

MERCURY - PERSEUS 400 kV TRANSMISSION LINE
VISUAL IMPACT ASSESSMENT REPORT

Prepared by:

The Landscape Architecture and Graphic Design Unit
STRATEGIC ENVIRONMENTAL FOCUS
P.O. Box 74785
Lynnwood Ridge
0040

Prepared for:

STRATEGIC ENVIRONMENTAL FOCUS
P.O. Box 74785
Lynnwood Ridge
0040

December 2003

EXECUTIVE SUMMARY

The primary goal of this specialist study is to identify potential risk sources resulting from the project that may impact on the visual environment of the study area, to assess their significance, and to recommend a preferred alignment.

The visual environment, the project components, the potential risk sources associated with the project components and their assessed impact on the visual environment were investigated by examining the following visual aspects:

- Genius Loci (Sense of place)
- Visual Quality (Aesthetics)
- Landscape Character
- Surrounding Landscape Compatibility
- Scale
- Visual Absorption Capacity (VAC)
- Visibility (viewshed and viewing distance)
- Critical Views

The study area is considered to be largely homogenous in terms of visual character and can be divided into three main landscape types: “grasslands”; “cultivated lands”; and “Acacia flood plains”. These three landscape types were digitised using 1:50 000 topocadastral plans and are illustrated in Figure 4.1.

The sensitivity to visual impacts for each segment of each of the proposed corridors was assessed in terms of the visual aspects listed above. The Acacia flood plain landscape type that occurs within the flood plain of the Vet and Vals rivers was highlighted as a particularly sensitive visual environment.

The proposed Mercury - Perseus 400 kV Transmission Line was divided into project components. The assessment of the risk sources of each proposed corridor considered the project components comprising the corridor, the phase during which certain impacts are likely to occur, as well as the linear extent of each component and of the entire corridor.

The transmission line is considered to pose the greatest potential risk of visual impact during both the construction and the operational phases due to its height and metallic, industrial aesthetic.

The clearing of vegetation either for access roads or within servitudes to manage the risk of damage due to fire is considered to pose a potentially great risk of visual impact during both the construction and the operational phases mainly within the river flood plains.

The establishment of construction camps, lay down areas and housing poses a potential risk of visual impact during the construction phase in terms of critical views from main roads and places of gathering such as urban centres, schools and other public recreational and institutional areas.

An assessment of the potential visual impacts for each of the corridors was carried out by means of a rating matrix, see **Table 6.1&2 Impact Assessment Matrix**. The basic assumption followed is that the risk associated with a project component increases in direct proportion to the linear extent in kilometres of that component. This assumption implies that for the three proposed corridors, where all else is equal, the risk of visual impacts is greatest for the corridor with the greatest length.

The results of the assessment indicate an order of **preference for the proposed corridors** as:

1. Proposed Corridor 1 (shortest alignment passing immediately west of Bultfontein and further to the west of, Wesselsbron and Bothaville);
2. Proposed Corridor 2 (alignment passing to the east of Bultfontein then alongside the R719 to a point just north of Wesselsbron before sweeping around to the east of Bothaville); and
3. Proposed Corridor 3 (the longest alignment extending some distance to the west of Bultfontein , then passing just to the west and north of Wesselsbron, before sweeping wide to the east via Viljoenskroon to the Mercury substation).

The potential visual impacts that may result from the six project components would each require a different set of management objectives and mitigation measures due to their differing scale and nature of risk. A comprehensive list of recommended management objectives and mitigation measures are outlined in **Section 7** for each project component. Monitoring programs have been proposed for the construction and operational phases of the proposed transmission line.

Three alternative alignment links were proposed for the project. These links do not provide alternative routes that would result in a lesser cumulative impact than the already identified and preferred corridor 1.

The construction and operation of the proposed Mercury - Perseus 400 kV Transmission Line will result in visual impacts within the study area. The significance of these impacts without mitigation will be high due to the relative scale of the structures and the high visibility within the study area. These impacts will last for the entire operational life of the transmission line.

However should the mitigation measures and monitoring programs recommended in this study be implemented the significance of these impacts can be reduced to an acceptable level.

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1. INTRODUCTION

This Visual Impact Assessment is a specialist study to determine the visual effects of the proposed Mercury - Perseus 400 kV Transmission Line on the surrounding environment, focussing on the proposed alternative alignments between the existing Perseus and Mercury Sub-Stations, adjacent to Dealesville and Vierfontein respectively, in the Free State Province. This study forms part of the overall environmental impact assessment for the Mercury - Perseus 400 kV Transmission Line project.

2. BACKGROUND AND BRIEF

The primary goal of this specialist study is to identify potential risk sources resulting from the project that may impact on the visual environment of the study area, to assess their significance, and to recommend a preferred alignment. This goal will be reached through the realisation of the following objectives:

- Determine the extent of the study area, this includes the site and the surrounding landscape which is visually connected to the site;
- Determine the visual character of the study area;
- Identify elements of particular visual quality (visual assets) that could be affected by the proposed project;
- Identify and define the project components that may potentially impact on the visual environment;
- Identify the potential visual impacts on the visual environment for each of the proposed corridors and alternate alignments;
- Assess the significance of the identified impacts for each of the corridors;
- Recommend a preferred alternative alignment; and
- Recommend generic mitigation measures to reduce the potential visual impacts in the study area that may result from the proposed project.

3. STUDY APPROACH

3.1 Information base (source)

- Contours with a 20 m interval were obtained from the Surveyor General in Mowbray, Cape Town. Elevation values were added where they were lacking and the data set was cleaned and built in ArcGIS 8.
- Digital copies of the relevant Topocadstral plans at a 1:50 000 scale were sourced from the Surveyor General, Surveys and Mapping in Mowbray, Cape Town
- Slope categories were calculated from the elevation grid and reclassified into three classes with slope <3%, 3 - 7 % and >7%.
- Visibility analyses were run in a GIS model from eleven selected observation points to determine what would be visible within a distance of 5 km.

3.2 Assumptions

- The land use and infrastructure indicated on the 1:50 000 topocadastral plans describe the current land use and extent of infrastructure within the study area with few, or any significant omissions or deviations;
- The proposed corridors and alternative alignments are indicative of a proposed route and not a precise alignment, i.e. the final alignment could deviate as much as 1000 m from the indicated alignment to avoid sensitive areas.

3.3 Limitations

- The slope categories generated from the elevation grid are at a resolution of 200 metres which has the effect of smoothing local ridges and koppies. The visibility analysis therefore does not highlight instances where these ridges and koppies would interrupt views of the proposed transmission lines at a local level. However at the scale of the study this is only considered a minor limitation;
- The site visit took place during a rainy period thereby reducing the degree of access to portions of the site far removed from all-weather roads. However due to the very flat terrain in most cases it was feasible to sight along the alignment of proposed corridors where these crossed roads.

3.4 Glossary of terms

Study area: Refers to the entire study area encompassing all the alternative alignments as indicated on the study area map.

Corridor: Refers to a specific alignment as numbered on the study area map (1 – 3)

Alternative alignment: Refers to a specific alignment (1 – 3) with one of the variations (a-b)

Elevation Grid: A raster data layer used in and generated through GIS modelling to calculate topographical information associated with elevation values and that is interpolated from contours in a vector format with elevation values of a known contour interval.

Proposed servitude: Refers to the proposed final alignment that the transmission line should follow.

Transmission line: Pylons support the 400 kV transmission line consisting of two steel support structures (supported by guy wires). Transmission lines are suspended between the supports.

Sub-station: A distribution point within the local and national network from which electrical current is rerouted along different power lines as well as distributed to local and municipal networks.

3.5 List of abbreviations

EIR Environmental Impact Report

DEAT Department of Environmental Affairs and Tourism

DTEEA Department of Tourism, Environmental and Economic Affairs

VAC Visual Absorption Capacity

VIA Visual Impact Assessment

3.6 Methodology

The following methodology was followed:

- The extent of the study area was identified as the combined area falling within a five kilometre buffer of the three proposed corridors and alternative alignments;
- The proposed alignments were visited for orientation purposes and to capture the landscape character and views in photographic images;
- Visual assets were identified during the site visit and from 1:50 000 scale topocadastral plans while typical photographic images of visual assets were captured during the site visit;
- Topocadastral plans at 1:50 000 scale were used to determine the visual absorption capacity of the study area;
- A "Topogrid" module was used to interpolate contours with a 20m interval to generate an elevation grid with a 200m resolution;
- Colour-coding was used to display the elevation values in the elevation model used as an orientation map;
- Slope categories were calculated from the elevation grid;
- Visibility analyses were run for selected observation points along the three proposed corridors to determine the area within a distance of 5 km from which these points would be visible;
- A report was prepared which describes; the visual environment, the project components, the potential risk sources associated with the project components and their assessed impact on the visual environment. This report examines the following visual aspects:
 - Genius Loci (Sense of place)
 - Visual Quality (Aesthetics)
 - Landscape Character
 - Surrounding Landscape Compatibility
 - Scale
 - Visual Absorption Capacity (VAC)
 - Visibility (viewshed and viewing distance)
 - Critical Views
- The sensitivity of the study area was analysed using a matrix of ordered values;
- The potential impacts of the project components on the landscape types traversed by the three proposed corridors and alternative alignments were analysed using a matrix of ordered values;
- An impact assessment matrix was used to identify potential visual impacts associated with the three proposed corridors and alternative alignments;
- A summary of the identified visual impacts and their significance was compiled based on the visual aspects and the visual assets mentioned above.

4. STUDY AREA

The scale of the visual impact assessment was determined by the use of 1:50 000 topocadastral plans and extended to a combined buffer area that extends five kilometres outside of the three proposed corridors and alternative alignments.

The study area is considered to be largely homogenous in terms of visual character and can be divided into three main landscape types: “grasslands”; “cultivated lands”; and “Acacia flood plains”. These three landscape types were digitised using 1:50 000 topocadastral plans and are illustrated in Figure 4.1.

An analysis of the sensitivity to visual impacts for the overall study area and each segment of each of the proposed corridors is provided in Table 4.1. A brief motivation for the values arrived at is provided below:

The six segments are:

- Perseus to R708 / Bultfontein
- R708 / Bultfontein
- R708 / Bultfontein Vet River
- Vet River
- Vet River to Wesselsbron
- Wesselsbron to Perseus

Overall Study Area

- The **sense of place** (Genius Loci) of the study area is that of vastness, of a single uninterrupted space that is defined by the flat to slightly undulating terrain. The sensitivity of the study area to impacts on sense of place is considered to be moderate.
- The **visual quality** of the study area is that of a homogenous and uncluttered landscape consisting mainly of flat grasslands or cultivated fields and few vertical features. Due to the uncluttered nature of the landscape but limited features of unique aesthetic value, the sensitivity of the study area to impacts on visual quality is considered to be moderate.
- The overall **landscape character** of the study area is defined by the vast, flat terrain and the predominant agricultural features and activities, such as livestock, fields of maize or sunflower, grain silos and farmsteads encompassed by mature blue gum and pine trees. Due to the dominant agricultural character the sensitivity of the study area to non-agricultural impacts on landscape character is considered to be high.

- The uninterrupted flat terrain that extends full circle defines the dominant horizontal **scale** of the study area. There are few natural features that define the vertical scale resulting in an overall lack of vertical scale. Vertical features associated with human activities define the vertical scale at a local level. These vertical features include large stands of blue gum and pine trees associated with farmsteads, the existing network of transmission lines, and silos. Due to the dominant horizontal scale and overall limited to non-existent vertical scale, the sensitivity of the study area to impacts on scale is considered to be high.
- The very flat terrain with limited changes in elevation and scattered vertical features indicates that the sensitivity of the study area to impacts in terms of **visibility** would be high. The results of visibility analyses for eleven points along the proposed corridors confirms that any development of vertical structures would be highly visible for distances up to and exceeding five kilometres throughout the study area. Figures 13.1 indicates the degree of visibility at the eleven selected viewpoints.
- The sensitivity of the overall study area in terms of **critical views** is considered to be moderate due to the dispersed nature of the typical agricultural road network yet high visibility of the region. In areas where the road network converges towards towns, the sensitivity to impacts in terms of critical views is considered to be high.
- The **visual absorption capacity (VAC)** of the overall study area is considered to be low. The **vegetation height** in the three landscape types is typically low and largely uniform therefore providing limited capacity to absorb intrusions into the visual environment. The vegetation height of the grasslands landscape is typically less than one metre while the cultivated lands consists mainly of maize and sunflower fields where the vegetation height ranges from zero to two metres depending on season and fertility of the soil. The vegetation height within the Acacia flood plains varies from low growing wetland plants to small trees, mainly Acacia species, of up to five metres in height.
- The **VAC** in terms of **slope** is considered to be low due to the very flat terrain of the study area. A map dividing the area in three slope categories with varying gradients (see Figure 4.2) was generated through the analysis of the elevation grid with a horizontal resolution of 200 metres. The three slope categories include slopes with: (1) 0%-3%; (2) 3%-7% and (3) greater than 7% gradients.
- The **VAC** in terms of **patter/diversity** is considered to be low due to the homogenous landscape character and flat terrain.

Where the sensitivity values of the six segments of the study area differ from the overall values, the different values are discussed below according to the respective segment.

R708 / Bultfontein

- The sensitivity of this segment of the study area to impacts on **sense of place** is considered to be low due to the numerous vertical features associated with human activities that in themselves do not add to the sense of place in the area surrounding Bultfontein.
- The sensitivity of this segment of the study area in terms of impacts on **visual quality** is considered to be low due to the increased clutter in the area surrounding Bultfontein.

- The sensitivity of this segment of the study area to impacts on **landscape character** is considered to be low due to the transition between agricultural and urban activities with no consistent character of its own.

R708 / Bultfontein to Vet River

- The sensitivity of this segment of the study area to impacts on **landscape character** is considered to be low due to the monotonous nature of the cultivated lands.
- The greater density of farmsteads, with their associated blue gum trees, within this segment reduces the sensitivity of the study area to impacts on **scale** to moderate.

Vet River

- The sensitivity of this segment of the study area to impacts on **sense of place** is considered to be high due to the presence of the Vet River and the adjacent Acacia flood plain vegetation.
- The sensitivity of this segment of the study area to impacts on **visual quality** is considered to be high due to the presence of the Vet River which has a unique aesthetic in the context of the overall study area.
- The sensitivity of this segment of the study area to impacts on **landscape character** is considered to be high due to the add richness of the Vet River and the surrounding Acacia tickets that add diversity to the local landscape.
- The sensitivity of this segment of the study area to impacts in terms of **visibility** is considered to be moderate due to the greater vegetation height and relatively depressed elevation values along the flood plain of the Vet River.
- The sensitivity of this segment of the study area in terms of **critical views** is considered to be moderate since the point at which the corridor crosses the Vet River is far removed from main distributor roads.
- The **VAC**, in terms of the **vegetation height**, is considered to be moderate due to the greater height of the Acacia thickets relative to the grazing and cultivated lands.
- The **VAC**, in terms of the **pattern/diversity**, is considered to be moderate due to the added complexity of the Acacia vegetation and the presence of the Vet River.

Vet River to Wesselsbron

- The sensitivity of this segment of the study area to impacts on **landscape character** is considered to be low due to the monotonous nature of the cultivated lands.
- The sensitivity of this segment of the study area, in terms of **critical views**, is considered to be moderate since the point at which the corridor crosses the Vet River is far removed from main distributor roads.

Weselsbron to Perseus

- The sensitivity of this segment of the study area to impacts on **landscape character** is considered to be low due to the monotonous nature of the cultivated lands.
- The greater density of farmsteads, with their associated blue gum trees, within this segment reduces the sensitivity of the study area to impacts to moderate in terms of **scale**.
- The **VAC** in terms of the **pattern/diversity** is considered to be moderate due to the added complexity of the non agricultural activities that take place in this segment such as urban areas, mining activities and a greater density of main roads.

Pans varying in size from 300 m² to 400 000m² occur throughout the study area. The visual character of these pans is defined by their seasonal variations in water level and absolute flatness with no vertical scale whatsoever. The visual character of the study area in terms of the sense of place, landscape character and visual quality is greatly influenced by the presence of these pans. The integrity of these pans is highly sensitive to visual intrusion associated with the introduction of vertical structures.

Mature blue gum and pine trees, typically thirty or more metres in height, that surround farmsteads and that line farm lanes in dense stands, often over 100m in extent, are typical features in the landscape of the study area. Where they occur they are particularly effective in screening and reducing the visual impact of adjacent transmission lines.

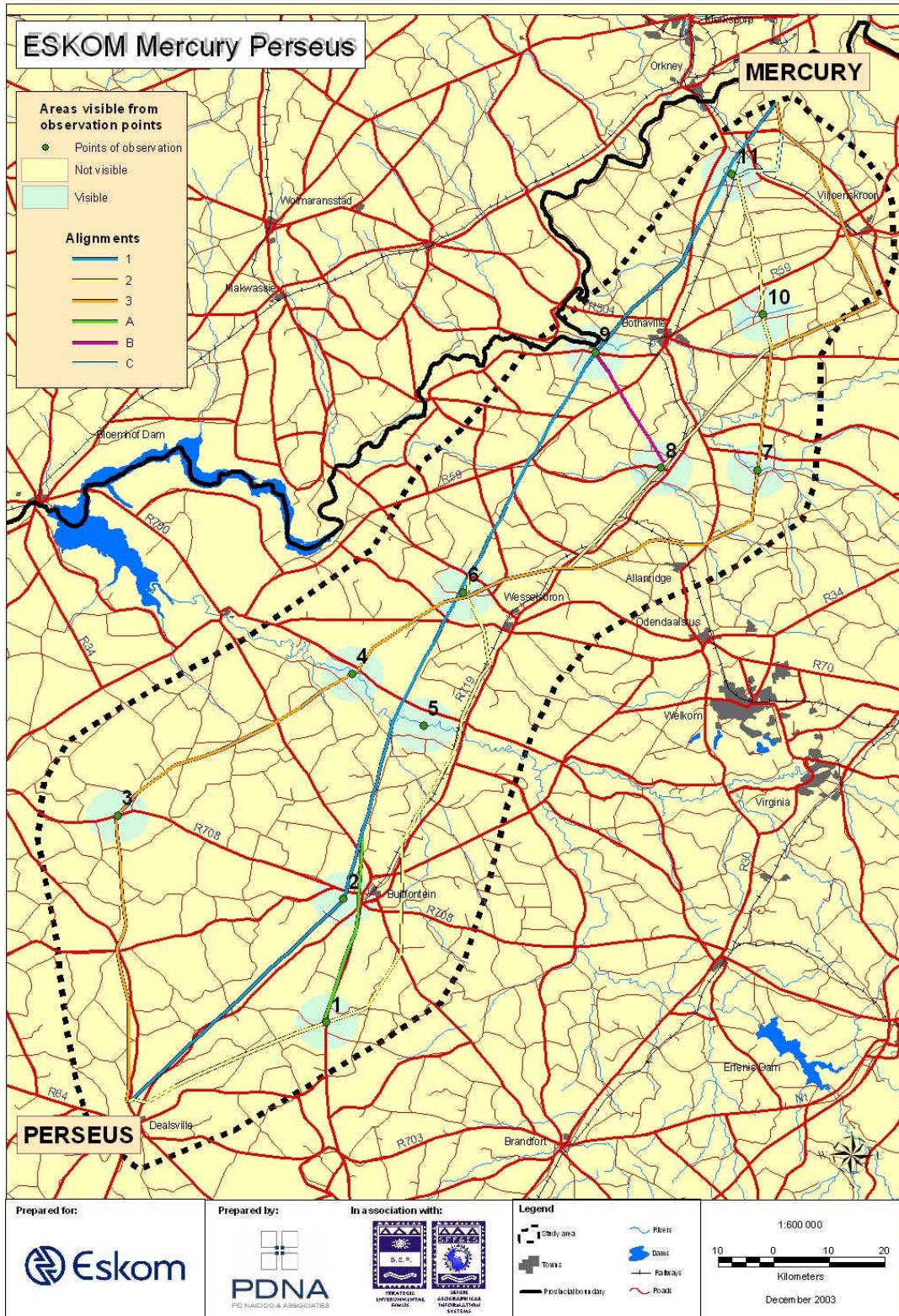
Figure 4. 1: Landscape Types



Figure 4. 2: Slope Analysis



Figure 4. 3: Viewpoints 1 - 11



4.1. Description of affected environment

The visual character and sensitivity of the visual environment within the study area varies at a local level depending on the presence of pans, ridges, agricultural use, roads, transmission lines and urban development. The proposed corridors and alternative alignments traverse three landscape types, cross two rivers and bypass a number of towns between Perseus and Mercury sub-stations.

The affected environment specific to each segment of the proposed corridors and alternative alignments is discussed below in as far as they differ in sensitivity from that of the values of the overall study area. An analysis of the sensitivity to visual impacts for each segment of each of the proposed corridors is provided in Table 4.1. The maximum sensitivity rating that any area can achieve is 17, a value that is achieved by being highly sensitive to impacts on all aspects and having a minimum visual absorption capacity in terms of slope, vegetation height and pattern/diversity.

The sensitivity values for the visual aspects for the affected environment along each of the three proposed corridors and the alternative alignments may differ from those of the overall study area. In the instances where these values do differ, the cause would be due to one or more of the following reasons:

- The **sense of place** is influenced negatively or positively by natural or man made features or activities that interrupt the single vast space, or create new positive spaces;
- The **visual quality** is influenced negatively by added clutter and inconsistent and incompatible activities or features, or positively by the presence of visual assets such as ridges, koppies, pans, rivers or aesthetically pleasing man made structures;
- The **landscape character** is influenced negatively by increased monotony of the landscape or presence of incompatible and discordant activities, or positively by the presence of natural and man-made features that enrich the character such as relatively steeper gradients, presence of rocky ridges, koppies, natural vegetation, pans, flood plains and seeps;
- The sensitivity of the study area to impacts on **scale** is influenced by the vertical height and frequency or density of vertical features and or structures, with a greater density of such features resulting in a reduction in sensitivity;
- The sensitivity of the study area to impacts in terms of **visibility** is influenced by local topography and natural and man made features that could interrupt or reduce the visibility of the affected portion of the transmission line;
- The sensitivity of the study area in terms of **critical views** is influenced by the relative alignment of the affected portion of the transmission line with respect to main roads in the immediate area and the total length of the alignment thus affected;
- The **VAC** in terms of the **slope** is consistent throughout the study area and no portion of any of the proposed alternative alignments is likely to have a significantly greater visual absorption capacity;
- The **VAC** in terms of vegetation height is directly related to the landscape type being traversed by the proposed transmission line;

- The **VAC** in terms of **pattern/diversity** is influenced by the complexity, frequency and densities of natural or man made features or infrastructure occurring within the affected area along the proposed corridor or alternative alignment.

Table 4.1: Sensitivity To Visual Impacts

Sensitivity rating		Susceptibility to visual impacts	Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	Capacity to mitigate visual impacts	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value	Sensitivity rating	Length of segment in km	Higher values equate to greater sensitivity
High	3															
Moderate	2															
Low	1															
Mitigation rating																
High	3															
Moderate	2															
Low	1															
STUDY AREA																
Overview of Entire Study Area																
Perseus to R708 / Bultfontein)			2	2	3	3	3	2		1	1	1	1.0	14.0	48.0	672.0
R708 / Bultfontein			1	1	1	3	3	3		1	1	1	1.0	11.0	-	-
R708 / Bultfontein Vet River			2	2	1	2	3	2		1	1	1	1.0	11.0	42.0	462.0
Vet River			3	3	3	3	2	2		1	2	2	1.7	14.3	3.5	50.2
Vet River to Wesselsbron			2	2	1	3	3	2		1	1	1	1.0	12.0	22.0	264.0
Wesselsbron to Mercury			2	2	1	2	3	3		1	1	2	1.3	11.7	134.0	1,563.3
													74.0	249.5	3,011.5	
Corridor 1																
Perseus to R708 / Bultfontein			2	2	3	3	2	3		1	1	2	1.3	13.7	49.0	669.7
R708 / Bultfontein			1	1	1	1	3	3		1	1	2	1.3	8.7	3.0	26.0
R708 / Bultfontein to Vet River			2	2	2	3	3	2		1	1	2	1.3	12.7	28.0	354.7
Vet River			3	3	3	3	2	2		1	2	2	1.7	14.3	6.0	86.0
Vet River to Wesselsbron			2	2	1	3	3	1		1	1	1	1.0	11.0	20.0	220.0
Wesselsbron to Mercury			2	1	1	3	3	3		1	1	2	1.3	11.7	92.0	1,073.3
													72.0	198.0	2,429.7	
Corridor 2																
Perseus to R708 / Bultfontein			2	2	3	3	3	2		1	1	1	1.0	14.0	60.0	840.0
R708 / Bultfontein			3	3	2	2	3	3		1	1	1	1.0	15.0	3.0	45.0
R708 / Bultfontein to Vet River			3	2	3	3	3	3		1	1	1	1.0	16.0	26.5	424.0
Vet River			3	3	3	3	3	3		1	2	2	1.7	16.3	6.0	98.0
Vet River to Wesselsbron			2	2	2	3	3	3		1	1	2	1.3	13.7	24.0	328.0
Wesselsbron to Mercury			2	1	2	2	3	3		1	2	2	1.7	11.3	123.0	1,394.0
													86.3	242.5	3,129.0	
Corridor 3																
Perseus to R708 / Bultfontein			2	2	3	3	3	1		1	1	1	1.0	13.0	48.0	624.0
R708 / Bultfontein			2	3	2	2	3	1		1	1	1	1.0	12.0	-	-
R708 / Bultfontein to Vet River			2	2	1	3	3	1		1	1	1	1.0	11.0	42.0	462.0
Vet River			3	3	2	3	2	1		1	2	2	1.7	12.3	3.5	43.2
Vet River to Wesselsbron			2	2	1	3	3	1		1	1	1	1.0	11.0	22.0	242.0
Wesselsbron to Mercury			2	2	2	3	3	2		1	1	1	1.0	13.0	134.0	1,742.0
													72.3	249.5	3,113.2	

4.1.1 *Visual environment of Corridor 1*

Perseus to R708 / Bultfontein

The proposed alignment within corridor 1 between the Perseus sub-station and Bultfontein is aligned with an existing all-weather gravel road that traverses the “grasslands” landscape type. This segment has a moderate sensitivity rating.

R708 / Bultfontein

This segment is aligned in close proximity to Bultfontein and has a low to moderate sensitivity due mainly to a low sensitivity in terms of scale and a higher VAC for pattern/diversity.

R708 / Bultfontein to Vet River

This segment traverses cultivated lands, primarily maize and sunflower crops. The sensitivity rating for this segment is moderate.

Vet River

This segment occurs on the Vet River and is limited to the width of the flood plain at the point where the proposed alignment of this corridor crosses the river. The sensitivity rating for this segment is moderate to high.

Vet River to Wesselsbron

This segment traverses cultivated lands, primarily maize and sunflower crops. The sensitivity rating for this segment is moderate.

Wesselsbron to Mercury

The proposed corridor falling within this segment is aligned with and falls mostly within 1000m of the R59 and R30 main roads. The sensitivity rating for this segment is moderate.

4.1.2 *Visual environment of Corridor 2*

Perseus to R708 / Bultfontein

The proposed alignment within corridor 2 between the Perseus sub-station and Bultfontein is aligned with an existing transmission line for most of the way to Bultfontein and traverses the “grasslands” landscape type. This segment has a moderate to high sensitivity rating.

R708 / Bultfontein

This segment is aligned in close proximity to Bultfontein to the south east and has a moderate to high sensitivity due to the high sense of place and visual quality and low absorption capacity relating to a series of large pans to the east of Bultfontein.

R708 / Bultfontein to Vet River

This segment is aligned adjacent to the R719, a busy road between Bultfontein and Wesselsbron. The sensitivity rating for this segment is high due to a high sensitivity in terms of sense of place, landscape character and scale and high visibility and critical views as a result of being aligned close to the main road.

Vet River

This segment occurs on the Vet River and is limited to the width of the flood plain at the point where the proposed alignment of this corridor crosses the river. The sensitivity rating for this segment is high due to a combination of high scores for sense of place, visual quality, landscape character, scale and high scores for visibility and critical views due to the alignment along the main road between Bultfontein and Wesselsbron.

Vet River to Wesselsbron

This segment is aligned adjacent to the R719 a busy road between Bultfontein and Wesselsbron. The sensitivity rating for this segment is high due a low VAC and high values for scale, visibility and critical views.

Wesselsbron to Mercury

This segment deviates from the R719 to the north west of Wesselsbron before re-aligning with it which it then follows for some distance before traversing cultivated lands towards Vierfontein. The sensitivity rating for this segment is moderate to moderate.

4.1.3 Visual environment of Corridor 3

Perseus to R708 / Bultfontein

The proposed alignment within corridor 3 between the Perseus sub-station and the R708 follows an all-weather gravel road due north from Perseus for about 25 kilometres before cutting across farmland for another 20 kilometres to join with an existing transmission line at the R708. This segment has a moderate to high sensitivity rating.

R708 / Bultfontein

The proposed corridor 3 crosses the R708 some distance to the west of Bultfontein. This segment is defined by its proximity to and the urban character of Bultfontein. Since corridor 3 does not pass close to the town of Bultfontein this segment length is effectively zero measured at the point where it crosses the R708.

R708 / Bultfontein to Vet River

This segment is aligned with an existing transmission line to the Vet River and traverses the “grasslands” landscape type. This segment has a moderate sensitivity rating.

Vet River

This segment occurs on the Vet River and is limited to the width of the flood plain at the point where the proposed alignment of this corridor crosses the river. The sensitivity rating for this segment is moderate due to a combination of high scores for sense of place, visual quality, landscape character, scale and moderate to low scores for visibility and critical views.

Vet River to Wesselsbron

This segment is aligned with an existing transmission line the entire way to Wesselsbron. The sensitivity rating for this segment is moderate.

Wesselsbron to Mercury

This segment is aligned with an existing transmission line for significant lengths of the proposed corridor and traverses cultivated lands past Vierfontein towards Mercury sub-station. The sensitivity rating for this segment is moderate.

5. IDENTIFICATION OF RISK SOURCES

The Visual Impact Assessment is focused on two phases of the proposed development: **the construction and operation phases**. For each phase, potential risks of impact to the affected environment are identified. The risk sources are briefly described in this section, while an expansion of the impact assessment is provided in the next section.

5.1 Proposed Corridors and alternative alignments

Three proposed corridors are assessed for potential risks sources. In addition three alternative alignments linking these corridors were proposed. In order to assess the potential risk sources for each of the proposed corridors as a whole it is necessary to first identify the project components and their associated risks sources.

The assessment of the risk sources of each proposed corridor considers the projects components comprising the corridor, the phase during which certain impacts are likely to occur, as well as the linear extent of each component and of the entire corridor. The basic assumption followed is that the risk associated with a project component increases in direct proportion to the linear extent in kilometres of that component. This assumption implies that for the three proposed corridors, where all else is equal, the risk of visual impacts is greatest for the corridor with the greatest length.

The project components with potential risks sources are discussed in greater detail in 5.2. The potential risk sources of visual impacts for the construction and operation phases are discussed under 5.3 Project Phases.

5.2 Project Components

To identify the potential risk sources that may result in impacts to the visual environment, the proposed Mercury - Perseus 400 kV Transmission Line has been divided into project components which are each analysed separately for risk sources. The identified project components introduce potential risks to one or other of the phases or in some instances both. Project components that have been identified are:

- The transmission line;
- Access roads;
- Cleared servitude;
- Sub-stations;
- Construction camps (equipment and lay down areas); and
- Campsites for construction crew housing.

The potential risk of visual impacts associated with each of the project components, is assessed for each of the three landscape types. Table 5.1 illustrates an analysis leading to a risk rating for the visual aspects for each project component within the three landscape types. These risk ratings are transferred to each segment of the study area according to the landscape type in which it occurs.

The analysis highlights potential risks to the visual environment that are associated with each of the project components. The nature and likelihood of risk in terms of the visual aspects is described below for each of the project components.

5.2.1 *Transmission lines*

Sense of place: The transmission line is a linear element that is elevated above the ground with cables stretching from almost fifty down to eight metres above ground. As such the transmission line introduces a definite visual division of the landscape.

Visual quality: The pylon structures and cable span of around 350m –500m have an industrial aesthetic that intrudes on the agricultural and natural aesthetic of the study area.

Landscape character: The industrial, engineered appearance and metallic nature of the pylons and cables intrudes on the typically agricultural activities and features that define the landscape character of the study area.

Scale: The scale of the pylon structure is strongly vertical while the cable spans create a well-defined bow that is elevated from eight to almost fifty metres above ground. The vertical nature of the transmission line contrasts strongly with and therefore has the potential to greatly intrude on the typical horizontal scale of the visual landscape.

Visibility: The pylons extend to up to fifty metres in height, which makes them highly visible in the typical flat landscape of the study area.

Critical views: The height and the foreign nature of the transmission line makes it highly visible and, due to the typically flat topography, the transmission can be seen from distances of up to five kilometres and more. Were main roads pass through the study area and across or along proposed corridors the risk of visual impact will be high.

VAC - Slope: The height of the pylon and elevated cable spans exceeds the capacity of the typically flat topography to either provide a backdrop or to limit the view shed. The transmission line will typically be silhouetted against the skyline and therefore intrude on the visual character of the study area.

VAC - Vegetation: The height of the pylon and elevated cable spans far exceeds the capacity of the typically low vegetation of the grasslands and cultivated lands to screen and therefore absorb the intrusion on the visual character of the study area.

VAC Pattern/Diversity: The relative height and scale of the pylon and elevated cable spans exceeds the capacity of the typically homogenous pattern of the grasslands, cultivated lands and low trees and shrub vegetation of the Acacia flood plains to screen and therefore absorb the intrusion on the visual character of the study area.

5.2.2 Access roads

Sense of place: Access roads will most likely be graded farm roads and will only be required where there are no existing roads. As the sense of place is primarily defined by the vast open space that is typically flat to gradually undulating, and graded farm roads are typical features, the potential risk of access roads is considered to be low in the grassland and cultivated landscape types. However the introduction of new access roads into the Acacia flood plain landscape type would require clearing of the vegetation that would result in an increased risk of visual impact on this landscape type.

Visual quality: The introduction of new access roads into the Acacia flood plain landscape type would require clearing of the vegetation that would result in an increased risk of visual impact on this landscape type as removing vegetation would degrade the local visual quality.

Landscape character: Potential risks to landscape character would only occur should new roads be introduced into the Acacia flood plain landscape.

Scale: No potential risks are considered likely due to the generally flat topography and the fact that graded roads essentially run along the surface.

Visibility: No potential risks are considered likely due to the generally flat topography and the fact that graded roads are elevated much above the general surroundings.

Critical views: No potential risks are considered likely due to the generally flat topography and the fact that graded roads essentially run along the surface.

VAC - Slope: No potential risks are considered likely due to the generally flat topography and little to no modification of the topography would be required.

VAC - Vegetation: The risk associated with new access roads within the grassland and Acacia flood plain landscape types is greatly dependent on careful and sensitive location and alignment to avoid indiscriminate clearing of vegetation in which case the potential risks are low.

VAC Pattern/Diversity: The risk associated with new access roads within the grassland and Acacia flood plain landscape types is greatly dependent on careful and sensitive location and alignment to avoid indiscriminate clearing of vegetation in which case the potential risks are low.

5.2.3 Cleared servitude:

Sense of place: The practise of clearing vegetation beneath transmission lines would only pose a potential risk in the Acacia flood plain landscape type since the cultivated land and grassland would not need to be cleared. The clearing of the vegetation in the Acacia flood plain landscape would result in an increase risk of visual impact on this landscape type.

Visual quality: Clearing of vegetation within the servitude would only be required in the Acacia flood plain landscape type therefore the potential risk of visual impact in this landscape type is high.

Landscape character: There is a moderate potential risk of impacts on the landscape character within the Acacia flood plains due to clearing of vegetation within the servitude.

Scale: A moderate potential risk of impacts in terms of scale is anticipated within the Acacia flood plains, as clearing of vegetation would redefine the vertical scale at a local level.

Visibility: No potential risks are considered likely as the extent of the area that would need to be cleared would not alter the visibility of the transmission lines to any great extent.

Critical views: No potential risks are considered likely, as the extent of the area that would need to be cleared would not alter the location of critical views. Clearing of lanes or stands of mature trees may result in a local increased risk of visual impacts as views are opened up.

VAC - Slope: No potential risks are considered likely.

VAC - Vegetation: The potential risk in terms of vegetation height and therefore VAC is considered to be moderate as clearing of vegetation reduces the visual absorption capacity.

VAC Pattern/Diversity: The linear nature of servitudes leads to the conclusion that the potential risk in terms of diversity and pattern would be high within the Acacia flood plain landscape should vegetation be cleared.

5.2.4 Sub-stations:

Sense of place: As no significant changes to the sub-stations are anticipated the potential risk in terms of sense of place is considered to be low.

Visual quality: No potential risks are considered likely.

Landscape character: No potential risks are considered likely.

Scale: No potential risks are considered likely.

Visibility: No potential risks are considered likely.

Critical views: No potential risks are considered likely.

VAC - Slope: No potential risks are considered likely.

VAC - Vegetation: No potential risks are considered likely.

VAC Pattern/Diversity: No potential risks are considered likely.

5.2.5 Construction camps (equipment and lay down areas)

Sense of place: Due to the typical appearance and use, a construction camp and lay down areas poses a moderate risk within the grassland landscape and a high risk in the Acacia flood plain.

Visual quality: Due to the typical appearance and use, a construction camp and lay down areas poses a moderate risk within the grassland landscape and a high risk in the Acacia flood plain.

Landscape character: The appearance and use of a construction camp and lay down areas poses a low risk within the grassland landscape as similar features occur of farmsteads, but a high risk in the Acacia flood plain where it would appear totally foreign.

- Scale:** It is anticipated that construction camps would not have an excessively large vertical scale and therefore pose a potentially moderate risk in terms of scale.
- Visibility:** The potential risk in terms of visibility is moderate to high due to the foreign nature of a construction camp and likelihood of dust cloud formation caused by the movement of construction vehicles over exposed soil within the camps.
- Critical views:** The potential risk in terms of critical views is moderate to high due to the foreign nature of a construction camp and likelihood of dust cloud formation. This risk increases with increased proximity to main roads and urban centres.
- VAC - Slope:** As the construction camp would have a vertical scale / height of at least three metres that would exceed the visual absorption capacity of the typically flat topography there is a moderate potential risk of impacts occurring.
- VAC - Vegetation:** The establishment of construction camps typically involves clearing of vegetation. The potential risk in terms of visual absorption capacity is considered to be low for the cultivated land, moderate for grasslands and high for the Acacia flood plain.
- VAC Pattern/Diversity:** No long term potential risks are considered likely in terms of the visual absorption capacity of the grassland and cultivated landscape types however clearing of vegetation within the Acacia landscape could pose a moderate risk of impacts as a cleared area would contrast with the surrounding established Acacia vegetation.

5.2.6 *Campsites for construction crew housing*

- Sense of place:** Due to the typical appearance and activities associated with construction housing, a high risk within the grassland landscape and Acacia flood plain is anticipated in terms of sense of place.
- Visual quality:** Due to the typical appearance and activities associated with construction housing, a moderate risk of a decrease in visual quality within the grassland landscape and high risk in the Acacia flood plain is anticipated.
- Landscape character:** Due to the typical appearance and activities associated with construction housing, a moderate risk of the depreciation of landscape character within the grassland landscape and high risk in the Acacia flood plain is anticipated.
- Scale:** It is anticipated that construction housing would not have an excessively large vertical scale and therefore poses a potentially moderate risk in terms of scale.

- Visibility:** The potential risk in terms of visibility is considered high due to the increase of human activity and need to locate the camps as close as possible to major access roads.
- Critical views:** The potential risk in terms of critical views is considered high due to the high pedestrian traffic that is likely to occur and the need to locate the camps as close as possible to major access roads.
- VAC - Slope:** As the construction housing would have a vertical scale / height of at least three metres that would exceed the visual absorption capacity of the typically flat topography there is a moderate potential risk of impacts occurring.
- VAC - Vegetation:** The establishment of construction housing typically involves clearing of vegetation for the camps as well as the surrounding area for firewood and increase the likelihood of veldfires. The potential risk in terms of visual absorption capacity is considered high for all landscape types.
- VAC Pattern/Diversity:** The clearing of vegetation for the establishment of construction housing and collection of firewood and increased likelihood of veldfires poses a moderate to high risk of reducing the visual absorption capacity of the grassland and Acacia flood plain landscape types.

Table 5.1: Analysis of project components for potential risk sources

Visual Impact on Landscape Types	Landscape Types	Transmission line										Access roads										Cleared Servitude												
		Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value	Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value	Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value			
	Grasslands	2	2	2	3	2	2	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	River flood plain Acacia thickets	3	3	3	3	2	2	3	2	2	2	2	2	2	1	1	1	1	1	1	2	1	1	2	3	2	2	1	1	1	1	2	3	2
	Cultivated lands	1	1	2	3	2	2	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Perseus to R708 / Bultfontein	2	2	2	3	2	2	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
R708 / Bultfontein	2	2	2	3	2	2	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
R708 / Bultfontein to Vet River	2	2	2	3	2	2	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Vet River	3	3	3	3	2	2	3	2	2	2	2	2	1	1	1	1	1	1	1	2	1	1	2	3	2	2	1	1	1	1	2	3	2
Vet River to Wesselsbron	1	1	2	3	2	2	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Wesselsbron to Perseus	1	1	2	3	2	2	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 5.1 continued: Analysis of project components for potential risk sources

Visual Impact on Landscape Types	Landscape Types	Sub-stations										Construction camps equip. & Materials										Construction crew housing									
		Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value	Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value	Sense of place	Visual Quality	Landscape Character	Scale	Visibility	Critical Views	VAC - Slope	VAC - Vegetation Height	VAC - Pattern/Diversity	VAC value
	Grasslands	3	2	2	2	3	3	3	3	3	3	2	2	1	2	2	2	2	2	1	2	3	2	2	2	3	3	2	3	2	2
	River flood plain Acacia thickets	3	3	2	2	3	3	3	2	2	2	3	3	3	2	3	3	2	3	2	2	3	3	3	2	3	3	2	3	3	3
	Cultivated lands	2	1	1	2	3	3	3	3	3	3	1	1	1	2	2	2	2	1	1	1	1	2	2	2	3	3	2	3	1	2
	Perseus to R708 / Bultfontein	3	2	2	2	3	3	3	3	3	3	2	2	1	2	2	2	2	2	1	2	3	2	2	2	3	3	2	3	2	2
	R708 / Bultfontein	3	2	2	2	3	3	3	3	3	3	2	2	1	2	2	2	2	2	1	2	3	2	2	2	3	3	2	3	2	2
	R708 / Bultfontein to Vet River	3	2	2	2	3	3	3	3	3	3	2	2	1	2	2	2	2	2	1	2	3	2	2	2	3	3	2	3	2	2
	Vet River	3	3	2	2	3	3	3	2	2	2	3	3	3	2	3	3	2	3	2	2	3	3	3	2	3	3	2	3	3	3
	Vet River to Wesselsbron	2	1	1	2	3	3	3	3	3	3	1	1	1	2	2	2	2	1	1	1	1	2	2	2	3	3	2	3	1	2
	Wesselsbron to Perseus	2	1	1	2	3	3	3	3	3	3	1	1	1	2	2	2	2	1	1	1	1	2	2	2	3	3	2	3	1	2

5.3 Project Phases

The assessment of potential risk sources is divided according to the phase of the project, namely the **construction phase** and the **operation phase**.

5.3.1 Construction Phase

During the construction phase the following project components are considered as potential risk sources:

- The transmission line;
- Access roads;
- Cleared servitude;
- Construction camps (equipment and lay down areas); and
- Campsites for construction crew housing.

Table 5.3 lists the potential risk of visual impacts with respect to each visual aspect and the source associated with the project components during the construction phase.

Table 5. 2: Construction phase

Possible Risks	Source of the risk
Actually identified risks	
Negative impact on the sense of place, visual quality and landscape character.	Construction of a transmission line within the Grasslands and Acacia flood plain landscape types.
Negative impact resulting from clear contrast in scale.	Construction of a transmission line within all three landscape types.
Negative impact due to high visibility.	Construction of a transmission line that is greatly elevated in relation to the topography.
Negative visual impacts due to low visual absorption capacity.	Construction of a transmission line that, due to its height, far exceeds the absorption capacity of the surrounding landscape.
Negative impact on sense of place, visual quality, landscape character and scale within Acacia flood plain landscape.	Clearing of vegetation within the transmission line servitude.
Anticipated risks	
Negative visual impact in close proximity to areas with critical views.	Construction of a transmission line close to main roads, tourism nodes and towns.
Negative visual impact on sense of place and visual quality.	Clearing of vegetation within the Acacia flood plain landscape to construct access roads.

Decrease in visual absorption capacity of landscape.	Clearing of linear strips of vegetation to construct access roads within the Acacia flood plain landscape may reduce the landscape's capacity to absorb visual impacts.
Decrease in visual absorption capacity of landscape.	Clearing of linear strips of vegetation within the transmission line servitude within the Acacia flood plain landscape may reduce this landscape's capacity to absorb visual impacts.
Negative impact on the sense of place, visual quality, landscape character and scale within the grasslands and Acacia flood plain landscape types.	Establishment of construction camps and lay down and/or construction housing may require the clearing of relatively large areas of vegetation.
Negative visual impacts due to high visibility and poor aesthetic quality.	Establishment of construction camps and lay down and/or construction housing with structures and material stockpiles extending to three metres or more and increased human activity.
Negative visual impacts due high visibility, poor aesthetic quality and location close to areas with critical views.	Establishment of construction camps and lay down and/or construction housing close to main roads, tourist nodes and urban centres.
Decrease in local visual absorption capacity of the landscape.	Establishment of construction camps and lay down and/or construction housing may require the clearing of relatively large areas of vegetation.

5.3.2 Operational Phase

During the operation phase the following project components are considered as potential risk sources:

- The transmission line;
- Access roads;
- Cleared servitude;

The possible risks associated with the above project components continue as during the construction phase.

Table 5.4 lists potential risk of visual impacts with respect to each visual aspect and the source associated with the project components during the operational phase.

Table 5. 3: Operation phase

Possible Risks	Source of the risk
Actually identified risks	
Negative impact on the sense of place, visual quality and landscape character.	Presence of the transmission line within the Grasslands and Acacia flood plain landscape types.
Negative impact resulting from clear contrast in scale.	Presence of the transmission line within all three landscape types.

Negative impact due to high visibility.	Presence of the transmission line that is greatly elevated in relation to the topography.
Negative visual impacts due to low visual absorption capacity.	Presence of the transmission line that due to its height far exceeds the absorption capacity of the surrounding landscape.
Negative impact on sense of place, visual quality, landscape character and scale within Acacia flood plain landscape.	Clearing of vegetation within the transmission line servitude.
Anticipated risks	
Negative visual impact in close proximity to areas with critical views.	Presence of the transmission line close to main roads, tourism nodes and towns.
Decrease in visual absorption capacity of landscape.	Strips of cleared vegetation within the transmission line servitude within the Acacia flood plain landscape may reduce this landscape's capacity to absorb visual impacts.

6. IMPACT DESCRIPTION AND ASSESSMENT

The assessment and comparison of the existing and potential visual impacts for each of the three proposed corridors serves to identify a preferred alignment for the proposed transmission line and its associated infrastructure and activities.

An assessment of the potential visual impacts for each of the corridors was carried out by means of a rating matrix, see **Table 6.1 Impact Assessment Matrix**. The matrix analyses each proposed corridor separately by multiplying the visual sensitivity ratings for each visual aspect of each project component by the potential risk rating for the corresponding visual aspect and project component for each segment of the proposed corridor. The proposed corridors are divided into segments that correspond to the landscape types over which the alignment passes. The values for the visual aspects are combined to arrive at an impact rating for each segment of the proposed corridor for each project component.

The three proposed corridors traverse the same landscape types in the same sequence resulting in essentially the same potential visual impacts. A comparison of the three corridors must therefore concentrate on the differences between the proposed alternatives. The primary difference is the length of the three proposals, as potential impacts that affect a greater extent of the visual environment on a longer alignment will have a higher significance.

The impact assessment matrix factors in the length of the segment over which each project component has influence to arrive at an impact value for each segment and for each project component. The higher figures indicate a potentially greater visual impact resulting from the project component assessed. The segment impact values are added to arrive at the impact value for the entire project component.

To assess which of the proposed corridors is the preferred one, the impact values for each project component is added up to arrive at an overall impact value for the entire corridor. The results of the assessment indicate an order of preference for the proposed corridors as:

1. Proposed Corridor 1 (shortest alignment passing west of Bultfontein across farmland);
2. Proposed Corridor 2 (alignment passing to the east of Bultfontein and alongside the R719); and
3. Proposed Corridor 3 (the longest alignment extending some distance to the west of Bultfontein).

The impact values arrived at in the impact assessment matrix indicates the potential for visual impacts. A further assessment is required to determine the significance of the identified impacts. The method of assessing significance used for the overall environmental impact assessment report serves as a template for determining the significance of the potential visual impacts identified for the construction and operational phases of the three proposed corridors. These assessments are summarised in Table 6.3 through to Table 6.5.

Table 6.1 continued: Assessment of project components for potential visual impacts

Vet River	-	9	6	6	6	6	6	3	6	6	2	37	-	-	6	6	3	6	4	4	2	4	2	2	27.3	0	-	9	6	6	6	6	6
Vet River to WesselsBron	-	6	4	2	6	9	3	3	3	3	3	27	-	-	4	4	1	6	6	2	2	2	1	2	21.3	0	-	6	4	2	6	9	3
Weselsbron to Mercury	31	6	2	2	6	9	9	3	3	6	3	31	1.0	23	4	2	1	6	6	6	2	2	2	2	23.3	1	32	6	2	2	6	9	9
	65													49													66						
Corridor 2																																	
Perseus to R708 / Bultfontein	34	6	4	6	6	9	6	3	3	3	3	34	1.0	25	4	4	3	6	6	4	2	2	1	2	25.3	1	35	6	4	6	6	9	6
R708 / Bultfontein	-	9	6	4	4	9	9	3	3	3	3	38	-	-	6	6	2	4	6	6	2	2	1	2	28.3	0	-	9	6	4	4	9	9
R708 / Bultfontein to Vet River	-	9	4	6	6	9	9	3	3	3	3	40	-	-	6	4	3	6	6	6	2	2	1	2	29.3	0	-	9	4	6	6	9	9
Vet River	-	9	6	6	6	9	9	3	6	6	2	43	-	-	6	6	3	6	6	6	2	4	2	2	31.3	0	-	9	6	6	6	9	9
Vet River to WesselsBron	-	6	4	4	6	9	9	3	3	6	3	35	-	-	4	4	2	6	6	6	2	2	2	2	26.3	0	-	6	4	4	6	9	9
Weselsbron to Mercury	31	6	2	4	4	9	9	3	6	6	3	31	1.0	22	4	2	2	4	6	6	2	4	2	2	22.3	1	32	6	2	4	4	9	9
	65													48													66						
Corridor 3																																	
Perseus to R708 / Bultfontein	31	6	4	6	6	9	3	3	3	3	3	31	1.0	23	4	4	3	6	6	2	2	2	1	2	23.3	1	32	6	4	6	6	9	3
R708 / Bultfontein	-	6	6	4	4	9	3	3	3	3	3	29	-	-	4	6	2	4	6	2	2	2	1	2	22.3	0	-	6	6	4	4	9	3
R708 / Bultfontein to Vet River	-	6	4	2	6	9	3	3	3	3	3	27	-	-	4	4	1	6	6	2	2	2	1	2	21.3	0	-	6	4	2	6	9	3
Vet River	-	9	6	4	6	6	3	3	6	6	2	32	-	-	6	6	2	6	4	2	2	4	2	2	24.3	0	-	9	6	4	6	6	3
Vet River to WesselsBron	-	6	4	2	6	9	3	3	3	3	3	27	-	-	4	4	1	6	6	2	2	2	1	2	21.3	0	-	6	4	2	6	9	3
Weselsbron to Mercury	32	6	4	4	6	9	6	3	3	3	3	32	1.0	24	4	4	2	6	6	4	2	2	1	2	24.3	1	33	6	4	4	6	9	6
	63													48													64						

Table 6. 2: Impacts of proposed CORRIDOR 1 on study area

Stage in project lifecycle Corridor 1	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Perseus to R708 / Bultfontein						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Low	Highly probable	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Intrusion of transmission line on sense of place and visual quality of elevated landforms: low rocky ridges and koppies that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Intrusion of transmission line on sense of place and visual quality of elevated landforms: low rocky ridges and koppies that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
R708 / Bultfontein						
Construction						
Impact due to high visibility of transmission line and critical views from Bultfontein and the road network to the west of the town.	Regional	Long term	Medium	Highly probable	Medium	Low to medium

Stage in project lifecycle Corridor 1	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Low	Highly probable	Low to medium	Low
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views from Bultfontein and the road network to the west of the town.	Regional	Medium term	Low	Probable	Low to medium	Low
Operation						
Impact due to high visibility of transmission line and critical views from Bultfontein and the road network to the west of the town.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
R708 / Bultfontein to Vet Rivier						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to high visibility of transmission line and critical views from the R719 and to a lesser extent the R700 and R710 main roads.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Low	Probable	Low to medium	Low
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views from the R719.	Regional	Medium term	Low	Probable	Low to medium	Low
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact due to high visibility of transmission line and critical views from the R719 and to a lesser extent the R700 and R710 main roads.	Regional	Long term	Medium	Highly probable	Medium	Low to medium

Stage in project lifecycle Corridor 1	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Vet Rivier						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to high visibility of transmission line and critical views from the R719 main road.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets for access roads and/or servitudes.	Site	Long term	Medium	Highly probable	Medium	Low
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets for construction camps or housing.	Site	Short term	Medium	Probable	Medium to high	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views from the R719.	Regional	Medium term	Low	Probable	Low to medium	Low
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views from Bultfontein and the road network to the west of the town.	Regional	Medium term	Low	Probable	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of Vet rivier that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to high visibility of transmission line and critical views from the R719 main road.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets within servitudes.	Site	Medium term	Medium	Probable	Medium	Low

Stage in project lifecycle Corridor 1	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Intrusion of transmission line on sense of place and visual quality of Vet river that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Vet Rivier to Wesselsbron						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to high visibility of transmission line and critical views from the R719 main road.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views from the R719 main road.	Regional	Medium term	Low	Probable	Low to medium	Low
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to high visibility of transmission line and critical views from the R719 main road.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Wesselsbron to Mercury						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact due to high visibility of transmission line and critical views from the R59, R30, and R504 main roads.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium

Stage in project lifecycle Corridor 1	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views from the R59, R30, and R504 main roads.	Regional	Medium term	Low	Probable	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Intrusion of transmission line on sense of place and visual quality of elevated landforms: low rocky ridges and koppies that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact due to high visibility of transmission line and critical views from the R59, R30, and R504 main roads.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Intrusion of transmission line on sense of place and visual quality of elevated landforms: low rocky ridges and koppies that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high

WOMM: Without mitigation measures

WMM: With mitigation measures

Table 6. 3: Impacts of proposed CORRIDOR 2 on study area

Stage in project lifecycle Corridor 2	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Perseus to R708 / Bultfontein						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Low	Highly probable	Low	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Intrusion of transmission line on sense of place and visual quality of elevated landforms: low rocky ridges and koppies that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Intrusion of transmission line on sense of place and visual quality of elevated landforms: low rocky ridges and koppies that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
R708 / Bultfontein						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium

Stage in project lifecycle Corridor 2	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact due to high visibility of transmission line and critical views from Bultfontein and the road network to the east of the town.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Regional	Medium term	Low	Highly probable	Low to medium	Low
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views from Bultfontein and the road network to the east of the town.	Regional	Medium term	Low	Probable	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact due to high visibility of transmission line and critical views from Bultfontein and the road network to the east of the town.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
R708 / Bultfontein to Vet Rivier						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to high visibility of transmission line and critical views from the R719 main road immediately adjacent to this proposed alignment.	Regional	Long term	Medium	Definite	Medium to high	Medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Regional	Medium term	Low	Probable	Medium to high	Low

Stage in project lifecycle Corridor 2	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Impact due to high visibility of construction camps and lay down areas and / or construction housing and critical views from the immediately adjacent R719 main road.	Regional	Medium term	Medium	Definite	Medium to high	Medium
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact due to high visibility of transmission line and critical views from the R719 main road.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Vet Rivier						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to high visibility of transmission line and critical views from the R719 main road.	Regional	Long term	Medium	Definite	High	Low to medium
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets for access roads and/or servitudes.	Site	Long term	Medium	Highly probable	Medium	Low
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets for construction camps or housing.	Site	Short term	Medium	Probable	Medium to high	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium
Impact due to high visibility of construction camps and lay down areas and / or construction housing and critical views R719.	Regional	Medium term	Medium	Highly probable	Medium	Low

Stage in project lifecycle Corridor 2	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Intrusion of transmission line on sense of place and visual quality of Vet river that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to high visibility of transmission line and critical views from the R719 main road.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets within servitudes.	Site	Medium term	Medium	Probable	Medium	Low
Intrusion of transmission line on sense of place and visual quality of Vet river that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Vet Rivier to Wesselsbron						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to high visibility of transmission line and critical views from the R719 main road.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views from the R719 main road.	Regional	Medium term	Low	Probable	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high

Stage in project lifecycle Corridor 2	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to high visibility of transmission line and critical views from the R719 main road.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Wesselsbron to Mercury						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact due to high visibility of transmission line and critical views from the R719 main road.	Regional	Long term	Medium	Highly probable	Medium	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium
Impact due to moderate visibility of construction camps and lay down areas and / or construction housing and critical views from Bothaville and the R719 main road.	Regional	Medium term	Low	Probable	Low to medium	Low
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact due to high visibility of transmission line and critical views from Bothaville and the R719 main road.	Regional	Long term	Medium	Highly probable	Medium	Low to medium

WOMM: Without mitigation measures

WMM: With mitigation measures

Table 6. 4: Impacts of proposed CORRIDOR 3 on study area

Stage in project lifecycle Corridor 3	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Perseus to R708 / Bultfontein						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Low	Highly probable	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
R708 / Bultfontein						
Construction						
None						
Operation						
None						
R708 / Bultfontein to Vet Rivier						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium

Stage in project lifecycle Corridor 3	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Low	Probable	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Vet Rivier						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets for access roads and/or servitudes.	Site	Long term	Medium	Highly probable	Medium	Low
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets for construction camps or housing.	Site	Short term	Medium	Probable	Medium to high	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium
Intrusion of transmission line on sense of place and visual quality of Vet river that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high

Stage in project lifecycle Corridor 3	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low
Impact on sense of place, visual quality and landscape character due to clearing of Acacia thickets within servitudes.	Site	Medium term	Medium	Probable	Medium	Low
Intrusion of transmission line on sense of place and visual quality of Vet river that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Vet Rivier to Wesselsbron						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Medium	Definite	Medium	Low to medium
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact on visual quality due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Low to medium
Intrusion of transmission line on sense of place and visual quality of pans that can be considered as visual assets.	Site	Long term	High	Highly probable	High	Medium to high
Wesselsbron to Mercury						
Construction						
Impact on sense of place due to construction of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding	Regional	Long term	Low	Definite	Low to medium	Low

Stage in project lifecycle Corridor 3	Extent	Duration	Intensity	Probability of occurrence /risk	Significance	
					WOMM	WMM
landscape.						
Impact on sense of place and visual quality due to the establishment of construction camps and lay down areas and / or construction housing.	Site	Medium term	Medium	Probable	Medium	Low to medium
Operation						
Impact on sense of place due to presence of transmission line.	Regional	Long term	Medium	Definite	Medium	Medium
Impact due to large contrast in vertical scale of transmission line versus horizontal scale of surrounding landscape.	Regional	Long term	Low	Definite	Low to medium	Low

WOMM: Without mitigation measures

WMM: With mitigation measures

7. RECOMMENDED MITIGATION / MANAGEMENT MEASURES

The potential visual impacts associated with the project components comprising of the three proposed corridor alternative alignments identified in Section 6 above all have the potential to impact negatively on the visual environment. It is not anticipated that any of the project components will have beneficial impacts in terms of the visual environment. The degree of visual impact can be managed through the establishment of a management plan that if followed can in order of preference avoid, remove, or minimise potential visual impacts.

The potential visual impacts that may result from the six project components would each require a different set of management objectives and mitigation measures due to their differing scale and nature of risk. The recommended management objectives and mitigation measures are outlined below for each project component.

7.1 *Transmission Line*

The potential impacts associated with the transmission line relate to its height of up to fifty metres and the metallic, industrial aesthetic that contrasts with the typically flat and agricultural character of the study area. The vertical scale of the pylon structures render the installation of any mitigation measures to screen them self defeating since the screening would need to be of a similar vertical scale and effectively transfer the visual impact.

7.1.1 *Objectives*

- The management of the potential visual impacts associated with the transmission line should focus on careful alignment to avoid sensitive areas;
- Advantage should be taken of existing vertical features to act as a screen or to serve as a backdrop for the transmission line;
- The alignment of the transmission line should maintain as much distance as possible from large concentrations of potential viewers;
- The design of the pylon structure should attempt to reduce the bulk of the steel girders thereby presenting a lighter structure with a lesser silhouette.

7.1.2 *Mitigation measures*

- The alignment should avoid natural features such as elevated ridges and koppies and pans that could be considered as visual assets and that therefore have the potential to be utilised for passive tourist related activities;
- A minimum buffer of 250 metres or 5 times the height of the of the pylons should be allowed between the alignment and any of these natural features;
- A greater distance should be considered around larger and therefore locally unique features;

- Where practical the alignment of the transmission line should run parallel to existing lanes and stands of mature gum and pine trees, which will serve either as a screen or camouflaging backdrop;
- The flagged route should be investigated for potential local re-alignment to further reduce visual impacts.

7.2 Access roads

The potential visual impacts associated with the construction and maintenance of access roads are related to the need to clear vegetation and carry out minor changes to the topography through excavations and fill. The clearing of vegetation has the greatest potential to produce visual impacts in the Acacia flood plain landscape along the Vet and Vals Rivers. Clearing of vegetation especially in long straight lengths impacts on the sense of place, the visual quality and landscape character while reducing the landscapes visual absorption capacity.

7.2.1 Objectives

- Make use of existing access roads where possible;
- Where new access roads are required they should disturb as small an area as possible;
- Locate and align access roads so as to limit modification of the topography and removal of large individual trees or stands trees or shrubs;
- Match the alignment and construction method of new access roads to the topography and to surrounding farm roads or track;
- Locate new access roads away from visual assets such pans, koppies and ridges;
- Where possible keep heavy construction vehicles and high frequency traffic away from areas of visual sensitivity.

7.2.1 Mitigation measures

- Where new access roads are required in the grasslands landscape they should:
 - Not cross over rises, ridges or areas of steep gradient where excavations or retaining structures would be required,
 - Curve around elevated natural features, mature trees and shrub thickets;
 - Keep to grassland areas and avoid any type of wetland vegetation;
 - Follow the existing grade as closely as possible;
 - Resemble the construction method of surrounding roads preferably modelled on the least disruptive example;
 - Be the absolutely minimum width required;
 - Have no or limited cleared verges.
- Where new access roads are required in the cultivated lands:
 - Access roads to pylons should follow the shortest route to the closest adjacent farm roads;

- Where the transmission line crosses a main road and views along the access roads extend for a significant length of the transmission line away from the main road, the sightline should be reduced to a couple of hundred metres by either curving the road or by aligning it alternatively on either side of the transmission line servitude.
- Where a new access road is required in the Acacia flood plain landscape:
 - The absolute minimum should be constructed, preferably a farm track;
 - The road should be designed for the minimum frequency and lightest traffic essential to inspect the line,
 - Where possible access over the last one or two hundred metres closest to the river and denser vegetation should be on foot,
 - Tracks should be limited to the perimeter of dense vegetation or clear grassland areas,
 - The clearing of trees and shrubs should be avoided and where required should not extend in straight lines for distances of more than fifty metres,
 - Tracks should meander around trees and shrub thickets using them to reduce the visible extent of longer tracks,
 - No or very limited verges should be cleared along tracks.
- Where new access roads are required in the vicinity of pans:
 - Roads should run concentrically around pans at a minimum distance of fifty metres and preferably not radiate away from pans,
 - They should be sunk slightly into the ground to hide them,
 - They should follow “the path of least resistance” around elevated areas and drainage lines,
 - No borrow pits or permanent spoil heaps shall be located within one hundred metres of the pans and spoil heaps shall not exceed one metre in height for every hundred metres away from the pan,
 - The existing surface profile around the perimeter of a pan shall not be modified, either elevated or cut to accommodate the access road.
- Where access roads are required in the vicinity of elevated landforms such as ridges and koppies:
 - Access roads shall not cross over the crest of these features,
 - Roads shall run parallel to and at a minimum distance of at least the height of the feature from the outline of the foot slopes,
 - Roads should follow “the path of least resistance” around rock outcrops, elevated areas, drainage lines, trees and shrubs.

7.3 Clearing of servitudes

The potential visual impacts associated with the initial clearing and on going maintenance of servitudes are related to the need to clear vegetation over a certain height that may pose as a fire risk to the transmission line. The clearing of vegetation would very likely result in a loss of visual quality and reduced visual absorption capacity along the servitude. The clearing of vegetation would most likely only be required in the Acacia flood plain landscape along the Vet and Vals Rivers.

7.3.1 Objectives

- Avoid the need to clear vegetation by careful alignment and design of the transmission line and its servitude within areas of low vegetation;
- The objective of reducing the risk of fire damage to the transmission line should be achieved through selective clearing of vegetation below the lines to reduce flammable material while allowing a natural transition of vegetation height and allowing tall trees to remain;
- Avoid a linear path of cleared vegetation that would contrast strongly with the surrounding landscape character.

7.3.2 Mitigation measures

- Examine the portion of the flagged route that falls within the Acacia flood plain and allow for local realignment to avoid the clearing of mature stands of indigenous trees and thickets of shrubs;
- Where the alignment must pass over dense stands of trees and shrubs or over areas of tall trees, either increase the height of the transmission line above the safe margin or reduce the extent of flammable material while allowing tall trees and thickets of shrubs of varying heights to remain;
- The vegetation within the servitude should not be cut to an even height across the servitude instead the vegetation mass (fuel for fires) should rather be reduced by removing material from each of the vegetation stories (grasses, shrubs and trees) thereby leaving a diversity of height and plant material.

7.4 Sub-stations

The extent of disturbance to the visual landscape around the sub-stations is not expected to be great and no or very limited risk of visual impact is anticipated.

7.5 Construction Camps & Lay down areas

The potential visual impacts associated with the establishment of construction camps and lay down areas relate to the possible clearing of vegetation and the foreign scale and aesthetic of the structures, security and stockpiled materials.

7.5.1 Objectives

- Locate construction camps outside of visually sensitive areas and away from critical view sources;
- Limit the contrast between the vertical scale of any of the receiving environment and that of the camp infrastructure and material stockpiles;
- Where possible locate campsites in areas of low visual quality.

7.5.2 Mitigation measures

- Do not locate camp sites in areas where it would be necessary to remove trees and shrubs or large areas of well established vegetation (especially indigenous vegetation);

- Do locate construction camps close to existing stands of exotic trees which can serve as a screen or act as a backdrop;
- If feasible and programme and season allowing, set up temporary camp sites behind a buffer of mature maize plantations in a relatively low lying area away from main roads;
- Where possible make use of sites that have previously been used as material storage sites and that may not have been re-vegetated.

7.6 Construction Housing

The potential visual impacts associated with the establishment of construction housing relate to the possible clearing of vegetation, the foreign scale and aesthetic of the accommodation and the increased human activity and associated visual intrusion into a landscape that is typically homogenous and inactive.

7.6.1 Objectives

- Locate construction housing outside of visually sensitive areas and away from critical view sources;
- Limit the contrast between the vertical scale of the receiving environment and that of the construction housing; and
- Avoid locating the camps where they would be silhouetted against the sky.

7.6.2 Mitigation measures

- Do not locate construction housing in areas where it would be necessary to remove trees and shrubs or large areas of well established vegetation (especially indigenous vegetation);
- Locate the camps close to existing stands of exotic trees, which can serve as a screen or act as a backdrop to the camp;
- Locate construction housing out of sight from critical views sources such as main roads, existing urban and rural settlements and public gathering areas such as schools, sporting facilities, community halls, show grounds, etc.;
- Where possible make use of sites that have previously been disturbed and that may not have been re-vegetated.

8. ALTERNATIVES

Three alternative links between the three proposed corridors are proposed. These are indicated in **Figure 4.1 Landscape Types** as A, B and C. These alternatives offer the opportunity to arrive at a preferred alignment made up of portions of two or more of the proposed corridors connected via one or more of the alternatives.

These three alternatives can influence the identification of a preferred alignment by:

- Providing a shorter route than that of the preferred corridor;
- Aligning a portion of the preferred corridor around a visually sensitive area.

The proposed alternative links would not reduce the overall length of any of the proposed corridors to less than the length of the preferred alignment, proposed corridor one. The alternative links do not provide preferred routes around potentially visually sensitive areas.

The preferred alignment remains that of the proposed corridor 1.

9. DISCUSSION

9.1 Goal

The primary goal of this specialist study is to identify potential risk sources resulting from the project that may impact on the visual environment of the study area, to assess their significance, and to recommend a preferred alignment.

9.2 Assessment

The visual environment, the project components, the potential risk sources associated with the project components and their assessed impact on the visual environment were investigated by examining the following visual aspects:

- Genius Loci (Sense of place)
- Visual Quality (Aesthetics)
- Landscape Character
- Surrounding Landscape Compatibility
- Scale
- Visual Absorption Capacity (VAC)
- Visibility (viewshed and viewing distance)
- Critical Views

9.1.1 Visual Environment

The study area is considered to be largely homogenous in terms of visual character and can be divided into three main landscape types: “grasslands”; “cultivated lands”; and “Acacia flood plains”. These three landscape types were digitised using 1:50 000 topocadastral plans and are illustrated in Figure 4.1.

9.1.2 Visually sensitive areas

The sensitivity to visual impacts for each segment of each of the proposed corridors was assessed in terms of the visual aspects listed above. The Acacia flood plain landscape type that occurs within the flood plain of the Vet and Vals rivers was highlighted as a particularly sensitive visual environment.

9.1.3 Project components

The proposed Mercury - Perseus 400 kV Transmission Line has been divided into project components that are analysed separately for risk sources. Project components that have been identified are:

- The transmission line;
- Access roads;
- Cleared servitude;

- Sub-stations;
- Construction camps (equipment and lay down areas); and
- Campsites for construction crew housing.

9.1.4 Potential risk sources

The assessment of the risk sources of each proposed corridor considers the projects components comprising the corridor, the phase during which certain impacts are likely to occur, as well as the linear extent of each component and of the entire corridor.

The transmission line is considered to pose the greatest potential risk of visual impact during both the construction and the operational phases due to its height and metallic, industrial aesthetic.

The clearing of vegetation either for access roads or within servitudes to manage the risk of damage due to fire is considered to pose a potentially great risk of visual impact during both the construction and the operational phases mainly within the river flood plains.

The establishment of construction camps, lay down areas and housing poses a potential risk of visual impact during the construction phase in terms of critical views from main roads and places of gathering such as urban centres, schools and other public recreational and institutional areas.

9.1.5 Assessment of potential visual impacts

An assessment of the potential visual impacts for each of the corridors was carried out by means of a rating matrix, see **Table 6.1&2 Impact Assessment Matrix**. The basic assumption followed is that the risk associated with a project component increases in direct proportion to the linear extent in kilometres of that component. This assumption implies that for the three proposed corridors, where all else is equal, the risk of visual impacts is greatest for the corridor with the greatest length.

9.1.5 Preferred alignment

The results of the assessment indicate an order of preference for the proposed corridors as:

1. Proposed Corridor 1 (shortest alignment passing immediately west of Bultfontein and further to the west of, Wesselsbron and Bothaville);
2. Proposed Corridor 2 (alignment passing to the east of Bultfontein then alongside the R719 to a point just north of Wesselsbron before sweeping around to the east of Bothaville); and
3. Proposed Corridor 3 (the longest alignment extending some distance to the west of Bultfontein, then passing just to the west and north of Wesselsbron, before sweeping wide to the east via Viljoenskroon to the Mercury substation).

The high visibility of the study area with views easily extending beyond five kilometres results in views of the proposed transmission line being very likely no matter the alignment. It is therefore considered preferable to align the proposed transmission line along existing disturbance corridors or through areas where higher concentrations of infrastructure exist, even though these may include roads that would experience critical views of the line, than introducing a highly intrusive transmission line into areas with little or no visible infrastructure.

The presence of large number of pans and of elevated topography such as small ridges and koppies south of the Vet River and around Wesselsbron, increases the visual quality of these areas and their sensitivity to visual intrusion by the proposed transmission line.

The least preferred alignment is that of Corridor 3 for the following reasons:

- It is the longest route;
- It passes close to a number of large pans both south of the Vet River and north of Wesselsbron;
- It sweeps in a great arc north and east of Wesselsbron through an area where little or no infrastructure is visible; and
- Crosses far more streams and rivers than the other alternatives.

Corridor 2 is less preferred than Corridor 1 for the following reasons:

It is the second longest alignment;

- Although it follows an existing disturbance corridor of a couple of transmission lines, from Perseus to Bultfontein, the cumulative visual impact of a third line would be highly negative;
- It passes very close to a large pan at Bultfontein and a number of smaller ones north of Wesselsbron; and
- It passes through area are west of Bothaville where there is generally little visible infrastructure.

Corridor 1 is the preferred alignment mainly because it presents the shortest route and therefore the smallest footprint that may impact on the study area. Other reasons for it being the preferred alignment include:

- It passes through the area of pans through a stretch where the pans are less densely concentrated;
- It largely misses the area of pans north of Wesselsbron;
- It crosses the fewest rivers and streams of the proposed alignments; and
- Passes west of Bothaville where there is a greater density in the road and transmission / power line networks.

9.1.6 Recommended mitigation

The potential visual impacts that may result from the six project components would each require a different set of management objectives and mitigation measures due to their differing scale and nature of risk. A comprehensive list of recommended management objectives and mitigation measures are outlined in section 7 for each project component.

9.1.7 Alternative alignments

Three alternative alignment links were proposed for the project. These links do not provide alternative routes that would result in a lesser cumulative impact than the already identified and preferred corridor 1.

9.2 Monitoring of implementation of mitigation measures

9.2.1 Transmission line

The greatest potential impacts to the visual environment are associated with the alignment of the transmission line and actual placement of pylon structures. A monitoring programme to ensure that the recommended mitigation measures in this regard are implemented would include:

- A revisit of the study area after the preferred alignment has been flagged to assess compliance with the recommendations and record any agreed amendments to the alignment if any;
- Follow up visits may be required to ensure that there are no deviations from the final agreed alignment.

9.2.2 Access roads and Clearing of transmission line servitude

The monitoring of the clearing of vegetation for access roads and within the servitude that may result in visual impacts should include:

- An assessment on site of the compliance of the alignment and location of each new access road with the recommendations;
- An on site assessment and of the appropriate extent of clearing of vegetation for access roads and within servitudes;
- A itemised photographic record of the existing vegetation;

- A clearing schedule referenced back to the photographic record;
- Follow up visits may be required to ensure that there are no deviations from the final agreed location of access roads and extent of clearing of vegetation.

9.2.3 *Construction Camps, Lay down areas and Housing*

A monitoring programme for the establishment operation and decommissioning of the construction camps, lay down areas and housing should include:

- An assessment on site of the compliance of the location of each new campsite and lay down area with the recommendations;
- An on site assessment and of the appropriate extent of clearing of vegetation for the campsite or lay down area;
- A itemised photographic record of the visual environment;
- Follow up visits may be required to ensure that there are no deviations from the final agreed location of camp sites and extent of clearing of vegetation.
- A final inspection of each site should be undertaken once campsite has been decommissioned.

10. CONCLUSION

The construction and operation of the proposed Mercury - Perseus 400 kV Transmission Line will result in visual impacts within the study area. The significance of these impacts without mitigation will be high due to the relative scale of the structures and the high visibility within the study area. These impacts will last for the entire operational life of the transmission line.

However should the mitigation measures and monitoring programs recommended in this study be implemented the significance of these impacts can be reduced to an acceptable level.

11. REFERENCES

The references quoted in the study report are to be listed in the order provided below.

LYNCH, K. (1996). Good City Form. 10th Printing. Massachusetts Institute of Technology (MIT) Press, Cambridge, Massachusetts, USA.

12. APENDIX ONE

1. VISUAL ASSESSMENT METHOD

This section describes the method of assessing the visual aspects, which have been considered in order to determine the intensity of the visual impact on the area.

1.1 *Genius Loci (Sense of place)*

The spirit, or sense, of place is that quality imparted by the aspects of scale, colour, texture, landform, enclosure, and in particular, the land use. According to Lynch (1996), "it is the extent to which a person can recognise or recall a place as being distinct from other places as having a vivid, or unique, or at least a particular, character of its own."

Table 12.1: Genius Loci Rating

A particularly definite place with an almost tangible dominant ambience or theme.	High
A place, which projects a loosely defined theme or ambience.	Moderate
A place having little or no ambience with which it can be associated.	Low

1.1.2 *Visual Quality (Aesthetics)*

The visual quality is the viewer's impression of a landscape, influenced by their own cultural values and past associations and the landscape's intrinsic physical properties. While cultural and past associations are individual to each viewer, the aesthetic properties, which invoke a reaction to the landscape character, can be identified and evaluated.

These aesthetic properties include the degree of visual diversity or complexity, any discernible textures or patterns, and the presence of unique or striking visual features in the landscape. The viewer's impression of the landscape is also significantly influenced by the degree of human intrusion into the landscape. The degree and compatibility of the human intrusion determines the intactness of the visual character. Together, these properties can be assessed in terms of the overall vividness, intactness and unity of the landscape.

Table 12. 2: Visual Quality Rating

A very attractive setting with great variation and interest but no clutter.	High
A setting, which has some aesthetic and visual merit.	Moderate
A setting, which has little aesthetic value.	Low

1.3 Landscape Character

The topography, vegetation cover and settlement patterns are the chief aesthetic properties, which define the landscape character of the study area. The study area can typically be divided into a number of landscape types.

1.4 Surrounding Landscape Compatibility

Two methods are used to assess the compatibility of a proposed project with the surrounding landscape. Firstly by comparing the proposed land use to that of the existing use and secondly by comparing the level of complexity between the proposed and existing use in terms of the technology, cultural style, and design philosophy evident.

The design philosophy is considered to be the degree of a formal, academic or western science response, as apposed to an evolved response where development is informed by, and is the result of the overlaying of natural and social patterns. Table 12.3 defines the landscape compatibility factors and rating.

Table 12. 3: Landscape Compatibility factors and rating

Landscape factor	Categories	Comment
Land use	Range	
	High	Complements and enhances the existing visual character of the land use.
	Moderate	Complements the visual character of the existing land use.
	Indifferent	Neither complements nor detracts from the visual character of the existing land use.
	Low	Detracts from the visual character of the existing land use.
	None	The visual character of the proposed and existing land uses are not at all compatible.
Complexity	Range	
	High	The existing technology, cultural style, and design philosophy is complimented and enhanced through refinement.
	Moderate	The existing technology, cultural style, and design philosophy is complimented.
	Indifferent	The proposed technology, cultural style, and design philosophy neither complements nor is it in conflict with the existing.
	Low	The proposed technology, cultural style, and design philosophy is in conflict with the existing.
	None	The proposed technology, cultural style, and design philosophy is not only in conflict with but also overwhelms the existing.

A final value is determined by combining the value given for Land use and Complexity compatibility. The final value must be None, Low, Moderate or High.

1.5 Scale

The scale of an area relates to the vertical and horizontal dimensions of the landscape. The vertical and horizontal dimensions of the topography and natural features including vegetation, rock outcrops, water bodies and rivers influence on one's spatial interpretation of the landscape.

A repetition or layering of either horizontal or vertical elements emphasises these dimensions and adds perspective to the landscape, thereby increasing its visual quality.

Upright features in the landscape typically define the vertical scale while the horizontal scale and depth of field are defined by natural and man-made features that block or interrupt the field of vision along the horizontal plane or the line of sight to the horizon respectively.

1.6 Visual Absorption Capacity (VAC)

The visual absorption capacity (VAC) is a measure of the landscape's ability to visually accept /accommodate or embrace a development. Areas that have a high visual absorption capacity are able to easily accept features or structures so that their visual impact is less noticeable. Conversely areas with low visual absorption capacity will suffer a higher visual impact from structures imposed on them.

In this case, the VAC has been defined as a function of three factors:

- Slope
- Vegetation height
- Visual pattern (diversity) with regard to vegetation and structures

Three ranked categories are defined within each factor and each category has been assigned a numerical value to enable an arithmetic calculation of the VAC of different zones. The VAC factors, categories and their values are shown in Table 12.4.

Slope categories were calculated from the elevation grid and reclassified into three classes with slope <3%, 3 - 7 % and >7.

As this study was undertaken at a local to sub-regional level, the areas of varying visual pattern (diversity) and vegetation height were based on the landscape types as discussed under section above. A buffer was drawn around each proposed alignment and the resulting buffers were overlaid to generate a single buffer encompassing all alternative alignments.

Table 12. 4: Visual Absorption Capacity (VAC) factors and their numerical values

VAC Factor	Categories			
	Slope	Range	0-3 %	3-7 %
	Numerical Value	3	2	1
	VAC	Low	Moderate	High
Vegetation Height	Range	< 1 m	1-5 m	5 m
	Numerical Value	3	2	1
	VAC	Low	Moderate	High
Visual Pattern	Description	Uniform	Moderate	Diverse
	Numerical Value	3	2	1
	VAC	Low	Moderate	High

1.7 Visibility (viewshed and viewing distance)

A Visibility analysis was done for various selected viewpoints along the proposed alignments. These points were selected at elevated points where it was anticipated that proposed alternative alignments, which may also be elevated, might result in visual impacts due to high visibility at that point in the landscape.

An elevation grid was created from 20m interval contours for the study area at a scale of 1:50 000. A viewshed analysis, using the elevation grid, was run for each viewpoint at a resolution of 200m. The visible areas were then intersected within 5km buffer zones.

Table 12. 5: Visibility ratings

Where a significant viewshed area allows uninterrupted view distances to the site from the source to < than 5 km.	High
Where a significant viewshed area allows uninterrupted view distances to the site from < 2,5 km but > 500 m.	Moderate
Where a significant viewshed area allows uninterrupted view distances to the site from the from < 500 m.	Low

1.8 Critical Views

Table 12. 6: Critical view ratings

Views of the project are to be seen by many people passing on main roads and from prominent areas i.e. communities and settlements.	High
Some views of the project from surrounding main roads and communities.	Moderate
Limited views to the project from main roads and communities.	Low