Eskom Holdings SOC Limited

PROPOSED NEW OLIFANTSHOEK 10MVA 132/11KV SUBSTATION, NORTHERN CAPE PROVINCE

VISUAL IMPACT ASSESSMENT REPORT

AUGUST 2017

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1 INTRODUCTION

1.1 GENERAL

This visual impact assessment (VIA) study forms part of the Basic Assessment that is being undertaken for the Proposed New Olifantshoek 10MVA 132/11KV Substation, Northern Cape Province by Savannah Environmental (Pty) Ltd on behalf of Eskom Holdings SOC Limited. This project is part of a network strengthening programme that includes a new 132kV power line to connect to the proposed new substation from the existing Emil Switching Station which is located some 31km to the north east of Olifantshoek. The proposed new power line is subject to a separate assessment process.

In terms of the EIA Regulations promulgated under the amended National Environmental Management Act (NEMA) Act No. 107 of 1998, the proposed development of the substation requires environmental authorisation. An impact to be assessed comprises the visual impact that the substation will have on surrounding areas.

The assessment is based on one site visit that was undertaken on the 23rd September 2016. The weather during the site visit was clear enabling long distance views which provided the assessor with a clear understanding of the likely maximum visibility of the proposed development and the likely implications for influencing the character of the affected landscape.

1.2 PROJECT LOCATION

The project is located in the Olifantshoek region of the Northern Cape Province, within ward 3 and ward 4 of the Gamagara Local Municipality, (Map 1: Locality Map).

Two substation location alternatives are under consideration both of which are located on the eastern edge of the town of Olifantshoek.

The approximate geographic coordinates for the alternative substation locations are;

PREFERRED SUBSTATION LOCATION			
South	27^0	55′	52.95″
East	22^0	44′	54.38″
ALTERNATIVE SUBSTATION LOCATION			
South	27^0	56′	11.27″
East	22^0	44′	28.95″

1.3 BACKGROUND OF SPECIALIST

Jon Marshall (Pr. LArch, CMLI, EAPSA, Dip LA) qualified as a Landscape Architect in 1978. He is also a certified Environmental Impact Assessment Practitioner. He has been involved in Visual Impact Assessment over a period of approximately 30 years. He has developed the necessary computer skills to prepare viewshed analysis (zone of theoretical visibility) and three dimensional modelling to illustrate impact assessments. He has undertaken visual impact assessments for major buildings, mining, industrial development, mining and infrastructure projects and has been

involved in the preparation of visual guidelines for large scale developments. Jon is responsible for report writing and the visual impact assessment.

Refer to **Appendix I** for brief Curriculum Vitae.

1.4 BRIEF AND RELEVANT GUIDELINES

The brief is to assess the visual impact that the facility will have on surrounding areas.

Work is to be 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), which is the only local relevant guideline, setting various levels of assessment subject to the nature of the proposed development and surrounding landscape, and

b. The Landscape Institute and Institute of Environmental Management and Assessment (UK) Guidelines for Landscape and Visual Impact Assessment which provides detail of international best practice (UK Guidelines).

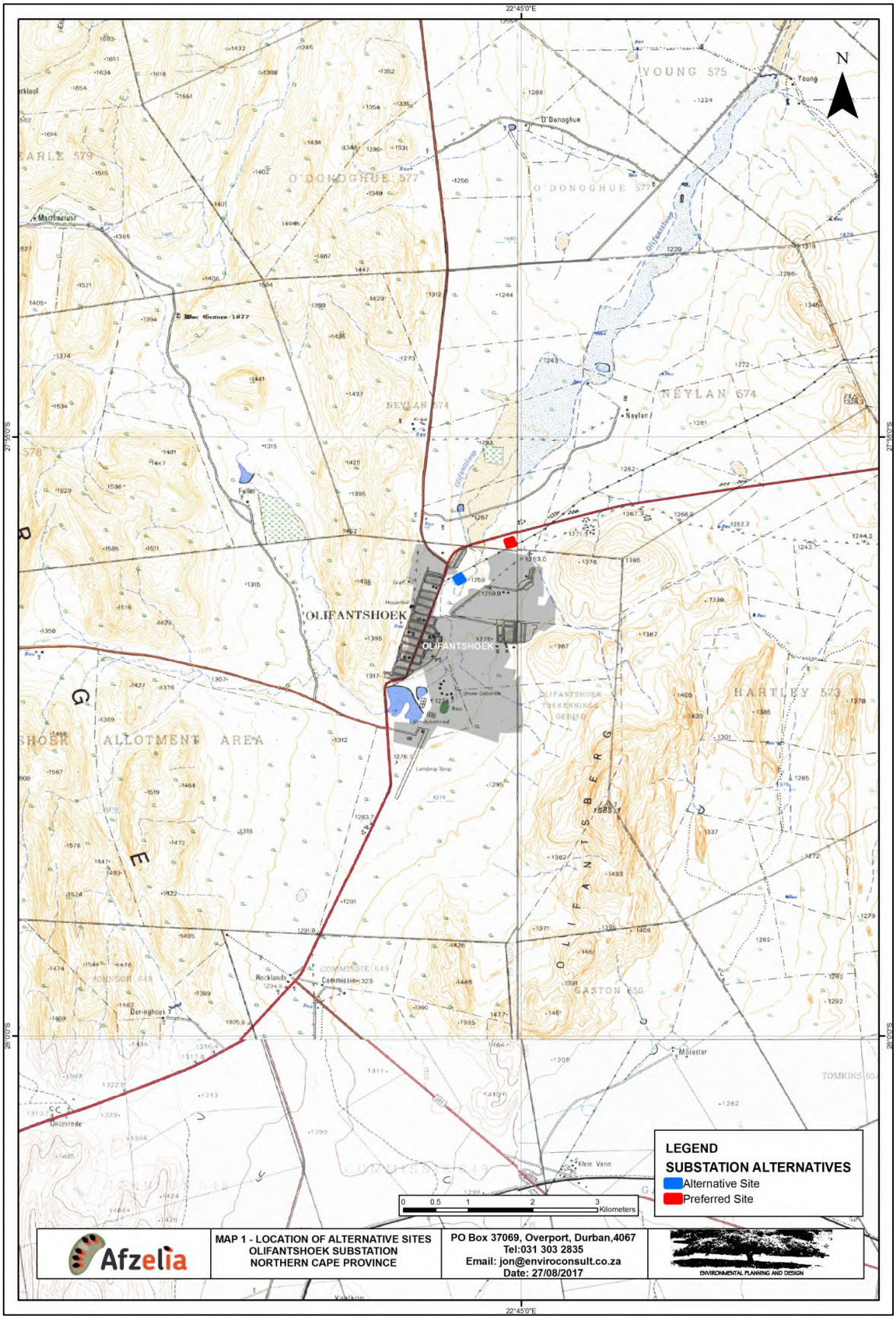
Refer to **Appendix II** for the Western Cape Guideline.

A Level 3 Assessment has been undertaken in accordance with the Western Cape Guidelines. This typically requires;

- Identification of issues raised and a site visit;
- Description of the receiving environment and the proposed project;
- Establishment of view catchment areas, 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.
- Review by independent, experienced visual specialist (if required).

This general methodology has been adopted in preparation of this assessment.

In accordance with the EIA regulations (GNR 327, 325 and 324 Appendix 6), there are specific requirements for the content of Specialist Reports. A checklist of these requirements is included as Appendix III. The checklist has been annotated to indicate the location of each required item within the report.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Neylan
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OLIFANTSHOEK
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ALLOTMENT AREA
HARTLEY 573
OLIFANTSBERG
GASTON 650
COMMISSIE 649
JOHNSON 648
Rocklands
Commissie 323
Doringhoek
Morester
Onlevrede
Klein Venn
LEGEND
SUBSTATION ALTERNATIVES
Alternative Site
Preferred Site
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Afzelia
MAP 1 - LOCATION OF ALTERNATIVE SITES
OLIFANTSHOEK SUBSTATION
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2. PROJECT DESCRIPTION AND CONTEXT

2.1 MOTIVATION

Eskom Holdings SOC Limited (Eskom) is proposing to establish a **substation** which will be used to increase customers Notified Maximum Demand (NMD) from 2.5MVA to 10 MVA as a provision for future developments within the Olifantshoek region.

2.2 PROJECT DESCRIPTION

The Olifantshoek Substation will be comprised of the following:

- A new 10MVA **on-site substation** (100m X 100m) to be constructed either adjacent to the existing 22/11kV Olifantshoek substation or in a new location in close proximity to Olifantshoek.
- The decommissioning of the existing 22/11kV Olifantshoek Substation

Substations generally have switching, protection and control equipment, and transformers.

The proposed substation will be located within a fenced enclosure.

Sub-station components and their functions

Equipment	Function
Transformers	To step-down or step-up voltage and transfer power from one current to another. The windings of such large transformers are immersed in transformer oil, which is a highly refined mineral oil that is stable at high temperatures and has excellent electrical insulating properties. Its functions are to insulate, suppress corona and arcing, and to serve as a coolant for transformers.
Circuit breakers	Automatic switching during normal or abnormal conditions
Feeder bay	Steelwork housing for circuits
Reactors	Equipment for the efficient operation of long transmission power lines as they compensate the voltage on power lines to avoid uncontrolled voltage rise, especially on lightly loaded lines
Isolators	Equipment for de-energising a circuit for maintenance and repair
Bus bars	Incoming and outgoing circuits of the same voltage tie into a common node called a busbar, which consists of a number of tubular conductors made of aluminium
Oil holding dams	For containment of accidental oil spills from transformers
Loop-in lines	Incoming power lines (connected to busbars)
Loop-out lines	Outgoing power lines (connected to busbars)
Telecommunication mast	Equipment used for remote communication with the sub-station
Buildings	Administrative office, control room, ablution blocks,

	equipment and storage areas
Lighting	For safety and security as well as for night-time emergency operations and maintenance

The highest elements within a substation are generally the bus bars that facilitate the transfer of electrical current into and out of the facility. These are likely to be in the order of 10 – 15m high.

The proposed substation will have a footprint of approximately of ± 100 m x 100 m.

Two alternative locations have been identified for the proposed substation, including;

- Approximately 500m east of the urban area of Olifantshoek and 50m south of the N14. This is considered to be the preferred substation location.
- Approximately 30m to the east of the existing Olifantshoek substation. This location has development around it and might be considered to be within the developed area. This is considered to be the alternative substation location.

The existing Olifantshoek substation will be decommissioned on completion of the new proposed substation.

Refer to Map 1 for the alternative substation locations.

TYPICAL ELEMENTS INCLUDED IN THE PROJECT

Plate 1 - Sub-station Bus Bars maximum height 10-15m

Plate 2 – Transformer with oil storage tank above.

Plate 3 - Sub-station & Communication Tower

3 DESCRIPTION OF RECEIVING ENVIRONMENT AND POSSIBLE RECEPTORS

3.1 LANDSCAPE CHARACTER

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

The landscape surrounding the site is arid, comprising relatively flat drainage plains with rocky outcrops of the Langberg to the east.

The general land use in the area appears to be agricultural and specifically low intensity grazing interspersed with isolated homesteads. The alternative sites are located close to or within the eastern urban edge of Olifantshoek. There is therefore a significant urban influence.

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

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

From the site visit the following characteristics have been identified.

3.1.1 Landform and Drainage

Both alternative substation sites are be located within the rocky terrain of the Langberg. This rugged topography could help to screen longer views of the development.

Refer to Map 2, Landform and Drainage.

3.1.2 Nature of Development and Land Uses

The population density of the area immediately surrounding the proposed development varies.

Kathu is the largest town and Olifantshoek is the second largest town of five towns within the Gamagara Local Municipality. However both are relatively small towns. At the 2011 census, the municipality had a total population of approximately 41,617 people approximately 71% of which are based in urban areas.

The area of the Municipality is 2,619km^2.

Rural homesteads were found to have an average occupancy of 3.5 people. This means that there is a rural homestead for approximately every 0.75km^2.

Given the province's dry conditions and dependence on irrigation, many Northern Cape farmers are branching out into value-added activities such as game farming. This is apparent in rural areas surrounding the area as low intensity grazing appears to be mixed with game farming, hunting operations and bush lodges.

Olifantshoek is primarily a rural service centre. It is likely also that a proportion of its economy is derived from local mining operations as well as its position on the N14 as it acts as a transit stop for travellers including tourists.

Apart from agriculture, mining is the largest industrial activity in the area.

From a detailed perspective, it is important to note that the Alternative Substation location is within an area of alien vegetation which lies within the urban area. This site has housing development approximately 250m to the south, 50m to the north and 130m to the west.

The preferred site is located to the east of the urban area. It also has settlement in the form of an informal area approximately 130m to the west.

The majority of the affected area outside Olifantshoek is identified as "Natural". This is largely comprised of rural areas that are used for low intensity grazing. Due to the nature of the land use, it appears relatively natural.

Refer to Map 3, Landuse.

3.1.3 Vegetation Patterns

According to Mucina & Rutherford (2006), the proposed substation alternatives are located within a relatively natural area. The vegetation types include;

- Koranna-Langeberg Mountain Bushveld
- Kathu Bushveld

Both vegetation types are usually open tree and shrub cover with a sparse grass layer.

From observations on site, the tree layer is often above eye level.

Visual implications include;

- Where the viewer is amongst natural vegetation, it is possible that there will be a degree of screening provided by the natural vegetation.
- Where the viewer is set back from natural vegetation or where ground elevation provides a slightly elevated overview of the landscape, the extent of screening provided by natural vegetation is likely to be limited.

Within and around the town of Olifantshoek, vegetation patterns have been highly modified. Within the main street and adjacent gardens there are many taller trees and shrubs that tend to limit visibility. The area around the town has also been degraded by human activity which has had the effect of reducing indigenous tree and shrub cover. In some areas, this has had the effect of opening up longer views than might be possible within more natural areas. In other areas it has resulted in the development of alien invasive species that have the effect of increasing screening.

This has the following visual implications for the project;

- The existing urban area is likely to provide a degree of screening for the development;
- Development of the preferred substation site is likely to be largely hidden from inside the town but visible to the eastern urban edge and the N14; and

- The alternative substation is likely to be most visible to urban areas to the north, south and west of it. Views from the N14 are likely to be limited due to surrounding development.

Refer to Map 4, Vegetation Types.

3.1.4 Landscape Character Areas, Visual Absorption Capacity (VAC) and Significance

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

The overriding character differentiating factors within the subject landscape appear to be landform /drainage and development.

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.

The landform appears to divide the landscape into three discrete areas including;

a) **The Upland Landscape Character Area** associated with the Langsberg on the valley sides which largely contain the development. This area is incised by minor valleys and is generally covered by natural thorn veld. Settlement is sparse and consists of isolated homesteads. The area is primarily important for agricultural production, however, it also provides a variety of environments for ecotourism activities. It also provides a backdrop to the lowland landscape. VAC due to landform is likely to be relatively high.
b) **The Valley Bottom Landscape Character Area** which is comprised of the valley floor around the Langsberg and to the north and east of Olifantshoek**.** This generally consists of relatively flat topography that is covered with natural thorn veld. Low intensity grazing is the predominant agricultural activity. In these areas landowners have diversified into game farming, hunting and bush lodges. Scattered homesteads are apparent in the landscape. VAC is likely to be relatively low due to the flat topography, however, vegetation is likely to limit views of the development.
c) **The Urban Landscape Character Area,** particularly the urban area of Olifantshoek, can be characterised by dense urban development. This area is primarily important as a living environment for residents. VAC within the settlement is likely to be high due to vegetation and buildings. On the edges of the settlement however VAC may be reduced due to the degraded nature of natural vegetation.

The LCAs are indicated on **Map 5, Landscape Character Areas.**

3.2 VISUAL RECEPTORS

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

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 that include the urban area of Olifantshoek.
- Point Receptors that include homesteads that are scattered throughout the area. It is likely that the focus for this area is agricultural production. Unless farms have diversified into the tourism market it is unlikely that this group of receptors will be overly sensitive to the likely landscape change as long as it does not impact on agricultural productivity.
- Linear Receptors that include the N14 and or local routes through the area. The N14 is a primary tourism route. Local routes surrounding the development are likely to be mainly used by local people and relate to agricultural activities.

Visual receptors that were identified on site are indicated on Map 5.

LANDSCAPE CHARACTER AREAS

Plate 4, Urban Landscape Character Area

LANDSCAPE CHARACTER AREAS

Plates 5, Valley Bottom Landscape Character Area

Plate 6, Upland Landscape Character Area

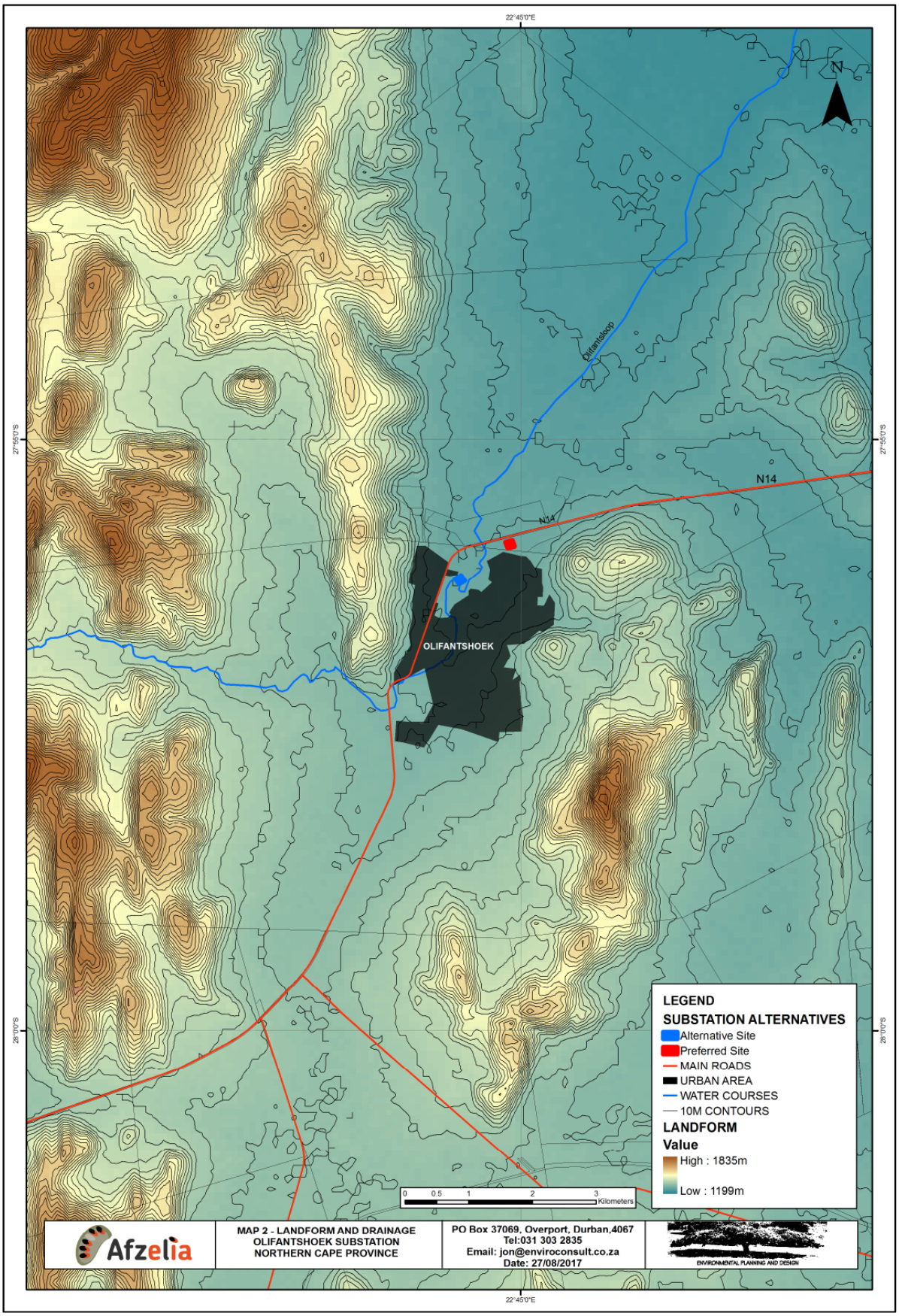
POSSIBLE SENSITIVE RECEIVERS

Plate 7, Houses in the Urban Area close to Substation Alternative Site

Plate 8, Rural Homesteads.

POSSIBLE SENSITIVE RECEIVERS

Plate 9, The N14.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N14
N14
OLIFANTSHOEK
LEGEND
SUBSTATION ALTERNATIVES
Alternative Site
Preferred Site
MAIN ROADS
URBAN AREA
WATER COURSES
10M CONTOURS
LANDFORM
Value
High : 1835m
Low : 1199m
0 0.5 1 2 3
Kilometers
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MAP 2 - LANDFORM AND DRAINAGE
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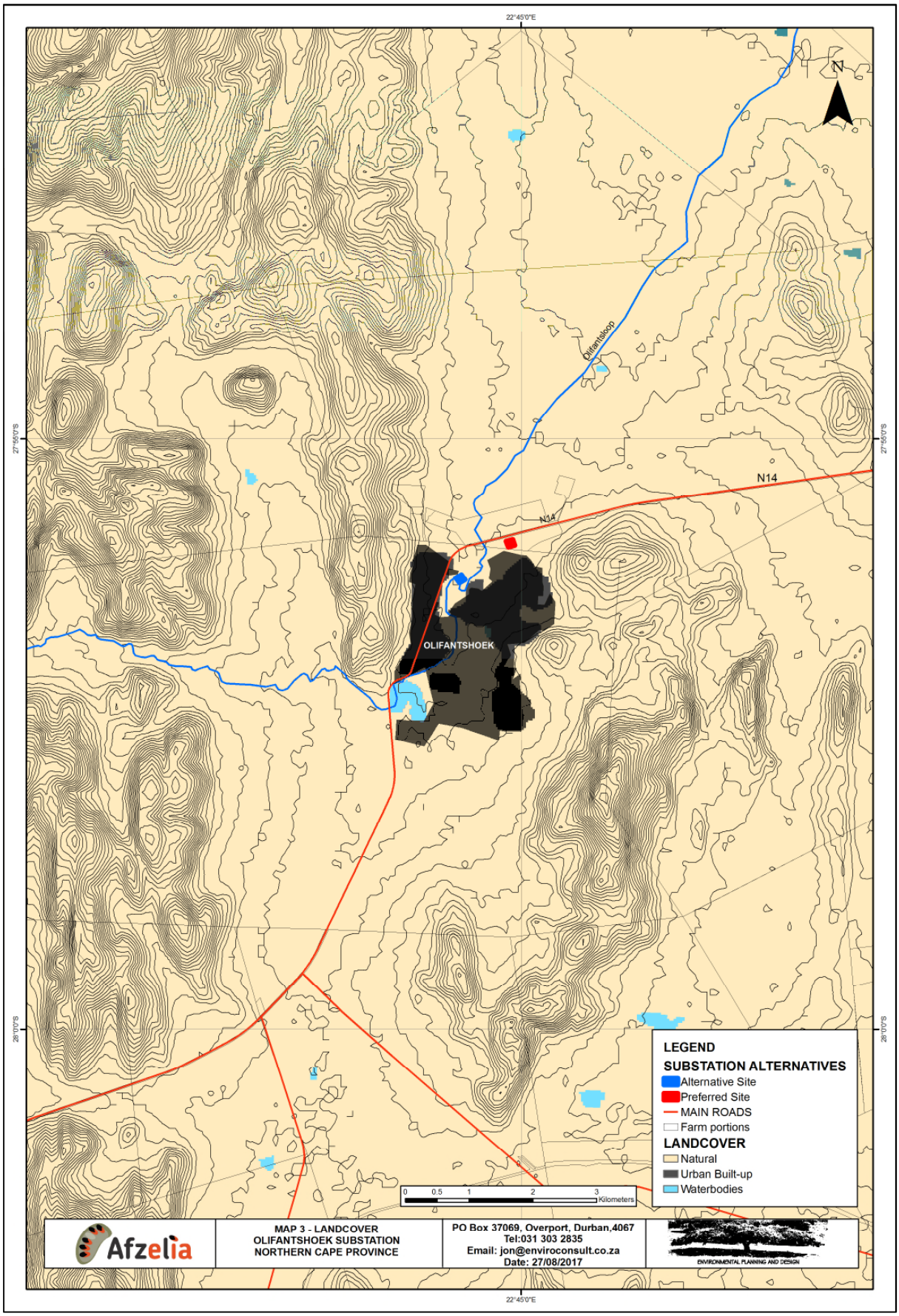
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OLIFANTSHOEK
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SUBSTATION ALTERNATIVES
Alternative Site
Preferred Site
MAIN ROADS
Farm portions
LANDCOVER
Natural
Urban Built-up
Waterbodies
0 0.5 1 2 3
Kilometers
Afzelia
MAP 3 - LANDCOVER
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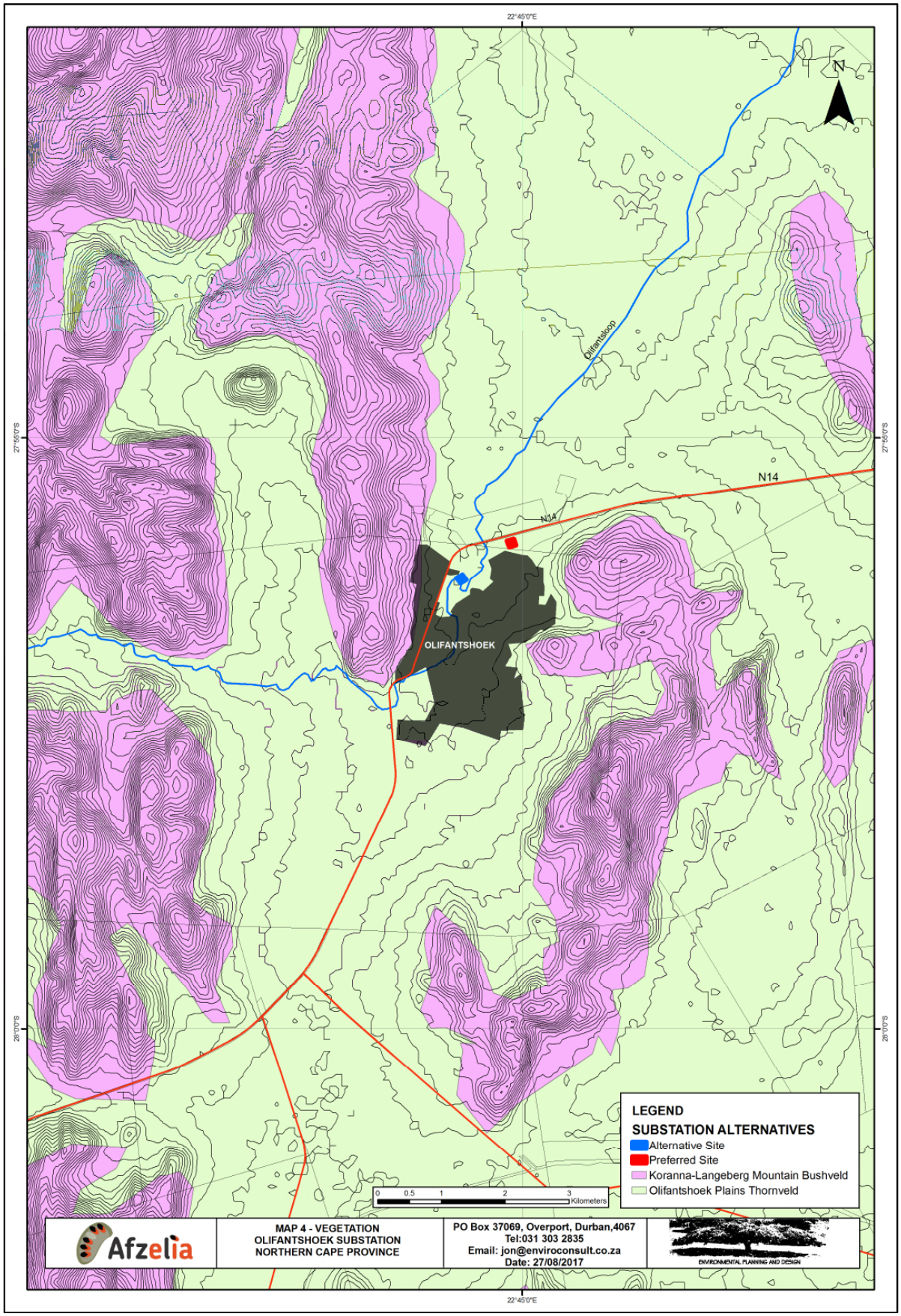
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SUBSTATION ALTERNATIVES
Alternative Site
Preferred Site
Koranna-Langeberg Mountain Bushveld
Olifantshoek Plains Thornveld
0 0.5 1 2 3
Kilometers
Afzelia
MAP 4 - VEGETATION
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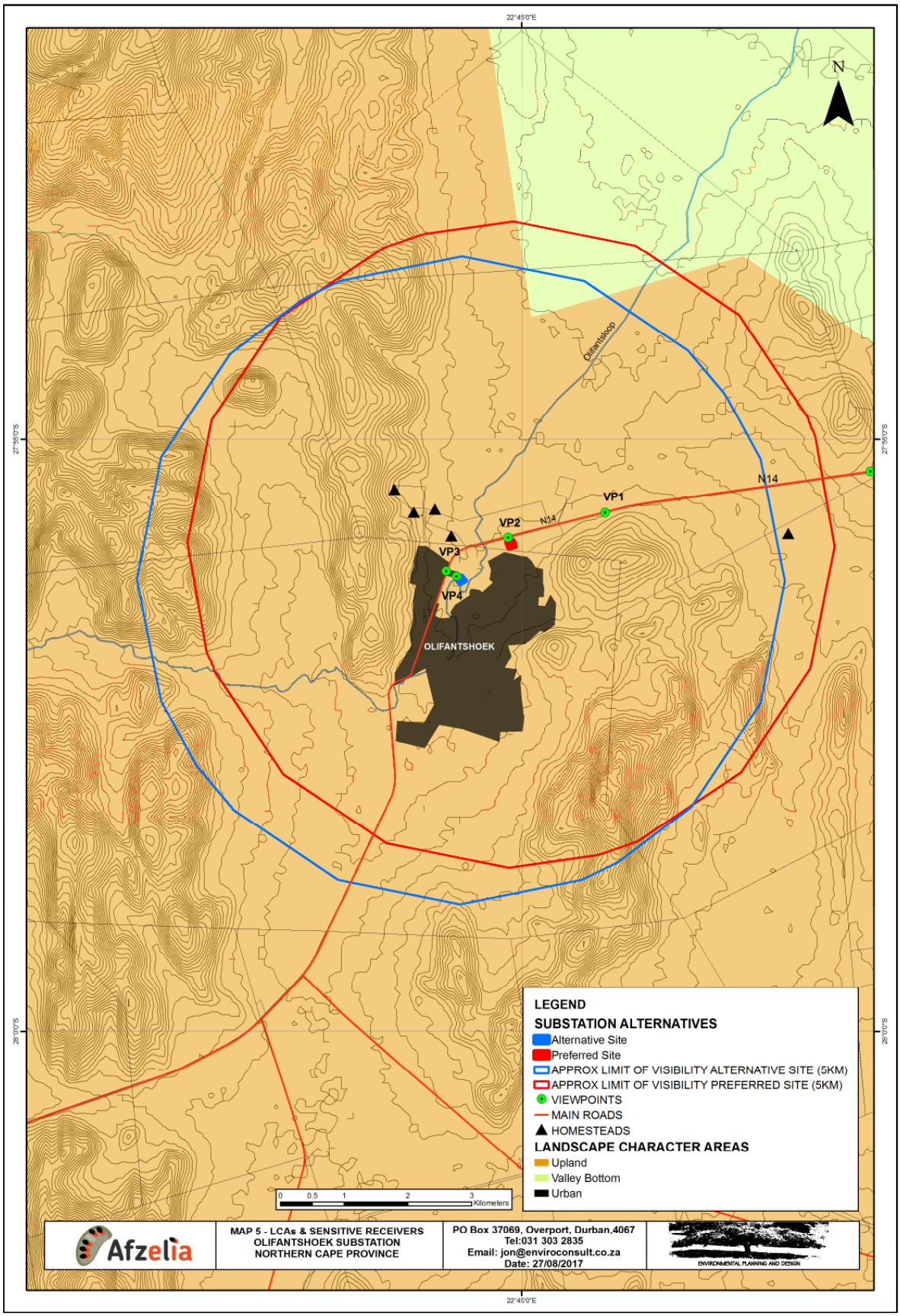
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OLIFANTSHOEK
LEGEND
SUBSTATION ALTERNATIVES
Alternative Site
Preferred Site
APPROX LIMIT OF VISIBILITY ALTERNATIVE SITE (5KM)
APPROX LIMIT OF VISIBILITY PREFERRED SITE (5KM)
VIEWPOINTS
MAIN ROADS
HOMESTEADS
LANDSCAPE CHARACTER AREAS
Upland
Valley Bottom
Urban
0 0.5 1 2 3 Kilometers
Afzelia
MAP 5 - LCAs & SENSITIVE RECEIVERS
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4 THE NATURE OF POTENTIAL VISUAL IMPACTS

4.1 GENERAL

Impacts could include general degradation of the Landscape Character Areas due to the development that may 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 areas or for general enjoyment of an area. This is generally assessed by the breaking down of a landscape into components that make up the overall character and understanding how proposed elements may change the balance of the various elements. The height, mass, form and colour of new elements all help to make new elements more or less obvious as does the structure of an existing landscape which can provide screening ability or texture that helps to assimilate new elements. This effect is known as visual absorption capacity.
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.
    - 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 SUBSTATION IMPACTS

The construction process will include the following activities;

- Vegetation clearance – removal or cutting of any vegetation if present (bush cutting);
- Levelling and grading of the substation area. This will involve the use of large earthmoving and compaction equipment;
- Civils work including the construction of concrete bases, ducting, roads and treatment of the bulk of the substation area which may include soil poisoning and the laying of crushed stone;

- Building work which will include the construction of minor buildings and fences.
- Installation works which include the installation and energising of electrical equipment.

Initial activities are only likely to be visible from the immediate vicinity of the site and particularly from adjacent roads. During the latter half of the construction period as larger steel structures are erected, the facility will become obvious over a wider area.

Visual implications of development of the proposed substation can be gauged from viewing existing infrastructure.

Plates 1 to 3 inclusive indicate the nature of views of the various elements from close range where detail is visible and industrial nature of the steel structures is obvious.

From a distance however, due to the transparency of a large proportion of the structures, the influence of a substation generally reduces. **Plate 10** indicates a view of the existing Hector Substation near Hammersdale. This indicates that from a distance of 1.5 – 2km the impact has reduced significantly. The detail of the majority of equipment is not obvious and the eye generally reads the stronger colours associated with vegetation and landform. Other than the extent of the compound, the most obvious elements are the pylons that support conductors linking into and out of the substation.

The proposed substation is significantly smaller than the Hammersdale facility. The principle noted above is likely to apply equally to the proposed facility in that it is likely to be obvious for a similar distance.

Plate 10, Distance view (1.5-2.0km) of the existing Hammersdale 400kV Substation. Note the 400kV pylons entering the site are the most obvious elements

It is possible that the substation will be lit for security and maintenance reasons.

Floodlighting may be used on high masts.

When it is on, it will provide a pool of bright light within the yard. This will be obvious from a distance as a pool of bright light. It is possible that if the floodlighting is not designed appropriately that there will be light spillage outside the yard area. It is also possible if lighting is not orientated correctly that bulbs will be obvious from surrounding areas causing glare to affect sensitive receivers.

It is also possible that the boundary of the site will be lit with security lights mounted on low poles that will run around the site.

It is therefore likely that lighting could make the substation highly obvious at night. Lighting will be visible intermittently from surrounding areas.

Subject to the light fittings selected and the lighting design it is also possible for glare from tall mast lighting and security lighting to spill into surrounding areas.

The preferred substation location is located to the north east of the urban area between the N14 and the urban edge. It is unlikely to be highly conspicuous during day light hours however at night lighting may make it obvious.

The alternative substation location is slightly to the east of the existing substation which is within the urban area and close to existing houses. It is likely that it will be obvious to residents. There is however sufficient space to use screen planting to provide a degree of mitigation.

5 VISIBILITY OF THE PROPOSED DEVELOPMENT

5.1 ZONES OF THEORETICAL VISIBILITY

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

ZTVs of the proposed development have been assessed using Arc Spatial Analyst GIS.

The assessment is based on terrain data that has been derived from satellite imagery. This data was originally prepared by NASSA 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 an online mapping programme.

Whilst the ZTV has been calculated from terrain data only, existing vegetation and development could have a significant modifying effect on the areas indicated.

Refer to Map 6 Zones of Theoretical Visibility. It should be noted that;

- The ZTV of development on the preferred Site is indicated in red;
- The ZTV of development on the Alternative Site is indicated in blue; and
- Where the ZTVs of the Preferred and Alternative Sites overlap, the coverage has been made transparent, the common area between the ZTVs is indicated in purple.

5.2 ASSESSMENT LIMIT

The GIS based assessment of Zones of Theoretical Visibility does not take the reduction in scale due to distance into account.

As indicated in Section 4, from observations of substations and incoming overhead power lines, due to the visual mass of associated structures, the proposed 10MVA substation, it is unlikely to be obvious at a distance greater than 2.5 – 3.0km and is unlikely to be visible at a greater distance than 5km. Outside of this limit it is still possible that the project may be visible, however it is unlikely that there will be noticeable impact.

The assessment therefore focuses on an area within 5.0km of the proposed development. This limit is indicated on Maps 5 and 6 in order to provide reference for the reader.

5.3 APPROACH TO THE ASSESSMENT

5.3.1 ZTV for Proposed Alternatives

Map 6 indicates the ZTV Analysis for all the proposed substation alternatives.

A 5km buffer is indicated to highlight the area within which the alternative substation locations are likely to be visible.

Whilst the ZTV analysis is a useful indicator of likely general areas of impact and because of subtle differences in locations as well as the proximity of a small number of

receptors to the proposed development it is important that the development is considered in more detail.

Map 7 indicates the alternative substation locations as they affect the urban edge of Olifantshoek.

General conclusions are therefore drawn from the ZTV analysis with more detailed assessment focusing on Map 7.

5.4 VISIBILITY OF DEVELOPMENT ALTERNATIVES

5.4.1 General

From the ZTV analysis, the following conclusions can be drawn;

a) The analysis indicates that both substation alternatives are likely to be visible over similar areas. It also indicates that visibility is focused by landform in a band running approximately north east to south west. The screening effects of vegetation and development are likely to further limit visibility.
b) Visual impacts are likely to affect both the Urban LCA and the Upland LCA.

5.4.3 Alternative Substation Locations.

a) The existing substation is located close to existing houses in the centre of the settlement and close to the substation alternative location. Whilst the substation alternative location is located slightly further from existing houses than the existing substation, the new facility will be approximately four times the area than the existing facility and will be in close proximity to houses (approximately 80m). It is therefore likely to impact on residents. This alternative is likely to be largely hidden from the N14 but they will impact the residential area.
b) The Preferred Alternative is located on the eastern fringes of Olifantshoek, approximately 130m from an area of existing informal settlement and 60m from the N14. There is therefore potential for the facility to be visible from the N14 and the adjacent informal settlement area. However, existing trees will help to mitigate impacts. It is also possible that mitigation in the form of screen planting may be undertaken.

5.5 CUMULATIVE IMPACTS

As the proposed substation is larger than the existing substation, development of the alternative site which is close to the existing substation has the potential to intensify visual impacts on the urban area.

As the Preferred Site is more removed from the urban area than the existing substation and the Alternative, development of this site has the potential to have a positive cumulative impact on the urban area.

The Preferred Substation has the potential to create new views of a substation from the N14.

5.6 KEY VIEWPOINTS

Key viewpoints that are adjudged to provide an indication of typical views towards the proposed development and are representative of views of the identified visual receptors / LCAs are located on **Map 6**. Photographs from these viewpoints are indicated in **Plates 16 to 26** inclusive.

The viewpoints include;

1. **VP1 (Plate 11)** is located on the N14 looking west towards Olifantshoek approximately 1.4km from the Preferred Location for the Substation. Due to existing vegetation, it is unlikely that the preferred substation will be obvious until the viewer is almost opposite it on the road.
2. **VP2 (Plate 12)** is located on the N14 looking to the south directly at the site of the Preferred Substation Location. The substation will be set back from the road approximately 60m. In the mid distance informal settlement can be seen. The Preferred Substation will be approximately 80m from this. It is likely that the substation will be visible from the road as the viewer approaches the viewpoint. There is space to include screen planting to divert views from and soften impacts associated with the substation.
3. **VP3 (Plate 13)** is located on the N14 within the town of Olifantshoek looking to the east towards the Alternative Substation site. The existing substation is slightly closer to the viewpoint and is just visible through the road side vegetation. The Alternative Substation may also be visible. It should be noted however that this is the only viewpoint on the urban section of the road from which the existing substation is visible and views of the substation structures are softened considerably by vegetation.
4. **VP4 (Plate 14)** looking west towards the existing Olifantshoek Substation. Existing residential development to the right of the substation and behind the substation should be noted. The line of trees that run across the image behind the substation includes garden vegetation as well as street trees beside the N14.
5. **VP4 (Plate 15)** looking east away from the existing substation. The Alternative Substation is to the right of the image in the area of alien vegetation. It should be noted that residential properties pictured in Plate 9 are located adjacent to the viewpoint out of shot. Subject to the use that the land on which the existing substation is located after it is decommissioned, it is possible that this alternative could result in reduced visual impact for local residents. It does however have the potential to maintain current levels of impact.

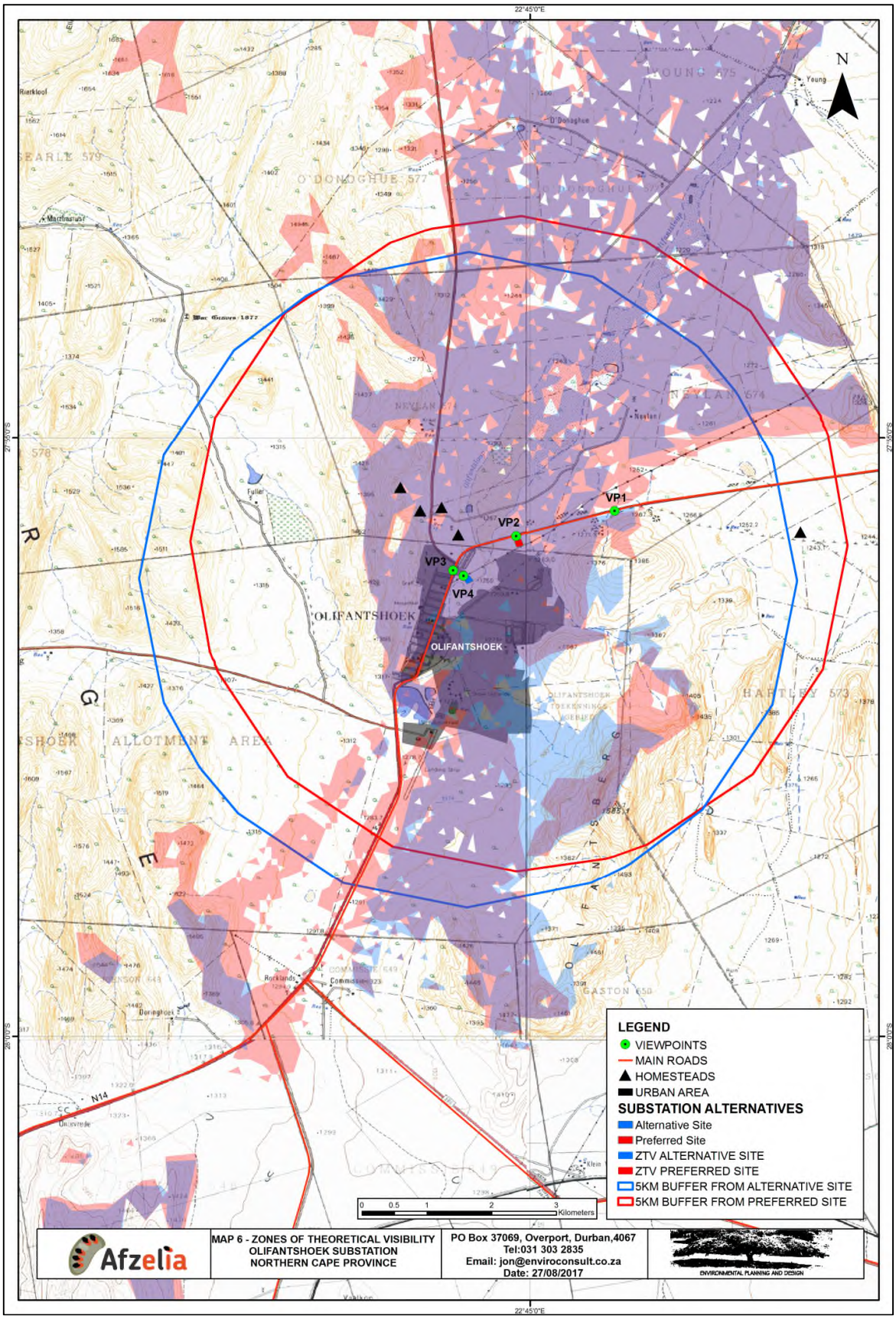
Plate 11 – VP1 located on the N14 looking east towards Olifantshoek approximately 1.4km from the preferred substation location.

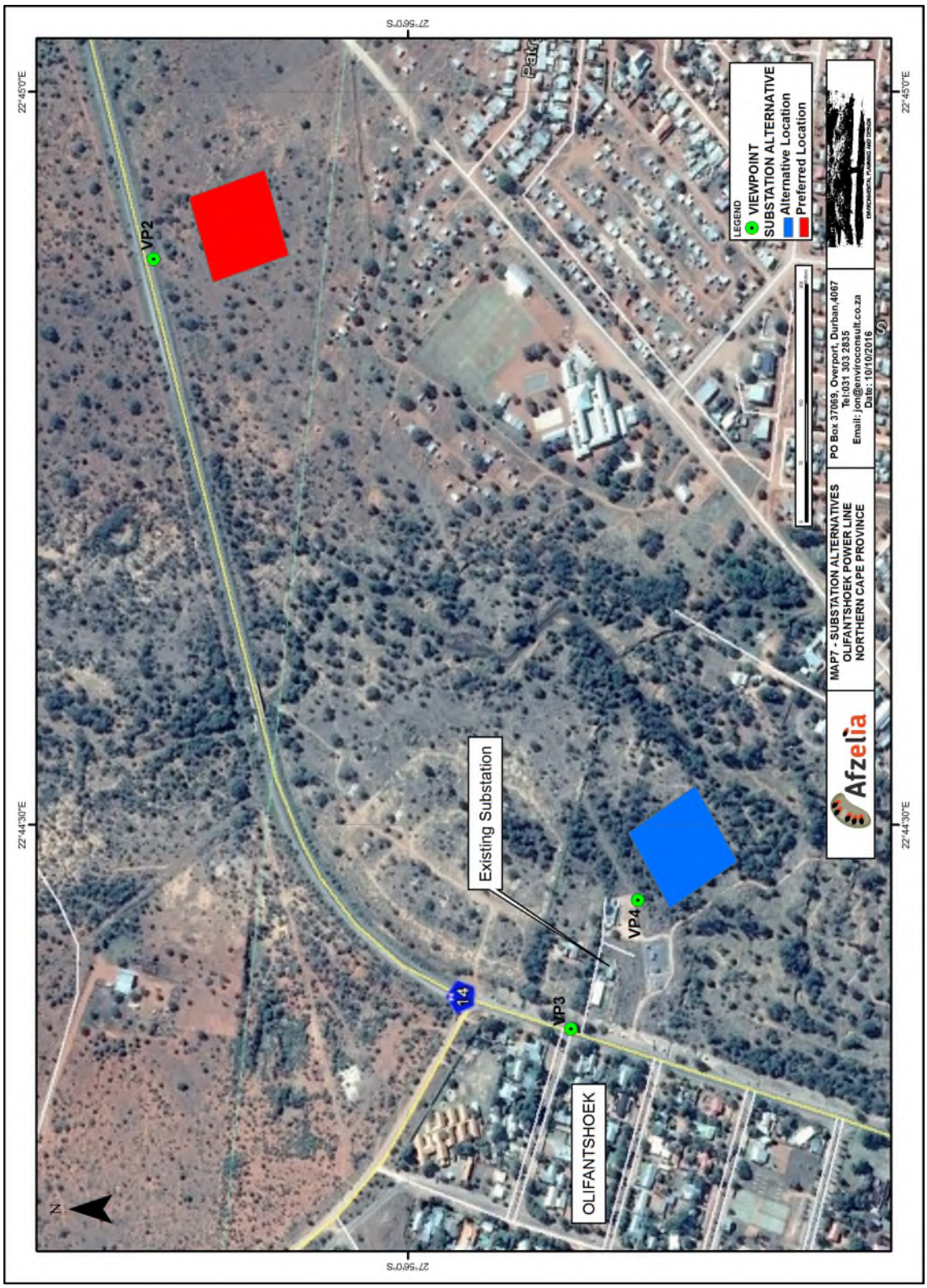
Plate 12 – VP2 located on the N14 looking to the south directly at the site of the preferred substation site.

Plate 13 – VP3 located on the N14 within the town of Olifantshoek looking to the east towards the alternative substation site.

Plate 14 – VP4 looking west towards the existing substation.

Plate 15 – VP4 looking east away from the existing substation.


22°45'0"E
27°50'0"S
28°0'0"S
N
VP1
VP2
VP3
VP4
OLIFANTSHOEK
OLIFANTSHOEK
ALLOTMENT AREA
N14
LEGEND
VIEWPOINTS
MAIN ROADS
HOMESTEADS
URBAN AREA
SUBSTATION ALTERNATIVES
Alternative Site
Preferred Site
ZTV ALTERNATIVE SITE
ZTV PREFERRED SITE
5KM BUFFER FROM ALTERNATIVE SITE
5KM BUFFER FROM PREFERRED SITE
0 0.5 1 2 3
Kilometers
Afzelia
MAP 6 - ZONES OF THEORETICAL VISIBILITY
OLIFANTSHOEK SUBSTATION
NORTHERN CAPE PROVINCE
PO Box 37069, Overport, Durban,4067
Tel:031 303 2835
Email: jon@enviroconsult.co.za
Date: 27/08/2017
ENVIRONMENTAL PLANNING AND DESIGN


27°56'0"S
22°45'0"E
22°44'30"E
VP2
VP3
VP4
Existing Substation
OLIFANTSHOEK
N14
N
LEGEND
VIEWPOINT
SUBSTATION ALTERNATIVE
Alternative Location
Preferred Location
MAP7 - SUBSTATION ALTERNATIVES
OLIFANTSHOEK POWER LINE
NORTHERN CAPE PROVINCE
Afzelia
PO Box 37069, Overport, Durban,4067
Tel:031 303 2835
Email: jon@enviroconsult.co.za
Date: 10/10/2016

6 VISUAL IMPACT ASSESSMENT

6.1 ASSESSMENT METHODOLOGY

The previous section of the report identified specific areas where visual impacts may occur. This section will quantify these impacts in their respective geographical locations and in terms of the identified issues (see Section 1.5).

The methodology for the assessment of potential visual impacts includes:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
    - local extending only as far as the development site area – assigned a score of 1;
    - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
    - will have an impact on the region – assigned a score of 3;
    - will have an impact on a national scale – assigned a score of 4; or
    - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
    - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
    - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
    - medium-term (5–15 years) – assigned a score of 3;
    - long term (> 15 years) - assigned a score of 4; or
    - permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
    - 0 is small and will have no effect on the environment;
    - 2 is minor and will not result in an impact on processes;
    - 4 is low and will cause a slight impact on processes;
    - 6 is moderate and will result in processes continuing but in a modified way;
    - 8 is high (processes are altered to the extent that they temporarily cease); and
    - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
    - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
    - Assigned a score of 2 is improbable (some possibility, but low likelihood);
    - Assigned a score of 3 is probable (distinct possibility);
    - Assigned a score of 4 is highly probable (most likely); and
    - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The *degree* to which the impact can be *mitigated.*

- The **significance** is determined by combining the criteria in the following formula:
    - S=(E+D+M)P; where S = Significance weighting, E = Extent, D = Duration, M = Magnitude, P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

6.2 ASSESSMENT

The following assessment focuses first on general landscape change that will occur due to the proposed development which provides context for the assessment of impacts on identified sensitive receptors. Key receptors that are considered include;

- Homesteads;
- Travellers on the N14; and
- Residents of Olifantshoek.

It should be noted that the impacts identified are likely to gradually increase from the current situation to the impact level indicated during the construction phase, be consistent at the impact levels indicated during the operation phase and decrease again from the levels indicated to close to the current situation during the decommissioning phase.

6.2.1 Impact of the Proposed Development on General Landscape Character

Nature of impact: Degradation of the character of the existing landscape. This is particularly relevant to existing natural and urban areas (Upland LCAs) where there is a possibility that the development could introduce industrial components.		
	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, **(2)**	Immediate surroundings, **(2)**
Duration	**Both Substation Alternatives** Long term, **(4)**	Long term, **(4)**
Magnitude	**Alternative Substation Location** Moderate, **(6)** **Preferred Substation Location** Low, **(4)**	Low, **(4)** Minor, **(2)**
Probability	**Alternative Substation Location** Highly probable, **(4)** **Preferred Substation Location** Probable, **(3)**	Probable, **(3)** Improbable, **(2)**
Significance	**Alternative Substation Location** Medium, **(48)**	Medium, **(30)**

	Preferred Substation Location Medium, **(30)**	Low, **(16)**
Status	The character of the urban and rural landscape will be changed. It is likely that the influence of industrial elements will not be highly obvious to the majority of people. It is likely that the majority of people will not consider the sight of a substation as a negative impact. **Neutral - negative**	**Neutral - negative**
Irreplaceable loss	**No irreplaceable loss**	**No irreplaceable loss**
Can impacts be mitigated?	**Yes**	

Mitigation / Management:

» Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.
» Ensure that vegetation is not unnecessarily removed during the construction period.
» Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources.
» Plan and implement screening for the substation.
» Plan to use motion sensor triggered lighting at the substation.
» Ensure that lighting is focused on the development with no light spillage outside the site.
» Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities

Residual Risks:
Lack of rehabilitation on decommissioning is likely to result in landscape degradation.

6.2.2 Impact of the Proposed Development on Identified Sensitive Receptors

Potential visual impacts on sensitive receptors that have been identified through the site visit include;

a) The visibility of the facility to and visual impact on local homesteads.
b) The visibility of the facility to and visual impact on the N14.
c) The visibility of the facility to and visual impact on urban residential areas.
d) The impact of lighting.

a) The visibility of the facility to and visual impact on rural homesteads.

Nature of impact:
The substation alternative site is located approximately 580m from the closest homestead, however there is urban development between the homestead and the proposed site.

The preferred site is located approximately 750m from the closest homestead. Existing vegetation is sufficiently dense that whilst glimpses of the development may be possible through the trees, the bulk of the development will be screened.		
	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, **(2)**	Immediate surroundings, **(2)**
Duration	**Both Substation Alternatives** Long Term, **(4)**	Long Term, **(4)**
Magnitude	**Alternative Substation Location** Small, **(0)** **Preferred Substation Location** Low, **(4)**	Small, **(0)** Small, **(0)**
Probability	**Alternative Substation Location** Very improbable, **(1)** **Preferred Substation Location** Improbable, **(2)**	Very improbable, **(1)** Very improbable, **(1)**
Significance	**Alternative Substation Location** Low, **(6)** **Preferred Substation Location** Low, **(20)**	Low, **(6)** Low, **(6)**
Status	It is likely that the majority of people will not consider a small partial view of a substation as a negative intrusion. **Neutral to negative.**	**Neutral to negative.**
Irreplaceable loss	**No irreplaceable loss**	**No irreplaceable loss**
Can impacts be mitigated?	**Yes *Mitigation / Management:***	
• Ensure that vegetation is not unnecessarily removed. • Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities. • Reduce and control construction dust using approved dust suppression techniques as and when required. • Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts along the servitude. • Rehabilitate all disturbed areas immediately after the completion of maintenance works. • Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish. • Screen planting that was specifically established to minimise the intrusiveness of the substation must be maintained and dead or sick plants replaced for a determinate period after construction and throughout operation.		
Residual Risks: Lack of rehabilitation on decommissioning is likely to result in degraded areas.		

b) The visibility of the facility to and visual impact on the N14.

Nature of impact: The proposed substations are likely to be visible to the N14. The Alternative Location will be located away from the road but a short view will be

possible through vegetation and buildings.
The Preferred Location will be located closer to the road on the urban edge. Existing vegetation is likely to result in views of this alternative only being obvious as the viewer is close to and opposite the facility but without additional mitigation the full extent of the substation is likely to be open to view from a short section of road parallel to the site.

	Without mitigation	With mitigation
Extent	**Both Substation Alternatives** Immediate surroundings, **(2)**	Immediate surroundings, **(2)**
Duration	**Both Substation Alternatives** Long term, **(4)**	Long term, **(4)**
Magnitude	**Substation Alternative Location** Small to minor, **(1)** **Substation Preferred Location** Low, **(4)**	Small, **(0)** Minor, **(2)**
Probability	**Substation Alternative Location** Improbable, **(2)** **Substation Preferred Location** Probable, **(3)**	Improbable, **(2)** Improbable, **(2)**
Significance	**Substation Alternative Location** Low, **(14)** **Substation Preferred Location** Medium, **(30)**	Low, **(12)** Low, **(16)**
Status	The character of the rural landscape adjacent to the affected section of the N14 will be modified. It is likely that the majority of people will not consider the sight of a substation close to the road on the urban edge as a negative intrusion. **Neutral to negative**	**Neutral to negative**
Irreplaceable loss	**No irreplaceable loss**	**No irreplaceable loss**
Can impacts be mitigated?	**Yes**	

Mitigation / Management:

- Ensure that vegetation is not unnecessarily removed.
- Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities.
- Reduce and control construction dust using approved dust suppression techniques as and when required.
- Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts along the servitude.
- Rehabilitate all disturbed areas immediately after the completion of maintenance works.
- Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish
- Screen planting that was specifically established to minimise the intrusiveness

of the substation must be maintained and dead or sick plants replaced for a determinate period after construction and though out operation.
Residual Risks: Lack of rehabilitation on decommissioning is likely to result in degraded areas.

c) The visibility of the facility to and visual impact on urban residential areas.

Nature of impact:
The Alternative Substation Location is located within the urban area close to existing homes.

The Preferred Substation Location is located approximately 80m from and will be visible to a small number of dwellings within an existing informal area on the edge of Olifantshoek.

	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, **(2)**	Immediate surroundings, **(2)**
Duration	**Both Substation Alternatives** Long term, **(4)**	Long term, **(4)**
Magnitude	**Alternative Substation Location** Low, **(4)** **Preferred Substation Location** Low to minor, **(3)**	Minor to low, **(3)** Minor, **(2)**
Probability	**Alternative Substation Location** Probable, **(3)** **Preferred Substation Location** Probable, **(3)**	Probable, **(3)** Improbable, **(2)**
Significance	**Alternative Substation Location** Medium, **(30)** **Preferred Substation Location** Low, **(27)**	Low, **(27)** Low, **(16)**
Status	It is likely that the majority of people will consider the sight of a large substation in close proximity to a residential area as a negative impact. **Negative**	**Negative**
Irreplaceable loss	**No irreplaceable loss**	**No irreplaceable loss**
Can impacts be mitigated?	**Yes**	

Mitigation / Management:

- Ensure that vegetation is not unnecessarily removed during the operation or maintenance period.
- Restrict the activities and movement of workers and vehicles during maintenance and operation of the site and make use of existing access roads.
- Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities.
- Reduce and control construction dust using approved dust suppression

techniques as and when required.

- Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts along the servitude.
- Rehabilitate all disturbed areas immediately after the completion of maintenance works.
- Maintain the general appearance of the servitude as a whole
- Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish
- Screen planting that was specifically established to minimise the intrusiveness of the substation must be maintained and dead or sick plants replaced for a determinate period after construction and though out operation.

Residual Risks:
Lack of rehabilitation on decommissioning is likely to result in degraded areas.

d) Lighting Impacts.

Nature of impact:
Lighting may be associated with the substation in the form of flood lighting and / or possibly security lighting.

The area within which the substations are located are either close to (Preferred Location) or within the urban area (Alternative Location). The issue of light pollution within an otherwise dark night time landscape is therefore not relevant.

More relevant however, it's the possibility that lighting could cause a nuisance to neighbours.

No specific detail has been provided regarding lighting of the substation. However observations on site and reference to **Plate 25** indicates that the existing substation is floodlit.

	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings **(2)**	Immediate surroundings **(2)**
Duration	**Both Substation Alternatives** Long term **(4)**	Long term **(4)**
Magnitude	**Alternative Substation Location** Low **(4)** **Preferred Substation Location** Minor, **(2)**	Minor, **(2)** Small, **(0)**
Probability	**Alternative Substation Location** Probable **(3)** **Preferred Substation Location** Improbable, **(2)**	Improbable, **(2)** Very improbable, **(1)**
Significance	**Alternative Substation Location** Medium **(30)** **Preferred Substation Location** Low **(16)**	Low, **(16)** Low, **(6)**
Status	Light spill that impacts on a residential area is likely to be	If the lights are generally not impacting on a residential

	seen by affected parties as a negative impact. **Negative.**	area then the impact is likely to be seen is neutral. **Neutral.**
Irreplaceable loss	No irreplaceable loss.	No irreplaceable loss
Can impacts be mitigated?	Yes	
Mitigation / Management: • All lighting, especially perimeter security lighting at the substation must be shielded to minimise light spillage and pollution. No direct light sources must be seen from outside the site. • Plan to implement motion sensor triggered lighting; • Ensure that lighting is focused on the development with no light spillage outside the site		
Residual Risks: No residual risk has been identified.		

6.2.3 CUMULATIVE IMPACTS

a) General landscape change and degradation of natural / urban landscape characteristics.

Nature of impact:
The affected urban area is also currently affected by existing electrical infrastructure including LV cables and an existing substation.

The proposed substation Alternative Location will increase the extent of electrical infrastructure that is obvious within the urban area. The Preferred Alternative will largely impact the urban fringe / Upland LCA.

	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, **(2)**	Immediate surroundings, **(2)**
Duration	**Both Substation Alternatives** Immediate surroundings, **(4)**	Long term, **(4)**
Magnitude	**Alternative Substation Location** Low, **(4)** **Preferred Substation Location** Low, **(4)**	Minor, **(2)** Minor, **(2)**
Probability	**Alternative Substation Location** Highly probable, **(4)** **Preferred Substation Location** Probable, **(3)**	Probable, **(3)** Improbable, **(2)**
Significance	**Alternative Substation Location** Medium, **(40)** **Preferred Substation Location** Medium, **(30)**	Low, **(24)** Low, **(16)**
Status	Negative	Negative
Reversibility	High	High

Loss of Resources?	No	No
Confidence in findings	High	
Can impacts be mitigated?	Yes	

Mitigation / Management:

Planning and construction:

- Plan and implement screening for the substation.
- Ensure that the use of the decommissioned substation site is consistent with residential use.
- Rehabilitate decommissioned substation site and construction disturbance.

Operational:

- Maintain screen planting around the substation

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site.
- Rehabilitate disturbed areas.

b) The visibility of the facility to, and potential visual impact on rural homesteads.

Nature of impact:

The substation alternative site is approximately 580m from the closest homestead, however there is urban development between the homestead and the proposed site.

The preferred site is approximately 750m from the closest homestead. Existing vegetation is sufficiently dense, that whilst glimpses of the development may be possible through the trees, the bulk of the development will be screened. This small impact will be seen in the context of other urban development, the N14 and a 132kV power line.

	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, **(2)**	Immediate surroundings, **(2)**
Duration	**Both Substation Alternatives** Long Term, **(4)**	Long Term, **(4)**
Magnitude	**Alternative Substation Location** Small, **(0)** **Preferred Substation Location** Low, **(4)**	Small, **(0)** Small, **(0)**
Probability	**Alternative Substation Location** Very improbable, **(1)** **Preferred Substation Location** Improbable, **(2)**	Very improbable, **(1)** Very improbable, **(1)**
Significance	**Alternative Substation Location** Low, **(6)** **Preferred Substation Location** Low, **(20)**	Low, **(6)** Low, **(6)**
Status	**Neutral to negative.**	**Neutral to negative.**
Reversibility	High	High
Loss of Resources?	No	No

Confidence in findings	High
Can impacts be mitigated?	Yes

Mitigation / Management:

Planning and construction:

- Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.
- Ensure that vegetation is not unnecessarily removed during the construction period.
- Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources.
- Plan and implement screening for the substation.
- Plan to use motion sensor triggered lighting at the substation.
- Ensure that lighting is focused on the development with no light spillage outside of the site.
- Rehabilitate disturbed areas.
- Ensure that vegetation is not unnecessarily removed.
- Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities.
- Reduce and control construction dust using approved dust suppression techniques as and when required.
- Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts along the servitude.
- Rehabilitate all disturbed areas immediately after the completion of maintenance works.
- Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish.
- Screen planting that was specifically established to minimise the intrusiveness of the substation must be maintained and dead or sick plants replaced for a determinate period after construction and though out operation.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site.
- Rehabilitate disturbed areas.

c) The visibility of the facility to, and potential visual impact on the N14.

Nature of impact:

The proposed substations are likely to be visible to the N14. The Alternative Location is away from the road but a short view will be possible of it through vegetation and buildings. This is likely to be similar in extent to the existing substation and so cumulative impacts are likely to be low

The Preferred Location is closer to the road outside of the urban edge. Existing vegetation is likely to result in views of this alternative only being obvious as the viewer is close to and opposite the facility but without additional mitigation the full extent of the substation is likely to be open to view for a short section of the road. The proposed substation will extend the views of development as seen from the N14.

	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, **(2)**	Immediate surroundings, **(2)**
Duration	**Both Substation Alternatives**	

	Long term, **(4)**	Long term, **(4)**
Magnitude	**Alternative Substation Location** Small, **(0)** **Preferred Substation Location** Low, **(4)**	Low, **(4)** Small, **(0)**
Probability	**Alternative Substation Location** Improbable, **(2)** **Preferred Substation Location** Probable, **(3)**	Improbable, **(2)** Improbable, **(2)**
Significance	**Alternative Substation Location** Low, **(12)** **Preferred Substation Location** Medium, **(30)**	Low, **(20)** Low, **(12)**
Status	Negative	Negative
Reversibility	High	High
Loss of Resources?	No	No
Confidence in findings	High	
Can impacts be mitigated?	Yes	

Mitigation / Management:

Planning and construction:

- Rehabilitate disturbed areas.
- Undertake screen planting particularly for the Preferred Site.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site.
- Rehabilitate disturbed areas.

d) The visibility of the facility to, and potential visual impact on urban residential areas.

Nature of impact:

The Alternative Substation Location is within the urban area close to existing homes. The proposed development is significantly larger than the existing substation that it will replace. It will therefore increase the cumulative impact on the residential area.

The Preferred Substation Location is located approximately 80m from and will be visible to a small number of dwellings within an existing informal area on the edge of Olifantshoek. The development will also result in the removal of the existing substation from within the residential area. It is likely therefore that this alternative will result in a positive cumulative impact.

	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, **(2)**	Immediate surroundings, **(2)**
Duration	**Both Substation Alternatives** Long term, **(4)**	Long term, **(4)**
Magnitude	**Alternative Substation Location** Low, **(4)**	Minor to low, **(3)**

	Preferred Substation Location Low, **(4)**	Moderate, **(6)**
Probability	**Alternative Substation Location** Probable, **(3)** **Preferred Substation Location** Probable, **(3)**	Probable, **(3)** Highly probable, **(4)**
Significance	**Alternatives Substation Location** Medium, **(30)** **Preferred Substation Location** Medium, **(30)**	Low, **(27)** Medium, **(48)**
Status	**Alternatives Substation Location** Negative **Preferred Substation Location** Positive	Negative Positive
Reversibility	High	High
Loss of Resources?	No	No
Confidence in findings	High	
Can impacts be mitigated?	Yes	

Mitigation / Management:

Planning and construction:

- Implement screen planting for substations.
- Rehabilitate decommissioned substation

Operations:

- Maintain screen planting around substations.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site.
- Rehabilitate disturbed areas.

e) Lighting impacts.

Nature of impact:

Lighting impacts are likely to be associated with nuisance caused by light spill from the substation lighting.

The existing substation located close to the Alternative Substation Location already has floodlighting. The existing substation that is to be decommissioned is also located closer to existing houses than the Alternative Site.

Because the Preferred Site is outside the urban area, it is likely that positive cumulative impacts could be associated with it.

If planned appropriately, it is also possible that positive impacts could be associated with the Alternative Substation Location if appropriate mitigation is undertaken.

	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, **(2)**	Immediate surroundings, **(2)**
Duration	**Both Substation Alternatives**	

	Long term, **(4)**	Long term, **(4)**
Magnitude	**Alternative Substation Location** Small, **(0)** **Preferred Substation Location** Small, **(0)**	Minor to low, **(3)** Moderate, **(6)**
Probability	**Alternative Substation Location** Probable, **(3)** **Preferred Substation Location** Probable, **(3)**	Probable, **(3)** Probable, **(3)**
Significance	**Alternative Substation Location** Low, **(18)** **Preferred Substation Location** Low, **(18)**	Low, **(27)** Medium, **(36)**
Status	**Alternative Substation Location** Negative **Preferred Substation Location** Positive	Positive Positive
Reversibility	High	High
Loss of Resources?	No	No
Confidence in findings	Medium	
Can impacts be mitigated?	Yes	
Mitigation / Management: Planning and construction: • Plan to implement motion sensor triggered lighting; • Ensure that lighting is focused on the development with no light spillage outside the site.		

7 IMPACT STATEMENT

7.1 LANDSCAPE CHARACTER

The affected landscape can be divided into the Lowland and Upland LCAs that are both relatively natural and the Urban LCA of Olifantshoek.

Both the Lowland and Upland LCAs are covered by relatively open thorn veld which will provide limited visual absorption capacity.

The Upland LCA has significantly greater visual absorption capacity due to the relatively rugged terrain.

The urban LCA is currently impacted by an existing substation which is located close to an existing residential area.

No protected areas are likely to be affected.

7.2 PROPOSED DEVELOPMENT

Two substation alternative sites are considered. The Preferred Location is on the eastern edge of the urban area and close to the southern edge of the N14. The alternative site is located within the urban area close to the existing Olifantshoek substation which will be decommissioned on completion of the project.

7.3 IDENTIFIED SENSITIVE RECEIVERS

The following sensitive receivers have been identified;

a) Local rural homesteads;
b) The N14 as it passes through Olifantshoek; and
c) The urban area of Olifantshoek which will largely be affected due to the proximity of the substation alternatives.

7.4 VISUAL IMPACT AND MITIGATION POTENTIAL

The Alternative Site is close to the centre of the urban area and also close to the existing substation that will be decommissioned on completion of the project. There is potential for existing visual impacts associated with electrical infrastructure to be replaced and possibly increased with this alternative.

The Preferred Location is on the eastern urban fringe of the settlement and will largely be visible to an area of informal settlement and to the N14.

There appears to be space around both substation alternatives to provide mitigation with screen planting.

The assessment found that the Alternative Location is likely to result in a visual impact levels of low to medium significance and the Preferred Location is likely to result in a visual impact levels of low significance without mitigation. After mitigation both impact levels are likely to reduce and will fall within the low category.

Potential lighting impacts are also associated with the proposed substation. The issue is likely to relate to nuisance for neighbours due to light spill from floodlighting. This impact however may be mitigated by lighting design and by ensuring that lighting is triggered by a motion sensor so that it is only turned on when necessary.

7.5 CUMULATIVE IMPACT

Because the proposed project will result in the decommissioning of the existing Olifantshoek substation which is located close to the centre of the urban area with homes in close proximity, with sensitive development and by ensuring that the old substation site is put to a use that is compatible with adjacent residential use, there is potential for the development to result in a positive cumulative impact in terms of its influence on the urban area. This positive effect is likely to be most obvious with the Preferred Site as this will ensure that the facility is located further from residents.

7.7 CONCLUSION

When considering the substation locations, the Preferred Location stands out as providing the largest potential to provide positive impacts for the urban area in that it will replace the existing substation which currently impacts on dwellings with a substation that is further removed from the urban area. This will reduce both lighting and daytime impacts on settlement.

The Alternative Location would be acceptable subject to adequate mitigation in the form of screen planting providing a buffer between the infrastructure and residents.

Both alternatives are likely to have minimal impact on local rural homesteads.

It is possible that the development of the preferred site could result in the substation being visible to the N14. However existing vegetation will limit this impact to a short section of the road. It is also possible to further mitigate this impact with screen planting.

If the preferred site is developed the project will be unlikely to have any significant visual impacts and thus can be considered acceptable from a visual perspective.

REFERENCES

Guidelines for involving visual and aesthetic specialists in EIA processes, Author; Bernard Oberhozer. Published by the Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning, 2005

Guidelines for landscape and visual impact assessment (third edition), authors; the Landscape Institute and Institute of Environmental Assessment and Management, published by E & FN Spon, 2013.

Manual of Environmental Appraisal, UK Department of Transport, 1992

Visual Impact Assessment Guidebook, Second Edition. Province of British Colombia. January 2001

APPENDIX I

SPECIALIST'S BRIEF CV

ENVIRONMENTAL PLANNING AND DESIGN

Name	JONATHAN MARSHALL
Nationality	British
Year of Birth	1956
Specialisation	Landscape Architecture / Landscape & Visual Impact Assessment / Environmental Planning / Environmental Impact Assessment.

Qualifications

Education	Diploma in Landscape Architecture, Gloucestershire College of Art and Design, UK (1979) Environmental Law, University of KZN (1997)
Professional	Registered Professional Landscape Architect (South Africa) Chartered Member of the Landscape Institute (UK) Certified Environmental Assessment Practitioner of South Africa. Member of the International Association of Impact Assessment, South Africa

Languages	English	- Speaking	-	Excellent
		- Reading	-	Excellent
		- Writing	-	Excellent

Contact Details

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Westville
3630
Republic of South Africa

Phone: +27 31 2668241, Cell: +27 83 7032995

Key Experience

Jon qualified as a Landscape Architect (Dip LA) at Cheltenham (UK) in 1979. He has also been a Certified Environmental Assessment Practitioner of South Africa since 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 a major supermarket chain and prepared CAD based visual impact assessments for public enquiries for new green field 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 Bill.

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 eighteen months includes assessments for proposed new mine developments in Ghana and Guinea, numerous solar plant projects for Eskom and private clients, proposed wind farm development and a proposed tourism development within the Isimangaliso Wetland Park World Heritage Site .

Jon has also had direct experience of working with UNESCO representatives on a candidate World Heritage Site and has undertaken VIAs within and adjacent to other World Heritage Sites.

Relevant Visual Impact Assessment Projects

1. **Isundu Sub- Station Development -** Visual impact assessment for a mnew major sub – station in KwaZulu Natal for Eskom.
2. **Bhangazi Lake Tourism Development** – Visual impact assessment for a proposed lodge development within the Isimangaliso Wetland Park World Heritage Site. This work is ongoing.
3. **Quarry Development for the Upgrade of Sani Pass –** Visual Impact Assessments for two proposed quarry developments on the edge of the uKhalamba-Drakensburg World Heritage Site.
4. **Mtubatuba to St Lucia Overhead Power Line** – Visual Impact Assessment for a proposed power line bordering on the Isimangaliiso Wetland Park World Heritage Site for Eskom.
5. **St Faiths 400/132 kV Sub-Station and Associated Power Lines** - Visual Impact Assessment for a proposed new major sub-station and approximately 15km of overhead power line for Eskom.
6. **Clocolan to Ficksburg Overhead Power Line** – Visual Impact Assessment for a proposed power line for Eskom.
7. **Solar Plant Projects including Photovoltaic and Concentrating Solar Power Plants** – Numerous projects for Eskom and private clients in the Northern Cape, Limpopo, Mpumalanga and the Free State.
8. **Moorreesburg Wind Farm.** Visual impact assessment for a proposed new wind farm in the Western Cape.
9. **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.
10. **Camperdown Industrial Development** - Visual Impact Assessment for proposed new light industrial area to the north o Camperdown for a private client.
11. **Wild Coast N2 Toll Highway** – Peer review of VIA undertaken by another consultant.
12. **Gamma to Grass Ridge 765kv transmission line** – Peer review of VIA undertaken by another consultant.
13. **Gateway Shopping Centre Extension (Durban)** – Visual Impact Assessment for a proposed shopping centre extension in Umhlanga, Durban.
14. **Kouroussa Gold Mine (Guinea)** – Visual impact assessment for a proposed new mine in Guinea working with SGS as part of their EIA team.
15. **Mampon Gold Mine (Ghana)** - Visual impact assessment for a proposed new mine in Ghana working with SGS as part of their EIA team.
16. **Telkom Towers** – Visual impact assessments for numerous Telkom masts in KwaZulu Natal
17. **Dube Trade Port, Durban International Airport** – Visual Impact Assessment for a new international airport.
18. **Sibaya Precinct Plan** – Visual Impact Assessment as part of Environmental Impact Assessment for a major new development area to the north of Durban.
19. **Umdloti Housing** – Visual Impact Assessment as part of Environmental Impact Assessment for a residential development beside the Umdloti Lagoon to the north of Durban.

20. **Tata Steel Ferrochrome Smelter** - Visual impact assessment of proposed new Ferrochrome Smelter in Richards Bay as part of EIA undertaken by the CSIR.
21. **Diamond Mine at Rooipoort Nature Reserve near Kimberley** – Visual impact assessment for a proposed diamond mine within an existing nature reserve for De Beers.
22. **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.
23. **Hillside Aluminium Smelter, Richards Bay -** Visual Impact Assessment of proposed extension of the existing smelter. The project utilised 3d computer visualisation techniques.
24. **Estuaries of KwaZulu Natal Phase 1 and Phase 2 –** 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.
25. **Signage Assessments** – Numerous impact assessments for proposed signage developments for Blast Media.
26. **Signage Strategy** – Preparation of an environmental strategy report for a national advertising campaign on National Roads for Visual Image Placements.
27. **Zeekoegatt, Durban** - Computer aided visual impact assessment. 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.
28. **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.
29. **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.
30. **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.
31. **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.
32. **Southgate Industrial Park, Durban** - Computer Aided Visual Impact Assessment and Landscape Design for AECI.
33. **Sainsbury's Bryn Rhos (UK)** - Computer Aided Visual Impact Assessment/ Planning Application for the development of a new store within the Green Wedge North of Swansea.
34. **Ynyston Farm Access (UK)** - Computer Aided Impact Assessment of visual intrusion of access road to proposed development in Cardiff for the Land Authority for Wales.
35. **Cardiff Bay Barrage (UK)** - Concept Design, Detail Design, Documentation, and Visual Input to Environmental Statement for consideration by Parliament in the debate prior to the passing of the

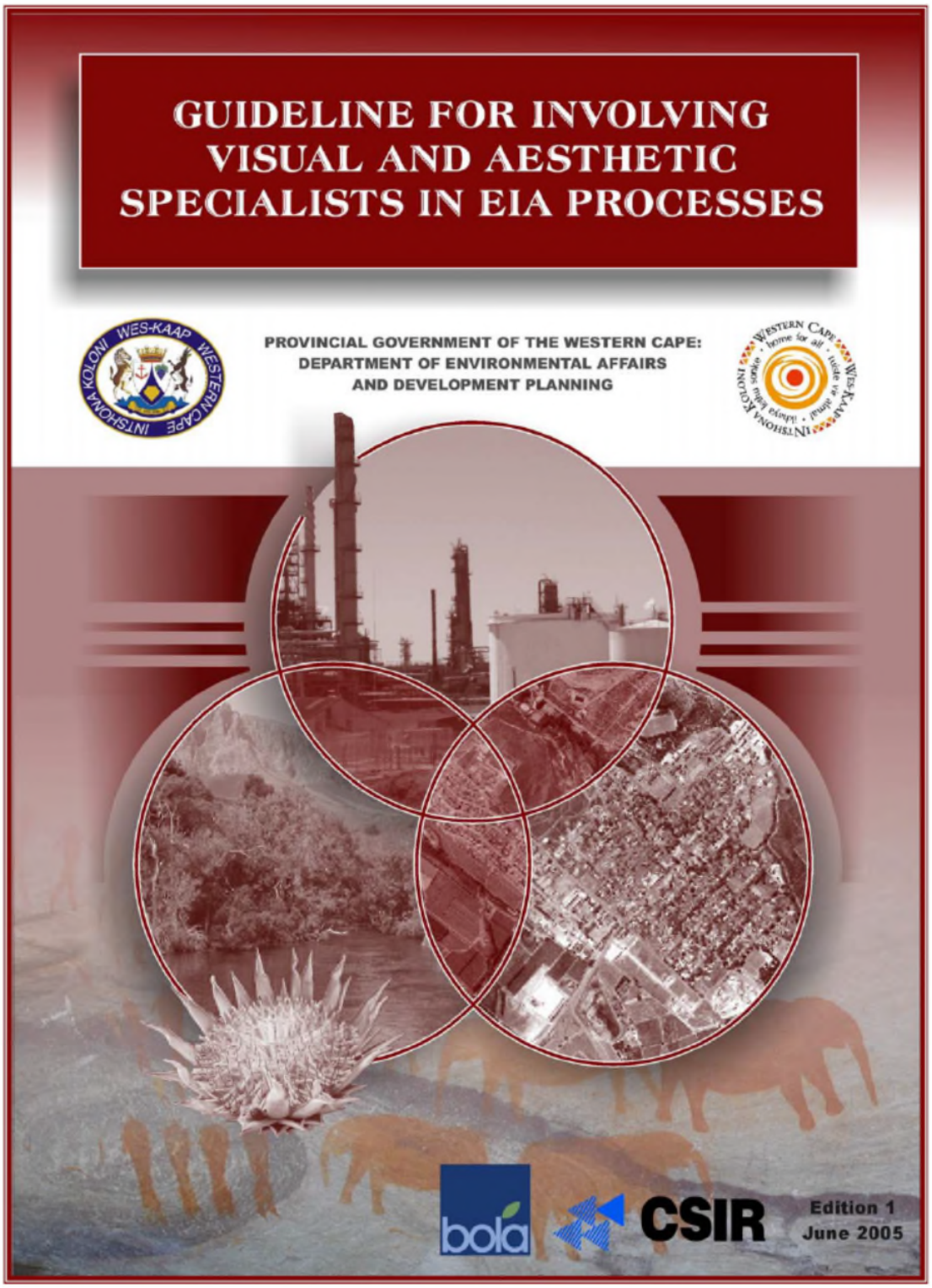
Cardiff Bay Barrage Bill. The work was undertaken for Cardiff Bay Development Corporation.

36. **A470, Cefn Coed to Pentrebach (UK)** - Preparation of frameworks for the assessment of the impact of the proposed alignment on the landscape for The Welsh Office.
37. **Sparkford to Illchester Bye Pass (UK)** - The preparation of the landscape framework and the draft landscape plan for the Department of Transport.
38. **Green Island Reclamation Study (Hong Kong)** - Visual Impact Assessment of building massing, Urban Design Guidelines and Masterplanning for a New Town extension to Hong Kong Island.
39. **Route 3 (Hong Kong)** - Visual Impact Assessment for alternative road alignments between Hong Kong Island and the Chinese Border.
40. **China Border Link (Hong Kong)** - Visual Impact Assessment and initial Landscape Design for a new border crossing at Lok Ma Chau.
41. **Route 81, Aberdeen Tunnel to Stanley (Hong Kong)** - Visual Impact Assessment for alternative highway alignments on the South side of Hong Kong Island.

APPENDIX II

GUIDELINES FOR INVOLVING VISUAL AND AESTHETIC SPECIALISTS IN EIA PROCESSES

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


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

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Finalisation of report figures and formatting:

Magdel van der Merwe and Elna Logie, DTP Solutions

PREFACE

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

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

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

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

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

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

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

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

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

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

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

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

Who is the target audience for these guidelines?

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

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

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

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

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

What will these guidelines not do?

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

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

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

How are these guidelines structured?

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

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

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

SUMMARY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CONTENTS

APPENDIX III
CHECKLIST OF SPECIALIST REPORT
REQUIREMENTS AS PER THE 2014 EIA REGULATIONS

EIA REGULATIONS 2017 GNR 327, 325 and 324 Appendix 6 CONTENT OF THE SPECIALIST REPORTS	Required at EIA Phase	Cross-reference in this EIA report
(a) details of— the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a curriculum vitae;	X	Chapter 1, section 3 Appendix I
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	X	Attached separately to EIA report.
(c) an indication of the scope of, and the purpose for which, the report was prepared	X	Chapter 1, sections 1 and 4.
(CA) an indication of the quality and age of Base Data used for the specialist report	X	Chapter 3, section 1. Chapter 5, section 1.
(CB) a description of existing impacts on the site, cumulative impacts of the proposed development and the levels of acceptable change	X	Chapter 3, section 1.4
(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	X	Chapter 1 section 1
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	X	Chapter 1 section 4 Chapter 5, sections 1, 2, 3, 4, 5 and 6. Chapter 6.1
(f) Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives.	X	Chapter 4 Chapter 1, map 1.
(g) an identification of any areas to be avoided, including buffers;	X	No areas on site identified to be avoided.
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including	X	Maps 6 – 8 inclusive

EIA REGULATIONS 2017 GNR 327, 325 and 324 Appendix 6 CONTENT OF THE SPECIALIST REPORTS	Required at EIA Phase	Cross-reference in this EIA report
areas to be avoided, including buffers		
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	X	Chapter 1 section 1 Chapter 4 section 2.2 (lighting) Chapter 5 section 2
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities	X	Chapter 5 sections 4, 5 and 6. Chapter 6 section 2.
(k) any mitigation measures for inclusion in the EMPr	X	Chapter 6 section 2
(l) any conditions for inclusion in the environmental authorisation;	X	Chapter 7 section 7
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	X	Appendix V
(n) a reasoned opinion— i. whether the proposed activity, activities or portions thereof should be authorised; and (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	X	Chapter 7 section 7 Appendix V
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	X	No comments received.
(p) any other information requested by the competent authority	X	No specific requirements.

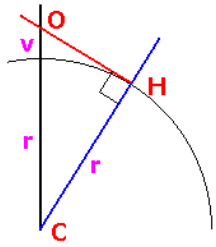
APPENDIX IV

FORMULA FOR DERIVING THE APPROXIMATE 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.



APPENDIX V

ENVIRONMENTAL MANAGEMENT PLAN

Project component/s	Olifantshoek 10MVA 132/11KV Substation Construction, Operation and Decommissioning		
Potential Impact	Change in Landscape Character Visual impact affecting travellers on the N14 Visual impact affecting residents of Olifantshoek Lighting impacts		
Activity/risk source	Vegetation clearance and rehabilitation during construction and decommissioning opening up views of the substation alternatives to homesteads, the N14 and urban residents. Lack of screening and management of vegetation opening up views of both substation alternatives to local community. Lack of screening and management of vegetation opening up views of preferred substation alternative to N14. Nuisance caused by light pollution from the Substation particularly the alternative substation. Decommissioning activities.		
Mitigation: Target/Objective	Minimise and reinstate vegetation loss. Undertake screen planting between the substation, residents and the N14. Maintain and augment screen planting as necessary Manage lighting to ensure that only necessary lighting for operations is obvious and light pollution is minimised. Remove structures and rehabilitate site on decommissioning.		
Mitigation: Action/control		**Responsibility** Contractor (C) Environmental Control Officer (ECO) Environmental Officer (EO) Environmental Liaison Officer (ELO)	**Timeframe** Construction Phase (C) Operation Phase (O) Decommissioning Phase (D)

Minimise disturbance and maintain existing vegetation as far as is possible both within and surrounding the development area.	C, EO, ELO	C
Reinstate any areas of vegetation that have been disturbed during construction.	C, EO, ELO	C
Undertake and maintain screen planting between the substation, residents and the N14 during the operational phase	C, EO, ELO	C, D
Rehabilitate areas to their natural state on decommissioning.	C, EO, ELO	C, D
Monitor rehabilitated areas post-construction and post-decommissioning and implement remedial actions.	C, ECO, ELO	C, D
Remove all temporary works.	C, EO, ELO	C
Remove infrastructure not required for the post-decommissioning use of the site.	C, EO, ELO	D
During the operational phase, minimise night lighting with motion sensors and use of infra-red security system. Maintain lighting focused on the substation and angled low.	EO, ELO	O

Performance Indicators	Vegetation presence and density. Presence of unnecessary infrastructure. Viewing of substations to ensure that visibility is minimised from residential areas and the N14. Viewing of night lighting to ensure lighting is minimised and concentrated on site.
Monitoring	Evaluate vegetation before, during and after construction. Evaluate vegetation growth associated with screen planting and reinstatement during operations and for a year after decommissioning. Evaluate the performance of lighting and undertake liaison with residents during the operation phase. Responsibility: ECO and ELO.

	Prepare regular reports.