

Note: The Impact Assessment and the proposed mitigation measures outlined in this chapter are based on the original Layout Alternative 1, but the residual impacts after mitigation have been adjusted on the basis of the revised preferred and Final Layout (Alternative 2) as informed by the EIA process.

ERM appointed Visual Resources Management to conduct the specialist visual impact assessment for the proposed Olyven Kolk Solar Power Plant. The findings of this study are detailed in *Annex I* and are summarised in this chapter.

This section considers the effects that the proposed Olyven Kolk solar power plant will have on the visual environment and characteristic features and on the people who view it. The potential visual impacts are summarised in *Table 10.1*.

Table 10.1 *Impact characteristics: Visual Impacts*

Summary	Construction	Operation
Project Aspect/ activity	Construction of the solar plant	Operation of the solar plant
Impact Type	Direct negative	Direct negative
Stakeholders/ Receptors Affected	Fixed receptors, Affected landowners, neighbouring land owners, road users, visitors to the area.	Affected landowners, neighbouring land owners, road users, visitors to the area.

10.1 INVENTORY PHASE- BASELINE

The potential visual impacts of the Olyven Kolk solar power plant are determined using a series of quantitative and qualitative criteria. These are described and in some cases ranked to determine both the expected level and significance of the visual impacts. These include:

- Site landscape character;
- Visual exposure;
- Receptor sensitivity;
- Key observation points; and
- Scenic quality.

Each of these aspects is summarized below. Further detail is provided in *Annex I*.

10.1.1 Site Landscape Character

Landscape character is defined by the U.K Institute of Environmental Management and Assessment (IEMA) as the '*distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is*

perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement. It creates the specific sense of place or essential character and 'spirit of the place'.

The vegetation at the Olyven Kolk site is characteristic of a typical Nama Karoo biome where the dominant vegetation is a grassy, dwarf shrubland. The general landuse of the area is for agricultural purposes and Kenhardt is considered the heart of the Dorper sheep-farming area. Hills to the south of Kenhardt contain the Quiver Tree Forest National Monument which is made up of 4000 – 5000 Quiver Trees.

The topography is characteristically flat to slightly undulating plains. Sporadic hills to the south of Kenhardt create some topographical relief. There is a large flat salt pan (Verneukpan) to the south and granite metamorphic outcrops in the area. 'The Bushmanland Basin, which the site falls into, forms an environment for a number of ephemeral pans and extensive systems of intermittent river channels. Approximately 4 km to the south of the Olyven Kolk site there are a number of large ephemeral waterbodies (pans) which may hold water at certain times of the year, during and immediately after the rains.

The following broad brush landscapes were defined within the greater Kenhardt district:

- Non perennial rivers and drainage lines;
- Disturbed context. E.g. Eskom Aries Substation;
- Railway line and access road; and
- Arid agricultural grazing landscape.

The various natural and modified landscapes of the wider areas and within the site are set out in *Figure 10.1* below. See *Annex I* for larger images.

The site is currently used for agricultural grazing and is crossed by intermittent tracks and fences. To the north of the property is a gravel district farm road connecting the R27 with the R358 to Pofadder. There are some isolated farmsteads on this road as well as the Eskom Aries Substation. The different components of modified landscape found in the vicinity of the site are a gravel airstrip, a railway line and service road, an Eskom substation including its associated power lines and a lattice communication tower.

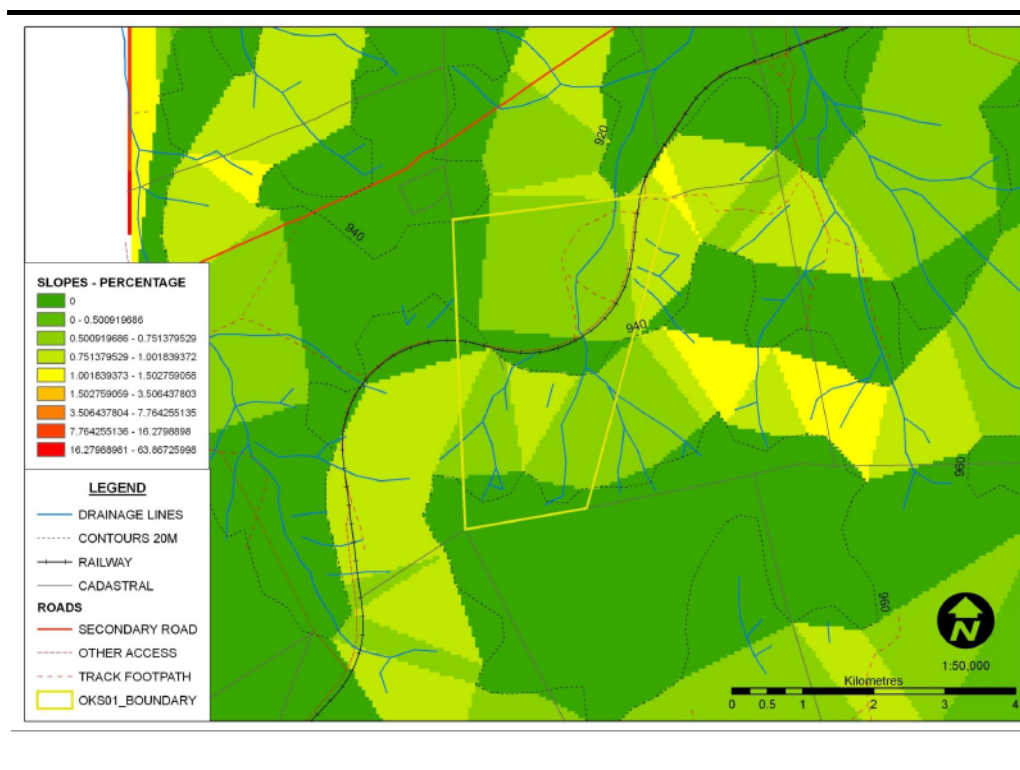
The landscape of the site and surrounds which is relatively flat with shallow drainage lines running in a south to north direction as shown in *Figure 10.2* and the area to the east of the Sishen- Saldanha railway is more undulating. The slope across the site is shallow with topographical elevations across the site ranging from approximately 960 to 930m amsl.

Figure 10.1 *Landscape character: Regional Landscape Character (top left), Existing visual context in terms of vegetation (top right), Existing Visual Context of the modified landscape (bottom left) and Site modifications (bottom right)*



There are sporadic existing landscape modifications in the area which reflects previous and existing agricultural activities, including farm labourers cottages, disused dwellings, farm tracks, as well as railway lines, existing overhead power lines, sub-station and lattice mast.

Figure 10.2 *Slope Analysis Map*



10.1.2 *Scenic Quality*

Scenic quality is a measure of the visual appeal of a tract of land and comprises a number of elements:

- Landform;
- Vegetation;
- Water;
- Colour;
- Scarcity;
- Adjacent Landuse; and
- Cultural Modifications.

Two key landscape types were identified as dry river beds/ drainage lines and Arid Nama Karoo biome. These landscapes are then rated from 1 - 5 with the higher values being the most valued. Three categories of scenic quality are provided based on the apparent scenic quality.

Table 10.2 Scenic Quality Rating Criteria

SCENIC QUALITY RATING CRITERIA	
A - High	19 or more
B - Medium	12 - 18
C - Low	11 or less

Table 10.3 Landscape Types and Scenic Quality Rating

LANDSCAPE AREAS (PRU)	LANDFORM	VEGETATION	WATER	COLOUR	ADJACENT SCENERY	SCARCITY	CULTURAL MODIFICATION	TOTAL	SCENIC QUALITY RATING
Dry river beds/ drainage lines	1	4	3	3	2	4	0	17	B
Arid Nama Karoo biome	1	1	0	2	3	1	0	9	C

(A= score of ≥19; B = score of 12 - 18, C= score of ≤11)

The scenic quality of the site was defined as **Moderate** to **Low** due to the uniformity of the landscape. Adjacent scenic value is **Low** due to the presence of the Aries substation and the power lines which cut through the property. The scarcity value of the dry river beds / drainage lines is due to the High and Medium to High ecological ratings for these areas from the Ecology Impact assessment (Simon Todd Consulting).

10.1.3 Viewshed Analysis

A viewshed analysis was undertaken for both of the Alternatives taking 3 m as the proposed height of the PV structure and as seen in *Figure 10.3* the viewshed is similar for both alternatives. The viewshed is fairly widely dispersed within the two km high visibility buffer area except for the southern extent where views will be contained by slightly elevated terrain. Within the 5 km foreground / middle ground zone the viewshed is broadly linear in spatial distribution aligning to a NE to SW direction. In both instances the viewshed could be rated **medium** in extent.

10.1.4 Visual Exposure

Exposure or visual impact tends to diminish exponentially with distance. The area where a landscape modification starts to influence the landscape character is termed the Zone of Visual Influence (ZVI) and is defined as the 'area within which a proposed development may have an influence or effect on visual amenity (of the surrounding areas).'

Figure 10.4 sets out the criteria used to determine the level of exposure to receptors. It is clear that the solar panels will be moderately visible from the

agricultural farm buildings at a distance of 3.5 km from the site and will be highly visible within 2 km from the site.

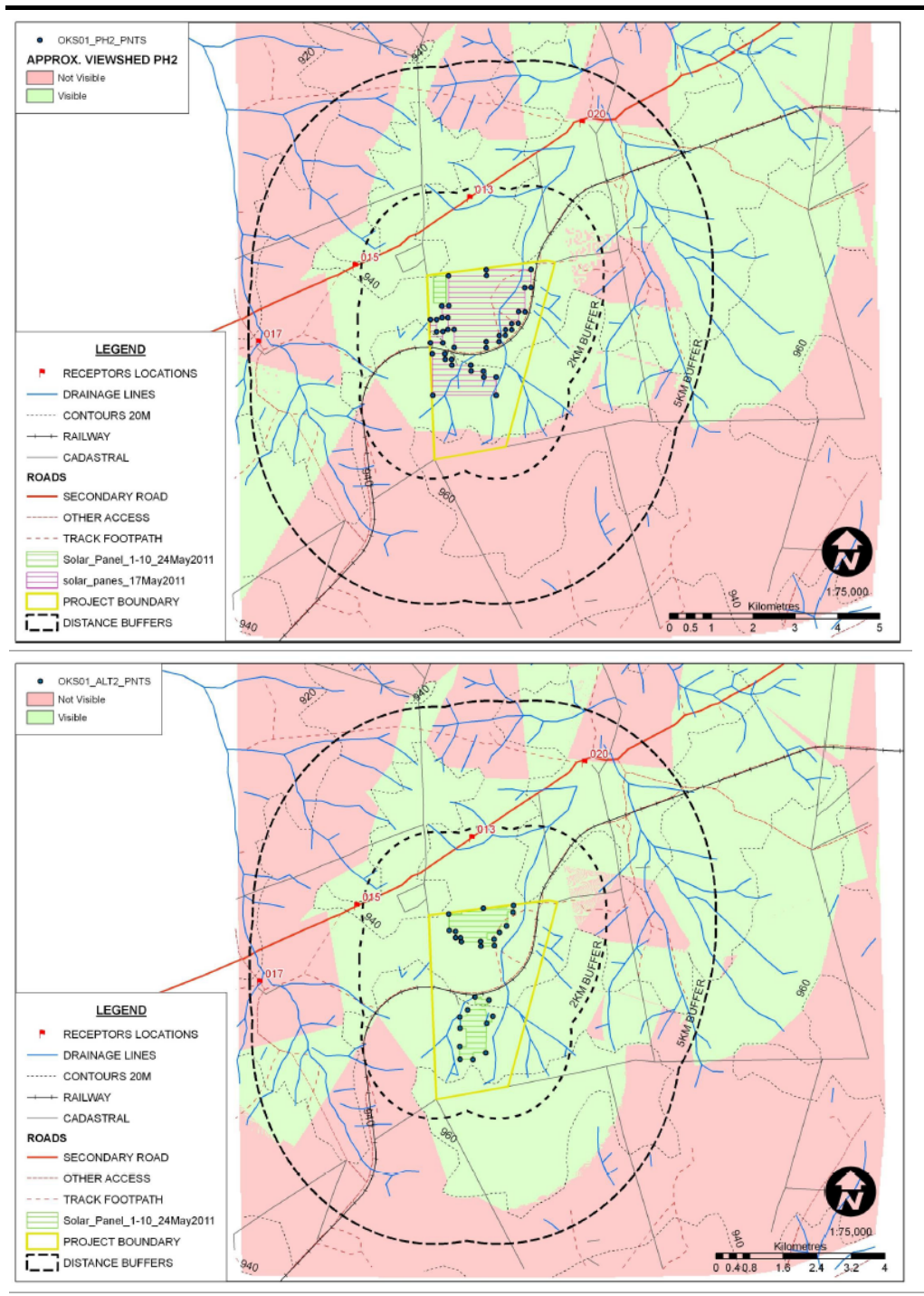
Table 10.4 *Criteria for determining level of exposure*

Receptor Communities	Solar Panels		Power Lines	
	Approx Distance (km)	Rating	Approx Distance (km))	Rating
Agricultural Farm buildings	3.5 km	M	5.5 km	M
Gravel District Road (Eastbound)	1.8 km	H	1 km	H
Gravel District Road (Westbound)	1.7 km	H	1 km	H
Agricultural Farmstead to the west of the site	4.3 km	M	4.3 km	M
Aries Substation	0.1 km	H	0.1 km	H

Visual Exposure Rating Criteria:

- High: Dominant or clearly noticeable (<2km)
- Moderate: Recognisable to the viewer (2 - 6km)
- Low: Minimally visible areas in the landscape (>6km)

Figure 10.3 Viewshed Analysis: Layout 1 (top), Layout 2 (bottom)



See Annex I for larger images.

10.1.5 Receptor Sensitivity

The following receptors were identified as being sensitive to the proposed development as they are located in the viewshed of the proposed component landscape modifications:

- Agricultural Farmstead (east of site);
- District Farm Road; and

- Agricultural Farmstead (west of site).

The criteria used to assess the sensitivity of each receptor is contained in the Visual Impact Assessment Specialist Report in *Annex J*. Sensitivity is ranked as L = Low, M = Moderate, H = High.

The overall sensitivity of the receptors would be **Low** due to the limited use of the views of the project site and the strong existing visual associations of the Aries Substation and transmission lines.

10.1.6 ***Key Observation Points***

Key observation points are defined as *'the people located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed'*. The key observation points identified are listed in *Box 10.1* and the view towards the site from each of these points is shown in *Figure 10.4*.

Box 10.1 ***Key Observation Points***

The following communities were identified as significant in terms of their proximity to the proposed landscape modifications:

1. Agricultural Farm buildings
2. District Farm Road
3. Agricultural Farmstead

Figure 10.4 Key Observation Points from the Olyven Kolk Farm



Existing view south to south east towards the site from the gravel road travelling west (GPS 13)



Modified view

For illustrative purposes

The suitability of landscape modification is assessed by measuring the degree of contrast of the proposed landscape modification with the existing landscape. This is done by evaluating the level of change to the existing landscape in terms of the line, colour, texture and form in relation the visual objectives defined for the area.

The Visual Impact Assessment Specialist Report provided in *Annex I* has a detailed outline of the methodology used to define the degree of contrast or rate of impact significance. The assessment examines the contrast rating for the Key Observation Points (KOP) identified in *Section 10.1.6*.

1. Agricultural Farm buildings
2. District Farm Road
3. Agricultural Farmstead

For each of these KOP's the key landscape features of the site were considered, dry river beds/ drainage lines and Arid Nama Karoo biome.

The other criteria used in the assessment include:

- **Scenic Quality** – see *Section 10.1.2*;
- **Sensitivity**- see *Section 10.1.5*;
- **VRM Class Objective** ⁽¹⁾ - the steps involved in the classification process are:
 - Outlining and numerical evaluation of scenic quality;
 - Outlining of visual sensitivity levels;
 - Delineating distance zones;
 - Overlaying the scenic quality, sensitivity levels and distance zones using a matrix to develop visual resource inventory classes;
 - Adjusting the inventory to meet the landscape goals and designating VRM management classes with objectives for each class through the planning process.
- **Degree of Contrast**- contrast rating criteria for assessment of visual intrusion:
 - *None* - The element contrast is not visible or perceived.
 - *Weak* - The element contrast can be seen but does not attract attention.

(1) Class I is assigned to those areas where a management or specialist decision has been made to maintain a natural landscape. The Class II objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low but should not attract the attention of the casual observer. The Class III objective is to partially retain the existing character of the landscape where the level of change to the characteristic landscape should be moderate and may attract attention but should not dominate the view of the casual observer. The Class IV objective is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the landscape can be high.

- *Moderate* - The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- *Strong* - The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

This has been combined with the ERM methodology to determine impact significance ratings.

10.2.1 *Impact Description and Assessment- Site Layout 1*

Construction and Operational Phase Impacts

Based on the criteria set out in *Section 10.2* and detailed in *Annex I*, the table below shows the contrast ratings for Site Layout 1.

Table 10.5 *VRM contrast ratings for Site Layout 1*

IMPACT SUMMARY SHEET		VRM			
KOP	PRU Area	Scenic Quality	Sensitivity	VRM Class Objective	Degree of Contrast
1	Dry river beds/ drainage lines	B	H	II	M
	Arid Nama Karoo biome	C	L	III	W
2	Dry river beds/ drainage lines	B	H	II	M
	Arid Nama Karoo biome	C	L	III	W
3	Dry river beds/ drainage lines	B	H	II	M
	Arid Nama Karoo biome	C	L	III	W

There are limited views of the site, however from an aesthetic perspective there is merit in design which takes the landscape into consideration. The landscape character of the site is defined by the topography with the washes and dry river beds being important ecological areas. As such it is recommended that development within these would **not meet the Class II visual objectives** to retain the existing character of the landscape. The level of change to the characteristic landscape would not be **low**.

Due to the low levels of scenic quality of the area as a result of the Aries substation and associated power lines, in conjunction with the limited visual resource drivers, there are no tourism related activities in the area. For Site Layout Alternative 1, the significance of the direct impacts on the biophysical environment would be **Major** as development would take place in the dry river beds which are identified as having a high ecological sensitivity. However, the surrounding communities would be able to adapt with relative

ease and maintain pre-impact livelihoods and therefore impact significance is **Moderate to Major**.

Box.10.2 *Construction and Operation Impact: Visual Impact of Site Layout 1*

Nature: **Direct negative** impact with a potential for cumulative impacts from other similar projects which would be located around the Aries substation.

Impact Magnitude -High

- **Extent:** The extent is **Local** as the zone of visual influence would extend approximately two km around the site. There is potential for further cumulative impacts associated with development in dry river bed areas.
- **Duration:** The visual impacts would be **Long term** and continue for the life of the project but would cease should the project be decommissioned and the area rehabilitated back to agricultural land use.
- **Intensity:** The intensity of the direct impacts on the Biophysical Environment would be **High** as development would take place in the dry river beds which are identified as having a high ecological sensitivity. The intensity of the indirect visual impacts on the surrounding receptors is Low as the surrounding communities would be able to adapt with relative ease and maintain pre-impact livelihoods. Due to the low levels of scenic quality of the area as a result of the Aries substation and associated power lines, in conjunction with the limited visual resource drivers, there are no tourism related activities in the area. The overall intensity would be **Medium to High**.

Likelihood – As the impact would be to the aesthetics of the area associated with the direct impact on the biodiversity of the dry river areas, the impact will be **Definite**.

IMPACT SIGNIFICANCE (PRE-MITIGATION) -MAJOR (-VE)

Degree of Confidence: The degree of confidence is **HIGH**.

10.2.2 *Mitigation Measures*

- Redesign the proposed site footprint to ensure that the footprint does not intrude into Class 2 areas which have been highlighted as sensitive.

Construction Mitigation measures

- The clearing of vegetation should as much as possible be limited so as to reduce dust;
- On the areas that are cleared, dust prevention measures need to be implemented during construction to reduce visual impacts associated with dust;
- Fencing needs to be limited to only surrounding the specific sites where the PV panels are to be located and not constructed around the whole property;
- Agricultural land use should be retained on the remaining property so as to retain the agricultural sense of place;
- The construction camp, if required, should be located on an area that will eventually be constructed;
- A litter fence needs to be erected around the construction fence to reduce windblown litter;

- Littering needs to be a punishable offence; and
- The structures need to be simple in design and form in order to blend with the surrounding agricultural setting.

Operation Mitigation measures

- As much as possible, natural vegetation needs to be retained between the PV panel rows to reduce the effects of windblown dust; and
- Littering needs to be a punishable offence.

10.2.3 Impact Description and Assessment- Site Layout 2

Construction and Operational Phase Impacts

The implementation of the above design mitigation measures have resulted in the revised Layout Alternative 2. The proposed footprint of Site Layout Alternative 2, does not intrude into Class 2 areas which have been highlighted as sensitive.

For Site Layout Alternative2, on the criteria set out in *Section 10.2* and detailed in *Annex I*, the table below shows the contrast ratings for Site Layout 2.

Table 10.6 VRM contrast ratings for Site Layout 2

IMPACT SUMMARY SHEET		VRM			
KOP	PRU Area	Scenic Quality	Sensitivity	VRM Class Objective	Degree of Contrast
1	Dry river beds/ drainage lines	B	H	II	M
	Arid Nama Karoo biome	C	L	III	W
2	Dry river beds/ drainage lines	B	H	II	M
	Arid Nama Karoo biome	C	L	III	W
3	Dry river beds/ drainage lines	B	H	II	M
	Arid Nama Karoo biome	C	L	III	W

As previously mention, the mitigated layout does take the dry river bed areas into consideration and the development is located within the **Class III** areas. As such the Class III objectives are met with mitigation (dust control) as the proposed landscape modifications would partially retain the existing character of the landscape where the level of change to the characteristic landscape would be **moderate**. Given that the surrounding landscape context is strongly associated with the Aries substation and associated transmission lines, it is likely that the development may attract attention but would not dominate the view of the casual observer.

Impact significance for Site Layout Alternative 2 is predicted to be Minor as detailed in *Box 10.3*.

Box 10.3 *Construction and Operation Impact: Visual Impact of Site Layout 2*

Nature: Neutral.

Impact Magnitude: Low

- **Extent:** The extent is **Local** as the zone of visual influence would extend approximately two kilometres around the site. There is potential for further cumulative impacts associated with development in dry river bed areas.
- **Duration:** The visual impacts would be **Long term** and continue for the life of the project but would cease should the project be decommissioned and the area rehabilitated back to agricultural land use.
- **Intensity:** The intensity of the direct impacts on the Biophysical Environment would be **Moderate** as development would not take place in the dry river beds which are identified as having a high ecological sensitivity. The intensity of the indirect visual impacts on the surrounding receptors is Low as the surrounding communities would be able to adapt with relative ease and maintain pre-impact livelihoods. Due to the low levels of scenic quality of the area as a result of the Aries substation and associated power lines, in conjunction with the limited visual resource drivers, there are no tourism related activities in the area. The overall intensity would be **Medium to Low**.

Likelihood – As the impact would be to the aesthetics of the area associated with the direct impact on the biodiversity of the dry river areas, the impact will be **Definite**.

IMPACT SIGNIFICANCE (PRE-MITIGATION) -MINOR (-VE)

Degree of Confidence: The degree of confidence is **HIGH**.

10.3 *RESIDUAL IMPACTS*

The bulk of the design phase mitigation measures have been incorporated into the revised site layout, Final Layout (Alternative 2). With the revised, preferred Final Layout (Alternative 2), impact significance ratings will reduce with the implementation of the revised layout and mitigation measures identified above. The implementation of the mitigation will contribute to reducing the significance of the residual impacts on the visual environment on to **minor** (see *Table 10.7*).

Table 10.7 *Pre- and Post-Mitigation Significance: Visual Impact*

Phase	Significance (Pre-mitigation) Site Layout 1	Significance (Pre-mitigation) Site Layout 2	Residual Impact Significance (Post-mitigation) Layout 2
Construction Phase Visual Impact	MAJOR (-VE)	MINOR (-VE)	MINOR (-VE)
Operational Phase Visual Impact	MAJOR (-VE)	MINOR (-VE)	MINOR (-VE)