NOORo IV Ouarzazate 70 MW Photovoltaic Power Project

Kingdom of Morocco

Specific Environmental and Social Impact Assessment Vol.1

Non-Technical Summary

Prepared for:

ACWA Power

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
AC	Alternate Current
CO_2	Carbon Dioxide
CSP	Concentrated Solar Power
DC	Direct Current
ESMP	Environmental and Social Management Plan
FESIA	Framework Environmental and Social Impact Assessment
IFC	International Finance Corporation
ILO	International Labour Organisation
IUCN	International Union for the Conservation of Nature
MASEN	Moroccan Agency for Solar Energy
MFS	Minimum Functional Specification
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 70 MW photovoltaic power project (the Project) within the NOORo Solar Power Complex (the Complex) which includes the NOORo I, II, III CSP Projects, and is located 10 km from the city of Ouarzazate, Morocco. The project also includes the construction of a Power Line (PL) and underground water pipe to connect the power plant to the existing NOORo Solar Power Complex 225 kV substation and water tank. No project component will be constructed outside the Complex.

ACWA Power has engaged an independent environmental and social consulting firm to prepare a Specific Environmental and Social Impact Assessment (SESIA) in accordance with national and international requirements.

The proposed Project is seeking international funding from Kreditanstalt für Wiederaufbau (KfW), a German government-owned development bank.

The SESIA report has been prepared in accordance with Law n°11-03 for the Protection and Improvement of the Environment and Law n°12-03 for the Environmental Study Impact Process of Morocco. It has also been prepared in accordance with KfW Development Bank Sustainability Guidelines issued in April 2014 (https://www.kfw-entwicklungsbank.de/PDF/Download-Center/PDF-Dokumente Richtlinien/Nachhaltigkeitsrichtlinie_EN.pdf), World Bank Safeguard Policies (http://go.worldbank.org/WTA1ODE7T0), World Bank Group Environmental, Health and Safety General Guidelines issued on 30 April 2007, and the Fundamental Conventions, all as in effect on 23 April 2016.

In addition, this SESIA report has adopted the applicable requirements established in the Framework Environmental and Social Impact Assessment (FESIA) prepared by MASEN for the NOORo Solar Power Complex in 2011 and updated in 2014.

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

2 PROJECT LOCATION

The Complex is located in the Ghessat Ogrour Toundout rural commune in Morocco, along the national highway connecting Ouarzazate and Errachidia. The Complex is approximately 10 km north east of the city of Ouarzazate and 6 km north of National Road N10. A detailed map of the area is included in the Appendix 1.

The NOORo IV PV will be located within the Complex, with direct road access through the existing road network. The proposed project site occupies approximately 210 hectares.

The specific plot for NOORo IV is located at the eastern boundary of the Complex, northeast of the NOORo I Parabolic CSP plant currently in operation and southeast of the NOORo II Parabolic CSP and NOORo III Tower CSP that are currently under construction.

The total area of the proposed NOORo IV PV site is 210 ha and is on a sparsely vegetated flat rocky plateau, where no residential, agricultural or grazing areas are found.

The proposed site has been selected for the following reasons:

- Unoccupied land;
- Existing Infrastructure (within an existing Solar Power Complex);
- Lack of biological features of significant concern;
- No significant impacts expected from the operation of the plant;
- No economic or physical displacement required;
- Convenient topographic conditions;
- No areas of biological or archaeological sensitivity;
- Availability of fresh water from the existing Complex's water tank, and
- Significant solar radiation (2,100 to 2,250 kWh/m^2 GHI).

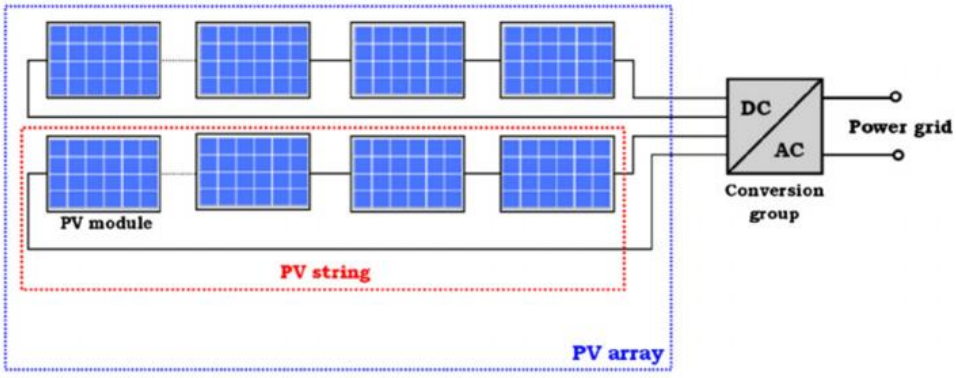
Alternative locations are unlikely to offer all the advantages listed above.

3 PROJECT DESCRIPTION

The PV Station will generate 71.5 MW_p (55 MW_{ac}) of energy without releasing harmful pollutants to the environment and avoiding the emission of 103,293.54 tonnes of CO_2 per year.

The PV array will occupy a total area of 432,236 m^2 and consist of 223,440 modules distributed in 11,172 strings (see figure below). The PV Station will also comprise inverters to change direct current (DC), as electricity is produced by PV cells, to alternating current (AC), as the electricity generated will be transported through the power line.

Figure 1 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 Project design includes the construction of a 2.2 km Power Line from the project site to the existing substation owned by the Office National d'Electricité et de d'Eau Potable (ONEE) located in the east side of the Complex. The power line will be transferred to ONEE upon construction.

The project design also includes the construction of an underground pipe to connect the proposed Project to the existing common water tank for the Complex.

The location and alignment of the three components is provided in the Appendix 1.

The site has been fenced for several years and security personnel are currently employed in the Complex.

3.1.1 Construction Program

It is understood that the construction phase is expected to last approximately 12 months from the notice to proceed, which is planned for the first quarter of 2017.

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

- Civil works ("cut and fill") at the site. No significant civil works are anticipated for the power line.
- Infrastructure works (PV site): construction of the fence, internal road, drainage system, pipe, etc.
- Infrastructure works (power line): foundations, erection of poles and installation of wire conductors (i.e. stringing, tensioning, clipping, etc.), connection to interconnection point, etc.

- Construction of PV site facilities and pipework.
- Installation of PV tracker systems, panels and other equipment (e.g. Reverse Osmosis Plant).
- PV connection to power line.

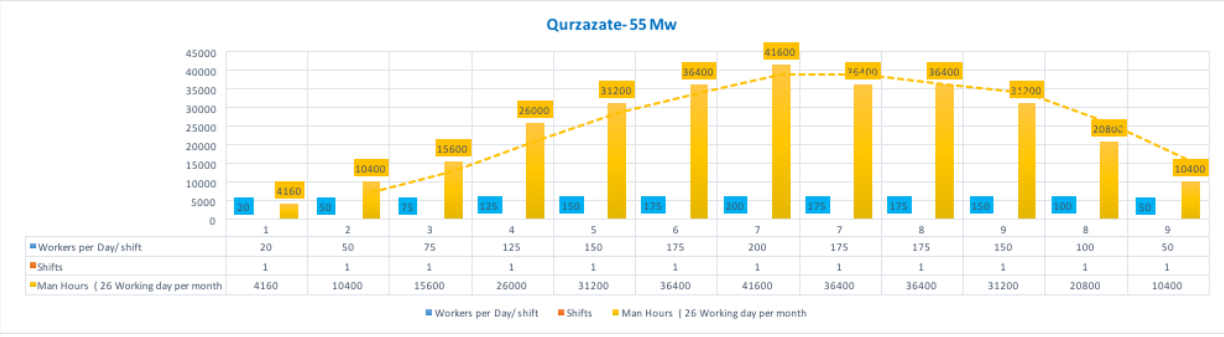
During construction, temporary facilities and equipment will be installed within the proposed PV site boundary and will be removed once the construction is complete. These facilities and equipment will include:

- Laydown area;
- Hazardous materials storage area;
- Hazardous waste storage area;
- Non-hazardous solid and liquid waste (septic tank and chemical toilets) area;
- Workshop/warehouse;
- Site offices;
- Canteen;
- Potable water storage;
- Security office;
- Diesel generators.

The above list covers key temporary facilities, but is not exhaustive.

It is expected that there will be approximately 200 workers at the peak period of construction (peak in the 7th month of the construction phase). The figure below includes the estimated workforce and man-hours per month during the construction phase.

Figure 2 Expected Construction Workforce



Foreign workers will likely be accommodated in the city of Ouarzazate or other adjacent residential centres. If any worker accommodation is developed for the project, it will be designed and operated in accordance with the IFC requirements, as outlined in the. Workers' accommodation: processes and standards guidance note by IFC and EBRD.

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/services.

3.1.2 Water consumption

During construction and operation, water will be piped to the Project from the common water tank located in the Complex and supplied by water abstraction from the Mansour Ed Dahbi Reservoir. The onsite water storage tank will have at least 50 m^3 capacity.

It is estimated that water requirements during the construction phase will be approximately 9,620 m^3 and 2,400 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 mixing).

During operation, automated wet cleaning technology will be used to remove the dust accumulation on the panels. This will demand around 0.6 to 1.2 l per panel, approximately 7,500 m^3/year (significantly lower than the 12,000 m^3/year established in the bid documentation). The operation of the Project will also require 300 m^3/year for domestic uses.

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.

4 Summary of Environmental and Social Conditions and Aspects, Impacts and Preliminary Management Measures

The SESIA has considered all environmental and social issues relating to the construction and operation works associated with the project. In response, a range of specific mitigation measures have been set out to prevent, reduce or remediate the potential impacts. The SESIA includes 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 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 and the power line to ONEE after construction.

4.1 Air quality

4.1.1 Power Plant

The proposed Project will be built within an existing solar power complex in which one solar CSP project is in operation and two CSP projects are currently under construction. Therefore, dust and other parameters associated with exhaust fumes could possibly be found in the local airshed resulting from the current construction activities/vehicles/equipment. Otherwise, no point source emissions from industries are located within the project's air shed. The closest non-point source are the vehicles travelling on the N10, located 3 km south from the proposed Project site, and the small road to Tasselmant adjacent to the proposed Project site.

Ambient Air Quality Monitoring was undertaken on November 8th 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 guidelines, and considered good.

Throughout the construction phase, the ambient air quality may potentially be affected by increased dust, particularly during 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 103,293.54 tonnes annually of CO_2 greenhouse gases, helping to offset the effects of Global

Warming. Only very limited emissions from transport/maintenance vehicles are expected, as this plant will not use a back-up generator for power generation.

4.1.2 Power Line

The proposed power line will be erected within an existing solar power complex.

The ambient air quality monitoring was undertaken on November 8th for 24 hours. The results showed that the ambient air quality conditions are well within the national and international ambient air quality standards, and considered good.

Impact expected during the construction phase of the power line are similar to those described for the power plant. During construction, the ambient air quality at the project site may potentially be affected by increased dust, mainly due to movement of vehicles and tracks on unpaved surfaces.

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

4.1.3 Mitigation

Measures to prevent increased dust (e.g. covers for fine material during transport and on stockpiles, or dust suppression), and exhaust fumes (e.g. equipment and vehicle maintenance and efficient management of deliveries) have been included. The release of Volatile Organic Compounds (VOCs) has also been considered. The main mitigation measures and monitoring activities are presented in Chapter 7.

4.2 Noise and Vibration

4.2.1 Power Plant

The closest residential area is the village of Igherm Ammellal (~2.1 km). The closest sources of noise to the proposed Project site are the adjacent roads, and the construction sites of NOORo II and III, which are 1.6 and 3 km away, respectively.

In order to establish a benchmark of the noise conditions at the site, an environmental noise survey was undertaken in the day and night time on November 8th. Average noise levels generally reflected a quiet environment and were below the maximum allowable standards for residential areas.

Noise and vibration impacts during the construction phase will be generated during site preparation works and the installation of the PV structures. The main sensitive receptors will be the workers of the site and the residents of the transport route.

A basic assessment of the likely construction noise levels to be experienced at the site boundary has been included within this SESIA (Vol. 2) in regard to the expected construction plant/machinery to be used at the site. Due to the impact of distance on noise propagation, noise by the residents in the closest villages, workers at the NOORo Complex and workers in the MASEN building.

For the operational phase, noise modelling has been undertaken. The modelling results predict 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.

4.2.2 Power Line

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. Construction vehicles will use the access road available to the project site. Increased heavy and light traffic is likely to result in increased noise levels. No sensitive receptors apart from the workers and residents along the transportation route (such as Ouarzazate) have been identified.

4.2.3 Mitigation

Mitigation measures including time restrictions of noisy activities, noise attenuation barriers for specific equipment, appropriate equipment and vehicle maintenance/worthiness and protective equipment for workers have been included in the SESIA. A summary of the main mitigation measures and monitoring activities are presented in Chapter 7.

4.3 Soil and Groundwater

4.3.1 Power Plant

The relatively undisturbed and undeveloped nature of the parcel signifies that the potential for existing contamination to the soil is unlikely. There are no permanent surface water bodies/streams within the project site and groundwater level was not met during geotechnical surveys (up to 50 m).

As part of the establishment of the baseline soil conditions at the proposed site, 5 Capitals undertook a limited soil sampling and analysis campaign in November 2016. In general, the results reveal that heavy metal concentrations at the sample locations are within the Dutch Target values.

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, domestic wastewater and municipal waste, and therefore, risk to ground contamination is low. Earthworks and minor changes in the drainage regime could lead to increased erosion.

4.3.2 Power Line

During the construction of the power line soil will be susceptible to contamination from sources related to construction vehicles and equipment handling. It is planned that all construction equipment will be stored in the laydown area proposed within the power plant site. Given the small amount of hazardous materials required, and that the laydown areas will be localised at the power plant, the potential risk to ground contamination is low.

4.3.3 Mitigation

The SESIA report includes 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 mitigation measures are presented in Chapter 7.

4.4 Stormwater Management

4.4.1 Power Plant

Changes in the topography of the site and infrequent heavy rain events may potentially result in increased erosion and run-off of sediment laden discharges.

An assessment has been conducted to identify relevant applicable standards and best practice relating to stormwater management and erosion prevention.

The existing natural drainage system within the proposed site consists of one chaaba (ephemeral stream) crossing the site from north to south. This chaaba originates few meters further north in the Complex and is blocked by the Complex road.

With regards to flood risk, the site is an elevated plateau and the chaaba collects and drains all stormwater downstream, consequently, there is no flood risk at the plot.

The design of the man-made stormwater drainage has considered the natural drainage pattern and therefore flow rates and flood risk will remain similar. Storm water will respect the existing natural drainage of the site.

4.4.2 Power Line

Only minor earthworks will be required in the corridor of the proposed power line, and therefore changes in the natural drainage are not expected.

4.4.3 Mitigation

Mitigation measures have been included in the SESIA to avoid contamination of runoff water (avoid entering areas where hazardous materials are stored or transferred) and erosion control measures. The mitigation measures and monitoring activities are presented in Chapter 7.

4.5 Biodiversity

4.5.1 Power Plant

An Ecological Impact Assessment has been conducted by undertaking a combination of desk studies and field surveys to gain an understanding of the terrestrial ecology of the PV.

The 2016 survey described five distinct habitat types within the surveyed area (project site and 500 m buffer): i) Rocky Plateau, ii) Steppe Plateau, iii) Chaabas, iv) Oued, and v) Escarpments. Only two habitats (Plateau Regs and small Chaabas/depressions) were found within the proposed Project footprint: Rocky Plateau and Chaabas. None of the habitats identified within the proposed footprint presented flora or fauna species of conservation concern. Some habitats within the study area show a higher productivity (large oueds to the SW and E of the site) but these will not be affected by the project at any time during the construction or operational phases.

Generally, the biological diversity of the site was considered low and will not be significantly impacted by the development of the proposed project.

Given that the project and its entire ancillary infrastructure are within the NOORo Complex, and there will be a buffer zone between the project fence and the complex fence, the only two impacts outside the project site on protected areas are considered to be water abstraction and potential wastewater discharges. The water use during construction of NOORo IV PV will represent a minor amount of the average contribution to the Mansour Ed Dahbi Reservoir and is highly unlikely that these minor quantities of water abstraction might have any noticeable impact on the ecosystem. Discharges of polluted water outside the project fence are not envisaged.

Finally, migratory birds may collide with operating panels due to the proximity of the Al-Mansour Reservoir, as migratory birds might confuse the surface of the PV panels with a freshwater body. While this impact has only been described on a few PV plants globally and most of the risk from solar power plants is associated with tower CSPs, the following assessment on the importance of the area as a migratory route is considered relevant, following a precautionary approach. The proposed site is not located on any main flyway path, which is concentrated to the West High Atlas; however, some migratory species might occasionally use this site for migration.

4.5.2 Power Line

High voltage power lines may generate impacts on biodiversity in the form of direct mortality of avifauna by collision due to the low visibility of conductor cables and the neutral cable. Because of their long suspended insulators the risk of electrocution on high-voltage power lines is low.

4.5.3 Mitigation

This SESIA has included general mitigation measures for the expected negative impacts such as direct loss of habitat from the required earthworks, direct mortality of fauna associated to increased traffic levels or birds confusing panels with fresh water. The main mitigation measures and monitoring activities are presented in Chapter 7.

4.6 Hazardous and Non-hazardous Materials and Waste Management

The main types of waste generated during the construction of the power plant and associated facilities (including the Power Line) 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 hazardous waste) will be generated and stored onsite. The only hazardous materials used during construction will be diesel fuels, lubricants, batteries, and solvents.

During the operation phase, only miscellaneous hazardous materials (e.g. electronic waste) 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.

4.6.1 Mitigation

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

Additionally, the SESIA report includes mitigation measures to help reduce the impact significance of those issues 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 mitigation measures and monitoring activities are presented in Chapter 7.

4.7 Water and Wastewater Management

4.7.1 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. 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 storage tank that will be collected by licensed operators.

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

With regards to water consumption, 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.

4.7.2 Power Line

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

4.7.3 Mitigation

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

A summary of the main mitigation measures and monitoring activities are presented in Chapter 7.

4.8 Traffic and Transportation

4.8.1 Power Plant

Ouarzazate is linked to Marrakesh by the N9 and to Errachidia by the N10. There is no bypass road to Ouarzazate, so all traffic bringing equipment from the ports is likely to cross the city. The site is connected by two paved roads for direct access from the N10 and from the village of Tasselmant.

Transport of containers will be carried out mainly through the harbor of Casablanca (438 km to the Project site) or Agadir (1,100 km to the site). Then road transport would be carried out from Casablanca to Ouarzazate, crossing the Atlas or, alternatively, using the route Casablanca – Agadir – Ouarzazate.

The main traffic impacts during construction and, to a lesser extent, 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 roads is considered minor given the capacity of the available road network. The increased in traffic levels could potentially lead to road safety issues, particularly in the city of Ouarzazate and other residential areas with no bypass road.

4.8.2 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 poles. Special transportation is likely to be required although impacts generated by transportation will be temporary.

4.8.3 Mitigation

Mitigation measures have been established in the SESIA for both internal roads (Complex and Project) and national road systems. The main mitigation measures and monitoring activities are presented in Chapter 7.

4.9 Archaeology and Cultural Heritage

A desk study relating to archaeological and cultural resources has been undertaken, in addition to a site walkover survey. Despite the rich history and abundance of historical sites in the Ouarzazate Province, no archaeological resources were identified in the Project site and study area.

Even though it is considered unlikely, cultural or archaeological artefacts could be unearth during the construction phase.

4.9.1 Mitigation

The SESIA report has included the necessary measures to avoid impact on archaeological heritage when deemed necessary (e.g. Chance Find Procedure). A summary of the main mitigation measures and monitoring activities are presented in Chapter 7.

4.10 Landscape and Visual Impact

4.10.1 Power Plant

The landscape is an important asset for tourism in Ouarzazate. There are no anthropogenic elements in the study area other than the NOORo Complex (operation and construction) and associated power lines, access roads for the village of Tasselmant and two telecommunication antennas in the intersection of the N10 and Tasselmant road. The NOORo IV Project will not be visible from nearby sensitive receptors as it does not require towering structures and does not have any glare effect. The PV plant will be noticeable from the road to Tassellmant.

4.10.2 Power Line

The PL will be located on a flat plateau away from the main residential centres and within anthropogenic elements (unpaved roads, paved roads, CSP Complex and existing power lines) that characterises the landscape character or the area. The PL will avoid disturbance to view sheds resources in pristine spaces in the project area and will not be noticeable from the nearest residential areas.

4.10.3 Mitigation

This SESIA report has included 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 and disturbance to drivers and fauna.

A summary of the main mitigation measures and monitoring activities are presented in Chapter 7.

4.11 Socio - Economic

This SESIA has highlighted the social and economic aspects associated with the development and operation of the Project and associated facilities (including the associated PL). In reflection to the requirements of the IFC Performance Standards, core components of the socioeconomic analysis has included: i) a review of any local communities within the proposed development site and its immediate environs; ii) an assessment of local labour market impacts; iii) an outline assessment of any community health, safety and security implications of the facility; iv) an assessment of impact upon local services; and v) the suitability of the site in light of the social / development profile of the site environs.

The proposed project is located within an uninhabited area of the Ait Oukrour Toundout ethnic group; therefore the project will not require the relocation of any communities. The project will result in positive socioeconomic impacts, mostly associated with local employment creation and local economic growth, as some construction materials will be purchased locally if available. The consultation meeting conducted for the project indicated that the local population perceived the project with a positive outlook.

The primary economic positive impact during construction is likely to result from any local employment creation and the use of local businesses/services. The workforce that will be employed during the construction phase will range from 150 to 200 workers at the peak of construction. Training programmes have been implemented for NOORo Complex so it is likely that the proportion of foreign workers will be lower than for those projects. Local workers will also stimulate the local economy, whereby money earned on the project will re-circulate within the local economy.

Potential negative socioeconomic impacts resulting from the development of the proposed project include potential for conflicts between workers and residents, community members or onsite security staff and transmission of communicable diseases as a result of the influx of workers.

4.11.1 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.

Additionally, a grievance mechanism will be implemented to receive and respond in due time and in a transparent manner complaints and concerns from the external stakeholders.

4.12 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.

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.

The main mitigation measures and monitoring activities are presented in Chapter 7.

5 STAKEHOLDER ENGAGEMENT PLAN

5.1 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 November 28th 2016. The stakeholders present at the meeting consisted of population, the Provincial technical departments (Ouarzazate Province Environment Department), the Elected Communal Councillors, the Naibs of collective lands, the Non- Governmental Organisations (<Al Fadaa Al Jamawi > Espace Associatif de Ghessate, l'Association Environnementale Tasselmante, Association Annakhil), and Government bodies such as the Délégation de Energies et Mines and Délégation de l'ABHSM.

The following is a summary of the perspectives and concerns of the stakeholders: employment and training of the local population; activities in support of initiatives for the development of health services, education, culture and economics; environmental impacts

in relation to water consumption, waste management, wastewater management, fauna/flora; and communications and grievance mechanisms.

A complete 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 the Appendices.

5.2 Grievance Mechanism

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

6 Environmental and Social Management Plan

The requirements for the Environmental and Social Management Plan for construction and operation are presented in Volume 3 of the SESIA. The ESMP 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 termed Construction Environmental and Social Management Plan (CESMP) and for Operation it is termed Operation Environmental and Social Management Plan (OESMP). 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.

7 Environmental Impacts and Mitigation

The following table 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 NOORo IV Ouarzazate PV Plant is provided in SESIA Volume 2 (Main text) and SESIA Vol. 3 (ESMP).

7.1 Construction Phase Mitigation Measures

7.1.1 Air Quality

Table 7-1 Air quality mitigation measures – Construction phase

Issue	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Dust from Earthworks and site activities & Dust from Vehicles (including the PV and PL).	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.	Negligible to 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.	EPC	As soon as the works start and throughout construction period.	
		Adding to stockpiles of dusty materials will be stopped when high winds are present (15 km/h).	EPC	As soon as the works start and throughout construction period.	
		Dusty material stockpiles will be located only onsite and away from the site boundaries.	EPC	As soon as the works start and throughout construction period.	
		Where sand and other dusty materials are transported to the site, trucks will not be overloaded and will be appropriately covered / sheeted to avoid loses en-route	EPC	As soon as the works start and throughout construction period.	
		Powdery materials (e.g. cements) will be stored and transported in sealed containers	EPC	As soon as the works start and throughout construction period.	
		No burning of wastes or other materials will be	EPC	As soon as the works start and	

Issue	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		allowed on site through the construction phase		throughout construction period.	
		Undertake daily visual assessment of dust levels and take actions (dust suppression) to reduce emissions, when they are identified as excessive.	EPC	As soon as the works start and throughout construction period.	
		Transport of uncovered dusty loads (materials and waste) is strictly forbidden	EPC	As soon as the works start and throughout construction period.	
Gaseous and Particulate emissions from Vehicles (including the PV and PL).	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.	Negligible to Minor
		Efficiently manage deliveries of equipment/plant to the site, to reduce the number of trips.	EPC	As soon as the works start and throughout construction period.	
		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 where necessary will not be permitted to enter the site.	EPC	As soon as the works start and throughout construction period.	
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 built, 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.	EPC	As soon as the works start and throughout construction period.	

Issue	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
General	Moderate	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.	Minor

7.1.2 Noise and Vibration

Table 7-2 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
		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.	
		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).	EPC	As soon as the works start and throughout construction period.	
		Items of plant on site 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 a duration of more than 8 hours per day without hearing protection noise 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).	EPC	As soon as the works start and throughout construction period.	
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
		The movement of heavy vehicles through residential areas	EPC	As soon as the works start and	

		during the night will be minimised.		throughout construction period	
		Deliveries of fuel and materials and removals of waste are to be undertaken during day hours, when possible.	EPC	As soon as the works start and throughout construction period .	
		All vehicles will be adequately maintained in order to minimise sound emissions	EPC	As soon as the works start and throughout construction 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 particularly in the city of Ouarzazate. These limits will be included in the Traffic Management Plan that will be prepared by the EPC prior to the construction works.	EPC	As soon as the works start and throughout construction period	

7.1.3 Soil and Groundwater Protection

Table 7-3 Soil mitigation measures – construction phase

Impact/ Source	Potential impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Spillage and leakage	Moderate to Minor	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.	Negligible to 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.	EPC	As soon as the works start and throughout construction period.	
		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.	EPC	As soon as the works start and throughout construction period.	
		All chemicals will be handled in accordance with relevant instructions (MSDS)	EPC	As soon as the works start and throughout construction period.	
		Reduce quantity of chemicals and fuels on site to minimum practicable levels	EPC	As soon as the works start and throughout construction period.	
		Regularly inspect drip collectors and containers for spills 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	

Impact/ Source	Potential impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				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	Before the start of the construction works and throughout construction period.	
		Metal structures (including painting and protections) will be designed/selected to resist corrosion due to local environment conditions. All outdoor structural steel shall be hot-dipped galvanized in accordance with ASTM requirements	EPC	As soon as the works start and throughout construction period.	
		Washing of equipment, machinery, and vehicles will not permitted on site and will only be carried out in adequate premises.	EPC	As soon as the works start and throughout construction period.	
		Develop a Vehicle Maintenance Plan.	EPC	Before the start of the construction works and throughout construction period.	
		Vehicle maintenance will not be undertaken in the project site 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 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 hardstanding).	EPC	As soon as the works start and throughout construction period.	
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	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		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.	EPC	As soon as the works start and throughout construction period.	
Storage and waste management	Moderate to Minor	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.	Negligible to 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.	EPC	As soon as the works start and throughout construction period.	
		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.	EPC	As soon as the works start and throughout construction period.	
		No hazardous material will be stockpiled.	EPC	As soon as the works start and throughout construction period.	
		Minimise the size and height of the stockpile as far as possible.	EPC	As soon as the works start and throughout construction period.	
Soil Compaction	Minor	Areas where visiting vehicles are allowed to circulate or park will be minimized and located only inside the project boundaries or in the existing Complex's roads/parking areas.	EPC	As soon as the works start and throughout construction period.	Minor to Negligible

7.1.4 Stormwater Protection

Table 7-4 Stormwater mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Soil erosion/Siltation	Minor	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	EPC	As soon as the works start and throughout construction period.	Negligible
		From the outset of work, plan, select and define areas for clearing, stripping and access routes in order to minimise unnecessary stripping of vegetation	EPC	As soon as the works start and throughout construction period.	Negligible
		Minimise disturbed areas	EPC	As soon as the works start and throughout construction period.	Negligible
		Reduce cut-offs and embankments as much as possible	EPC	As soon as the works start and throughout construction period.	Negligible
		Disturbed areas will be stabilized to minimise further erosion. Construct gabions and concrete barriers for containment, use metal mesh and nets, drains and gutters in slopes for terrain stability	EPC	Design	Negligible
		Road gradient will be avoided or minimized (contour and slopes) in order reduce run-off induced erosion. Internal roads/routes gradients should not exceed 15%	EPC	Design	Negligible
		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.	Negligible
		Reduce height of any built up embankments and slopes, if possible	EPC	As soon as the works start and throughout construction period.	Negligible
		Restore vegetation on slopes and embankments where possible and in areas away from electrical equipment to avoid fires	EPC	As soon as the works start and throughout	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				construction period.	
Storm Water Drainage	Minor	The stormwater drainage system will minimize and control surface run off and erosion.	EPC	Design	Negligible
		The stormwater drainage system will include the necessary sediment retaining systems to ensure that runoff is free of excessive sediment and other constituents at the discharge point.			
		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	EPC	Design	Negligible
		Hazardous materials storage areas will be roofed to prevent rainfall entering such areas and avoid to avoid emissions of wastewater to the soils, chaabas, or stormwater drainage system.	EPC	Design / Construction	Negligible
		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.	EPC	Design / Construction	Negligible
		The stormwater drainage system will include a system to retain garbage carried by the runoff water. The system will be atthe project boundary and allow easy access to collect retained materials.	EPC	Design / Construction	Negligible
Flooding	Minor	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.	EPC	Design	Negligible
		The stormwater drainage system will need to consider the increase on speed of the water flow with a concrete channel and consider the flood			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		conditions that can potentially be caused downstream (particularly at the discharge point) to avoid erosion.			

7.1.5 Biodiversity and conservation

Table 7-5 Biodiversity and conservation mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Habitat Loss	Negligible to Minor	The contractor will ensure that no encroachment to the nearby, adjacent land will occur. All temporary facilities and infrastructure for the construction phase will be located within the project site boundaries and removed maximum 2 months after the start of the operational phase.	EPC	As soon as the works start and throughout construction period.	Negligible
		Vehicles will keep to the designated routes in order to prevent unnecessary land encroachment, thus protecting the natural resources and reducing dust emissions	EPC	As soon as the works start and throughout construction period.	
		Replanting in places 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 put in the selection of the native vegetation and location of planting in order to successfully achieve 'in-kind' ecological restoration. Replanting will only be conducted in sites away from electrical equipment to avoid future fire hazards. Plating large trees or shrubs onsite is not recommended, as the existing evidence suggests that it attracts birds, reptiles and other fauna to the site, and this might result in increased mortality. Therefore, planting will be limited to the herbaceous species that currently inhabit the site.	EPC	As soon as the works start and throughout construction period.	
Poaching/ Hunting/ Trade	Negligible	Hunting, falconry and trade will be strictly forbidden and penalized on site. Notes on informative boards will be displayed.	EPC	As soon as the works start and throughout construction period.	Negligible
Direct Mortality of Fauna	Negligible to Minor	A 25 km/h speed limit will be imposed across the construction site in order to avoid direct mortality of fauna. Speed limits will be respected on offsite access routes.	EPC	As soon as the works start and throughout construction period.	Negligible to Minor

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Workers will be trained to inform the HSE team of any reptiles or small mammals trapped on trenches, and a procedure will be in place to safely take the animals outside the complex (not only outside the project site).	EPC	As soon as the works start and throughout construction period.	
		Transportation within, 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.	
		Include in the inception training sections to increase their 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.	
		Establish procedures for the occasion any species are found on the construction site including procedures for reporting, identification and potential relocation	EPC	Before the start of the construction works start and throughout construction period	
Pest	Negligible to Minor	An integrated pest management scheme will be developed for the plant, avoiding use of any prohibited persistent organochlorine and organo-phosphorus pesticides, or the widespread use of pesticides. All food waste will be stored in lidded containers.	EPC	As soon as the operation start and throughout operation period. Cost should be integrated into the operational budget.	Negligible
Human disturbance	Negligible to Minor	Where and when possible, night work will be avoided in order to prevent excessive human disturbance over fauna species. Measures to reduce lightning impacts, as described in the landscape chapter, and noise impacts, as described in the relevant chapter, will be implemented where posible.	EPC	As soon as the operation start and throughout operation period.	Negligible

7.1.6 Non-hazardous Waste and Hazardous Materials

Table 7-6 Non-hazardous Waste and Hazardous Materials mitigation measures – construction phase

Impact/ Source	Potential Impacts	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 will be re-used in the internal road construction and base fillings. 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	EPC	As soon as the works start and throughout construction period.	
		Ordering materials that have reusable packaging and/or in bulk to 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	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				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	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.	Negligible
		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 storage facilities for non-hazardous waste in designated areas to prevent waste from dispersing throughout the site	EPC	As soon as the works start and throughout construction period	
		Include in the employees' inception training information 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.	
Waste Storage	Minor	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.	Negligible
		Lightweight waste e.g. paper, cardboard, plastics: Must be stored within a skip sealed with a secured tarpaulin/netting sufficient to	EPC	As soon as the works start and throughout	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		prevent any material being dispersed.		construction period.	
		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.	EPC	As soon as the works start and throughout construction period.	
		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.)	EPC	As soon as the works start and throughout construction period.	
		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	EPC	As soon as the works start and throughout construction period.	
		No underground waste containers will be deployed.	EPC	As soon as the works start and throughout construction period.	
		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 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 site personnel in proper waste management and chemical handling procedures will be conducted at regular intervals.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		Incineration/burning of wastes will not be allowed onsite	EPC	As soon as the works start and throughout construction period.	
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	EPC	As soon as the works start and throughout construction period.	
		Materials will be separated into combustible and non-combustible, and all flammable substances must be kept away from sources of ignition.	EPC	As soon as the works start and throughout construction period.	
		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.).	EPC	As soon as the works start and throughout construction period.	
		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. Photographic records of water tests will be kept. 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.	EPC	As soon as the works start and throughout construction period.	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		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	EPC	As soon as the works start and throughout construction period.	
		Hazardous materials will only be transported to/from the site by a 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.	EPC	As soon as the works start and throughout construction period.	
		Only trained personnel will be permitted to handle hazardous materials.	EPC	As soon as the works start and throughout construction period.	
Waste Facilities	Moderate	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

7.1.7 Wastewater Management

Table 7-7 Wastewater mitigation measures – construction phase

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Sanitary wastewater	Moderate	Chemical toilets will be available at different locations in the construction site in sufficient number to attend the number of employees expected (at least one per 20 workers) and cleaned at least every two days. Overground chemical toilets will need to be checked frequently for leaks and replaced when required.	EPC	As soon as the works start and throughout construction period.	Negligible
		Underground septic tanks will be equipped with flow metres (to identify leaks) and overflow alarms.	EPC	As soon as the works start and throughout construction period.	
		No domestic wastewater will be discharged outside the chemical toilets / septic tanks to avoid emissions of wastewater to the soils, chaabas, or stormwater drainage system.	EPC	As soon as the works start and throughout construction period.	
		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 reaches 80% of its capacity. The required authorizations and contracts shall be obtained by the EPC before the construction works start.	EPC	As soon as the works start and throughout construction period.	
		Septic tanks and chemical toilets 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.	EPC	As soon as the works start and throughout construction period.	
		Develop a Wastewater Management Plan.	EPC	Before the start of the construction activities and throughout the construction period.	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		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	Throughout the construction period.	

7.1.8 Traffic and Road Safety

Table 7-8 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 local roads	Negligible o Minor	Develop a Traffic Management Plan	EPC	Before the start of the construction works and throughout construction period.	Negligible
		Determine the designated access routes for delivery of equipment, road capacity, site entrance/exit points, etc..	EPC	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	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. Cost should be integrated into the operational budget.	
		Construction heavy and light vehicles will not exceed 20 km/h in residential areas	EPC	As soon as the works start and throughout	

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				construction period.	
		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.	EPC	Cost should be integrated into the operational budget.	
		Engines will be turned off while waiting in or outside the project site.	EPC	As soon as the works start and throughout construction period.	
		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.	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 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.	EPC	As soon as the works start and throughout construction period. .	
Movement of vehicles	Negligible o Minor	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.	Negligible to Minor

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				Cost should be integrated into the operational budget.	
		Determine the designated access routes for delivery of equipment, site entrance points, laydown areas and parking areas, etc.	EPC	As soon as the works start and throughout construction period.	
		Post designated routes and signs for directions and speed limits (25 km) in the project 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.	

7.1.9 Archaeology and Heritage

Table 7-9 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 the Chance Find Procedure as per the best practice guidelines outlined on the SESIA.	EPC	Before the startf of the construction works and throughout construction period.	Negligible

7.1.10 Landscape and Visual

Table 7-10 Traffic and Road Safety 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 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
Topographical impacts to landscape	Negligible to Minor	The heights of fences and any other structures will aim to minimise their visibility from the road to Tasselmant.	EPC	As soon as the works start and throughout construction period.	Minor

7.1.11 Socioeconomic

Table 7-11 Socioeconomic mitigation measures – construction phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Employment and Accommodation	Moderate 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. 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	EPC	As soon as the works start and throughout construction period.	Moderate Positive

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		aligned with IFC standards.			
		A Retrenchment Plan will be prepared for moving from construction to operation	EPC & Project Company		
Purchases	Minor Positive	The EPC will only engage with reputable suppliers that do not use force or child labour	EPC	As soon as the works start and throughout construction period.	Minor Positive
		Purchase of goods and services by the workforce and of construction materials within the local/regional will be prioritized			
E&S and Health and Safety Risks	Moderate Positive	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 commencement.	EPC	As soon as the works start and throughout construction period.	Moderate Positive
		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.	EPC	As soon as the works start and throughout construction period.	Minor Positive
Conflict-workforce/local residents	Minor Negative	Inception training will include information on the cultural background of the closest residents	EPC	As soon as the works start and throughout construction period.	Minor negative
Security Provisions	Minor negative	Develop and implement a Policy on Security and a Code of Conduct for Security Personnel.	EPC	Before the start of	Minor negative

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		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.		the construction works 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), the way they should interact with local communities and workers.			
Spread of disease	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.	Minor negative
Informal Settlemetns	Negligible to Minor Negative	Unplanned settlements will be monitored by onsite security personnel	EPC	As soon as the works start and throughout construction period.	Negligible to Minor Negative
		The local public security forces will be required to deal with encroachers as per national requirements			

7.2 Operational Phase Mitigation Measures

7.2.1 Air Quality

Table 7-5 Air Quality mitigation measures – operational phase

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Schedule	Implementation Schedule/Cost	Residual Impact
Air emission from vehicles	Minor	Regular vehicle maintenance in dedicated maintenance areas.	O&M	OESMP – operation	As soon as the operation start and throughout operation period. Cost should be integrated into the operational budget.	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.	O&M	OESMP – operation		

7.2.2 Noise and Vibration

Table 7-6 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 day time.	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	O&M	As soon as the operation start and throughout operation	

				period.	
Operational Noise	Minor	All machinery will be adequately maintained in order to minimise sound emissions	O&M	As soon as the operation start and throughout operation period.	Negligible
		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	O&M	As soon as the operation start and throughout operation period. Cost should be integrated into the design operational budget	

7.2.3 Soil and Groundwater

Table 7-7 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.	O&M	Before the operation starts and throughout operation period.	Negligible
		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.	
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.	O&M	As soon as the operation start and throughout operation period.	Negligible

		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.	

7.2.4 Stormwater Protection

Table 7-8 Stormwater mitigation measures – Operation phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Erosion/Siltation/Flooding	Minor	The discharge point of the drainage system will be protected against erosion at each discharge point.	O&M	Design	Negligible
		Runoff collection system will be inspected monthly and at the start of a rain event to ensure that no blockages could result with overflowing.		As soon as construction works are completed and mainteained thoughout the operational period.	Negligible
		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 stormwater flows.		As soon as the operation start and throughout operation period.	Negligible
Stormwater Drainage	Minor	The site will be inspected regularly to ensure that no spills have occurred in areas that may be susceptible to stormwater run-off. All spills must be immediately contained and cleaned, in order to prevent direct and indirect contamination to soils and water sources.	O&M	As soon as the operation start and throughout operation period.	Negligible
		Waste and hazardous material storage areas have to be designed in such a way that rainwater is not in contact		Design	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		at any point with the waste.			
		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.		Design	Negligible

7.2.5 Ecology and Biodiversity

Table 7-5 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 with the PL	Negligible or Minor	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*". For each of these design recommendations, the EPC will clearly state which have been incorporated into the design, and when one has not been incorporated, the technical reason why it is not applicable will be detailed. 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.	EPC	Project Design	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Direct mortality of avifauna due to collision with the PL	Mino to Moderate	Multi-level arrangements of the power line cables and with neutral cable high above the conductor cables will be avoided if possible, as there pose higher risks for birds. A single-level arrangement is preferred.	EPC	Project Design	Minor
		Where possible, use of neutral cable will be avoided. If the avoidance of the neutral cable is not possible, the cable could be required to be made clearly visible by suitable marker balls. Marker balls can reduce collision accidents by 50 to 85%. In order to determine if collision rates justify the installation of marker balls, bird mortality monitoring will be undertaken for the first two years of operation of the Power Line, as detailed in the monitoring chapter. 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, ball markers will be installed. If there is a clear geographical pattern of bird mortality, the markers could be installed only in the areas with significantly higher mortality rates.	EPC (Design) O&M (monitoring) EPC (if installation of marker balls is required during the first two years of operation)	Project Design	
Direct mortality of avifauna due to collision with the PV	Minor to Moderate	Mortality monitoring will be undertaken on a continuous basis by O&M staff during the operational phase of the plant. Specific training will be provided to ensure that carcases or wounded birds are reported and the appropriate identification of species,	O&M	As soon as the operation start and throughout operation period.	Negligible to Minor
Direct Mortality of Fauna	Minor	A 30km/h speed limit will be imposed across the site in order to minimise accidental collision with birds or fauna.	O&M	As soon as the operation start and throughout operation period.	Negligible to Minor
		Vehicles will keep to the designated routes in order to			

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		prevent unnecessary land encroachment, thus protecting the natural resources and reducing dust emissions		Cost should be integrated into the design operational budget	
Poaching/Hunting/Trade	Negligible	Hunting, falconry and trade will be strictly forbidden and penalized on site. Notes on informative boards will be established.	O&M	As soon as the operation start and throughout operation period.	Negligible
Herbicides and Pesticides	Negligible to Minor	An integrated pest management scheme will be developed for the plant, avoiding use of any prohibited persistent organochlorine and organo-phosphorus pesticides, or the widespread use of pesticides	O&M	As soon as the operation start and throughout operation period. Cost should be integrated into the design operational budget	Negligible

7.2.6 Non-hazardous Waste and Hazardous Materials Management

Table 7-6 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.	Minor
		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	O&M	As soon as the operation start and throughout operation period.	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		disposal/destination, etc.)			
		Install adequate storage facilities for non-hazardous waste in designated areas to prevent waste from dispersing throughout the site.	O&M	As soon as the operation start and throughout operation period. Cost should be integrated into the design operational budget	
		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.	O&M	As soon as the operation start and throughout operation period.	
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.		As soon as the operation start and throughout operation 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 main waste storage area.		As soon as the operation start and throughout operation 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		As soon as the operation start and throughout operation	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		securely attached. Wherever possible, chemicals will be kept in their original container		period.	
		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.		As soon as the operation start and throughout operation period.	
		Regular training of site personnel in proper waste management and chemical handling procedures will be conducted at regular intervals.		As soon as the operation start and throughout operation period.	
		Incineration/burning of wastes will not be allowed		As soon as the operation start and throughout operation period.	
Hazardous Materials	Minor	Implement best practice and regulations procedures for adequate handling, establishment of secure temporary storage areas, and disposal of waste by approved contractors.	O&M	As soon as the operation start and throughout operation period.	Negligible
		Hazardous wastes be disposed in an environmentally safe manner and by licensed hazardous waste operator		As soon as the operation start and throughout operation period.	
		Materials will be separated into combustible and non-combustible, and all flammable substances must be kept away from sources of ignition.		As soon as the operation start and throughout operation period.	
		No underground hazardous materials storage containers will		As soon as the	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		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.).		operation start and throughout operation period.	
		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.		As soon as the operation start and throughout operation period. Cost should be integrated into the design operational budget	
		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		As soon as the operation start and throughout operation period.	
		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.		As soon as the operation start and throughout operation period. Cost should be integrated into the design operational	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				budget	
		Only trained personnel will be permitted to handle hazardous materials.		As soon as the operation start and throughout operation period.	
Waste Facilities	Minor	Only Waste management facilities approved by 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

7.2.7 Wastewater Management

Table 7-7 Wastewater and Storm Water Drainage mitigation measures – operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Sanitary Wastewater Generation	Minor	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.	Negligible
		The septic tanks will be sited away from vehicle traffic, in order to prevent any damage to the tanks.	O&M	As soon as the operation start and throughout operation period.	
		Aboveground septic tanks will be bunded. The bund will be able to accommodate 110% of the capacity of the tank.	O&M	As soon as the operation start and throughout operation period.	
		Underground septic tanks will be equipped with flow metres (to identify leaks) and overflow alarms.	O&M	As soon as the operation start and throughout operation period. Cost should be integrated into the design operational budget	

		Develop a Wastewater Management Plan.	O&M	Before the start of the 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.	

7.2.8 Traffic and Road Safety

Table 7-9 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	Minor	Develop a Traffic Management Plan	O&M	Before the operation activities start and throughout operation period.	Negligible
		Determine the designated access routes for collecting and delivering, site entrance points, and parking areas, etc.		As soon as the operation start and throughout operation period.	
		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.		As soon as the operation start and throughout operation period.	
		Specific waiting areas will be designated in suitable locations.		As soon as the operation start and throughout operation period.	

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		The movement of vehicles along the access road will be minimized to essential operational and maintenance related activities.		As soon as the operation start and throughout operation period.	
		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.		As soon as the operation start and throughout operation period.	
		Speed limit to be established onsite (30 km/hr).		As soon as the operation start and throughout operation period.	

7.2.9 Archaeology and Cultural Heritage

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

7.2.10 Landscape and Visual

Table 7-10 Landscape and Visual mitigation measures – construction/operational phase

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Light Pollution	Minor	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.	Negligible

Impact/ Source	Potential Impact	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
		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.	O&M	As soon as the operation start and throughout operation period.	
		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.	O&M	As soon as the operation start and throughout operation period.	

7.2.11 Socioeconomic

Table 7-11 Socioeconomic mitigation measures – operational phase

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
Employment	Minor Positive	The PV will seek to employ local workers where these are willing and with articular skills for the job, and where appropriate. All non-specialist job opportunities will likely 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.	O&M	Planning and throughout the operational period.	Minor to Positive
Employment	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	Planning and throughout the operational period.	Minor to Positive
Purchases	Negligible positive	The O&M will only engage with reputable suppliers that do not use forced or child labour	O&M	Planning and throughout the operational period.	Negligible positive
		Purchase of goods and services by the workforce and of construction materials within the local/regional will be prioritized			
Dissemination of Skills	Minor Postiive	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	Throughout the operational period.	Minor Positive
Conflict – workforce / local residents	Negligible Negative	Inception training will include information on the cultural background of the population	O&M	Throughout the operational period.	Negligible Negative
Security Provisions	Negligible Negative	Develop and implement a Security Policy and a Code of Conduct for Security Personnel.	O&M	Planning and throughout the operational	Negligible Negative

Impact/ Source	Potential Impacts	Mitigation Measure	Responsibility	Implementation Schedule/Cost	Residual Impact
				period.	
		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.	O&M	Planning and throughout the operational 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), the way they should interact with local communities and workers.	O&M	Planning and throughout the operational period.	
Spread of Diseases	Negligible Negative	Prevention of diseases (including STDs) will be included in the training programme.	O&M	Throughout the operational period.	Negligible Negative

7.3 Decommissioning Mitigation Measures

With regards to the decommissioning phase, it should be noted that the PV project will be transferred to MASEN at the end of the 25-year PPA period and the power line to ONEE after the construction. 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 SESIA, CESMP and the OESMP.

7.4 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.

Table 7-10 Framework Monitoring Plan

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?)
SESIA – Baseline Monitoring						
SESIA monitoring- Air Quality – PM_{10}, $PM_{2.5}$	As specified in vol.2 of the SESIA	As specified in vol.2 of the SESIA	November 2016	Establish baseline for the SESIA	Conducted & Paid	5 Capitals - Phenixa
SESIA monitoring- Air Quality - Dust			November 2016	Establish baseline for the SESIA	Conducted & Paid	5 Capitals - Phenixa
SESIA monitoring- Noise			November 2016	Establish baseline for the SESIA	Conducted & Paid	5 Capitals - Phenixa
SESIA monitoring- Soil			November 2016	Establish baseline for the SESIA	Conducted & Paid	5 Capitals - Phenixa
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	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?)
				replaced		
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	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.	Construction activities increase noise levels (nuisance, disturb fauna, work hazard)	To be covered by the EPC (indicative cost noise meter 2000-5000 MD)	EPC
Waste management - 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	-	Waste log	Bi-weekly	Monitor compliance with waste management targets	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?)
Waste management - 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.	-	Waste log	Every time waste is taken offsite. Statistics compiled monthly.	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	EPC / subcontractors
Wastewater management - quantities and types septic tanks taken off site, the approved handler, and where the waste was disposed;	-	Waste log	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, identification of leackage – quantities of sewage flowing into underground septic tank compared to		Waste log	Calculations undertaken monthly.	Potential leackeage from underground septic tanks.	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?)
sewage being tankered off;						
Waste Management - 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	Solid Waste Storage Areas	Visual inspection	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

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?)
Runoff system - erosion prevention	Runoff system discharge points	Visual inspection	Weekly and following intense rain events	Monitor compliance with erosion objectives	Not applicable	EPC
Soil Quality	Hazardous materials and liquid and solid waste storage areas as a minimum	Sampling methodology as described in SESIA Vol. 2	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.	Onsite and ~200 m buffer area	Count and identification of fauna species	Monthly	Monitor ecology around the site	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 ispections to identify trapped animals	Daily	Monitor ecology onsite	Not applicable	EPC
Traffic and	Within the	Speed meter device	Weekly	Monitor	Cost of speed	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?)
Transportation	site and in the access road			compliance with speed limits	meter	
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	Prevent light pollution to the other areas	Not applicable.	EPC
Recruitment policy	Not applicable	Ratio local, regional, national and international empoyees. 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						
Waste management - 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	-	Waste log	Quaterly	Monitor compliance with waste management targets	Not applicable	O&M / subcontractors
Waste management -	-	Waste log	Every time waste leaves	Monitor	Not applicable	O&M /

MONITORING PLAN						
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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.			the site. Statistics to be compiled quarterly.	compliance with off-site disposal by approved subcontractors		subcontractors
Waste management - quantities and types septic tanks taken off site, the approved handler, and where the waste was disposed;	-	Waste log	Monthly	Monitor compliance with off-site disposal by approved subcontractors	Not applicable	O&M / subcontractors
Waste Management - evidence of accidental releases and to verify that wastes are properly labelled and stored	Waste storage collection, storage and transfer areas	Visual inspection	Weekly	Monitor compliance with waste storage requirements	Not applicable	O&M
Hazardous Materials -	Hazardous Materials	Visual inspection	Weekly	Monitor compliance with	Not applicable	O&M

MONITORING PLAN						
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	storage collection, storage and transfer areas			hazardous materials storage requirements		
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 mitigation measures	Runoff system discharge points	Visual inspection	Monthly	Monitor compliance with erosion objectives	Not applicable	O&M
Soil Quality	Hazardous materials and liquid and solid waste storage areas as a minimum	Sampling methodology as described in SESIA Vol. 2	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 –	Onsite	Identification and	Daily inspections	Monitor potential	Not Applicable	O&M

MONITORING PLAN						
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Identify bird or other fauna mortality		count of mortality	All O&M workers to be trained to report carcasses onsite.	mortality due to collision		
Ecological status – Bird Mortality Monitoring	PL alignment and poles See Section 20.1	Bird mortality identification, count of carcasses, species identification and carcass removal trials. All O&M workers to be trained to report carcasses onsite.	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 Mortality within the alignment.	To be covered by the O&M.	O&M
Lighting	Boundaries of the site	Visual assessment of directional lighting	Quarterly	Prevent light pollution	Not Applicable	O&M
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	Register complaints and how they are addressed	Every time there is a complaint	Record, address and follow up complaints	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?)
	the site entrance					
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 Environmental Audits – Documentation	-	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	Quarterly (construction) Twice a year (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.	NOORo IV Project Company The auditors will be required to have contraction/operational auditing experience in Morocco in renewable

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		mitigation and monitoring measures stated in the SESIA, including the monitoring results				projects and auditing experience in projects aligned with IFC requirements— Site inspection
Independent Environmental Audits.	-	The auditors will visit the plant, to ensure that the environmental and social procedures are being adequately applied onsite.	Quarterly (construction) Twice a year (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.	