closure applications
- Liaison with various Government Departments, on behalf of the clients.
- Liaising with and facilitating various specialist studies on behalf of our clients
- Compiling mining permit, mining rights and prospecting right applications and renewals thereof
- Section 102 applications
- Advising on all aspects of the environmental law applicable to mining houses
- Closure Plan, Environmental Risk Report and Final Risk Assessment.
- Calculating Financial Provision for Environmental Rehabilitation.
- Implementing and compiling monthly environmental monitoring reports
- Due diligences
- Feasibility reports

Environmental Consultant

Blue Swallow Environmental Services (Pty) Ltd.

July 2002 to December 2003

Initially I was appointed as a Projects Manager to run various projects undertaken by the company. From June 2003 to December 2003, I was appointed the General Manager of the company which in addition to my allocation of various projects, I was responsible for the day to day running of the company. The majority of my work focussed around mining activities, including:

- Environmental Management Programme Reports (in terms of the Minerals Act, 1991).
- Pre-ISO Auditing.
- Environmental Impact Assessment Checklists.
- Liaison with Government departments, on behalf of the clients.
- Financial Provision documents.
- Rehabilitation plans and projects.
- Closure Reports.
- Tourism Marketing.

Camp Manager / Senior Game Ranger / Game Ranger

Londolozi Safari Lodge, CCAfrica

January 2001 to May 2002

My responsibilities outside of being senior game ranger include helping with the day to day running of the lodge.

Ngala Game Reserve, CCAfrica

January 1999 to January 2001

As well as being a game ranger, I was also involved in the community development aspects of the lodge, organizing conservation lessons and taking an interest in the African Foundation Rural Investment funds work in the Welverdiend community adjacent to Ngala. For the month October 2000, I worked as a game ranger / assistant camp manager at Sandibe lodge, Okavango Delta, Botswana.

PERSONAL DETAILS:

Full names:	Gregory David Coates
Telephone:	011 791 3389
Fax:	011 791 3384
E-mail:	greg@umhlaba.co.za

EDUCATION:

Formal:

- **Senior Certificate with exemption (1997)** – Durban High School, RSA.
- **BSc: Wildlife Science (graduated 2001)** – University of Natal, Pietermaritzburg, RSA.
- **MSc: Zoology (graduated 2003)** - University of KZN, Pietermaritzburg, RSA.

Training: Courses, Workshops and Seminars Attended:

- IAIAsa ECO Workshop

2019 (September) – Panel discussion on ECO vs EAP registrations

- Environmental Law Update Workshop

2018 (October) – Legal Training Workshop by Imbewu Sustainability Legal Specialist

- Carbon Footprint Analyst

2018 (July) – IEMA and SETA accredited course by Terra Firma Academy

- Air Quality: Dustfall Monitoring and Reporting

2017 (October) – Short Course by Gondwana Environmental Solutions

- Conducting and Reporting an Independent EIA Process

2017 (February) - Short Course by Gondwana Environmental Solutions

- Financial Provision Regulations and Mine Closure Requirements

2016 (July) – Legal Training Workshop by Imbewu Sustainability Legal Specialist

- Invasive Species Consultant Training

2015 (April) – Workshop by South African Green Industries Council

- ArcGIS1: Introduction to GIS

2014 (September) – Short Course by ESRI

- Environmental Law for Environmental Managers

2014 (August) – Short Course by Centre for Environmental Management, Potchefstroom

- Intro to the Practical Implementation of Environmental Law and the Legislation Updates

2013 (October) – Workshop by Imbewu Sustainability Legal Specialists

- Introductory Workshop in Project Management and Project Management Thinking

2013 (July) – Online Course by ProjectManagement.co.za

EMPLOYMENT HISTORY:

Environmental Consultant Umhlaba Environmental Consulting CC

August 2013 – Present

My role at the company is as a generalist consultant either managing or collaborating on projects involving new applications for, or the amendment / renewal of, environmental authorisations (EA) in terms of NEMA EIA Regulations. I have experience in compiling applications for mining and prospecting rights, water use licenses and waste licenses in conjunction with EA processes (SEIA and BA) as part of the country's one environmental system. I also undertake projects assessing environmental compliance (audits of EA's), environmental risk (due diligence), environmental liability (financial provisioning), environmental monitoring networks (dust fallout and water quality) and environmental rehabilitation.

Nature Guide Savanna Private Game Reserve

August 2010 – May 2013

I was a FGASA and DEAT registered nature guide for this exclusive safari lodge.

Nature Guide Mala Mala Private Game Reserve

March 2010 – August 2010

I was a FGASA and DEAT registered nature guide for this exclusive safari lodge.

Policy Advisor UK Department of Energy and Climate Change

December 2008 – September 2009

I was part of a team developing policy and regulations for the Carbon Reduction Commitment scheme which was a mandatory emissions trading scheme to reduce carbon emissions from the small business sector in the UK.

Consultant 1st Contact Ltd

December 2006 – September 2008

I was a consultant for the tax refunds and immigration services offered by this London based company.

Nature Guide Mala Mala Private Game Reserve

December 2003 – September 2006

I was a nature guide for this exclusive safari lodge.

LIST OF EIA's IN LAST FIVE YEARS:

AfriSam South Africa (Pty) Ltd:

- Lead EAP for an EMP amendment process for Verulam Quarry.

Anganna Investments 143 (Pty) Ltd:

- Lead EAP for a Basic Assessment process for a prospecting right application for gold.

Atoll Metal Recovery (Pty) Ltd:

- Lead EAP for an EMP amendment process for Zimbiwa Quarry.

Drift Supersand (Pty) Ltd:

- Lead EAP for an EMP amendment process for Laezonia Quarry.

FIL Stone Projects CC:

- Lead EAP for a Basic Assessment process for a prospecting right application for aggregate.

Khuma Mining and Exploration (Pty) Ltd:

- Assistant EAP for a Basic Assessment process for a prospecting right application for gold.

Rand Leases Properties (Pty) Ltd:

- I&AP review of the draft Basic Assessment reports for the West Wits Kimberley West and Creswell Park mining permit applications.

Roelan Trading 173 (Pty) Ltd:

- Lead EAP for Scoping and EIA process for a prospecting right application for platinum.

West End Claybricks (Pty) Ltd:

- Lead EAP for an EMP amendment process.

LIST OF OTHER PROJECTS IN LAST THREE YEARS:

AfriSam South Africa (Pty) Ltd:

- Environmental Audits of the EMP for Coedmore Quarry, PMB Quarry, Umlaas Rd Quarry, Newcastle Quarry, Ladysmith Quarry, Macassar Sand Mine, Jukskei Quarry and Ferro Quarry.
- Monthly collection of dust fallout / water samples for four quarry operations and reporting on results.

Atoll Metal Recovery (Pty) Ltd:

- Environmental Audit of the EMP and Financial Provision Calculation using the Quantum method for the Zimbiwa Quarry.

Begane Quarry (Pty) Ltd

- Independent review of the environmental monitoring network including dust fallout and water quality.

Bundu Mining (Pty) Ltd:

- Environmental Audit of the EMP and Financial Provision Calculation using the Quantum method for the Doornrandje Quarry.

Drift Supersand (Pty) Ltd:

- Environmental Audit of the EMP for Laezonia Quarry.
- Closure application in terms of MPRDA for the Roodekrans Prospecting Right.

Goldfields (Pty) Ltd:

- Infrastructure inventory for the purposes of calculating financial provision for the South Deep operation.

Gold One (Pty) Ltd:

- Renewal applications for the Newshelf Nigel, Grootvlei and Cons Modder prospecting rights.
- Closure applications for the Newshelf New State Areas and West Pit 1 prospecting rights.
- Environmental Audit of the EMP for the Sub Nigel operation.

Group Five Construction (Pty) Ltd:

- Environmental Audit of the EMP and Financial Provision Calculation using the Quantum method for the Zimbiwa Quarry.
- Environmental Audit of the EMP and Financial Provision Calculation using the Quantum method for the Sky Sands operation.
- Development of environmental monitoring protocols (dust and water) and independent monthly review of dust fallout and water quality monitoring results.

Raumix Aggregates (Pty) Ltd:

- Environmental Audit of the EMP and Financial Provision Calculation using the Quantum method for the Donkerhoek, Rosslyn, Willows and Crushco Quarries.
- Updating of the mine work programmes for the Willows, Rosslyn, Rossway and Crushco quarries.

Regal Bricks (Pty) Ltd:

- Environmental Audit of the EMP and Financial Provision Calculation using the Quantum method for the Chamdor operation.
- Renewal application for a mining right.

Sibanye Stillwater (Pty) Ltd:

- Properties Assessment and Infrastructure Inventory for Beatrix, Driefontein, Kloof, Cooke, Rustenberg, Kroondal and Marikana operations.

West End Claybricks (Pty) Ltd:

- Environmental Audit of the EMP and Financial Provision Calculation using the Quantum method.

PUBLICATIONS / PRESENTATIONS:

Coates G.D. & Downs C.T. (2005) Survey of the status and management of sympatric bushbuck and nyala in KwaZulu-Natal, South Africa. South African Journal of Wildlife Research. 35(2): 179-190.

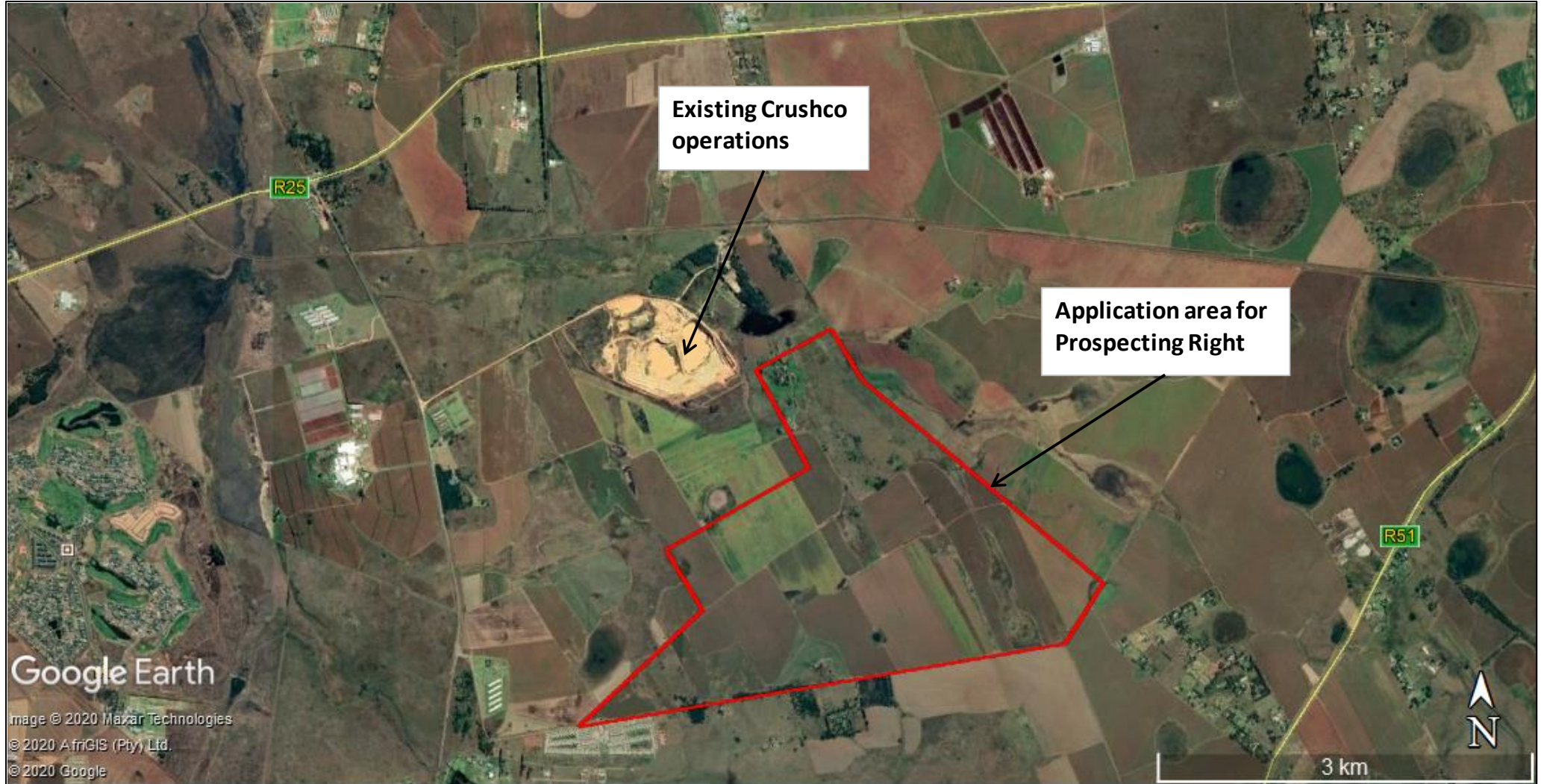
Coates G.D. & Downs C.T. (2005) A telemetry-based study of bushbuck (*Tragelaphus scriptus*) home range in Valley Bushveld. African Journal of Ecology. 43: 376 – 384.

Coates G.D. & Downs C.T. (2006) A preliminary study of valley thicket and coastal bushveld-grassland habitat use during summer by bushbuck (*Tragelaphus scriptus*): a telemetry based study. South African Journal of Wildlife Research. 36(2): 167-172.

Coates G.D. & Downs C.T. (2007) Population estimates of bushbuck *Tragelaphus scriptus* in valley thicket and coastal bushveld-grassland habitat. South African Journal of Wildlife Research. 37(1): 91-95.

Downs, C., Coates, G. and Child, M. (2016) A Conservation Assessment of *Tragelaphus sylvaticus*. In: M.F. Child, L. Roxburgh, D. Raimondo, E. Do Linh San, J. Selier and H. Davies-Mostert (eds), *The Red List of Mammals of South Africa, Swaziland and Lesotho*. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

APPENDIX A2: SITE LAYOUT PLAN



APPENDIX A.3: RECORD OF PUBLIC PARTICIPATION DURING THIS BASIC ASSESSMENT PROCESS.

This section will be updated after the consultation period has been completed.

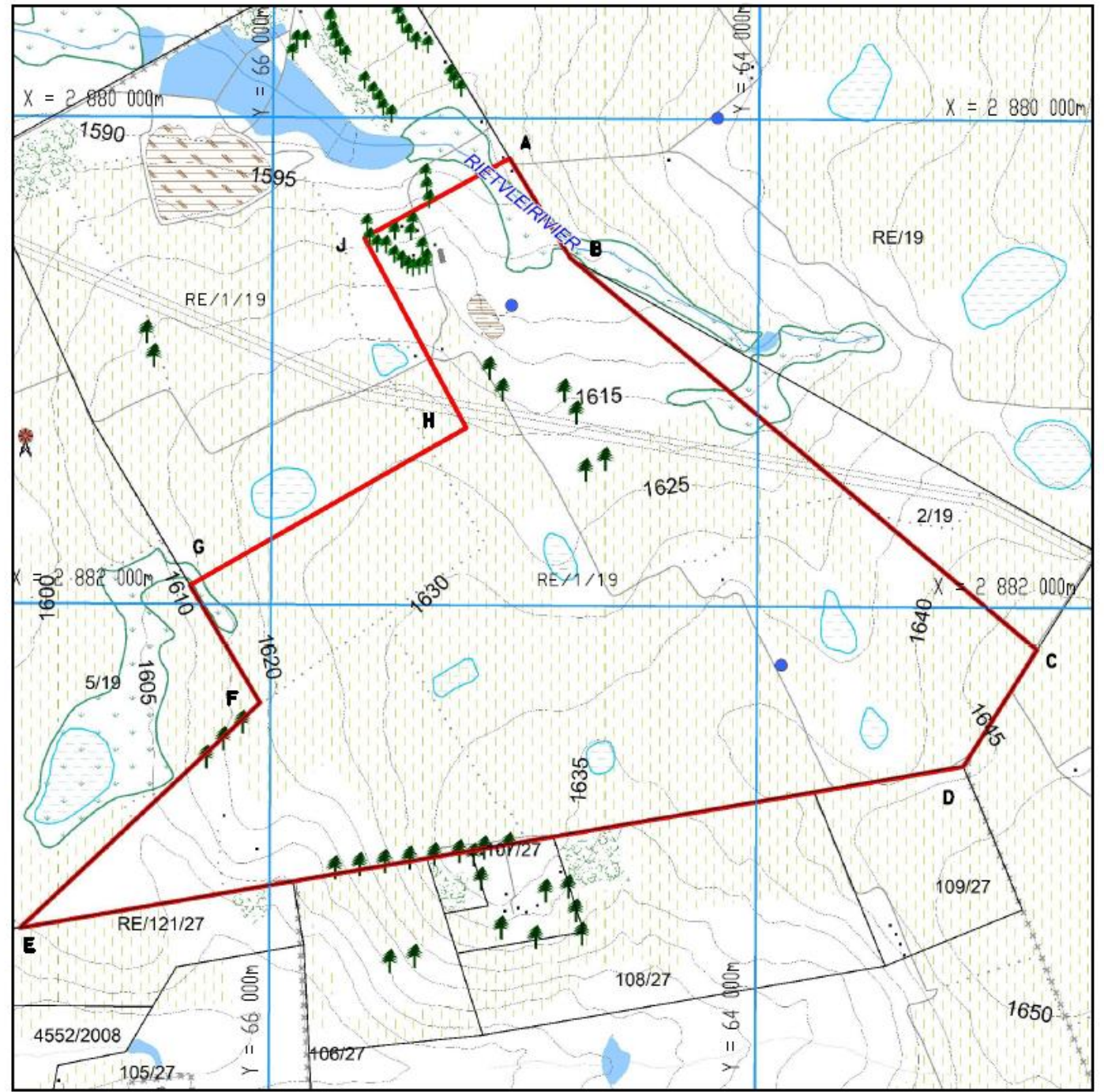
Appendix A.3.1. Documents used in Notification and Consultation Process and Public meeting

Appendix A.3.2. Feedback as received by I&AP's.

APPENDIX A.4: IMPACT ASSESSMENT REGISTER

Activity		Aspect	Source / Cause	Impact	Consequence				Probability	External Factors		Ranking	Controls / Management Measures Implemented				Significance (WITH controls)	
Phase	Description of the physical activities that will cause the impacts		Description as to how the activity may cause the impact	Description of the impact that may result from the activity	Nature	Extent	Duration	Frequency		I&AP	Cumulative	Significance (WITHOUT controls)	Effective Engineering	Effective Procedural	Effective Training	Effective Monitoring / Maintenance		
Application for Authorisations	Basic Assessment: - GNR 327 Activity 20 - application for a prospecting right - GNR 327 Activity 22 - decommissioning - GNR 324 Activity 12 - clearing more than 300sqm of natural vegetation	Socio-economic	Application in terms of EIA regulations to NEMA	Legal and responsible prospecting	Pos	Medium	Local	Medium	Annually or less	High	No	No	Medium	No	No	No	No	Medium
Non-Invasive Prospecting	<ul style="list-style-type: none"> Aerial survey and digital terrain model Obtaining and evaluating existing literature Planning infill drilling campaign 	Socio-economic	Commencing with non-invasive prospecting activities over the application area.	Potential decrease in property values Altering of the sense of place of the local area.	Neg	Low	On-site	Medium	6 Monthly	Low	No	No	Low	No	No	No	Yes	Low
Invasive Prospecting	<ul style="list-style-type: none"> Access roads (3m x1km) from existing farm roads Site establishment (drill pad 20x20m) Drilling and Sampling (5 drill sites) 	Air quality	Dust generation from stripping activities, using dirt access tracks, implementing drilling and exhaust emissions	Increased local dust fallout	Neg	Low-Med	Neighbouring	Very short	Monthly	Low	No	Yes	Low-Medium	No	Yes	No	Yes	Low-Medium
		Noise nuisance	Noise generated from vehicle / drilling operations	Increased ambient noise levels	Neg	Low-Med	Neighbouring	Very short	Monthly	Low	No	Yes	Low-Medium	No	Yes	Yes	Yes	Low-Medium
		Visual	Drill rig temporarily visible	Sense of place altered by visible drill rigs	Neg	Low-Med	Neighbouring	Very short	Monthly	Low	No	Yes	Low-Medium	No	No	Yes	Yes	Low-Medium
		Water	Hydrocarbon spills / spills from chemical toilets entering a water course / wetland	Pollution of a water resource	Neg	Medium	Local	Short	Monthly	Medium	No	Yes	Medium	No	Yes	Yes	Yes	Low-Medium
		Soil	Soil is not stored for rehabilitation requirements / soil is altered through hydrocarbon spills, compaction or erosion	Degradation of soil quality effecting the ease to implement rehabilitation activities	Neg	Med-High	On-site	Medium	Monthly	Low	No	Yes	Low-Medium	No	Yes	No	Yes	Low-Medium
		Fauna / flora (Ecology)	Stripping of flora and impacting on habitats when clearing a drill pad area or creating a new access track.	Destruction of flora and impact on habitats	Neg	Med-High	On-site	Medium	Monthly	Medium	No	Yes	Medium	Yes	No	No	No	Low-Medium
		Agriculture	Stripping of crops when clearing a drill pad area or creating a new access track.	Loss of crop yield	Neg	Low-Med	On-site	Medium	Monthly	Medium	No	Yes	Medium	Yes	No	No	No	Low-Medium
		Heritage	Clearing of area for the drill pad may effect a heritage resource.	Loss of a heritage resource	Neg	High	On-site	Permanent	Annually or less	Improbable	No	No	Low	No	Yes	Yes	Yes	Low
		Social	Unauthorised access to land. Lack of consideration of landowners requests. Not rehabilitating land.	Unhappy landowners / land occupiers	Neg	Med-High	On-site	Long	Monthly	Improbable	No	Yes	Low-Medium	Yes	Yes	Yes	No	Low
Decommissioning and Rehabilitation	Concurrent rehabilitation of drill pads upon completion of drilling activities	All environmental aspects and socio-economic impacts on interested and affected parties	Implementation of successful concurrent rehabilitation activities	Reverse the temporary negative impacts associated with the drilling activities.	Pos	Medium	On-site	Medium	Monthly	High	No	No	Medium	No	No			Medium
Mining Feasibility	Resource statement Prefeasibility study Specialist studies Bankable feasibility study Preparation for Mining Authorisation	All environmental aspects and socio-economic impacts on interested and affected parties	Specialist requiring access to properties to complete various studies	Social impacts	Neg	Low-Med	On-site	Very short	6 Monthly	Low	No	No	Low	No	Yes	Yes	Yes	Low

APPENDIX A5: SITE MAP



Legend
— Application Area
— Farm & Portion Boundaries

Scale 1 : 25 000

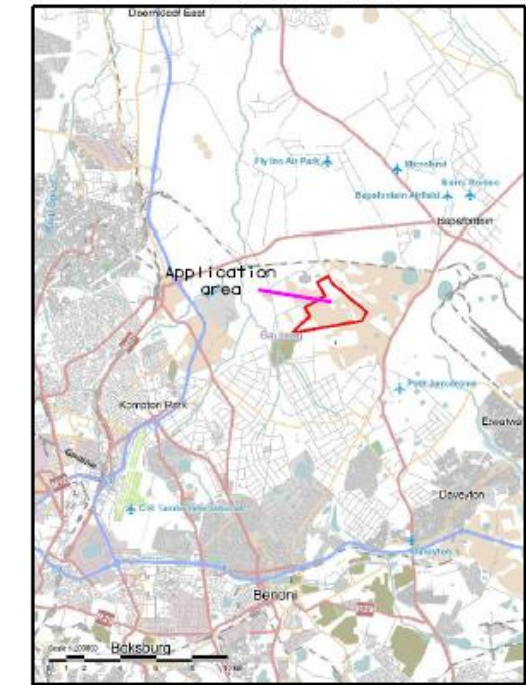


REGULATION 2(2) PLAN

CRUSHCO (PROPRIETARY) LIMITED
 Co Reg No: 2015/045720/07

SIDES Meters	ANGLES OF DIRECTION	CO-ORDINATES WGS 84 WG 29	
		Y+	X+
AB	476.909 328:27:23	A	65026.497 2880163.565
BC	2508.276 309:43:40	B	64777.003 2880570.007
CD	562.705 32:01:28	C	62847.915 2882173.150
DE	3938.425 80:00:23	D	63146.307 2882650.223
EF	1351.887 226:37:38	E	67024.974 2883333.694
FG	562.964 148:56:49	F	66042.286 2882405.296
GH	1306.187 240:05:03	G	66332.680 2881923.010
HJ	886.791 151:29:18	H	65200.530 2881271.580
JA	681.836 241:10:17	J	65623.830 2880492.340

IN EXTENT: 576.4730 Ha
 LOCALITY PLAN



LEGEND

Province	District municipality	Local municipality	Sub place	SAZIS	Land use: Low urban density	Land use: Recreation area	Land use: Cemetery	Land use: Villa range	Land use: High urban density	Land use: Golf course	Land use: Military camp	Land use: Caravan site	Land use: Container depot	Land use: Garden	Land use: Refuse dump	Land use: Drive in theater	Land use: Holiday resort	Land use: Bird sanctuary	Land use: Park	Land use: Historical ge site zone	Land use: Golf driving range	Roads: Other access	Roads: Secondary road	Roads: Main road	Roads: Street	Roads: National route	Roads: Arterial route	Roads: Hiking trail	Roads: Under construction	Roads: On/off ramp	Roads: National freeway	Roads: Interchange	Roads: Glassblock	Roads: Overbridge	Roads: Power line single	Roads: Overhead	Roads: Power line multiple	Roads: Station (points)	Roads: Station (lines)	Roads: Large station (lines)	Roads: Horse garage	Roads: Attached	Roads: Large station (park)	Roads: Under construction	Roads: Untyped	Roads: Station (lines)	Vegetation: Cultivated land (perennial)	Vegetation: Woodland	Vegetation: Orchard/vineyard	Vegetation: Plantation	Vegetation: Cultivated land (perennial)	Vegetation: Marsh/estuar	Vegetation: Wetland	Vegetation: Pasture	Vegetation: Field	Vegetation: Swamp	Vegetation: Water tank	Water: Dry water course center line	Water: Dry water course extent (area)	Water: Dry water course extent (line)	Water: Flood bank	Water: Non-perennial center line (area)	Water: Non-perennial center line (line)	Water: Non-perennial extent	Water: Perennial center line	Water: Perennial extent	Water: Rapids	Water: Dam bank	Water: Untyped (area)	Water: Untyped (line)	Water: Weirfall	Water: Dam	Water: Embankment	Water: Sandy area	Water: Shrubland	Water: Sand dune	Water: Dry water course extent	Water: Cut line	Water: Fine break	Water: Forme	Water: Rocky outcrop	Water: Wetland	Water: Cave	Water: Ground sign	Water: Monument	Water: Shmiesch
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APPENDIX A6: SOCIO-ECONOMIC ASSESSMENT

No specialist socio-economic investigation was conducted for this application however socio-economic impacts are considered in the impact assessment register based on the information obtained from the approved Integrated Development Plan for the City of Ekurhuleni (2018/19). Should specific socio-economic impacts be raised by I&AP's during the consultation period these will be included in the updated assessment of impacts already identified when finalising the report.

APPENDIX A7: HERITAGE ASSESSMENT

No specific sites of cultural heritage importance have been identified to date within the proposed application area. The National Screening Tool (Department of Environment, 2017) indicates high sensitivities in mainly the areas identified as sensitive habitats in previous sections of this report, however, as no invasive prospecting activities will be permitted within sensitive habitats or within the respective buffer zones illustrated in Appendix B1, potential artefacts in these areas will not be disturbed.

Given that the remainder of the application area is already disturbed by cultivation, it is likely that if any artefacts were present in these areas, they would have already been destroyed. Therefore, it is considered that the likelihood of discovering any artefacts outside of the areas identified as sensitive habitats is low and no specialist study was commissioned.

APPENDIX A8: MOTIVATION WHERE NO ALTERNATIVES ARE CONSIDERED

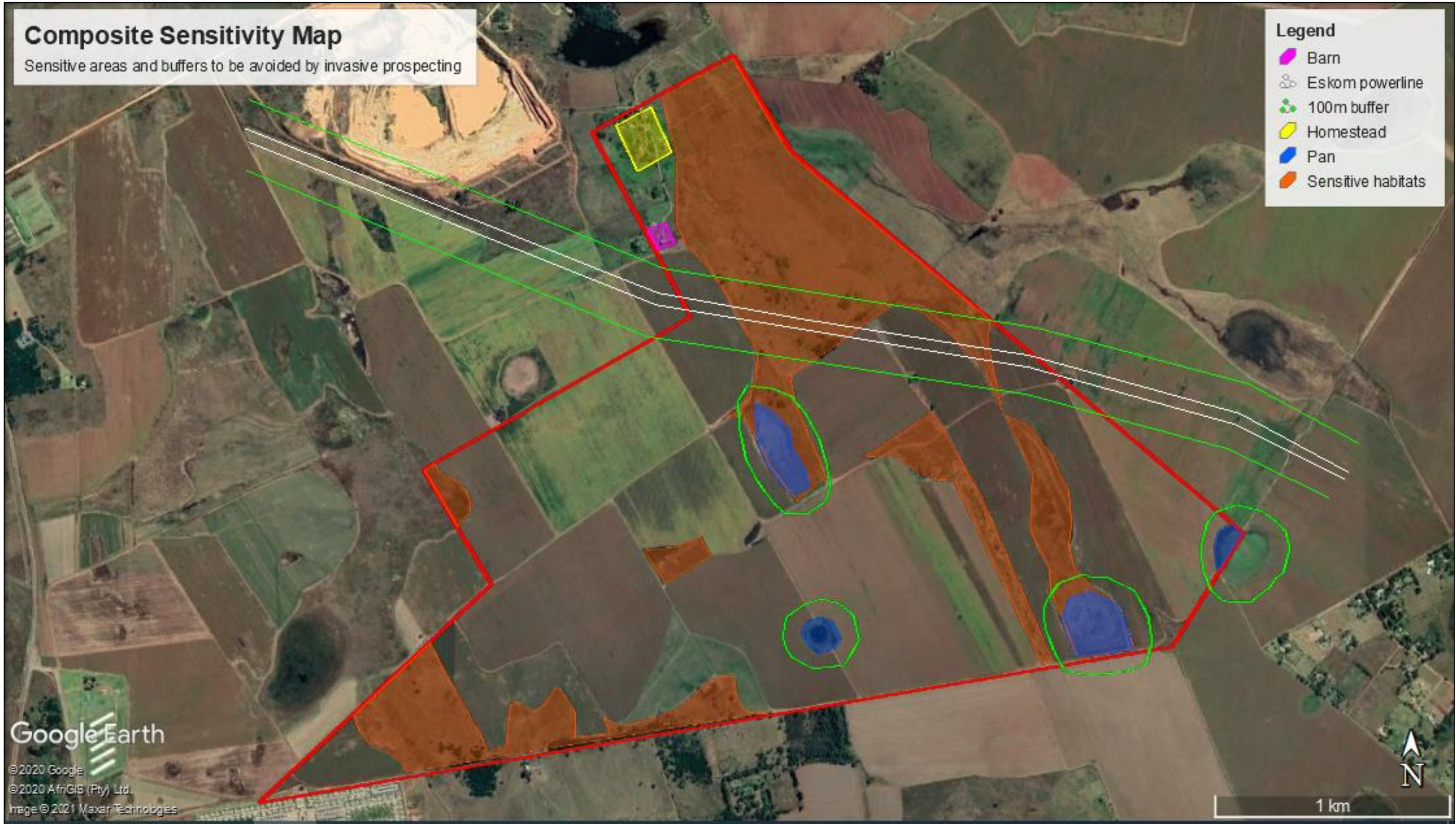
The overall goal of the prospecting activities is to investigate the availability of the target minerals on the land to the south of the existing Crushco operations as part of future planning for the mine. The application area is the next logical direction of mining should a resource occur therefore no alternative site location was considered.

Due to the simplistic nature of the proposed operation there are also no operational or technological alternatives identified that would be viable.

APPENDIX A9: BIRD SPECIALIST STUDY

APPENDICES FOR PART B

APPENDIX B1: COMPOSITE MAPS SHOWING ENVIRONMENTAL SENSITIVITY



APPENDIX B2: IMPLEMENTATION PLAN

Implementing Drilling Activities:

Management objectives: The main management objectives for the invasive drilling activities are;

- Avoid potential impacts by positioning the drill sites in a manner which avoids / minimise potential impacts. This can be achieved by implementing appropriate buffer zones.
- Reduce impacts through implementing realistic operational management measures such as imposing restrictions on the time of day when drilling can take place.
- Restore the physical impact of drilling through implementation of concurrent rehabilitation as and when drilling at one site is completed.
- Use the results of drilling to determine viability of future mining project.

Desired Management outcomes: Through implementing the above objectives the desired outcomes are;

- Implement a drilling programme that does not impact on any sensitive environmental feature
- Implement a drilling programme with the consent of the applicable landowner
- Ensure that all temporary impacts are minimised
- Once complete there should be no evidence that the drilling activities took place.

The following management measures will be implemented to assist in the implementation of effective environmental management during the drilling activities.

MANAGEMENT MEASURES	
GENERAL MANAGEMENT MEASURES	Compliance
<ul style="list-style-type: none"> • Prior to the implementation of drilling activities the drilling contractors will undergo environmental awareness training to inform drillers of the sensitivity of; <ul style="list-style-type: none"> - The sensitivity of water courses, wetlands and other ecological features such as termite mounds. - The need to avoid pollution of the soil by ensuring hydrocarbon spills are minimized or if they do occur they are cleaned up. - The need to implement effective waste management (separation of domestic & hazardous waste) - Do not unnecessarily disturb any wildlife - Good behavior in terms of interaction with the land owner and local community when implementing drilling 	•
<ul style="list-style-type: none"> • Chemical toilets to be provided at the drill site for sanitation requirements. 	•
<ul style="list-style-type: none"> • Only well maintained drill rigs with a service history to be used during the drilling campaign 	•
<ul style="list-style-type: none"> • At each drill site the drill equipment will be positioned on a plastic lining when not in use to prevent possible spillages. 	•
<ul style="list-style-type: none"> • Only biodegradable lubricants will be used during the drilling operations. 	•
<ul style="list-style-type: none"> • All chemicals required for the duration of the surface drilling operation will be stored in a sealed container at the established drill site. <ul style="list-style-type: none"> - Spillages of hydrocarbon liquids will be cleaned up immediately and placed in a sealed container and disposed of appropriately. - Diesel container / bowser will be housed on a plastic lined area when on site. 	•

MANAGEMENT MEASURES		
MEASURES TO BE IMPLEMENTED PRIOR TO IMPLEMENTING THE DRILLING PROGRAMME		
<ul style="list-style-type: none"> ● Consultation with affected landowner. 	<ul style="list-style-type: none"> ● 1 month prior to implementing any drilling the applicable landowner/developer must be re-consulted. ● Record of consultation must be kept on file ● Reasonable request from the landowner must be considered and where possible addressed 	●
<ul style="list-style-type: none"> ● Planning access routes. 	<ul style="list-style-type: none"> ● Drill site positions should be located, as close as possible, to an existing road or access track. ● Unnecessary tracks will be avoided. ● If a new track is required, the same track will be used to access and exit the area. ● Any new access tracks must avoid termite mounds and trees ● No new access tracks will be created which cross a water course or wetland. (only existing roads / tracks will be used). 	●
<ul style="list-style-type: none"> ● Positioning of the drill pads 	<ul style="list-style-type: none"> ● The final positioning of the drill site will where feasible, adhere to the following minimum distances: <ul style="list-style-type: none"> - Ideally maintain 100m away from the Eskom powerlines. - Maintain at least 100m away from the closest edge of the water course. - Maintain a 100m buffer from any identified wetland - Maintain at least 50m away from any other structures / heritage sites (see specialist studies) - No trees to be cut down - Avoid all established termite mounds 	●
<ul style="list-style-type: none"> ● Securing water requirements 	<ul style="list-style-type: none"> ● Potable water to be brought onto site daily ● Drilling water to be obtained from a legal source within the area. 	●
<ul style="list-style-type: none"> ● Photographic gallery 	<ul style="list-style-type: none"> ● Prior to commencing any invasive activities a photographic gallery of the current state of the area to be subjected to disturbance must be recorded. Photographs should be taken of: <ul style="list-style-type: none"> - Each proposed drill pad - The status of existing access routes - The status of the environment on planned new access tracks. - Any other area subjected to invasive activities. - These photographs will be used to prove effective rehabilitation. 	●
<ul style="list-style-type: none"> ● Securing of the drilling activities 	<ul style="list-style-type: none"> ● Applicable warning signs to be erected during drilling ● Access to drill site area to be restricted to authorised personnel only 	●
<ul style="list-style-type: none"> ● Accommodation requirements 	<ul style="list-style-type: none"> ● Existing accommodation in the area to be used for the drillers ● Only security to be allowed to stay at drill sites on a permanent basis 	●
MEASURES TO BE IMPLEMENTED DURING THE DRILLING PROGRAMME		

MANAGEMENT MEASURES		
<ul style="list-style-type: none"> ● Potential for soil degradation 	<p>Drill sites: The following topsoil management measures are applicable for the drill sites and drilling;</p> <ul style="list-style-type: none"> ● Each site will only be developed a maximum time of 1 week prior to it being used and only once drilling in the area is confirmed. No drill sites to be created unnecessarily. ● The topsoil from the area to be drilled will be moved aside and stored next to the drilling operation. ● Topsoil (top 50cm) and overburden will be kept separate (if applicable). ● The drill equipment will be on a plastic lining when not in use to ensure that no unnecessary soil pollution will occur. Upon completion of the drilling programme the soil will be returned to the exact area that it was moved from. Overburden will be replaced first followed by topsoil. ● If a sump is required - the soil moved to dig the sump will be located next to the sump. The sump will be lined with plastic. After completion of drilling, the plastic lining will be removed from the sump and disposed of in a registered landfill site and the soil moved to generate the sump will be replaced. ● Any chemicals stored at the drill site which could pollute soil if spilt will either be stored within a protected container or in the case of a diesel container on a plastic lined area. <ul style="list-style-type: none"> - The plastic lining must be large enough to cope with minor spillages and leaks. ● Any soil polluted as a result of a hydrocarbon spill will be dug up and disposed of as hazardous waste. <p>Maintenance: The following will be applicable with regards to the carrying out of maintenance;</p> <ul style="list-style-type: none"> ● Only minor maintenance may occur on-site with use of drip trays and / or on a plastic lining. ● Major maintenance activities must be undertaken off-site. ● Any chemical spillages must be cleaned up immediately and be dealt with as hazardous waste. 	<ul style="list-style-type: none"> ●
<ul style="list-style-type: none"> ● Potential impact on Fauna and Flora 	<ul style="list-style-type: none"> ● Access route will be developed to avoid any trees or termite mounds if present. ● Once drilling is completed at a site, concurrent rehabilitation will be implemented. 	<ul style="list-style-type: none"> ●
<ul style="list-style-type: none"> ● Potential impact on water resources 	<p>The impact of any of the invasive activities on water resources will be minimised by:</p> <ul style="list-style-type: none"> ● No invasive activity will take place within 100m of the closest edge of the water course. ● A 50m buffer from a wetland will be respected (see specialist studies) ● All potentially polluting chemicals will be stored within a demarcated protected area. ● Any chemical spills that may occur will be cleaned up immediately and the polluted material removed as hazardous waste. ● Need to ensure that any water intersection identified during drilling is included within the borehole logs. ● Drilling inspection checklist will be used on a daily basis to force drillers to check the rig for potential spills. Any problems identified during the inspections must be rectified. 	<ul style="list-style-type: none"> ●
<ul style="list-style-type: none"> ● Air quality 	<ul style="list-style-type: none"> ● Staff will be supplied with the appropriate PPE. 	<ul style="list-style-type: none"> ●

MANAGEMENT MEASURES		
<ul style="list-style-type: none"> ● Potential impact of noise 	<ul style="list-style-type: none"> • When drilling occurs in an area that can be heard by surrounding residents, drilling activities will be restricted to daylight hours (unless permission to drill for longer is obtained from the closest community). Documented proof of this permission must be maintained. • Staff will be supplied with the appropriate PPE. • The timing of implementing drilling programme is not set. If necessary certain drill sites can be timed to occur during school terms. This will be confirmed during the pre-drilling consultation. 	•
<ul style="list-style-type: none"> ● Potential impact on interested and affected parties 	<ul style="list-style-type: none"> • Any complaint received by an interested and affected party will be recorded in a complaints book, investigated immediately and the cause of the complaint will, if possible, be rectified. 	•
<ul style="list-style-type: none"> ● Waste management requirements 	<ul style="list-style-type: none"> • At all sites where invasive activities are implemented, separate containers will be provided for the collection of both domestic and hazardous waste. Ideally these containers should be labelled so as to facilitate separation of different waste streams. • The containers should be located in an area that is protected from surface water run-off. • Domestic and hazardous waste will be disposed of separately and appropriately. • Inspections at each of the sites where invasive activities are taking place will be implemented to ensure that correct waste management practices are being applied. 	•
<ul style="list-style-type: none"> ● Monitoring commitments 	<p>Inspections will cover the following (see table below):</p> <ul style="list-style-type: none"> • Implement daily equipment checks for potential hydrocarbon spills • Implementation of effective waste management • Discuss if any concerns have been raised • Evidence of any hydrocarbon pollution • Rehabilitation of completed drill sites • The appropriate storage of topsoil. 	
<ul style="list-style-type: none"> ● Administrative commitments 	<p>Documentation requirements:</p> <ul style="list-style-type: none"> • At least the following environmental documentation must be maintained on file: <ul style="list-style-type: none"> – A copy of the approved mining right – A copy of the EMPR – A copy of all environmental communication with the DMRE – A copy of the photographic gallery – A copy of the weekly inspection reports – Details of any complaints that may have been raised 	
MEASURES TO BE IMPLEMENTED UPON COMPLETION OF THE DRILLING PROGRAMME		
<ul style="list-style-type: none"> ● Closure & environmental objectives 	<p>After invasive prospecting is complete, the land will be reverted back to its original condition.</p> <ul style="list-style-type: none"> • (New) Access routes: Will be rehabilitated with the aim to return the road to its original state. Existing access routes will be left in the same state they were found. • Drill pads: After drilling has been completed in one area, the drilling team will ensure the site is 	

MANAGEMENT MEASURES	
	<p>reverted back to its original by:</p> <ul style="list-style-type: none"> - Removing all infrastructures, such as the drill equipment and the chemical toilet. - Infilling the boreholes as per legal requirements. - Ensure that no foreign matter (waste) is left behind on the drill site. - Refilling the sump required for the drilling activities (if applicable). Initially the plastic lining will be removed and disposed on in a registered landfill site and the soil returned to effectively fill in the sump. - The whole drill site will be inspected for any signs of hydrocarbon pollution. Any identified soil which has been polluted as a result of the drilling activities will be removed and disposed of in a registered landfill site. - Any area compacted as a result of the drill rig will be tilled.
	<ul style="list-style-type: none"> • Upon completion of the drilling programme another set of photographs of the access route and the individual drill site after the implementation of concurrent rehabilitation will act as proof of rehabilitation to its original state / improvement to the original state. • These photographs will be maintained on file. • The applicable landowner will be requested to inspect the rehabilitated drill sites and if willing sign off acceptance of rehabilitation. • Upon completion of the drilling activities, each site will be monitored for the next year on a bi-annual basis to ensure that no environmentally related problems resulting from the drilling activities has occurred and that the drill sites are re-vegetating naturally.

DRILLING WEEKLY INSPECTION REPORT	
<ul style="list-style-type: none"> • Have daily equipment checks been undertaken? • Is waste management been implemented effectively? • No littering on site? • Separation of domestic and hazardous waste? • Proof of proper disposal of waste? 	
<ul style="list-style-type: none"> • Has any complaints or concerns be raised? • Has any interaction occurred with surrounding community members? If yes what was the results of the interaction 	
<ul style="list-style-type: none"> • Any evidence of any hydrocarbon spills at the drill sites? • Have polluted soil been cleared up? 	
<ul style="list-style-type: none"> • Have completed drill sites been rehabilitated in accordance with the environmental management plan? 	
<ul style="list-style-type: none"> • Is the chemical toilet available and clean? 	
<ul style="list-style-type: none"> • If topsoil is removed - is topsoil been stored, protected and used properly? 	
<ul style="list-style-type: none"> • Is all chemicals (including diesel) been housed on a protected plastic lining? 	
<ul style="list-style-type: none"> • Are access tracks been kept to a minimum? 	

Implementing additional specialist studies:

Based on the environmental screening assessment the area is sensitive for both aquatic and terrestrial biodiversity. A number of small pans have been noted on the 1 in 50 000 map of the area. Should the prospecting campaign be successful in identifying a viable resource, the relevant specialist studies will be commissioned to determine the sensitivity of the site in relation to possible future mining activities. At minimum the following will be implemented for any specialist study commissioned during prospecting:

Management Measures: The main management measures for the specialist studies are;

- Prior to commencing with the site visit of any specialist study, the affected landowner needs to be re-consulted. During this re-consulting the landowner needs to be made aware of the following;
 - Date that the specialist intends to access the land
 - Duration that the specialist will require on the land
 - Details of any person who will form part of the specialist team
 - Details of the activity the specialist will undertake on the property
- All reasonable requests from the landowner (during the consultation) must be implemented
- The applicable landowner should be provided / informed of the outcomes of the specialist study once completed.