NOOR Boujdour 20 MW Photovoltaic Power Project and 22 kV Power Line

Boujdour Province

Specific Environmental and Social Impact Assessment Vol1:

Non-Technical Summary

Prepared for:

ACWA Power

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1	Financial Capital
2	Social Capital
3	Natural Capital
4	Manufactured Capital
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LIST OF ABBREVIATIONS

Abbreviation	Meaning
AC	Alternate Current
CO_2	Carbon Dioxide
DC	Direct Current
ESMP	Environmental and Social Management Plan
FESIA	Framework Environmental and Social Impact Assessment
IFC	International Finance Corporation
IUCN	International Union for Conservation
MASEN	Moroccan Agency for Solar Energy
NTP	Notice to Proceed
ONEE	Office National d'Electricité et de d'Eau Potable
O&M	Operation and Maintenance
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometers.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5 micrometers.
PS	Performance Standards on Environmental and Social Sustainability
PV	Photovoltaic
SESIA	Specific Environmental and Social Impact Assessment
VOC	Volatile Organic Compounds
5 Capitals	5 Capitals Environmental and Management Consulting

1 INTRODUCTION

The Moroccan Agency for Solar Energy (MASEN) has declared ACWA Power as the preferred bidder to develop a 20 MW photovoltaic (PV) power project in the rural commune of Lamsid, province of Boujdour. The NOOR Boujdour project (the Project) includes the construction of a power line to connect the power plant to an existing substation located near the city of Boujdour. The construction of the access road to connect the PV site with the N1 road will be the responsibility of MASEN.

ACWA Power has engaged an independent environmental and social consulting firm, 5 Capitals, to prepare two Specific Environmental and Social Impact Assessment (SESIA), one for the photovoltaic facility and one for the power line. These SESIA reports have been prepared in accordance with national requirements, the World Bank/International Finance Corporation (IFC) Performance Standards (PS) on Environmental and Social Sustainability, and the IFC Environmental, Health and Safety (EHS) Guidelines and the IFC EHS Guidelines for Electric Power Transmission and Distribution. The SESIAs have also considered the requirements outlined in the Framework Environmental and Social Impact Assessment (FESIA) prepared by MASEN for the PV project in May 2016.

The two SESIA reports have being prepared by 5 Capitals and Phenixa (a Moroccan environmental and social consultancy firm) in coordination with ACWA Power and MASEN. The SESIAs have identified the impacts on all the environmental and social aspects deemed significant for the PV facility, the power line, and the access road (henceforth the Project). The SESIA reports include a mitigation strategy for all impacts identified and an Environmental and Social Management Plan to ensure appropriate implementation and monitoring through construction, operation and decommissioning phases.

The 5 Capitals' team undertook a site visit in February 2016 together with MASEN and ACWA Power to evaluate the environmental and social conditions of the Project area and obtain a comprehensive understanding of the technical aspects of the Project.

This Non-Technical Summary summarises the key aspects of the two SESIA reports.

2 PROJECT LOCATION

The proposed PV site will occupy 60 hectares of land and is located in *commune rurale* of Lamsid in the province of Boujdour. The proposed Project site is approximately 13 km northeast from the city of Boujdour and 3 km southeast of the N1 road. Although the project is located in Lamsid, the closest residential area within this *commune rurale* is over 35 km northeast from the proposed project site.

The proposed PV site and the access road to the N1 road are situated in an undeveloped desert area. There are no residential, agricultural, grazing, industrial or archaeological sites in or nearby to the proposed Project site.

The proposed site has been selected for the following reasons:

- Abundant unoccupied land;
- No nearby sensitive receptors (communities, industries, agricultural land, etc.)
- Lack of biological features of significant concern;
- No economic or physical displacement required;
- Convenient topographic conditions;
- No surface water bodies in the project site or nearby;
- No areas or archaeological sensitivity;
- Availability of fresh water from the local desalination facility, and
- Significant solar radiation (2,100 to 2,250 kWh/m GHI).

2.1 Power Line

The Project includes the construction of an overhead power line to connect the proposed PV facility to an existing substation located on the northeast boundary of the city of Boujdour. Part of the new power line (~ 8 km) will be co-located in an existing corridor parallel to the N1 road and that currently comprises an existing power line. Part of the new power line (~ 3 km) will be located adjacent to the new access road. This will minimize impact on natural resources such as ecology and, local communities reduce visual impact and ensure accessibility with no further intervention.

A detailed map of the area and the Project is included below.

Figure 1 Project Location


N
Qamsid
N1
N1 Road (yellow)
Access Road to Power Plant (black)
~ 13 km
Boujdour
Boujdour 20 MW Photovoltaic Power Plant (purple)
~ 0.53 km
~ 1.05 km

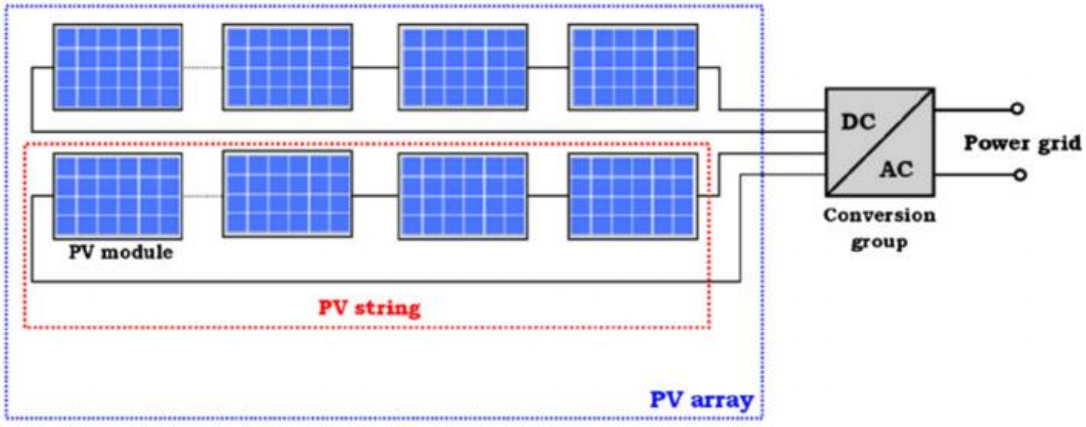
3 PROJECT DESCRIPTION

3.1.1 Photovoltaic Power Facility

The PV Station has the capacity to generate 19.5 MW_p(15 MW_{AC}) of electricity without releasing harmful pollutants to the environment and avoiding the emission of 28,678.86 tonnes of CO_2 per year.

The PV array of panels will occupy a total area of 117,886 m^2 and consist of 60,940 modules distributed in 3,047 strings (see figure below). The PV Station will also comprise inverters to change direct current (DC), as produced by the PV cells, to alternating current (AC), as the electricity generated will be transported through the power lines.

Figure 2 General PV Assembly



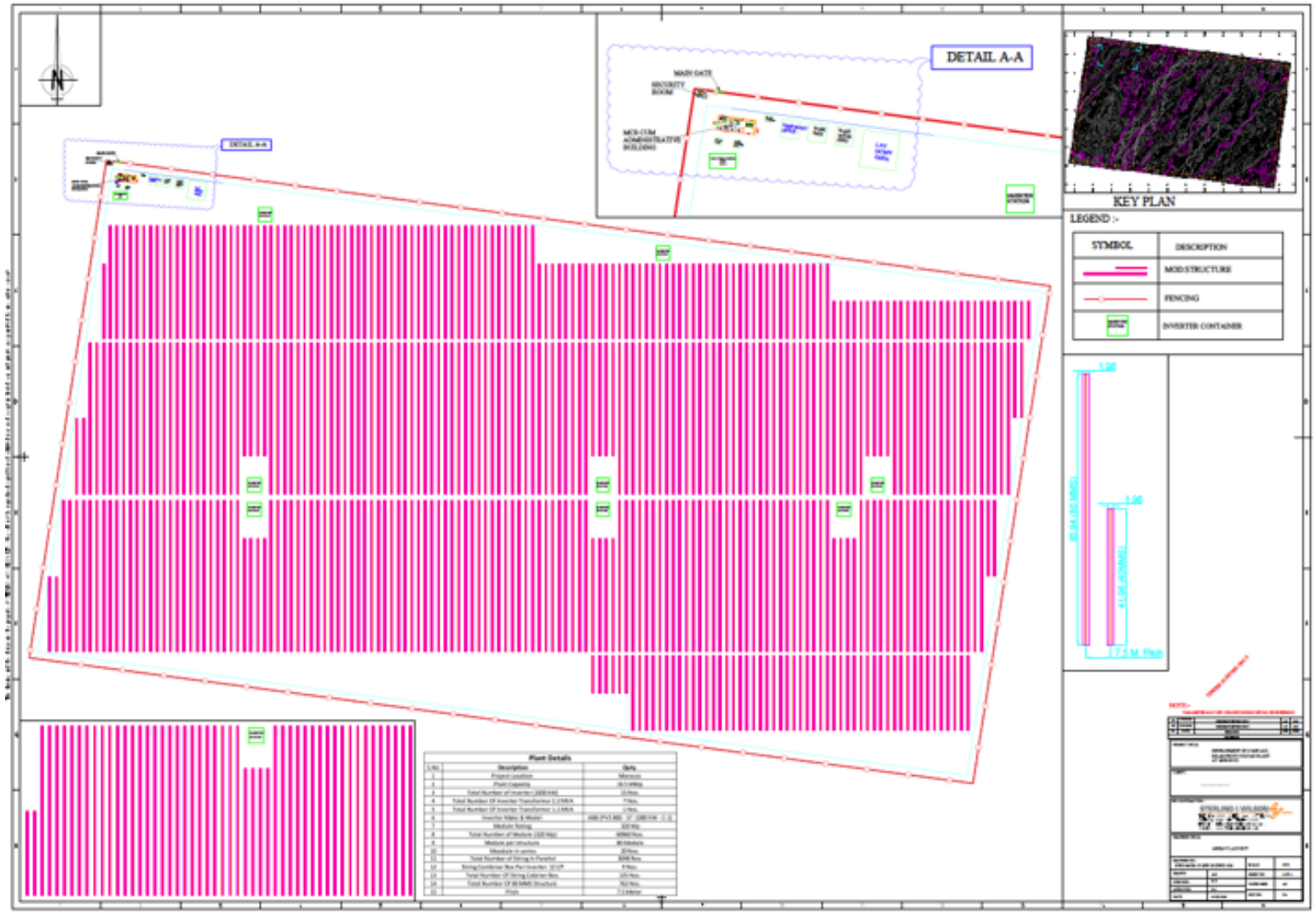
Photovoltaic power plants have a number of advantages in comparison to other solar power technologies; for example, they do not require hazardous fluids for heat transmission, nor any heat exchange system, or cooling requirements. Equally, they are low maintenance, require minimal water consumption, and provide higher efficiency and generation of electricity during periods of cloud.

The proposed project site will be connected with the N1 by a ~3 km sealed access road to be constructed by MASEN.

The proposed site will be fenced and security personnel will be employed to prevent unauthorized access. The security arrangements and practices will be aligned with best international practices and Human Rights.

A detailed layout is provided below.

Figure 3-3 Project Layout



3.1.2 Power Line

The Project includes the construction of an overhead power line of approximately 11 km with 22 kV capacity to connect the proposed PV facility to an existing 60/22 kV substation owned by the Office National d'Electricité et de d'Eau Potable(ONEE). This power line of approximately 11km in length will offload the power generated in the PV facility to the national grid.

The table below includes the main design features of the power line.

Table 3-1 PL Design

Design Elements		Description
General	Distance	~ 11 km
	Type	Over ground
	Capacity	22 kV
Poles	Total number	76
	Types (e.g. suspension tower, deviation tower, termination tower)	11 Guyed Delta Transmission Towers 65 Suspension Transmission Towers (See Figures below)
	Anti-corrosion protection	Hot Dip Galvanized
Wire Conductors	Number	2x3x181,6 mm²
	Material	Almelec
	Anti-corrosion protection	Hot Dip Galvanized

3.1.3 Construction Program

It is understood that the construction phase for the PV facility is expected to last approximately nine months from the Notice to Proceed (NTP), possibly during the second quarter of 2017.

The following main series of works will be undertaken during the construction of the Project:

- Civil works ("cut and fill"). For the PV site, it is anticipated that the platform will be distributed in one level. The right-of-way corridor for the power line will not require significant preparation.
- Infrastructure works (PV site): construction of the fence, internal road, drainage system, etc.
- Infrastructure works (power line): foundations, erection of poles and installation of wire conductors (i.e. stringing, tensioning, clipping, etc.), connection to interconnection point.
- Construction of PV site facilities, pipework, etc.
- Installation of PV panels, mounted on a single axis tracker system foundation, and other equipment (e.g. Reverse Osmosis Plant).

- PV connection to power line.

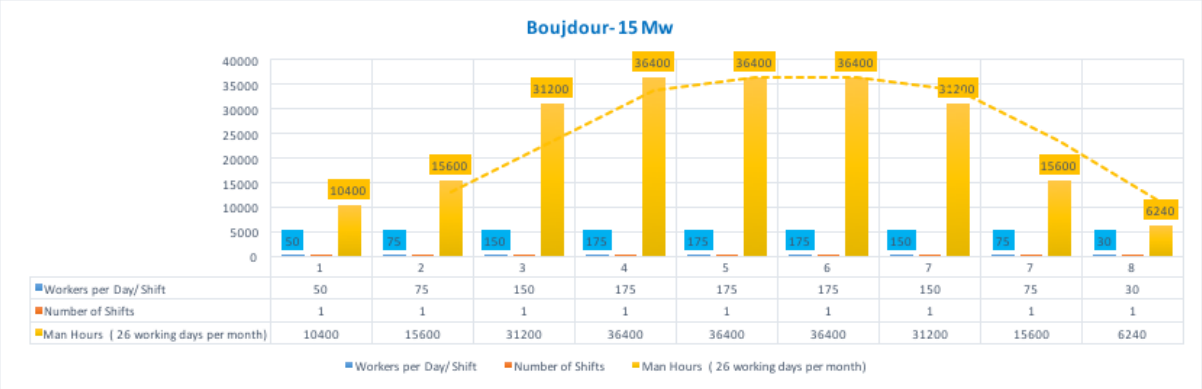
During this phase, temporary facilities and equipment will be installed within the proposed PV site boundaries and will be removed once the construction is complete. These facilities and equipment will include:

- Laydown area
- Material storage area
- Site offices and canteen
- Potable water storage
- Wastewater and solid waste storage
- Security office
- Workshops
- Generators
- Cranes, etc.

The construction of the power line will require additional equipment to be temporarily stored in the right-of-way adjacent to the east line of the N1 road. The power line will not have a dedicated laydown area but will use the laydown area of the PV site.

The figure below includes the estimated total workforce and man hours per month during the construction phase of the photovoltaic power facility. The expected workforce for the power line and the access road are not available at this stage but will be significantly lower than the number of workers required for the PV facility.

Figure 4 Expected Construction Workforce



Foreign workers will likely be accommodated in the city of Boujdour or other adjacent cities.

The project is likely to result in local employment creation during both construction and operation and, subsequently, the dissemination of best practice construction skills into the

local labour force. The local economy is likely to benefit from the use of local businesses and services.

3.1.4 Water consumption

It is estimated that during the construction phase of the power plant the amount water required will be approximately 3,200 m^3, and 800 m^3 for the testing month (testing firefighting system, spray system and containers, and equipment cleaning, etc.). Water will be used for domestic purposes, dust suppression measures and typical construction requirements (e.g. cement preparation).

During operation, automated wet cleaning technology will be used to remove dust accumulated on the panels. This will demand around 0.6 to 1.2 l per panel, approximately 2,800 m^3/year (considerably less that the 4,000 m^3/year established in the bid documentation). The PV will include a reverse osmosis water treatment plant for polishing of the stored water for use in the PV panel cleaning and ensure that water for panel cleaning complies with the specifications established by MASEN.

Water will be tankered to site from the ONEE-owned desalination plant located in Boujdour. The onsite water storage tank will have at least 50 m^3 capacity.

4 LAND ACQUISITION

The land acquisition procedure is not within the scope of ACWA Power as MASEN is the owner of the land and will lease the allocated plot for the proposed project.

MASEN procured 1,735 ha of land through a voluntary buyer-seller agreement between the Moroccan State and MASEN. The cost of the transaction was agreed on 10,000 Moroccan Dirhams per ha.

No economic or physical displacement will be required as no economic or residential activity is undertaken in the parcel of land or adjacent areas.

The NOOR Boujdour project will occupy 60 ha of land that the Project Company (entity created for the construction and operation of the power plant) will lease from MASEN during the 25-year period.

5 SUMMARY OF ENVIRONMENTAL AND SOCIAL CONDITIONS, IMPACTS AND MANAGEMENT MEASURES

The two SESIA reports are considering all environmental and social issues relating to the construction and operation works associated with the project. In response, a range of specific mitigation measures are being set out to prevent, reduce or remediate the potential impacts. The SESIA reports include a management and monitoring plan to ensure that the mitigation measures are fully applied and that the results are in line with the expected outcome. The decommissioning phase has only been discussed in general terms since the ownership of the plant will be handed over to MASEN at the end of the 25-year period.

5.1 Air quality

5.1.1 Power Plant

The proposed NOOR Boujdour Plant will be built in a remote desert area where no heavy industries or other sources of air pollution are found. The closest non-point sources are the vehicles travelling on the N1 road, located 3 km northwest from the site. As a result, emissions around the proposed project area are insignificant.

Ambient air quality monitoring was undertaken on November 13th for 24 hours at the centre of the PV site using a continuous high volume mass sampler. The monitoring values observed for coarse dust particles and fine dust particles show that the ambient air quality conditions are well within the national and international ambient air quality standards, and considered good.

Throughout the construction phase, the ambient air quality may potentially be affected by increased dust, particularly during excavation and earthworks, and by emissions from construction vehicles/plant equipment. However, dust will be the main pollutant as exhaust gases from construction vehicles are not expected to cause a significant impact due to the scale of the facility, duration of construction and the volume of the materials that will need to be mobilised.

At the operational phase impacts to the air will be neutral and will prevent the generation of 28,678.86 tonnes of CO_2 greenhouse gases, helping to offset the effects of Global Warming. Only limited emissions from maintenance/cleaning vehicles could be expected.

5.1.2 Power Line

The proposed power line will be built in close proximity to the northern boundary of the city of Boujdour and parallel to the N1 road and the future access road. As a result, emissions around the proposed corridor area might be affected by traffic.

Ambient air quality monitoring was also undertaken at two location of the PL corridor. The monitoring values observed for coarse dust particles and fine dust particles show that the ambient air quality conditions are within the national and international standards.

Impacts expected during the construction phase of the power line are similar to those described for the power plant. Dust impacts will not pose a serious threat to N1 drivers as the power line will be located more than 250 m from the N1 road.

At the operational phase, impacts to the air will be neutral. Only very limited emissions from maintenance vehicles could be expected.

5.1.3 Mitigation

Measures to prevent increased dust (e.g. cover powdery material during transport and stockpile, or dust suppression), and exhaust fumes (e.g. equipment and vehicle maintenance and efficient management of deliveries) have been implemented. The SESIA report for the power line includes additional measures to ensure that increased dust levels generated during the construction of the line do not affect N1 drivers and residents. A summary of the main mitigation measures and monitoring activities are presented below.

5.2 Noise and Vibration

5.2.1 Power Plant

The proposed NOOR Boujdour Plant will be located in an isolated area, with no developments or activities adjacent to the project site. The closest source of noise is the N1 road and no sources of vibrations are found. Noise and vibration impacts during the construction phase of the PV Plant will be generated during site preparation works and the installation of the PV structures. The main sensitive receptors will be the workers.

In order to establish the baseline noise conditions, a day and night time noise survey was undertaken on November 8th at two location (site and site boundary). Average noise levels generally reflected a quiet environment and were below the maximum allowable standards for residential areas during both day and night time. No sources of vibration were identified during the survey.

The SESIA has included an assessment of the potential future noise during construction works taking into account the type of machinery and vehicles to be used during that phase. The assessment suggested that the construction activities are unlikely to affect ambient noise levels beyond the neighbouring area.

For the operational phase, noise modelling has been undertaken. The modelling results suggest that noise levels will be insignificant at the project boundary of the proposed site

and therefore, the closest residents or even people walking nearby will not notice the operation of the PV plant.

5.2.2 Power Line

The proposed power line will be erected in close proximity to the northern boundary of the city of Boujdour, and parallel to the N1 road and the future access road. Therefore, existing sources of noise are attributable to traffic and routine activities in the area.

An environmental noise survey was also undertaken at two locations (PV and substation connection points). Average noise levels generally reflected a quiet environment at the PV site and were below the maximum allowable standards for residential areas during both day and night time. The average noise levels at the substation slightly exceeded the standard for residential areas due to the proximity of the N1 road. No sources of vibration were identified during the survey.

During the construction of the power line, noise and vibration will be generated principally as a result of the preparation of foundations and erection of poles.

Works undertaken at the interconnection point (northeast boundary of the city of Boujdour) or adjacent to the N1 road will not generate significant noise/vibration levels and will be undertaken only once during the entire construction schedule. Due to the impact of distance on propagation, the residents in the city of Boujdour will not notice noise or vibration impacts. N1 drivers might temporarily be exposed to high noise levels.

5.2.3 Mitigation

Mitigation measures including time restrictions of noisy activities, noise attenuation barriers for specific equipment, appropriate equipment maintenance and protective equipment for workers will be included in The SESIA reports. A summary of the main mitigation measures and monitoring activities are presented in Chapter 7.

5.3 Soil and Groundwater

5.3.1 Power Plant

The relatively undisturbed and undeveloped nature of the proposed site signifies that the potential for existing contamination to the soil is unlikely. According to the FESIA, there is no shallow groundwater in the project site.

As part of the establishment of the baseline soil conditions at the proposed site, 5 Capitals undertook soil sampling and analysis campaign. The results showed that heavy metal

concentrations at the sample locations are within the standards, so there is no contamination.

Soil will be susceptible to contamination from various sources during the construction and operational phases of the project. The main sources of contamination are typically the handling, transport and storage of hazardous material and the potential threat of releases and spills into the ground. The only hazardous materials onsite will be limited amounts of fuel and oil/lubricants, as well as domestic wastewater and municipal waste. Therefore, risk of soil contamination is low. Earthworks and changes in the drainage regime could lead to increased erosion.

5.3.2 Power Line

The power line will be constructed adjacent to an existing power line and the N1 road. Therefore, soil contamination could exist from previous construction activities, current maintenance of the existing power line, litter from vehicles, vehicle accidents/damage or settling of exhaust gases from vehicles. Additionally, domestic litter was found in the interconnection point during site visit.

The soil sampling and analysis campaign conducted at four locations alongside the PL corridor showed that heavy metal concentrations at the sample locations are below the Dutch Standards.

No dedicated laydown area is expected to be required for the construction of the power line and it is planned that all construction equipment will be stored in the laydown area proposed within the power plant site.

During the construction of the power line soil will be susceptible to contamination from sources related to construction vehicles and equipment handling. However, given the small amount of hazardous materials required, the potential risk to ground contamination is low.

Earthworks and levelling activities are not required for the corridor of the proposed power line, as the alignment is within the existing power line corridor.

At the operational phase, no impacts to soil are expected from onsite activities.

5.3.3 Mitigation

The SESIA reports include measures to ensure suitable storage areas and containers for hazardous material and soils and liquid waste, as well as collection by licensed operators and auditing and control measures. A summary of the main construction and operational mitigation measures and monitoring activities for both the PV ant the PL are presented in the tables at the end of this document.

5.4 Ecology and Biodiversity

5.4.1 Power Plant

A preparation of an Ecological Assessment has been undertaken by a combination of desk studies and field survey. The assessment was carried out in order to assess the ecological sensitivities of the project area.

The proposed PV site is not located within any national or international protected areas. The nearest Designated Area, *Pointe d'Awfist* Important Bird Area (IBA) is located approximately 75 km to the south of the proposed PV site. This designated area is an important wintering roost for migratory Gulls and Waders.

The site is located on a rocky plateau with sparse vegetation. A total of eleven flora species have been identified within the rocky plateau habitat and are likely to be impacted during the construction phase of the Project. From these, five are endemic species in Morocco but none are of international conservation concern.

Only two reptile species were identified during the site visit within the study area, and none of these are of international concern. Further details of the reptile species that could potentially be present in the habitats identified within the study area but were not identified during the site surveys include seven reptile species. One of these species is of international conservation concern and a Moroccan endemic species. The other six reptile species are Moroccan, North African or Western Sahara endemic species.

A single species of mammal was identified within the study area during the field survey undertaken in 2016. Species that could potentially be present in the habitats identified within the study area but were not identified onsite include five endemism of small and medium-size mammals. None of these species are of international conservation concern. A number of mammal species are extinct species within the region due to direct persecution, poaching, and trade activities.

During the construction of the proposed PV Project, the removal of vegetation cover, earthworks and the establishment of laydown areas will remove the habitats and flora onsite. Vegetation clearance and earthworks are likely to generate destruction of burrows and nests. Further impacts on fauna include direct mortality of small fauna due to vehicle movements, open trenches and illegal hunting or poaching. Finally, displacement of fauna could be generated onsite due to an upsurge of human presence, noise levels, lighting and vibration.

The proposed project site is located in close proximity (~ 10 km) to the Atlantic Ocean and direct impacts to birds may occur, when the reflection from the PV panels creates a lake

effect, which inadvertently attracts water birds, that attempt to land on the surface of the panels

5.4.2 Power Line

The power line does not have the potential to alter or disrupt flora species other than those individuals that will need to be removed to ground the poles. The power line is located in close proximity to the Atlantic Ocean and therefore, migratory birds that fly over could potentially collide with the wire conductors. Additionally, local bird species could potentially get electrocuted.

5.4.3 Mitigation

Based on the vulnerable species and their associated threats identified, the SESIA reports propose measures to avoid impact on the existing biodiversity (i.e. reptile translocation activities and nursery for the growth and planting of endemic flora), including those associated to bird mortalities from electrocution or collision (e.g. exclusion devices in the power line to avoid bird mortality where deemed necessary, design alternatives for the PL) during the operation of the PV and associated PL. The SESIA reports also include mitigation measures for those negative impacts on terrestrial fauna species (i.e. limited speed limit within the proposed project area, and access roads, drainage checks and coverage, etc.).

A summary of the main construction and operational mitigation measures and monitoring activities for both the PV and the PL are presented on the tables at the end of this document.

5.5 Hazardous and Non-Hazardous Waste and Waste Management

Typically, the type of waste streams and materials (hazardous and non-hazardous) generated during the construction of a power line and a power plant are similar and so management is. And therefore, these will be described jointly.

The main types of non-hazardous waste generated during the construction of the power line and the power plant would be inert (sand, gravel, glass, plastic, cables, metals, packaging materials, etc.) and domestic waste from workers during both construction and operation.

The total amount of waste will be small and does not pose a significant threat to human health or the environment. However, proper management is required in order to reduce associated impacts such as resource use and habitat destruction.

Minor amounts of hazardous materials (including waste) will be generated and stored in the shared laydown area for the power plant and the power line. The only hazardous materials during construction will be diesel, lubricants, batteries, used drums, and clean-up materials.

During the operation phase of the power plant, only miscellaneous hazardous materials (e.g. batteries) and clean-up materials will be stored onsite. Small amounts of hazardous materials (e.g. insulating oil) will only be contained inside electrical components. Pesticides will not be stored onsite.

Examples of likely hazardous materials/waste streams that may arise during the operation of the Project include chemical, soil contaminated from spills, miscellaneous wastes, and general clean-up materials.

5.5.1 Mitigation

The mitigation measures related to waste and hazardous waste/materials management in the SESIA reports have considered minimization, appropriate storage, segregation, reuse and recycling, and collection by licensed operators. Storage of waste outside the laydown area will not be permitted. Additionally, the SESIA for the power line include measures to ensure that all waste generated as a result of the construction of the power line is appropriately collected and transferred to the laydown area.

5.5.2 Mitigation

The mitigation measures related to waste management in the SESIA reports have considered minimization, appropriate storage, segregation, reuse and recycling, and collection by licensed operators. Storage of waste outside the project site will not be permitted.

The SESIA includes mitigation measures to help reduce the risks associated to non-hazardous and hazardous waste and hazardous materials such as appropriate handling and storage (impermeable bunds, roofed, etc.), proper transport, regular inspections, audits, monitoring and training.

A summary of the main construction and operational mitigation measures and monitoring activities for both the PV and the PL is presented on the tables at the end of this document.

5.6 Water and Wastewater Management

5.6.1 Power Plant

The construction and operation of the power plant will result in the generation of domestic wastewater from canteens and lavatories. Domestic wastewater will be stored in septic tanks

during construction and operation site. Septic tanks will be emptied by an external operator for offsite treatment and disposal.

Additionally, during the operational phase, a Reverse Osmosis plant will be used to polish the water received from the local desalination plant, so that it is of suitable quality for use in the washing of the PV panels. The wastewater generated from the polishing process will only contain few trace minerals and suspended solids, resulting from the polishing of potable water. This wastewater stream will be stored in a dedicated septic tank that will be collected by licensed operators.

Other wastewater streams have been avoided by prohibiting the maintenance of vehicles in the project site or in the corridor, and avoiding the entrance of rain in the shared laydown area where the hazardous storage or equipment maintenance areas area located.

The earthworks on site will disturb natural drainage patterns, potentially increasing erosion on site. The changes in the soil characteristics and increased earthworks activity, may result with increased siltation in the storm water, however, given the construction activities will be temporary and most soils will be compacted, the risk for increased silt will be temporary and infrequent.

The O&M will focus on implementing the most environmentally and cost effective cleaning solution and manual cleaning with soft sponges and squeegees will be considered as an option to reduce the water consumption over the operational phase.

5.6.2 Power Line

During the construction phase of the power line, chemical toilets are likely to be installed at appropriate locations through the power line corridor and/or in the shared laydown area during the construction phase. Chemical toilets will be collected by an external operator for offsite treatment and disposal.

Canteens and other facilities that will generate domestic wastewater will be located in the PV site, which will be collected by an external operator for offsite treatment and disposal.

The power line will be located through an existing corridor in conjunction with an existing power line and therefore, no major earthworks and changes in the drainage regime are deemed necessary.

5.6.3 Mitigation

The SESIA reports include the necessary measures to ensure appropriate storage (septic tank with secondary containment), collection (licenced operator) and transfer to avoid leaks and spills of domestic liquid waste.

The drainage system of the proposed power plant site has been designed to avoid entering areas where hazardous materials are stored or transferred and the SESIA reports incorporate erosion mitigation measures.

A summary of the main construction and operational mitigation measures and monitoring activities for both the PV and the PL are presented on the tables at the end of this document.

5.7 Traffic and Transportation

5.7.1 Power Plant

The project site is located 3 km from the N1 road. The design includes the construction of an access road to connect the project site with the N1 road.

The main traffic impacts during the construction and, at a lower magnitude, during the operation phase will be the transport of equipment and staff to the site. The relative contribution from the increase in traffic movements on the highway is considered minor given the existing low traffic movements and the capacity of the road. Vehicles using the N1 road will need to go through several municipalities with no bypass road available. The increased in traffic levels could potentially lead to road safety issues.

Workers are likely to be accommodated in Boujdour. Transport services will therefore need to be included as part of the daily construction activities.

5.7.2 Power Line

Part of the proposed power line will be located adjacent to the N1 road and the future access road. Road disruptions are not anticipated during the construction of the power line.

The main traffic impacts during the construction phase will be the transport of heavy and large structures and the use of cranes to offload and erect the poles. Special transportation is likely to be required

Other traffic impacts during the construction phase will be the disturbance to road users as a result of heavy trucks, truck-mounted cranes and construction workers, and dust generated from typical power line construction activities and vehicles movement. Disturbance and increased levels of dust can lead to road accidents, which might subsequently lead to higher occupational health risks. Transport of equipment and staff to the site and offload and erection of heavy structures are also a major threat for road safety issues.

5.7.3 Mitigation

Mitigation measures have been established in the SESIA for both internal roads (Complex and Project) and national road systems.

The main construction and operational mitigation measures and monitoring activities for both the PV and the PL are presented below.

5.8 Archaeology and Heritage

A desk study relating to archaeological and cultural resources in the area has been undertaken, in addition to a site walkover survey. No archaeological resources were identified in the PV site and adjacent areas, and power line corridor and neighbouring strips, so no specific mitigation measures are considered necessary.

5.8.1 Mitigation

The SESIA reports require a protocol for an archaeological watching brief to be prepared in case a chance find occurs, which detail the required procedures to protect, report and preserve any archaeological finds.

5.9 Landscape and Visual Impact

5.9.1 Power Plant

The proposed project site will be located on a rocky plateau 3 km away from the main road. There are no anthropogenic elements on the site other than the weather station and temporary security tents. The design of the power plant does not include any towering infrastructure and will not be noticeable from the access road or the city of Boujdour. Only people that visit the project area will notice the facility.

5.9.2 Power Line

The power line will be located in conjunction with the access road and an existing power line to minimize disturbance to view sheds resources in pristine areas. Therefore, the new power line will not change the landscape character of the area.

5.9.3 Mitigation

The SESIA reports include measures to ensure that pollution from flood lights is reduced by setting a number of conditions applicable to the lighting system (e.g. previsions, position, angles, etc.) to avoid reflected glare, light spill and sky glow which may otherwise cause disturbance to drivers and fauna.

The main construction and operational mitigation measures and monitoring activities for both the PV and the PL are presented below.

5.10 Electric and Magnetic Fields

Power lines generate electric and magnetic fields when electricity is being transmitted. The strength of the electromagnetic field at ground level varies in accordance with the design characteristics of the power line and the distance of the latest from the ground. There are no sensitive receptors within the potential impact corridor of electromagnetic field.

Taking into consideration the low voltage transmitted by the 225 kV PL, the low EMF field levels emitted, the dissipation of EMF over distance, and the absence of any sensitive receptors within the potential impact corridor, the significance of negative impacts are considered negligible.

5.11 Socio – Economic

The type of positive and potential negative socioeconomic impacts resulting from the development of the proposed PV are considered similar to the ones generated by the construction of the associated PL and therefore these two are described jointly.

The Project will result in positive socioeconomic impacts, mostly associated to local employment creation, which will range from 50 to 175 workers at the peak of construction. As well as the direct monetary uplift to the families of those employed, salaries to local workers will also stimulate the local economy. Local employment will also promote dissemination of skills into the local labour force.

It is likely that the project construction also require a proportion of work on the site to be undertaken by immigrant population. Potential negative socioeconomic impacts resulting from the development of the proposed Project include conflicts between workers, community members or onsite security staff and transmission of communicable diseases as a result of the influx of workers.

Socioeconomic negative and positive impacts are expected to have a lower magnitude during the operational phase.

5.11.1 Mitigation

This SESIA include measures to ensure that the security staff are trained in line with the UN Voluntary Principles on Security and Human Rights and all staff onsite is trained to avoid the spread of diseases. This SESIA also include measures to prevent child and forced labour,

exploitation, excessive overtime, insufficient wages, harassment at the workplace, and unsafe/unhygienic living and working conditions.

The main construction and operational mitigation measures and monitoring activities for both the PV and the PL are presented below.

6 STAKEHOLDER ENGAGEMENT PLAN

6.1 Public Consultation

A Stakeholder Engagement Plan (SEP) has been prepared to ensure efficient and transparent public participation in the projects.

A public consultation meeting was carried out on December 1st 2016. The stakeholders present at the meeting consisted of population, the Provincial technical departments the elected Communal councillors and Non- Governmental Organisations.

The following is a summary of the perspectives and concerns of the stakeholders: Impacts on the livelihood of the herders, Developing social programs to help sustain the herders, Employment and training opportunities for the local population, Environmental impacts in relation to source of water, soil quality, ecology, livestock, and health/security impacts; and Communications and grievance mechanisms.

A summary description of each question raised during the meeting is provided in Volume 2 of the SESIA, the detailed Minutes of this public consultation and the detailed SEP are included in SESIA Volume 4.

6.2 Grievance Mechanism

A Grievance Mechanism, described in the SEP, will be implemented by APO, to address stakeholder concerns during the Project's lifecycle.

7 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The requirements for the Environmental and Social Management Plan for construction and operation are presented in Volumes 3 of the SESIA reports. The ESMPs serves as a basis for the preparation of comprehensive management plans in order to avoid, prevent, reduce or rectify environmental and social impacts that may arise during both construction and operation.

For construction, the ESMP is developed into a Construction Environmental and Social Management Plan (CESMP) and for Operation an Operation Environmental and Social Management Plan (OESMP) will be prepared. The EPC Constructor is responsible for the preparation and implementation of the CESMP and the O&M contractor for the preparation and implementation of the OESMP.

Issues covered within each framework include: environmental and social management staff roles and responsibilities, environmental and social requirements and compliance, environmental training and social awareness programmes, and monitoring, recording, inspection and auditing protocol.

8 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES SUMMARY TABLES

The following tables provide a summary of the identified environmental impacts, their significance, the main mitigation measures proposed, the responsibilities for the implementation of the mitigation measures and the main monitoring activities. This table only outlines what are considered to be the main mitigation measures and monitoring activities.

A full description of the main mitigation measures and monitoring requirements for the NOOR 20 MW Boujdour PV Plant and the NOOR 22 kV Power Line are provided on the respective SESIAs - Volume 2 (Main text) and Vol. 3 (ESMP).

8.1 PV -Construction Phase Mitigation Measures

8.1.1 Air Quality

Table 8-1 Air quality mitigation measures – construction phase

Issue	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Dust Generation due to site preparation and site activities	Minor to Moderate	Site preparation and levelling will be undertaken during periods of low winds (<15 km/h).	EPC	As soon as the works start and throughout construction period..	Minor
		Material stockpiles of dusty materials higher than 5 metres will be avoided where possible, with dust suppression sprays being utilised on any piles during periods where the wind speed exceeds 15km/h. Alternatively, stockpiles of dusty materials can be covered.			
		Adding to stockpiles of dusty materials will be stopped when high winds are present (15 km/h).			
		Dusty material stockpiles will be located only onsite and away from the site boundaries and be effectively contained			
		Where sand and other dusty materials are transported to site, trucks will not be overloaded and will be appropriately covered / sheeted to avoid loses en-route.			
		Powdery materials (e.g. cements) will be stored and transported in sealed containers			
		No burning of wastes or other materials will be allowed on site through the construction phase			
		Undertake daily visual assessment of dust levels and take actions (dust			

Issue	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		suppression) to reduce emissions, when these are identified as excessive.			
		Transport of uncovered dusty loads (materials and waste) is strictly forbidden.			
Gaseous and Particulate Emissions from Vehicles	Minor to Moderate	Onsite/offsite speed limits are included in the Traffic and Road Safety Section of this SESIA. Besides road safety, these limits will contribute to reduce exhaust gases resulting from traffic movements.	EPC	As soon as the works start and throughout construction period..	Minor
		Efficiently manage deliveries of equipment/plant to the site, to reduce the number of trips			
		Minimise exhaust fumes and particulates emitted from trucks and vehicles by ensuring the use of vehicles in good condition. Vehicles entering the site for the first time will be inspected for their worthiness and when deemed inadequate will not be permitted to enter the site.			
VOCs and other Fugitive Emissions	Minor to Moderate	Hazardous materials stored and used on site with potential gas emissions (e.g. Volatile Organic Compounds) will be located in well-ventilated, secure low-risk areas.	EPC	As soon as the works start and throughout construction period.	Negligible
		Fires and material burning is prohibited on the Project site.			
General	Minor	Personal Protection Equipment will be provided to all employees when necessary. Special attention will be given during site preparation and other activities likely to cause significant levels of dust.	EPC	As soon as the works start and throughout construction period.	Negligible

8.1.2 Noise and Vibration

Table 8-2 Noise and Vibration mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Construction Noise and vibration	Moderate to Major	Diesel compression equipment or generators will be equipped with effective silencers when necessary	EPC	As soon as the works start and throughout construction period.	Minor to Moderate
		Electrically powered equipment will be preferred, where practical, to mechanically powered alternatives. All mechanically powered equipment will also be fitted with suitable silencers when necessary.			
		Items of plant on site operating intermittently will be shut down in the intervening periods between uses.			
		Construction employees will, at all times, carry out all work in such a manner as to keep any disturbance from noise and vibration to a minimum.			
		Where appropriate, noise barriers /attenuation to be employed (e.g. for generators) to ensure that the maximum noise level at 1 m distance from a single source will not exceed 85 dB(A).			
		Where noise levels exceed 85dB(A) for an 8-hour time-weighted average, hearing protection devices shall be provided to personnel on-site. No unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C)			
Vehicle Noise	Moderate to Major	Vehicles will be equipped with effective silencers when necessary and switched off when are not in motion for more than 2 minutes	EPC	As soon as the works start and throughout construction period.	Minor
		Deliveries of fuel and materials and removals of waste are to be undertaken during day hours, when possible.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		All vehicles will be adequately maintained in order to minimise sound emissions.			
		Onsite/offsite speed limits are included in the Traffic and Road Safety Section of this SESIA. Besides road safety, these limits will contribute to reduce noise levels resulting from traffic movements particularly in residential areas without bypass road. These limits will be included in the Traffic Management Plan that will be prepared by the EPC prior to the construction works.			

8.1.3 Soil and Groundwater Protection

Table 8-3 Soil mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impacts
Spillage and leakage	Moderate	Chemicals, fuels, lubricants and paints will be stored in dedicated locations on impermeable surfaces to prevent leakage into the ground and contained inside a secondary bund (110% of largest container). Additional mitigation measures are included in the Non-hazardous Waste and Hazardous Materials section.	EPC	As soon as the works start and throughout construction period. Plans to be prepared before the construction works start	Minor
		Permanent/temporary storage areas will be designed and located considering potential ground contamination risks. Runoff will be prevented from entering areas where hazardous materials are stored, handled or transferred. If runoff can enter potentially contaminated areas, a dedicated drainage system will direct the run off to dedicated tanks to avoid impacts to soils and groundwater. The fluids in these tanks will be collected by licensed operators and managed as Hazardous wastewater.			
		Hazardous materials storage areas will be positioned away from major transport corridors and construction activities, in order to avoid potential collisions from vehicles or other machinery.			
		All chemicals will be handled in accordance with relevant instructions (MSDS).			
		Reduce quantity of chemicals and fuels on site to minimum practicable levels.			
		Regularly inspect drip collectors and containers for spills and leaks.			
		Provide spill kits at all areas where hazardous liquids are stored.			
		Develop and implement an Emergency preparedness and Response Plan, to immediately remediate the affected area in the event of a spill or leakage of chemicals, fuels, paints, and any hazardous material.			
		Develop a Vehicle Maintenance Plan			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impacts
		Washing of equipment, machinery, and vehicles will not permitted on site and will only be carried out in adequate premises.			
		Vehicle maintenance will not be undertaken in the project site and will be carried out only in offsite permitted premises			
		If vehicles and machinery are too large to be moved off site, or if it is not practicable to move the machinery for regular maintenance during the construction phase, then measures to protect the soils from spills and leaks during the cleaning/maintenance activity must be implemented (impermeable hard standing area with dedicated drainage system).			
Cross contamination of soils	Minor	Implement good housekeeping practices during construction activities including procedure and requirements for proper handling, storage, and transport of hazardous chemicals and waste	EPC	As soon as the works start and throughout construction period.	Negligible
		If contaminated soil is observed during construction activity, the identified contaminated soil will be excavated separately, and stored onsite in accordance with environmentally adequate measures for waste management, to avoid cross-contamination. A licensed operator will collect the contaminated soil for disposal.			
		Construction Workers will attend training programmes, and safety induction sessions with regards to the transportation and handling of hazardous materials. Toolbox talks will also be held.			
Storage and waste management	Moderate	All hazardous construction waste and chemicals, such as fuel, will be stored in well-equipped, leak-tight enclosures where drums have drip trays to avoid spillage to the ground. The storage tanks of fuels or chemicals and septic tanks will be properly maintained and stored in bunded areas equivalent to 110% of the storage capacity.	EPC	As soon as the works start and throughout construction period.	Minor
		Wherever possible, reduce the quantity of chemicals and fuel stored on site to minimum practical level. Infrequently used chemicals will be ordered just before they are needed.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impacts
		All servicing, refuelling, stockpiles, waste disposal and storage areas will be located as far as possible from the run-off drainage system to reduce potential of pollution via spillage or windblown debris.			
		No hazardous material will be stockpiled.			
		Minimise the size and height of the stockpile as far as possible.			
Removal of natural site drainage / Soil erosion / Compaction	Moderate	The storm water and drainage system will minimize and control surface run off and erosion. This will include the necessary sediment retaining systems.	EPC	As soon as the works start and throughout construction	Minor
		Minimise disturbed areas			
		Road gradient will be avoided or minimized (contour and slopes) in order reduce run-off induced erosion.			
		Excavated materials will be kept in the stockpile for as short a time as possible and, once an area is back-filled with soil material, compacted in a short time			
		Disturbed areas will be stabilized to minimise further erosion.			
		Runoff from the PV site will be free of excessive sediment and other constituents.			
Soil Compaction	Minor	Areas where visiting vehicles are allowed to circulate or park will be minimized and located only inside the project boundaries or access road.	EPC	As soon as the works start and throughout construction period.	Negligible

8.1.4 Wastewater Protection

Table 8-4 Wastewater mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Sanitary wastewater	Moderate	Develop a Wastewater Management Plan.	EPC	Before the start of construction works and throughout construction period	Negligible
		The reuse of wastewater on site is allowed if the following conditions are met: - Wastewater is treated in the ONEE STEP; - Analysis are provided to Masen showing that national and international water quality standards are met before its discharge into the environment; - Authorizations are obtained from local authorities allowing the reuse of the water.	EPC	As soon as the works start and throughout construction period.	
		Chemical toilets/ septic tanks will be available at the construction site in sufficient number to attend the number of employees expected	EPC	As soon as the works start and throughout construction period.	
		No domestic wastewater will be discharged outside the chemical toilets / septic tanks			
		Wastewater from chemical toilets/ septic tanks will be collected by licensed operators. Each chemical toilets/ septic tank will generally be collected and emptied before its contents reach 80% of its capacity. The required authorizations and contracts shall be obtained by the EPC before the construction works start			
		Septic tanks must be completely emptied before demobilisation to avoid contamination to the site area. The demobilisation procedure will ensure that tanks are not destroyed or damaged during the removal process.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Storm Water Drainage	Moderate	Construct a specific area for site equipment maintenance (lubrication, oil and filter changes, repair work, etc.). A waterproof concrete area or impermeable geo-textile liner shall be provided with a tank or perimeter ditch to collect any liquid waste that will be stored in a dedicated septic tank and collected by a licensed operator. Maintenance of vehicles will only be undertaken offsite in appropriate premises.	EPC	Design	Negligible
		Hazardous materials storage areas will be roofed to prevent rainfall entering such areas and avoid polluted runoff		As soon as the works start and throughout construction period	
		Permanent/temporary storage areas will be designed and located considering potential ground contamination risks. Runoff will be prevented from entering areas where hazardous materials are stored, handled or transferred. If runoff can enter potentially contaminated areas, a dedicated drainage system will direct the run off to dedicated tanks to avoid impacts to soils and groundwater. The fluids in these tanks will be collected by licensed operators and managed as Hazardous wastewater.			
		The stormwater drainage system will be able to accommodate and evacuate runoff so that it protects equipment during the worst case scenario as per local rain conditions and site area (funnelled to the channel) and soil and vegetation coverage conditions.			
		The stormwater drainage system will need to consider the increase on speed of the water flow with a concrete channel and consider the flood conditions that can potentially be caused downstream (particularly at the discharge point) to avoid erosion.			
		Adequate drainage systems will be provided to minimize and control infiltration. Sediment traps (i.e. filter fabric) will also be installed.			
		The stormwater drainage system will include a system to retain garbage carried by the runoff water. The system will be at the project boundary and allow easy access to collect retained materials.			
		The site will be fenced to ensure that no soil disturbance occurs outside of the site area. The areas requiring excavation/filling shall be clearly demarcated to ensure that the soil is no disturbed outside that area			
		Internal roads/routes gradients should not exceed 15%			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		The longitudinal slope of the road must be at least 3% in order to facilitate surface run-off of water and to avoid the build-up of sediment in gutters			
		Reduce height of any built up embankments and slopes, if possible.			
		Restore vegetation on slopes and embankments where possible and in areas away from electrical equipment to avoid fires			
		Construct gabions and concrete barriers for containment, use metal mesh and nets, drains and gutters in slopes for terrain stability			
		From the outset of work, plan, select and define areas for clearing, stripping and access routes in order to minimise unnecessary stripping of vegetation			
		Reduce cut-offs and embankments, if possible.			

8.1.5 Biodiversity

Table 8-5 Ecology and Biodiveristy mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Habitat loss	Minor	The following Moroccan endemic *species* were identified within the project footprint: *Ononis hesperia, Teucrium chardonianum, Helianthemum canariense, Pentzia hesperdium and* Zygophyllum waterlottii. These endemic species will be selected for landscaping, where practical, at the end of construction phase, to mitigate site clearance. This can be undertaken by collection of seed within the Region for sowing on site If agreed by the relevant stakeholders, the project company will support efforts for habitat restoration in the region (project area or nearby protected areas.	EPC	As soon as the works start and throughout construction period.	Minor
		The laydown areas of the site will be minimised in size wherever possible, and preferably located in areas with little or no vegetation, wherever possible. Post construction restoration may include sowing seed from local endemic species.			
		The contractor will ensure that no encroachment to the nearby, adjacent land will occur.			
		All construction vehicles adhere to clearly defined transportation routes. Transport routes will be identified and training provided to emphasise the need to adhere to the designated routes in order to protect the existing vegetation and reduce encroachment on adjacent land, and reduce dust fall across the site.			
		Restoration will take place where colonization is difficult or in the interest of accelerating the process will be carried out in areas were vegetation will not be a safety concern during the operational phase. Particular effort will be placed in selection of endemic species and location of planting in order to successfully achieve 'in-kind' ecological restoration. Restoration will only be conducted in sites away from electrical equipment to avoid future fire hazards. Therefore, planting will be limited to the herbaceous species that currently inhabit the site.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Poaching/Hunting/Trade	Moderate	Hunting, falconry and fauna/flora trade will be strictly forbidden on site. Warning signs will be placed around the site.	EPC	As soon as the works start and throughout construction period.	Negligible to Minor
Direct mortality of fauna	Minor to Moderate	Prior to vegetation clearance, the EPC will engage an ecologist to advise on the removal of reptiles that may be found on the site. A procedure will be prepared including photographs of any species found on site during previous surveys and potentially present onsite, and a procedure to safely remove them from the site. The HSE team will ensure that all workers are trained on the procedure. Alternatively, an ecologist can be deployed onsite to implement a translocation programme. All removals of reptiles from the site will be documented with photographs.	EPC	As soon as the works start and throughout construction period. Plans to be prepared before the construction works starts.	Negligible to Minor
		Speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Speed limits onsite are specified on Chapter 14 Traffic.			
		Workers will be trained to report trapped herpetofauna or small mammals encountered inside any trenches. Trapped wildlife will be released on the natural areas outside the construction area. Photographs of captured / released fauna to be retained by HSE Manager for inspection during external audits.			
		Establish procedures for the occasion any species are found on the construction site including procedures for reporting, identification and potential relocation.			
		Fires will be forbidden onsite			
		Induction training will include content to raise awareness of fauna that may be encountered, including reptiles and insects and protocols for alerting HSE Manager and avoiding harm to the fauna.			
		Schedule land clearing and excavation work outside the nesting period of the avifauna from June onwards.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		It is desirable that earthworks and clearing be completed by September in order to avoid any disturbance in the reproduction of birds that are likely to breed a second time if the rains occur in late summer.			
		Workers will be trained and sensitized on site so as not to kill or harm birds or nests if they are on site. These birds or nests will be identified and reported to the HSE manager and will be moved off site.			
		Training on conservation awareness on bird nests and burrows will be undertaken onsite.			
		Fencing design will minimise the permeability for fauna, where practical, as there is a direct mortality risk due to the operation of vehicles onsite during both construction and operations.			
Displacement due to Human disturbance	Minor	No floodlights will be directed to the natural environment around the project site by controlling light spill.	EPC	As soon as site works are completed	Negligible to Minor
		No noisy activities will be undertaken outside the project site.			

8.1.6 Non-hazardous Waste and Hazardous Materials

Table 8-6 Non-hazardous Waste and Hazardous Materials measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Solid waste volumes/quantities	Minor	Prepare a site-specific Waste Management Plan (WMP) including hazardous and non-hazardous waste. The plan will include training of staff.	EPC	Before the start of the construction works and throughout construction period.	Negligible
		Waste masonry should be re-used in the internal road construction and base fillings, when possible. Reasonable levels of utilization would be 60 to 80%	EPC	As soon as the works start and throughout construction period..	
		100% waste metal will be recycled			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Ordering materials that have reusable packaging and/or in bulk can significantly reduce waste generated			
		Request suppliers to use minimal packaging.			
		Chemicals should be ordered in returnable drums.			
		"Buy-back" arrangements should be made with key suppliers so that any surplus chemicals or materials can be returned			
		Refillable containers will be used, where possible, for collection of solid and liquid wastes			
Housekeeping	Minor	Separate waste streams to facilitate recycling. All storage areas must be well organised and waste appropriately managed through segregation of hazardous and non-hazardous waste. Waste within each category will be further segregated by type (paper, plastic, metal, masonry) and whether the material is recyclable or non-recyclable.	EPC	As soon as the works start and throughout construction period.	Minor
		A waste log will be kept onsite and will contain, at least, information about quantities, management solution (according to the waste management hierarchy described in the baseline section) types, operator, final disposal/destination, etc.)			
		Install adequate storage facilities for non-hazardous waste in designated areas to prevent waste from dispersing throughout the site			
		Include in the employees' inception training sections to increase their awareness of waste management protocols including proper handling and storage of waste, and emergency response and contingency plans.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Waste Storage	Moderate	Food waste must be stored within a sealed metal or plastic skip or bin with self-closing lid, in order to prevent birds/vermin/pests gaining access	EPC	As soon as the works start and throughout construction period	Minor
		Lightweight waste e.g. paper, cardboard, plastics: Must be stored within a skip sealed with a secured tarpaulin/netting sufficient to prevent any material being dispersed.			
		Heavy waste can be contained within an open skip, providing that segregation occurs effectively enough to remove all lightweight material that could be blown away.			
		Litter, bins for different types of waste (food waste, domestic waste) categories will be placed throughout the site at locations where construction workers and staff consume food. These will be regularly collected and taken to the main waste storage area. Portable separate bins will also be placed at areas where works will be undertaken (interconnection point, power line, access road, etc.)			
		No underground waste containers will be deployed.			
		Waste containers will be clearly marked with appropriate labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, and securely attached. Wherever possible, chemicals will be kept in their original container			
		Waste generated during construction will only be transported off-site for disposal by an appropriately licensed vendor. This service provider will follow the proper protocols to ensure that all waste handling and disposal from the site is carried out according to the environmental regulations. A record for all waste streams will be kept onsite.			
		Regular training of site personnel in proper waste management and chemical handling procedures will be conducted at regular intervals.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Incineration/burning of wastes will not be allowed onsite			
Hazardous Materials	Moderate	Implement best practice and regulations procedures for adequate handling, establishment of secure temporary storage areas, and disposal of waste by approved contractors.	EPC	As soon as the works start and throughout construction period. .	Negligible
		Hazardous wastes will be disposed in an environmentally safe manner and by licensed hazardous waste operators			
		Materials will be separated into combustible and non-combustible, and all flammable substances must be kept away from sources of ignition.			
		No underground hazardous materials storage containers will be deployed. Storage of hazardous materials will be undertaken in a fenced dedicated area with a dedicated drainage system and roofed to prevent rainwater from entering the area. This hazardous materials storage area will be located considering potential risks (e.g. traffic accidents/collisions, fall of items, drainage system, etc.).			
		Provide bunds for storing hazardous materials containers. The bunds will have the capacity to contain 110% of the total volume of stored materials and will be protected from vehicles or other risks. This area must be placed away from any sources of ignition. Storage areas will have impermeable bases (this need to cover a wider area if needed to avoid soil contamination, e.g. refuelling areas will include an impermeable base that protects the ground where the vehicles will be parked), will be roofed and be equipped with spill kits.			
		Hazardous Materials containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed technical specifications and safety precautions. Labels will be waterproof, and securely attached. Wherever possible, hazardous materials will be kept in their original container			
		Hazardous materials will only be transported to/from the site by a			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		licensed operator. This service provider will follow the proper protocols to ensure that all hazardous materials are transported and transferred according to the environmental regulations. A record for all hazardous materials will be kept onsite.			
		Only trained personnel will be permitted to handle hazardous materials.			
Waste Facilities	Minor	Only licensed waste management facilities shall be used for the disposal of non-hazardous and hazardous wastes, respectively.	EPC	As soon as the works start and throughout construction period.	Negligible

8.1.7 Traffic and Road Safety

Table 8-7 Traffic and Road Safety mitigation measures – construction phase

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Increased traffic load along National Highway and other on Residential Areas	Negligible to Minor	Develop Traffic Management Plan	EPC	Before the start of construction works and throughout construction period	Negligible
		Determine the designated access routes for delivery of equipment, road capacity, site entrance/exit points, etc.		As soon as the works start and throughout construction period.	
		Determine requirements for regular maintenance of vehicles (currently implemented) and use of manufacturer approved parts			
		Identify areas/spots sensitive to road safety issues and implement the necessary road safety measures, including residential areas where construction-related vehicles will pass through and at the interconnection point of the access road with the N1 road. Sensitive area will be communicated in advance to all drivers who will be provided with maps to ensure awareness. Special measures will need to be implemented if deemed necessary and appropriately communicated to drivers (e.g. lowers speed at a specific vulnerable spot in the route).			
		Manage delivery times of construction materials and equipment outside of peak hours.			
		Stagger key deliveries or periods of high vehicle movements to the site and reduce waiting times for drivers and over demand on receiving staff at the site.			
		Engines will be turned off while waiting in or outside the project site.			

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Staff will not be allowed to rest in vehicles to prevent excessive fuel wastage through the need to use air conditioning. Appropriate resting facilities will be provided at the landing for the drivers.			
		Drivers should be fully competent and authorised to drive HGVs and should receive specific road safety training			
		All vehicles dedicated full time for the project and circulating on roads outside the project site (owned or used by the Project Company, EPC or subcontractors) will have a clearly visible unique identification number and a sign with a telephone number for any road user that identifies reckless driving behaviour to be able to report it. Reports will be documented as grievances and investigated.			
Movement of vehicles	Moderate or Major	The access road will be clearly signalled and compacted (as a minimum) or tarmacked. Dust suppression measures will be conducted where and when required.	EPC	As soon as the works start and throughout construction period.	Minor
		Determine the designated access routes for delivery of equipment, site entrance points, laydown areas and parking areas, etc.			
		A 30km/h speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Vehicle speeds will be restricted to 20Km/h on haul roads and unpaved areas of the site			
		Post designated routes and signs for directions and speed limits onsite and along the route to access the main road.			
		Specific waiting areas will be designated in suitable locations. No waiting areas will be designate in proximity to residential units or settlements.			
		Inspect access and local roads (including N1) and remove construction materials			

8.1.8 Archaeology and Heritage

Table 8-8 Archaeology and Heritage mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Destruction of unknown archaeological remains onsite	Moderate	Implement a Chance Find Procedure	EPC	Before works start and throughout construction period.	Negligible

8.1.9 Landscape and Visual

Table 8-9 Landscape and Visual mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Topographical impacts to landscape	Minor	The heights of building, fences and any other tall structures will aim to minimise their visibility from the road. The grading of the site, will aim to match the surrounding topography and avoid any sudden changes in ground height between the project boundary and surrounding landscape.	EPC	As soon as the works start and throughout construction period.	Minor
Light Pollution	Moderate	Any flood lights required during night time construction activities will be directed onto the site, with a maximum position angle of 30° from vertical, therefore minimising any potential light spill, glare and sky glow.	EPC	As soon as the works start and throughout construction period	Minor

8.1.10 Socioeconomic

Table 8-10 Socioeconomic mitigation measures – construction phase

Impact/ Source	Initial Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impacts
Employment and Accommodation	Minor Positive	The project will seek to employ local workers where these are willing and available and have the skills required for the task. Non-specialist job opportunities will be offered to the local residents prior to hiring of employees from other areas when possible. The employment of women and vulnerable groups will be specifically targeted when possible.	EPC	As soon as the works start and throughout construction period.	Moderate Positive
		Establish and implement a recruiting policy and ensure that the necessary measures to mitigate negative impacts associated to labour and working conditions are implemented (e.g. child and forced labour, exploitation, excessive overtime, insufficient wages, harassment, unsafe/unhygienic living and working conditions, etc.). Labour and working conditions will be aligned with IFC standards.			
		Workers' accommodation (if required, as it is not envisaged at this stage) will comply with IFC standards.			
		Strict controls over the provision of housing shall prevent any unplanned settlements from developing.			
		A Retrenchment Plan will be prepared for moving from construction to operation.			
Purchases	Minor Positive	The EPC will only engage with reputable suppliers that do not use force or child labour and are capable to comply with the environmental and social standards established by the IFC for suppliers.	EPC	As soon as the works start and throughout construction period.	Minor Positive
		The EPC will only engage with reputable subcontractors that do not use force or child labour and are capable to implement the applicable with environmental and social measures established in the CESMP and other documents applicable to the construction of the project.			
		Purchase of goods and services within the local/regional area will be prioritized.			

Impact/ Source	Initial Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impacts
E&S and Health and Safety Risks	Negligible to minor Negative	If any activities that have not been assessed on the SESIA are proposed, potential E&S and HS risks to the communities will be assessed prior to their implementation or development. The site will be fenced and access to the construction site will be controlled by the security staff.	EPC	As soon as the works start and throughout construction period.	Negligible to Minor Negative
Dissemination of Skills	Minor Positive	Local employees will receive E&S and OHS training to enhance the development of skills. A certificate outlining the contents of the training and signed by the management of the PV plant will be provided to employees upon finalisation of the employment contract.	EPC	As soon as the works start and throughout construction period.	Minor Positive
Conflict – workforce	Negligible to Minor Negative	Training for foreign employees will include information on the cultural background of the local population.	EPC	As soon as the works start and throughout construction period.	Negligible to Minor Negative
Security Provisions	Minor Negative	Develop and implement a Policy on Security and a Code of Conduct for Security Personnel. The security provider and personnel will adhere to international human right code of conduct. Only security personnel and companies with no human right violations will be employed. Security personnel will undergo a dedicated training program which will include, as a minimum, information on how to exercise practices following GIIP (UN Voluntary Principles on Security and Human Rights), cultural background of the area and the workforce (main groups), and the way	EPC	Before the start of the construction works and throughout construction period	Minor Negative

Impact/ Source	Initial Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impacts
		they should interact with local communities and workers.			
Spread of Diseases	Negligible to Minor Negative	Prevention of diseases (including STDs) will be included in the training programme through toolbox talks or separate training sessions.	EPC	As soon as the works start and throughout construction period.	Negligible to Minor Negative
Informal Settlements / Encroachment	Negligible to Minor Negative	Unplanned settlements will be monitored by onsite security personnel and reported to the authorities. The local public security forces will be required to deal with encroachers as per national requirements.	EPC	As soon as the works start and throughout construction period.	Negligible Negative

8.2 PV - Operational Phase Mitigation Measures

8.2.1 Air Quality

Table 8-5 Air Quality mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Air emission from vehicles	Negligible to Minor	Regular vehicle maintenance in dedicated maintenance areas.	O&M	As soon as the operation start and throughout operation period.	Negligible
		Third parties employed to provide services during the operation of the project which involves regular transport to site (e.g. waste or septic tanks collectors) will be required to use vehicles regularly maintained and in good condition and will be inspected before entering the site.			

8.2.2 Noise and Vibration

Table 8-6 Noise and Vibration mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Vehicle Noise	Minor to Moderate	Deliveries of fuel and materials and removals of waste are to be undertaken during daylight hours.	O&M	As soon as the operation start and throughout operation period.	Negligible
		All vehicles will be adequately maintained in order to minimise sound emissions			
Operational	Minor	All machinery will be adequately maintained in order to minimise sound emissions	O&M	As soon as the	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Noise		All equipment specifications, will limit near field noise to 85 dB(A) at 1m. Where equipment and plant exceed 85 dB(A) at 1m under typical operating conditions, noise suppression techniques will be developed, these may include: silencers, noise insulation, noise attenuation barriers and housing for equipment. This will be determined and validated during performance testing		operation start and throughout operation period.	
		Onsite/offsite speed limits are included in the Traffic and Road Safety Section of this SESIA. Besides road safety, these limits will contribute to reduce noise levels resulting from traffic movements.			

8.2.3 Soil and Groundwater

Table 8-7 Soil and Groundwater mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Spillage	Moderate	Develop and implement a spill emergency and contingency plan Develop and implement training program for employees to increase their awareness of chemical management protocols including proper handling and storage of chemicals, emergency response, contingency plans and appropriate PPE, if needed.	O&M	As soon as the operation start and throughout operation period.	Negligible
Storage and waste management	Moderate	Storage areas for domestic waste will be sealed, covered, leak tight flooring, and correct shelving / cabinets in order to prevent spillage and leakage into the ground. The storage tanks of fuels/chemicals/sewage will be properly maintained and stored within a bunded area of 110% of their storage capacity.	O&M	As soon as the operation start and throughout operation period.	Negligible

8.2.4 Wastewater

Table 8-8 Wastewater mitigation measures – Operation phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Sanitary Wastewater	Minor	Develop a Wastewater Management Plan.	O&M	Before the start of the	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Generation				operation activities and throughout operation period.	
		The reuse of wastewater on site is allowed if the following conditions are met: - Wastewater is treated in the ONEE STEP; - Analysis are provided to Masen showing that national and international water quality standards are met before its discharge into the environment; Authorizations are obtained from local authorities allowing the reuse of the water.	O&M	Throughout the operation period	
		Sanitary and domestic wastewater will only be discharged to chemical toilets/ septic tanks that will be available on the project site.	O&M	As soon as the operation start and throughout operation period.	
		The septic tanks will be sited away from vehicle traffic, in order to prevent any damage to the tanks.			
		Aboveground septic tanks will be bunded. The bund will be able to accommodate 110% of the capacity of the tank.			
		Underground septic tanks will be equipped with flow metres (to identify leaks) and overflow alarms.			
		Wastewater from the chemical toilets/ septic tanks will be collected by a licensed operator.			
Storm Water	Minor	The site will be inspected regularly to ensure that no spills have occurred	O&M	As soon as	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Drainage		in areas that may be susceptible to storm water run off. Any and all spills must be immediately contained and cleaned, in order to prevent direct and indirect contamination to soils and water sources.		the operation start and throughout operation period.	
		The stormwater drainage system will include a system to retain garbage carried by the runoff. The system will be located before the project boundary and allow easy access to collect retained materials.			
		Runoff collection system will be inspected monthly and at the start of a rain event to ensure that no blockages could result with overflowing.			
		Waste storage areas have to be designed in such a way that rainwater is not in contact at any point with the waste.			
		The effectiveness of erosion prevention mitigation measures at rainwater discharge points will be verified after storm events to ensure that the adequacy of the design measures. Otherwise, these should be upgraded to meet storm water flows.			
		A re-vegetation programme on the slopes and embankments where storm water will be discharged shall be considered to reduce soil erosion. Only native species of shrubs native to the area shall be used in areas where dry vegetation do not pose a fire risk.			

8.2.5 Ecology and Biodiversity

Table 8-9 Ecology and Biodiversity mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Direct mortality of avifauna due to collision	Minor to Moderate	If significant direct mortality is identified through the monitoring programme, bird deterrence measures will be implemented to avoid migratory birds from attempting to "land" on the plant.	O&M	As soon as the operation start and throughout	Minor

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Since there are no comprehensive international studies for bird collision with PV panels, it is not possible to recommend a single technique to avoid collisions. The mitigation will follow the following two principles: The objective will be to avoid bird collisions, as this is the preferred approach in the mitigation hierarchy; The latest methods that are used internationally will be applied onsite. If specific guidance for PV plants is issued addressing this risk before the operational phase commences, it will be followed. Alternatively, the methods outlined in the guidelines to deter large flocks of birds from approaching airports (such as the UK Civil Aviation Authority 2014 Wildlife Hazard Management at Aerodromes CAP 772) will be applied.		operation period.	
Direct Mortality of Fauna	Minor	Speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Speed limits onsite are specified on Chapter 14 Traffic. Vehicles will keep to the designated routes during transportation of goods in order to prevent unnecessary land encroachment, thus protecting the natural resources and reducing dust emissions	O&M	As soon as the operation start and throughout operation period.	Negligible
Poaching/Hunting/Trade	Minor	Hunting, falconry and trade will be strictly forbidden on site. Notes on informative boards will be established.	O&M	As soon as the operation start and throughout operation period.	Negligible

8.2.6 Non-hazardous Waste and Hazardous Materials Management

Table 8-10 Non-hazardous waste and hazardous materials mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Solid waste volumes/quantities	Minor	Prepare a site-specific Waste Management Plan (WMP) including both hazardous and non hazardous waste. The plan will include training of staff.	O&M	Before the operation activities start and throughout operation period.	Negligible
		100% waste metal will be recycled	O&M	As soon as the operation start and throughout operation period.	
		Ordering materials that have reusable packaging and/or in bulk can to reduce waste generated			
		Request that suppliers use minimal packaging.			
		Chemicals should be ordered in returnable drums.			
		"Buy-back" arrangements should be made with key suppliers so that any surplus chemicals or materials can be returned			
		Refillable containers will be used, where possible, for collection of solid and liquid wastes			
Housekeeping	Minor	Separate waste streams to facilitate recycling. All storage areas must be well organised and waste appropriately managed through segregation of hazardous and non-hazardous waste. Waste within each category will be further segregated by type (paper, plastic, metal) and whether the material is recyclable or non-recyclable. A waste log will be kept onsite and will contain, at least, information about quantities, management solution (according to the waste management hierarchy described in the baseline section) types, operator, final disposal/destination, etc.)	O&M	As soon as the operation start and throughout operation period.	Minor
		Install adequate storage facilities for non-hazardous waste in designated areas to prevent waste from dispersing throughout the site.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Include in the inception training for employees sections to increase their awareness of waste management protocols including proper handling and storage of waste, and emergency response and contingency plans.			
Waste Storage	Minor	Food waste must be stored within a lidded metal or plastic skip or bin, in order to prevent vermin/pests gaining access.	O&M	As soon as the operation start and throughout operation period.	Negligible
		Lightweight waste e.g. paper, cardboard, plastics must be stored within a skip lidded with a secured tarpaulin/netting sufficient to prevent any material being dispersed.			
		For litter (food waste, domestic waste), bins for separate categories will be placed throughout the site at locations where construction workers and staff consume food. These will be regularly collected and taken to the main waste storage area.			
		Waste containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, and securely attached. Wherever possible, chemicals will be kept in their original container			
		Waste generated during operation will only be transported off-site for disposal by an appropriately licensed vendor. This service provider will follow the proper protocols to ensure that all waste handling and disposal from the site is carried out according to the environmental regulations. A record for all streams of generated and collected waste will be kept onsite.			
		Regular training of site personnel in proper waste management and chemical handling procedures will be conducted at regular intervals.			
		Incineration/burning of wastes will not be allowed			
		Food waste must be stored within a lidded metal or plastic skip or bin, in order to prevent vermin/pests gaining access.			
Hazardous	Minor	Implement best practice and regulations procedures for adequate handling, establishment of secure temporary storage areas, and disposal of waste by	O&M	As soon as the	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Materials		approved contractors.		operation start and throughout operation period.	
		Hazardous wastes be disposed in an environmentally safe manner and by licensed hazardous waste operator			
		Materials will be separated into combustible and non-combustible, and all flammable substances must be kept away from sources of ignition.			
		No underground hazardous materials storage containers will be deployed. Storage of hazardous materials will be undertaken in a fenced dedicated area with a dedicated drainage system and roofed to prevent rainwater from entering the area. This hazardous materials storage area will be located considering potential risks (e.g. traffic accidents/collisions, fall of items, drainage system, etc.).			
		Provide bunds for storing hazardous materials containers. The bunds will have the capacity to contain 110% of the total volume of stored materials and will be protected from vehicles or other risks. This area must be placed away from any sources of ignition. Storage areas will have impermeable bases (this need to cover a wider area if needed to avoid soil contamination, e.g. refuelling areas will include an impermeable base that protects the ground where the vehicles will be parked), will be roofed and be equipped with spill kits.			
		Hazardous Materials containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed technical specifications and safety precautions. Labels will be waterproof, and securely attached. Wherever possible, hazardous materials will be kept in their original container			
		Hazardous materials will only be transported to/from the site by an appropriately licensed operator. This service provider will follow the proper protocols to ensure that all hazardous materials are transported and transferred according to the environmental regulations. A record for all hazardous materials will be kept onsite.			
		Only trained personnel will be permitted to handle hazardous materials.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Waste Facilities	Minor	Only licensed waste management facilities approved by national/regional authorities shall be used for the disposal of non-hazardous and hazardous wastes, respectively.	O&M	As soon as the operation start and throughout operation period.	Negligible

8.2.7 Traffic and Road Safety

Table 8-11 Traffic and Road Safety Mitigation Measures – Operational Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Movement of vehicles along the site access road and onsite	Moderate	Determine the designated access routes for collecting and delivering, site entrance points, and parking areas, etc.	O&M	As soon as the operation start and throughout operation period.	X
		Determine requirements for regular maintenance of vehicles in line with national requirements and GIIP. Maintenance of vehicles will be undertaken in appropriate premises outside the project site.			
		Specific waiting areas will be designated in suitable locations.			
		The movement of vehicles along the access road will be minimized to essential operational and maintenance related activities.			
		All vehicles dedicated full time for the project and circulating on roads outside the project site (owned or used by the Project Company, EPC or subcontractors) will have a clearly visible unique identification number and a sign with a telephone number for any road user that identifies reckless driving behaviour to be able to report it.			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Reports will be documented as grievances and investigated.			
		Speed limit to be established onsite (30 km).			

8.2.8 Archaeology and Cultural Heritage

It is not considered that any significant impacts upon archaeological or cultural resources could occur during the operational phase.

8.2.9 Landscape and Visual

Table 8-12 Landscape and Visual mitigation measures – construction/operational phase

Impact/ Source	Potential impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Light Pollution	Moderate	Lighting provision shall not be excessive or unnecessary – Lights for the plant will be switched on only when strictly necessary	O&M	As soon as the operation start and throughout operation period.	Minor
		Lights required during night time will be directed onto the site, with a maximum position angle of 30° from vertical, therefore minimising any potential back spill and impacts at night to avoid disturbance to fauna.			
		Strictly monitor the light intensity, direction and duration. Design and install lighting such that light bulbs and reflectors are not visible from public viewing areas. Lighting should not cause reflected glare or sky glow.			

8.2.10 Socioeconomic

Table 8-13 Socioeconomic mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/ Cost	Residual Impact
Employment and Accommodation	Minor Positive	The PV will seek to employ local workers where these are willing and available, and where appropriate. All non-specialist job opportunities will be offered to the local residents prior to hiring of employees from other areas. The employment of women and vulnerable groups will be specifically targeted when possible and monitored if possible.	O&M	As soon as the operation start and throughout operation period.	Minor Positive
Employment and Accommodation	Minor Positive	Establish and implement a recruiting policy and ensure that the necessary measures to mitigate negative impacts associated to labour and working conditions are implemented (e.g. child and forced labour, exploitation, excessive overtime, insufficient wages, harassment, unsafe/unhygienic living and working conditions, etc.). Labour and working conditions will be aligned with IFC standards.	O&M	As soon as the operation start and throughout operation period.	Minor Positive
Purchases	Minor Positive	The O&M will only engage with reputable suppliers that do not use force or child labour and are capable to comply with the environmental and social standards established by the IFC for suppliers.	O&M	As soon as the operation start and throughout	
		The O&M will only engage with reputable subcontractors that do not use force or child labour and are capable to implement the applicable with environmental and social			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/ Cost	Residual Impact
		measures established in the OESMP and other documents applicable to the construction of the project.		operation period.	
		Purchase of goods and services by the workforce and of construction materials within the local/regional will be prioritized			
E&S and OHS Risks	Negligible to Minor Negative	Address potential E&S and H&S risks to the communities and workers	O&M	As soon as the operation start and throughout operation period.	Negligible Negative
		The site will be fenced and access to the construction site will be controlled by the security staff			
Dissemination of Skills	Minor Positive	Local employees will receive E&S and OHS training to enhance the development of skills. A certificate outlining the contents of the training and signed by the management of the PV plant will be provided.	O&M	As soon as the operation start and throughout operation period.	
Conflict – workforce / local residents	Negligible to Minor Negative	Training for foreign workers will include information on the cultural background of the population.	O&M	As soon as the operation start and throughou	Negligible Negative

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/ Cost	Residual Impact
				t operation period.	
Security Provisions	Minor Negative	Develop and implement a Security Policy and a Code of Conduct for Security Personnel.	O&M	As soon as the operation start and throughout operation period.	Negligible to Minor Negative
		The security provider and personnel will adhere to international human right code of conduct. Only security personnel and companies with no human right violations will be employed.			
		Security personnel will undergo a dedicated training program which will include, as a minimum, information on how to exercise practices following GIIP (UN Voluntary Principles on Security and Human Rights), cultural background of the area and the workforce (main groups), the way they should interact with local communities and workers.			
Spread of Diseases	Negligible to Minor Negative	Prevention of diseases (including STDs) will be included in the training programme.	O&M	As soon as the operation start and throughout operation period.	Negligible Negative

8.3 PL - Construction Phase Mitigation Measures

8.3.1 Air Quality

Table 8-14 Air quality Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Dust from Transportation	Minor to Moderate	Powdery materials (e.g. cements) will be transported in sealed containers	EPC	As soon as the works start and throughout construction period.	Negligible to Minor
		The PL corridor will be sprayed with water to minimise the dust from vehicles movements if the dust levels (visual inspection) are considered high.	EPC	As soon as the works start and throughout construction period.	
Gaseous and Particulate emissions from Transportation	Negligible to Minor	Vehicles and machinery will be periodically inspected for their worthiness and where necessary will not be permitted to enter the PL corridor.	EPC	As soon as the works start and throughout construction period.	Negligible
		Efficiently manage deliveries of equipment to reduce the number of trips.	EPC	As soon as the works start and throughout construction period.	
		Designated tracks/roads will include signage for directions and speed limits.	EPC	As soon as the works start and throughout construction period.	
		Vehicles will be turned off while waiting to minimise gas emissions.	EPC	As soon as the works start and throughout construction period.	

8.3.2 Noise and Vibration

Table 8-15 Noise and Vibration Mitigation Measures – Construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Construction Noise/Vibration	Major	All activities with highest noise emissions at the interconnection point (ONEE substation) will be undertaken during daytime in the working week and not on official holidays.	EPC	As soon as the works start and throughout construction period.	Minor
		Diesel compression equipment or generators will be equipped with effective silencers when necessary	EPC	As soon as the works start and throughout construction period.	
		Electrically powered equipment will be preferred, where practical, to mechanically powered alternatives. All mechanically powered equipment will also be fitted with suitable silencers when necessary.	EPC	As soon as the works start and throughout construction period. Cost should be integrated into the budget.	
		Plant equipment on the PL corridor operating intermittently will be shut down in the intervening periods between uses.	EPC	As soon as the works start and throughout construction period.	
		Construction employees will, at all times, carry out all work in such a manner as to keep any disturbance from noise and vibration to a minimum.	EPC	As soon as the works start and throughout construction period.	
		Where noise levels exceed 85dB(A) for an 8-hour time-weighted average, hearing protection devices shall be provided to workers. No unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C)	EPC	As soon as the works start and throughout construction period.	
Vehicle Noise	Minor	Vehicles will be equipped with effective silencers when necessary and switched off when are not in motion for more than 2 minutes	EPC	As soon as the works start and throughout construction period.	Negligible
		All vehicles will be adequately maintained in order to minimise sound	EPC	As soon as the works start	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		emissions.		and throughout construction period.	
		Speed limits are included in the Traffic and Road Safety Section of this SESIA. Besides road safety, these limits will contribute to reduce noise levels resulting from traffic movements particularly in residential areas without bypass road.	EPC	As soon as the works start and throughout construction period.	

8.3.3 Soil and Groundwater Protection

Table 8-16 Soil Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Leaks and Spillage of Hazardous Materials	Moderate	Chemicals, fuels, lubricants and paints will be stored and transferred only in dedicated locations of the shared Laydown Area on impermeable surfaces to prevent leakage into the ground and contained inside a secondary bund (110% of largest container).	EPC	As soon as the works start and throughout construction period.	Negligible
		Storage areas will be designed and located considering potential ground contamination risks. Runoff will be prevented from entering areas where hazardous materials are stored, handled or transferred. If runoff can enter potentially contaminated areas, a dedicated drainage system will direct the run off to dedicated tanks to avoid impacts to soils and groundwater. The fluids in these tanks will be collected by licensed operators and managed as Hazardous wastewater.	EPC	As soon as the works start and throughout construction period.	
		Hazardous materials storage area will be positioned away from major transport corridors in the shared Laydown Area, in order to avoid potential collisions from vehicles or other machinery.	EPC	As soon as the works start and throughout construction period.	
		Health care waste will be separated following GIIP (at least, infectious waste, sharps, pharmaceutical and chemical wastes, and waste containing high levels of hazardous substance(s) or pressurised containers, if any)	EPC	As soon as the works start and throughout construction period.	
		No refuelling of vehicles or equipment will be undertaken outside the dedicated location of the shared Laydown Area.	EPC	As soon as the works start and throughout construction period.	
		All chemicals will be handled in accordance with relevant	EPC	As soon as the works	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		instructions (MSDS)		start and throughout construction period.	
		Reduce quantity of chemicals and fuels to minimum practicable levels	EPC	As soon as the works start and throughout construction period.	
		Regularly inspect drip collectors and containers for spill and leaks.	EPC	As soon as the works start and throughout construction period.	
		Provide spill kits at all areas where hazardous liquids are stored.	EPC	As soon as the works start and throughout construction period.	
		Develop and implement an Emergency preparedness and Response Plan, to immediately remediate the affected area in the event of a spill or leakage of chemicals, fuels, paints, and any hazardous material.	EPC	As soon as the works start and throughout construction period.	
		Washing of equipment, machinery, and vehicles will not permitted and will only be carried out in adequate offsite premises.	EPC	As soon as the works start and throughout construction period.	
		Vehicle maintenance will not be undertaken in the PL corridor and will be carried out only in offsite permitted premises	EPC	As soon as the works start and throughout construction period.	
		If vehicles and machinery are too large to be moved offsite, or if it is not practicable to move the machinery for maintenance during the construction phase, then measures to protect the soils from spills and leaks during the cleaning/maintenance activity must be implemented (impermeable hard standing area with dedicated drainage system located). Maintenance of these vehicles will only be undertaken in the shared Laydown Area.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Erosion / Soil Compaction	Minor	Minimise disturbed areas.	EPC	As soon as the works start and throughout construction period.	Negligible
Cross-contamination of Soils		Excavated materials will be kept in the stockpile for as short a time as possible and, once an area is back-filled with soil material, compacted in a short time.	EPC	As soon as the works start and throughout construction period.	
		Areas where vehicles are allowed to circulate will be minimized and located only inside the corridor.	EPC	As soon as the works start and throughout construction period.	
		Implement good maintenance practices during construction activities, including the procedure and requirements for the proper handling, storage and transport of chemicals and hazardous waste	EPC	As soon as the works start and throughout construction period.	

8.3.4 Biodiversity

Table 8-17 Biodiversity Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Habitat Loss	Minor to Moderate	The following Moroccan endemic *species* were identified within the study area. *Euphorbia balsamifera, Ononis Hesperia, Teucrium chardonianum, Zilla spinosa subs. pcotata, Helianthemum canariense, Pentzia hesperdium, Suaeda ifniensis, Suaeda monodiana, and Zygophyllum waterlottii.* Avoidance of clearing any of these endemic species will be undertaken where possible. Appendix 2 of the ESIA Vol.2 includes a picture of each of these species. Adjustment of the proposed poles or tracks will be considered if any endemic species are to be affected by vegetation	EPC	As soon as the works start and throughout construction period.	Minor

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		clearance.			
		These endemic species will be planted, where practical, at the landscaping areas (within the PV site) at the end of construction, to maintain populations locally. The Project Company can select the most suitable approach to comply with the measures outlined above. Seeds will be collected from local sources for sowing onto areas of land which are not a fire risk to the PV Plant and suitable for the site landscaping.	EPC	As soon as the works start and throughout construction period. Cost should be integrated into the budget.	
		The contractor will ensure that no encroachment to the nearby, adjacent land will occur.	EPC	As soon as the works start and throughout construction period.	
		All construction vehicles will adhere to clearly defined transport routes identified during induction training. This will emphasise the need to adhere to the designated routes in order to protect the existing vegetation and fauna and reduce encroachment onto adjacent land, and reduce dust fall across the site.	EPC	As soon as the works start and throughout construction period.	
Poaching/Hunting/Trade	Minor to Moderate	Hunting, falconry and trade will be strictly forbidden along the PL corridor and adjacent 500m buffer zone. Induction training and informative boards will raise awareness to all employees and subcontractors.	EPC	As soon as the works start and throughout construction period.	Minor
Direct mortality of fauna	Minor to Moderate	Speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Speed limits onsite are specified on Chapter 14 Traffic.	EPC	As soon as the works start and throughout construction period.	Minor
		Transportation within and to and from the site will be minimised through efficient transport management in order to minimise the risk of running animals over.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Fires will be forbidden onsite or anywhere along the PL corridor.	EPC	As soon as the works start and throughout construction period.	
		Induction training for employees will include awareness of ecological management protocols including activities forbidden onsite, and protocols when fauna is encountered.	EPC	As soon as the works start and throughout construction period.	
		In order to avoid the destruction of active nests/burrows, vegetation clearance works for the base of poles and any new tracks will be scheduled before the commencement of the breeding period (end-February 2017)	EPC	As soon as the works start and throughout construction period.	
		Training on conservation awareness on bird nests and burrows will be undertaken onsite.	EPC	As soon as the works start and throughout construction period.	
Human disturbance	Minor	No glare or light spill from floodlights will be directed to the natural environment around the PL corridor or the 500m buffer.	EPC	As soon as the works start and throughout construction period.	Negligible
Direct mortality of avifauna due to electrocution	Minor Negative	The EPC will prepare a technical assessment of the PL design, to show compliance with international good practice for bird mortality management in the design of the line, as specified in the EU "*Bern Convention Group of Experts on Conservation of Birds*" and Birdlife "*Birds and Power Lines within the Rift Valley/ Red Sea Flyway*". Aspects to be included in the assessment will include, but not be limited to: • The installation of bird rejecters above non-suspended insulators; • Strain poles with power lines below the crossarm to have insulating chains of more than 60cm length • Avoidance of strain poles with one conductor above the crossarm	EPC	Design	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		• Avoidance of power poles with upright insulators • Conductors of suspended insulators will be placed at least 140cm apart. • For poles with the middle suspended insulator in a triangle- or vault-shaped frame, the distance between the perching site and middle suspended insulator to be at least 200cm in order to avoid electrocution during perching. • Terminal Poles and Tower stations: over voltage reactors to be attached below the crossarm and all down leading wires will be insulated with tubing. • Switch towers to be designed to have their switches below the cross arm. For each of these design recommendations, the EPC will clearly state which have been incorporated into the design, and when any has not been incorporated, the technical reason why it is not applicable will be outlined. • The report will be submitted to the Project Company and reviewed by a qualified independent expert to ensure that the proposed detailed design is aligned with good international practice to minimise bird mortality.			

8.3.5 Non-hazardous Waste and Hazardous Materials

Table 8-6 Non-hazardous Waste and Hazardous Materials Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Solid waste volumes/quantities	Negligible to Minor	100% waste metal will be recycled	EPC	As soon as the works start and throughout	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				construction period.	
		Ordering materials that have reusable packaging and/or in bulk can significantly reduce waste generated	EPC	As soon as the works start and throughout construction period.	
		Request suppliers to use minimal packaging.	EPC	As soon as the works start and throughout construction period.	
		Chemicals should be ordered in returnable drums.	EPC	As soon as the works start and throughout construction period.	
		"Buy-back" arrangements should be made with key suppliers so that any surplus chemicals or materials can be returned	EPC	As soon as the works start and throughout construction period.	
		Refillable containers will be used, where possible, for collection of solid and liquid wastes	EPC	As soon as the works start and throughout construction period.	
Housekeeping	Negligible to Minor	Separate waste streams to facilitate recycling. All storage areas must be well organised and waste appropriately managed through segregation by type (paper, plastic, metal, masonry) and whether the material is reusable onsite, recyclable or non-recyclable.	EPC	As soon as the works start and throughout construction	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				period.	
		A waste log will be kept onsite and will contain, at least, information about quantities, management solution (according to the waste management hierarchy described in the baseline section) types, operator, final disposal/destination, etc.)	EPC	As soon as the works start and throughout construction period.	
		Install adequate containers for non-hazardous waste in designated areas to prevent waste from dispersing throughout the PL alignment. All containers will be collected, segregated and emptied on a regular basis in the storage facilities located in the shared Laydown Area.	EPC	As soon as the works start and throughout construction period.	
		Include in the employees' inception training sections to increase their awareness of waste management protocols including proper handling and storage of waste, and emergency response and contingency plans.	EPC	As soon as the works start and throughout construction period.	
		Separate waste streams to facilitate recycling. All storage areas must be well organised and waste appropriately managed through segregation of hazardous and non-hazardous waste. Waste within each category will be further segregated by type (paper, plastic, metal, masonry) and whether the material is recyclable or non-recyclable.	EPC	As soon as the works start and throughout construction period.	
Waste Storage	Negligible to Minor	Food waste must be stored within a sealed metal or plastic skip or bin, in order to prevent vermin/pests gaining access	EPC	As soon as the works start and throughout construction period.	Negligible
		Lightweight waste e.g. paper, cardboard, plastics: Must be stored within a skip sealed with a secured tarpaulin/netting sufficient to prevent any material being dispersed.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Heavy waste must be contained within an open skip, providing that segregation occurs effectively enough to remove all lightweight material that could be blown away.	EPC	As soon as the works start and throughout construction period.	
		For litter (food waste, domestic waste), bins for separate categories will be placed throughout the site at locations where construction workers and staff consume food. These will be regularly collected and taken to the laydown area. Portable separate bins will also be placed at areas where works will be undertaken (interconnection point, power line, access road, etc.)	EPC	As soon as the works start and throughout construction period.	
		No underground waste containers will be deployed and will be located in a fenced dedicated area in the shared Laydown Area. This waste storage area will be located considering potential risks (e.g. traffic accident).	EPC	As soon as the works start and throughout construction period.	
		Waste containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, and securely attached. Wherever possible, chemicals will be kept in their original container	EPC	As soon as the works start and throughout construction period.	
		Waste generated during construction and stored in the shared Laydown Area will only be transported off-site for disposal by an appropriately licensed vendor. This service provider will follow the proper protocols to ensure that all waste handling and disposal from the site is carried out according to accepted national/regional environmental regulations. A record for all streams of generated and collected waste will be kept onsite.	EPC	As soon as the works start and throughout construction period.	
		Regular training of personnel in proper waste management and chemical handling procedures will be conducted at regular intervals.	EPC	As soon as the works start and throughout	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				construction period.	
		Incineration/burning of wastes will not be allowed	EPC	As soon as the works start and throughout construction period.	
		Incineration/burning of wastes will not be allowed	EPC	As soon as the works start and throughout construction period.	
		Only qualified personnel are authorized to handle hazardous materials.	EPC	As soon as the works start and throughout construction period.	
		Waste and hazardous materials must be placed in leakproof containers with sufficient containment to prevent spillage. These categories include hazardous materials contained in mobile refueling tanks.	EPC	As soon as the works start and throughout construction period.	
Waste Facilities	Negligible to Minor	Only Waste management facilities approved by national/regional authorities shall be used for the disposal of non-hazardous and hazardous wastes, respectively.	EPC	As soon as the works start and throughout construction period.	Negligible

8.3.6 Wastewater Management

Table 8-18 Wastewater Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Domestic Wastewater	Negligble to Minor	Chemical toilets/ septic tanks will be available at appropriate locations in the PL corridor and in the shared Laydown Area in sufficient number to attend the number of employees expected.	EPC	As soon as the works start and throughout construction period.	Negligible
		No domestic wastewater will be discharged outside the chemical toilets / septic tanks	EPC	As soon as the works start and throughout construction period.	
		Licensed operators will collect wastewater from chemical toilets/ septic tanks. Each chemical toilets/ septic tank will generally be collected and emptied before its contents reaches 80% of its capacity.	EPC	As soon as the works start and throughout construction period.	
		Septic tanks must be completely emptied before demobilisation to avoid contamination to the ground. The demobilisation procedure will ensure that tanks are not destroyed or damaged during the removal process.	EPC	As soon as the works start and throughout construction period.	

8.3.7 Traffic and Road Safety

Table 8-7 Traffic and Road Safety mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Increased traffic load along National Highway and other on Residential Areas	Negligible to Minor	Determine the designated access routes for delivery of equipment, road capacity, entrance/exit points, etc.	EPC	As soon as the works start and throughout construction period.	Negligible
		Determine requirements for regular maintenance of vehicles (currently implemented) and use of manufacturer approved parts	EPC	As soon as the works start and throughout construction period.	
		Identify areas/spots sensitive to road safety issues and implement the necessary road safety measures, including residential areas where construction-related vehicles will pass through and at the interconnection point of the access road with the N1 road. Sensitive area will be communicated in advance to all drivers who will be provided with maps to ensure awareness. Special measures will need to be implemented if deemed necessary and appropriately communicated to drivers (e.g. lowers speed at a specific vulnerable spot in the route).	EPC	As soon as the works start and throughout construction period.	
		Manage delivery times of construction materials and equipment outside of peak hours.	EPC	As soon as the works start and throughout construction period.	
		Stagger key deliveries or periods of high vehicle movements to the laydown area and reduce waiting times for drivers and over demand on receiving staff at the laydown area.	EPC	As soon as the works start and throughout construction period.	
		Engines will be turned off while waiting in or outside the site.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Staff will not be allowed to rest in vehicles to prevent excessive fuel wastage through the need to use air conditioning. Appropriate resting facilities will be provided at the landing for the drivers at the laydown area.	EPC	As soon as the works start and throughout construction period.	
		Drivers should be fully competent and authorised to drive HGVs and should receive specific road safety training	EPC	As soon as the works start and throughout construction period.	
		All vehicles dedicated full time for the project and circulating on roads outside the site (owned or used by the Project Company, EPC or subcontractors) will have a clearly visible unique identification number and a sign with a telephone number for any road user that identifies reckless driving behaviour to be able to report it. Reports will be documented as grievances and investigated.	EPC	As soon as the works start and throughout construction period.	
Movement of vehicles alongside the corridor	Minor to Moderate	Temporary construction roads will be clearly signalled. Dust suppression measures will be conducted where and when required.	EPC	As soon as the works start and throughout construction period.	Negligible
		Determine the designated access routes for delivery of equipment, corridor entrance points.	EPC	As soon as the works start and throughout construction period.	
		A 30km/h speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Vehicle speeds will be restricted to 20Km/h on unpaved areas.	EPC	As soon as the works start and throughout construction period.	
		Post designated routes and signs for directions and speed limits along the site.	EPC	As soon as the works start and throughout construction period.	
		Specific waiting areas will be designated in suitable locations. No waiting areas will be designate in proximity to residential units or settlements.	EPC	As soon as the works start and throughout construction period.	
		Inspect daily N1 and remove building materials	EPC	As soon as the works start and throughout construction period	

8.3.8 Archaeology and Heritage

Table 8-8 Archaeology and Heritage Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Destruction of unknown archaeological remains onsite	Minor	Implement a Chance Find Procedure	EPC	As soon as the works start and throughout construction period.	Negligible

8.3.9 Landscape and Visual

Table 8-9 Landscape and Visual Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Light Pollution	Minor	Any flood lights required during night time construction activities will be directed onto the PL corridor, with a maximum position angle of 30° from vertical, therefore minimising any potential light leakage and impacts at night.	EPC	As soon as the works start and throughout construction period	Negligible to Minor

Socio-economic

Table 8-10 Socio-economic Mitigation Measures – Construction Phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Employment and Accommodation	Minor Positive	The project will seek to employ local workers where they are willing and available and have the skills required for the task. Non-specialist job opportunities will be offered to the local residents prior to hiring of employees from other areas when possible. The employment of women and vulnerable groups will be specifically targeted when possible.	EPC	As soon as the works start and throughout construction period	Moderate Positive
		Establish and implement a recruiting policy and ensure that the necessary measures to mitigate negative impacts associated with labour and working conditions are implemented (e.g. child and forced labour, exploitation, excessive overtime, insufficient wages, harassment, unsafe/unhygienic living and working conditions, etc.). Labour and working conditions will be aligned with IFC standards.	EPC	As soon as the works start and throughout construction period	
		Workers' accommodation (if required, as it is not envisaged at this stage) will comply with IFC standards.	EPC	As soon as the works start and throughout construction period Cost should be integrated into the budget.	
		Strict controls over the provision of housing shall prevent any unplanned settlements from developing.	EPC	As soon as the works start and throughout construction period	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		A Retrenchment Plan will be prepared for moving from construction to operation.	EPC	As soon as the works start and throughout construction period	
Purchases	Minor Positive	The EPC will only engage with reputable suppliers that do not use force or child labour and are capable to comply with the environmental and social standards established by the IFC for suppliers.	EPC	As soon as the works start and throughout construction period	Minor Positive
		The EPC will only engage with reputable subcontractors that do not use force or child labour and are capable to implement the applicable with environmental and social measures established in the CESMP and other documents applicable to the construction of the project.	EPC	As soon as the works start and throughout construction period	
		Purchase of goods and services within the local/regional area will be prioritized.	EPC	As soon as the works start and throughout construction period	
E&S and Health and Safety Risks	Minor Negative	If any activities that have not been assessed on the SESIA are proposed, potential E&S and HS risks to the communities will be assessed prior to their implementation or development.	EPC	As soon as the works start and throughout construction period	Minor Negative
Dissemination of Skills	Minor Positive	Local employees will receive E&S and OHS training to enhance the development of skills. A certificate outlining the contents of the training and signed by the management of the project will be provided to employees upon finalisation of the employment contract.	EPC	As soon as the works start and throughout construction period	Minor Positive

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Conflict – workforce	Negligible to Minor Negative	Training for foreign employees will include information on the cultural background of the local population.	EPC	As soon as the works start and throughout construction period	Negligible to Minor Negative
Security Provisions	Minor Negative	Develop and implement a Policy on Security and a Code of Conduct for Security Personnel.	EPC	As soon as the works start and throughout construction period	Minor Negative
		The security provider and personnel will adhere to international human right code of conduct. Only security personnel and companies with no human right violations will be employed.	EPC	As soon as the works start and throughout construction period	
		Security personnel will undergo a dedicated training program which will include, as a minimum, information on how to exercise practices following GIIP (UN Voluntary Principles on Security and Human Rights), cultural background of the area and the workforce (main groups), and the way they should interact with local communities and workers.	EPC	As soon as the works start and throughout construction period	
Spread of Diseases	Negligible to minor Negative	Prevention of diseases (including STDs) will be included in the training programme through toolbox talks or separate training sessions.	EPC	As soon as the works start and throughout construction period	Negligible to minor Negative
Informal Settlements / Encroachment	Minor Negative	Unplanned settlements will be monitored by onsite security personnel and reported to the authorities.	EPC	As soon as the works start and throughout construction	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				period	
		The local public security forces will be required to deal with encroachers as per national requirements.	EPC	As soon as the works start and throughout construction period	

8.4 PL -Operational Phase Mitigation Measures

8.4.1 Air Quality

No mitigation measures are deemed significant for the operation of the PL.

8.4.2 Noise and Vibration

No mitigation measures are deemed significant for the operation of the PL.

8.4.3 Soil and Groundwater

No mitigation measures are deemed significant for the operation of the PL.

8.4.4 Biodiversity

Table 8-19 Ecology and Biodiversity mitigation measures – operational phase

Impact / Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Direct mortality of avifauna due to electrocution	Minor Negative	The EPC will prepare a technical assessment of the PL design, to show compliance with international good practice for bird mortality management in the design of the line, as specified in the EU "*Bern Convention Group of Experts on Conservation of Birds*" and Birdlife "*Birds and Power Lines within the Rift Valley/ Red Sea Flyway*". Aspects to be included in the assessment will include, but not be limited to: • The installation of bird rejecters above non-suspended insulators; • Strain poles with power lines below the crossarm to have insulating chains of more than 60cm length	EPC	Design	Negligible

Impact / Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		• Avoidance of strain poles with one conductor above the crossarm • Avoidance of power poles with upright insulators • Conductors of suspended insulators will be placed at least 140cm apart. • For poles with the middle suspended insulator in a triangle- or vault-shaped frame, the distance between the perching site and middle suspended insulator to be at least 200cm in order to avoid electrocution during perching. • Terminal Poles and Tower stations: over voltage reactors to be attached below the crossarm and all down leading wires will be insulated with tubing. • Switch towers to be designed to have their switches below the cross arm. For each of these design recommendations, the EPC will clearly state which have been incorporated into the design, and when any has not been incorporated, the technical reason why it is not applicable will be outlined. • The report will be submitted to the Project Company and reviewed by a qualified independent expert to ensure that the proposed detailed design is aligned with good international practice to minimise bird mortality.			
Direct mortality of avifauna due to collision	Minor Negative	In order to determine if collision rates justify the installation of bird markers, an intensive monitoring will be undertaken for the first two years after the construction of the Power Line. If identified mortality during a single migratory season exceeds 3 carcasses of threatened species (VU, CR or EN as per IUCN) or 10 carcasses in total, bird markers will be installed. If there is a clear geographical pattern of bird mortality, the markers could be installed only in the areas with a significantly higher mortality rates. Examples of flight diverters/markers are shown in Figure 5.	EPC (Design) O&M (monitoring) EPC (if installation of bird markers is required during the first two years of operation)	As soon as the operation start and during the fist two years of operation	Negligible

Impact / Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Such provision can reduce collision accidents by 50 to 85%.			

8.4.5 Non-hazardous Waste and Hazardous Materials Management

No mitigation measures are deemed significant for the operation of the PL.

8.4.6 Wastewater Management

No mitigation measures are deemed significant for the operation of the PL.

8.4.7 Traffic and Road Safety

8.4.8 Archaeology and Cultural Heritage

No mitigation measures are deemed significant for the operation of the PL.

8.4.9 Landscape and Visual

No mitigation measures are deemed significant for the operation of the PL.

8.4.10 Socioeconomic

No mitigation measures are deemed significant for the operation of the PL.

8.5 Decommissioning Mitigation Measures

With regards to the decommissioning phase, it should be noted that the Project will be transferred to MASEN at the end of the 25-year PPA period. Consequently, the responsibilities for the decommissioning of the plant will not fall under the responsibility of ACWA Power.

Considering that decommissioning will occur beyond 25 years from the operation of the plant, the management plans, regulatory requirements and methodologies should be revised to ensure applicability with the industrial standard practice at the time of decommissioning.

Consequently, the decommissioning contractor will draft a DESMP (Decommissioning Environmental and Social Management Plan) that will include the measures and the proposed roles, responsibilities and monitoring activities that should be implemented during this phase. The DESMP will consider the applicable mitigation measures included in the CESMP and the OESMP.

9 FRAMEWORK MONITORING PLAN

The following table outlines the parameters that, as a minimum, need to be monitored for the project. It includes monitoring that was undertaken at the SESIA stage and monitoring that is considered necessary as a result of the findings of the SESIA for the construction and operational phases of the project.

Additional frequency, parameters or locations might be monitored if new activities that were not covered in the SESIA are implemented onsite, or following emergency situations, incidents (e.g. spills) or requests from stakeholders.

9.1 PV – Monitoring Plan (construction and operational phases)

Table 9-1 Monitoring Measurers Summary Table (Photovoltaic Power Plant)

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Construction						
Air quality - PM_{10} $PM_{2.5}$	Site boundary	Air filters or dust collectors	Weekly during site preparation activities	Dust from vehicles and earthworks	To be determined by the EPC	EPC
Air Quality - Exhausts	Equipment exhausts	Visual inspection of the smoke (follow testing equipment specifications for use)	Daily Inspections	If there is visible dark smoke, the equipment will be sent for maintenance or replaced	Not applicable	EPC/ Subcontractors
Air Quality – Exhausts	Vehicles entering to the site	Visual inspection of the smoke (follow testing equipment specifications for use)	Always	If there is visible dark smoke, the vehicles will not enter the site	Not applicable	EPC/ Subcontractors
Noise	Inside the Project Site and at Sensitive Receptors (if any)	Standard noise monitoring methodology, as described in the baseline monitoring survey.	Weekly during site preparation and construction of foundations. Monthly during the rest of	Construction activities increase noise levels (nuisance, disturb fauna, work	To be covered by the EPC (indicative cost noise meter 2000-5000 MD)	EPC

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
			construction.	hazard)		
Waste management -	-	Waste log quantities and types of solid waste reuse, recycling and disposal. Include an indication if solid waste disposal has met intended construction phase recycling, recovery or reuse targets	Bi-weekly	Monitor compliance with waste management targets	Not applicable	EPC / subcontractors
Waste management	-	Waste log- quantities and types of solid waste taken off site, the approved handler, and where the waste was disposed. Special attention will be given to hazardous waste.	Every time waste is taken offsite. Statistics compiled monthly.	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	EPC / subcontractors
Wastewater management -	-	Waste log quantities and types septic tanks taken off site, the approved handler, and where the waste was disposed;	Every time sewage is taken offsite. Statistics compiled monthly.	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	EPC / subcontractors
Underground Septic Tanks,	-	Waste log quantities of sewage flowing into	Calculations undertaken monthly.	Potential leakage from underground	Not applicable	EPC / subcontractors

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
identification of leakage –;		underground septic tank compared to sewage being tankered off		septic tanks.		
Waste Management -	Solid Waste Storage Areas	Visual inspection non-hazardous solid waste storage collection, storage and transfer areas or evidence of accidental releases and to verify that wastes are properly labelled and stored	Daily	Monitor compliance with waste storage targets	Not applicable	EPC
Hazardous Materials -	Hazardous Materials storage collection, storage and transfer areas	Visual inspection	Daily	Monitor compliance with hazardous materials storage targets	Not applicable	EPC
Runoff system - blockages	Runoff system	Visual inspection	Weekly and in prevision of rain	Monitor compliance with overflowing	Not applicable	EPC
Runoff system - erosion prevention	Runoff system discharge points	Visual inspection	Weekly and following intense rain events	Monitor compliance with erosion objectives	Not applicable	EPC

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Soil Quality	Hazardous materials and liquid and solid waste storage areas as a minimum	Sampling methodology as described in SESIA – Soil Quality section	Soil samples will be analysed following the release of hazardous substances onto the soil and the required restoration	Monitor compliance with ground pollution targets	Quotations to be obtained by the EPC.	EPC
Ecological status – presence of fauna and bird nesting.	Along fence line boundary and buffer zone outside of PV site.	Visual inspection of habitat around the boundary of the site and photograph of any changes. Document an monitor bird nests.	Monthly	To ensure that there is no loss of habitat or fauna outside of the plant boundary fence. Monitor any impacts on nests.	Not applicable	EPC
Ecological status - Additionally, detect caught/trapped fauna. Specialist is not required.	Onsite	Visit trenches and other risk areas as part of the daily inspections to record any trapped animals	Daily	To avoid mortality of reptiles or small mammals	Not applicable	EPC
Traffic and Transportation	Within the site and in the access road	Speed meter device	Weekly	Monitor compliance with speed limits	Cost of speed meter	EPC
Housekeeping	Site and access	Visual Inspection and	Onsite: Daily	Monitor good	Not applicable	EPC

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
	roads	collection	Access roads: Weekly	construction housekeeping practices onsite and at access roads		
Lighting	Boundaries of the site and at Sensitive Receptors	Visual assessment of directional lighting	Quarterly	Minimise light spill glare and sky-glow.	Not applicable.	EPC
Recruitment policy	Not applicable	Ratio local, regional, national and international employees. Rations of women employees.	Monthly	Provide employment for local population, minimize impact immigrant labour	Not applicable	EPC
Complaints register	Point of contact to be posted at the site entrance	Register complaints and how they are addressed	Every time there is a complaint	Record, address and follow up complaints	Not applicable	EPC
Community Grievances	Isolated households and Edchera	HSE team members from the EPC and Project Company to visit the isolated houses in the area and the village of Edchera	Monthly	Capture grievances from potentially vulnerable social receptors	Not applicable	Project Company and EPC

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
		to capture potential grievances.				
Emergency monitoring	Not applicable	Register emergencies and follow-up-remediation	Every time there is an emergency	Register emergencies and follow-up-remediation	To be covered by the EPC.	EPC
Operation						
Waste management -	-	Waste log estimated of quantities and types of solid waste reuse, recycling and disposal. Include an indication if solid waste disposal has met intended recycling, recovery or reuse targets	Quarterly	Monitor compliance with waste management targets	Not applicable	O&M / subcontractors
Waste management -	-	Waste log quantities and types of solid waste taken off site, the approved handler, and where the waste was disposed. Special attention will be	Every time waste leaves the site. Statistics to be compiled quarterly.	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	O&M / subcontractors

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
		given to hazardous waste.				
Waste management -	-	Waste log quantities and types septic tanks taken off site, the approved handler, and where the waste was disposed;	Monthly	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	O&M / subcontractors
Waste Management -	Waste storage collection, storage and transfer areas	Visual inspection evidence of accidental releases and to verify that wastes are properly labelled and stored	Weekly	Monitor compliance with waste storage requirements	Not applicable	O&M
Hazardous Materials -	Hazardous Materials storage collection, storage and transfer areas	Visual inspection	Weekly	Monitor compliance with hazardous materials storage requirements	Not applicable	O&M
Runoff system - blockages	Runoff system	Visual inspection	Monthly and in prevision of rain	Monitor compliance with overflowing	Not applicable	O&M
Runoff system - erosion prevention	Runoff system discharge points	Visual inspection	Monthly	Monitor compliance with erosion objectives	Not applicable	O&M

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
mitigation measures						
Soil Quality	Hazardous materials and liquid and solid waste storage areas as a minimum	Sampling methodology as described in SESIA Soil Contamination chapter	If major accidental releases of pollutants take place, following remediation.	Monitor compliance with ground pollution targets	To be covered by the O&M or responsible subcontractor.	O&M / subcontractor
Ecological status – Presence of fauna species and identification of nests. Specialist is not required.	Onsite, adjacent area (~200 m buffer)	Count of fauna species and identification of nesting areas.	Monthly	Monitor ecology around the site	Not Applicable	O&M
Ecological status – Identify bird or other fauna mortality, presence onsite and nesting onsite.	Onsite	Identification and count of fauna species and mortality onsite (if any).	Daily inspections All O&M workers to be trained to report carcasses onsite.	Monitor ecology around the site	Not Applicable	O&M
Lighting	Boundaries of the site	Visual assessment of directional lighting	Quarterly	Minimise light spill glare and sky-glow.	Not Applicable	O&M

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Recruitment policy	Not applicable	Ratio local, regional, and Moroccan to expatriate labour and women to men	Quarterly	Provide employment for local population, minimize impact immigrant labour	Not Applicable	O&M
Complaints register	Point of contact to be posted at the site entrance	Register complaints and how they are addressed	Every time there is a complaint	Record, address and follow up complaints	Not Applicable	O&M
Community Grievances	Isolated households and Edchera	HSE team members from the O&M to visit the isolated houses in the area and the village of Edchera to capture potential grievances.	Quarterly	Capture grievances from potentially vulnerable social receptors	Not applicable	O&M
Emergency monitoring	Not applicable	Register emergencies and follow-up-remediation	Every time there is an emergency	Register emergencies and follow-up-remediation	To be covered by the O&M .	O&M
Supervision (during the construction and operation phases)						
Independent	-	The auditors will review the	Quarterly	Independent	Project	Project

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Environmental Audits – Documentation		environmental and social documentation kept at the facility, check the adequate implementation of the environmental procedures established in the ESMP (CESMP/OESMP) and documentary evidence of the application of the mitigation and monitoring measures stated in the SESIA, including the monitoring results	(construction) Every six months (operation –first two years) Yearly (remaining operational phase)	environmental audits provide assurance of compliance with the measures included in the SESIA and the ESMP.	Company to hire independent external auditors.	Company. The auditors will be required to have auditing experience in Morocco in renewable projects and auditing experience in projects aligned with IFC requirements
Independent Environmental Audits — Site inspection	-	The auditors will visit the plant, to ensure that the environmental and social procedures are being adequately applied onsite.	Quarterly (construction) Every six months (operation –first two years) Yearly (remaining operational phase)	Independent environmental audits provide assurance of compliance with the measures included in the SESIA and the ESMP.	Project Company to hire independent external auditors.	Project Company. The Consultancy will be required to have auditing experience in Morocco in renewable projects and auditing

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
						experience in projects aligned with IFC requirements

9.2 PL - Monitoring Plan (construction and operational phases)

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Construction						
Air quality - Dust	Site boundary	Visual Inspection of dust particles	Weekly during site preparation activities	Dust from vehicles and earthworks	To be determined by the EPC	EPC

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Noise	Inside the Project Site and at Sensitive Receptors (if any)	Standard noise monitoring methodology, as described in the baseline monitoring survey.	Weekly during site preparation and construction of pylons. Monthly during the rest of construction.	Construction activities increase noise levels (nuisance, disturb fauna, work hazard)	To be covered by the EPC (indicative cost noise meter 2000-5000 MD)	EPC
Ecological status – presence of fauna and bird nesting.	Along fence line boundary and buffer zone outside of PV site.	Visual inspection of habitat around the boundary of the site and photograph of any changes. Document an monitor bird nests.	Monthly	To ensure that there is no loss of habitat or fauna outside of the plant boundary fence. Monitor any impacts on nests.	Not applicable	EPC
Waste management -	Not applicable	Waste-log quantities and types of solid waste reuse, recycling and disposal. Include an indication if solid waste disposal has met intended construction phase recycling, recovery or reuse targets	Bi-weekly	Monitor compliance with waste management targets	Not applicable	EPC / subcontractors
Waste management	Not applicable	Waste log- quantities and types of solid waste taken off site, the approved	Every time waste is taken offsite. Statistics compiled monthly.	Monitor compliance with off-site disposal by	Not applicable	EPC / subcontractors

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
		handler, and where the waste was disposed. Special attention will be given to hazardous waste.		approved subcontractors		
Wastewater management -	Not applicable	Waste log quantities and types septic tanks taken off site, the approved handler, and where the waste was disposed;	Every time sewage is taken offsite. Statistics compiled monthly.	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	EPC / subcontractors
Waste Management -	Solid Waste Storage Areas	Visual inspection non-hazardous solid waste storage collection, storage and transfer areas or evidence of accidental releases and to verify that wastes are properly labelled and stored	Daily	Monitor compliance with waste storage targets	Not applicable	EPC
Hazardous Materials -	Hazardous Materials storage collection, storage and transfer areas	Visual inspection	Daily	Monitor compliance with hazardous materials storage targets	Not applicable	EPC

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Soil Quality	Hazardous materials and liquid and solid waste storage areas as a minimum	Sampling methodology as described in SESIA – Soil Quality section	Soil samples will be analysed following the release of hazardous substances onto the soil and the required restoration	Monitor compliance with ground pollution targets	Quotations to be obtained by the EPC.	EPC
Traffic and Transportation	Within the site and in the access road	Speed meter device	Weekly	Monitor compliance with speed limits	Cost of speed meter	EPC
Housekeeping	Site and access roads	Visual Inspection and collection	Onsite: Daily Access roads: Weekly	Monitor good construction housekeeping practices onsite and at access roads	Not applicable	EPC
Lighting	Boundaries of the site	Visual assessment of directional lighting	Quarterly	Minimise light spill glare and sky-glow.	Not applicable.	EPC
Recruitment policy	Not applicable	Ratio local, regional, national and international employees. Rations of women employees.	Monthly	Provide employment for local population, minimize impact immigrant labour	Not applicable	EPC

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Complaints register	Point of contact to be posted at the site entrance	Register complaints and how they are addressed	Every time there is a complaint	Record, address and follow up complaints	Not applicable	EPC
Emergency monitoring	Not applicable	Register emergencies and follow-up-remediation	Every time there is an emergency	Register emergencies and follow-up-remediation	To be covered by the EPC.	EPC
Operation						
Ecological status – Presence of fauna species and identification of nests. Specialist is not required.	Onsite, adjacent area (~200 m buffer)	Count of fauna species and identification of nesting areas.	Monthly	Monitor ecology around the site	Not Applicable	O&M
Ecological status – Bird Mortallity Monitoring	PL alignment and poles See Section 6.1.1	Bird mortality identification, count of carcasses, species identification and carcass removal trials. All O&M workers to be trained to report carcasses	Monthly during bird migration periods (end of August to November and March to mid May) for the first two years of operation of the power line.	Monitor Bird Mortallity within the alignment. See Section 6.1.1	To be covered by the O&M.	O&M

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
		onsite. See Section 6.1.1	See Section 6.1.1			
Supervision (during the construction and operational phases)						
Independent Environmental Audits – Documentation	Not applicable	The auditors will review the environmental and social documentation kept at the facility, check the adequate implementation of the environmental procedures established in the ESMP (CESMP/OESMP) and documentary evidence of the application of the mitigation and monitoring measures stated in the SESIA, including the monitoring results	Quarterly (construction) Every six months (operation –first two years) Yearly (remaining operational phase)	Independent environmental audits provide assurance of compliance with the measures included in the SESIA and the ESMP.	Project Company to hire independent external auditors.	Project Company The auditors will be required to have previous auditing experience in Morocco and in projects aligned with IFC requirements.

MONITORING PLAN						
What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Independent Environmental Audits — Site inspection	Not applicable	The auditors will visit the plant, to ensure that the environmental and social procedures are being adequately applied onsite.	Quarterly (construction) Every six months (operation –first two years) Yearly (remaining operational phase)	Independent environmental audits provide assurance of compliance with the measures included in the SESIA and the ESMP.	Project Company to hire independent external auditors.	Project Company The auditors will be required to have previous auditing experience in Morocco and in projects aligned with IFC requirements.