UNIVERSAL COAL DEVELOPMENT 1 (PTY) LTD

PROPOSED EXTENSION TO THE EXITING KANGALA COAL MINE NEAR DELMAS, IN MPUMALANGA PROVINCE

VISUAL IMPACT SCOPING REPORT

AUGUST 2018

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1 INTRODUCTION

1.1 GENERAL

This Visual Impact Scoping Report (VISR) forms part of the Scoping and Environmental Impact Assessment that is being undertaken for the proposed extension of the Kangala Coal Mine by Environmental Impact Management Services (Pty) Ltd (EIMS) on behalf of Universal Coal Development 1 (Pty) Ltd (UCD1), a subsidiary of Universal Coal plc.

In terms of the amended National Environmental Management Act (NEMA) Act No. 107 of 1998, the proposed development requires environmental authorisation. A key impact to be assessed comprises the visual impact that the facility will have on surrounding areas.

This desktop Visual Impact Assessment Report has been prepared for inclusion in the Scoping Report prepared for the project.

1.2 PROJECT LOCATION

The project footprint is in Victor Khanye Local Municipality, located within the Nkangala District Municipality, Mpumalanga Province. The project area covers portions 14, 15, 16, 18, 19, 20, 22, 23 and 24 of the Farm Strydpan 243 IR and is situated approximately 7.5km south-east of the town Delmas. Please refer to locality map (**Map 1**).

1.3 BACKGROUND OF SPECIALIST

Jon Marshall qualified as a Landscape Architect in 1978. He is also a certified Environmental Assessment Practitioner (EAP) of South Africa. He has been involved in Visual Impact Assessment over a period of approximately 30 years. He has developed the necessary computer skills to prepare viewshed analysis and three dimensional modelling to illustrate impact assessments. He has undertaken visual impact assessments for major buildings, industrial development, renewable energy, mining and infrastructure projects and has been involved in the preparation of visual guidelines for large scale developments.

A brief Curriculum Vitae outlining relevant projects is included as **Appendix I.**

1.4 TERMS OF REFERENCE AND RELEVANT GUIDELINES

The brief is to assess the visual impact that the proposed mine extension will have on surrounding areas.

Work was undertaken in accordance with the following guideline documents:

a. The Government of the Western Cape Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (Western Cape Guideline) (Oberholzer, 2005). This is the only local relevant guideline available in South Africa, setting various levels of assessment subject to the nature of the proposed development and surrounding landscape **(Appendix II)**; and
b. The Landscape Institute and Institute of Environmental Management and Assessment (UK) Guidelines for Landscape and Visual Impact

Assessment (GVLIA) which provides detail of international best practice (UK Guidelines) (Landscape Institute and Institute of Environmental Assessment and Management, 2013).

1.4.1 Western Cape Guideline

Given the nature of the proposed project, in accordance with the guidelines, the proposed development could be expected to have high visual impact for which a Level 4 Assessment is required in accordance with the Western Cape Guidelines.

In accordance with the Western Cape Guidelines, a Level 4 Assessment requires the following input:

- Verification of issues raised in scoping phase, and site visit;
- Description of the receiving environment and the proposed project;
- Establishment of view catchment area, view corridors, viewpoints and receptors;
- Indication of potential visual impacts using established criteria;
- Inclusion of potential lighting impacts at night;
- Description of alternatives, mitigation measures and monitoring programmes.
- Complete 3D modelling and simulations, with and without mitigation.
- Review by independent, experienced visual specialist (if required).

1.4.2 UK Guideline

The GVLIA provides the following criteria which, at least, should be borne in mind as it could help the professional in carrying out the process of assessing the Landscape Effects as follows:

- Consider the physical state of the landscape. This includes the extent to which typical character is represented in individual areas, the intactness of the landscape from visual, functional and ecological perspectives and the condition of individual elements of the landscape;
- Consider scenic quality which depends upon perception and reflects the particular combination and pattern of elements in the landscape, its aesthetic qualities, its more intangible sense of place or 'genius loci' and other more intangible qualities;
- Consider the rarity of the landscape, it might be valued because it is a rare type, or because it contains rare elements, features or attributes;
- Consider representativeness, as a landscape may be valued because it is considered to be a particularly good example of its type either in terms of its overall character or because of the elements or features it contains;
- Consider conservation interests, i.e. the presence of features of wildlife, earth science or archaeological or historical and cultural interest can add to the value of the landscape as well as having value in their own right.
- Consider perceptual aspects as a landscape may be valued for its perceptual qualities, notably wildness and/or tranquillity; and
- If public opinion has been sought consider if there may be a consensus of opinion, expressed by the public, informed professionals, interest groups, and artists, writers and other media, on the importance of the landscape.

As regards the Visual Effects, the GVLIA suggests the selection of the final viewpoints used for the assessment should take account of a range of factors including:

- Accessibility to the public;
- Potential number and sensitivity of viewers who may be affected;
- Viewing distance (i.e. short, medium and long distance views) and elevation
- View type (for example panoramas, vistas, glimpses);
- Nature of viewing experience (for example static views, views from settlements and points along sequential routes);
- Potential for cumulative views of the proposed development in conjunction with other developments

1.5 THE NATURE OF VISUAL IMPACT

Visual impacts may relate to a general change in the character of an area or in the change in a specific view for a person or group of people.

Visual impacts can be positive or negative and a degree of subjectivity is required in deciding this point. The approach of any visual assessment should, as objectively as possible, describe a landscape and as far as is possible reflect the likely majority view regarding positive / negative aspect of an impact. This can be difficult particularly in South Africa due to different values and cultures associated with various sectors of the population. For example, poorer and particularly rural based sectors of the population are possibly more concerned with the productive nature of a landscape than its appearance, whereas the wealthier sectors might be more concerned with scenic value particularly as it is associated with property values. If possible the values and opinions of all impacted sectors of the community should be considered.

General change to a landscape might have greater or lesser significance subject to issues listed in 1.4.2.

In terms of change to a specific view this might be defined as either visual intrusion or visual obstruction.

a) Visual intrusion is a change in a view of a landscape that reduces the quality of the view. This can be a highly subjective judgement. Subjectivity has been removed as far as possible in this assessment by classifying the landscape character of each area and providing a description of the change in the landscape that will occur due to the proposed development.
b) Visual obstruction is the blocking of views or foreshortening of views. This can generally be measured in terms of extent.

More often than not such an impact will be a combination of intrusion and obstruction. Obstruction can be measured in terms of the extent of an existing view that is screened by a development. However, judging intrusion requires a degree of subjectivity. It is however possible to relate this judgement to the manner in which proposed change would impact on the use or enjoyment of an area which again requires an understanding or local values.

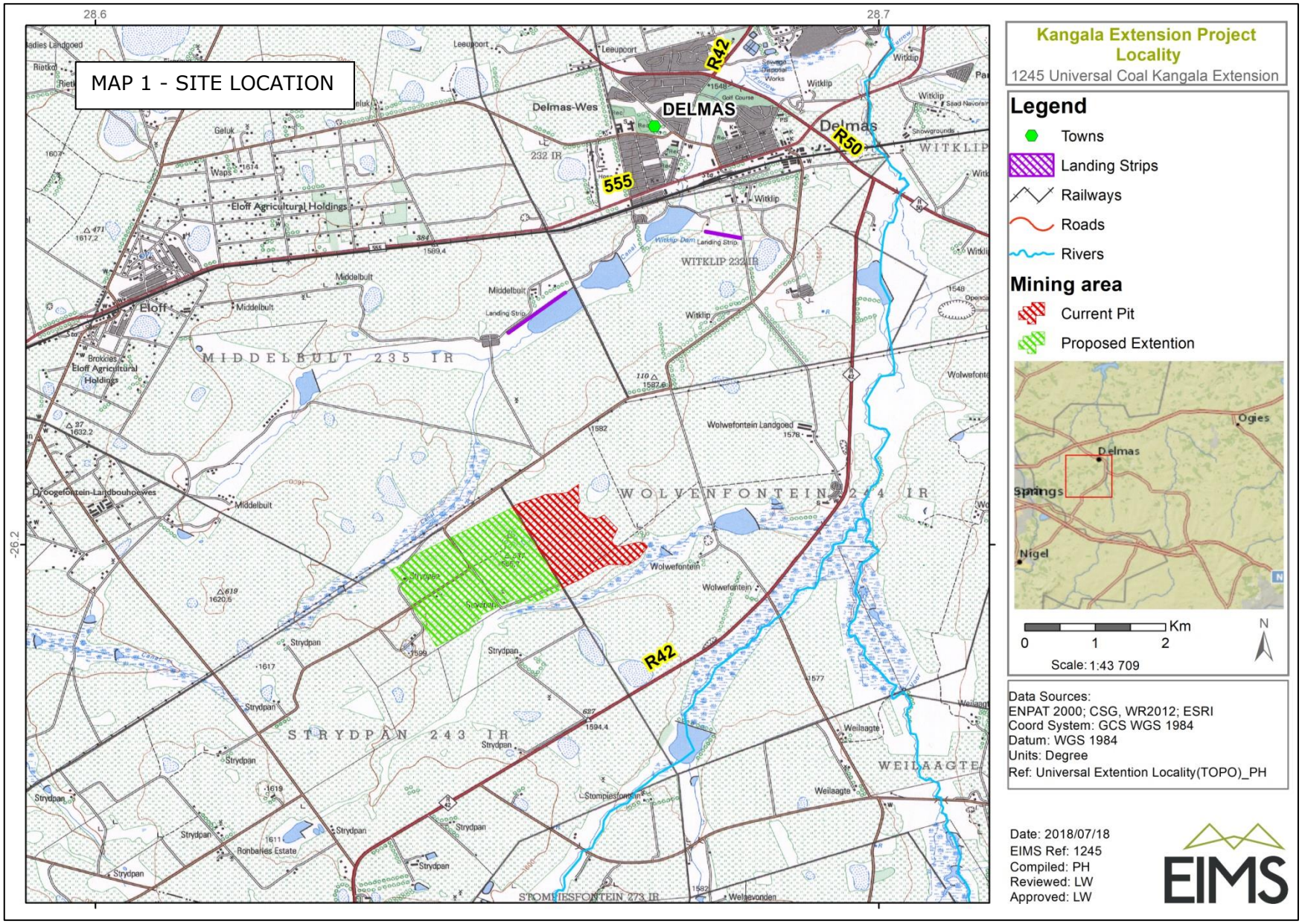
1.6 SCOPING OBJECTIVES

This Environmental Scoping Study identifies and evaluates potential environmental impacts associated with all aspects of the proposed Project. In terms of the EIA

Regulations, feasible and reasonable alternatives should be assessed within the Scoping Study. The scope of an environmental assessment is defined by the range of issues and feasible alternatives to be considered, and the approach towards the assessment that will follow.

The characteristics of a scoping exercise are as follows:

a) Feasible and reasonable alternatives are identified and selected for further assessment;
b) Important characteristics of the affected environment are identified;
c) Significant issues that are to be examined in the assessment procedure are identified; and
d) It provides the basis for determining terms of reference for the assessment procedure.


MAP 1 - SITE LOCATION
28.6
28.7
-26.2
DELMAS
Delmas-Wes
Delmas
Eloff
Eloff Agricultural Holdings
Middelbult
MIDDELBULT 235 IR
WITKLIP 232 IR
WOLVENFONTEIN 244 IR
STRYDPAN 243 IR
STOMPIESFONTEIN 273 IR
WEILAAGTE
Witklip
Wolwefontein
Wolwefontein Landgoed
Weilaagte
Strydpan
Droogefontein-Landbouhoewes
Ronbaries Estate
Stompiesfontein
R42
R50
555
Kangala Extension Project
Locality
1245 Universal Coal Kangala Extension
Legend
Towns
Landing Strips
Railways
Roads
Rivers
Mining area
Current Pit
Proposed Extention
Ogies
Delmas
Springs
Nigel
Km
0
1
2
Scale: 1:43 709
N
Data Sources:
ENPAT 2000; CSG, WR2012; ESRI
Coord System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Ref: Universal Extention Locality(TOPO)_PH
Date: 2018/07/18
EIMS Ref: 1245
Compiled: PH
Reviewed: LW
Approved: LW
EIMS

2. PROJECT DESCRIPTION

2.1 PROJECT MOTIVATION

UCD1 holds a Mining Right to mine coal on portion 1 and the remaining extent of portion 2 the farm Wolvenfontein 244 IR in the Delmas area of the Mpumalanga Province. The project is known as the Kangala Coal Mine (Kangala).

A Mining Right was granted to Universal Coal by the Department of Minerals and Energy (now Department of Mineral Resources) in May 2012.

Coal is the primary energy source for South Africa and is expected to remain a strategic input to power generation. Currently, coal provides for more than 70 % of the country's primary energy needs.

Coal production from the current Kangala Mine is anticipated to cease in approximately June 2020. UCD1 are therefore seeking an extension of the mine that they anticipate will result in coal production extending to approximately June 2027.

2.2 PROJECT DESCRIPTION

UCD1 wishes to develop a new opencast coal mining operation covering an extent of 251 hectares (ha), adjacent to the existing Universal Coal's Kangala Colliery on various portions of the Farm Strypan 243 IR - herein referred to as the Kangala Extension Project.

The proposed Kangala Extension Project is anticipated to use a standard truck and shovel mining method based on strip mining design and layout.

The existing Coal Handling and Processing Plant at the Kangala Colliery will be utilised for the proposed Kangala Extension Project. It is expected that no new surface infrastructure such as offices, dams, stores facility, workshops, or change house will be required for the project.

The truck and shovel mining method is a standard mining technique that sees sequential removal of overburden, mining of coal and backfilling of mined areas. It should mean that rehabilitation and mining are ongoing parallel operations. It should also result in minimising the extent of over burden stockpiles. The following description has been extracted from the SACMA's [1] Surface Strip Coal Mining Handbook;

Figure 1 shows a typical truck and shovel terrace mining method in which three overburden benches are mined to expose a thick coal seam, divided into top, middle and lower seam products. The overburden benches are level and trucks haul the spoil around the pit to be back dumped. In this way the pit is continuously backfilled and reclaimed as the mine progresses.

The coal is accessed by removing overburden from the top down in a series of horizontal layers of various thicknesses called benches. Mining starts with the top bench and after sufficient floor area has been exposed, mining of the next bench

[1] South African Colliery Managers Association

can begin. The process continues until the bottom bench elevation is reached and the coal removed. From this point onwards, the benches advance laterally , thus it becomes a multi-benched sideways moving method, the whole mine moves over the coal reserve from one end to the other but not necessarily in a single bench or single panel. The number of benches used is usually a function of the excavation depth and type of machinery used (typically between 10-15m bench height and 2-10 benches in the terrace).

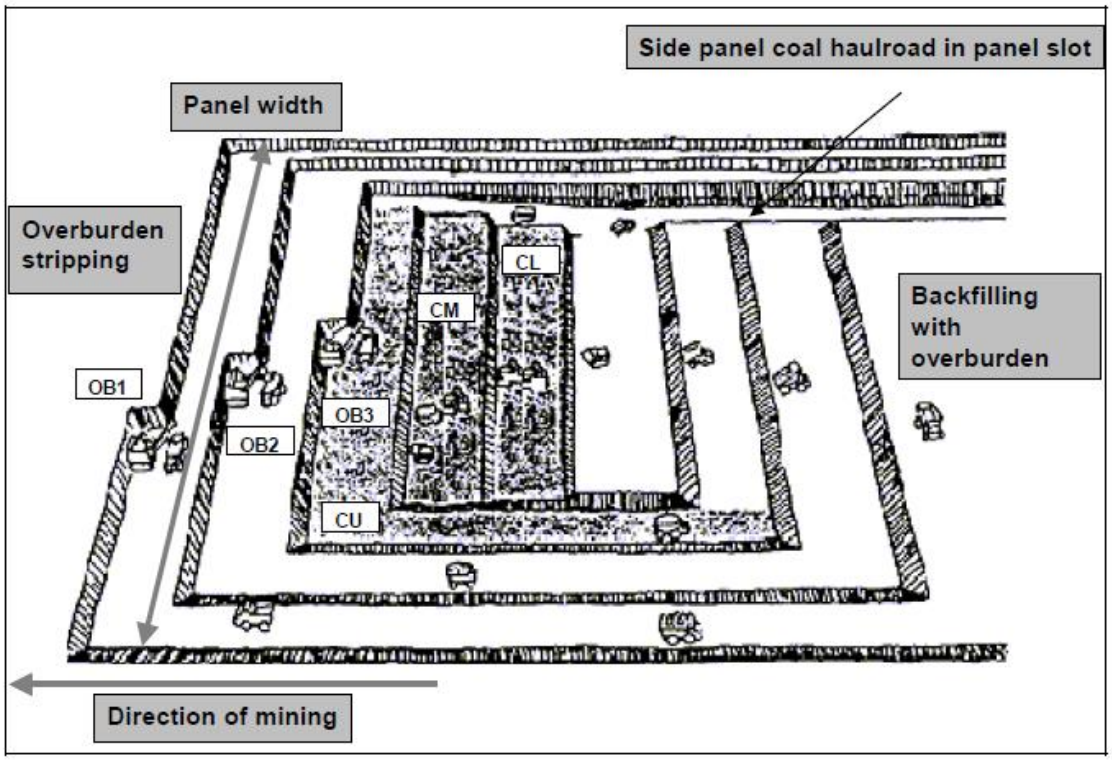


Figure 1 – Typical terrace mining operation. The diagram shows 3 benches waste (OB1-3) and 3 coal seams (CU, CM, CL) terrace operation with mining moving from R to L in the diagram.
Source: South African Colliery Managers Association

This working method is likely to result in the following visual implications;

a) Because the current coal handling, processing plant and other support infrastructure on the existing mine site will be utilised this should mean that there will be no additional structures required on the proposed mine extension.
b) Temporary over burden and topsoil stockpiles will be required on site. On the current mine these extend to approximately 30m high, it is therefore assumed that a similar maximum stockpile height will be required. It must be understood that these stockpiled material will grow to a maximum until the coal seams are reached, it will then reduce slightly as excavated coal seams are backfilled and will reduce rapidly as coal seams are exhausted and the mine is closed. The stockpiles on the existing mine should also reduce rapidly as coal seams are exhausted and that mine is closed.
c) Ongoing activity is likely to be obvious around the mine from initial stages to closure. It is likely that more activity will be evident during initial stages and closure as more plant will be obvious at the surface. As mining operations progress much of the activity will be below existing ground levels

and will not be as obvious from outside the site. A constant stream of trucks will be evident however delivering coal to the processing facility.

This methodology means that the Construction Phase is relatively short and really focuses on providing access roads and infrastructure to enable mining to commence.

As rehabilitation is ongoing through the life of the mine, the decommissioning phase is also relatively short and focuses on final areas of rehabilitation and removal of roads and other infrastructure.

Figure 2 indicates an aerial view of the existing mine. The area enclosed in white indicates the proposed extended mining area. The existing terraces, exposed coal seams and stockpiles are highlighted. The proposed extension would result in the terraced mining extending to the south west. New stockpiles would also develop adjacent to the terraced area whilst the existing stockpiles will be removed and used to backfill the existing mine.

Where "proposed mine extension" is referred to in this document it should be read to include both the proposed mining extension area as well as the proposed new stockpiles.

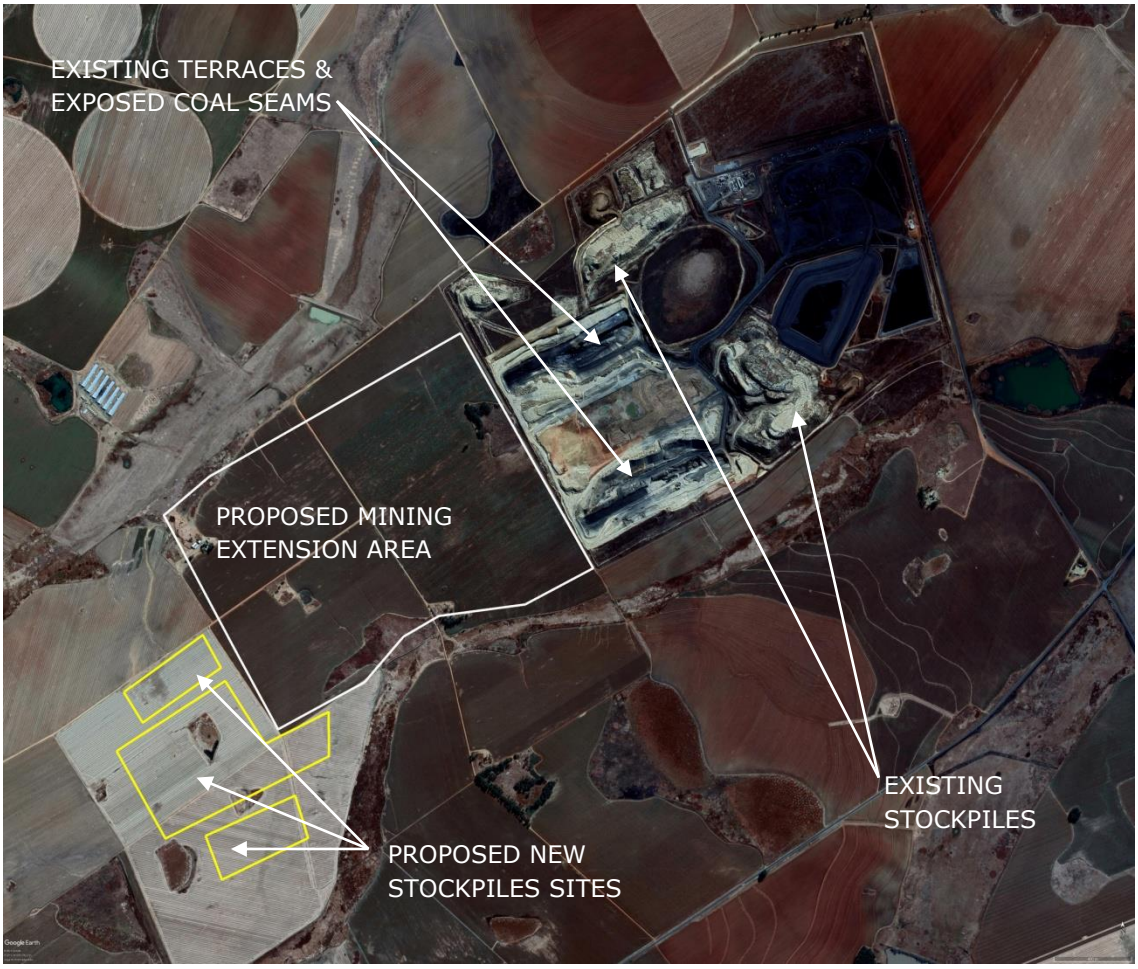


Figure 2 – Aerial view of existing mine, the proposed mine extension area and proposed stockpile areas.
Source: Google Earth

Plate 1 – Existing Kangala Mine Stockpiles. It is the stockpiles that are evident from a distance.
Source: EIMS

3 DESCRIPTION OF RECEIVING ENVIRONMENT AND RECEPTORS

It is possible that landscape change due to the proposed development could impact the character of an important landscape. Landscape character can be derived from specific features relating to the urban or rural setting and may include key natural, historic or culturally significant elements. Importance might also relate to landscapes that are uncommon or under threat from development.

This section will:

- Provide an initial description of the types of landscape that may be impacted;
- Provide an initial Indication of the likely degree of sensitivity; and
- Provide an initial description of how the landscape areas may be impacted.

The study area is defined by the limit of visibility of the proposed project. As an initial guide the limit has been set at 19.6km from the proposed site being the approximate limit of visibility of the stockpiles being the tallest items associated with the proposed development. Refer to Section 5 for the justification for this distance.

3.1 LANDSCAPE CHARACTER

Landscape character is defined as "a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another"[2].

Landscape Character is a composite of a number of influencing factors including:

- Landform and drainage;
- Nature and density of development; and
- Vegetation patterns.

3.1.1 Landform and Drainage

Refer to Map 2 for analysis of the landform and drainage.

The study area generally falls from the south west to the north east. The general landform is comprised of low undulating ridgelines that are aligned with the general direction of fall.

Ridgelines in the vicinity of the site are approximately 40-60m above valley floors.

The non-perennial streams that drain the area flow to the northwest into the Olifants River. This system flows through the Kruger Park into Mozambique and then into the Indian Ocean.

The proposed site is located on a shallow sloping broad ridgeline. The proposed mining extension falls from a mid-high point of approximately 1603mamsl to a low point at its eastern extremity of approximately 1582m amsl. This results in an approximate fall along the length of the site of approximately 1:45.

This landform is likely to have a number of implications for visibility of the proposed development;

[2] UK Guideline

- The majority of the development is likely to be located on the flatter upper sections of the proposed site. This could mean that screening that might be provided by landform is likely to be minimal.

- The relatively steep stockpiles are likely to contrast strongly against the gently undulating terrain.

3.1.2 Landcover

Refer to Map 3 for analysis of the Landcover.

The site appears to be located within an area that is predominantly under cultivation. These farm areas also have isolated farmsteads that are comprised of farm buildings including buildings used for residential and storage uses.

There are also bands of natural vegetation in close proximity to the proposed mine extension.

Other major landcover types include:

- Three large areas of settlement including Sundra, Eloff and Demas that lie to the north, the closest being Delmas which is approximately 3.8km to the north of the proposed mine extension; and
- Two areas (Vischkuil and Droogfontein) that are indicated as urban on Map 3 are in fact areas of small holdings. Activities within these areas appear to include intensive / industrial agriculture such as agricultural tunnels as well as large individual private houses.
- A number of other large coal mines including one approximately 3.2km to the east and one approximately 2.2km to the south of the proposed mine extension.

There is only one protected area in the vicinity of the proposed site. This is the Marievale Bird Sanctuary which is a Provincial Nature Reserve which is approximately 16km from the proposed mine extension. Due to the distance and the fact that there are other existing mines in close proximity, it is highly unlikely that this protected area will be affected by the proposed mine extension.

There are a number of regional roads in the area including the R42 which runs approximately 1.4km to the south and the R55 which runs approximately 3.8km to the north of the proposed mine extension.

Existing landcover is likely to have the following visual implications for the proposed mine extension:

- Open cultivated areas in which the mine is set are unlikely to provide any screening of the proposed mine extension and stockpiles;
- It is possible that the adjacent natural areas could provide a degree of screening for the proposed mine and stockpiles, particularly if they include alien invasive tree species;
- Whilst there are regional routes close to the propose mine extension, due to the nature of the area which includes numerous mine sites, they are unlikely to have significant tourism or recreational importance and are therefore

unlikely to be highly sensitive to visual changes associated with the proposed mine extension; and
- Settlement areas to the north as well as individual farmsteads could have greatest visual sensitivity to the proposed mine extension.

3.1.3 Vegetation Patterns

The main natural vegetation types as defined by Mucina and Rutherford[3]in the vicinity of the proposed mine extension include:

a) Eastern Highveld Grassland; and
b) Soweto Highveld Grassland.

Whilst botanically these vegetation types may be very different, in visual terms they are both short dense grasslands which in themselves are unlikely to provide any screening.

It is obvious from the landcover analysis that only small areas of natural vegetation exist in close proximity to the proposed mine extension. It is possible that some natural areas have been invaded by alien tree species. If this is the case then it is possible that a significant amount of localised screening could be provided.

3.2 LANDSCAPE CHARACTER AREAS& VISUAL ABSORPTION CAPACITY

Landscape Character Areas (LCAs) are defined as "single unique areas which are the discrete geographical areas of a particular landscape type"[4].

Visual Absorption Capacity (VAC) is defined as the landscape's ability to absorb physical changes without transformation in its visual character and quality. Where elements that contrast with existing landscape character are proposed, VAC is dependent on elements such as landform, vegetation and other development to provide screening of a new element. The scale and texture of a landscape is also critical in providing VAC, for example; a new large scale industrial development located within a rural small scale field pattern is likely to be all the more obvious due to its scale.

As the topography is very similar throughout the study area, landscape character is generally defined by the extent of development and transformation of vegetation types. The affected landscape can be broadly divided into the following LCAs.

- **The Mining Urban LCA** is comprised of an area to the west of the Approximate Limit of Visibility where mines have been developed in close proximity to urban development. Due to distance and the extent of mining, receptors that may include residential properties and roads within this area are unlikely to be sensitive to the landscape change associated with the proposed development. VAC is likely to be high due to the extent of existing development.
- **The Rural Mining LCA** is comprised of an area where mines have been developed within a predominantly rural agricultural (cultivation) landscape. The existing mine and the proposed mine extension fall within this LCA. Due to the lack of screening provided by vegetation and the low undulating topography,

[3] Vegetation types of South Africa (including Prince Edward and Marion Islands), Lesotho and Swaziland, 2006
[4] UK Guidelines.

VAC is likely to be low and largely provided by low ridgelines which may screen the operational areas of the mine extension and a proportion of the stockpiles.

- **The Rural Natural LCA** is comprised of areas that are covered with predominantly natural vegetation. As this vegetation is likely to be comprised of predominantly low grassland there is likely to be little screening provided by vegetation. Should areas include alien invasive tree species however a high level of localised screening may be provided. VAC could therefore vary considerably within this LCA.
- **The Small Holding LCA** including Vischkuil and Droogfontein. These areas include various land uses including semi-industrial agriculture and relatively large private houses. Subject to use, it is possible that these areas could be sensitive to the landscape change associated with the proposed development. The eastern edge of Droogfontein being closest to the proposed mine extension may be most affected.
- **The Urban LCA** is largely comprised of settlement areas. Due to the density of development visibility of the surrounding landscape from within these areas is likely to be low. Due to the low VAC of the surrounding landscape however, views of the development from the closest edges of the settlement areas are likely to be possible.

The proposed mine extension will be located largely within the Rural Mining LCA. It is therefore unlikely to result in a significant landscape character change.

This initial landscape analysis is indicated on **Map 4**. This needs to be ground truthed during the EIA phase.

3.3 LANDSCAPE QUALITY AND IMPORTANCE

The majority of the affected landscape appears to be largely transformed by a combination of mining activity, agriculture and settlement.

The most natural and perhaps the most sensitive LCA to possible change associated with the proposed development is the **Rural Natural LCA** although views of mining activities are likely to be possible from the majority of this LCA. The proposed mine extension will extend marginally into this LCA.

It seems unlikely that there are critical high quality landscapes in the vicinity of the proposed site that are worthy of preservation. It seems more likely that specific views associated with sensitive visual receptors will be the main concern.

There is only one protected area that is close to the south western edge of the Approximate Limit of Visibility. This area is located close to other existing mines. Due to distance and the current setting, it is unlikely to be sensitive to the landscape change that could result from the proposed development.

3.4 VISUAL RECEPTORS

3.4.1 Definition

Visual Receptors are defined as "individuals and / or defined groups of people who have the potential to be affected by the proposal"[5].

[5] UK Guidelines.

It is also possible that an area might be sensitive due to an existing use. The nature of an outlook is generally more critical to areas that are associated with recreation, tourism and in areas where outlook is critical to land values.

3.4.2 Possible visual receptors

This section is intended to highlight possible Receptors within the landscape which due to use could be sensitive to landscape change. They include;

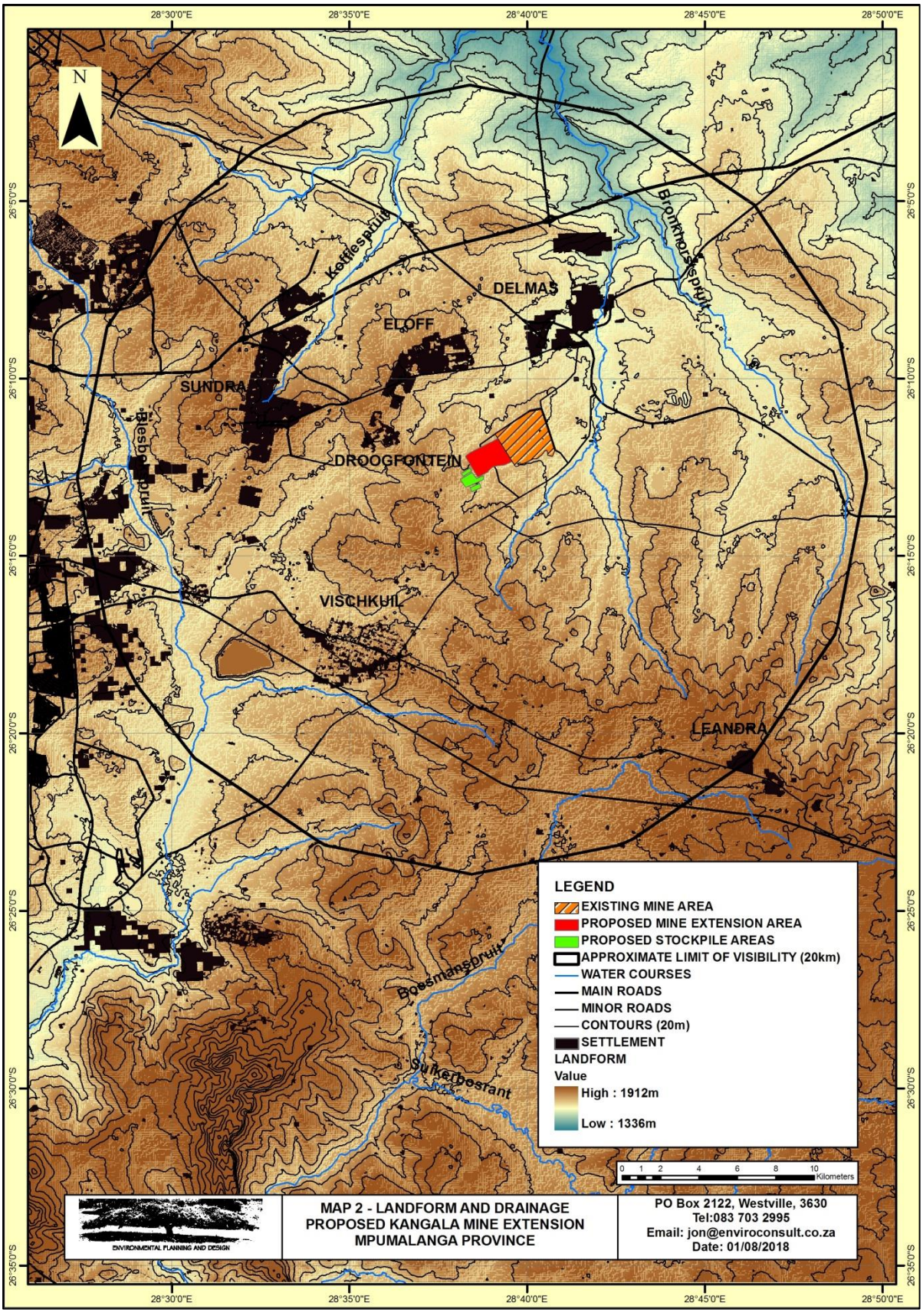
Area Receptors

Area Receptors include:

- The urban areas to the north and south of the project site including Delmas, Eloff, Sundra and Devon. Areas associated with this use could be sensitive to possible changes in outlook associated with the proposed development. However it seems likely that due to distance, and the VAC of the landscape, the majority of these areas will be subject to minimal visual impact. These impacts are likely to be limited to the urban edge;
- The two areas of smallholdings, Droogfontain and Vischkuil. It is possible that closest properties could be affected and subject to use may be sensitive; and
- The Marievale Bird Sanctuary, however due to distance and the fact that there are other mining activities in close proximity to this receptor, it is unlikely that it will be sensitive.

- **Linear Receptors** which include the R555 which runs approximately 3.7km to the north and the R42 which runs approximately 1.8km to the south of the proposed mine extension. There are also a number of other minor local roads, one of which runs adjacent to the northern boundary of the proposed mine extension. Given that these roads are likely to be used as local distributor routes and that they are unlikely to have significant recreational or tourism importance, these receptors are likely to have a low level of sensitivity to the likely landscape change.
- **Point Receptors** which include isolated homesteads and small rural settlements most of which are likely to be associated with agricultural uses of the surrounding rural area. It is possible but unlikely that a number may also be used for recreational and tourism activities. Subject to location and the degree of screening provided by vegetation around the homesteads, these could be sensitive to the landscape change.

Visual receptors will be subject to verification during the EIA phase.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DROOGFONTEIN
VISCHKUIL
LEANDRA
Boesmansspruit
Suikerbestant
LEGEND
EXISTING MINE AREA
PROPOSED MINE EXTENSION AREA
PROPOSED STOCKPILE AREAS
APPROXIMATE LIMIT OF VISIBILITY (20km)
WATER COURSES
MAIN ROADS
MINOR ROADS
CONTOURS (20m)
SETTLEMENT
LANDFORM
Value
High : 1912m
Low : 1336m
0 1 2 4 6 8 10
Kilometers
ENVIRONMENTAL PLANNING AND DESIGN
MAP 2 - LANDFORM AND DRAINAGE
PROPOSED KANGALA MINE EXTENSION
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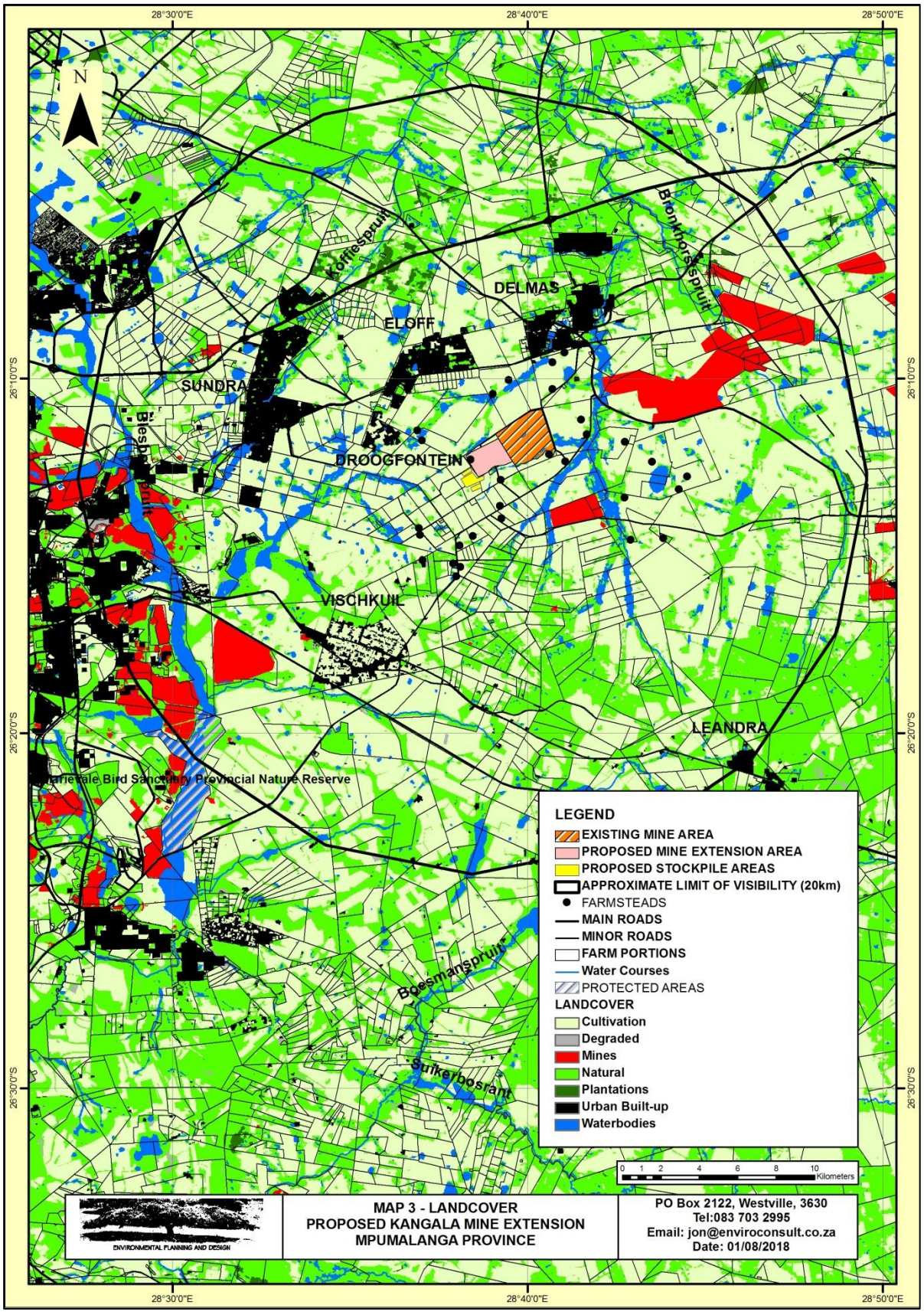
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VISCHKUIL
LEANDRA
Bronkhorstspruit
Koffiespruit
Blesbokspruit
Boesmansspruit
Suikerbosrant
Marievale Bird Sanctuary Provincial Nature Reserve
LEGEND
EXISTING MINE AREA
PROPOSED MINE EXTENSION AREA
PROPOSED STOCKPILE AREAS
APPROXIMATE LIMIT OF VISIBILITY (20km)
FARMSTEADS
MAIN ROADS
MINOR ROADS
FARM PORTIONS
Water Courses
PROTECTED AREAS
LANDCOVER
Cultivation
Degraded
Mines
Natural
Plantations
Urban Built-up
Waterbodies
0 1 2 4 6 8 10
Kilometers
ENVIRONMENTAL PLANNING AND DESIGN
MAP 3 - LANDCOVER
PROPOSED KANGALA MINE EXTENSION
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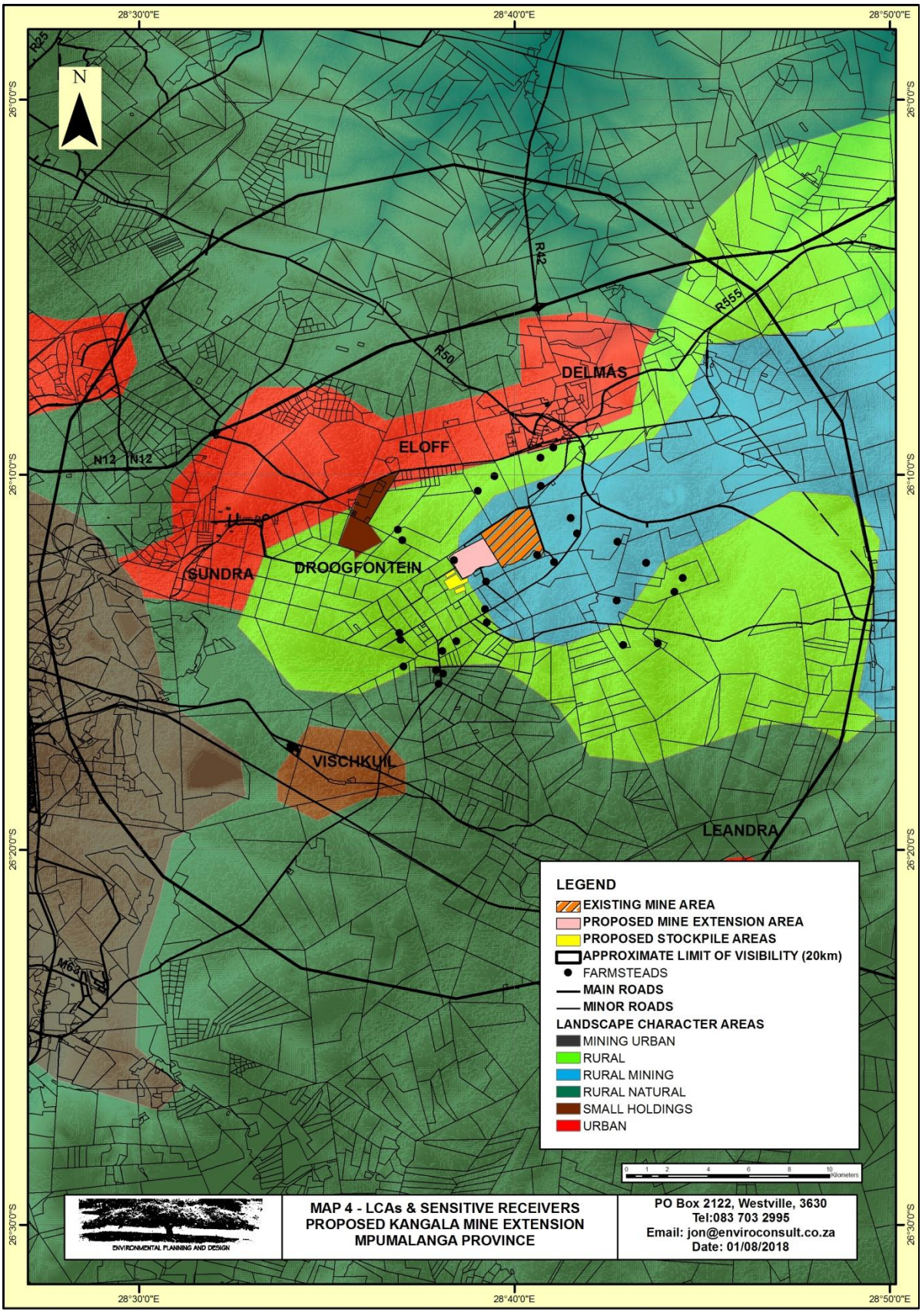
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PROPOSED MINE EXTENSION AREA
PROPOSED STOCKPILE AREAS
APPROXIMATE LIMIT OF VISIBILITY (20km)
FARMSTEADS
MAIN ROADS
MINOR ROADS
LANDSCAPE CHARACTER AREAS
MINING URBAN
RURAL
RURAL MINING
RURAL NATURAL
SMALL HOLDINGS
URBAN
0 1 2 4 6 8 10 Kilometers
ENVIRONMENTAL PLANNING AND DESIGN
MAP 4 - LCAs & SENSITIVE RECEIVERS
PROPOSED KANGALA MINE EXTENSION
MPUMALANGA PROVINCE
PO Box 2122, Westville, 3630
Tel:083 703 2995
Email: jon@enviroconsult.co.za
Date: 01/08/2018

4 THE NATURE OF POTENTIAL VISUAL IMPACTS

4.1 GENERAL

Impacts could include general landscape change, or due to the development as it could detract from the existing character as well as change of view for affected people and / or activities:

a. General landscape change or degradation. This is particularly important for protected areas where the landscape character might be deemed to be exceptional or rare. However it can also be important in non-protected areas particularly where landscape character is critical to a specific broad scale use such as tourism or just for general enjoyment of an area. This is generally assessed by the breaking down of a landscape into components that make up the overall character and understanding how proposed elements may change the balance of the various elements. The height, mass, form and colour of new elements all help to make new elements more or less obvious as does the structure of an existing landscape which can provide screening ability or texture that helps to assimilate new elements. This effect is known as visual absorption capacity; and
b. Change in specific views within the affected area from which the character of a view may be important for a specific use or enjoyment of the area:
    - Visual intrusion is a change in a view of a landscape that reduces the quality of the view. This can be a highly subjective judgement. Subjectivity has however been removed as far as is possible by classifying the landscape character of each area and providing a description of the change in the landscape that will occur due to the proposed development. The subjective part of the assessment is to define whether the impact is negative or positive. Again to make the assessment as objective as possible, the judgement is based on the level of dependency of the use in question on existing landscape characteristics; and
    - Visual obstruction is the blocking of views or foreshortening of views. This can generally be measured in terms of extent.

Due to the nature of the proposed development, visual impacts are expected to relate largely to intrusion.

4.2 ZONES OF THEORETICAL VISIBILITY

Zones of Theoretical Visibility (ZTV) are defined by the UK Guidelines as "a map usually digitally produced showing areas of land within which a development is theoretically visible".

An initial ZVT map has been prepared for:

- The proposed stockpiles in order to highlight the overall area from which the highest elements associated with the mine extension are likely to be visible from. A height of 30m has been assumed for stockpiles which is that same as current stockpiles on the existing mine; and

- The low level operations around the proposed pit. A maximum height of 7m has been used for this which is the approximate height of the largest truck that may be used to transport excavated / mined material. It is likely that other low level items will include buildings, mining plant, car parking and smaller stockpiles.

The ZTV maps also indicates the area over which existing spoil heaps and low level operations are likely to be visible from in order that the difference between existing areas of impact an possible future areas of impact can be assessed.

An initial site layout has been provided (Figure 2) which indicates locations of the proposed stockpiles and the area to be mined.

The ZTV analysis has been undertaken using Arc Spatial Analyst Geographic Information System (GIS). The assessment is based on terrain data that has been derived from satellite imagery. This data was originally prepared by the National Aeronautics and Space Administration (NASA) and is freely available on the International Center for Tropical Agriculture's- Climate Change, Agriculture and Food Security (CIAT-CCAFS) website (http://www.cgiar-csi.org).

The GIS Assessment does not take the curvature of the earth into account. In order to provide an indication of the likely limit of visibility due to this effect a universally accepted navigational formula has been used to calculate the likely distance that the proposed structures might be visible over(**Appendix III**). This indicates that in a flat landscape the proposed structures may be visible for the following distances;

Table 1 – Approximate limit of Visibility

ELEMENT	APPROXIMATE LIMIT OF VISIBILITY
Stockpiles 30m high	19.6 kilometres
Ground level operations 7m high	9.4 kilometres

In reality these distances could be reduced by:

- Weather conditions that limit visibility. This could include hazy conditions during fine weather as well as mist and rain; and
- Scale and colour of individual elements making it difficult to differentiate structures from background:
    - Due to the scale and colour of the stockpiles it is possible that these could be visually obvious to the limit of visibility if the VAC of the existing landscape does not reduce their apparent scale / height; and
    - Because low level operations are likely to include a combination of smaller scale elements including smaller stockpiles, mine infrastructure as well as trucks and plant, it is likely that these will not be obvious to the limit of visibility. It is also more likely that the small amount of VAC that may be provided by the existing landscape will more readily help to reduce visibility of these elements.

4.2.1 Likely Visibility of the proposed elements

When considering visibility, it is important that this is compared with the visibility of the existing mine due to the following:

- It is likely that the tallest existing elements will gradually disappear from the landscape as rehabilitation of existing mining operations occurs. At the same time the stockpiles associated with the proposed mine extension will start to grow. The visual impact of the proposed stockpiles will therefore replace an existing visual impact.
- It has been indicated by the applicant that all processing, maintenance and administration areas associated with the existing mine will remain in place and will be used for the proposed mine extension. However, it seems likely that additional low level operations will appear in the landscape including:
    - Trucks hauling material to stockpile and for coal processing;
    - Small stockpiles;
    - Minor buildings; and
    - Mining plant.

  It is likely therefore that the proposed mine extension could extend existing visual impacts associated with low level mining operations.

Map 5 compares the ZTV of existing stockpiles with the ZTV of the stockpiles associated with the proposed mine extension

Map 6 compares the ZTV of low level operations around the existing mine with low level operations around the proposed mine extension.

The following can be noted from this analysis:

a) **Visibility of Stockpiles –** The stockpiles associated with the proposed mine extension will be visible from the majority of areas from which current stockpiles are visible, including the southern edges of Delmas and Eloff, the eastern edge of Droogfontein, approximately 13.5km of the R555, approximately 4km of the R50 and approximately 10km of the R42. In addition the stockpiles associated with the proposed mine extension will extend the visibility of stockpiles on the south eastern edge of Sundra
b) **The low level mining operations –** Operations and low level elements around the proposed mine extension will be visible from the same areas from which existing mining operations and low level elements are visible from. These include the southern edges of Delmas and Eloff, the eastern edge of Droogfontein, approximately 6km of the R555, approximately 6km of the R50 and approximately 8km of the R42.

In general therefore visibility of the proposed mine extension will be very similar to the visibility of the existing mine.

4.3 LIKELY IMPLICATIONS FOR LANDSCAPE CHARACTER

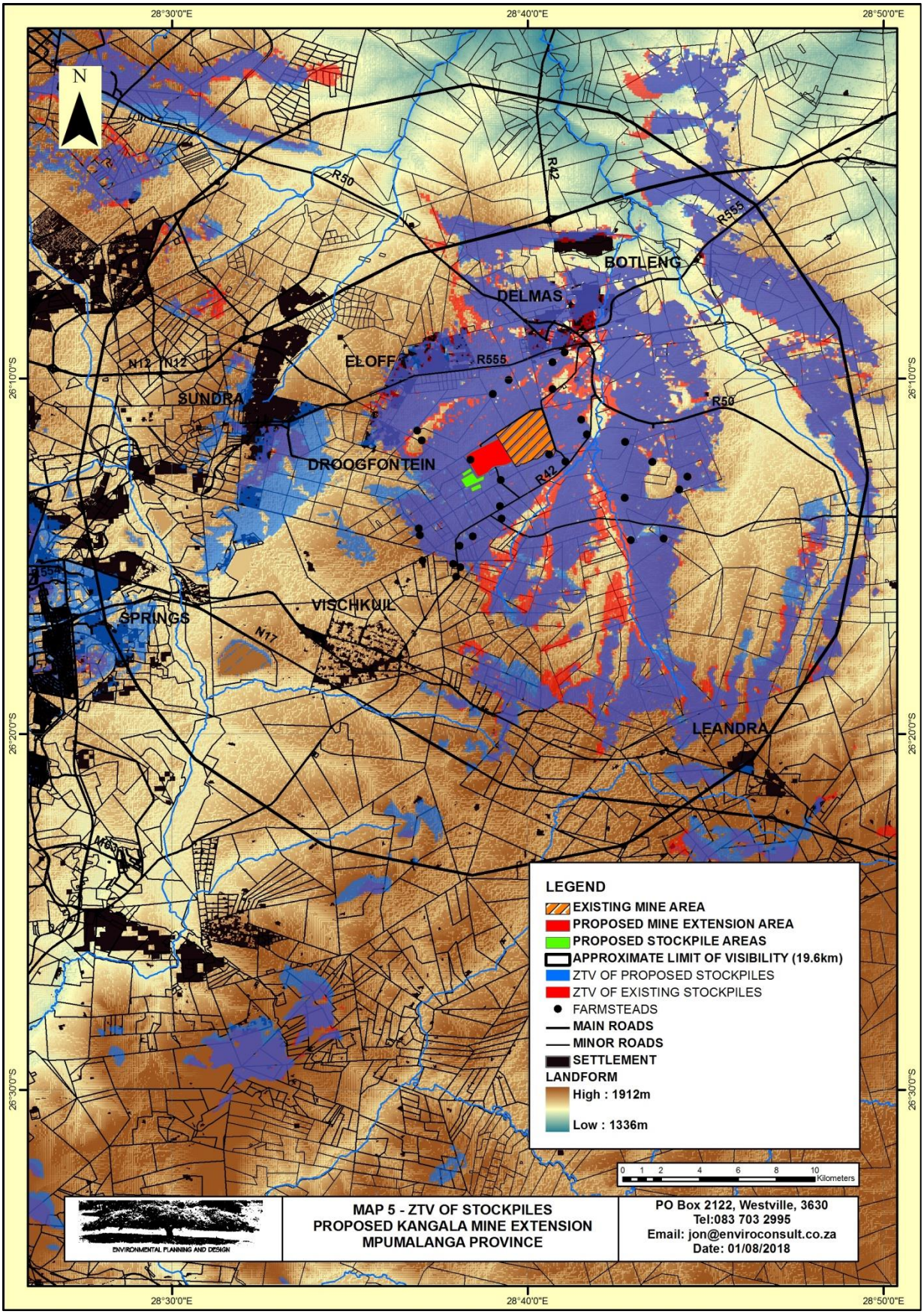
Whilst, the proposed mine extension is likely to be visible to the same areas as the existing mine, the visual implications of the proposed extension for identified Landscape Character Areas are likely to include:

a) Because the stockpiles will be removed from the northern and eastern section of the existing mine, which is on the eastern side of the proposed extension, and the stockpiles associated with the proposed mine extension will be locates on the western side of the extension, the rural character to the west of the extension is likely to be impacted.

4.4 POSSIBLE IMPLICATIONS FOR VISUAL RECEPTORS

Whilst, the proposed mine extension is likely to be visible to the same areas as the existing mine, the visual implications of the proposed extension for identified receptors are likely to include:

a) Because the proposed mine extension is located to the west of the existing mine it is likely to make mining more obvious to receptors to the west including the eastern edge of Droogfontein, the southern edge of Eloff, the R555 and the R42.
b) Because the stockpiles will be removed from the northern and eastern section of the existing mine and the stockpiles associated with the proposed mine extension will be locates on the western side of the extension, mining stockpiles are likely to become less obvious from areas to the east of the existing mine including the southern edge of Delmas, and sections of the R55, the R42, and the R50.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DELMAS
ELOFF
N12
SUNDRA
DROOGFONTEIN
VISCHKUIL
SPRINGS
N17
LEANDRA
LEGEND
EXISTING MINE AREA
PROPOSED MINE EXTENSION AREA
PROPOSED STOCKPILE AREAS
APPROXIMATE LIMIT OF VISIBILITY (19.6km)
ZTV OF PROPOSED STOCKPILES
ZTV OF EXISTING STOCKPILES
FARMSTEADS
MAIN ROADS
MINOR ROADS
SETTLEMENT
LANDFORM
High : 1912m
Low : 1336m
0 1 2 4 6 8 10
Kilometers
ENVIRONMENTAL PLANNING AND DESIGN
MAP 5 - ZTV OF STOCKPILES
PROPOSED KANGALA MINE EXTENSION
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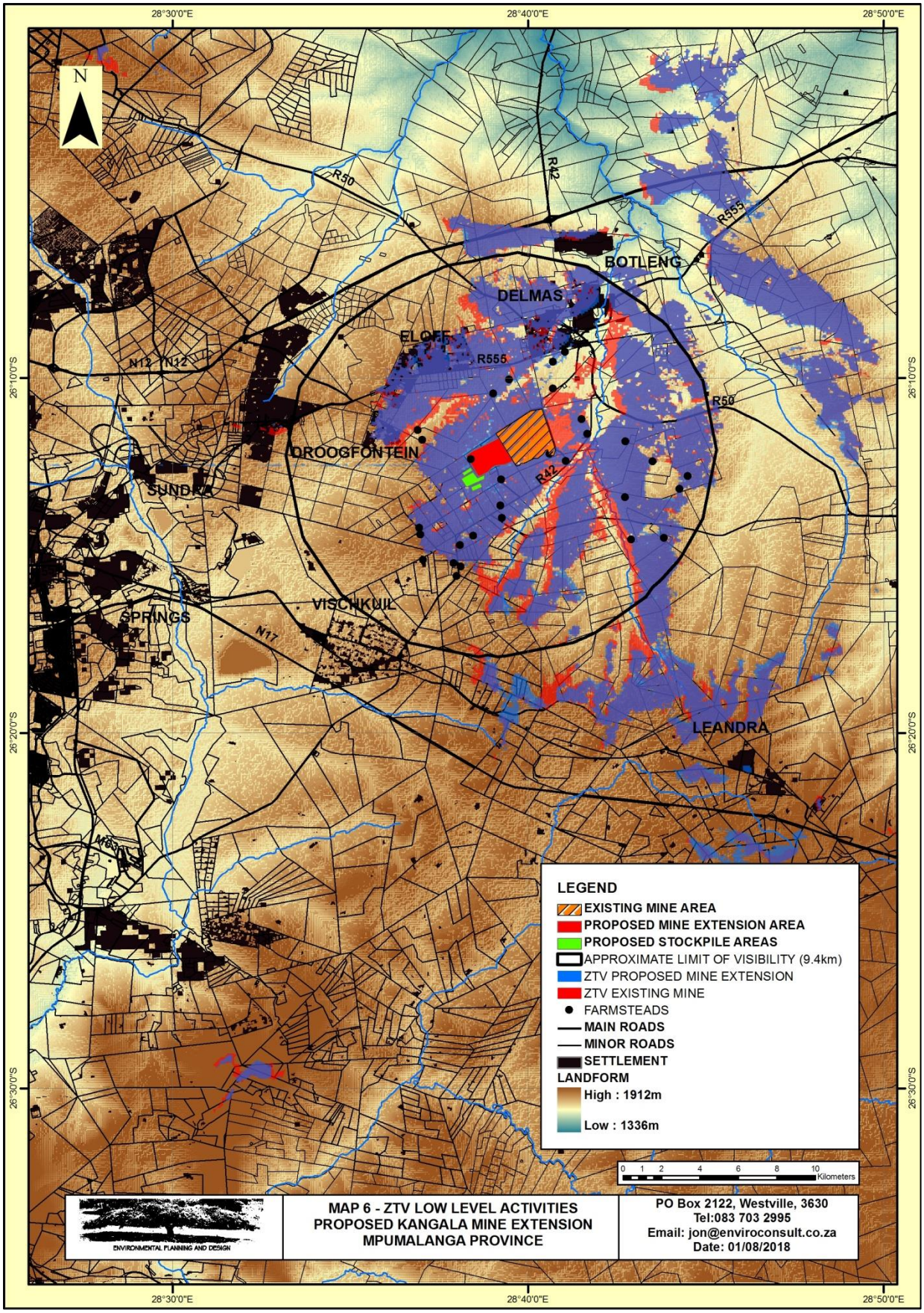
Date: 01/08/2018


28°30'0"E
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N
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R555
BOTLENG
DELMAS
ELOFF
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N12
R555
R50
IDROOGFONTEIN
R42
SUNDRA
VISCHKUIL
SPRINGS
N17
LEANDRA
LEGEND
EXISTING MINE AREA
PROPOSED MINE EXTENSION AREA
PROPOSED STOCKPILE AREAS
APPROXIMATE LIMIT OF VISIBILITY (9.4km)
ZTV PROPOSED MINE EXTENSION
ZTV EXISTING MINE
FARMSTEADS
MAIN ROADS
MINOR ROADS
SETTLEMENT
LANDFORM
High : 1912m
Low : 1336m
0 1 2 4 6 8 10
Kilometers
ENVIRONMENTAL PLANNING AND DESIGN
MAP 6 - ZTV LOW LEVEL ACTIVITIES
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5 IDENTIFIED AREAS OF IMPACT

5.1 VISUAL IMPACTS TO BE CONSIDERED

From the review of the proposed project, it is proposed that the following issues should be addressed during the EIA phase;

a) The proposed mine extension could impact on the Rural Landscape Character Area to the west of the mine;
b) The proposed mine extension could make mining more obvious to receptors to the west including the eastern edge of Droogfontein, the southern edge of Eloff, the R555, the R42 and farmsteads. This needs to be offset against likelihood that mining will become less obvious from areas to the east including the southern edge of Delmas, and sections of the R55, the R42, and the R50.

These issues will be considered in the context of the Landscape Character Areas, visual effects identified and the possible cumulative influence of other mining operations.

Possible mitigation measures will also be identified.

5.2 TIMING OF LIKELY VISUAL IMPACTS

Impact levels are likely to gradually increase during the initial stage of mining operations as the stockpile areas and heights increase. However as material that is cleared from terraces reaches equilibrium with material that is used to fill and rehabilitate mined areas, stockpiles heights and areas are likely to remain constant.

Towards the end of mining operations, amounts of material used to backfill mined areas and for rehabilitation will be greater than material going to stockpile. During this period, visual impacts associated with the proposed mine extension are likely to gradually decrease.

It is possible that impacts associated with the existing mining area may also decrease or even end towards the end of the mining within the proposed extension area. However, it is also possible that processing facilities within the existing mine may be retained should an additional extension to the mining area be authorised. For the sake of the assessment the complete removal of mining operations within the current mine cannot be considered.

5.3 IMPACT ASSESSMENT METHODOLOGY

The impact assessment methodology has been provided by Environmental Impact Management Services. Using this standard methodology should help to ensure that specialist assessments can be integrated more easily into the overall Environmental Impact Assessment

5.3.1 Method of Assessing Impacts:

The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations (2010). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/likelihood (P) of the impact occurring. This

determines the environmental risk. In addition other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S). Please note that the impact assessment must apply to the identified Sub Station alternatives as well as the identified Transmission line routes.

5.3.2 Determination of Environmental Risk:

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER).

The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R)}{4} \times N$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table .

Table 2: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),

Aspect	Score	Definition
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P (refer to **Error! Reference source not found.**). Probability is rated/scored as per Table .

Table 3: Probability Scoring

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

ER= C x P

Table 4: Determination of Environmental Risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Probability				

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table .

Table 5: Significance Classes

Environmental Risk Score	
Value	**Description**
< 9	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥9; <17	Medium (i.e. where the impact could have a significant environmental risk),
≥ 17	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

5.3.3 Impact Prioritisation

In accordance with the requirements of Regulation 31 (2)(l) of the EIA Regulations (GNR 543), and further to the assessment criteria presented in the Section above it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

In addition it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 6: Criteria for Determining Prioritisation

Public response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public response.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.

	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 11. The impact priority is therefore determined as follows:

Priority = PR + CI + LR

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Refer to Table).

Table 7: Determination of Prioritisation Factor

Priority	Ranking	Prioritisation Factor
3	Low	1
4	Medium	1.17
5	Medium	1.33
6	Medium	1.5
7	Medium	1.67
8	Medium	1.83
9	High	2

In order to determine the final impact significance the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 8: Final Environmental Significance Rating

Environmental Significance Rating	
Value	**Description**
< 10	Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
≥10 <20	Medium (i.e. where the impact could influence the decision to develop in the area),

≥ 20	High (i.e. where the impact must have an influence on the decision process to develop in the area).

5.4 INITIAL VISUAL IMPACT ASSESSMENT

Due to the scale elements, particularly stockpiles, mitigation measures are generally unlikely to be significant in reducing levels of visual impact. The assessment tables can therefore be read as with or without mitigation unless stated.

5.4.1 The proposed mine extension could impact on the Rural Landscape Character Area to the west of the mine

a) Nature of Impact

In general terms the proposed mine extension will be visible to the same settlement areas and from a similar distance as the existing mine. The one exception to this is the rural area to the west of the extension area. As current stockpiles associated with the existing mine are located to the east and stockpiles associated with the proposed extension being located to the west of the proposed mine extension, it is likely that mining operations will become more obvious from this currently largely rural area.

b) Possible Mitigation

In a relatively flat landscape, the scale and nature of the stockpiles will be impossible to screen. The only possible mitigation measure is to locate them to the east of the extension area.

General mining activities around the mine extension are unlikely to cause a major change in the current level of impact. Good housekeeping measures will all help to ensure that visual impacts are not exacerbated. These include;

i. Minimising the disturbed area;
ii. Retention of as much existing vegetation as possible;
iii. Dust suppression; and
iv. Progressive rehabilitation.

c) Impact Assessment

In terms of determining prioritisation, public response, cumulative effects and the possible irreplaceable loss of resources have to be considered.

As consultation has not been undertaken it is impossible to confirm public response, however, given the extent of mining in the vicinity and the fact that landscape is not protected and unlikely to be of high quality, it seems unlikely that the issue will be raised as a concern.

In terms of cumulative effects, the proposed mine extension will combine with existing mining operations in the area to slightly extend the influence of mining operations in the area. However, this is considered relatively marginal as exsiting mine stockpiles are likely to be removed.

Table 9 - Visual Impact on Urban Areas, Assessment Table

Impact Name	Change of Character				
Alternative	**Alternative 1**				
Phase	**Construction**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	1	1
Extent of Impact	2	2	Reversibility of Impact	1	1
Duration of Impact	1	1	Probability	2	2
Environmental Risk (Pre-mitigation)					-2,50
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					-2,50
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					-2,50

Impact Name	Change of Character				
Alternative	**Alternative 1**				
Phase	**Operation**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	1	1
Extent of Impact	3	3	Reversibility of Impact	1	1
Duration of Impact	3	3	Probability	2	3
Environmental Risk (Pre-mitigation)					-4,00
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					-6,00
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					

Prioritisation Factor	1,00
Final Significance	-6,00

Impact Name	**Change of Character**				
Alternative	**Alternative 1**				
Phase	**Decommissioning**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	1	1	Magnitude of Impact	1	1
Extent of Impact	1	1	Reversibility of Impact	1	1
Duration of Impact	1	1	Probability	2	2
Environmental Risk (Pre-mitigation)					2,00
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					2,00
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					2,00

5.4.2 The proposed mine extension could impact on the edges of Urban Areas that face towards the proposed mine extension

a) Nature of Impact

In general terms the proposed mine extension will be visible to the same settlement areas and from a similar distance as the existing mine. The one exception to this is Droogfontein which appears to be an area of smallholdings that have been developed with varying uses including large private houses and semi industrial agriculture. The proposed stockpile location associated with the extension is significantly closer to this area than stockpiles associated with the existing mine. They could therefore be more obvious to this area. Whilst it is unlikely that this impact will affect residential or agricultural use of the area, subject to the degree of screening provided by vegetation within and around the settlement, it is possible that this could cause a change in the nature of view that residents could find objectionable.

b) Possible Mitigation

In a relatively flat landscape, the scale and nature of the stockpiles will be impossible to screen. The only possible mitigation measure is to locate them to the east of the extension area as far from Droogfontein as possible.

General mining activities around the mine extension are unlikely to cause a major change in the current level of impact. Good housekeeping measures will all help to ensure that visual impacts are not exacerbated. These include;

v. Minimising the disturbed area;
vi. Retention of as much existing vegetation as possible;
vii. Dust suppression; and
viii. Progressive rehabilitation.

c) Impact Assessment

In terms of determining prioritisation public response, cumulative effects and the possible irreplaceable loss of resources have to be considered.

As consultation has not been undertaken it is impossible to confirm public response, however, given the extent of mining in the vicinity and the fact that landscape is not protected and unlikely to be of high quality, it seems unlikely that the issue will be raised as a concern.

In terms of cumulative effects, the proposed mine extension will combine with existing mining operations in the area to slightly extend the influence of mining. The main area of concern is Droogfontein which will now have stockpiles locate within 3.5km of the closest house. Prior to development, the closest stockpiles would be in the order of 5km from the closest house.

Table 10 - Visual Impact on Urban Areas, Assessment Table

Impact Name	**Impact on Urban Edge**				
Alternative	**Alternative 1**				
Phase	**Construction**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	1	1
Extent of Impact	1	1	Reversibility of Impact	1	1
Duration of Impact	1	1	Probability	1	1
Environmental Risk (Pre-mitigation)					-1,00
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					-1,00
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					-1,00

Impact Name	Impact on Urban Edge				
Alternative	**Alternative 1**				
Phase	**Operation**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	2	2
Extent of Impact	3	3	Reversibility of Impact	1	1
Duration of Impact	3	3	Probability	2	2
Environmental Risk (Pre-mitigation)					-4,50
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					-4,50
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					2
Issue has received a meaningful and justifiable public response					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,17
Final Significance					-5,25

Impact Name	Impact on Urban Edge				
Alternative	**Alternative 1**				
Phase	**Decommissioning**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	1	1	Magnitude of Impact	1	1
Extent of Impact	1	1	Reversibility of Impact	1	1
Duration of Impact	1	1	Probability	2	2
Environmental Risk (Pre-mitigation)					2,00
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					2,00
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00

Final Significance	2,00

Mitigation in the form of moving the proposed stockpile areas to the east of the proposed extension area is likely to reduce the Operational Period Environmental Significance Rating from Medium to Low.

5.4.3 The proposed mine extension could impact on farmsteads

a) Nature of Impact

In general terms the proposed mine extension is likely to be visible to the same farmsteads and from a similar distance as the existing mine. However there are likely to be the following exceptions:

i. There is one farmstead that appears to be located in close proximity to existing mine stockpiles. As these stockpiles are removed for backfilling and rehabilitation, the visual impact on this receptor is likely to reduce significantly;
ii. There is one farmstead that appears to be within the proposed mine extension area (NW corner). It has to be assumed that this farmstead will be removed if authorisation for the mine extension is granted; and
iii. One farmstead is within 1km of the stockpile area associated with the proposed extension. There appear to be areas of alien trees around the farmstead that are likely to help to mitigate views of the stockpiles.

b) Possible Mitigation

In a relatively flat landscape, the scale and nature of the stockpiles will be impossible to screen. The only possible mitigation measure is to locate them to the east of the extension area as far from Droogfontein as possible.

General mining activities around the mine extension are unlikely to cause a major change in the current level of impact. Good housekeeping measures will all help to ensure that visual impacts are not exacerbated. These include;

ix. Minimising the disturbed area;
x. Retention of as much existing vegetation as possible;
xi. Dust suppression; and
xii. Progressive rehabilitation.

c) Impact Assessment

In terms of determining prioritisation it is necessary to consider public response, cumulative effects and the possible irreplaceable loss of resources.

As consultation has not been undertaken it is impossible to confirm public response, however, given the extent of mining in the vicinity and the fact that landscape is not protected and unlikely to be of high quality, it seems unlikely that the issue will be raised as a concern.

In terms of cumulative effects, the proposed mine extension will combine with existing mining operations in the area to slightly extend the influence of mining. However, the impact on farmsteads is not anticipated to increase significantly.

Table 11 - Visual Impact on Farmsteads, Assessment Table

Impact Name	Impact on Farmsteads				
Alternative	**Alternative 1**				
Phase	**Construction**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	1	1
Extent of Impact	1	1	Reversibility of Impact	1	1
Duration of Impact	1	1	Probability	1	1
Environmental Risk (Pre-mitigation)					-1,00
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					-1,00
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					-1,00

Impact Name	Impact on Farmsteads				
Alternative	**Alternative 1**				
Phase	**Operation**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	1	1
Extent of Impact	3	3	Reversibility of Impact	1	1
Duration of Impact	3	3	Probability	1	1
Environmental Risk (Pre-mitigation)					-2,00
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					-2,00
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00

Final Significance	-2,00

Impact Name	**Impact on Farmsteads**				
Alternative	**Alternative 1**				
Phase	**Decommissioning**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	1	1	Magnitude of Impact	1	1
Extent of Impact	1	1	Reversibility of Impact	1	1
Duration of Impact	1	1	Probability	2	2
Environmental Risk (Pre-mitigation)					2,00
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					2,00
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					2,00

5.4.4 The proposed mine extension could impact on views from local roads

d) Nature of Impact

In general terms the proposed mine extension is likely to be visible to the same roads and from a similar distance as the existing mine.

Visual impacts associated with the proposed mine extension are therefore unlikely to create significant new areas or different types of visual impact.

e) Possible Mitigation

In a relatively flat landscape, the scale and nature of the stockpiles will be impossible to screen.

General mining activities around the mine extension are unlikely to cause a major change in the current level of impact. Good housekeeping measures will help to ensure that visual impacts are not exacerbated. These include;

xiii. Minimising the disturbed area;
xiv. Retention of as much existing vegetation as possible;
xv. Dust suppression; and
xvi. Progressive rehabilitation.

f) Impact Assessment

In terms of determining prioritisation it is necessary to consider public response, cumulative effects and the possible irreplaceable loss of resources.

As consultation has not been undertaken it is impossible to confirm public response, however, given the extent of mining in the vicinity and the fact that landscape is not protected and unlikely to be of high quality, it seems unlikely that the issue will be raised as a concern.

In terms of cumulative effects, the proposed mine extension will combine with existing mining operations in the area however, these are unlikely to extend the influence of mining over new sections of road.

Table 12 - Visual Impact on Local Roads, Assessment Table

Impact Name	**Impact on Local Roads**				
Alternative	**Alternative 1**				
Phase	**Construction**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	1	1
Extent of Impact	1	1	Reversibility of Impact	1	1
Duration of Impact	1	1	Probability	1	1
Environmental Risk (Pre-mitigation)					-1,00
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					-1,00
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					-1,00

Impact Name	**Impact on Local Roads**				
Alternative	**Alternative 1**				
Phase	**Operation**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	-1	-1	Magnitude of Impact	1	1
Extent of Impact	3	3	Reversibility of Impact	1	1
Duration of Impact	3	3	Probability	1	1
Environmental Risk (Pre-mitigation)					-2,00

Mitigation Measures	
See above	
Environmental Risk (Post-mitigation)	-2,00
Degree of confidence in impact prediction:	medium
Impact Prioritisation	
Public Response	1
Low: Issue not raised in public responses	
Cumulative Impacts	1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.	
Degree of potential irreplaceable loss of resources	1
The impact is unlikely to result in irreplaceable loss of resources.	
Prioritisation Factor	1,00
Final Significance	-2,00

Impact Name	**Impact on Local Roads**				
Alternative	**Alternative 1**				
Phase	**Decommissioning**				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature of Impact	1	1	Magnitude of Impact	1	1
Extent of Impact	1	1	Reversibility of Impact	1	1
Duration of Impact	1	1	Probability	1	1
Environmental Risk (Pre-mitigation)					1,00
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					1,00
Degree of confidence in impact prediction:					medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
The impact is unlikely to result in irreplaceable loss of resources.					
Prioritisation Factor					1,00
Final Significance					1,00

6 RECOMMENDED ASSESSMENT METHODOLOGY

6.1 REQUIREMENTS IN ACCORDANCE WITH THE WESTERN CAPE GUIDELINES

The criterion recommended by the Western Cape Guidelines for justification of level of input for a VIA is the expected level of visual impact. This categorisation is derived from the following matrix;

Table 13 – Categorisation of Impact Level, Western Cape Guideline

Type of environment	Type of development (see Box 3) Low to high intensity				
	Category 1 development	Category 2 development	Category 3 development	Category 4 development	Category 5 development
Protected/wild areas of international, national, or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high scenic, cultural, historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of medium scenic, cultural or historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected
Areas or routes of low scenic, cultural, historical significance / disturbed	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites / run-down urban areas / wasteland	Little or no visual impact expected. Possible benefits	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

The categorisation of development is indicated below;

Category 1 development:
e.g. nature reserves, nature-related recreation, camping, picnicking, trails and minimal visitor facilities.

Category 2 development:
e.g. low-key recreation / resort / residential type development, small-scale agriculture / nurseries, narrow roads and small-scale infrastructure.

Category 3 development:
e.g. low density resort / residential type development, golf or polo estates, low to medium-scale infrastructure.

Category 4 development:
e.g. medium density residential development, sports facilities, small-scale commercial facilities / office parks, one-stop petrol stations, light industry, medium-scale infrastructure.

Category 5 development:
e.g. high density township / residential development, retail and office complexes, industrial facilities, refineries, treatment plants, power stations, wind energy farms, power lines, freeways, toll roads, large-scale infrastructure generally. Large-scale development of agricultural land and commercial tree plantations. Quarrying and mining activities with related processing plants.

The proposed mine extension is a Category 5 development.

The necessary level of assessment will be subject to the quality of the existing landscape. The initial assessment indicates that the proposed development is likely to largely impact areas that are already impacted by mining activities and that scenic and protected areas are unlikely to be impacted.

The above tables indicate that the proposed development might generally be expected to have a low visual impact.

It is possible however that the proposed mine extension could increase the intensity of visual impacts associated with mining activities on the eastern edge of Droogfontein.

The Western Cape Guidelines indicate that a moderate to very high impact might be expected. If a moderate impact is predicted then a Level 3 Assessment should be undertaken, however if either a high or very high impact is expected then a Level 4 Assessment should be undertaken.

A Level 3 Assessment requires the following input;

- Identification of issues raised in scoping phase, and site visit;
- Description of the receiving environment and the proposed project;
- Establishment of view catchment area, view corridors, viewpoints and receptors;
- Indication of potential visual impacts using established criteria;
- Inclusion of potential lighting impacts at night;
- Description of alternatives, mitigation measures and monitoring programmes; and
- Review by independent, experienced visual specialist (if required).

A Level 4 Assessment requires the following additional input;

- As per Level 3 assessment, plus complete 3D modelling and simulations, with and without mitigation.
- Review by independent, experienced visual specialist (if required).

It is proposed that the assessment stage is commenced as a Level3 Assessment. If the proposed development is found to have significant impacts particularly on Droogfontein, then the assessment will be elevated to Level 4.

Confirmation of the requirement for a specialist review is required.

6.2 DETAILED METHODOLOGY

As indicated above a site visit is required in order to investigate and finalise the issues and impacts highlighted by this initial scoping exercise.

The following methodology will be used in preparation of the VIA report.

6.2.1 Identification of issues raised in scoping phase, and site visit

Likely issues have already been identified in this scoping analysis. These issues will be verified from a site visit as well as response from stakeholders to the Scoping Report.

6.2.2 Description of the receiving environment and the proposed project

The receiving environment has been described and categorised. This will be verified from a site visit.

6.2.3 Establishment of view catchment area, view corridors, viewpoints and receptors

Zones of theoretical visibility and visual receptors have been established from GIS analysis. These will be verified from a site visit. Existing mining operations should help to provide a useful guide as to likely visibility of the proposed development.

Viewpoints will be identified from a site visit to represent views of visual receptors.

6.2.4 Indication of potential visual impacts using established criteria

Areas of likely visual impacts have been identified and described from this scoping exercise. These impacts will be verified from a site visit.

It is possible that additional impacts might be identified form the site visit and from comments by stakeholders.

Types of identified impacts include:

- General landscape degradation or changes to landscape character areas that most people are likely consider as negative. In this case this could be the introduction of a relatively large scale development into a natural landscape.This introduction could erode the natural character of the landscape. This is partly a subjective judgement as it is based on the assumption that the majority of people would prefer views over a more natural landscape (loss of rural characteristics is rated as a negative impact). It can however be measured in terms of likely extent of change. The influence of existing urban areas and service related development on existing landscape character will be assessed from a site visit. The area and nature of impacts associated with the proposed developments will overlaid and an assessment made as to how these additional impacts are likely to change general landscape character;
- Change to the views of visual receptors. These impacts might relate to visual obstruction and / or intrusion. The assessment will make judgements as to how changes in view are likely impact on land uses.

Impacts will be assessed using a numerical assessment system that has been adopted by Environmental Impact Management Services for the overall assessment. This methodology is tried and tested and its use will ensure that the Visual Impact Assessment can be easily incorporated into the Environmental Impact Assessment.

6.2.5 Inclusion of potential lighting impacts at night

The impact of lighting at night will be included in the assessment using the above criteria.

6.2.6 Description of alternatives, mitigation measures and monitoring programmes.

The alternatives that have been identified for this project as well as the "no-go" alternative will be considered in the assessment.

Mitigation and monitoring measures will be developed during the preparation of the VIA report.

6.2.7 Review by independent, experienced visual specialist (if required).

Confirmation of this requirement is needed.

7 CONCLUSIONS

The desktop scoping assessment indicates that the development of the proposed mine extension is unlikely to impact on sensitive or protected landscape areas.

The stockpiles are likely to be the most visible elements and may be seen for up to 19.6km.

Because the proposal is for an open cast mine within relatively flat topography, major mining operations will be mainly below existing ground and will not be visible to surrounding areas. However operations and infrastructure located around the open cast area may be visible. These elements are likely to include trucks hauling material to and from stockpile areas and coal for processing, roads, minor infrastructure and small stockpiles. These elements may be visible for up to 9.4km.

As the mine extension is developed, the larger elements including stockpiles within the existing mine will disappear as material is used for fill and rehabilitation. Elements associated with processing, maintenance and administration within the existing mine will remain in use during the life of the proposed extension. This will mean that development of these elements will not be necessary within the extension area.

Refer to the table 14 below for the initial Visual Impact Significance Ratings.

Table 14, Initial Visual Impact Significance Ratings

Landscape Character			Urban Areas			Farmsteads			Local Roads		
C - 2.5	O -6	D +2	C - 1	O -5.25	D +1	-C 1	0 -2	D +2	C -1	0 -2	D +1

C = Construction phase, O = operational phase, D = decommissioning phase, Orange = Medium Significance, Yellow = Low Significance, + = a positive impact, - = a negative impact

The fact that visual impacts associated with the proposed mine extension will develop as the visual impacts associated with the existing mine are likely to diminish, means that a low level of impact might generally be anticipated. However, when specific areas of impact are reviewed there are concerns that need to be investigated:

a) The possible slight extension of the influence of mining activities on the character of surrounding landscape rural character; and
b) The possible increase in the intensity of visual impact on Droogfontein;

In addition the assessed low levels of visual impact on other urban areas, farmsteads and local roads will need to be verified.

Possible mitigation measures have been identified. Whilst these measures will generally not reduce the identified impacts, they should help to ensure that impacts are not exacerbated.

The exception to this is the possible moving of the proposed stockpile areas which is likely to mitigate Operational Phase impacts on the urban area of Droogfontein from a medium significance to a low significance. Currently there is no confirmation

that this is necessary or that this is feasible. It is raised as a possible response to a possible concern.

A site visit is required prior to undertaking the final assessment in order to;

- Confirm conclusions drawn in the initial assessment regarding the existing Landscape Character Areas;
- Confirm the level of influence of existing mining operations on the character of the surrounding landscape;
- Confirm the initial assessment and the likely success of suggested mitigation measures;
- Ground truth the ZTV mapping; and
- Confirm the Visual Absorption Capacity of the existing landscape.

It is proposed that the Visual Impact Assessment proceeds as a Level 3 Assessment in accordance with the Western Cape Guidelines. Should significant visual issues be raised either from the site visit or by local stakeholders in response to the scoping phase, then the assessment will be raised to a Level 4.

REFERENCES

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APPENDIX I
ASSESSROR'S BRIEF CURRICULUM VITAE

Name	JONATHAN MARSHALL
Nationality	British
Year of Birth	1956
Specialisation	Landscape Architecture / Landscape & Visual Impact Assessment / Environmental Planning / Environmental Impact Assessment.
Qualifications	
Education	Diploma in Landscape Architecture, Gloucestershire College of Art and Design, UK (1979) Environmental Law, University of KZN (1997)
Professional	Registered Professional Landscape Architect (SACLAP) Chartered Member of the Landscape Institute (UK) Certified Environmental Assessment Practitioner of South Africa (ICB) Member of the International Association of Impact Assessment, South Africa
Languages	English - Speaking - Excellent - Reading - Excellent - Writing - Excellent
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General

Jon qualified as a Landscape Architect (Dip LA) at Cheltenham (UK) in 1979. He has been a chartered member of the Landscape Institute UK since 1986. He is also a Registered Landscape Architect and Certified Environmental Assessment Practitioner of South Africa (2009).

During the early part of his career (1981 - 1990) He worked with Clouston (now RPS) in Hong Kong and Australia. During this period he was called on to undertake visual impact assessment (VIA) input to numerous environmental assessment processes for major infrastructure projects. This work was generally based on photography with line drawing superimposed to illustrate the extent of development visible.

He has worked in the United Kingdom (1990 - 1995) for major supermarket chains including Sainsbury's and prepared CAD based visual impact assessments for public enquiries for new store development. He also prepared the VIA input to the environmental statement for the Cardiff Bay Barrage for consideration by the UK Parliament in the passing of the Barrage Act (1993).

His more recent VIA work (1995 to present) includes a combination of CAD and GIS based work for a new international airport to the north of Durban, new heavy industrial operations, overhead electrical transmission lines, mining operations in West Africa and numerous commercial and residential developments.

VIA work undertaken during the last twelve months includes VIA input for wind energy projects, numerous solar plant projects (CSP and PV), a new coal fired power station as well as electrical infrastructure.

Select List of Visual Impact Assessment Projects

- **Establishment of Upmarket Tourism Accommodation on the Selati Bridge, Kruger National Park** – Assessment of visual implications of providing tourism accommodation in 12 railway carriages on an existing railway bridge at the Skukuza Rest Camp in the Kruger Park.
- **Jozini TX Transmission Tower** – Assessment of visual implications of a proposed MTN transmission tower on the Lebombo ridgeline overlooking the Pongolapoort Nature reserve and dam.
- **Bhangazi Lake Development** – Visual Impact Assessment for a proposed tourism development within the iSimangaliso Wetlend Park World Heritage Site.
- **Palesa Power Station** - VIA for a new 600MW power station near Kwamhlanga in Mpumalanga for a private client.
- **Heuningklip PV Solar Project** – VIA for a solar project in the Western Cape Province for a private client.
- **Kruispad PV Solar Project** – VIA for a solar project in the Western Cape Province for a private client.
- **Doornfontein PV Solar Project** – VIA for a solar project in the Western Cape Province for a private client.
- **Olifantshoek Power Line and Substation** – VIA for a new 10MVA 132/11kV substation and 31km powerline, Northern Cape Province, for Eskom.
- **Noupoort Concentrating Solar Plants -** Scoping and Visual Impact Assessments for two proposed parabolic trough projects.
- **Drakensberg Cable Car –** Preliminary Visual Impact Assessment and draft terms of reference as part of the feasibility study.
- **Paulputs Concentrating Solar Plant (tower technology)** – Visual Impact Assessment for a new CSP project near Pofadder in the Northern Cape.
- **Ilanga Concentrating Solar Plants 1, 2, 3, 4 & 5** – Scoping and Visual Impact Assessments for the proposed extension of five authorised CSP projects including parabolic trough and tower technology within the Karoshoek Solar Valley near Upington in the Northern Cape.
- **Ilanga Concentrating Solar Plants 1, 2, 3, 4 & 5 Shared Infrastructure** –Visual Impact Assessment for the necessary shared infrastructure including power lines, substation, water pipeline and roads for these projects.
- **Ilanga Concentrating Solar Plants 7, 8 & 9** - Scoping and Visual Impact Assessments for three new CSP projects including parabolic trough and tower technology within the Karoshoek Solar Valley near Upington in the Northern Cape.
- **Sol Invictus Solar Plants** - Scoping and Visual Impact Assessments for three new Solar PV projects near Pofadder in the Northern Cape.
- **Gunstfontein Wind Energy Facility** – Scoping and Visual Impact Assessment for a proposed WEF near Sutherland in the Northern Cape.
- **Moorreeesburg Wind Energy Facility** – Visual Impact Assessment for a proposed WEF near Moorreeesburg in the Western Cape.
- **Semonkong Wind Energy Facility** - Visual Impact Assessment for a proposed WEF near Semonkong in Southern Lesotho.
- **Great Karoo Wind Energy Facility** – Addendum report to the Visual Impact Assessment Report for amendment to this authorised WEF that is located near Sutherland in the Northern Cape. Proposed amendments included layout as well as rotor diameter.
- **Perdekraal East Power Line** – Visual Impact Assessment for a proposed power line to evacuate power from a wind energy facility near Sutherland in the Northern Cape.
- **Tshivhaso Power Station** – Scoping and Visual Impact Assessment for a proposed new power station near Lephalale in Limpopo Province.
- **Saldanha Eskom Strengthening** – Scoping and Visual Impact Assessment for the upgrading

of strategic Eskom infrastructure near Saldanha in the Western Cape.

- **Eskom Lethabo PV Installation** - Scoping and Visual Impact Assessment for the development of a solar PV plant within Eskom's Lethabo Power Station in the Free State.
- **Eskom Tuthuka PV Installation** - Scoping and Visual Impact Assessment for the development of a solar PV plant within Eskom's Thutuka Power Station in Mpumalanga.
- **Eskom Majuba PV Installation** - Scoping and Visual Impact Assessment for the development of a solar PV plant within Eskom's Majuba Power Station in Mpumalanga.
- **Golden Valley Power Line** - Visual Impact Assessment for a proposed power line to evacuate power from a wind energy facility near Cookhouse in the Eastern Cape.
- **Mpophomeni Shopping Centre** – Visual impact assessment for a proposed new shopping centre close to the southern shore of Midmar Dam in KwaZulu Natal.
- **Rheeboksfontein Power Line** - Addendum report to the Visual Impact Assessment Report for amendment to this authorised power line alignment located near Darling in the Western Cape.
- **Woodhouse Solar Plants** – Scoping and Visual Impact Assessment for two proposed solar PV projects near Vryburg in the North West Province.
- **AngloGold Ashanti, Dokyiwa (Ghana)** – Visual Impact Assessment for proposed new Tailings Storage Facility at a mine site working with SGS as part of their EIA team.
- **Gateway Shopping Centre Extension (Durban)** – Visual Impact Assessment for a proposed shopping centre extension in Umhlanga, Durban.
- **Kouroussa Gold Mine (Guinea)** – Visual impact assessment for a proposed new mine in Guinea working with SGS as part of their EIA team.
- **Mampon Gold Mine (Ghana)** - Visual impact assessment for a proposed new mine in Ghana working with SGS as part of their EIA team.
- **Telkom Towers** – Visual impact assessments for numerous Telkom masts in KwaZulu Natal.
- **Eskom Isundu Substation** – Visual Impact Assessment for a proposed major new Eskom substation near Pietermaritzburg in KwaZulu Natal.
- **Eskom St Faiths Power Line and Substation** – Visual Impact Assessment for a major new substation and associated power lines near Port Shepstone in KwaZulu Natal.
- **Eskom Ficksburg Power Line** – Visual Impact Assessment for a proposed new power line between Ficksburg and Cocolan in the Free State.
- **Eskom Matubatuba to St Lucia Power Line** – Visual Impact Assessment for a proposed new power line between Mtubatuba and St Lucia in KwaZulu Natal.
- **Dube Trade Port, Durban International Airport** – Visual Impact Assessment
- **Sibaya Precinct Plan** – Visual Impact Assessment as part of Environmental Impact Assessment for a major new development area to the north of Durban.
- **Umdloti Housing** – Visual Impact Assessment as part of Environmental Impact Assessment for a residential development beside the Umdloti Lagoon to the north of Durban.
- **Tata Steel Ferrochrome Smelter** - Visual impact assessment of proposed new Ferrochrome Smelter in Richards Bay as part of EIA undertaken by the CSIR.
- **Durban Solid Waste Large Landfill Sites –** Visual Impact Assessment of proposed development sites to the North and South of the Durban Metropolitan Area. The project utilised 3d computer visualisation techniques.
- **Hillside Aluminium Smelter, Richards Bay -** Visual Impact Assessment of proposed extension of the existing smelter. The project utilised 3d computer visualisation techniques.
- **Estuaries of KwaZulu Natal Phase 1 –** Visual character assessment and GIS mapping as part of a review of the condition and development capacity of eight estuary landscapes for the Town and Regional Planning Commission. The project was extended to include all estuaries in KwaZulu Natal.
- **Signage Assessments** – Numerous impact assessments for proposed signage

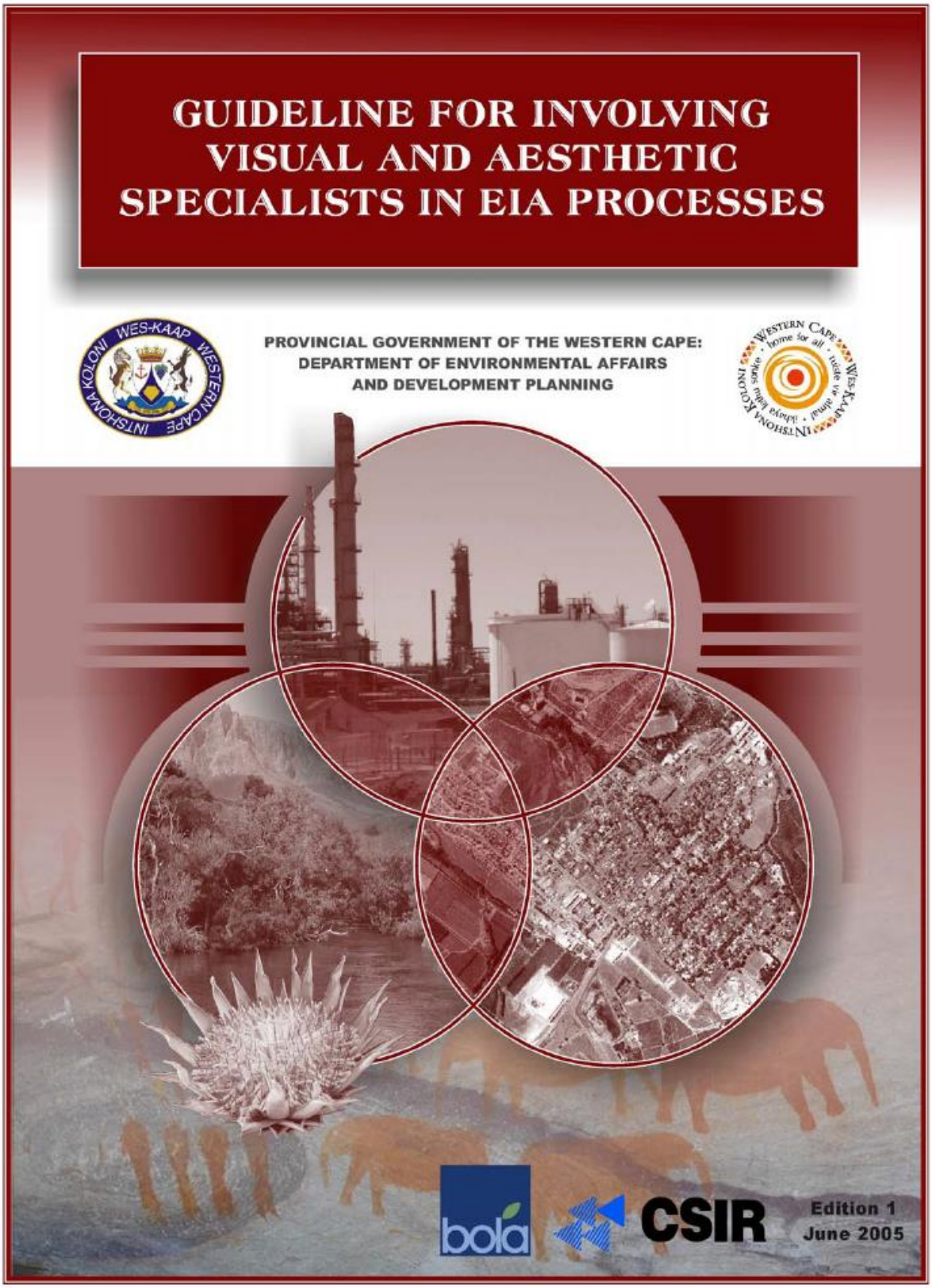
developments for Blast Media.

- **Signage Strategy** – Preparation of an environmental strategy report for a national advertising campaign on National Roads for Visual Image Placements.
- **Zeekoegatt, Durban** - Computer aided visual impact assessment. EDP acted as advisor to the Province of KwaZulu Natal in an appeal brought about by a developer to extend a light industrial development within a 60 metre building line from the National N3 Highway.
- **La Lucia Mall Extension** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed extension to shopping mall for public consultation exercise.
- **Redhill Industrial Development** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed new industrial area for public consultation exercise.
- **Avondale Reservoir** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed hilltop reservoir as part of Environmental Impact Assessment for Umgeni Water.
- **Hammersdale Reservoir** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed hilltop reservoir as part of Environmental Impact Assessment for Umgeni Water.
- **Southgate Industrial Park, Durban** - Computer Aided Visual Impact Assessment and Landscape Design for AECI.
- **Sainsbury's Bryn Rhos** - Computer Aided Visual Impact Assessment/ Planning Application for the development of a new store within the Green Wedge North of Swansea.
- **Ynyston Farm Access** - Computer Aided Impact Assessment of visual intrusion of access road to proposed development of Cardiff for the Land Authority for Wales.
- **Cardiff Bay Barrage** – Preparation of the Visual Impact Statement for inclusion in the Impact Statement for debate by parliament (UK) prior to the passing of the Cardiff Bay Barrage Bill.
- **A470, Cefn Coed to Pentrebach** - Preparation of landscape frameworks for the assessment of the impact of the proposed alignment on the landscape for The Welsh Office.
- **Sparkford to Illchester Bye Pass** - The preparation of the landscape framework and the draft landscape plan for the Department of Transport.
- **Green Island Reclamation Study** - Visual Impact Assessment of building massing, Urban Design Guidelines and Masterplanning for a New Town extension to Hong Kong Island.
- **Route 3** - Visual Impact Assessment for alternative road alignments between Hong Kong Island and the Chinese Border.
- **China Border Link** - Visual Impact Assessment and initial Landscape Design for a new border crossing at Lok Ma Chau.
- **Route 81, Aberdeen Tunnel to Stanley** - Visual Impact Assessment for alternative highway alignments on the South side of Hong Kong Island.

APPENDIX II

GUIDELINES FOR INVOLVING VISUAL AND AESTHETIC SPECIALISTS IN EIA PROCESSES

(Preface, Summary and Contents for full document go to the Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning web site, http://eadp.westerncape.gov.za/your-resource-library/policies-guidelines)


GUIDELINE FOR INVOLVING VISUAL AND AESTHETIC SPECIALISTS IN EIA PROCESSES
PROVINCIAL GOVERNMENT OF THE WESTERN CAPE:
DEPARTMENT OF ENVIRONMENTAL AFFAIRS
AND DEVELOPMENT PLANNING
bola
CSIR
Edition 1
June 2005

GUIDELINE FOR INVOLVING VISUAL AND AESTHETIC SPECIALISTS IN EIA PROCESSES

Edition 1

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This guideline should be cited as:

Oberholzer, B. 2005. *Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1.* CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

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Stakeholders engaged in the guideline development process:

These guidelines were developed through a consultative process and have benefited from the inputs and comments provided by a wide range of individuals and organizations actively working to improve EIA practice. Thanks are due to all who took the time to engage in the guideline development process.

In particular, thanks are due to Jan Glazewski (University of Cape Town), Keith Wiseman (City of Cape Town), Paul Britton (SANPARKS), Graham Young (University of Pretoria), Lisa Parkes (Ninham Shand) and Paul Claassen (Environomics) for providing useful information and in-depth comments.

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PREFACE

The purpose of an Environmental Impact Assessment (EIA) is to provide decision-makers (be they government authorities, the project proponent or financial institutions) with adequate and appropriate information about the potential positive and negative impacts of a proposed development and associated management actions in order to make an informed decision whether or not to approve, proceed with or finance the development.

For EIA processes to retain their role and usefulness in supporting decision-making, the involvement of specialists in EIA needs to be improved in order to:

- Add greater value to project planning and design;
- Adequately evaluate reasonable alternatives;
- Accurately predict and assess potential project benefits and negative impacts;
- Provide practical recommendations for avoiding or adequately managing negative impacts and enhancing benefits;
- Supply enough relevant information at the most appropriate stage of the EIA process to address adequately the key issues and concerns, and effectively inform decision-making in support of sustainable development.

It is important to note that not all EIA processes require specialist input; broadly speaking, specialist involvement is needed when the environment could be significantly affected by the proposed activity, where that environment is valued by or important to society, and/or where there is insufficient information to determine whether or not unavoidable impacts would be significant.

The purpose of this series of guidelines is to improve the efficiency, effectiveness and quality of specialist involvement in EIA processes. The guidelines aim to improve the capacity of roleplayers to anticipate, request, plan, review and discuss specialist involvement in EIA processes. Specifically, they aim to improve the capacity of EIA practitioners to draft appropriate terms of reference for specialist input and assist all roleplayers in evaluating whether or not specialist input to the EIA process is appropriate for the type of development and environmental context. Furthermore, they aim to ensure that specialist inputs support the development of effective, practical Environmental Management Plans where projects are authorised to proceed (refer to *Guideline for Environmental Management Plans*).

The guidelines draw on best practice in EIA in general, and within specialist fields of expertise in particular, to address the following issues related to the timing, scope and quality of specialist input. The terms "specialist involvement" and "input" have been used in preference to "specialist assessment" and "studies" to indicate that the scope of specialists' contribution (if required) depends on the nature of the project, the environmental context and the amount of available information and does not always entail detailed studies or assessment of impacts.

The guidelines draw on best practice in EIA in general, and within specialist fields of expertise in particular, to address the following issues related to the timing, scope and quality of specialist input. The terms "specialist involvement" and "input" have been used in preference to "specialist

assessment" and "studies" to indicate that the scope of specialists' contribution depends on the nature of the project, the environmental context and the amount of available information.

	ISSUES
TIMING	▪ When should specialists be involved in the EIA process; i.e. at what stage in the EIA process should specialists be involved (if at all) and what triggers the need for their input?
SCOPE	▪ Which aspects must be addressed through specialist involvement; i.e. what is the purpose and scope of specialist involvement? ▪ What are appropriate approaches that specialists can employ? ▪ What qualifications, skills and experience are required?
QUALITY	▪ What triggers the review of specialist studies by different roleplayers? ▪ What are the review criteria against which specialist inputs can be evaluated to ensure that they meet minimum requirements, are reasonable, objective and professionally sound?

The following guidelines form part of this first series of guidelines for involving specialists in EIA processes:

- Guideline for determining the scope of specialist involvement in EIA processes
- Guideline for the review of specialist input in EIA processes
- Guideline for involving biodiversity specialists in EIA processes
- Guideline for involving hydrogeologists in EIA processes
- Guideline for involving visual and aesthetic specialists in EIA processes
- Guideline for involving heritage specialists in EIA processes
- Guideline for involving economists in EIA processes

The *Guideline for determining the scope of specialist involvement in EIA processes* and the *Guideline for the review of specialist input in EIA processes* provide generic guidance applicable to any specialist input to the EIA process and clarify the roles and responsibilities of the different roleplayers involved in the scoping and review of specialist input. It is recommended that these two guidelines are read first to introduce the generic concepts underpinning the guidelines which are focused on specific specialist disciplines.

Who is the target audience for these guidelines?

The guidelines are directed at authorities, EIA practitioners, specialists, proponents, financial institutions and other interested and affected parties involved in EIA processes. Although the guidelines have been developed with specific reference to the Western Cape province of South Africa, their core elements are more widely applicable.

What type of environmental assessment processes and developments are these guidelines applicable to?

The guidelines have been developed to support project-level EIA processes regardless of whether they are used during the early project planning phase to inform planning and design decisions (i.e. during pre-application planning) or as part of a legally defined EIA process to obtain statutory approval for a proposed project (i.e. during screening, scoping and/or impact assessment). Where specialist input may be required the guidelines promote early, focused and appropriate involvement of specialists in EIA processes in order to encourage proactive consideration of potentially significant impacts, so that negative impacts may be avoided or

effectively managed and benefits enhanced through due consideration of alternatives and changes to the project.

The guidelines aim to be applicable to a range of types and scales of development, as well as different biophysical, social, economic and governance contexts.

What will these guidelines not do?

In order to retain their relevance in the context of changing legislation, the guidelines promote the principles of EIA best practice without being tied to specific legislated national or provincial EIA terms and requirements. They therefore do not clarify the specific administrative, procedural or reporting requirements and timeframes for applications to obtain statutory approval. They should, therefore, be read in conjunction with the applicable legislation, regulations and procedural guidelines to ensure that mandatory requirements are met.

It is widely recognized that no amount of theoretical information on how best to plan and coordinate specialist inputs, or to provide or review specialist input, can replace the value of practical experience of coordinating, being responsible for and/or reviewing specialist inputs. Only such experience can develop sound judgment on such issues as the level of detail needed or expected from specialists to inform decision-makers adequately. For this reason, the guidelines should not be viewed as prescriptive and inflexible documents. Their intention is to provide best practice guidance to improve the quality of specialist input.

Furthermore, the guidelines do not intend to create experts out of non-specialists. Although the guidelines outline broad approaches that are available to the specialist discipline (e.g. field survey, desktop review, consultation, modeling), specific methods (e.g. the type of model or sampling technique to be used) cannot be prescribed. The guidelines should therefore not be used indiscriminately without due consideration of the particular context and circumstances within which an EIA is undertaken, as this influences both the approach and the methods available and used by specialists.

How are these guidelines structured?

The specialist guidelines have been structured to make them user-friendly. They are divided into six parts, as follows:

- **Part A**: Background;
- **Part B**: Triggers and key issues potentially requiring specialist input;
- **Part C**: Planning and coordination of specialist inputs (drawing up terms of reference);
- **Part D**: Providing specialist input;
- **Part E**: Review of specialist input; and
- **Part F**: References.

Part A provides grounding in the specialist subject matter for all users. It is expected that authorities and peer reviewers will make most use of Parts B and E; EIA practitioners and project proponents Parts B, C and E; specialists Part C and D; and other stakeholders Parts B, D and E. Part F gives useful sources of information for those who wish to explore the specialist topic.

SUMMARY

This guideline document, which deals with specialist visual input into the EIA process, is organised into a sequence of interleading sections. These follow a logical order covering the following:

- the background and context for specialist visual input;
- the triggers and issues that determine the need for visual input;
- the type of skills and scope of visual inputs required in the EIA process;
- the methodology, along with information and steps required for visual input;
- finally, the review or evaluation of the visual assessment process.

Part A is concerned with defining the visual and aesthetic component of the environment, and with principles and concepts relating to the visual assessment process. The importance of the process being logical, holistic, transparent and consistent is stressed in order for the input to be useful and credible.

The legal and planning context within which visual assessments take place indicate that there are already a number of laws and bylaws that protect visual and scenic resources. These resources within the Western Cape context have importance for the economy of the region, along with the proclaimed World Heritage Sites in the Province.

The role and timing of specialist visual inputs into the EIA process are outlined, with the emphasis being on timely, and on appropriate level of input, from the early planning stage of a project, through to detailed mitigation measures and management controls at the implementation stage.

Part B deals with typical factors that trigger the need for specialist visual input to a particular project. These factors typically relate to:

(a) the nature of the receiving environment, in particular its visual sensitivity or protection status;
(b) the nature of the project, in particular the scale or intensity of the project, which would result in change to the landscape or townscape.

The correlation between these two aspects are shown in a table, in order to determine the varying levels of visual impact that can be expected, i.e. from little or no impact, to very high visual impact potential.

Part C deals with the choice of an appropriate visual specialist, and the preparation of the terms of reference (TOR) for the visual input. Three types of visual assessment are put forward, each requiring different expertise, namely:

Type A: assessments involving large areas of natural or rural landscape;
Type B: assessments involving local areas of mainly built environment;
Type C: assessments involving smaller scale sites with buildings, or groups of buildings.

The scope of the visual input would in summary relate to the following:

- the issues raised during the scoping process;
- the time and space boundaries, i.e. the extent or zone of visual influence;

- the types of development alternatives that are to be considered;
- the variables and scenarios that could affect the visual assessment;
- the inclusion of direct, indirect and cumulative effects.

Approaches to the visual input relate to the level of potential impact and range from minimal specialist input, to a full visual impact assessment (VIA). A list of the typical components of a visual assessment is given, and the integration with other studies forming part of the EIA process is discussed.

Part D provides guidance for specialist visual input, and on the information required by specialists. Notes on predicting potential visual impacts are given, along with suggested criteria for describing and rating visual impacts. The assessment of the overall significance of impacts, as well as thresholds of significance are discussed.

Further aspects that need to be considered by visual specialists in EIA processes include:

- affected parties who stand to benefit or lose,
- risks and uncertainties related to the project,
- assumptions that have been made, and their justification,
- levels of confidence in providing the visual input or assessment,
- management actions that can be employed to avoid or mitigate adverse effects and enhance benefits, and
- the best practicable environental option from the perspective of the visual issues and impacts.

Finally, pointers for the effective communication of the findings are given.

Part E lists specific evaluation criteria for reviewing visual input by a specialist, where this becomes necessary. Further guidance on this is given in the document on *Guideline for the review of specialist input in EIA processes.*

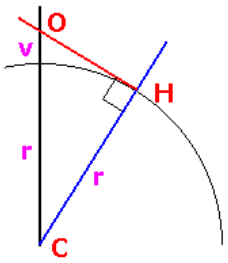
CONTENTS

APPENDIX III

APPENDIX II
CALCULATION OF VISUAL HORIZON

The Mathematics behind this Calculation

This calculation should be taken as a guide only as it assumes the earth is a perfect ball 6378137 metres radius. It also assumes the horizon you are looking at is at sea level. A triangle is formed with the centre of the earth (C) as one point, the horizon point (H) is a right angle and the observer (O) the third corner. Using Pythagoras's theorem we can calculate the distance from the observer to the horizon (OH) knowing CH is the earth's radius (r) and CO is the earth's radius (r) plus observer's height (v) above sea level.



Sitting in a hotel room 10m above sea level a boat on the horizon will be 11.3km away. The reverse is also true, whilst rowing across the Atlantic, the very top of a mountain range 400m high could be seen on your horizon at a distance of 71.4 km assuming the air was clear enough.