

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 and preferred Final Layout (Alternative 2) as informed by the EIA process.

ERM appointed ACO Associates cc to conduct a heritage impact assessment, as part of the EIA process for the proposed Olyven Kolk solar power plant. The findings of this study are detailed in *Annex H* and summarized in this chapter. This chapter discusses the potential impacts on archaeology, palaeontology and cultural heritage resources resulting from the establishment of the solar power plant on the Olyven Kolk site. The potential impacts are assessed and mitigation measures to reduce the impacts are outlined below.

Features of archaeological interest found at the site include scatters of stone artefacts dating from the Early Stone Age (ESA) ⁽¹⁾, Middle Stone Age (MSA) ⁽²⁾ and Late Stone Age (LSA). These were found extensively on gravel pavements across the site. No burial graves were observed during the site visit. Two buildings are found on site, a shed and a labourer's cottage, neither of which constitutes a feature of heritage interest. Therefore, sense of place impacts related to features of cultural heritage are not anticipated to be of significance and are therefore not assessed in this chapter but are assessed in *Chapter 10, Landscape and Visual Impacts*.

Table 11.1 *Impact characteristics: Impacts on Archaeology, Palaeontology and Cultural Heritage*

Summary	Construction	Operation
Project Aspect/ activity	(i) Disturbance of or damage to archaeological, cultural heritage sites or palaeontology resources associated with site preparation and construction activities.	N/A
Impact Type	Direct	N/A

(1) Early Stone Age: The archaeology of the Stone Age between 700 000 and 2500 000 years ago.

(2) Middle Stone Age: The archaeology of the Stone Age between 20-300 000 years ago associated with early modern humans.

Summary	Construction	Operation
Receptors Affected	(i) Archaeological and cultural heritage interests within site clearance areas. (ii) On-site fossils.	N/A

11.1 *DISTURBANCE OR DAMAGE TO ARCHAEOLOGY, PALAEOLOGY AND CULTURAL HERITAGE*

11.1.1 *Impact Description and Assessment*

Construction Phase Impact

During site preparation works a number of project activities are likely to have the potential to interfere with archaeological and palaeontological resources present within the site boundary. These include, levelling and grading of areas where the array will be sited although the extent of levelling is likely to be minimal given the flat nature of the terrain on the site. Additional site levelling is required in preparation for the car park, temporary laydown and storage areas. In addition, trenching activities required for drainage and cable routes and the installation of array structures into the ground have the potential to impact features of archaeological and palaeontological interest.

Palaeontology

The impacts of the development on paleontological heritage will generally occur only in the construction phase. They stem from the disturbance, destruction or sealing-in of fossil material preserved at or beneath the ground surface. The Palaeozoic bedrocks as well as the superficial sediments (alluvium, wind-blown sands) within the Olyven Kolk site are considered to be of low sensitivity.

The construction of a solar power plant requires minimal intrusive works and excavations of potentially fossiliferous bedrocks. Given this and since the palaeontological sensitivity of the rock units within the site is generally low, the area affected by intrusive construction activities is relatively small the magnitude of the impact is expected to be low. In addition it is not expected that the trenches required will not be deep enough to intersect with any major fossil bearing sediments.

Construction Impact: Destruction or Disturbance of Palaeontology

Nature: Site preparation activities associated with the development have the potential to have a direct negative impact on paleontological finds if these occur in the affected areas.

Impact Magnitude – Low

- **Extent:** The extent of the impact is **on-site**.
- **Duration:** The duration would be **permanent** if fossils are encountered and destroyed.
- **Intensity:** **Low**.

Likelihood – There is **unlikely** that this impact will occur.

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

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

Archaeology

Scatters of Stone Age artefacts were recorded across the site on gravel pavements. These scatters have the potential to be impacted by construction activities including the movement of vehicles or presence of personnel on site. In general, the stone scatters are considered to be of minor importance or value and are probably not in their original context. The scatters observed on site are not associated with organic remains such as bone, which could provide valuable information on prehistoric lifeways and therefore merit these more importance of value.

Construction activities likely to impact the sites archaeological features (surface clearing, trenching for cables, array structure frames, buildings, car park and laydown areas) will be limited to a relatively small area of the site and the remainder of the site will remain relatively undisturbed and it is considered that the impact of disturbance of stone age material in the affected zones is sustainable.

Construction Impact: Destruction or Disturbance of Archaeology

Nature: Construction activities would result in a **negative direct** impact on archaeological interests on the solar plant site.

Impact Magnitude – Low

- **Extent:** The extent of the impact is **on-site**.
- **Duration:** The duration would be **permanent** as these resources are non-renewable and once destroyed, they can not be replaced.
- **Intensity:** Destruction or disturbance of archaeological resources will be of **negligible** intensity.

Likelihood – There is a **definite** likelihood that localised archaeological resources would be lost should the solar power plant be constructed on the Olyven Kolk site.

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

Degree of Confidence: The degree of confidence is **medium to high**.

11.1.2 *Mitigating for Damage or Destruction of Archaeological and Paleontological Resources*

The objective of mitigation is to minimise impacts on archaeological and paleontological resources and ensure opportunities to identify such resources are maximised.

Design Phase

- Palaeontological fossils preserved within alluvial sediments will be largely safeguarded by avoiding the drainage areas on site.

Construction Phase

- Should any human burials, archaeological or palaeontological materials (fossils; bones; artefacts; cultural Material such as historic glass, ceramics, etc; sub-surface structures, graves etc) be uncovered or exposed during earthworks or excavations, they must immediately be reported to the South African Heritage Resources Agency (SAHRA). After assessment and if appropriate a permit must be obtained from the SAHRA or HNC to remove such remains.

11.1.3 *Residual Impact*

Should the mitigation measures listed above be undertaken upon finds of palaeontological interest (fossils, bones, artefacts etc.), impacts will be considered **positive** as the finds will be documented and data can be added to existing scientific data of the region. In addition, Site Layout Alternative 2 avoids the drainage lines and therefore palaeontological fossils preserved within alluvial sediments will be largely safeguarded.

The archaeological features of the site are not regarded as sensitive and it is expected that construction activities will result in minor impacts to the archaeological features of the site (see *Table 11.1*). It is inevitable that features of archaeological interest may be disturbed during construction activities give the extensive number of artefacts across the site and therefore the impact significance remains as **minor**, regardless of implementation of recommended mitigation measures.

Table 11.1 *Pre- and Post-Mitigation Significance: Damage or destruction to Archaeological and Paleontological Resources*

Phase	Significance (Pre-mitigation) Site Layout 1	Significance (Pre-mitigation) Site Layout 2	Residual Impact Significance (Post-mitigation) Layout 2)
Construction - Palaeontology	MINOR (-VE)	MINOR (+VE)	MINOR (+VE)
Construction - Archaeology	MINOR (-VE)	MINOR (-VE)	MINOR (-VE)

12.1 BENEFITS FOR THE LOCAL ECONOMY

12.1.1 *Impact Description and Assessment*

The development of the proposed Olyven Kolk solar power plant will result in increased spending in South Africa thus having a positive impact on the national, regional and local economy to varying degrees. Direct impacts such as employment and procurement associated with the project will have the most significant impact when compared to other indirect and induced economic impacts. The direct impacts will be most significant during the construction phase of the project, and are likely to have the largest influence on the local economy.

Table 12.1 *Impact Characteristics: Benefits for the Local Economy*

Summary	Construction	Operation
Project Aspect/ activity	Employment and Procurement of local contractors/workers.	Employment and Procurement of local contractors/workers.
Impact Type	Direct, indirect and induced positive impact.	Direct, indirect and induced positive impact.
Stakeholders/ Receptors Affected	Local community, Local Municipality, suppliers throughout South Africa and Directly Affected Landowner.	Local community, Local Municipality, suppliers throughout South Africa and Directly Affected Landowner.

Construction Phase Impacts

Employment and training

The capital investment required for the 190 MW solar power plant is approximately R6.5 billion (if built to this capacity). The construction phase will be approximately six to eight months for every 10 MW. It is estimated that for the construction phase activities, an average of 60 site construction jobs will be created for a 10 MW block of the facility (thus approximately 300 jobs could be created for the facility as it is established over time). Of these jobs, approximately 20 to 30 percent of the jobs will require highly skilled personnel; the remainder will comprise semi-skilled and unskilled workers.

Unemployment is high (29 percent) in the Project Area and in Kenhardt. There is a high dependency by the community on government grants (approximately 95 percent). This is attributed to the general lack of employment opportunities and lack of public transportation services in the area. It is intended that AES and its contractors will source the majority of the semi-skilled and unskilled workers from the local municipal area with the remainder being sourced regionally. The benefit to the local economy, however, will be for the short-term (i.e. for the duration of the construction phase).

During the site preparation phase, semi- skilled and unskilled persons will be employed from the local community. The jobs in this phase will include site security, manual labour, civil works, transportation of goods and services.

The construction phase will create opportunities for 'on-the-job' training for the local people. AES plans to bring in a highly-skilled team of solar energy technicians from overseas who will be providing training to a number of potential employees, preferably from the regional area, thus increasing the general skills levels in the local area.

Procurement

During the construction phase the specialised industrial machinery and building construction sectors will derive the greatest benefits. Local procurement will primarily benefit the civil engineering, construction, hospitality and service industries. The highly specialised nature of the machinery required for the Project will require that the majority of the technical components be imported from specialist suppliers. The renewable energy sector is still developing in South Africa and as such the appropriate supplies and service providers are not available in the country; this may, however, change over time. The majority of the project spend will be on PV panels which will be imported, the balance of plant (buildings, substations etc) will be sourced in South Africa.

Indirect and induced benefits

The project will lead to increased spending in the local economy resulting from increased levels of disposable income and demand for additional services (e.g. retail shops and restaurants). This in turn will generate indirect and induced job opportunities.

Box 12.1

Construction Impact: Local Economy (including Procurement and Employment)

Nature: The benefit to the local economy will be **direct** via employment and procurement of services

Impact Magnitude – medium

- **Extent:** Employment and procurement of services will be created for South African's at a **local, provincial and national** level depending on skills and capacity availability.
- **Duration:** Employment and procurement will be generated during the construction phase and will therefore be **short-term**.
- **Intensity:** The intensity will be **medium** as the employment numbers at the site during the construction period are anticipated to be 60 per 10 MW and there will be some increase in procurement of goods and services in the local area during the construction phase.

Likelihood – This impact will **definitely** occur.

IMPACT SIGNIFICANCE (PRE-ENHANCEMENT) – MODERATE POSITIVE

Degree of Confidence: The degree of confidence is **medium** given that actual figures are not yet available due to the early stage of this project.

Operational Phase Impacts

Direct employment

Operation of the Solar Power Farm will largely be automated with routine scheduled services and maintenance. The operations team will comprise of between three to four full time jobs for every 10 MW (or between 24 and 30 jobs for a 190 MW facility). It is estimated that half of the operations team will be semi-skilled and unskilled labour and therefore potentially sourced locally. Approximately two of the staff for 10 MW (approximately 14 for the 190 MW) will be highly skilled; the majority of jobs will include security, groundskeeper, panel cleaners and infrastructure maintenance.

Much of the knowledge regarding operations and maintenance will be acquired 'on-the-job'. It is envisaged that operations personnel will be increasingly trained up and qualified to high levels over the operational period, consistent with demonstrated capability and ambition.

Direct procurement

Similar to the construction phase, the majority of goods and services will be highly specialised and technical in nature with the majority of operational expenditure being imported. Locally procured services will include maintenance work for balance of plant facilities, 24 hour security and cleaning resulting in an ongoing investment injection. Over time, as businesses develop locally to meet the needs of the renewables sector, levels of procurement may increase.

Indirect and induced benefits

Apart from the direct benefits resulting from the operational spend and direct jobs created, the spending of those employed directly would result in a positive indirect impact on the local and regional economy.

The potential for the proposed Project and other future projects to result in greater impacts on local economies and the South African economy as a whole is primarily dependent on economies of scale. Initially import content will be high. If the sector grows in size, however, it should provide opportunities for growth of the local supply chain and the additional benefits that would flow from this. The introduction of a large-scale renewable energy programme could provide local economic opportunities for component manufacturers. AES will also look into establishing a community development fund from which the community will benefit.

Operational Impact: Local Economy (including Procurement and Employment)

Nature: The benefit to the local economy will be **direct** via employment and procurement of services and **indirect** and induced via the spend in the local economy due to increased wages; local supply chain etc.

Impact Magnitude - Low

- **Extent:** Employment and procurement of service will be created for South African's at a **local, provincial and national** level depending on skills and capacity availability.
- **Duration:** Employment and procurement of services will be generated during the operational phase over a period of 20 years and will therefore be **long-term**.
- **Intensity:** The intensity will be **low** given the relatively small number of employees and procurement spend during the operation phase.

Likelihood - This impact will **definitely** occur.

IMPACT SIGNIFICANCE (PRE-ENHANCEMENT) - MINOR POSITIVE

Degree of Confidence: The degree of confidence is **medium** given that actual figures are not yet available due to the early stage of this project.

12.1.2

Enhancement Mitigation

The objective of enhancement is to optimise opportunities for employment and procurement of local labour and services, wherever possible, or alternatively that procurement at a regional or national level should take place.

Employment and procurement

It is important to recognise that the nature of the project dictates that large proportions of specialist materials and some specialist skills will have to come from outside of South Africa (and/or outside the province) with a high portion of international imports. However, the objective of enhancement is to optimise opportunities for employment/procurement of local people/suppliers or alternatively that employment and procurement opportunities are enhanced on a regional or national basis, where possible.

The following measures will be implemented to ensure that employment of local people is maximised and procurement of local, regional and national services are maximised:

- AES will establish a recruitment and procurement policy which sets reasonable targets for the employment of South African and local residents/suppliers (originating from the local municipality) and promote the employment of women as a means of ensuring that gender equality is attained. Criteria will be set for prioritising, where possible, local (local municipal) residents/suppliers over regional or national people/suppliers. All contractors will be required to recruit and procure in terms of AES's recruitment and procurement policy.

- AES will work closely with relevant local authorities, community representatives and organisations to ensure that the use of local labour and procurement is maximised. This may include:
 - liaison with the local labour office ⁽¹⁾ to advertise employment opportunities as part of the local recruitment drive;
 - sourcing and using available databases on skills/employment-seekers that local authorities may have;
 - advertising job opportunities and criteria for skills and experience needed through local and national media; and
 - conducting an assessment of capacity within the Local Municipality and South Africa to supply goods and services over the operational lifetime of the project.

- No employment will take place at the entrance to the site. Only formal channels for employment will be used.

- Advertise experience, quality and volume requirements for the supply chain needs.

- AES to work closely with the suppliers to provide the requisite training to the workers. The training provided will focus on development of local skills.

- Ensure that the appointed project contractors and suppliers have access to Health, Safety, Environmental and Quality training as required by the Project. This will help to ensure that they have future opportunities to provide goods and services to the sector.

Community Development:

- AES should explore ways to enhance local community benefits with a focus on broad-based BEE through mechanisms such as a community development fund. At this preliminary stage, and in accordance with the relevant BEE legislation and guidelines, up to four percent of after tax profit could be used for community development over and above that associated with expenditure in the area.

The BEE Scorecard specifies the following contributions (totalling four percent):

- enterprise development – max of 15 points for contribution of three percent of after tax profit or more; and
- socio-economic development – max of 5 points for contribution of one percent of after tax profit or more.

(1) Labour Office: There is no labour office in the area; however, a satellite office comes to the area once a month to assist the local community with its employment related queries.

- Community investment activities will be identified in collaboration with the local Municipality and community representatives to ensure alignment with the key needs identified through the Integrated Development Planning process.
- All projects will be aligned with AES's policies.

12.1.3 *Residual Impact*

The implementation of the above measures would ensure that the construction and operation impacts remain of minor positive significance. The pre- and post- enhancement impacts are compared in *Table 12.2*.

Table 12.2 *Pre- and Post- Enhancement Significance: Local Economy (including Procurement and Employment)*

Phase	Significance (Pre-enhancement)	Residual Impact Significance
Construction	MODERATE positive	MODERATE positive
Operation	MINOR positive	MINOR positive

12.2 *INCREASED SOCIAL ILLS*

12.2.1 *Impact Description and Assessment*

Table 12.3 *Impact Characteristics: Increased Social Ills*

Summary	Construction
Project Aspect/ activity	Temporary worker camp on site
Impact Type	Direct, negative impact
Stakeholders/ Receptors Affected	Specifically landowners of directly affected neighbouring farms.

Construction Phase Impacts

The Project area is located outside of town in an area predominantly characterised by agricultural activities. The population density of the immediate area is low; Kenhardt, the closest community, is located approximately 44 km from the site. Beside the distance, there is a general lack of public transportation services as well as a lack of accommodation in the town.

AES will require accommodation for approximately 60 to 80 people per 10 MW and 200 for the entire project. The project is considering accommodating construction workers in Kenhardt and using shuttle buses transport workers to and from the site. An alternative option is to construct a temporary construction workers camp at the site. The worker camp will lead to a dramatic increase in the population of an area that has an extremely small population.

One of the four neighbouring landowner's resides on his farm; raised concerns about the presence of worker camps in the area. His main concern was based on the fact that livestock on these farms are generally left unattended. This may potentially lead to social ills, such as livestock theft and petty crimes may be increased if a construction camp is built on the site.

The two social ills that may occur as a result of the increased number of workers are described below.

- **Theft of livestock** is already problematic on farms located close to roads (R27) and in areas where construction work is taking place. It is likely that stock theft will continue and possibly increase during the construction phase.
- **Petty crimes** (e.g. theft of tools, household items and farm materials) on the project affected farm and neighbouring farms could occur.

Box 12.3

Construction Impact: Increased Social Ills

Nature: The social ills likely to accompany the Project would be regarded as an **indirect, negative** impact.

Impact Magnitude – Medium

- **Extent:** It is anticipated that the potential social ills will have impacts at the **local** scale.
- **Duration:** The worker camp will be on site for the duration of construction and it is expected to be **short-term**.
- **Intensity:** The intensity will be **low** as people should be able to adapt with relative ease.

Likelihood – This impact is **likely** to occur during the construction phase; one landowner has highlighted that stock theft already occurs and is likely to increase with the presence of a construction camp.

IMPACT SIGNIFICANCE (PRE-MITIGATION) – MODERATE NEGATIVE

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

12.2.2

Mitigation

The objectives of mitigation are:

- to limit, where possible, social ills brought about by the construction and operation of the Solar Power Farm; and
- to ensure that Contractors manage their workers in such a way that the impacts on local communities are limited.

Specific measures include:

- AES and the appointed contractors to develop an induction programme, including a Code of Conduct, for all workers (AES and contractors

including their workers) directly related to the project. A copy of the Code of Conduct to be presented to all workers and signed by each person.

- The Code of Conduct must address the following aspects:
 - respect for local residents;
 - respect for farm infrastructure and agricultural activities;
 - no hunting or unauthorised taking of products or livestock;
 - zero tolerance of illegal activities by construction personnel including: unlicensed prostitution; illegal sale or purchase of alcohol; sale, purchase or consumption of drugs; illegal gambling or fighting;
 - compliance with the Traffic Management Plan and all road regulations; and
 - description of disciplinary measures for infringement of the Code and company rules.

- If workers are found to be in contravention of the Code of Conduct, which they signed at the commencement of their contract, they will face disciplinary procedures that could result in dismissal. Stock theft should be noted as a dismissible offence.

- AES will implement a grievance procedure that is easily accessible to neighbouring farmers and other stakeholders, through which complaints related to contractor or employee behaviour can be lodged and responded to. AES will respond to all such complaints. Key steps of the grievance mechanism include:
 - circulation of contact details of ‘grievance officer’ or other key contact;
 - awareness raising among local communities (including all directly affected and neighbouring farmers) regarding the grievance procedure and how it works; and
 - establishment of a grievance register to be updated by AES, including all responses and response times.

- The construction workers (from outside the area) should be allowed to return home over the weekends or on a regular basis to visit their families; the contractor should make the necessary arrangement to facilitate these visits.

12.2.3 *Residual Impact*

The implementation of the above mitigation measures would reduce the construction impacts from moderate to minor significance. The pre- and post-mitigation impacts are compared in *Table 12.4*.

Table 12.4 *Pre- and Post- Mitigation Significance: Increased Social Ills*

Phase	Significance (Pre-mitigation)	Residual Impact Significance
Construction	MODERATE negative	MINOR negative

12.3 LOSS OF AGRICULTURAL LAND

12.3.1 Impact Description and Assessment

Table 12.5 Impact Characteristics: Loss of Agricultural Land

Summary	Construction and Operation
Project Aspect/ activity	Land take for the construction and operation of facility.
Impact Type	Direct, negative impact.
Stakeholders/ Receptors Affected	Directly affected landowner, Local, Provincial and National Government.

Construction and Operation Phase Impacts

At present, there are three relevant pieces of legislation that apply to the change of land use; they are the Land Use and Planning Ordinance ⁽¹⁾ (Ordinance 15 of 1985) (LUPO), the Northern Cape Planning and Development Act No 7 of 1998 and the Subdivision of Agricultural Land Act No 70 of 1970. The Department of Environmental Affairs and Development Planning has published amendments to LUPO. The proposed amendments provide that a consent use in Agriculture Zone 1 may be obtained for renewable energy structures. Numerous development parameters for renewable energy structures are included in the proposed amendments, making provision for height, setback, finishing and colour, lighting, advertising, noise and any associated noise pollution ⁽²⁾. The proposed amendments must be read with environmental legislation, including any laws relating to the rehabilitation of land, land clearing, soil erosion and habitat impact and provide for the restoration of land during the decommissioning process. The Department intends to finalise the amendments in September 2011 ⁽³⁾.

In addition to the amendments to LUPO, an intergovernmental meeting was held in October 2010 by the Department of Energy and National Department of Agriculture Forestry and Fisheries (DAFF) and the South African Wind Energy Association to discuss guidelines for the regulation of renewable energy farm's uptake of agricultural land ⁽⁴⁾. The new draft guidelines state that no renewable energy facility structures, footprint, service area, supporting infrastructure or access routes in any form or for any purpose will be allowed:

- On high potential or unique agricultural land as has been determined or identified by DAFF or the relevant provincial Department of Agriculture

(1) LUPO is used by three provinces Western Cape Northern Cape and Eastern Cape on Local Municipal level. On May 21st an updated Ordinance was published in the Western Cape Provincial Gazette for public comment.

(2) <http://www.legalbrief.co.za/article.php?story=20110726104904758>

(3) <http://www.legalbrief.co.za/article.php?story=20110726104904758>

(4) Comments received from Department of Agriculture in the Western Cape, 2010

through its existing or future developed spatial information data sets and/or through a detail agricultural potential survey.

- On areas currently being cultivated (cultivated fields/ production areas) or on fields that have been cultivated in the last ten years. This is relevant to cultivated land utilised for dry land production as well as land under any form of irrigation.
- To intervene with or impact negatively on existing or planned production areas (including grazing land) as well as agricultural infrastructure (silos, irrigation lines, pivot points, channels, feeding structures, dip tanks, grazing camps, animal housing, farm roads etc).
- To result in a degradation of the natural resource base of the farm or surrounding areas. This include, but are not limited to, the limit of soil degradation or soil loss through erosion or any manner of soil degradation, the degradation of water resources (both quality and quantity) and the degradation of vegetation (composition and condition of both natural or established vegetation).

The construction and operation of the proposed renewable energy facility will require that approximately 15 percent of the identified land parcel will be taken for the construction and operation of the renewable energy facility. AES plans to buy the farm from the landowner for the development and its related infrastructure.

Even though agricultural land will be lost to the project, the area where the project site is located is regarded as an area of low quality soil and cannot sustain any agricultural activities beyond a low level of grazing. The carrying capacity of the entire site is about 200-250 goats/sheep as it is currently being used.

Box 12.4 ***Construction and Operation Impact: Loss of Agricultural Land***

Nature: The impact on agricultural land is going to be experienced as a **direct, negative** impact.

Impact Magnitude - Low

- **Extent:** The impact on agricultural land resulting from the construction and operation activities will occur at the **local** level.
- **Duration:** This impact will occur for the duration of the construction and operation phases and will therefore be **long-term**.
- **Intensity:** The intensity will be **low** as limited agricultural land will be lost and the affected land is of low productive capacity.

Likelihood - This impact will **definitely** occur.

IMPACT SIGNIFICANCE (PRE-MITIGATION) - MINOR NEGATIVE

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

12.3.2 *Mitigation*

The objective of mitigation is to minimise the loss of agricultural land resulting from project related activities during construction and operational phases.

Specific measures include:

- AES to minimise the damage to farmland caused by construction activities by ensuring strict compliance with construction plans to minimise the development footprint and to implement a ‘Code of Conduct’ governing workers.
- AES to design the infrastructure layout in a manner that limits the project footprint and allow for continued grazing on the land.
- AES’s Community Development Fund will seek to increase the extent of farming or the intensity of farming practice in order to counter the effects of agricultural land loss.
- AES to minimise the damage caused by construction activities to the farmland by ensuring strict compliance with construction plans and worker ‘Code of Conduct’.
- Any damage to vegetation will be rehabilitated in accordance with mitigation proposed for the rehabilitation of natural vegetation in *Chapter 8*.

12.3.3 *Residual Impact*

The implementation of the above mitigation measures would ensure that the construction and operation phase impacts are reduced from minor to negligible significance. The pre- and post-mitigation impacts are compared in *Table 12.6*.

Table 12.6 *Pre- and Post- Mitigation Significance: Loss of Agricultural Land*

Phase: Construction & Operation	Significance (Pre-mitigation)	Residual Impact Significance
Affected Landowner	MINOR negative	NEGLIGIBLE

12.4 *UNMET STAKEHOLDER EXPECTATIONS*

12.4.1 *Impact Description and Assessment*

Table 12.7 *Impact Characteristics: Unmet Stakeholder Expectations*

Summary	Construction	Operation
Project Aspect/ activity	Construction and operation of a PV project.	

Summary	Construction	Operation
Impact Type	Indirect, negative impact	
Stakeholders/ Receptors Affected	Local communities, local businesses and local government	

Construction and Operation Phase Impacts

During stakeholder consultation it was clear that there are high expectations around economic benefits (employment and procurement) and community development associated with the Project.

Many of the stakeholder expectations will be met through routine Project related activities (e.g. employment, procurement and skills development). Other expectations will be met through the community development fund. It is however possible that the expectations may exceed the benefits delivered.

There is likely to be disappointment and potential anger and resentment if these expectations are not met. Unmet expectations that are not actively managed by AES could have a negative impact on stakeholder relations. As such all grievances raised need to be addressed as per the process outlined in the grievance mechanism.

13.1 TRAFFIC

13.1.1 *Impact Description and Assessment*

This section considers the impacts to traffic and road users during the construction and operation of the Olyven Kolk solar power plant.

Table 13.1 *Impact Characteristics: Traffic*

Summary	Construction	Operation
Project Aspect/ activity	Delivery of PV components and construction equipment. Delivery of concrete. Construction personnel commuting to and from site.	Operational personnel commuting to and from site. Delivery of replacement PV components.
Impact Type	Direct negative	Direct negative
Stakeholders/ Receptors Affected	Road users. Affected landowners.	Road users. Affected landowners.

Construction Phase Impacts

During the construction phase of the solar power plant, there will be an increase in vehicle movement to and from the site. This has the potential to impact on traffic along the final transport route and on the site.

The increase in traffic could create noise, dust ⁽¹⁾ and safety impacts for other road users and people living or working within close proximity to the roads on the selected transport route. In addition, the increased volume of traffic along the transport route will increase the wear and tear on these roads and possibly lead to deterioration in road conditions. As mentioned in *Chapter 4*, the PV, electrical and structure equipments will be procured in South Africa where available, or from an international manufacturer when sourcing from within the country is not possible. It is expected that these components will be delivered to site via road in small trucks ⁽²⁾, however the final route to be taken to transport these components to the Olyven Kolk site will be dependent on the chosen manufacturer.

The construction phase of the project will take place in a phased approach, and as mentioned in *Chapter 4*, the approach is dependent on various factors. Installation of the full project could take up to 14 months to complete or more, with solar components arriving throughout the period.

(1) Impacts of dust are assessed separately below.

(2) Should abnormal loads be required, the relevant permits will be sought prior to transportation.

As the Sishen-Saldanha railway passes through the site, AES will liaise with Transnet to take measures necessary to mitigate disturbance or impacts to the railway.

Box 13.1 *Construction Impact: Traffic*

Nature: Construction activities that increase traffic would result in a **negative direct** impact on people who use the roads along the final transport route.

Impact Magnitude – Medium

- **Extent:** The extent of the impact is **regional** as the potential impact will extend along the selected transport route.
- **Duration:** The duration would be **short-term** for the duration of construction.
- **Intensity:** The intensity is likely to be **medium** given that the increase in traffic will be temporary, but may create a nuisance and impact on the safety of other road users.

Likelihood – There is a **high** likelihood of increased traffic.

IMPACT SIGNIFICANCE (PRE-MITIGATION) – MODERATE (-VE)

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

Operation Phase Impacts

A limited number of people will be employed permanently at the site during the operation phase of the solar power plant; these employees will reside in on site accommodation. Infrequent deliveries of replacement parts may be made during the lifespan of the solar power plant. Traffic impacts associated with the operation of the facility will be minimal and therefore traffic impacts associated with operation are not considered any further.

Similarly during the operational phase any disturbance or impacts to the railway will be mitigated to avoid impacts to the railway line.

13.1.2 *Mitigation Measures*

Construction

- During construction, arrangements and routes for abnormal loads (if required) must be agreed in advanced with the relevant authorities and the appropriate permit must be obtained for the use of public roads.
- A grievance procedure will be established whereby any complaints by neighbours or affected parties are recorded and responded to.
- Liaison with Transnet to mitigate or minimise disturbance or impacts to the Sishen-Saldanha railway.

Operation

- During operation, if abnormal loads are required for maintenance, the appropriate arrangements will be made to obtain the necessary

transportation permits and the route agreed with the relevant authorities to minimise the impact of other road users.

- Liaison with Transnet to mitigate or minimise disturbance or impacts to the Sishen-Saldanha railway.

13.1.3 *Residual Impacts*

If mitigation measures are implemented, the overall significance will be reduced to minor negative for construction. Impacts will be negligible for the operational phase.

Table 13.2 *Pre- and Post- Mitigation Significance: Traffic*

Phase	Significance (Pre-mitigation)	Residual Impact Significance
Construction	MODERATE (-VE)	MINOR (-VE)
Operation	NEGLIGIBLE	NEGLIGIBLE

13.2 WASTE AND EFFLUENT

13.2.1 *Impact Description and Assessment*

Waste and effluent will be generated during the construction and operational phases of the Olyven Kolk solar power plant. The key types of waste generated and/or activities these arise from to be are set out below.

Table 13.3 *Impact Characteristics: Waste and Effluent*

Summary	Construction	Operation
Project Aspect/ activity	Construction activities including excavation/ trenching, unpacking of solar components, accommodation facilities on site (if required) and ablution facilities.	Maintenance activities, personnel and general office facilities.
Impact Type	Direct negative	Direct negative
Stakeholders/ Receptors Affected	Affect land owner. Surrounding habitat	Affect land owner. Surrounding habitat

Construction Phase Impacts

The construction of the solar power plant will produce a variety of waste products. The initial solid waste generated on site will be the cleared vegetation and soil overburden from levelling and grading of areas of the site. Some building rubble will be produced throughout the construction phase from activities such as the construction of temporary and permanent buildings and concrete pouring. Packaging material will be accumulated from unpacking of solar components. Packaging material (e.g. wooden pallets and cartons, cable rests etc) will be recycled as far as possible however, any waste that cannot be recycled or reused will be disposed of at a licensed disposal facility.

General waste will be produced by site personnel including wrapping from food, bottles and cans. Should a construction camp be required, quantities of waste generated may be high. It is anticipated that waste will be temporarily stored on site before it is removed by an appropriate contractor.

Effluent will be produced from toilet facilities. This wastewater is likely to be treated by temporary chemical toilets until a septic tank system is installed on site. There is potential for waste and effluent stored on site to leach into the soil and/ or groundwater, causing harm to the natural environment and potentially contaminating the soil and/ or groundwater.

Box 13.2 *Construction Impact: Waste and Effluent*

Nature: Construction activities that produce waste would result in a **negative direct** impact on the site.

Impact Magnitude – Medium

- **Extent:** The extent of the impact is **local** as impact would be restricted to the site.
- **Duration:** The duration would be **short-term** as impacts could persist after the construction of the solar power plant.
- **Intensity:** The intensity is likely to be **medium** as levels of waste volumes generated will be high based on the large workforce required onsite.

Likelihood – It is **unlikely** that waste and effluent generated on site will impact on the soil and/ or groundwater and other site users.

IMPACT SIGNIFICANCE (PRE-MITIGATION) – MODERATE (-VE)

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

Operation Phase Impacts

General waste, including office waste and effluent from onsite toilet facilities will be produced during the operation phase of the solar power plant by personnel working and or staying onsite. However, this will be limited as there is only likely to be up to 30 permanent personnel on site during the operational phase of the plant and a small team of personnel expected during maintenance activities. Waste produced during the operation phase will be minimal.

The PV panels will possibly be cleaned once or twice a year to remove dust accumulated on the surfaces of the modules during the operational phase of the project. The water used for cleaning will not contain any harmful chemicals or additives and will not be heated. Therefore the water is not regarded as wastewater and the water will be allowed to percolate onto the soil.

Box 13.3 *Operation Impact: Waste and Effluent*

Nature: Operation activities that produce waste would result in a **negative direct** impact on the site.

Impact Magnitude – Low

- **Extent:** The extent of the impact is **local** as impact would be restricted to the site.
- **Duration:** The duration would be **long-term** during the operation of the solar power plant.
- **Intensity:** The intensity is likely to be **low** owing to the small number of personnel present on site during the operation phase and few waste generating activities.

Likelihood – It is **unlikely** that large quantities of general waste will be generated on site.

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

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

13.2.2 *Mitigation Measures*

The potential impacts associated with the generation of waste and effluent can be minimised through careful mitigation measure.

Design

- A suitable area for waste skips must be selected, away from drainage lines, and included in the final site layout plan with the approval by an ECO.

Construction

- All waste must be separated into skips for recycling, reuse and disposal. Recycled waste will be removed by an appropriate contractor, as per the EMP recommendations.
- Vegetative material will be kept on site and mulched after construction to be spread over the disturbed areas to enhance rehabilitation of the natural vegetation.
- Effluent from concrete washings etc will be contained within a bunded area.
- All hazardous and liquid waste materials e.g. fuel for generators, including any contaminated soils will be stored in a bunded area and disposed of by a licensed contractor.
- Effluent and stormwater run-off will be discharged away drainage lines.
- Materials that cannot be re-used or recycled will be placed in a skip and removed from site to a licensed disposal facility.

Operation

- General waste must be removed from site by a licensed contractor.

13.2.3 Residual Impacts

If mitigation measures given above and listed in the EMP are implemented, the overall significance will be minor during the construction phase and operation phases of the Olyven Kolk solar power plant.

Table 13.4 Pre- and Post- Mitigation Significance: Waste and Effluent

Phase	Significance (Pre-mitigation)	Residual Impact Significance
Construction	MODERATE (-VE)	MINOR (-VE)
Operation	MINOR (-VE)	NEGLIGIBLE

13.3 AIR QUALITY

This section considers the impacts to air quality during the construction and operation of the Olyven Kolk solar power plant. The two primary areas of interest are:

- dust generated during clearing of vegetation and earthmoving activities and by vehicles on site travelling along unpaved roads; and
- emissions from the exhaust of vehicles during construction.

Table 13.5 Impact Characteristics: Air Quality

Summary	Construction	Operation
Project Aspect/ activity	Soil disturbance and excavating. Vehicle movement on gravel roads. Emissions from construction vehicles and equipment.	Vehicle movement on gravel roads.
Impact Type	Direct negative	Direct negative
Stakeholders/ Receptors Affected	Affected landowners. Road users. Construction personnel.	Affected landowners.

Construction Phase Impacts

The presence of dust can be a nuisance to site users, including construction workers and other nearby receptors. Across the site there are large exposed areas of soil bearing little vegetation i.e. the *Rhigozum* thicket community shows a poorly developed grass layer. This is likely to be a result of heavy grazing and/or suppression of the grass layer by the dense *Rhigozum* stands. The levels of dust at the site are expected to be highly variable and dependent on the time of year, the intensity of the activity and the prevailing winds. During the construction phase, dust will be generated from increased vehicle movements from trucks driving on gravel roads and through activities that cause disturb of the soil.

Dust becomes airborne due to the action of winds on material stockpiles and other dusty surfaces, or when thrown up by mechanical action, for example the movement of tyres on a dusty road or activities such as excavating. The quantity of dust released during construction depends on a number of factors, including:

- the type of construction activities occurring;
- the area of exposed materials;
- the moisture and silt content of the materials;
- distances travelled on unpaved surfaces; and
- the mitigation measures employed.

Figure 13.1 Example of Trenching



Source: AES

The key construction activities likely to result in increased dust levels are movement of trucks transporting solar infrastructure to and from the site, movement of construction vehicles along dusty roads, clearance of vegetation, trenching, burial of cables and screwing/ piling poles of solar structures into the ground. Dust emissions are exacerbated by dry weather and high wind speeds. The impact of dust also depends on the wind direction and the relative locations of dust sources and receptors.

Construction vehicles and other construction equipment will generate exhaust emissions. It is not anticipated that large volumes of exhaust emissions will be generated during the construction phase of the solar power plant.

Nature: Construction activities that generate dust and emissions would result in a **negative direct** impact on receptors in the area.

Impact Magnitude – Low

- **Extent:** The extent of the impact is **local**, limited to within 200m of construction activities.
- **Duration:** The duration would be **short-term** for the duration of construction phase.
- **Intensity:** The site is very remote and dust generated or emissions released are therefore unlikely to impact any sensitive receptors, the intensity can be considered **low**.

Likelihood – There is a **definite** likelihood of dust and emissions generation.

IMPACT SIGNIFICANCE (PRE-MITIGATION) – MINOR

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

Operation Phase Impacts

Minimal dust generation is expected to occur during the operational phase of the project by maintenance vehicles along the gravel access roads, which will be infrequent. Therefore, impact of dust generated during the operation phase is not considered any further.

13.3.2

Mitigation Measures

Given that the site is located in a water-scarce area, wetting of surfaces to minimise dust is not recommended.

Construction Phase

- Vehicles travelling on gravel roads will not exceed a speed of 40 km/hr.
- Stockpiles of dusty materials will be enclosed or covered by suitable shade cloth or netting to prevent escape of dust during loading and transfer from site.
- Vehicles are to be kept in good working order and serviced regularly to minimise emissions.
- Any directly affected individuals including neighbouring farmers will be able to lodge grievances with AES using the Grievance Procedure (included in the EMP) regarding dust emissions that could be linked to the project.

Operation phase

- Vehicles travelling on gravel roads should not exceed a speed of 40 km/hr.

13.3.3

Residual Impacts

If mitigation measures are implemented, the overall significance will be negligible.

Table 13.6 *Pre- and Post- Mitigation Significance: Dust and Emissions*

Phase	Significance (Pre-mitigation)	Residual Impact Significance
Construction	MINOR (-VE)	NEGLIGABLE
Operation	NEGLIGABLE	NEGLIGABLE