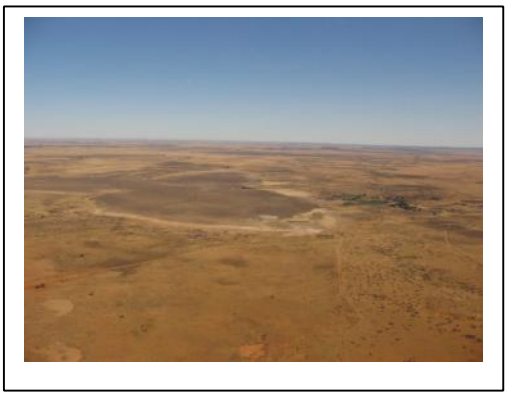
Eskom Holdings Limited

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED PERSEUS-HYDRA 765kV TRANSMISSION POWER LINE



Visual Impact Assessment Study

J25235A

April 2006

EXECUTIVE SUMMARY

Eskom intends to construct a new 765 kV transmission line from the Perseus Substation near Dealesville (approximately 70 km north-west of Bloemfontein) to the Hydra Substation at De Aar. The towers are a new design of the kite form and are approximately 45 m high and are stabilised by four guy cables. This power line forms part of the Cape Strengthening Project.

This report evaluates four alternative routes selected during a 3-day visit of the environmental project team.

Risk sources of the visual intrusion of the proposed transmission line in the landscape are identified. These relate primarily to the increase in visual intrusion, which may result from the practical and cost elements to keep the line / route as straight as possible.

Each alternative route is discussed and rated according to the visual criteria of visibility from roads and the general surrounding landscape, the possible visual intrusion on landscape character and sense of place and the visual association with existing transmission lines.

Each alternative is assessed according to an intensity rating for each criteria. The two alternative routes, which have the lowest rating are recommended for further investigation.

Mitigation measures are proposed and the conclusion drawn is that Alternative 3 (Centre Route) at this level of assessment will have the least visual impact with Alternative 4 (Western Route) being marginally less. The dilemma of placing a new route close to existing lines or corridors or well away from these to reduce the visual intrusion intensity remains but will require a decision following further study.

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Figure A: Locality Plan

1 INTRODUCTION

1.1 Background

Eskom Holdings Limited (Eskom) intend to construct a 765 kV overhead transmission line from Perseus Substation near Dealesville (Refer to **Figure 1**, Locality Plan) to Hydra Substation near De Aar.

This transmission line forms part of Eskom's upgrading of electricity to the Cape.

In accordance with the requirements of Section 22 of the Environmental Conservation Act 73 of 1989. The new powerline falls into the category 1(a) of Schedule 1 of R1182 due to its scale, extent and expected general impact on the natural and social environments.

This visual impact study forms part of the Environmental Impact Assessment Report as required by the Act and which will be produced by ARGUS GIBB, the principal environmental consultants on the project.

1.1.1 Powerline Route Alternatives

This report is preliminary in that its function is to identify from a visual impact perspective, and in collaboration with other specialists, preferred powerline routes following the initial site visit carried out during 24-26 August 2005.

The alternative routes chosen are shown on **Figure 2**, Route Alternatives and are based on site observations that identified the following constraints and requirements:

- Existing four major transmission line routes exists between the Perseus and Hydra Substations. The new line will have to be either west or east of these.

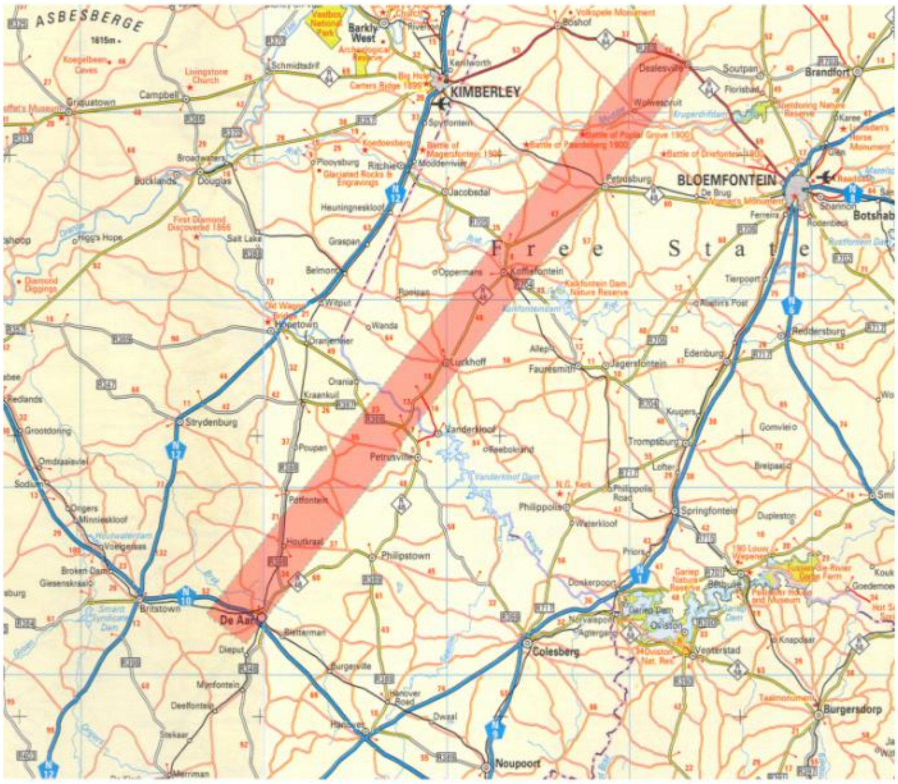
- The western route was chosen from a visual perspective above the eastern route due to the extent of visually sensitive areas. These include conservation areas – some associated with major dams and the extensive cultivated and irrigated farmland. Refer to **Figure 3**, Visual Sensitive Areas.

- The slightly raised and varied landform created by the presence of dolerite silts, dykes which have eroded to form platforms, ridges and koppies to the west of the existing line routes provided greater visual diversity. These assist in reducing the visual impact of a linear structure in a predominantly flat landscape.

- The requirement that the transmission line route should minimise the need to change direction.

In general the alternative routes are described in terms of distance west from the existing new 765 kV transmission line. These were agreed upon at a meeting of specialists following the site visit. They are as follows:

Alternative 1: 200 metres from the existing 765 kV line chosen as to contain the routes in one large corridor - map description: Existing 765 kV route.



LOCALITY PLAN **FIGURE 1**

Alternative 2: 2 km from the 765 kV line - chosen as a result of the need to avoid the saline soils and pans as these are visually sensitive relative – map description: Eastern route.

Alternative 3: Approximately 5 km – as above but additionally the higher lying landform and plains interrupted by dolerite remnant landforms of plateau and koppies. These will provide occasional screens and backdrops to the line – map description: Centre route.

Alternative 4: Approximately 10 km from the 765 kV line – chosen to be visually disassociated with the existing lines and to be on the higher ground – yet able to be visually screened along portions of its length by ridges, plateaux and koppies – map description: Western route.

1.1.2 The Visual Impact Assessment in Context

The size of the transmission line tower (45 m high) and the length of the route (256 km) will significantly alter the visual character and quality of the landscape over which it traverses. Refer to **Figure 4** Transmission Tower Form.

The visual impact study is intended to assess the extent of the visual intrusion on the existing landscape and to identify route alternatives that will have the least visual impact. In addition, visual impact mitigation guidelines will be presented. Preferred route alternatives will be identified based on the severity of the assessed visual impact.

1.2 Study Approach

This report is preliminary, in that it will review and assess the four identified routes and identify preferred alignments based on visual impact criteria.

This report will be complimented at a later stage by another report, which will assess in detail the alignments of the preferred alternatives.

This report, therefore, is the first of two visual assessment phases – the general route selection and identification of the preferred alternatives and a visual impact assessment of the preferred alternatives.

1.2.1 The Study Approach and Method

The approach to this first phase was to gain an overall impression of the terrain through which the proposed transmission route will pass. This was achieved by flying the route in a helicopter and later by driving through the general areas identified for the routes.

The first traverse of the route provided a good broad overview of topographic and specific constraints (e.g. pans, irrigated areas) to route alignments from a visual impact viewpoint.

The second traverse by car allowed for human scale interpretation of the preliminary selected route alternatives made during the flight.

Maps of land cover were used to correlate visual and mapped features. Using the information gained from the flight and car traverses of the area four alternative routes were placed on the plan.

1.2.2 Assumptions made regarding the Route Alternative Corridor

The study area is approximately 70 km wide within which four major transmissions lines have already been constructed. Refer to **Figure 2.**

The land use and natural features of the study area were assessed and the decision was made to investigate only the western side of the existing lines. The reasons for this decision are:

- There are significant physical obstacles present on the eastern side such as major dams, conservation areas, extensive irrigated areas and more diverse topography.
- The eastern side is more scenic than the western side.
- The eastern area landscape was likely to be viewed and appreciated by a greater number of landowners and tourists.
- The western side was less density utilised and occupied.

1.2.3 Limitations of this Study

The purpose of this visual assessment study is to identify alternative routes and to preliminarily assess the visual impacts of each and then to identify and rank the line alternatives according to their perceived visual impact.

This study does therefore not develop and model viewsheds and the visual absorption capacities of the landscape.

The position of important or key viewpoints such as farmsteads, tourist lodges and private conservancies were not available at the time of the site visit.

2 DESCRIPTION OF AFFECTED ENVIRONMENT

The extent of the visual impact of linear structures will depend on the following characteristics of the receiving environment:

- Topography: varied or uniform and open, i.e. plains or closed hilly viewsheds
- Vegetation cover: grassland, savanna, forest
- Land use: pasture, irrigated land, agricultural holdings, suburban conservation areas
- Landscape diversity: a combination of the above
- Landscape character: sense of place, scenic quality

The study area is broadly divided into two sections. These are the plains containing irrigated and dryland farms together with salt pans north of the Orange River and the predominantly pasture grasslands amongst varied small plateaux and koppies of the dolerite intrusives south of the Orange River.

2.1 Topography

The northern area is characterised by flat open plains that contain a number of salt pans. The soils are commercially cultivated either as dryland or by irrigation. The pans align generally north-south along ancient drainage lines.

Implications for the Project

The open flat landscape with minor vertical relief will allow any high structure to be silhouetted above the horizon. Only distant views of the transmission line will mitigate its visibility in this flat landscape. Align transmission line upslope and away from pans to keep the view along the pan alignments open.

The southern area is characterised by open grassland plains with the vertical relief of plateaux and koppies formed by dolerite intrusions. The soils are predominantly shallow and are used as natural grassland pasture.

Implications for the Project

Align the route on the midslope between the plains and the plateaux and koppies. This will provide a backdrop at lengths along the line that will reduce the horizon being broken by the transmission towers. This is effective particularly at a distance of 2 km and more (observation on site).

2.2 Vegetation

The northern area is a patch work of cultivated land and natural grassland. Few trees are present and if so they are clustered on rocky outcrops or along drainage lines.

Implications for the Project

The grassland affords little variation in height over the plains to make any difference to the visibility of the tall rows of transmissions towers.

The southern area is predominantly grassland with natural fynbos on the slope of koppies and plateaux.

Implications for the Project

The grassland provides little variation to materially affect the visibility of the transmission lines.

2.3 Land Use

The northern area comprises predominantly of cultivated dryland and irrigated farmland.

The southern area is predominantly natural pasture grazing for sheep and cattle.

Implications for the Project

The visibility of the transmissions towers will be very much more significant in the northern area due to the more intense farming activities and the cultivated lands. These monocultures of vegetation are geometric in shape and line.

To the south of the Orange River the visibility will be less due to the large areas of natural pasture and the associated reduced density of farming activities and farmsteads.

2.4 Landscape Diversity

The diversity of the northern area is influenced by the land use patterns of cultivation rather than any topographical features. This pattern is made up of the cultivated lands and natural veld areas, which are interspersed with the shallow salt pans. This pattern of diversity is significantly altered by the dense irrigated lands in the immediate surroundings of the Modder and Riet Rivers, which flow east to west across the area.

Implications for the Project

The landscape patterns in a predominantly flat landscape is only appreciated when viewed from above. The visual mitigation of the transmission lines is not significantly affected by the landscape diversity where topographical relief is present in the form of plateaux and koppies.

The diversity of the southern area is dominated by the topography of the plateaux and koppies. The land use diversity is restricted to natural areas of pasture and patches of thicket bush, and high fynbos.

Implications for the Project

As for the northern area the pattern only becomes apparent when viewed from above. The generally low vegetation height offers little visual mitigation but the raised dolerite based landforms can provide silhouette reducing backdrops when viewed from ground level.

2.5 Landscape Character

The northern half (between the Riet River and Modderspruit) has an agricultural character as a result of the dryland and irrigated lands. This character is significantly negatively modified by the four existing transmission lines which all fall within a 10 km wide corridor midway between the boundary of the study area.

Implications for the Project

The option to add another transmission line to the concentration of existing lines or to move the new line well to the west of these to reduce the repeated visual intrusion experienced as one travels east-west across the area, needs to be carefully considered.

The southern half of the western study area has a more natural grassland character as a result of the predominant pastoral land use. The more varied landform of plateaux and koppies adds to the natural character of this section.

Implications for the Project

The visual change to a relatively natural scenic landscape by a new transmission requires consideration.

3 IDENTIFICATION OF RISK SOURCES

The following general risks are associated with the visual intrusion in the landscape and therefore apply to all alternatives. These may result if the urge to keep the line as straight as possible persists.

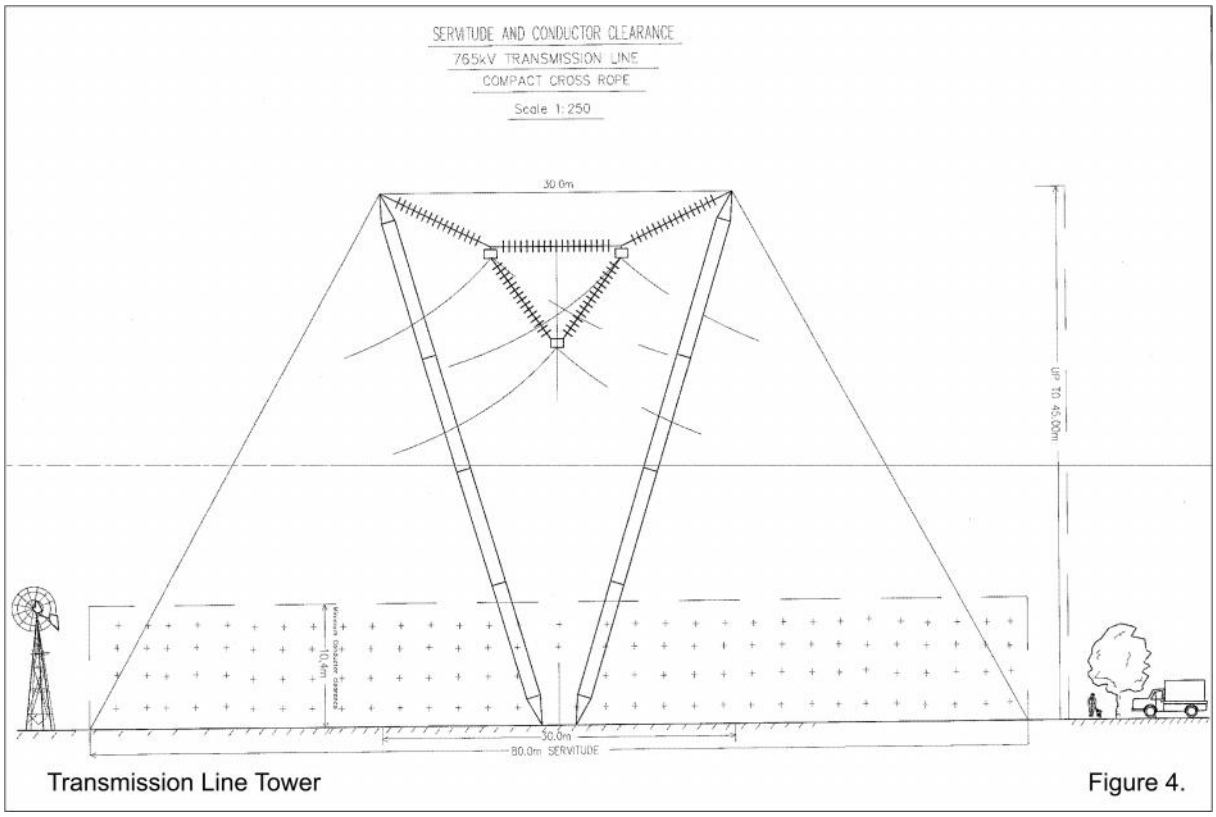
- The obscuring of views from existing farm houses.
- The provision of views along the transmission line from existing roads. This will magnify the visual intrusion of the line in the landscape.
- The degradation of areas of particular visual character e.g. salt pans, if the line is placed too close by.
- The exposure of the entire silhouette of the transmission tower by unnecessarily crossing plateaux or ridges.

4 THE VISUAL ASSESSMENT

An assessment of the wider visual issues will be described for each alternative. There will be no discussion of the extent of viewsheds since this is a preliminary assessment of the potential visual intrusion / impact of the proposed 765 kV transmission line.

The description of the visual impacts of the phases of erection and decommissioning will not be presented since these are not considered as significant visual impacts since the period of activity is of short duration and of a primary impact (localised, of short duration and is easily mitigated at the end of the phase) and the fact that rehabilitation is undertaken of disturbed areas, e.g. camps / laydown areas.

It is the operational phase that presents the most significant visual long term impact. This is due primarily to the scale and form of the transmission towers. Refer to **Figure 4**, Typical Transmission Line Tower and to a lesser extent the transmission cables. These invariably recede at distances perpendicular from the line.



Transmission Line Tower Figure 4.

Apart from the physical structure of the towers and the cables are the ancillary requirements to ensure maintenance of uninterrupted electricity transmission. These include access roads, cleared servitudes and substations.

These have greater visual intrusions in the landscape the more vegetated and hilly the terrain.

This route will traverse a flat landform and therefore the extent of servitude clearance of tall vegetation is not a significant visual impact element and therefore is not addressed in detail.

The two substations Perseus and Hydra exist and therefore comment on their visual intrusion will not form part of this report.

The visual impact assessment will be evaluated against the following criteria and rating:

Table 1: Visual Assessment Criteria

Visual Assessment Criteria	Intensity Rating		
	High	**Medium**	**Low**
Visibility from existing major roads (N8, R48, R705, R639, R369)	Highly visible due to alignment with road and within 1 km	Partially visible due to roads approximately 2 km from line	Low visibility due to line being > 3 km from road
Visibility from general surrounding landscape	Not obscured by natural landform	Partially obscured by landform	Mostly obscured by surrounding landform
Visual intrusion on landscape character and sense of place	Dominates sense of place	Partially influences sense of place	Has little effect on sense of place
Visual association with existing transmission lines to the east	Existing lines are easily visible from proposed corridor (within 2 km)	Existing lines are partially visible from proposed corridor (>2-<5 km)	Existing lines are barely noticeable (>6 km) from the proposed corridor.

4.1 Alternative 1 – 200 m West of Existing 765 kV line

In terms of the scale between this alternative and the other three the alignment can, from a visual assessment viewpoint, be identical to the present alignment of the existing 765 kV transmission line only magnified in intensity.

4.1.1 Visibility

- Visibility from Existing Major Roads

  The majority of the major roads convey traffic in an east-west direction and the visual experience of the transmission line is reduced because the intersection of the line and the road is at approximately right angles. The visual intrusion of the two lines being so close together will be the highest of the four alternatives at these points of intersection.

  With respect to the R48 which has an approximate north-south alignment the "double" line will have a high visibility between Van der Kloof and Koffiefontein. The R48 between De Aar and Van der Kloof is not influenced by the new route except at the crossing point just due north of De Aar.

  Due to the nearness of this alternative alignment to the existing 765 kV line thereby presenting a bulkier visual image in the view from the road the intensity rating is given as **high**.

- Visibility from General Surrounding Landscape

  The proximity of this alternative to the existing 765 kV line has the effect of making the two lines more visible in the landscape. Whether the combined visibility is obscured by natural landforms or not the visual bulking will increase the visibility and therefore the intensity rating is given as **high**.

- Visual Intrusion on Landscape Character and Sense of Place

  The existing 765 kV line has already intruded visually on the landscape character of its corridor. The additional visual intrusion of Alternative Route 1 will not double the significance of the intrusion but may quadruple its intrusion. On this basis the visual intrusion intensity rating on landscape character and sense of place is given is **high**.

- Visual Association with Existing Transmission Lines to the East

  The existing transmission lines are visually associated by being close and relatively close to the proposed alignment. The intensity rating is therefore **high**.

4.2 Alternative 2 – Eastern Route 2 km from the Existing 765 kV line

4.2.1 Visibility

- Visibility from Existing Major Roads

  The visibility of the transmission line is greatest at the road crossings and will be the same for the Alternative Routes 2, 3 and 4. The long term visibility is associated with near parallel alignments with roads. The greater the distance from the same reduces the visibility.

  This alternative route is approximately between 10 km west of the critical section of the R48, i.e. between Van der Kloof and Koffiefontein. The intensity of the visibility is therefore **low**, i.e. greater than 5 km away.

- Visibility from the General Surrounding Landscape

  The section of the line between Perseus (Dealesville) and Koffiefontein passes through a flat landscape of cultivated land and a denser rural population relative to the sections between Koffiefontein and De Aar. The proposed Alternative Route 2 will therefore have a **high** intensity of visibility between Perseus and Koffiefontein.

  The section from Koffiefontein to De Aar has a more varied landform, which is the result of the dolerite intrusives that form the low plateaux and koppies. These landforms will assist in partially obscuring the transmission line. This section is rated as having a **medium** intensity visibility rating.

4.2.2 Visual Intrusion on Landscape Character and Sense of Place

The route section Perseus to Koffiefontein is primarily an agricultural landscape with cultivated dryland and irrigated fields. The flatness of the landform combined with the vertical scale of the transmission tower (45 m) does dominate the sense of place within a distance of 500 m either side of the servitude. This detracts from the sense of place.

The intensity of visual intrusion is therefore judged to be **high** because of the relatively intense cultivation of the central portion of the Perseus / Koffiefontein section.

4.2.3 Visual Association with Existing Transmission Lines

The nearest and largest of the existing transmission lines is the 765 kV. This line is approximately 2 km to the east of Alternative Route 2. Due to the flat landscape in the Perseus / Koffiefontein section this line is partially visible. This section is rated as having a **medium** intensity visual association with the existing lines.

This 2 km distance of Alternative Route 2 from the existing line continues all the way along the section Koffiefontein to De Aar. The intensity of visual association of Alternative Route 2 with the existing lines is rated as **medium** since the distance is approximately 5 km from the nearest line.

4.3 Alternative 3 – Centre Route – approximately 5 km westward of the existing 765 kV Transmission Line

4.3.1 Visibility

- Visibility from Existing Roads

  The visibility is the greatest at the road crossings, the same visibility as for the other alternative routes.

  The greater distance (approximately 10 km) from the R48 between Koffiefontein and Van der Kloof reduces the possible visibility. The rated intensity of visibility from roads is judged as **low** for this section.

  Similarly the section Van der Kloof to De Aar is also judged as having a **low** intensity of visibility from major north-south routes as a result of the viewing distance.

- Visibility from the General Surrounding Landscape

  The same visibility condition prevails for this alternative route in the section Perseus to Koffiefontein since it also traverses the flat, agricultural landscape of cultivated land and a dense rural population. It is therefore not obscured by natural raised landforms. Its intensity of visibility in the landscape is judged as **high**.

  The visibility in the section Koffiefontein to the Orange River is slightly reduced as the landform becomes interspersed with low plateaux and koppies. Still further south from the Orange River to De Aar the visibility is further reduced as a result of the increase in the number of plateaux and koppies. The intensity of visibility rating for these two sections is judged to be **medium** for the section Koffiefontein to De Aar.

4.3.2 Visual Intrusion on Landscape Character and Sense of Place

The intrusion of the alternative route remains the same as for the other routes (1 & 2) between Perseus and Koffiefontein for the same reasons namely scale of tower in a flat landscape of intense dryland and irrigated farmland. This is judged as having a **high** intensity.

The route section from Koffiefontein to the Orange River traverses an area of large salt pans which have a particularly visual value apart from other attributes. The route passes close-by and over a narrow section of one pan. This visual intrusion on a land type that has a particular quality is judged as having a **high** intensity.

The route section Orange River to De Aar is characterised by more frequently occurring plateaux and koppies in a natural veld plain. The scale of the landform assists in reducing the visual dominance of the towers by providing a backdrop from time to time along the route length. The visual intrusion for this section is judged to be **medium.**

4.3.3 Visual Association with Existing Transmission Lines to the East

The approximate 10 km distance from the existing 765 kV line and the intervening landforms renders the nearest existing line not noticeable over the whole length. The intensity of visual association with the existing transmission lines is judged as **low**.

4.4 Alternative 4 – Western Route – Approximately 10 km West of the Existing 765 kV Transmission Line

4.4.1 Visibility

- Visibility from Existing Roads

  The same description of visibility applies to this route as for the previous route assessments in that the greatest visibility on national and regional roads is at the crossing of the transmission line.

  The visibility at road crossing of the R48 and R388 just north-west of De Aar increases this route's visibility relative to Alternative 2 and 3. The R48 north of Van der Kloof and on to Koffiefontein is too far east to provide views of this route alternative. The intensity of visibility of the proposed line route from roads is judged to be **medium** as a result of the R48 and R388 crossing.

- Visibility from the General Surrounding Landscape

  The visibility condition is the same as that for Alternative Route 3 for the route section Perseus to Koffiefontein namely a flat landform of cultivated farmland and a denser population. This is judged as a **high** visual intensity. The visibility in the section Koffiefontein to the Orange River and on to De Aar is the same as that as described for Route Alternative 3. The intensity of visibility is therefore judged as being **medium**.

4.4.2 Visual Intrusion on Landscape Character and Sense of Place

On the section Perseus to Koffiefontein the route traverses an area that is almost at the western limit of extensive agriculture zone and salt pans. The intrusion on the agricultural character of the area is less pronounced due to this. The intrusion on landscape character is judged to be **medium** for this section.

The section Koffiefontein to the Orange River conflicts less with the character of the four large salt pans midway in that the route skirts the western edge. For this reason the intensity of visual intrusion is judged as **medium** since the transmission line is judged to only partially influence the sense of place.

The route section Orange River to De Aar is similar to that as described for Alternative Route 3 and therefore the visual intrusion is judged also to be **medium**.

4.4.3 Visual Association with Existing Transmission Lines to the East

This route is so far (10 km approximately) from the existing 765 kV line that the two cannot be seen from ground level due to distance and the intervening landforms.
The intensity of visual association with existing transmission lines is therefore judged to be **low** for the whole route.

Table 2: Summary of Visual Criteria Rating for Four Alternative Transmission Route Alignments

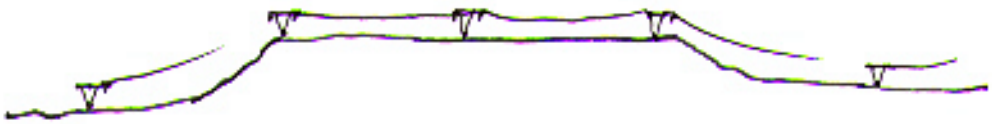
VISUAL ASSESSMENT CRITERIA	INTENSITY RATING OF ALTERNATIVE ROUTES			
	1	**2**	**3**	**4**
1. Visibility				
• From existing roads N8, R48, R705, R639, R369				
Section a: Perseus Substation to Koffiefontein	H	L	L	M
Section b: Koffiefontein to Orange River	H	L	L	M
Section c: Orange River / Van der Kloof to De Aar	H	L	L	M
• From the general surrounding landscape				
Section a: Perseus Substation to Koffiefontein	H	H	H	H
Section b: Koffiefontein to Orange River	H	M	M	M
Section c: Orange River / Van der Kloof to De Aar	H	M	M	M
2. Visual Intrusion on landscape character and sense of place				
Section a: Perseus Substation to Koffiefontein	H	H	H	M
Section b: Koffiefontein to Orange River	H	H	H	M
Section c: Orange River / Van der Kloof to De Aar	H	H	M	M
3. Visual association with existing transmission lines to the east				
Section a: Perseus Substation to Koffiefontein	H	M	L	L
Section b: Koffiefontein to Orange River	H	M	L	L
Section c: Orange River / Van der Kloof to De Aar	H	M	L	L
Alternative Route Ranking	**4**	**3**	**1**	**2**

5 RECOMMENDED MITIGATION MEASURES

The level of this scoping report does not allow for detailed mitigation measures to be identified for each route.

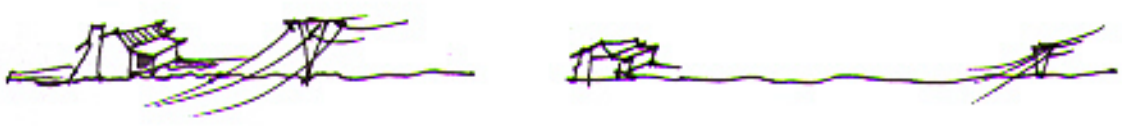
The following general measures therefore relate to the entire transmission route with relevance to the minimisation of the visual intrusion and impact on the existing receiving environment.

- Avoid selecting a route that will traverse the top of the plateau landforms.



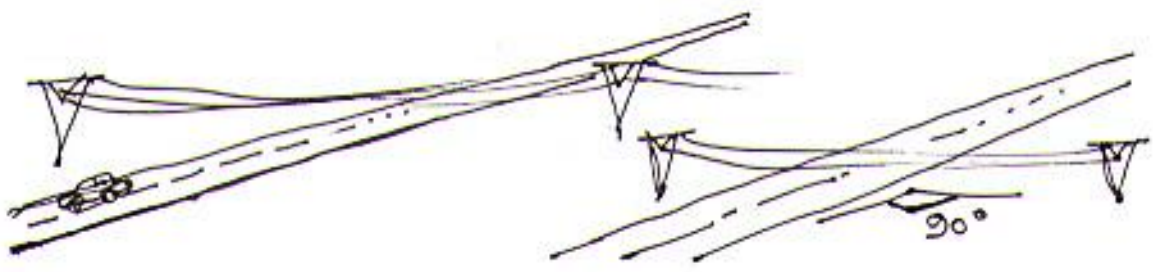
- Avoid a route that will follow a narrow valley between plateaux or koppies

- Avoid a route that will dominate any farmsteads' view.



- Position the towers on a midslope of a landform that rises to a plateau and koppie so that the plateau or koppie will form a background to the line.

- Cross roads, rivers and streams at right angles to limit visual intrustion of the landscape by the line to road users.



- When a new line runs parallel and close to an existing line place the transmission towers at the same spacing as the existing line where possible.

6 CONCLUSIONS AND RECOMMENDATIONS

The recommendation for the Perseus Hydra route is that the alternative route 3 and 4 be further investigated after including information not presently at hand. The findings should then be tested in the field.

The conclusions and recommendations, where appropriate, are discussed for each sector of the report and the pertinent aspects at each are presented.

- Alternative Routes

  - The corridor option for this new line should be west of the other existing transmission lines. This focuses the study zone to half of the original area proposed.
  - The alternative routes have been selected with a significant degree of attention to landform, land use and natural features, all of which contribute to the visual character and quality of the study area.

- Study Method and Approach

  The method of obtaining an overall visual impression and feel for the study area in a short space of time has definite benefits for the visual study and preliminary route selection.

- Limitations of the Study

  At this phase in the Environmental Impact Assessment information that may have an influence on the macro alignment was not available. This information such as the position of homesteads, tourist related lodges and environmental conservancies will be required in the Environmental Impact Assessment Phase.

  The development of viewshed models will contribute significantly to narrow the choice for the least visually intrusive transmission line route.

- The Affected Environment

  The landform and pattern of land use are the primary characteristics that influence the visual intrusion and impact of this transmission line route. The overall flatness of the landform in the northern section provides little opportunity to screen, mask or obscure the line. Views on the horizon of transmission towers will characterise the visual intrusion and impact on the landscape setting.

- Risks

  In a feature impoverished landscape those features that do exist assume land mark proportions or areas. The characteristic low plateau or “tafel” and the cone “koppie” are characteristic at the western portion of the study area. In the low areas nestle ephemeral pans which come to life each rain season. The character and sense of

place of these areas and features should not be compromised if at all possible by the scale and position of transmission towers.

- The Visual Assessment

  The summary of the visual assessment of the alternative routes reveal the following:

  - That Route 1, 200 m from the existing line will by virtue of the closeness to the existing line present the greatest visual intrusion in the landscape. This is due to the visual "mass" of the double row of transmission towers through the landscape.
  - That Alternative Route 3 and 4 present the lowest intensity rating of the chosen assessment criteria. If the visual association with the existing transmission line is ignored since both routes have the same value, Alternative Route 3 has the lower visibility intensity rating, but a higher "visual intrusion on landscape character" rating than that of Route 4.

  The result therefore presents Alternative Route 3 as the preferred alignment with Route 4 a close second by virtue of the medium intensity ratings for "visual intrusion on character". These ranking positions may change once more information on farmstead and tourist lodge positions and conservancy areas are known and a viewshed analysis is completed.

  The perennial dilemma associated with new transmission line alignments choice in the vicinity of existing lines is whether to contain the visual intrusion but increase its intensity by placing the new route near to the existing route/s or to place the new route well away and intrude on a new area but at a reduced visual intrusion intensity.

- Mitigation Measures

  At this level of the study the mitigation measures relate to the general placement of the line in the landscape to reduce the visual intrusion on landscape character and sense of place.

  The recommendations for mitigation are principals to follow when plotting the chosen alternative route.

  Further some of the alternative routes can merge or cross over at certain points to achieve the best visually acceptable route. This aspect of route selection must be considered prior to evaluating on an EIA the final chosen alternatives.

ADDENDUM

ADDITIONAL TRANSMISSION LINES BETWEEN
A) PERSEUS AND BETA SUBSTATIONS (12 KM) AND
B) PERSEUS SUBSTATION AND A POINT ON THE EXISTING 400 KV BETA-HYDRA TRANSMISSION LINE (33 KM)

7 INTRODUCTION

7.1 Background

Eskom have amended the configuration of transmission lines in the vicinity of the Perseus and Beta Substations.

This report assesses the visual issues that will arise when these lines are erected. Proposals on the mitigation of the expected visual intrusion of the lines in the existing landscape and setting are described.

7.2 Transmission Line (Refer to Figure A)

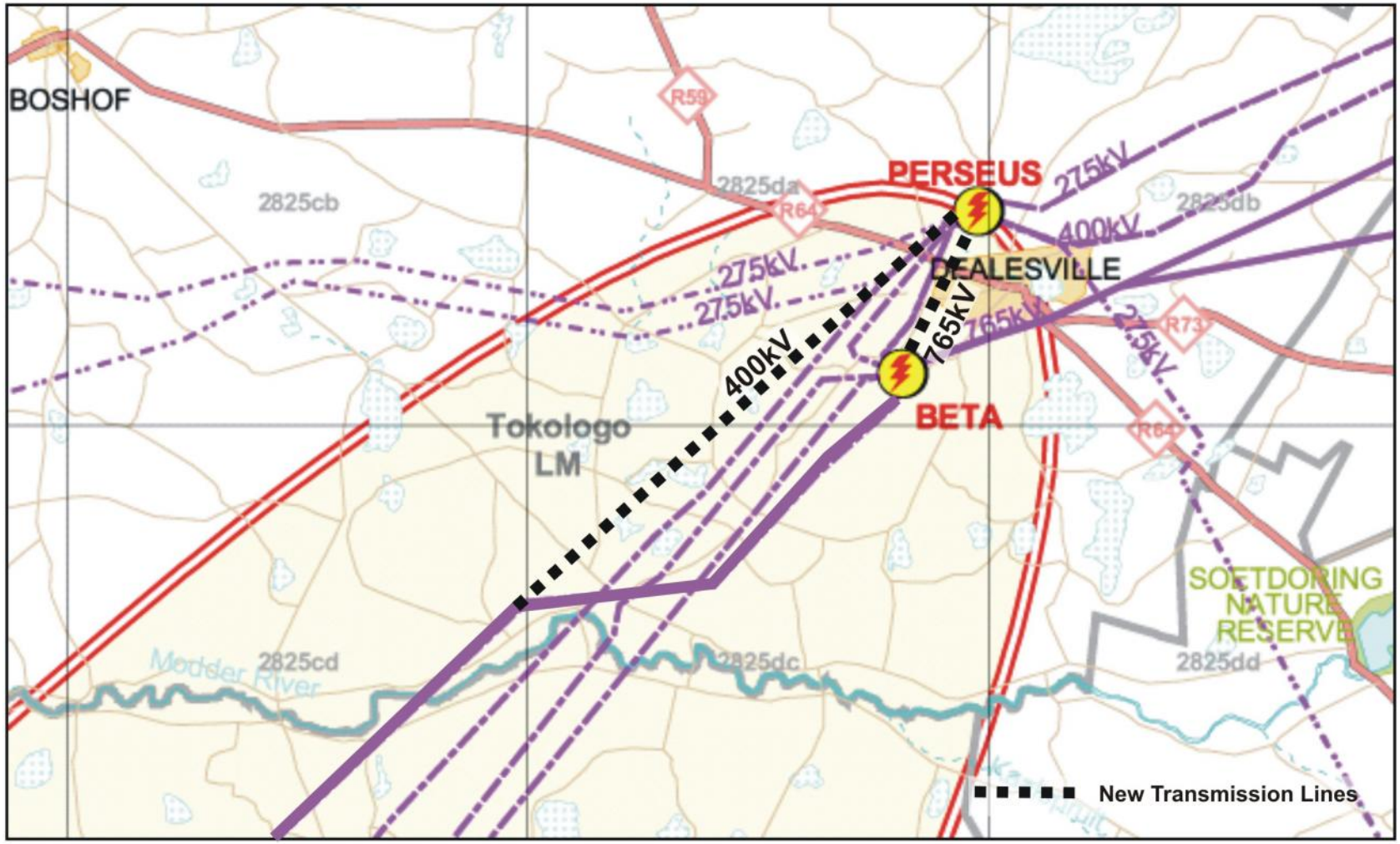
The two routes are (i) a 12 km 765 kV transmission line which will link the Perseus Substation near Dealesville with the Beta Substation and ii) a 33 km 400 kV transmission line which will link the Perseus Substation to a point south on the existing western most 400 kV line.

7.3 Assumptions on Alternative Routes

At this scoping stage it has been assumed that it is not justified to consider alternative routes for each line. The reason is that the distance is short and the route will need to be relatively direct. However, a detailed assessment of the siting of the route at the micro scale will be reported on in the Specialist Visual Impact Assessment Report.

7.4 Limitations of this Assessment

No site inspection was carried out and therefore the visual relationship of the existing convergence of transmission lines into Perseus and Beta Substation relative to landscape scale and form cannot be fully appreciated. However, use of photographs and existing maps provide sufficient information to determine the main visual issues associated with these two lines.



Locality Plan **Fig. A**

8 DESCRIPTION OF AFFECTED ENVIRONMENT

8.1 Topography

The area comprises of flat plains which contain a number of salt pans.

Implications for the Project

The salt pans provide scenic relief and areas of interest in the openness of the plains. Little can be done to obscure the transmission pylons silhouette against the horizon. The alignment should skirt all pans wherever possible.

8.2 Vegetation

The 400 kV line to Perseus will cross predominantly shrub land while the 765 kV line Perseus-Beta will cross grassland.

Implications for the Project

The shrub land will have a minor visual mitigating effect due to the vegetation's varied height and pattern. This will partially mitigate the scale and line of the transmission towers.

8.3 Land Use

The land use is a combination of irrigated and dry land agriculture.

Implications for the Project

The transmission towers and the line will be more visually significant in the monoculture cropland of geometric lines.

8.4 Landscape Diversity

The diversity of the landscape is the result of land use patterns created by cultivation of flat featureless plains. There is little vertical relief.

Implications for the Project

The transmission lines' project above the horizontal geometry of the cultivated land and visual mitigation is limited.

8.5 Landscape Character

The agricultural character of the landscape is evident by the relatively intensively attended dryland and irrigated cropland.

Implications for the Project

The visual character of the area in the vicinity of the two power stations has already been affected by the existing transmission lines that serve the Perseus and Beta Substations.

9 IDENTIFICATION OF RISK SOURCES

The following general risks are associated with the visual intrusion in the landscape and therefore apply to all alternatives. These may result if the urge to keep the line as straight as possible persists.

- The obscuring of views from existing farm houses.
- The provision of views along the transmission line from existing roads. This will magnify the visual intrusion of the line in the landscape.
- The degradation of areas of particular visual character e.g. salt pans, if the line is placed too close by.
- The exposure of the entire silhouette of the transmission tower by unnecessarily crossing plateaux or ridges.
- The view to the traveller using the R54 in the vicinity immediately west of Dealesville of a nest of transmission towers that support the lines as these converge on the Perseus Substation.

10 THE VISUAL ASSESSMENT

The two transmission lines that connect to Perseus Substation add to the orb web of lines that already exist.

The most significant identified visual impact is focused on the section of the R54 Road just west of Dealesville.

This short section of road will have 8 (5 existing and 3 new [2 – 400 kV and 1 – 765 kV]) transmission lines that cross it, within an approximate distance of 5 kilometres.

The visual impact of the two new short transmission lines is significant in that they contribute visually to the existing lines that converge on the Perseus Substation, particularly where these cross the R54 Provincial Road.

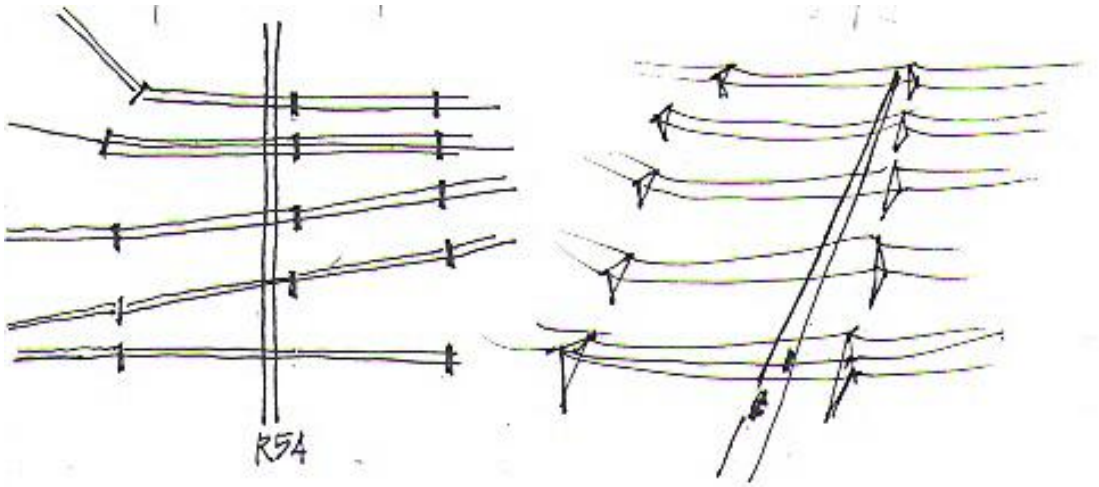
This “blanket” of lines which will occur locally over the R54 has the following visual impacts:

- The lines will be significantly more visible
- The visual intrusion of the immediate landscape and the sense of place is considerable due to the increase in the number and scale of adjacent transmission towers.

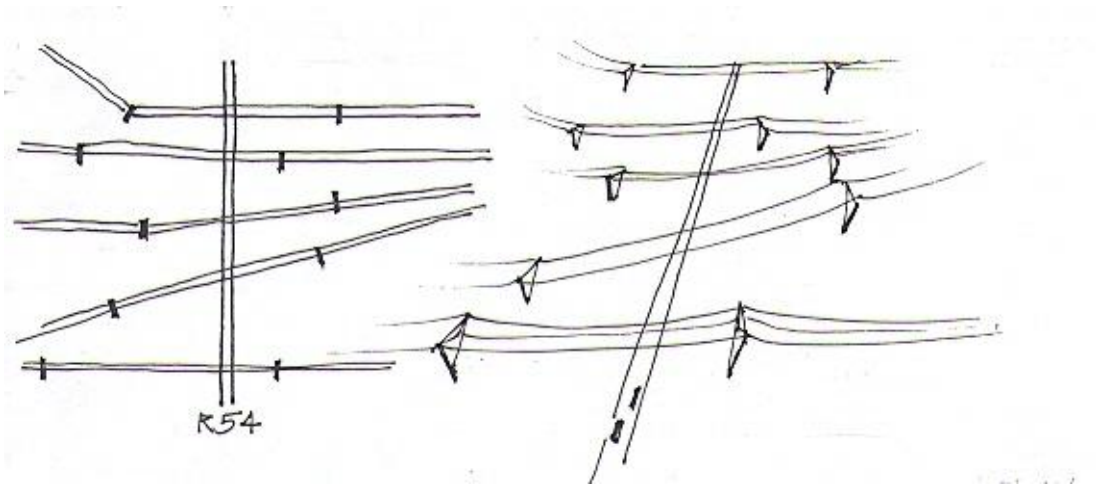
11 RECOMMENDED MITIGATION MEASURES

The mitigation measures that have been recommended for the Perseus-Hydra 765 kV Transmission power line apply to this situation as well. However, in addition the following will apply to the area where the new lines will cross the R54.

- Locate the transmission pylons so that they are spatially staggered relative to the positions of new and existing pylons.



- Avoid placing transmission pylons close to the road and almost in line.



- Stagger the transmission pylons to reduce their visibility to the road user.
- Avoid placing the line near or over existing salt pans.

12 CONCLUSIONS AND RECOMMENDATIONS

It is evident that there already exists an impact on the visual characteristics of the landscape within a 5 km corridor, 40 km south of the Perseus Substation. This is a result of existing transmission lines that converge on the Substation.

Although a successful general mitigation for the visual impact mitigation for transmission lines and their towers is “distance” it is clearly not possible in this case.

The focus of the highest visual impact is along the 5 kilometres of the R54 where the transmission lines cross this road.

It is clear that the visual impact exists and the additional transmission lines will compound the condition. However, where possible, the mitigation measures of placing the towers of each new line to be at different distances from the road (as illustrated), their visual intrusion into the landscape will be lessened from the view from the road.