UNIVERSAL COAL DEVELOPMENT (PTY) LTD

CO-DISPOSAL FACILITY AT THE EXITING KANGALA COAL MINE NEAR DELMAS, IN MPUMALANGA PROVINCE

LANDSCAPE & VISUAL IMPACT REPORT

May 2021

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TABLE OF CONTENTS

1 INTRODUCTION

1.1 GENERAL

This Landscape and Visual Impact Assessment Report (LVIR) forms part of the Environmental Impact Assessment that is being undertaken for the proposed Co-Disposal Facility at the existing Kangala Coal Mine by Environmental Impact Management Services (Pty) Ltd (EIMS) on behalf of Universal Coal PLC (UC).

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.

1.2 PROJECT LOCATION

The project footprint is in Victor Khanye Local Municipality, located within the Nkangala District Municipality, Mpumalanga Province. The project area is located on the farm Wolvenfontein 244 IR and is situated approximately 3km south of the town of Delmas. Please refer to Site Location and Context map (**Map 1**).

1.3 BACKGROUND OF SPECIALIST

Jon Marshall qualified as a Landscape Architect in 1978. He has also worked extensively as an Environmental Assessment Practitioner in South Africa.

He has been involved in Landscape and Visual Impact Assessment for more than 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 projects, mining and infrastructure projects and has been involved in the preparation of visual guidelines for large scale planning work.

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 co-disposal facility 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

The Western Cape Guidelines indicate that a moderate to very high impact might be expected. If a moderate impact is predicted in accordance with the guidelines 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).

The Landscape and Visual Impact Scoping Report indicated that visual impacts associated with the proposed Co Disposal Facility, during the operational phase, are likely to exacerbate the visual influence of existing mine stockpiles. During and after decommissioning however, it will remain in place while stockpiles will be removed and the mining area rehabilitated. Therefore, ultimately it will a permanent visual legacy of mining operations.

The main visual concerns recorded at the scoping stage include:

- The proposed co-disposal facility could extend the visual influence of mining operations on the surrounding landscape;
- The proposed co-disposal facility could exacerbate existing visual impacts for receptors on the edges of urban areas, adjacent roads and homesteads; and

Whilst from knowledge of the area, impacts are not expected to be high or very high in accordance with the guidelines, in order to illustrate the expected shift in the nature of impact and justify the assessed levels of impact, a Level 4 assessment has been undertaken.

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 LIMITATIONS AND ASSUMPTIONS

The following limitations and assumptions should be noted.

In the assessment tables the subjective judgement as to whether an impact is negative or positive is based on the assumption that the majority of people are likely to prefer to view a natural or a rural landscape than an industrial landscape.

A site visit was undertaken on a single day (21st March 2021) to verify the likely visibility of the proposed development, the nature of the affected landscape and affected receptors.

The site visit was planned to ensure that weather conditions were clear ensuring maximum visibility.

The timing of photography was planned to ensure that the sun was as far as possible behind the photographer. This was to ensure that as much detail as possible was recorded in the photographs.

Visibility of the proposed facility has been assessed using the Global Mapper Viewshed tool.

The visibility assessment is based on terrain data that has been derived from satellite imagery. This data was originally prepared by NASA and is freely available on the CIAT-CCAFS website (http://www.cgiar-csi.org). This data has been ground truthed using a GPS as well as online mapping.

Calculation of visibility is based purely on the Digital Elevation Model and does not take into account the screening potential of vegetation or other development.

Simulations have been prepared using basic wireframe CAD modelling of proposed stockpiles and overlaying images of the CAD model onto photographs that were taken from the same viewpoints. Reference points have been used within the model to ensure that the overlay is as accurately located as possible. The simple CAD wireframe has then been rendered using colours and tones borrowed from the existing mine stockpiles.

It has been assumed that the facility will cover the entire areas indicated and will be approximately 43.5m high.


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DELMAS
ELOFF
EEUWPAN MINE
MANUNGU MINE
N12
R50
R42
R555
Summel Road
kangala railway
VP1
VP2
VP3
VP4
VP5
VP6
VP7
N17
LEGEND
EXISTING KANGALA MINE AREA
NEW AUTHORISED MINING AREA (ELOFF PHASE 3)
PROPOSED CO DISPOSAL FACILITY
URBAN AREAS
VIEWPOINTS
0.0 km 1.0 km 2.0 km 3.0 km 4.0 km 5.0 km 6.0 km
ENVIRONMENTAL PLANNING AND DESIGN
MAP 1 - SITE LOCATION & CONTEXT
KANGALA MINE CO DISPOSAL FACILITY
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2. PROJECT DESCRIPTION

2.1 PROJECT MOTIVATION

The proposed co-disposal coal discard facility is required in order to accommodate the expansion of the mining into the neighbouring Middlebult and Eloff block mines.

2.2 PROJECT CONTEXT

The existing Kangala Mine is located within a landscape in which mining operations are commonplace. Two other mines, the Eeuwpan Coal Mine and the Manungu Coal Mine are located approximately 4km to the east and 3.3km to the south respectively.

In accordance with the Kangala mining plan, the current mining area is anticipated to be complete this year (2019-20) subsequent to which rehabilitation of the open cast area will begin. Rehabilitation will involve the use of existing overburden and topsoil stockpiles to fill the mine and return the surface to a usable agricultural area.

Authorisation for an additional mining area was granted in 2020 (Eloff Phase 3). The additional area is located immediately to the south west of the existing mine. Mining within the additional area will also take the form of an open cast process with topsoil and overburden stockpiles located to the south west of the site. It is anticipated that this additional mining area will subject to closure in 2027. The existing mining infrastructure close to the proposed co-disposal facility is likely to be used for the operational phase of the new mining area.

Due to the extent of the coal field, it seems likely that additional mining applications may be made and it is therefore possible that the mining of additional areas will be undertaken past 2027.

It is likely therefore that coal mining will be ongoing in the vicinity for the foreseeable future.

2.3 PROJECT DESCRIPTION

Refer to Figures 1 and 2 for a plan and sections of the proposed co-disposal coal discard facility. The location relative to other mining operations is indicated on Map1.

The proposed co-disposal coal discard facility will accommodate the expansion of mining into the neighbouring Middlebult and Eloff block mines

The coal waste will be comprised of:

- Course material with broadly graded rock fill greater than 75mm that is free draining; and
- Fines with a particle size distribution of 200 micron that will be suspended in a slurry.

It has been assessed as type 3 waste (According to NEMWA 2013 Regulation 635). It is acid forming and has the potential for spontaneous combustion.

The facility is intended to be permanent. This means that it will be in place after existing mining operations have closed and been rehabilitated.

The proposed co-disposal coal discard facility will be approximately 43.5m high.

The facility has been designed to minimise embankment volumes and related costs of materials placement and maintenance. In order to facilitate this, the outer slope will have an eventual overall slope of 1V:3H with intermediate step backs of 4m width to accommodate slope drainage after every 15m of vertical rise i.e. at 15m and 30m above NGL. These step back berms serve an additional precautionary function in the unlikely event of overtopping or seepage through side walls.

The Project Engineer has reported that experience in embankment dam engineering and in particular coal mine rehabilitation in northern KZN has shown side slopes of 1V:5h and are required if grassing is required for erosion protection. The on-site available material is however broadly graded and will be selected to have the semi-pervious material in the outer zone for both stability (increasing permeability towards the outer shell) and erosion resistance. It is therefore not intended to grass the side slopes.

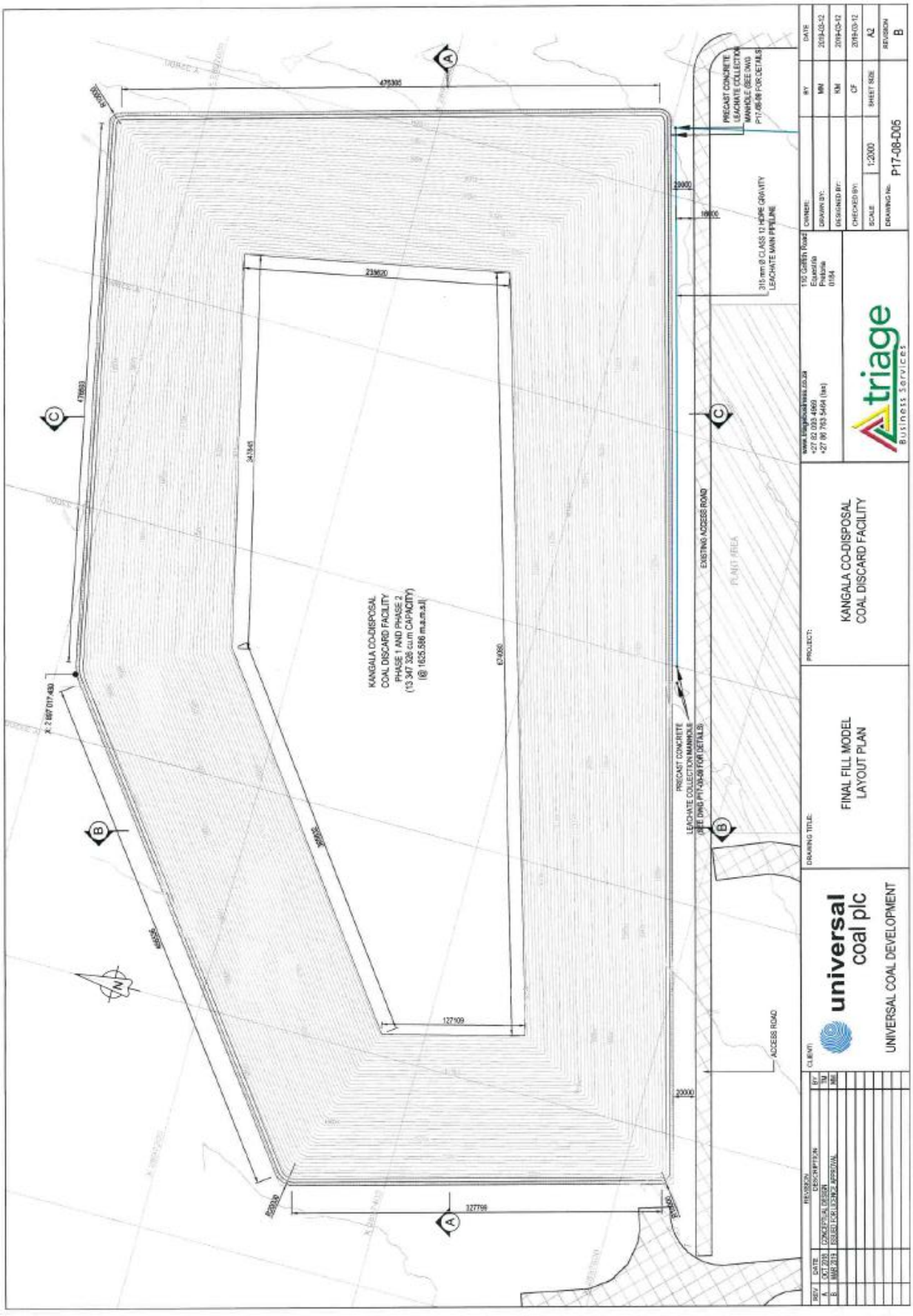


Figure 1 – Layout of proposed co-disposal facility

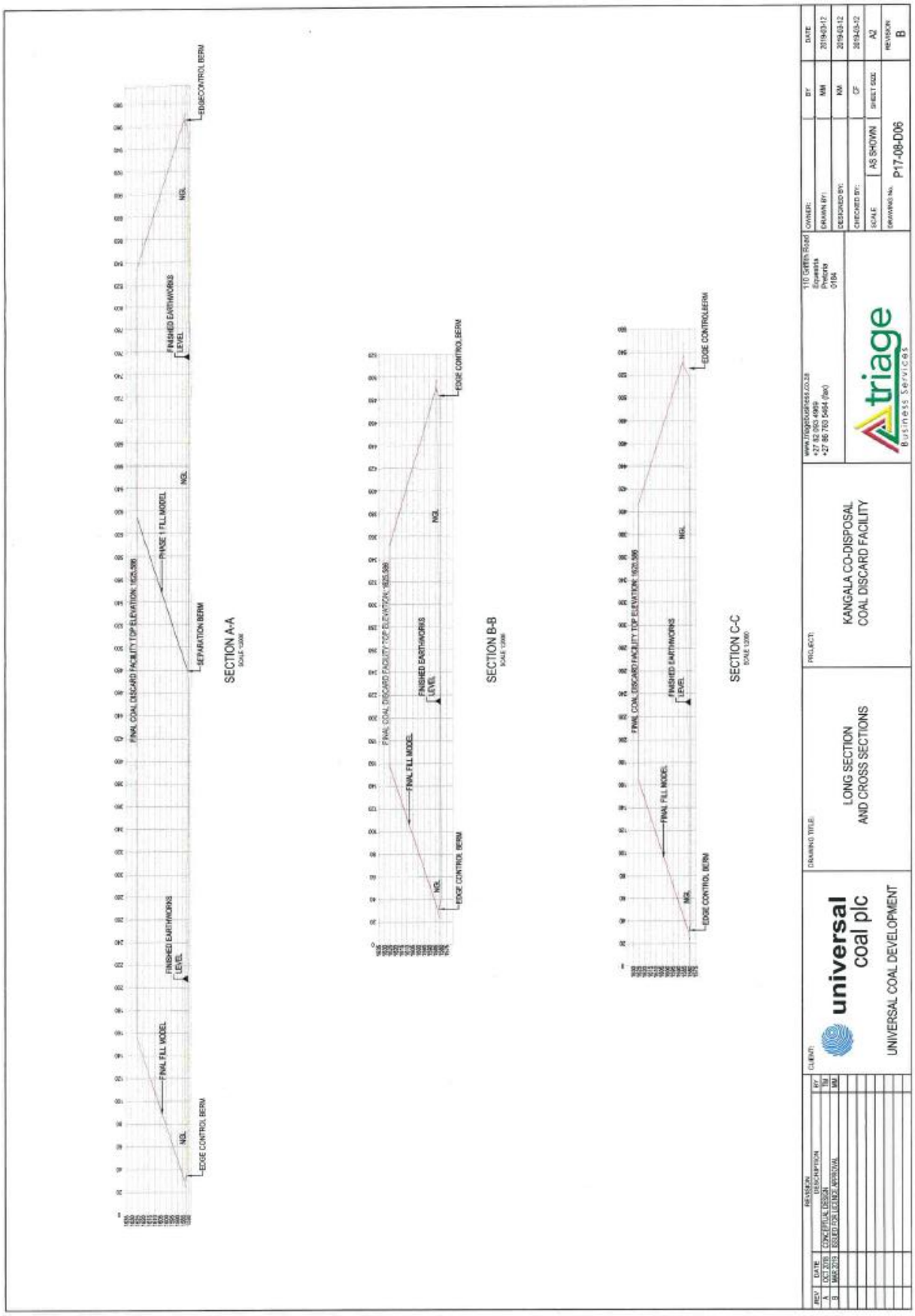


Figure 2 – Cross sections through proposed co-disposal facility

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 23.6km from the proposed site being the approximate limit of visibility of the proposed 43.5m high stockpile associated with the co-disposal facility. Refer to Section 4 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"[1].

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 landform surrounding the site is general comprised of low undulating ridgelines.

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 site falls from a high point of approximately 1588m above mean sea level (amsl) on the northern and eastern boundaries to a low point on the southern boundary of approximately 1582m amsl. This results in a relatively flat site.

The area immediately to the south of the proposed site is comprised of an area of open cast mine workings.

Immediately to the west and south west of the proposed site are a number of large stockpiles that appear of similar scale to the proposed facility.

[1] UK Guideline

The visual implications of this disturbed landform is that there are large stockpiles in the vicinity of the proposed facility that, to the lay person, are likely to look similar to and provide a degree of screening for the proposed facility particularly from the south west and west of the proposed site. Whilst these exiting stockpiles may provide a degree of screening, the material in these existing stockpiles will be used for rehabilitation works on closure of the mine.

Plate 1, The landform surrounding the site is general comprised of low undulating ridgelines

Plate 2, Current mine stockpiles immediately adjacent to the south and west of the proposed co-disposal facility site (foreground)

3.1.2 Landcover

Refer to Map 3 for analysis of the Landcover.

The site is 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 co-disposal facility.

Other major landcover types include:

- Three large areas of settlement including Sundra, Eloff and Delmas that lie to the north, the closest being Delmas which is approximately 3km to the north of the proposed facility; 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 4.6km to the east and one approximately 4.7km to the south of the proposed facility.

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 that is approximately 21km from the proposed facility. 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 project.

There are a number of regional roads in the area including the R42 which runs approximately 2.7km to the south and the R55 which also runs approximately 2.7km to the north of the proposed facility.

Existing landcover is likely to have the following visual implications for the proposed mine co-disposal facility:

- Open cultivated areas in which the mine is set are unlikely to provide any screening of the proposed facility;
- It is possible that the adjacent natural areas could provide a degree of screening for the proposed facility, particularly if they include alien invasive tree species;
- The existing large mine stockpiles to the south-west, and the west of the proposed facility will provide some screening and should mean that the proposed facility is developed within an area where large mine storage stockpiles are a common site;
- Whilst there are regional routes close to the proposed facility, 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 facility; and
- Settlement areas to the north as well as individual farmsteads could have greatest visual sensitivity to the proposed facility.

Plate 3, Existing mine stockpiles on the Manungu Mine to the south of the proposed project. Mine stockpiles are a common element within the surrounding landscape

Plate 4, Open cultivated areas. Note alien invasive tree species on property boundaries.

3.1.3 Natural Vegetation Patterns

Refer to Map 4 for analysis of the Vegetation.

The main natural vegetation types as defined by Mucina and Rutherford[2] in the vicinity of the proposed co-disposal facility 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.

Existing areas of cultivation and settlement have been overlaid onto the vegetation types. From this it is apparent that the majority of natural vegetation in the vicinity of the site has been transformed.

It is obvious that only small areas of natural vegetation exist in close proximity to the proposed mine extension.

It is therefore obvious that natural vegetation patterns play a minimal role in defining landscape character.

From the site visit, it is also obvious that most natural areas have been invaded by alien tree species. These alien tree species are common within and around settlements, farmsteads, on roadsides, along stream lines and on agricultural property boundaries.

A significant amount of localised screening is provided by this alien vegetation.

Plate 5, Existing railway embankment / line and alien vegetation on the southern edge of Delmas provides significant screening from the settlement area

[2] Vegetation types of South Africa (including Prince Edward and Marion Islands), Lesotho and Swaziland, 2014

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"[3].

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 approximately 17km to the west of the proposed site and close to 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 (arable) landscape. The existing mine and the proposed mine extension fall within this LCA. Due to the relative scale of major mining elements including large stockpiles and limited screening provided by vegetation and the low undulating topography, VAC over much of the area is relatively low. However larger alien vegetation significantly increases the level of VAC in localised areas. Whilst the existing VAC of the landscape may not be sufficient to generally assimilate taller elements associated with a mine, the visibility of lower operational areas including haul roads, surface excavation, offices and lower stockpile areas is mitigated to a large degree by the low undulating topography and vegetation cover.
- **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. However, should areas include alien invasive tree species a high level of localised screening may be provided. VAC could therefore varies 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 facility may be most affected.
- **The Urban LCA** is comprised of a mix of landuses including residential, commercial and industrial operations. Due to the density of development

[3] UK Guidelines.

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 may be possible although vegetation within and on the edge of urban areas is likely to limit views.

The proposed co-disposal facility will be located within the Rural Mining LCA. Within this LCA there are numerous areas of open cast mining with associated mine stockpiles. It is therefore unlikely to result in a significant change in landscape character.

This initial landscape analysis is indicated on **Map 5**.

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 visual influence of the proposed facility is unlikely to extend 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"[4].

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 (2.93km to the north) and Eloff (3.65km to the north-west). 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, the VAC of the landscape and the occurrence of other mining stockpiles in the vicinity the

[4] UK Guidelines.

majority of these areas will be subject to minimal visual impact and the level of sensitivity is likely to be low. Impacts are likely to be limited to the urban edge;
- The two areas of smallholdings, Droogfontain (5.93km to the west) and Vischkuil (12.26km to the south-west). It is possible that closest properties could be affected and subject to use may be sensitive. Due to distance Vischkuil is highly unlikely to be sensitive, this area is also screened by existing stockpiles; 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 highly unlikely that it will be sensitive.

Linear Receptors

Linear receptors include:

- Major roads including the R555 which runs approximately 2.8km to the north and the R42 which runs approximately 2.3km to the south of the proposed co-disposal facility.
- Minor local roads, one of which runs adjacent to the northern boundary of the proposed facility. 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 possible landscape change.

Point Receptors

Point receptors include:

- 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. The closest homesteads are within 2km to the north and east of the proposed co-disposal facility.

Visual receptors were subject to verification during the EIA phase.

LANDSCAPE CHARACTER AREAS

Plate 6, Rural Natural LCA - This LCA includes arable areas interspersed with patches of natural vegetation. Alien tree species provide localise screening. Mining stockpiles are visible but do not dominate the scene.

Plate 7, Rural Mining LCA - This LCA includes extensive mining operations interspersed with arable agriculture and patches of largely alien vegetation. Mining stockpiles are highly obvious in the landscape.

Plate 8, Smallholdings LCA – This LCA is comprised of a mix of landuses largely including large residential buildings /complexes and agri-industrial operations mainly in the form of chicken farms.

Plate 9, Urban LCA – This LCA is comprised of a mix of landuses including residential, commercial and industrial operations. It is largely inward looking with views of surrounding areas only being possible from the urban edge.

VISUAL RECEPTORS

Plate 10, Local Homesteads – There are four homesteads, located to the north and east, within 2km of the proposed co-disposal facility.

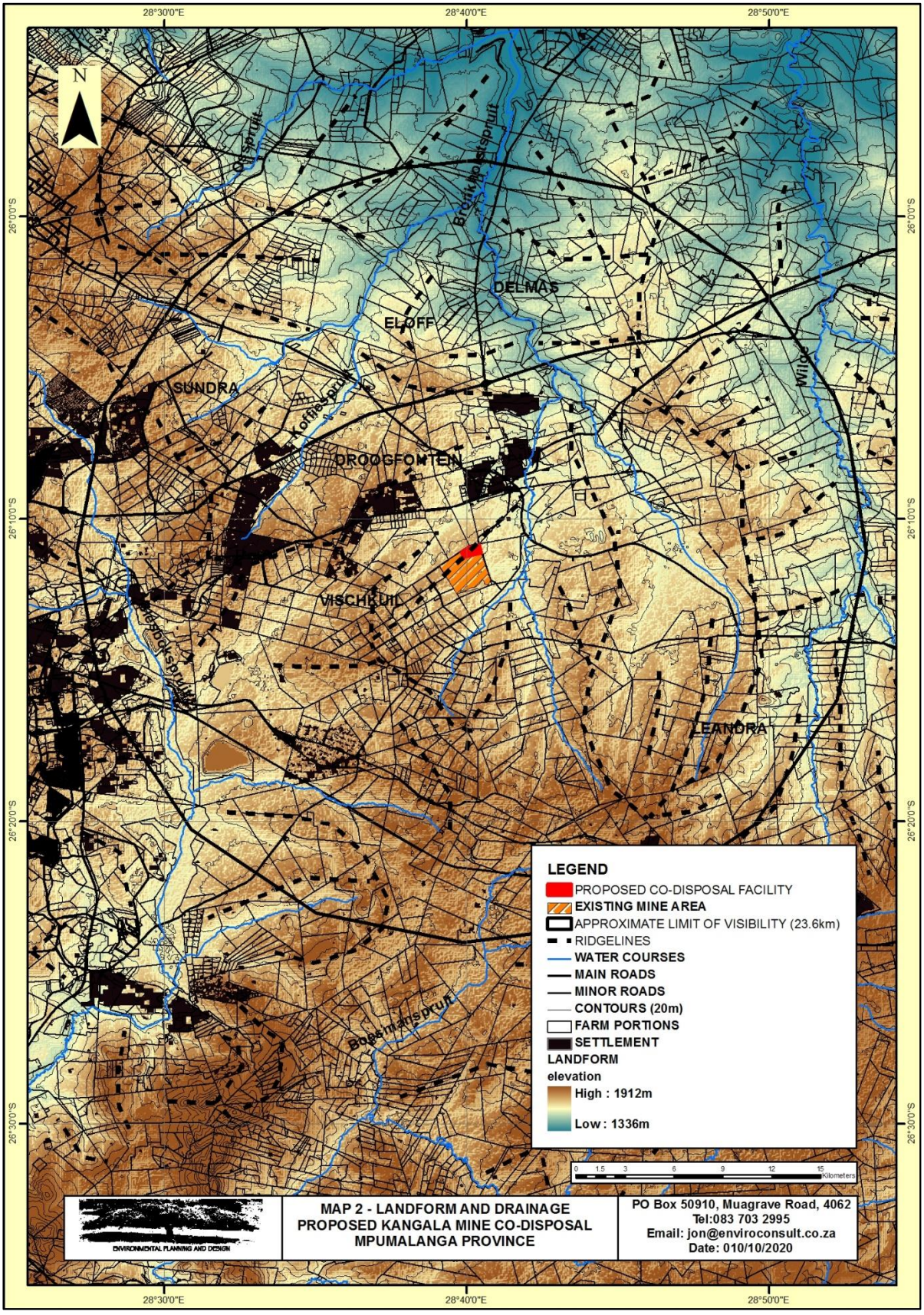
Plate 11, The south-eastern edge of Droogfontein - This area is comprised of a mix of uses including large houses and agri-industrial operations. The area is slightly elevated which could make the proposed co-disposal facility more obvious.

VISUAL RECEPTORS

Plate 12, The southern urban edge of Delmas - The existing railway and dense vegatation will largely screen views from the settlement towards the proposed co-disposal facility.

Plate 13, The R555 – The existing railway largely screens views of the existing mine stockpiles and is likely to also provide screening for the proposed co-disposal facility from the majority of the road.

Plate 14, The R42 – The existing mine stockpiles are highly visible from this road. These stockpiles will partially screen views of the proposed co-disposal facility from sections of the road to the south and west of the mine.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DROOGFONTEIN
VISCHKUIL
LEANDRA
Koffiespruit
Bosmansspruit
LEGEND
PROPOSED CO-DISPOSAL FACILITY
EXISTING MINE AREA
APPROXIMATE LIMIT OF VISIBILITY (23.6km)
RIDGELINES
WATER COURSES
MAIN ROADS
MINOR ROADS
CONTOURS (20m)
FARM PORTIONS
SETTLEMENT
LANDFORM
elevation
High : 1912m
Low : 1336m
0 1.5 3 6 9 12 15 Kilometers
ENVIRONMENTAL PLANNING AND DESIGN
MAP 2 - LANDFORM AND DRAINAGE
PROPOSED KANGALA MINE CO-DISPOSAL
MPUMALANGA PROVINCE
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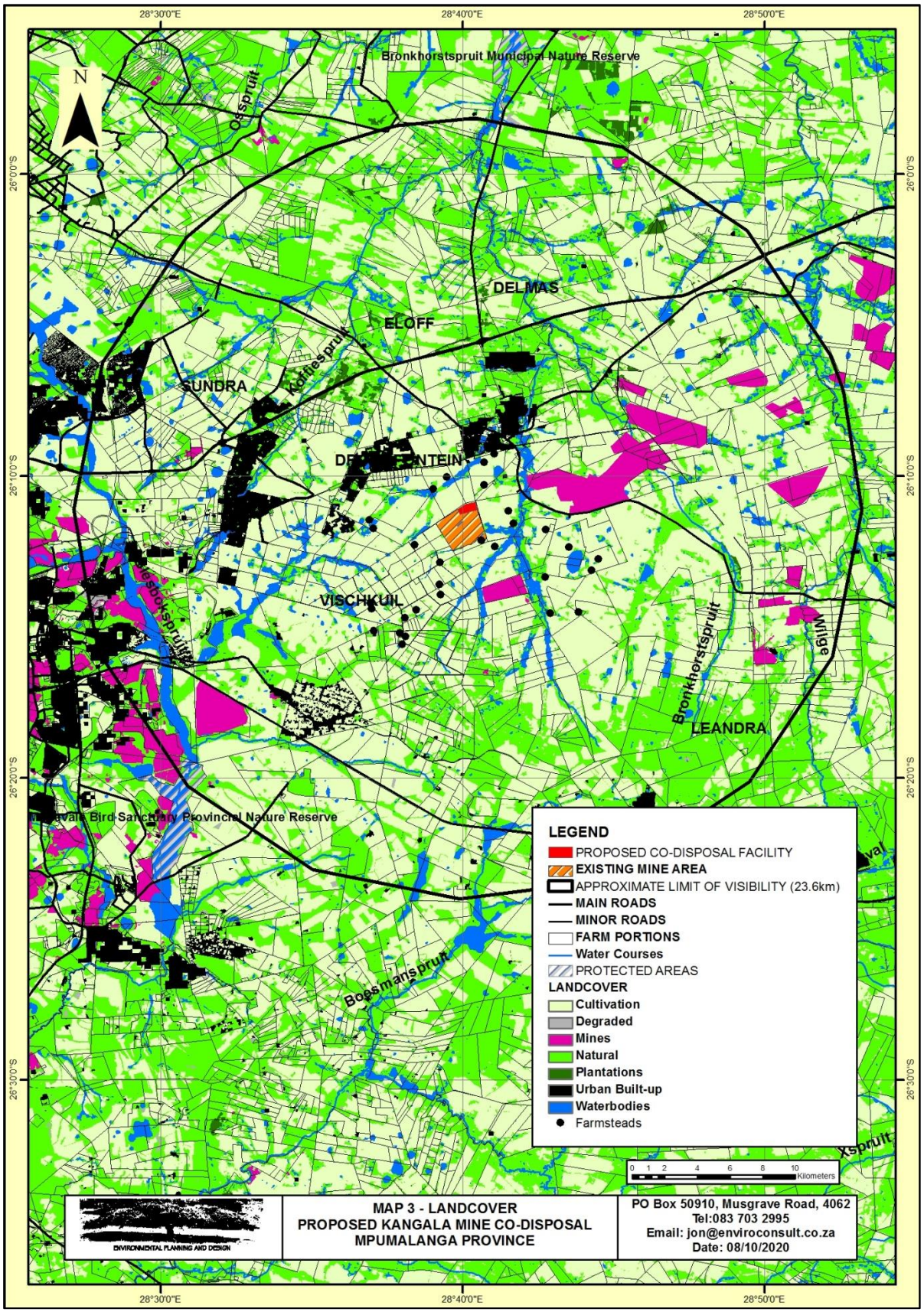
Date: 010/10/2020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Olifantspruit
DELMAS
ELOFF
Koffiespruit
SUNDRA
VISCHKUIL
Bronkhorstspruit
Wilge
LEANDRA
Xspruit
Boesmanspruit
LEGEND
PROPOSED CO-DISPOSAL FACILITY
EXISTING MINE AREA
APPROXIMATE LIMIT OF VISIBILITY (23.6km)
MAIN ROADS
MINOR ROADS
FARM PORTIONS
Water Courses
PROTECTED AREAS
LANDCOVER
Cultivation
Degraded
Mines
Natural
Plantations
Urban Built-up
Waterbodies
Farmsteads
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Kilometers
ENVIRONMENTAL PLANNING AND DESIGN
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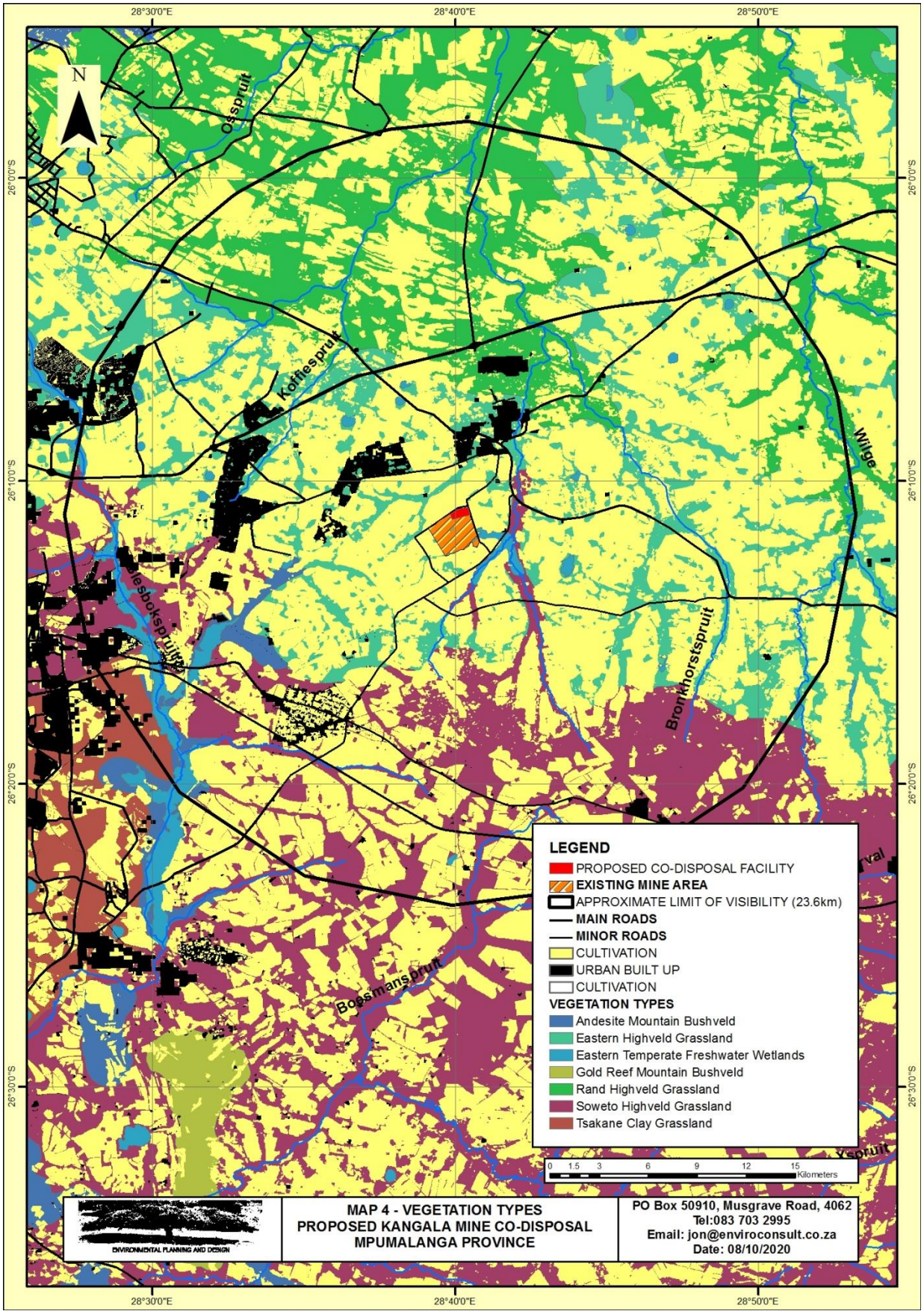
Email: jon@enviroconsult.co.za
Date: 08/10/2020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Bronkhorstspruit
Boesmansspruit
Yspruit
LEGEND
PROPOSED CO-DISPOSAL FACILITY
EXISTING MINE AREA
APPROXIMATE LIMIT OF VISIBILITY (23.6km)
MAIN ROADS
MINOR ROADS
CULTIVATION
URBAN BUILT UP
CULTIVATION
VEGETATION TYPES
Andesite Mountain Bushveld
Eastern Highveld Grassland
Eastern Temperate Freshwater Wetlands
Gold Reef Mountain Bushveld
Rand Highveld Grassland
Soweto Highveld Grassland
Tsakane Clay Grassland
0 1.5 3 6 9 12 15
Kilometers
ENVIRONMENTAL PLANNING AND DESIGN
MAP 4 - VEGETATION TYPES
PROPOSED KANGALA MINE CO-DISPOSAL
MPUMALANGA PROVINCE
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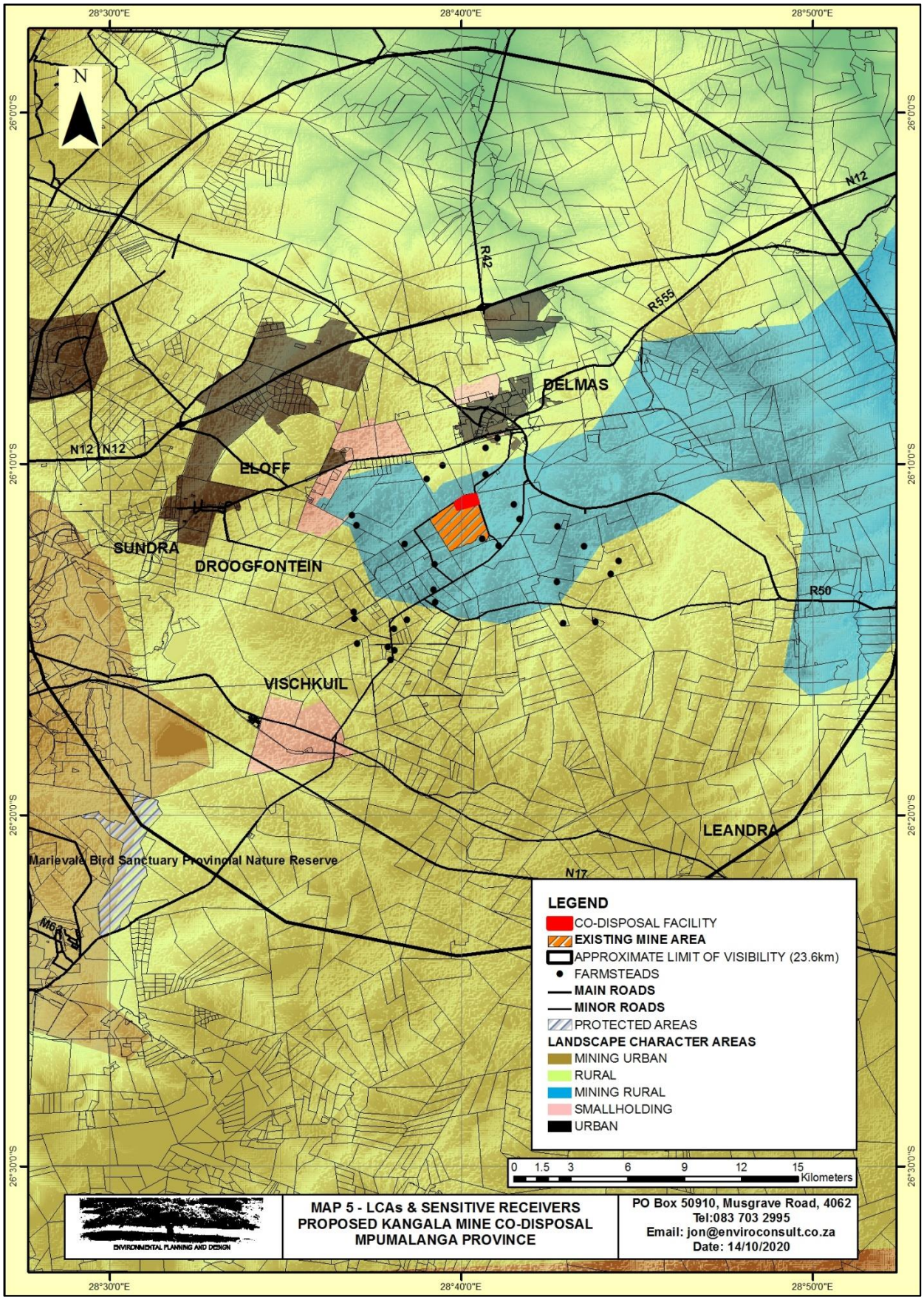
Date: 08/10/2020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R42
R555
DELMAS
N12 N12
ELOFF
SUNDRA
DROOGFONTEIN
R50
VISCHKUIL
LEANDRA
Marievale Bird Sanctuary Provincial Nature Reserve
N17
M68
LEGEND
CO-DISPOSAL FACILITY
EXISTING MINE AREA
APPROXIMATE LIMIT OF VISIBILITY (23.6km)
FARMSTEADS
MAIN ROADS
MINOR ROADS
PROTECTED AREAS
LANDSCAPE CHARACTER AREAS
MINING URBAN
RURAL
MINING RURAL
SMALLHOLDING
URBAN
0 1.5 3 6 9 12 15
Kilometers
ENVIRONMENTAL PLANNING AND DESIGN
MAP 5 - LCAs & SENSITIVE RECEIVERS
PROPOSED KANGALA MINE CO-DISPOSAL
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4 THE NATURE OF POTENTIAL VISUAL IMPACTS

4.1 GENERAL

Impacts could include general landscape change 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 usually 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".

A ZTV map has been prepared for the proposed co-disposal facility in order to highlight the overall area from which the highest element associated with the proposed facility is likely to be visible from. A height of 43.5m has been assumed for co-disposal facility which is a similar scale to current adjacent stockpiles associated with the mine.

The ZTV maps also indicates the area over which existing stockpiles are likely to be visible from in order that the difference between existing areas of impact and possible future areas of impact associated with the co-disposal facility can be compared.

An initial site layout has been provided (Figure 2) which indicates location of the proposed co-disposal facility.

The ZTV analysis has been undertaken using the Global Mapper Geographic Information System (GIS) Viewshed tool. 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 Centre 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
Co-disposal facility 43.5m high	23.6 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 facility it is possible that it could be visually obvious to the limit of visibility if the VAC of the existing landscape does not reduce its apparent scale / height; and
    - Because low level operations are likely to include a combination of 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

The proposed 43.5m high stockpile will be the most obvious element. This facility will gradually grow to a maximum impact just prior to mine closure.

Map 6 compares the ZTV of existing stockpiles with the ZTV of the proposed co-disposal.

The following can be noted from this analysis:

a) The proposed co-disposal facility 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.
b) The ZTV indicates that the proposed facility could extend the visibility of stockpiles seen from the south eastern edge of Sundra. However due to distance,

intervening development and vegetation, the facility is highly unlikely to be visible from this area.

The ZTV analysis does not take into account the screening effect of existing mine stockpiles that are located directly to the south and west of the proposed co-disposal facility. It is likely therefore that these existing stockpiles will at least partially screen views of the proposed facility from these directions during the construction and operational phases.

When material from the existing stockpiles is removed for rehabilitation of mining areas during mine closure, the proposed co-disposal facility will be more obvious from these directions.

In general therefore visibility of the proposed facility is likely to be very similar to the visibility of the existing mine stockpiles.

4.3 LIKELY IMPLICATIONS FOR LANDSCAPE CHARACTER

Because the proposed facility is likely to be largely visible to the same areas as the existing mine stockpiles, the visual implications of the proposed co-disposal facility for identified Landscape Character Areas is likely to include:

a) In the short to medium term while existing stockpiles remain in place, the proposed co-disposal facility could intensify the existing visual impact associated with the existing stockpiles particularly to the north, south east and to a lesser degree to the west. However, mine stockpiles are a common site in the surrounding landscape. Therefore this is not likely to significantly alter the local landscape character; and
b) In the long term as existing mine stockpiles are removed, the general intensity of the visual impact on the rural landscape is likely to reduce again to lower than current levels. When all temporary stockpiles are removed, only the proposed co-disposal facility will be visible. Given that mines in the vicinity will have similar co-disposal facilities and will utilise temporary stockpiles for rehabilitation, the majority of mine stockpiles are ultimately likely to disappear from the landscape and +/- one permanent facility per mine may remain.

4.4 POSSIBLE IMPLICATIONS FOR VISUAL RECEPTORS

Whilst, the proposed co-disposal facility is likely to be visible to the same areas as the existing mine stockpiles, the visual implications of the proposed co-disposal facility for identified receptors are likely to include:

a) In the short to medium term, the proposed co-disposal facility is likely to intensify visual impacts associated with existing mine stockpiles particularly on receptors to the north, south east and to a lesser degree to the west. Views of the facility from the south, south west and north-east and east are likely to be partially screened by existing stockpiles and vegetation.
b) In the long term as existing adjacent mine stockpiles are removed and used for rehabilitation, the intensity of visual impacts associated with the mine will reduce. However, the co-disposal facility remain in place and is likely to impact on receptors to a similar degree as the current stockpiles associated with the mine. This means that the proposed facility will extend the visual

influence of mining past the closure date of the mine. It is likely however, that mining operations will continue in the area in the long term and that other mines will leave in place similar permanent facilities that will also be visible to surrounding receptors.

4.5 POSSIBLE MITIGATION MEASURES

General activities around the co-disposal facility 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 to minimise risk of erosion

As the co-disposal facility increases in size it will gradually become more obvious in the landscape. Its size will mean that screening will be difficult. In this situation, visual impact mitigation measures typically involve methods to either site the project so that it is less visible from sensitive viewpoints or to reduce the level of visual contrast between the project and the surrounding landscape. This is typically achieved by changing the form, lines, colours, and/or textures of the proposed project elements to better match those of the surrounding landscape.

In terms of siting, the proposed facility will be located such that existing vegetation and infrastructure will help screen views particularly from the north-east, east and south-west. There are also a number of patches of vegetation that will soften the outline of the facility from other directions.

In terms of form, the facility has been designed to ensure that the anticipated quantity of material arising may be accommodated in the available area. The height of the proposed facility (43.5m) will mean that from areas that it is visible, it is likely to influence landscape character. The view from VP7 suggests however that this influence is likely to be limited to approximately 7km. Reducing the height of the proposed facility is likely to result in it extending over a larger area but being visually obvious over a smaller area. This would mean that less area would be returned to productive use in the long term. Given the extent and location of other mining operations in the area it is doubtful this measure would significantly reduce the influence of mining on landscape character in the long term

In terms of colour and texture, as designed, the facility should appear as an engineered stockpile with mid to dark grey outer slopes. The grassing of slopes may assist in blending the facility more readily with surrounding areas. This however would require the flattening of side slopes to 1V:5H which would also help to soften views of the facility. In terms of colour and as long as the facility remains free of erosion, this is only likely to have a significant mitigatory impact from close up and for more distant views when the sun is directly behind the viewer (from the east in the morning, north in the middle of the day and west in the late afternoon). This measure is also likely to result in a slightly larger footprint. In terms of visual implications alone it is however likely to be beneficial.

The most critical mitigation measure is to ensure that erosion of side slopes is prevented. The reduction of slope angles and grassing of slopes is likely to help this, however even if this is undertaken, ongoing maintenance is likely to be required.

Plate 15, VP1 – View from the south-eastern edge of Droogfontein. The proposed co-disposal facility will be viewed beside and to the left of existing mine stockpiles until existing stockpiles are removed on closure of mining operations.

Plate 16, VP2 – View from the R555 approximately 3km to the north of the proposed co-disposal facility. The proposed co-disposal facility will largely screened from this road. The viewpoint was selected as it is one of the few places where views over the railway track were possible. It is therefore the worst case view from this road. Over limited sections of the road the upper section of the proposed co-disposal facility will be visible. It should be noted that existing mine stockpiles are visible to the right of the co-disposal facility.

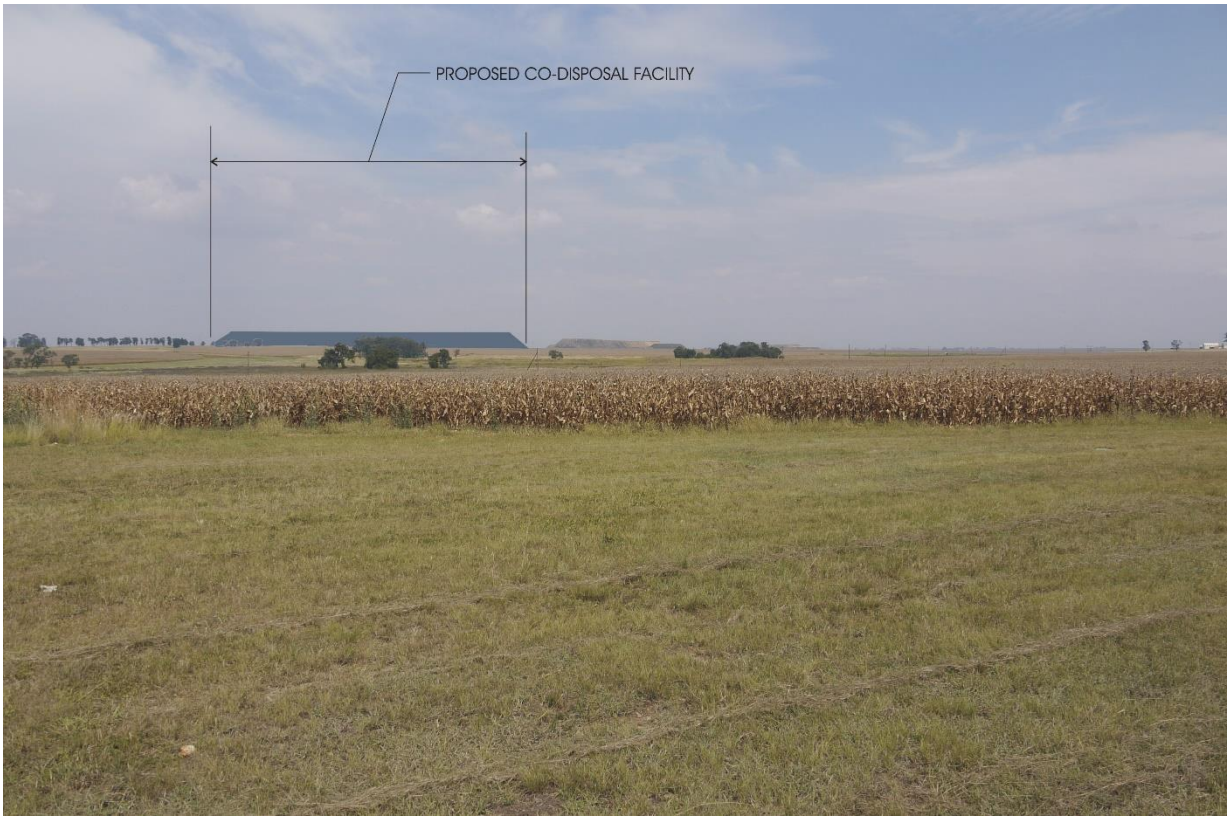


Plate 17, VP3 – View from the southern edge of Delmas approximately 2.7km to the north of the proposed co-disposal facility. This is the only section of the settlement located on the mine (southern) side of the railway. The railway and existing vegetation screen views towards the mine from the majority of the southern edge of the settlement. This is therefore the worst case view. The mine stockpiles to the right of the proposed co-disposal facility will be removed on the closure of mining operations.

Plate 18, VP4 – View from approximately 2.6km to the north east of the proposed co-disposal facility. Existing vegetation and infrastructure will screen views of the proposed co-disposal facility from this area. It should be noted that existing stockpiles are not highly obvious from this area.

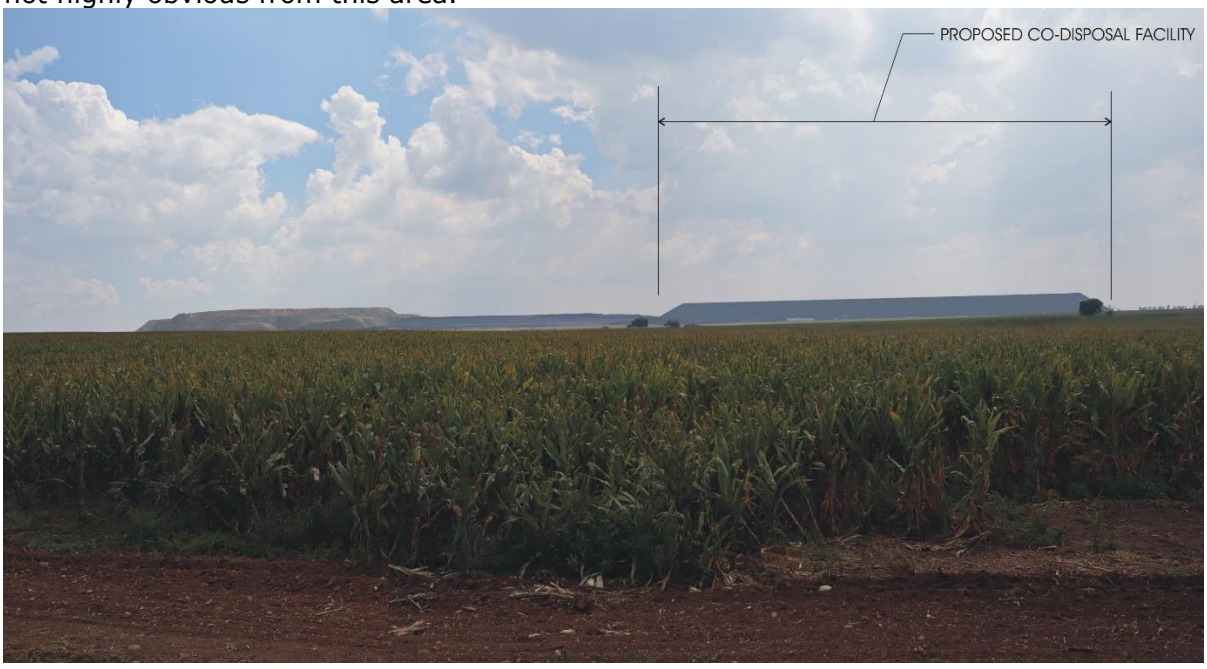
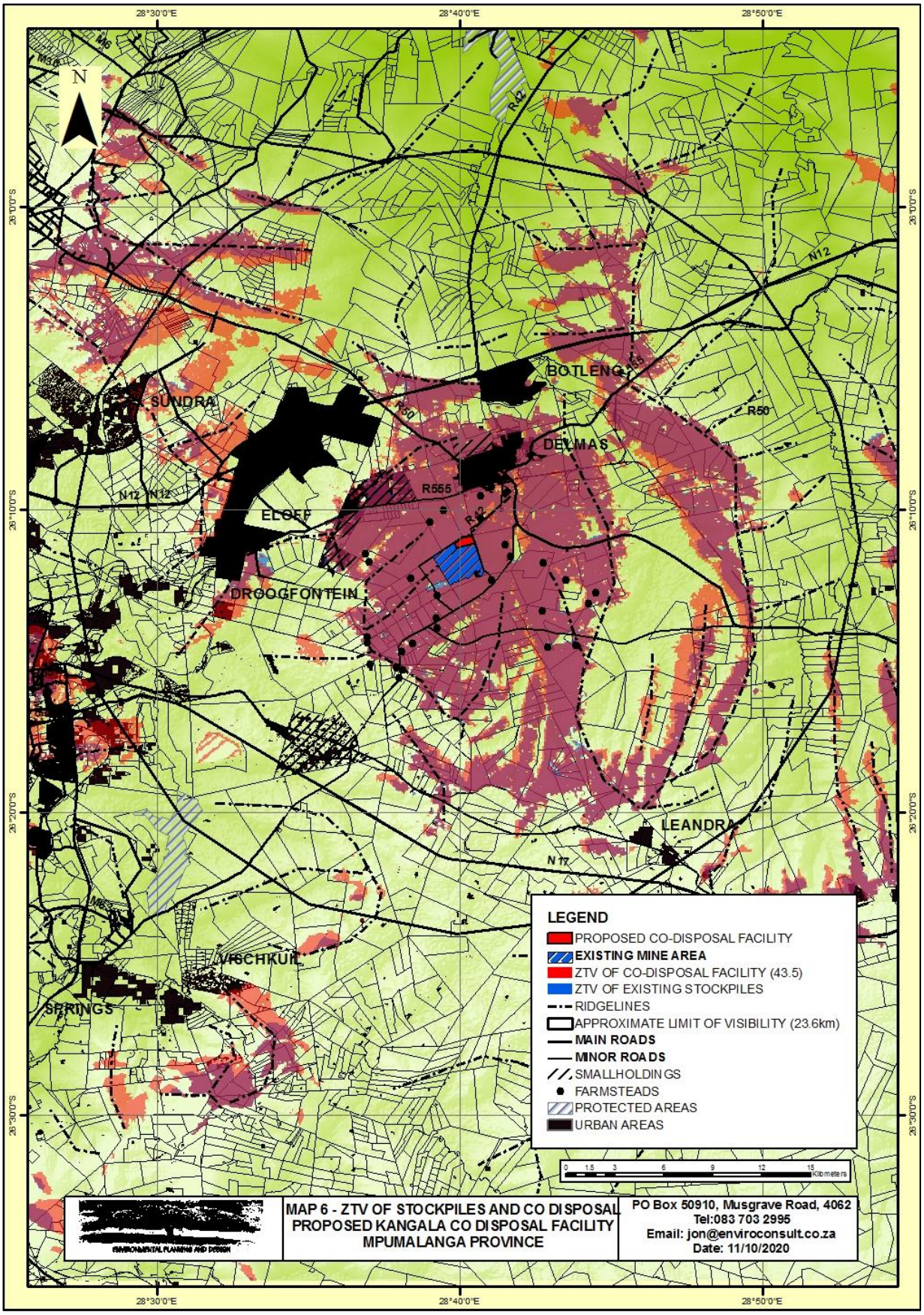


Plate 19, VP5 – View from the R42 approximately 2.4km to the south-east of the proposed co-disposal facility. The proposed co-disposal facility will double the apparent extent of mine stockpiles from this quarter. On mine closure the existing mine stockpiles to the left of the co-disposal facility will be removed.

Plate 20, VP6 – View from the R42 approximately 5km to the south-west of the proposed co-disposal facility. The proposed co-disposal facility will be largely screened by existing vegetation.

Plate 21, VP7 – View from approximately 7km to the west-south-west of the proposed co-disposal facility. The proposed co-disposal facility will be partially screened by existing vegetation. Due to distance neither the proposed co-disposal facility nor the existing mine stockpiles will be highly obvious. The existing mine stockpiles will be removed on mine closure.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M6
M36
R42
N12
BOTLENG
SUNDRA
R50
DELMAS
R555
ELOFF
DROOGFONTEIN
LEANDRA
N17
VISCHKUIL
SPRINGS
LEGEND
PROPOSED CO-DISPOSAL FACILITY
EXISTING MINE AREA
ZTV OF CO-DISPOSAL FACILITY (43.5)
ZTV OF EXISTING STOCKPILES
RIDGELINES
APPROXIMATE LIMIT OF VISIBILITY (23.6km)
MAIN ROADS
MINOR ROADS
SMALLHOLDINGS
FARMSTEADS
PROTECTED AREAS
URBAN AREAS
0 1.5 3 6 9 12 15 Kilometers
MAP 6 - ZTV OF STOCKPILES AND CO DISPOSAL
PROPOSED KANGALA CO DISPOSAL FACILITY
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5 IDENTIFIED AREAS OF IMPACT

5.1 VISUAL IMPACTS TO BE CONSIDERED

From the analysis, the following issues have been identified:

a) In the short term, during construction and operation, the proposed co-disposal facility is likely to intensify visual impacts on the rural landscape in which it is set particularly to the north, east and west of the mine;
b) In the long term and particularly during and after decommissioning, the proposed co-disposal facility will perpetuate the visual impacts associated with mining on the surrounding rural landscape;
c) In the short term, during construction and operation, the proposed co-disposal facility could intensify visual impacts associated with mining operations on receptors particularly those located to the to the north, east, south east and west including the eastern edge of Droogfontein, the southern edge of Eloff, the R555, the R42 (eastern section) and farmsteads;
d) In the long term and particularly during and after decommissioning, the proposed co-disposal facility will perpetuate the visual impact of mining on receptors to the north, south, east and west including the eastern edge of Droogfontein, the southern edge of Eloff, the R555, the R42 and farmsteads; and
e) The removal of existing mine stockpiles on mine closure will mean that cumulative visual impacts associated with mining will reduce significantly in the long term.

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 have been identified.

5.2 TIMING OF LIKELY VISUAL IMPACTS

Impact levels associated with the co-disposal facility alone are likely to gradually increase during the operational stage as the co-disposal facility increases in height and area and surrounding stockpiles reduce.

Cumulative visual impacts are however likely to reduce with time as adjacent stockpiles reduce and are eventually removed.

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),

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

5.4 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.

For the sake of the assessment the following phases have been considered:

- The construction phase will include the initial site preparation works;
- The operational phase will include the gradual formation of the co-disposal facility from the initial transportation and deposition of waste coal material to mine closure; and
- The decommissioning phase will include the period after mine closure when the applicant will need to undertake ongoing maintenance of the facility.

5.4.1 The proposed co-disposal facility could impact on the Rural Landscape Character surrounding the mine

a) Nature of Impact

In general terms the proposed co-disposal facility is likely to have a similar impact on landscape character as existing mine stockpiles. This will mean that it will approximately double the extent of stockpiles that are visible in the landscape. It is likely therefore that it will intensify the influence of mine stockpiles on the surrounding landscape. When existing stockpiles are removed at mine closure, the intensity of impact is likely to reduce again to current levels. This means that landscape character will be influenced by mining operations in-perpetuity.

b) 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 not of high quality, it seems unlikely that the issue will be raised as a significant concern.

In terms of cumulative effects, the proposed co-disposal facility will not change the character of views. It will however combine with adjacent mine stockpiles during the construction and operational phases to intensify current impacts on landscape character.

After decommissioning, visual impacts will reduce due to the reduction on operational mine stockpiles. Views of the proposed co-disposal facility will combine with views of existing similar facilities associated with other mining operations in the area to maintain the visual influence of mining on the area in-perpetuity.

During the construction phase, the impact will be associated with the addition of a new co-disposal facility will be relatively minor and is likely to include low level earthworks and drainage.

During the operational phase the co-disposal facility will progressively grow in height.

During and after decommissioning the stockpile associated with the proposed facility will remain in place whereas stockpiles associated with other mining operations will be removed as closure proceeds. It is possible however, that similar stockpiles associated with other mines in the area may also remain in the long term.

Mitigation measures considered include the flattening and grassing of side slopes. This is likely to marginally reduce impacts and should also reduce the extent of maintenance that is required in the long term to prevent the risk of erosion.

Table 9 - Visual Impact on Existing Landscape Character, Assessment Table

Impact Name	**Change of Landscape Character**				
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	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 possible that the impact will result in spatial and temporal cumulative 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	**Change of Landscape Character**				
Phase	**Operation**				
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	3	3
Duration of Impact	4	4	Probability	3	3
Environmental Risk (Pre-mitigation)					-8,25
Mitigation Measures					
See above					

Impact Name	Change of Landscape Character	
Environmental Risk (Post-mitigation)		-8,25
Degree of confidence in impact prediction:		Medium
Impact Prioritisation		
Public Response		1
Low: Issue not raised in public responses		
Cumulative Impacts		2
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is possible that the impact will result in spatial and temporal cumulative 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		-9,65

Impact Name	Change of Landscape Character				
Phase	**Decommissioning**				
Nature of Impact	-1	-1	Magnitude of Impact	2	1
Extent of Impact	3	3	Reversibility of Impact	4	4
Duration of Impact	5	5	Probability	3	3
Environmental Risk (Pre-mitigation)					-10,50
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					-9,75
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 possible 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
Final Significance					-9,75

5.4.2 The proposed co-disposal facility could impact on the edges of urban areas and adjacent main roads and homesteads that face towards the proposed facility

a) Nature of Impact

In general terms the proposed co-disposal facility is likely to have a similar impact and will be visible to the similar settlement areas, homesteads and roads as the

existing stockpiles associated with existing mining operations. This will mean that it will approximately double the extent of stockpiles that are visible to these receptors.

It is likely therefore that it will intensify the visual impact of mine stockpiles on current sensitive receptors. When existing stockpiles are removed at mine closure, the intensity of impact is likely to reduce again to current levels. This means that views will be influenced by mining operations in-perpetuity.

b) 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 not of high quality, it seems unlikely that the issue will be raised as a significant concern.

In terms of cumulative effects, the proposed co-disposal facility will not change the character of views. It will however combine with adjacent mine stockpiles during the construction and operational phases to intensify current impacts on landscape character.

After decommissioning, visual impacts will reduce due to the reduction on operational mine stockpiles. Views of the proposed co-disposal facility will combine with views of existing similar facilities associated with other mining operations in the area to maintain the visual influence of mining on the area in-perpetuity.

During the construction phase, the impact will be associated with the addition of a new co-disposal facility will be relatively minor and is likely to include low level earthworks and drainage.

During the operational phase the co-disposal facility will progressively grow in height.

During and after decommissioning the stockpile associated with the proposed facility will remain in place whereas stockpiles associated with other mining operations will be removed as closure proceeds. It is possible however, that similar stockpiles associated with other mines in the area may also remain in the long term.

Mitigation measures considered include the flattening and grassing of side slopes. This is likely to marginally reduce impacts and should also reduce the extent of maintenance that is required in the long term to prevent the risk of erosion.

Table 10 - Visual Impact on Urban Areas, Adjacent Roads and Homesteads, Assessment Table

Impact Name	**Impact on Urban Edge, Adjacent Roads and Homesteads**				
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	2	2

Environmental Risk (Pre-mitigation)	-2.00
Mitigation Measures	
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 possible that the impact will result in spatial and temporal cumulative 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 Urban Edge, Adjacent Roads and Homesteads**				
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	3	3
Duration of Impact	4	4	Probability	2	2
Environmental Risk (Pre-mitigation)					-8,25
Mitigation Measures					
See above					
Environmental Risk (Post-mitigation)					-8,25
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					2
Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is possible that the impact will result in spatial and temporal cumulative 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					-9,65

Impact Name	**Impact on Urban Edge, Adjacent Roads and Homesteads**				
Phase	**Decommissioning**				
Nature of Impact	-1	-1	Magnitude of Impact	2	1
Extent of Impact	3	3	Reversibility of Impact	4	4
Duration of Impact	5	5	Probability	3	3

Environmental Risk (Pre-mitigation)	-10,50
Mitigation Measures	
See above	
Environmental Risk (Post-mitigation)	-9,75
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 possible 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
Final Significance	-9,75

6 CONCLUSIONS

6.1 AREAS AND NATURE OF LIKELY VISUAL IMPACTS

The assessment indicates that the development of the proposed Co-Disposal Facility is highly unlikely to impact on sensitive or protected landscape areas.

The proposed Co-Disposal Facility could be visible for up to 23.6km.

The analysis indicates that the proposed Co-Disposal Facility will be visible over approximately the same area and to the same sensitive receptors as existing mine stockpiles associated with the Kangala Mine.

Because the proposed Co-Disposal facility will be of a similar scale and extent as existing mine stockpiles, it will approximately double the extent of stockpiles that will be visible to sensitive receptors particularly to the north, south east and west during the construction and operational phase of the project.

Due to screening of the proposed co-disposal facility during construction and operation provided by existing mine stockpiles and existing vegetation, the facility is likely to be at least partly screened from the east. north east and south west.

The proposed Co-Disposal Facility is therefore likely to intensify the influence of mining operations on the general landscape character of the area.

It could influence the character of views from 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 proposed facility could extend the visibility of stockpiles seen from the south eastern edge of Sundra. However, due to distance and intervening development and vegetation, the facility is highly unlikely to be visible from Sundra.

As mine closure occurs and existing stockpiles are reduced or removed for mine rehabilitation, the landscape character impacts and impacts on sensitive receptors are likely to reduce to approximately current levels.

It is likely that the closure of other mines in the area will also leave remnant stockpile areas of a similar scale as the proposed Co-Disposal Facility. In the long term therefore the proposed facility is unlikely to look out of place in the surrounding landscape that is still likely to bear the marks of mining activities in perpetuity.

The following areas of impact were therefore identified:

f) In the short term, during construction and operation, the proposed co-disposal facility is likely to intensify visual impacts on the rural landscape in which it is set particularly to the north, east and west of the mine;
g) In the long term and particularly during and after decommissioning, the proposed co-disposal facility will perpetuate the visual impacts associated with mining on the surrounding rural landscape;
h) In the short term, during construction and operation, the proposed co-disposal facility could intensify visual impacts associated with mining operations on receptors particularly those located to the to the north, south east and west

including the eastern edge of Droogfontein, the southern edge of Eloff, the R555, the R42 (eastern section) and farmsteads.

i) In the long term and particularly during and after decommissioning, the proposed co-disposal facility will perpetuate the visual impact of mining on receptors to the north, south, east and west including the eastern edge of Droogfontein, the southern edge of Eloff, the R555, the R42 and farmsteads.

The removal of existing mine stockpiles on mine closure will mean that cumulative visual impacts associated with mining will reduce significantly in the long term.

Refer to the table 13 below for the Landscape and Visual Impact Significance Ratings (with mitigation).

Table 11, Landscape & Visual Impact Significance Ratings

Landscape Character			Urban Areas, Farmsteads and Local Roads		
C -2.00	O -8.25	D **-9,75**	C -2.00	O -8.25	D **-9,75**

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

6.2 POSSIBLE MITIGATION

General activities around the co-disposal facility 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 to minimise risk of erosion

As the Co-Disposal Facility increases in size it will gradually become more obvious in the landscape. Its size will mean that screening will be difficult. In this situation, visual impact mitigation measures could involve methods to either site the project so that it is less visible from sensitive viewpoints or to reduce the level of visual contrast between the project and the surrounding landscape. This is typically achieved by changing the form, lines, colours, and/or textures of the proposed project elements to better match those of the surrounding landscape.

In terms of siting, the proposed facility will be located such that existing vegetation and infrastructure will help screen views particularly from the north-east, east and south-west. There are also a number of patches of vegetation that will soften the outline of the facility from other directions.

In terms of form, the facility has been designed to ensure that the anticipated quantity of material arising may be accommodated in the available area. The height of the proposed facility (43.5m) will mean that from areas that it is visible, it is likely to influence landscape character. The analysis indicates however that this influence is likely to be limited to approximately 7km. Reducing the height of the proposed facility is likely to result in it extending over a larger area but being visually obvious over a smaller area. This would mean that less area would be returned to productive use in the long term. Given the extent and location of other mining operations in the

area it is doubtful this measure would significantly reduce the influence of mining on landscape character in the long term

In terms of colour and texture, as designed, the facility should appear as an engineered stockpile with mid to dark grey outer slopes. The grassing of slopes may assist in blending the facility more readily with surrounding areas. This however would require the flattening of side slopes to 1V:5H which would also help to soften views of the facility. In terms of colour and as long as the facility remains free of erosion, this is only likely to have a significant mitigatory impact from close up and for more distant views when the sun is directly behind the viewer (from the east in the morning, north in the middle of the day and west in the late afternoon). This measure is also likely to result in a slightly larger footprint. In terms of visual implications alone it is however likely to be beneficial.

The most critical mitigation measure is to ensure that erosion of side slopes is prevented. The reduction of slope angles and grassing of slopes is likely to help this, however even if this is undertaken, ongoing maintenance is likely to be required.

6.3 RECOMMENDATION

Given the current nature of the affected landscape, the current relatively low levels of visual impact on sensitive receptors and the fact that in the long term the proposed project will not extend current levels of impact, there is no reason from a landscape and visual impact perspective that the project should not proceed as long as effective means of preventing erosion are implemented.

REFERENCES

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APPENDIX I
ASSESSROR'S BRIEF CURRICULUM VITAE

Name	JONATHAN MARSHALL
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Specialisation	Landscape Architecture / Landscape & Visual Impact Assessment / Environmental Planning / Environmental Impact Assessment.
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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
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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.

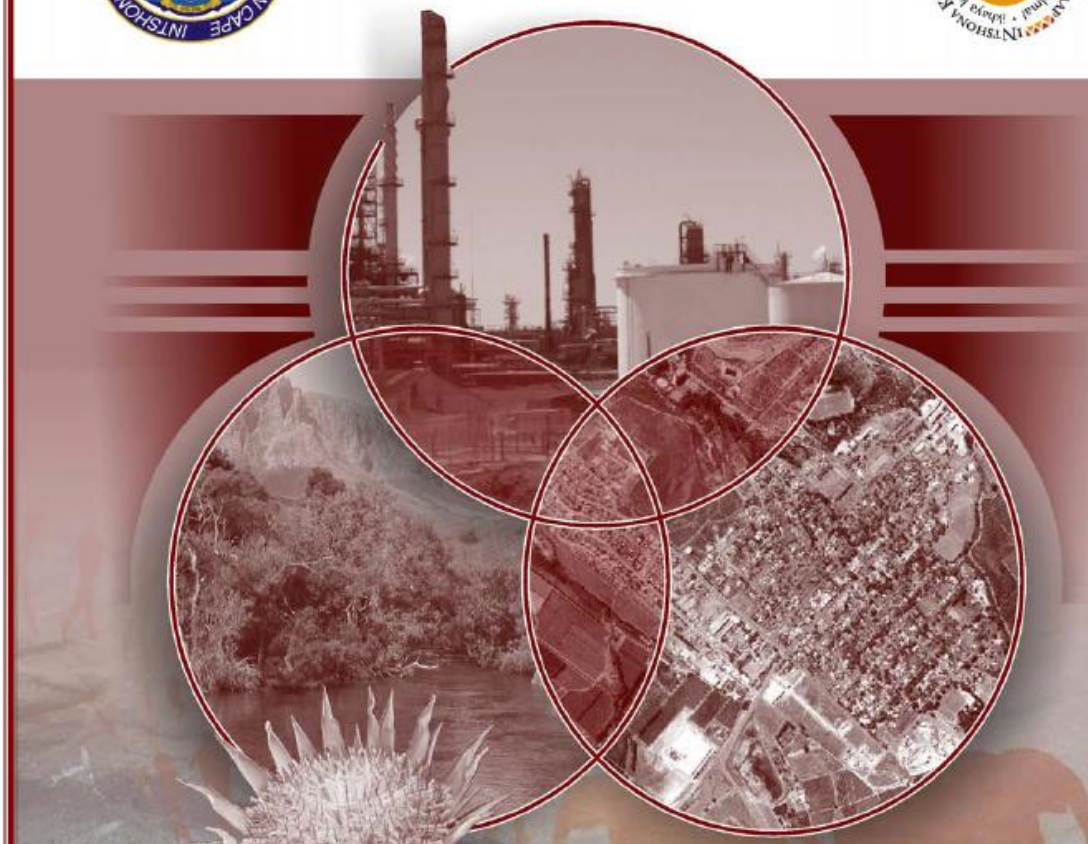
APPENDIX II

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



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GUIDELINE FOR INVOLVING VISUAL AND AESTHETIC SPECIALISTS IN EIA PROCESSES

Edition 1

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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.

Finalisation of report figures and formatting:

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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.

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	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.*

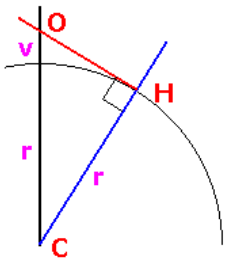
CONTENTS

APPENDIX III

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.