200MW Photovoltaic Power Project
Kom Ombo, Aswan, Arab Republic of Egypt

Preliminary Environmental Assessment

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CONTENTS

LIST OF ABBREVIATIONS

Abbreviation	Meaning
AFD	Agence Française de Développment
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
CO_2	Carbon Dioxide
COD	Commercial Operation Date
dB(A)	A-weighted decibels
EEAA	Egyptian Environmental Affairs Agency
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EPs	Equator Principles
EPC	Engineering, Procurement and Construction
EPFIs	The Equator Principle Financial Institutions
IFC	International Finance Corporation
IFI	International Financial Institution
ILO	International Labour Organisation
Leq (A)	A-weighted Equivalent Continuous Sound Level
MW	Mega Watts
NO_2	Nitrogen Dioxide
NOMAC	The First National Operation and Maintenance Company
NREA	New and Renewable Energy Authority
OEMP	Operational Environmental Management Plan
OHTL	Overhead Transmission Lines
O&M	Operation and Maintenance
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres.
PEA	Preliminary Environmental Assessment
SO_2	Sulphur Dioxide
VEC	Environmental and Social Components
VOC	Volatile Organic Compounds
WHO	World Health Organisation
5 Capitals	5 Capitals Environmental and Management Consulting

1 INTRODUCTION

The Government of Egypt plans to increase renewable energy generation capacity in the country to 20% of the total energy mix by 2022 with wind energy providing 12%, hydropower providing 5.8% and solar energy providing 2.2%.

As part of the Egyptian Government's strategy to generate 2.2% solar power by the year 2022, the New and Renewable Energy Authority (NREA) with support from Agence Française de Développment (AFD) has launched the development of a 200MW Photovoltaic Solar Power Project at Kom Ombo town in the Aswan Governorate of the Arab Republic of Egypt.

ACWA Power is developing the Kom Ombo 200MW PV project (herein referred to as "the Project") and has appointed 5 Capitals Environmental & Management Consultancy (5 Capitals) to manage the environmental and social activities of the Project up to permitting and financial close with the Project's prospective lenders. This will include obtaining all environmental approvals from the applicable Egyptian regulators and international financiers respectively.

This report is the Preliminary Environmental Assessment (PEA) which is also referred to as the Environmental Scoping Study, has been prepared as a pre-cursor to the Environmental and Social Impact Assessment (ESIA) study to outline the anticipated environmental and social impacts associated with the development of the Project and identify the respective scope of work required to prepare a robust ESIA study as required by the Egyptian Environmental Affairs Agency (EEAA). In addition to national environmental and social requirements, standards and regulations in Egypt, this PEA has been prepared in accordance with environmental and social requirements of lending institutions and international best practices.

In order to ensure that the project meets the Egyptian Environmental Affairs Agency (EEAA) expectations and is submitted by a registered Egyptian consultancy, 5 Capitals has partnered with Environment & Development Group (EDG), who will be responsible for elements of the ESIA process, including baseline studies submission and liaison with EEAA and the necessary consultations.

The PEA report will be submitted to EEAA and prospective project lenders with investment policies aligned with either EBRD Performance Standards, Equator Principles, IFC Performance standards, and/or OECD Common Approaches. As such, the aforementioned lender requirements have been included in this report and considered in the ESIA scope as applicable.

It should however be noted that for the purpose of this document the term ESIA is considered to be inclusive of the Environmental Impact Assessment (EIA) requirements of EEAA as well as the Environmental & Social Impact Assessment requirements of the lenders. As such, references

to the impact assessment of environmental and social parameters are termed as ESIA, unless there is specific reference to the EIA requirements of EEAA.

1.1 Objectives of the Preliminary Environmental Assessment

The main objectives of this PEA in relation to the Project are as follows:

- Preliminary identification and evaluation of baseline environmental conditions based on review of available information to ensure the establishment of robust environmental conditions of the Project site and its surroundings;
- Identification of sensitive receptors and potential key environmental impacts attributable to the construction and operational phases of the project at an early stage to ensure assessment techniques for the subsequent ESIA address these issues specifically;
- Identification of further baseline studies, investigations and environmental assessment required for the subsequent ESIA; and
- Identification of the structure and content of the ESIA at an early stage.

This report has been informed by:

- A site visit to the Project site and surrounding areas conducted on the 17th and 18th of December 2019 to assess the site conditions and identify the sensitive receptors;
- Analysis of the Project details and proposed works stated in the projects RfP and technical specification issued by NREA to ACWA Power;
- Study of relevant mapping and aerial photography;
- Review of data sources obtained from ACWA Power such as the Environmental Impact Assessment Report prepared by DNV-GL Energy in August 2014, geotechnical investigation report, project site topography report etc.;
- Review of other secondary information (e.g. available online databases and reports); and
- 5 Capitals' Experience in the preparation of and review of ESIA's for similar projects in Egypt and worldwide.

1.2 Structure of the Preliminary Environmental Assessment

This PEA includes the following notable sections:

- Section 2 describes the key features of the proposed Project. It contains details about the Project's location, technology, associated facilities, the scope of construction and operational activities of the Project and also mentions the anticipated Project timeline;
- Section 3 describes the regulatory framework applicable to the Project, including Egyptian and potential project lender requirements;

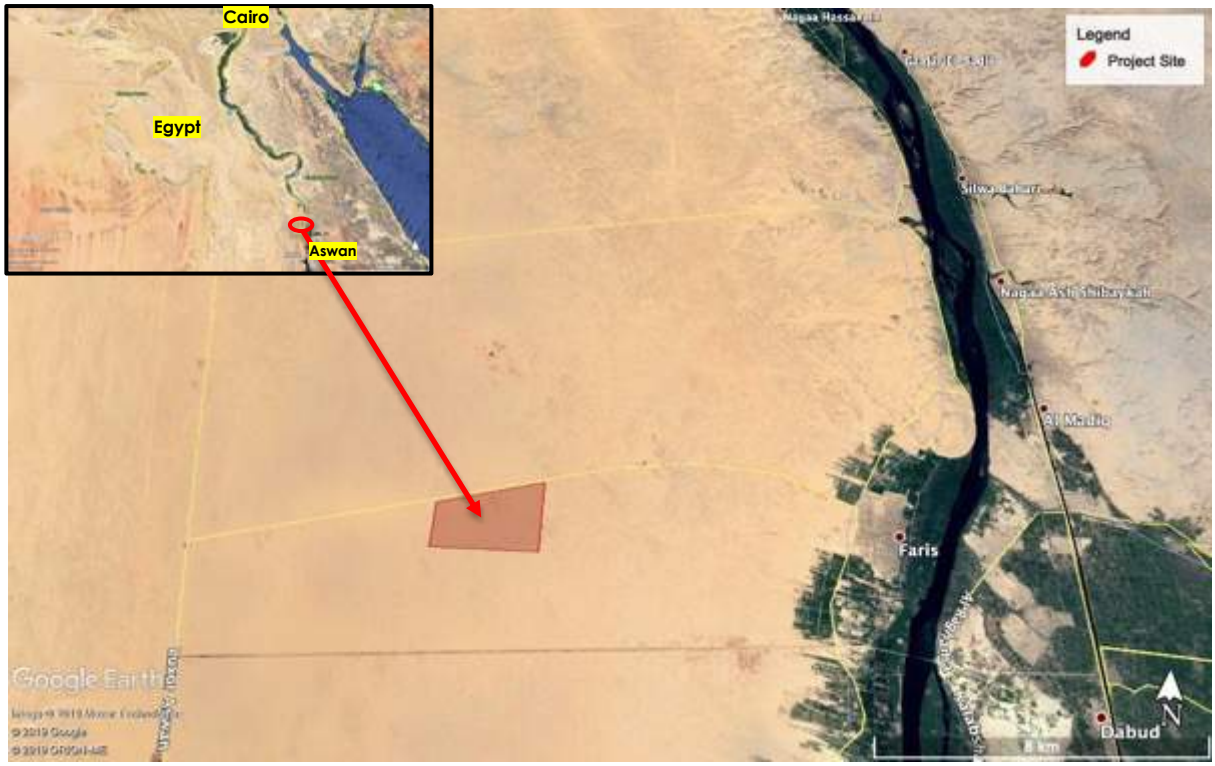
- Section 4 presents the required environmental assessment process including ESIA methodology;
- Sections 5 to 14 present the following information for the different environmental and social parameters under consideration:
    - A brief description of the existing environmental conditions at the Project site and an evaluation of existing environmental information on the area;
    - Potential environmental issues and constraints (and opportunities) associated with the construction and operational phase of the proposed project facilities based on the project information and local environment; and
    - Proposed assessment methodology and requirements during the environmental assessment process.

2 PROJECT INFORMATION

2.1 Project Location

The Project will be located within a desert area of Kom Ombo town in the Aswan Governorate. The total area of the project site is approximately 15.2km^2. The proposed site is located over 600km south of Egypt's capital Cairo, approximately 60km north of Aswan city and about 7km west of the river Nile. An existing tarmac road, which connects Aswan to Cairo and several overhead transmission lines, are located in proximity to the northern and eastern boundaries of the Project site respectively.

Figure 2-1 Project Location



Map Source: Google Earth

The co-ordinates of the Project site are presented in the table below.

Table 2-1 Project Site Coordinates

WGS 84		
Degrees Minutes & Seconds (DMS)		
	Northing	Easting
1	24°37'25.06"	32°48'33.19"
2	24°36'17.43"	32°48'33.29"
3	24°36'17.42"	32°46'49.69"
4	24°37'0.50"	32°46'49.69"

2.2 Site Description and Conditions

2.2.1 Land Ownership

The land has been assigned to the New and Renewable Energy Authority (NREA) by a Presidential decree. NREA will grant ACWA Power the use of the land via the Usufruct Agreement. This agreement allows ACWA Power to build, own, operate and maintain the Project for a limited time period. With regards to this Project, the Usufruct Agreement will be valid for 25 years of the Project's operation. The Usufruct Agreement is expected to be finalized and signed in the first quarter of 2020. Currently, NREA issued an authorization Letter to ACWA Power for accessing the site.

2.2.2 Land Use

Based on the site visit conducted on 17th and 18th of December and the initial consultation with the nearest village (i.e. Fares Village), it is understood that there are/have been no current or previous uses of the land, with the exception at the northeastern corner of the Project site which is occupied by Fares Contractors Union (Plate 2-2). The union is a group of local contractors who are currently providing different services to the neighboring PV project, owned by NREA and TSK. The union currently manages the construction waste from TSK PV project by which they segregate, compact and give the waste to different recycling companies.

The project site is bounded by TSK PV Project to the North East, which is currently under construction. Table 2.2 and Figure 2.2 present a description of the surrounding areas and land-uses within 5 km radius from Project boundaries. Also, a compilation of photographs of the surrounding land use are presented in Plate 2-2.

Table 2-2 Surrounding Land Use

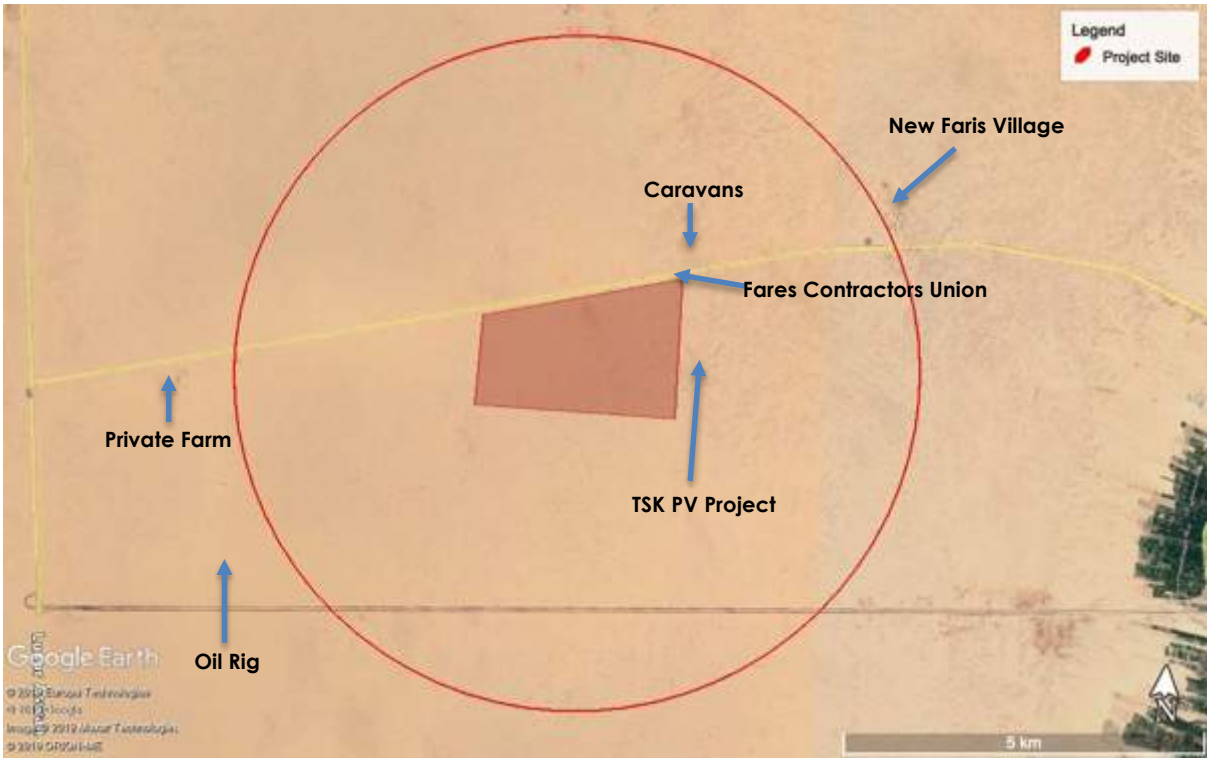
Surrounding Area	Description	Land Use
TSK PV Project (Plate 2-2/ A)	A PV project under construction owned by NREA and TSK located adjacent to Project site from the North East.	Industrial
Private Farm (Plate 2-2/ B)	Private fam located approximately 5 km west of the Project site.	Agricultural
Caravans (local contractors)	Caravans for local contractors looking to work in PV projects located across the road to the north east approximately 150 m from the Project site.	Commercial
New Faris Village - Residential Development (Abandoned) (Plate 2-2/ C)	An abandoned residential development of 100 houses developed by the Ministry of Housing and Governorate of Aswan for unemployed youth in 2005. Development located approximately 3.2 km north east of Project site.	Residential
Oil Production Facility (Plate 2-2/ D)	Approximately 6 km southwest of the project site.	Industrial

Plate 2-1 Surrounding Land Use – Compilation of Photographs

Site Photographs	
Surrounding Land use	
A - TSK PV Project	B- Private Farm
	
C- New Faris Village (Housing Development)	D- Oil Production Facility (Oil Rig)

Site Photographs	
	

Figure 2-2 Surrounding Land Use



2.2.3 Topography

The project site is located in a climatically hyper-arid, mostly barren area with extremely low primary productivity. The area has a rolling topography with an overall gentle slope towards the east and is covered with coarse sand and patches of gravel. No signs of surface drainage channels were observed anywhere within the site or its surroundings.

Very minimal vegetation was observed on site with few species scattered in a number of small patches of vegetation in low-lying areas. Anima life is expected to be very limited throughout the site and the surrounding area. Nonetheless, signs of wildlife were observed in the project site. Animal tracks and burrows of rodents (e.g. jerboas and gerbils), as well as insects (e.g.

tenebrionid beetles) and fringe-toad lizards were spotted in vegetation patches. Some reptiles may also be present, but are currently in hibernation.

Plate 2-2 presents a compilation of photographs showing the Project site.

Plate 2-2 Project Site Topography

2.2.4 Local Receptors

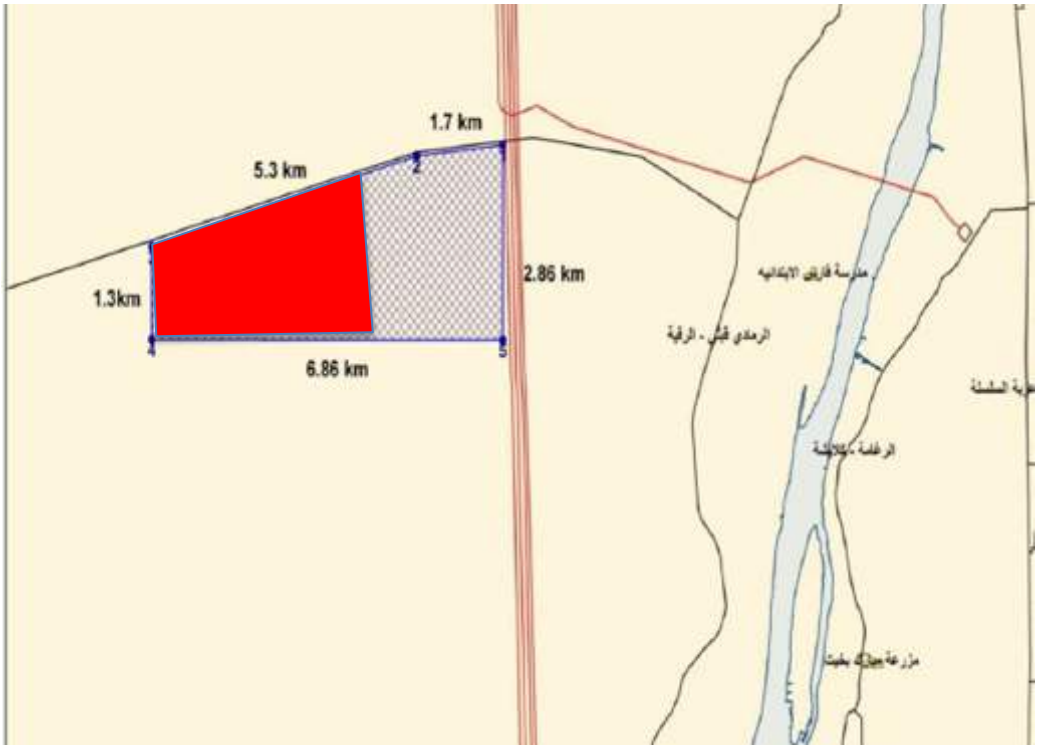
The Project site is situated approximately 60km north of the Aswan city in "Upper Egypt" with an altitude of approximately 146m to 156m above mean sea level.

Directly adjacent to the northern boundary is a 2-way single carriageway road and approximately 2.7km to the southern boundary of the Project site is a 2-way dual carriageway road. Both of which runs perpendicular to the Al Ramadi Kebii – Al Raqaba road & the Luxor-Aswan road and connects the village of Faris to the Luxor-Aswan road. (See Figure 2-3)

The nearest residential receptor to the Project site is New Faris Village located approximately 3.2 km north east of the Project site as discussed above. The village was developed by the Ministry of Housing and Governorate of Aswan for unemployed youth in 2005.

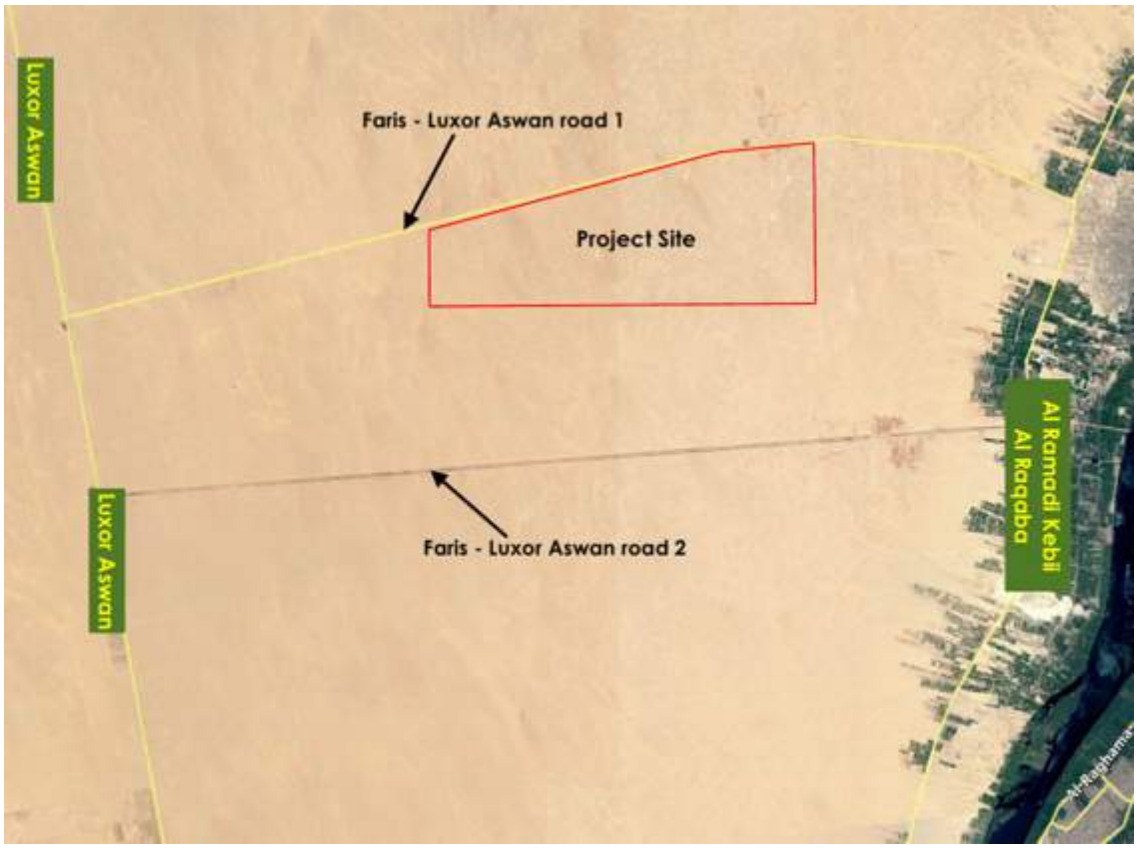
Approximately 110m to the eastern boundary of the Project site are four (4) rows of 220kV Overhead Transmission Lines (OHTL) (see Figure 2-3). The Faris village and the Nile River are located approximately 8.8km and 10.5km east of the Project site respectively.

Figure 2-3 Location of Overhead Transmission Lines (ref. red lines)



Note: For ease of description, the roads to the north and south of the Project boundary will be referred to as Faris – Luxor Aswan road 1 and Faris – Luxor Aswan road 2 respectively.

Figure 2-4 Roads within the Project Area



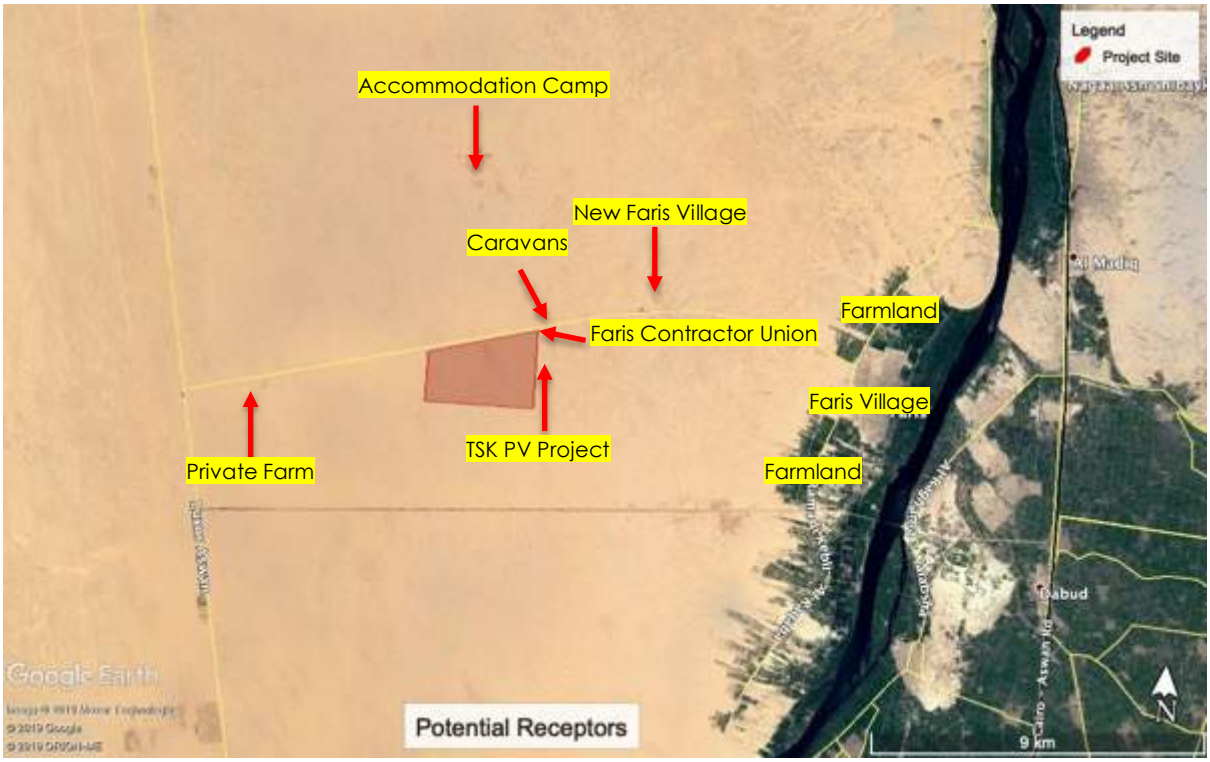
The potential receptors identified within a 10km radius of the Project are shown in Table 2-3 and Figure 2-5.

Table 2-3 Potential Local Receptors

Receptor	Receptor Type	Distance from the Project Site
Faris Contractor Union	Human/ Commercial	Within the road 50 m setback and suspected to be partially on Project site (north east corner).
TSK PV Project (under construction)	Industrial	Adjacent to Project site from the North East.
Users of the Faris – Luxor Aswan road 1	Infrastructure	Directly adjacent to the northern boundary of the Project site.
Users of the Faris – Luxor Aswan road 2		Approximately 2.7km to the southern boundary of the Project site.
Caravans (local contractors)	Commercial	Located across the road to the north east approximately 150 m from the Project site.
New Faris Village	Residential	Approximately 3.2km north east of the Project boundary.
Accommodation Camp		Approximately 4.7km north of the Project boundary.
Private Farm	Agricultural	Approximately 5 km west of the Project site.
Agricultural Farmlands	Agricultural	Approximately 7.8 and 8.2km south east and north east of the Project boundary.

Receptor	Receptor Type	Distance from the Project Site
Faris Village	Residential	Approximately 8.8km east of the Project boundary

Figure 2-5 Potential Local Receptors

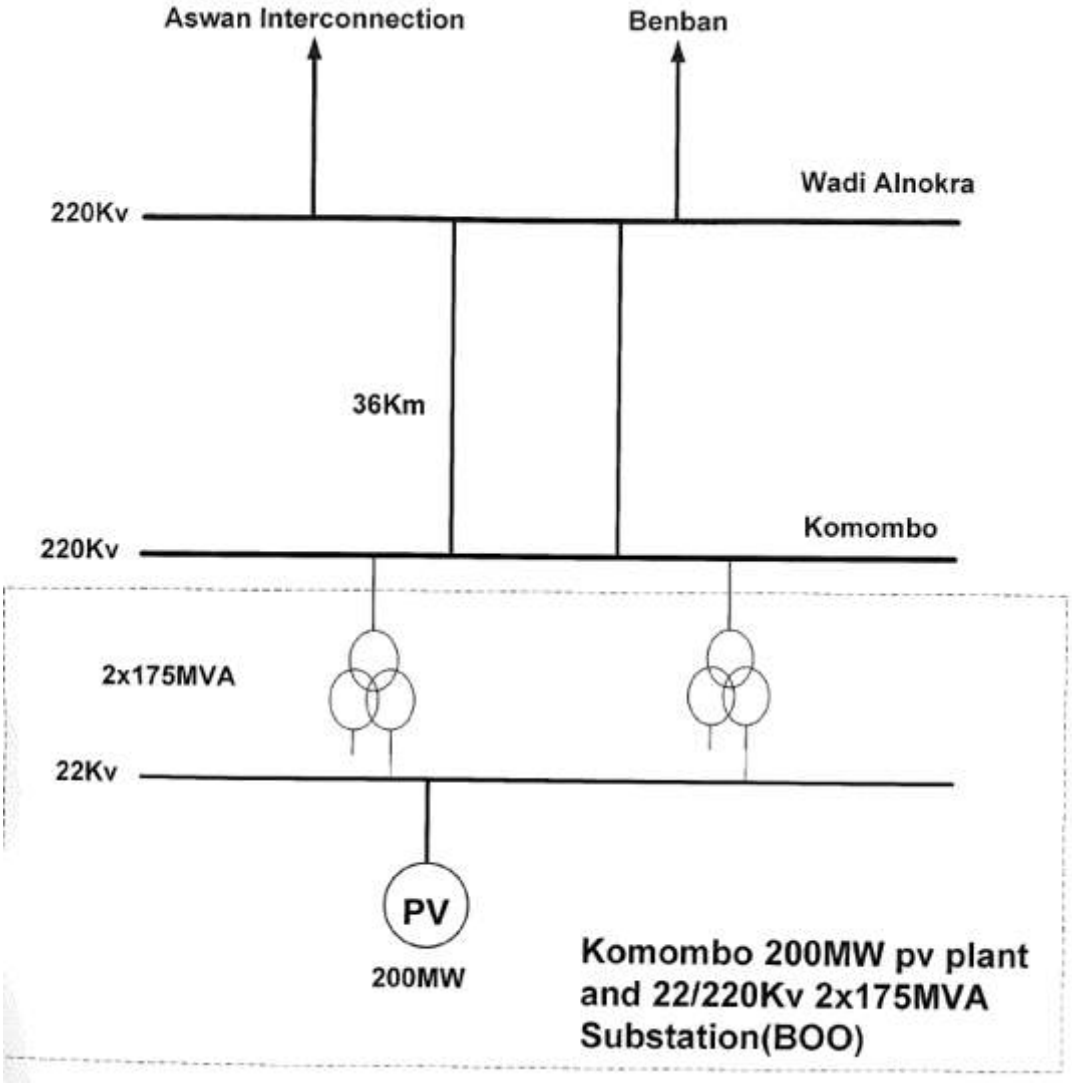


2.3 Project Overview

The project will comprise of 1 x 200MW PV Plant using bi-facial technology. The PV cells within modules will be installed on fixed or tracking ground mounted racks arranged to ensure the most efficient alignment for the capture of solar radiation. Due to the height restrictions of the Project site, only 50% of the land will be used for the installation of the PV panels.

For connection to the grid, the plant will be connected to a 220kV/MV substation which will be situated within the Project boundary. Connection to this substation will be via 220kV cables and power will be exported via the substation to the 220kV Overhead Transmission lines (see figure below). There will be a corridor between the 220kV overhead transmission line gantries outside the Project boundary and the Project boundary.

Figure 2-6 Single Line Diagram for the Evacuation of Power From the 200MW PV Project



According to the Technical Specification of the Request for Proposal issued by NREA to ACWA Power, the scope of the Project will include the design, engineering, permitting, procurement, manufacturing, factory testing, transport to site, erection, construction, commissioning, trial run, performance testing and reliability test of the 200MW PV Plant. It will also include, the operation and maintenance of the facility and the complete decommissioning, dismantling and restoration of the project area to its original condition.

Internal Roads

Internal roads within the Project site will be developed such that it is adequate and suitable to connect to the road network in order to facilitate transportation of equipment to and within the site.

Water Supply System

Water will be required during both construction and operational phases of the Project. This will be obtained from an existing portable water Aboveground Storage Tank (AST) at the Faris Village approximately 7km east of the Project site. Water supply from this AST to the Project site will be via water trucks that will efficiently transport water to storage tanks within the Project boundary in order to cover the water demand of the Project during both construction and operational phases. At no point will the Project require the construction of a water supply pipeline for connection to the Aboveground Storage Tank.

2.4 Project Associated Facilities

2.4.1 External Access Roads

Entrance into the Project site is expected to be from the southern end of the Project site. It is understood that a 4km road that will link to a single carriageway south of the Project site will be constructed to connect to the centre of the southern boundary of the Project site.

2.4.2 Electrical Connection

A 220kV substation will be constructed within the Project boundary. The 200MW PV unit will be connected to the 220kV/MV substation via 220kV cables. To enable connection between the PV unit and the substation and to connect this substation to the grid, the Project will require its own electrical connection facility on-site.

2.5 Primary Construction Activities

Principle construction activities and associated requirements in relation to civil works are anticipated to include but not limited to;

- Construction of general buildings, such as administrative and control buildings, temporary site offices, staff facilities, storage area/building, electrical building, auxiliary buildings and structures, etc.;
- Site clearance, grading and fencing;
- Construction and reinforcement of access roads;
- Excavations for foundation and on-site interconnections;
- Installation of distribution systems for temporary utilities such as electric power, potable water, drainage system, sewage disposal;
- Construction of cable trenches, preassembly area, cranes platforms etc.

Principle Project construction activities in relation to electrical works include installation of;

- Electrical system including lightning and overvoltage protection;

- LV power supply;
- Cabling and cable supporting systems and;
- Uninterruptable power supply as required etc.

2.5.1 Construction Requirements

Temporary Laydown Areas

Temporary laydown areas will be required during the construction phase of the Project for the storage of materials by the Engineering Procurement and Construction (EPC) contractor as well as sub-contractors. The location of the temporary laydown areas in relation to the site is unknown at this stage, but will be assessed within the later ESIA.

Manpower requirement

The expected manpower required during the construction phase is approximately 800 workers during peak demand. However, requirements for manpower are yet to be finalised and will be considered at the ESIA stage, and used in the respective impacts assessment of construction waste, wastewater, as well as requirements for working conditions, community health, safety and security and worker accommodation.

Worker accommodation

Requirements for worker accommodation are yet to be finalised, but will be provided on a contractor-by-contractor basis. These areas are unlikely to be at the project site and will likely be situated in the local area of Aswan or at the accommodation camp located approximately 4.7km north of the Project site.

Wherever located, it is expected that the necessary facilities and standards of facilities for worker accommodation will be in accordance with the IFC/EBRD Worker Accommodation Guidelines.

2.6 Project Milestones

Construction works at the Project site are anticipated to commence in the second quarter of 2020. The Commercial Operation Date (COD) of the project is provisionally scheduled for the second quarter of 2021.

2.7 Operations and Maintenance

The project will be operational for a minimum of 25-years prior to decommissioning. It is understood that the project will be operated and maintained by NOMAC (The First National Operation and Maintenance Company) a subsidiary of ACWA Power. The Project will be operated in full compliance with all applicable environmental requirements. It will also be

operated within the technical limits of the power plant while ensuring that the photovoltaic tracking systems of the power plant follows the solar irradiation profile from sunrise to sunset.

Besides typical day to day operational activities, preventive and corrective maintenance works will be carried out during the operational life of the PV project are expected to include, visual inspections, regular parts replacements and other works to correct any incidents, failures or defects.

2.8 Project Decommissioning Requirements

At the end of the 25 years operational period of the PV plant, the facility will be decommissioned and dismantled according to the Law and the site will be restored to its original status as per the Usufruct agreement. Given that the decommissioning of this Project is not expected for at least 25 years following Commercial Operation Date, it has not considered practical or of value to speculate on future environmental & social conditions including the sensitivity of current or future receptors at this time, or facilities that may or may not be present to handle wastes etc., or the extent of environmental and social regulation that may exist.

Therefore, all impacts relating to the decommissioning phase of the Project will be planned to be approached and mitigated via a specific decommissioning plan prepared closer to the time of decommissioning as it would be able to account for changes in regulation, improvements in technology and methods of demobilization. The decommissioning plan would be developed prior to decommissioning and would be based on the projects ESMS.

3 REGULATORY FRAMEWORK

The following chapter presents the regulatory requirements for conducting an ESIA for the Project in accordance with Egyptian Federal, Governorate/ Local Regulations as well as International guidelines, standards and "best practices".

3.1 Federal Regulatory Requirements

The regulatory body responsible for the protection and promotion of the environment and the development of environmental regulations in Egypt is the Egyptian Environmental Affairs Agency (EEAA).

The law that governs environmental protection issues and addresses pollution resulting from existing projects or establishments as well as potential pollution from new establishments and expansions of existing establishments in Egypt is the Law No. 4 of 1994 for the "Protection of the Environment" amended by Law No 9 of 2009.

This Law states that "Certain new establishments are required to conduct an Environmental Impact Assessment (EIA) prior to the start of construction works, prior to the implementation or the relevant expansion of such project or prior to a license is issued by the competent administrative authority". According to Article 1 (36), Environmental Impact Assessment is defined as "studying and analyzing the environmental feasibility of proposed projects, whose construction or activities might affect the safety of the environment".

The law identifies projects that should be subjected to an Environmental Impact Assessment based upon the four (4) main principles; the type of the activity performed by the project/establishment, the extent of natural resources exploitation, the location of the project/establishment and the type of energy to be used during operation of the project.

In 2009, the Egyptian Environmental Affairs Agency published the second edition of the Guidelines of Principles and Procedures for Environmental Impact Assessment which groups projects that may be subjected to an EIA into three (3) main categories based on different levels of EIA requirements according to the severity of potential environmental impacts and location of the establishment/project and its proximity to residential settlements.

According to the list of Category A, B & C projects provided in this guideline, it is anticipated that this 200MW PV Project will be categorized as a Category "B" project and requires the preparation of an Environmental Impact Assessment (EIA) Study.

Ambient air quality, ambient noise levels and procedures for handling hazardous waste established under the Law No. 4 of 1994 have been considered in this report as they are relevant to the Project.

In addition to the Law No. 4 of 1994, the following specialized laws that govern the environmental and social performance of projects in Egypt are relevant to this Project and have also been considered in the preparation of this Preliminary Environmental Assessment report:

- Law 38/1967 on general public cleaning, and other local Decrees in Governorates that governs solid waste management issues;
- Law 93/1962 on Wastewater and Drainage covering the construction of sewers and sewage treatment facilities including allowable discharges from residential, commercial and industrial facilities to the sewer. Ministerial Decree 9/1988 revised the standards set out in this law;
- Agricultural Law 53/1966 on protecting wildlife specially birds useful for agriculture;
- Decree No. 134/1968 on guideline for handling wastes from domestic and industrial sources, including specifications for collection, transportation, composting, incineration and land disposal;
- Law No 48 of 1982 concerning the protection of the Nile River and the water channels against pollution.
- Law No. 117/1983 on antiquities and cultural heritage requirements, the protection and procedures to follow upon detection and fundamental ownership.
- Decree 338/1995 on promulgating the executive regulations of the law for the environment;
- Decree No. 673/1999 on handling and transportation of hazardous waste;
- Law 94/2003 on application of the Human Rights on Egypt
- Law No. 137/1981 on Labour, amended by Decision 12/2003 (Unified Labour Law) Book 1, 2, 3 & 4 which includes certain stipulations and standards for the working environment and the welfare of labor including:
  - General provisions on labour and working conditions,
  - General working conditions,
  - Wages;
  - Contract termination;
  - Leaves;
  - Vocational guidance and training;
  - Collective association;
  - Child labour and;
  - Female labour
- Resolution No.851 of 2006 on hazardous and dangerous chemical substances
- Law no. 142/2014 and 121/2008 prohibits drivers to dump wastes or any other material including accidental releases of cargo and forbids vehicles emitting

high levels of noise, heavy smoke, odours and emissions that are non-compliant with environmental requirements.

3.2 International Treaties and Convention

As Egypt is signatory to a number of international conventions, the Project will also need to comply with the following international treaties and conventions.

Table 3-1 International Protocols and Conventions

Name of International Protocol/Convention
International Plant Protection Convention
African Convention on the Conservation of Nature and Natural Resources
CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora
Convention on the Conservation of Migratory Species of Wild Animals
Convention on Biological Diversity
Convention concerning the Protection of the World Cultural and Natural Heritage
Convention for the safeguarding of the intangible cultural heritage
United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa
Stockholm Convention on Persistent Organic Pollutants (POPs)
United Nations Framework Convention on Climate Change, Kyoto Protocol and Paris Agreement
Vienna Convention for the Protection of the Ozone Layer
Montreal Protocol on Substances that deplete the Ozone Layer
Convention concerning protection of workers against occupational hazards in working environment due to air pollution, noise and vibration
Convention concerning the prevention and control of occupational hazards caused by carcinogenic substances and agents
Convention on the rights of the child
International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Bamako Convention on the ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa

3.3 Lender Requirements

It is understood that ACWA Power will seek project finance from international financial institutions who may be signatories to the Equator Principles (a voluntary set of principles established to manage environmental and social investment risks), or have investment policies that are consistent with the IFC Performance Standards, or the EBRD Performance Requirements. As such there are a number of separate requirements for the ESIA of the project as set out below.

3.3.1 European Bank for Reconstruction and Development (EBRD)

The European Bank for Reconstruction and Development (EBRD) has adopted an Environmental and Social Policy (2014) and a set of specific Performance Requirement (PRs) covering key areas of environmental and social impacts. These reflect EBRD's commitment to promote EU environmental standards as well as the European Principles for the Environment in their investments. The PRs are outlined below:

- PR1: Assessment and Management of Environmental and Social Impacts and Issues;
- PR2: Labour and Working Conditions;
- PR3: Resource Efficiency and Pollution Prevention and Control;
- PR4: Health and Safety;
- PR5: Land Acquisition, Involuntary Resettlement and Economic Displacement;
- PR6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- PR7: Indigenous People;
- PR8: Cultural Heritage;
- PR9: Financial Intermediaries, and
- PR10: Information Disclosure and Stakeholder Engagement

In line with PR 1, there is a requirement for EBRD financed projects to undertake appropriate Environmental and Social Assessment. The EBRD Environmental and Social Policy (2014) categorizes projects into different categories that determine the nature and level of environmental and social investigations, information disclosure and stakeholder engagement required.

The EBRD Environmental and Social Policy (2014) categorizes projects into different categories that determine the nature and level of environmental and social investigations, information disclosure and stakeholder engagement required. This Project is expected to be categorized as Category "B". A Project is categorized B when it could result in potential adverse future environmental and/or social impacts are typically site-specific, and/or readily identified and addressed through mitigation measures. Environmental and social appraisal requirements may vary depending on the project and will be determined by the EBRD on a case- by-case basis.

The ESIA will be prepared on the basis of undertaking a full ESIA commensurate with a Category B requirement.

3.3.2 The Equator Principles

The Equator Principles (EP) are a risk assessment framework used by financial institutions to determine, assess and manage the environmental and social risk in projects financing globally. The Equator Principles were updated in 2006 (EPII) to include projects with a capital cost of US$10 million or more across all industry sectors and these are the prevailing applicable conditions for this project. The Equator Principles Association Steering Committee reviewed the Equator Principles in 2011 and approved the latest version, EP III on April 26th 2013. This became effective from June 2013.

The EPs establish the minimum standards to be adopted by the EP Financial Institution (EPFI) as those from IFC Performance Standards/World Bank EHS Guidelines and/or the relevant host country laws, regulations and permits that pertain to environmental and social issues.

The Equator Principles consist of the following principles:

- Principle 1 - Review and Categorisation
- Principle 2 - Environmental and Social Assessment
- Principle 3 - Applicable Environmental and Social Standards
- Principle 4 - Environmental and Social Management System and Equator Principles Principle Action Plan
- Principle 5 - Stakeholder Engagement
- Principle 6 - Grievance Mechanism
- Principle 7 - Independent Review
- Principle 8 - Covenants
- Principle 9 - Independent Monitoring and Reporting
- Principle 10- EPFI Reporting

3.3.3 IFC Performance Standards

The IFC Performance Standards are designed to help avoid, mitigate, and manage risks and impacts throughout the life of a project as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. The 2006 version of the IFC Performance Standards was reviewed and made applicable to all new projects from 1st January 2012. The updated IFC PSs reflect IFC's stronger commitment to climate change, business and human rights, corporate governance and gender equality as well as strengthening the due diligence process for IFIs. Such updates include comparable labour terms for migrant and non-migrant workers, clarification of levels of stakeholder engagement, monitoring of supply chains and an enhanced focus on energy efficiency.

IFC is a shareholder in ACWA Power, and therefore all ACWA Power projects must comply with the IFC Performance Standards and IFC EHS Guidelines. The following lists the IFC Performance Standards (2012):

- Performance Standard 1: assessment and Management of Environmental and Social Risks and Impacts
- Performance Standard 2: Labor and Working Conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention
- Performance Standard 4: Community Health, Safety, and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Performance Standard 7: Indigenous Peoples
- Performance Standard 8: Cultural Heritage

3.3.4 World Bank and IFC General EHS Guidelines

The World Bank Group and IFC Environmental, Health and Safety Guidelines (EHS Guidelines) are technical reference documents with general and industry-specific examples of GIIP, as defined in IFC's PS 3: Resource Efficiency and Pollution Prevention. IFC uses the EHS Guidelines as a technical source of information during project appraisal activities.

The World Bank Group International Finance Corporation (IFC), Environmental, Health and Safety (EHS) General Guidelines of April 2007 superseded the World Bank Handbook issue of 1998. The updated EHS Guidelines serve as a technical reference source to support the implementation of the IFC Performance Standards, particularly in those aspects related to PS 3: Resource Efficiency & Pollution Prevention, as well as certain aspects of Occupational and Community Health and Safety. The General EHS Guidelines contain information on crosscutting environmental, health, and safety issues potentially applicable to all industry sectors. No industry specific guidelines have been developed for solar power projects.

The General EHS Guidelines contain the performance levels and measures that are normally acceptable to IFC, and that are generally considered to be achievable in new facilities at reasonable costs by existing technology.

3.4 Environmental Regulations and Standards

The environmental standards specified by the Law 9 of 1994, EEAA and lender guidelines that are applicable to the proposed Project with respect to air, noise and vibration, geology, soils and groundwater etc. are presented under the respective applicable section of each

environmental parameter (from Section 5 onwards). The applicable environmental standards for the Project as per the national regulations and lender guidelines are outlined below.

Table 3-2 Applicable Standards & Guidelines

ENVIRONMENTAL PARAMETER	ARAB REPUBLIC OF EGYPT STANDARDS	LENDER GUIDELINES
Ambient Air Quality	Annex 5 of Law No.4 1994 amended by Law No 9 of 2009 on Maximum Limits of Outdoor Air Pollutants	EU Directive 2008/50/EC on Ambient Quality and Cleaner Air: Annex VII and XI IFC EHS General Guidelines: Table 1.1.1 WHO Ambient Air Quality Guidelines
Noise	Annex 7 of Law No.4 1994 amended by Law No 9 of 2009 on Permissible Limits of Sound Intensity and safe exposure periods: Table 1 and 2	IFC EHS General Guidelines: Table 1.7.1 Noise Level Guidelines
Soil & Groundwater Quality	There are no established soil and groundwater standards in Egypt. As such, the use of the Dutch standards will be applied as a good practice standard in the benchmarking of soil and groundwater quality.	
Wastewater Discharges	Law No 48/1982: Table 1 and 3 on Standards and Specifications of Allowable Discharged Treated Industrial Effluent (TILE) to Fresh & Brackish Water	IFC EHS Guidelines for Thermal Power Plant: Table 5 Effluent Guidelines

All the above-mentioned standards require project compliance. Where there is contradiction in limits between Arab Republic of Egypt standards and lender guidelines, the most stringent will apply to the Project.

In accordance with lender requirements, where specific national standards do not exist, a best practice standard should be applied; hence the reference to the Dutch soil and groundwater standards.

4 APPROACH TO ESIA

4.1 Delineation of Study Area

4.1.1 Scope of Assessment

The proposed project will be located on land assigned to the New and Renewable Energy Authority (NREA) by a Presidential decree. NREA will grant ACWA Power the use of the land via the Usufruct Agreement.

The co-ordinates of the project boundary have been detailed in Table 2-1. The primary study area therefore comprises the footprint of the project. Where project impacts (or areas of influence) extend to geographies or receptors external to the study area, these will also be assessed.

The ESIA will assess the potential impacts related to the proposed projects construction phase, commissioning and operation. Potential impacts relating to decommissioning will be similar to those encountered during the construction phase. However, given that the decommissioning phase is not expected for at least 25 years from Commercial Operation Date, it is not practical to speculate on future environmental and social conditions including the sensitivity of current or future receptors at this time.

It is considered that impacts relating to decommissioning are best approached and mitigated via a specific decommissioning plan prepared closer to the time of decommissioning. A plan prepared at this time would be able to account for changes in regulation, improvements in technology and methods of demobilization.

Associated Facilities for Assessment

The ESIA will endeavour to assess impacts relating to associated facilities such as access roads, electrical connections, water connections, temporary construction facilities and any temporary worker accommodation areas, however the locations/routings of such facilities are yet to be identified at this stage. Where information is available these impacts will be assessed or otherwise the necessary management measures in accordance with best practices will be stated, with the intention of follow up management in the projects implementation.

4.2 Preliminary Environmental Assessment

The PEA/ Environmental Scoping Study is a key stage in the ESIA process with the aim of providing an amount of factual information about the condition of the project site and its environs and identifying potential significant environmental impacts. This process intends to evaluate whether certain environmental parameters will be scoped in or out of the full

assessment, to ensure that only the impacts of potential significance will be assessed at the ESIA stage.

This report includes the scoping assessment for the following environmental parameters which are based on existing data sources and have been supplemented by secondary information and observations form satellite imagery and the site visit conducted on 17th and 18th of December 2019:

- Air quality
- Noise and Vibration
- Terrestrial Ecology
- Geology Soils and Groundwater
- Waste and Wastewater Management
- Archaeology & Cultural Heritage
- Landscape and Visual Amenity
- Socio Economics
- Community Health, Safety and Security
- Worker Conditions and Occupational Health and Safety

Where potential project impacts are scoped out of detailed assessment in the ESIA, further data collection, quantitative analysis or detailed assessment is not specifically proposed as part of the ESIA. Despite this, a qualitative assessment will be conducted and applicable mitigation and management measures will be included to the ESIA to ensure good practices are followed through into the respective Construction and Operational Environmental Management Plans (i.e. CEMP and OEMP).

This PEA sets out a scope of work for the full ESIA and the methods that will be used to assess the identified preliminary project impacts.

4.3 ESIA Methodology

This section provides information about the data collection and consultation process to inform the ESIA and the methodology that has been used to describe the sensitivity of environmental receptors; predict the magnitude of environmental impacts and assess the significance of impacts upon applicable environmental parameters.

4.3.1 Site Visit

An initial site visit has been conducted by 5 Capitals team on the 17th and 18th of December 2019 to establish the conditions of the Project site and surrounding areas, establish the 'area

of influence' for the Project, identify the sensitive receptors and carry out the initial identification of stakeholders that may be impacted by the development of the Project.

4.3.2 Baseline Data Collection

Baseline data collection provides the basis for identifying key existing conditions and environmental and social sensitive receptors within the project site and its surrounding environment. This process enables the assessment of the potential impacts the proposed Project may have on identified potential sensitive receptors during construction and operational phases of the Project.

Baseline surveys will comprise primary or secondary data (or a combination), which may include physical surveys on-site, use of maps, satellite imagery, references from relevant studies and other available data sources.

The scope of the required studies is based upon the existing level of information available and a determination of what further information is required to provide a representative reference of the current environment. The determination of required further studies is set out in the relevant chapters of this scoping report, with suitable justification.

4.3.3 Public Consultation and Stakeholder Engagement

Egyptian Requirement

The Guideline of Principles and Procedures for Environmental impact Assessment published by the Egyptian Environmental Affairs Agency outlines the statutory requirements for public consultation for Category "C" Projects. This requires the involvement of the public and concerned entities during the ESIA planning and implementation phases of the project to raise concerns or comment mainly on the environmental and social aspects related to the project.

The consultation process provides the concerned parties with the opportunity to indicate their opinion in the measures to minimize potential negative environmental and social impacts, strengthen social acceptance of the project, informing the concerned parties that the environmental impacts will be minimized to levels that are low as reasonably practical and achieve the balance between legitimate requirements for development and environmental protection.

It is to be undertaken twice during the ESIA process. The first consultation is to be undertaken during the phase of identifying the scope of the project ESIA, and the second consultation to be undertaken after the preparation of the draft ESIA.

Preliminary Group Meetings – Scoping Consultation

The first consultation meetings were undertaken on the 17th and 18th of December 2019 with representatives from Faris Village. The Project team met with the Head of the Village along

with key members of the community to introduce the Project and the ESIA study that will be undertaken for the Project. During that meeting, the community's concerns and expectations from the Project was discussed. Two sperate meetings were held on the second day, one was attended by the men (24 participants) from the village and a separate one for the women (3 participants). Outcome of the meetings are provided in **Appendix A** of the Project in the Initial Site Visit Report.

Focus Group Discussions (Baseline Data Collection)

A number of focus group discussions will be conducted with stakeholders residing in in the vicinity of the PV project location. Each focus group will include 8 – 12 participants. The stakeholders will be divided based on their gender, profession or age group. The following is a proposed categorization of the stakeholders; the exact classification will be developed based on the results of the stakeholder mapping:

- Farmers – Women; and
- Youth/high school students (males and females) – NGOs.

The focus group discussions will be held in a venue near the site, such as a youth center, a mosque's events center, etc. The objective of these focus group meetings will be to discuss stakeholders' concerns regarding the project and to collect information about the residents' daily lives.

Public Consultation/Hearing – After the Preparation of the ESIA Report

A public hearing will be conducted o present to the stakeholders the results of the ESIA study and discuss the mitigation plan. The public hearing will be held at a suitable location close to the project site, to which representatives of the various stakeholder groups will be invited. This consultation process will be designed to assess how the community and other stakeholders perceive the project, as well as its positive and negative impacts. Data collected by the ESIA team on the Project, and its potential positive and negative impacts will be shared with the stakeholders through this public consultation meeting. The meeting will include a presentation about the project concept and objectives, its expected positive and negative impacts, and suggested mitigation plan. Participants of this public hearing will be encouraged to provide their input to the mitigation plan and to ask for clarifications concerning the solutions/options that were outlined. The results of the public consultation will be taken into consideration in the finalization of the mitigation plan and the final ESIA.

Lender Requirements

In regard to the lender requirements, all of the IFC Performance Standards and EBRD Performance Requirements include requirements for an amount of stakeholder engagement (either in the ESIA, or as part of the future ESMS) and therefore the project will require a level of engagement. In particular, IFC Performance Standard 1 on "Social and Environmental Assessment and Management Systems" describes the stakeholder engagement requirements in more depth. It states the following:

"*Stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts. Stakeholder engagement is an on-going process that may involve, in varying degrees, the following elements:*

- Stakeholder analysis and planning;
- Disclosure and dissemination of information;
- Consultation and participation;
- Grievance mechanism; and
- On-going reporting to Affected Communities.

The nature, frequency, and level of effort of stakeholder engagement may vary considerably and will be commensurate with the project's risks and adverse impacts, and the project's phase of development."

As common and good practice, stakeholder engagement is considered a key aspect of all projects and should be undertaken at the ESIA stage in order to notify, gain views and enable a better understanding of the dynamics of the local environment.

With respect to the project, it is recognized that there are few project stakeholders due to the lack of any required land acquisition and rights of way. Despite this, the following stakeholders have been initially outlined for consultation.

- Ministry of State or Environmental Affairs (MSEA);
- Egypt Environmental Affairs Agency (EEAA);
- Ministry of Electricity and Energy (MEE);
- Ministry of Transportation;
- Ministry of State for Antiquities;
- Local NGOs interested in environment;
- Local universities and research centres

Note: All consultation will be subject to prior agreement from ACWA Power, and therefore may change from the intentions outlined above.

4.3.4 Impact Significance Assessment Criteria

In order to obtain a credible assessment of environmental impacts, the assignment of 'effect significance' to each identified impact needs to be a robust, consistent and transparent process. The methodology to assess 'effect significance' is outlined below and follows a good practice guideline[1] based on the assumption that the significance of an impact on resources or receptors is considered to result from an interaction between three factors:

- The nature and magnitude of the impact (i.e. a change in the environment, social and/or health baseline conditions);
- The number of resources or receptors affected (i.e. humans and the environment);
- The environmental value or sensitivity of those resources or receptors to the change.

A three-step approach has been used to determine the significance of environmental effects, as follows:

- **Step 1** – Evaluation of value/sensitivity of resource or receptor;
- **Step 2** – Assessing the magnitude of the impact on the resource or receptor; a
- **Step 3** – Determining the significance of impacts

Identification and Evaluation of Sensitive Receptors

Sensitive receptors are defined as:

- Elements of the ***environment*** that are of value to the functioning of natural systems (i.e. areas or elements of ecological, landscape or heritage value, species, habitats and ecosystems, soil, air and water bodies or land-use patterns);
- ***Social*** receptors, such as stakeholders (i.e. users of dwellings, places of recreation, places of employment, community facilities or household relocation) and human systems (e.g. employment market, population disease susceptibility and disease communicability, exposure to toxicity of chemicals).

The environmental value (or sensitivity) of the resource or receptor has been defined by using the criteria below in the table below.

Table 4-1 Environmental Value of Receptor or Resource

[1] See for example Scottish Natural Heritage (2009) A handbook on environmental impact assessment or Highways Agency (2008) Assessment and Management of Environmental Effects design manual for roads and bridges HA 205/08 Volume 11, Section 2, Part 5.

Value (sensitivity)	Description of Value
Very High	• High importance and rarity on an international scale and limited or no potential for substitution. • The receptor has already reached its carrying capacity, so any further impact is likely to lead to an excessive damage to the system that it supports. • Locations or communities that are highly vulnerable to the environmental impact under consideration or critical for society (e.g. indigenous peoples, hospitals, schools).
High	• High importance and rarity on a national scale, and limited potential for substitution. • The receptor is close to reaching its carrying capacity, so a further impact may lead to a significant damage to the system that it supports. • Locations or communities that are particularly vulnerable to the environmental impact under consideration (e.g. residential areas, vulnerable/marginalized groups).
Medium	• High or medium importance and rarity on a regional scale, limited potential for substitution. • The receptor is already significantly impacted, but it is not close to reaching its carrying capacity. Further impacts will get increase the stress of the underlying system, but evidence does not suggest that it is about to reach a critical point. • Locations or groups that are relatively vulnerable to the environmental impact under consideration (e.g. commercial areas).
Low	• Low or medium importance and rarity on a local scale. • The receptor is not significantly impacted and shows a large spare carrying capacity. Impacts are not likely to generate any noticeable stress in the underlying system. • Locations or groups that show a low vulnerability to the environmental impact under consideration (e.g. industrial areas).
Very Low	• Very low importance and rarity on a local scale. • The receptor is not impacted and shows a very large spare carrying capacity. Impacts are very unlikely to generate any noticeable stress in the underlying system. • Locations or groups that show a very low vulnerability to the environmental impact under consideration (e.g. industrial areas).

The existence of receptors that are legally protected (e.g. designated areas, protected habitats or species) will be taken into consideration for the assessment of the sensitivity of the receptors.

Identification and Evaluation of Environmental Impacts

The following types of impacts have been considered in line with 5 Capital's assessment methodology:

- Direct Impacts - Potential impacts that may result from the construction and occupation of the Project acting directly on an environmental or social receptor (e.g. land take for construction of the camps);

- Indirect Impacts – Potential impacts which are not a direct result of a Project activity, often produced later in time or further removed in distance, but are normally a result of a complex pathway (e.g. dust deposition on vegetation which causes reduction in photosynthetic rates);
- Beneficial Impacts – Impacts that have a positive, desirable or favourable effect on the sensitive resources or receptors (e.g. landscape providing artificial habitat for a variety of species, creating jobs during the construction and/or occupation phases of a project);
- Adverse Impacts – Impacts that are detrimental and have a negative influence on sensitive resources or receptors;
- Event Related Impacts - Potential unplanned or accidental impacts stemming from an unintentional event such as fire, explosion, oil spill, etc. taking into consideration likelihood of occurrence;
- Cumulative Impacts - The additive potential impacts that may result from the incremental potential impacts of the planned Project plus the potential impacts of reasonably anticipated future projects or future phases of a same development.

The magnitude of the impact refers to the extent of change that is anticipated to occur for the receptor(s) under consideration and is considered as a function of:

- Extent/scale;
- Duration;
- Frequency and;
- Likelihood of occurrence.

In other words, the criterion that has been used for assessing the magnitude of impacts includes: the geographical scale of the impact, the permanence of impact and the reversibility of the impacted condition. A brief description of the magnitude of the impacts is provided in the Table below.

Table 4-2 Criteria for Magnitude of Impacts

Magnitude of Impact	Description of Magnitude
Major	*Adverse:* Loss of resource and/or quality and integrity; severe damage to key characteristics, features or elements. A major impact is usually large scale, permanent and irreversible. *Beneficial:* Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.
Moderate	*Adverse:* Significant impact on the resource, but not adversely affecting the integrity; Partial loss of/damage to key characteristics, features or elements. Moderate impacts usually extend above the site boundary, and are usually permanent, irreversible or cumulative. *Beneficial:* Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	*Adverse:* Some measurable change in attributes quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. Minor impacts usually are only noticeable within the site and are temporary and reversible. *Beneficial:* Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	*Adverse:* Very minor loss or detrimental alteration to one or more characteristics, features or elements. *Beneficial:* Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Determination of Significance of Impacts

Significance of impacts is determined by taking into consideration the sensitivity of an identified receptor or resource and the magnitude of the project impact. That is, the greater the environmental sensitivity of an identified receptor or resource, and the greater the magnitude of impact, the more significant the impact (project impact). In addition to this, where a project has a major detrimental impact on a highly valued environmental resource/receptor, the consequences of that impact on the said resource would be significant adverse effect. In other words, it is the result of the impact acting on the receptor that produces an environmental effect. Effects can be either beneficial or adverse. Table 4-3 shows the criterion used for determining the significance of environmental impacts. Definitions of each significance categories are provided in Table 4-4.

Table 4-3 Criteria for Determining Significance of Impacts

		Magnitude of impact (degree of change)				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
Sensitivity of Receptor	**Very High**	Neutral	Minor	Moderate to Major	Major	Major
	High	Neutral	Minor	Minor to moderate	Moderate to Major	Major
	Medium	Neutral	Negligible to minor	Minor	Moderate	Moderate to Major
	Low	Neutral	Negligible to minor	Negligible to minor	Minor	Minor to moderate
	Very Low	Neutral	Negligible	Negligible to minor	Minor	Minor

In some cases, above the significance is shown as being one of two alternatives. In these cases, a single description is decided upon with reasoned judgement for that level of significance chosen.

Table 4-4 Definition of Impact Significance

Significance Category	Criteria
Very Large	Only adverse effects are assigned this level of importance as they represent key factors in the decision-making process. Effects are associated with sites and features of national or regional importance. Effects exceed statutory limits. Mitigation measures are unlikely to remove such effects.
Large	Important considerations at a local scale but, if adverse, are potential concerns to the project and may become key factors in the decision-making process. Mitigation measures and detailed design work are unlikely to remove all of the effects upon the affected communities or interests.
Moderate	These effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource. They represent issues where effects will be experienced but mitigation measures and detailed design work may ameliorate or enhance some of the consequences upon affected communities or interests. Some residual effects will still arise.
Slight	Local issue unlikely to be of importance in the decision-making process. Effects do not exceed statutory limits. Nevertheless, they are of relevance in enhancing the subsequent design of the project and consideration of mitigation or compensation measures.

Significance Category	Criteria
Neutral	No effect or effect that is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error. No mitigation is required.

The significance of the effect is determined by comparison, wherever possible with company, locally, nationally or internationally accepted standards. If no standards are available then it is necessary to develop project specific limits, based on guidance or best practice as necessary. Such standards or limits are referred to as the **Significance Threshold**. If the size and type of effect is greater that the significance threshold, then this is termed a **Significant Effect**. Potential significant effects need to be avoided and are therefore prioritised identifying mitigation measures to reduce the effect to an acceptable level. Significant effects will be those, which are 'Major' or 'Moderate to Major'.

Note: All predicted impacts with a beneficial impact have been colour coded green.

4.3.5 Mitigation and/or Management Measures

The project includes a variety of measures to ensure that environmental standards and guidelines can be achieved by the project.

The projects impact assessment process as outlined above will therefore take into consideration those measures included to the projects design. In addition to specific measures included to the projects design, the ESIA will outline further mitigation and/or management measures for the construction & commissioning phases and the operational phase, upon which the project can further minimise or avoid negative impacts and ameliorate positive impacts.

Upon approval of the project, the stated mitigation and management measures in the approved ESIA will be required for implementation as a condition of the environmental permit, or as the lenders as part of the loan agreement.

4.3.6 Residual Impacts

Following assessment of the inclusion of the mitigation and/or management measures, the projects residual impact significance will be considered. The significance of such impacts is based upon the same criteria used to determine the impact significance of the projects design referenced above.

4.3.7 Cumulative Impacts

A Cumulative Impact Assessment (CIA) will be carried out for this Project to determine how the potential impacts of the Project development might combine cumulatively, with the potential impacts of other projects or human activities as well as natural stressors such as droughts or extreme climatic events. In addition, known and documented on-going and future projects in

the Project's Area of Influence will be determined and establish whether there are barriers to both current and future development within the projects area of influence.

The objectives and expected outcomes of a Cumulative Impact Assessment process are as follows:

- Identification of Valued Environmental and Social Components (VECs) such as air, water, soil etc. that may be affected by the Project and the selected VECs the assessment will focus on;
- Identification of existing and reasonably anticipated and/or planned developments, as well as natural environmental and external social drivers, that could affect the selected VECs;
- Assessment and/or estimation of the future condition of selected VECs, as the result of the cumulative impacts that the development is expected to have, when combined with those of other reasonably predictable developments;
- Evaluation of the future condition of the VECs relative to established or estimated thresholds of VEC condition or to comparable benchmarks;
- Avoidance and minimization of cumulative impacts of the Project on the VECs; and
- Monitoring and management measures to ensure the VEC viability over the life span of the development or its impacts.

5 AIR QUALITY

5.1 Standards and Regulatory Requirements

5.1.1 National Requirements

Annex 5 of the Egyptian Law No. 4 of 1994 amended by Law No 9 of 2009 for the Protection of the Environment specify the ambient air quality guidelines and maximum allowable emissions from industrial establishments that will be considered for the assessment of the air quality impacts of the project.

Table 5-1 Maximum Limit of Outdoor Air Pollutants

Pollutant	Exposure Period	Maximum Limit Value (µg/m³)
Sulfur Dioxide (SO_2)	1Hr	350
	24Hr	150
	Annual	60
Nitrogen Dioxide (NO_2)	1Hr	400
	24Hr	150
Ozone (O_3)	1Hr	200
	8Hr	120
Carbon Monoxide (CO)	1Hr	30,000
	8Hr	10,000
Suspended Particles measured as Black Smoke	24Hr	150
	Annual	60
Total Suspended Particles (TSP)	24 Hr	230
	Annual	90
PM_{10}	24Hr	70
Lead (Pb)	Annual	1

5.1.2 Lender Requirements

As a guide, the requirements of the IFC EHS Guidelines (which reference the WHO ambient air quality standards) and EBRD Performance Requirements (European Environmental Standards - EU2008/50/EC Directive on Ambient Air Quality) have been provided below.

Table 5-2 WHO Ambient Air Quality Standards (µg/m³ unless otherwise specified)

Parameter	24 hour	Annual
PM_{10}	150 (Interim target 1)	70 (Interim target 1)
	100 (Interim target 2)	50 (Interim target 2)
	75 (Interim target 3)	30 (Interim target 3)
	50 (guideline)	20 (guideline)
$PM_{2.5}$	75 (Interim target 1)	35 (Interim target 1)
	50 (Interim target 2)	25 (Interim target 2)
	37.5 (Interim target 3)	15 (Interim target 3)
	25 (guideline)	10 (guideline)
NO_2	200 (1 hour)	40
SO_2	125 (Interim target 1)	500 (10-minute guideline)
	50 (Interim target 2)	
	20 (guideline)	
O_3	160 (interim target 1) (8-hour daily maximum)	
	100 (8 hour daily maximum guideline)	

Source: World Bank General EHS Guidelines, 2007

Table 5-3 EU Air Quality Directive (µg/m³ unless otherwise specified)

Parameter	Hourly	24 hour	Annual	Comments
$PM_{2.5}$	-	-	Limit value, 25	-
PM_{10}	Limit value, 50	-	Limit value, 40	**Hourly**: Not to be exceeded on more than 35 days per year
NO_2	Limit Value, 200	-	Limit value, 40	**Hourly**: Not to be exceeded on more than 18 times a calendar year
O_3	Target value, 120 (Maximum daily 8-hour mean)			Not to be exceeded on more than 25 days per year, averaged over three years

5.2 Observation and Baseline Condition

5.2.1 General Conditions

Egypt experiences a hot desert climate which is generally extremely dry all over the country except on the northern Mediterranean coast. The prevailing wind in Egypt comes from north westerly direction, from the Mediterranean Sea and continuously blows over the northern coast without any interference and thus, greatly moderates temperatures throughout the

year. Because of this effect, average low temperatures vary from 9°C in the winter to 23 °C in summer and average high temperatures vary from 17 °C in winter to 32 °C in summer.

Though temperatures are moderated along the northern coasts, the situation changes in the interiors, which are away from the moderating northerly winds. Thus, in the central and the southern parts, daytime temperatures are hotter, especially in summer where average high temperatures can exceed 45°C like in Aswan, Luxor, Asyut or Sohag which are located in the deserts of Egypt.

Due to the hot desert environment extremely hot, dry and dusty wind called *Khamasin* blows from the south or the southwest every year sometime between March and May. This transports fine sand and dust particles resulting in a dusty wind which causes relative humidity levels to drop under 5% and results in sudden, early heat waves and the absolute rise in temperature. Such dust/sandstorms can significantly impact upon ambient air quality.

Egypt receives an average of 14.2 rain days per year with a total average annual rainfall of 24.7mm. The places with highest rainfall days are Alexandria and Rafah. Average rainfall is almost zero in the central and southern part of the country.

5.2.2 Local Conditions

The climate in Aswan Governorate is hot in summer, where temperatures can potentially reach above 50ºC, moderate in winter, with relatively dry nature and high evaporation rate and very low precipitation rate. The winds are mainly north, northwest and southwest. Sandstorms are often during spring and autumn seasons which occur for an average of 2-4 days per year, such events have the potential to increase ambient concentrations of particulates and to degrade local air quality.

According to the Environmental and Social Impact Assessment Report (August 2014) provided by NREA, air quality in Kom Ombo City (about 20km southeast of the project site) is considered poor. In 2003 the Kom Ombo air quality monitoring station was one among three (3) stations that exceeded the Egyptian annual average for sulphur dioxide (SO_2) of 60μg/m^3. In addition, the Total Suspended Matter exceeded the Egyptian standards levels during most monitored days. An example of emission sources in Kom Ombo is provided below at Kom Ombo Sugar Factory, located approximately 18km south east of the Project site.

Plate 5-1 Air Emissions from the Kom Ombo Sugar Factory

5.2.3 Site Based Conditions

Based on the site visit conducted in December 2019, the visible sources of air emissions in the vicinity of the Project site include:

- Gaseous emissions (NO_2, SO_2, VOCs, etc.) from the generators used by Faris Contractors Union at the north eastern corner of the site;
- Dust and gaseous emissions (NO_2, SO_2, VOCs, etc.) from the on-going construction activities from TSK PV Project (bordering the Project site form the east);
- Fugitive emissions from the oil production facility located approximately 6 km southwest of the project site;
- Combustion emissions from vehicles from the nearby road at the northern and southern boundaries of the site; and
- Potential low-level detectable concentrations of pollutants from Kom Ombo city.

5.3 Sensitive Receptors

The identified sensitive receptors (existing) for this Project are detailed in Table 2-3 and shown in Figure 2-5 in Section 2.2.4. The locations of the ASRs were identified from available mapping and site visit.

5.4 Potential Impacts

5.4.1 Construction Phase

During construction, local ambient air quality may potentially be affected by increased dust, particularly during the site preparation stage (site clearance, leveling of sand dunes areas and earthworks) and by the exhaust fumes of construction vehicles, equipment and temporary power generators. The typical air emissions resulting from these activities include: nitrogen oxides, sulphur dioxide, carbon monoxide, carbon dioxide, VOCs, particulates and BTEX.

The principle sources of particulate and gaseous emissions during construction will be:

- Excavations and earthworks, such as ground breaking, cutting, filling and leveling;
- Truck movements on unpaved, or compacted surfaces;
- Particulate matter dispersion from uncovered truckloads;
- Vehicle and Construction equipment emissions (e.g. NO_x, SO_x and CO, CO_2, VOCs, particulates and BTEX) and particulates from vehicles, generators and other mechanical equipment;
- Stored VOCs and other volatile hazardous materials and;
- Odour from temporary wastewater facilities, or containment.

Secondary impacts from increased vehicle movements are likely to have an impact for receptors along site access routes, particularly at junctions, where vehicle acceleration occurs. Effects of vehicular dust may also occur where dirty vehicles move off the site without wheel washing or other cleaning.

5.4.2 Operational Phase

As the proposed project is associated entirely with the generation of renewable energy, there are no permanent fuel combustion requirements or any other associated air emissions directly from the Project. An emergency generator may be supplied to provide supply in case of a site connection issue or disconnection from the grid.

The facility will necessitate a minor vehicle usage of the access road to the site. However, impacts to receptors are not likely to be discernible.

5.5 Proposed Assessment Requirement for ESIA

In accordance with the outlined potential impacts, the following table details those impacts that will be scoped in and scoped out of detailed assessment at the ESIA stage.

Table 5-4 Air Quality Impacts for Detailed Assessment at the ESIA Stage

Potential Impact	Scoped In/Out of Detailed Assessment at ESIA	Justification
Construction		
Dust Generation	**Scoped In**	In line with the UK's IAQM Guidance on the Assessment of Dust from Construction, the need for detailed assessment relating to dust impacts will normally be required where • There is a 'human receptor' within 350m of the boundary of the site, or within 50m of a route used by construction vehicles on public roads (up to 500m from the site entrance). • There is an 'ecological receptor' within 50m of the boundary of the site, or within 50m of a route used by construction vehicles on public roads (up to 500m from the site entrance). With respect to these criteria, dust generation as a result of construction activities can potentially impact the Faris Contractor Union, TSK PV Project and the local contractors (Caravans) as these human receptors are located approximately between 50 to 200 m from the Project boundary. As the road north of the Project site will be used during construction to enable connection to the Project's 4km road, users of this road could be potentially impacted by dust generation or particulate emissions as a result of increase traffic on this road. It is therefore considered that impacts relating to construction dust will be "Scoped In" for detailed assessment in the ESIA stage.
Gaseous Emissions	**Scoped In**	The principle sources of gaseous emissions to air during construction will be the combustion of fossil fuels from the operation of vehicles, construction equipment and plant. Any emissions from these sources are expected to mix in ambient air close to the point of origin and are unlikely to be discernible thereby resulting in emissions that are not distinguishable from the background concentrations. However, given that the ambient air quality at Kom Ombo city has exceeded the limit for SO_2 at a certain time, it is necessary to undertake a baseline air quality assessment of the Project area to confirm concentration of air pollutants are still well within established standards.
VOC's	**Scoped Out**	The potential for VOC impacts is expected to be minimal and expected to be limited to the site or negligible at off-site receptors in the immediate surrounding of the Project area and as such is "Scoped Out" of detailed assessment in the ESIA stage. This is primarily due to the limited potential for diffuse source VOC's from the site.
Odour	**Scoped Out**	The potential for odour impacts during construction is expected to be minimal and expected to be limited to the site area or negligible at off-site receptors in the immediate surrounding of the Project area and as such is Scoped Out of detailed assessment in the ESIA stage.

Potential Impact	Scoped In/Out of Detailed Assessment at ESIA	Justification
Operation		
Vehicle Gaseous Emissions	**Scoped Out**	Given that the operation of the Project will only require the usage of few vehicles, emission from vehicle movements are not expected to result in emissions that are not distinguishable from the background concentrations.

5.6 Assessment Methodology at the ESIA Stage

Construction

In order to provide appropriate data enabling confirmation of baseline conditions prior to construction, an ambient air quality monitoring survey will be conducted as a component of the ESIA, particularly for dust impacts and gaseous vehicle emissions that have been scoped in for detailed assessment.

The ambient air quality monitoring survey will include an inventory of local emission sources within 5km of the site, types and sensitive receptors (existing and any known or planned future receptors), which will be based on site observations and the review of satellite imagery.

One (1) ambient air quality monitoring station will be established at a central location in order to provide a representative baseline for the site.

The monitoring will be conducted by the use of a continuous air quality monitoring station and will be used to obtain data on ambient concentrations of carbon monoxide (CO), nitrogen oxides (NO_x), sulphur dioxide (SO_2) and Particulate Matter ($PM_{2.5}$ and PM_{10}).

The parameters will be monitored for three consecutive 24-hour cycles (100% recovery is 80% of the 24 hours as per USEPA regulations and guidelines). Air temperature, relative humidity, wind speed and direction, and Sigma Theta (the standard deviation of the horizontal wind direction fluctuation) at the time of the air quality measurement will also be monitored. An efficient data acquisition system for recording the 1- minute averages will be used to compute the 1-hour and 24-hours averages. All ambient air quality data shall be provided in $\mu g/m^3$ units.

Results of the air quality monitoring will be compared against all applicable standards as listed in the Standards and Regulatory Section above.

Although the potential construction impacts relating to VOC's and odour have been scoped out of detailed assessment, the ESIA will include best practice mitigation and management measures for the construction phase to reduce the potential for any associated effects to air quality. The intention will be for these best practice measures to be included into the Construction Environmental Management Plan (CEMP) and construction phase Environmental Management System (EMS) for effective management and implementation on-site.

Operation

Although the potential operational impacts relating to air quality have been scoped out of detailed assessment, the ESIA will include best practice mitigation and management measures related to operations. The intention will be for these best practice measures to be included into the Operational Environmental Management Plan (CEMP) and operational phase Environmental Management System (EMS) for effective management and implementation on-site.

6 NOISE AND VIBRATION

6.1 Standards and Regulatory Requirements

6.1.1 National Requirement

Annex 7 of the Egyptian Law No. 4 of 1994 amended by Law No 9 of 2009 for the Protection of the Environment sets out the maximum permissible noise levels for different receptor types.

Table 6-1 Maximum Permissible Limit for Noise Intensity in Different Areas

Receptor Classification	Permissible limit for noise intensity dB(A)		
	Day (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)
Residential rural areas, hospitals and gardens	45	40	35
Residential suburbs with low traffic	50	45	40
Residential areas in the city	55	50	45
Residential areas in which can be found some workshops or commercial establishments or which are located on a main road	60	55	50
Commercial, administrative and downtown areas	65	60	55
Industrial areas (heavy industries)	70	65	60

The table below provides standards for the maximum permissible noise levels inside the workplace.

Table 6-2: Maximum Permissible Noise Levels Inside the Work Place

Type of Place and Activity	Maximum Permissible Noise [level equivalent to dB(A)]
Work place with up to 8 hour shifts and aiming to limit noise hazards on sense of hearing	90
Work place where acoustic signals and good audibility are required	80
Work rooms for the follow up, measurement and adjustment of high performance operations	65
Work rooms for computers, typewriters or similar equipment	70
Work rooms for activities requiring routine mental concentration	60

6.1.2 Lender Requirements

Financial institutions are likely to require adherence to WHO noise standards as detailed in IFC EHS Guidelines, which stipulate a maximum threshold of 70dB(A) at industrial or commercial receptors during daytime. It is noted that if EBRD are a lender, the project will alternatively require compliance with European Union noise standards.

Table 6-3 World Bank Ambient Noise Level Guidelines

Receptor	One Hour LAeq (dBA)	
	Daytime (7am-10pm)	Night (10pm-7am)
Residential, Institutional, Educational	55	45
Industrial, Commercial	70	70
Guideline values are for noise levels measured out of doors.		

Source: World Bank EHS General Guidelines, 2007.

European (EBRD) Standards

The European Commission Environmental Noise Directive (Directive 2002/49/EC) relating to the assessment and management of environmental noise and is the main EU instrument to identify noise pollution levels and to trigger the necessary action both at Member State and at EU level. The Directive applies to noise to which humans are exposed, particularly in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise-sensitive buildings and areas. It is important to note, however, that the Directive does not set limit or target values, nor does it prescribe the measures to be included in the action plans, thus leaving those issues at the discretion of the competent Member State authorities.

6.2 Observation and Baseline Condition

Based on the site visit conducted in December 2019, the potential noise sources within the vicinity of the Project site include:

- Construction noise from the adjacent TSK PV Plant site located east of the Project site;
- Noise form the waste segregation and compaction activities carried out by Faris Contractors Union at the north eastern corner of the Project site; and
- Vehicular noise from the Faris – Luxor Aswan Road bordering the site from the north.

It is understood that aircraft operating to and from Aswan Airport located approximately 70km from the Project site fly irregularly over the Project site. It is understood that at this distance

aircraft tend to maintain a relatively high altitude with ground level noise being low, if discernible.

The only potential source of vibration within close proximity to the Project site might be from the construction activities on-going at the TSK PV project. However, during the site it was noticed the PV panels were already installed and majority of the constriction activities seemed to be complete. Therefore, existing vibration impacts at the project site are not expected.

6.3 Sensitive Receptors

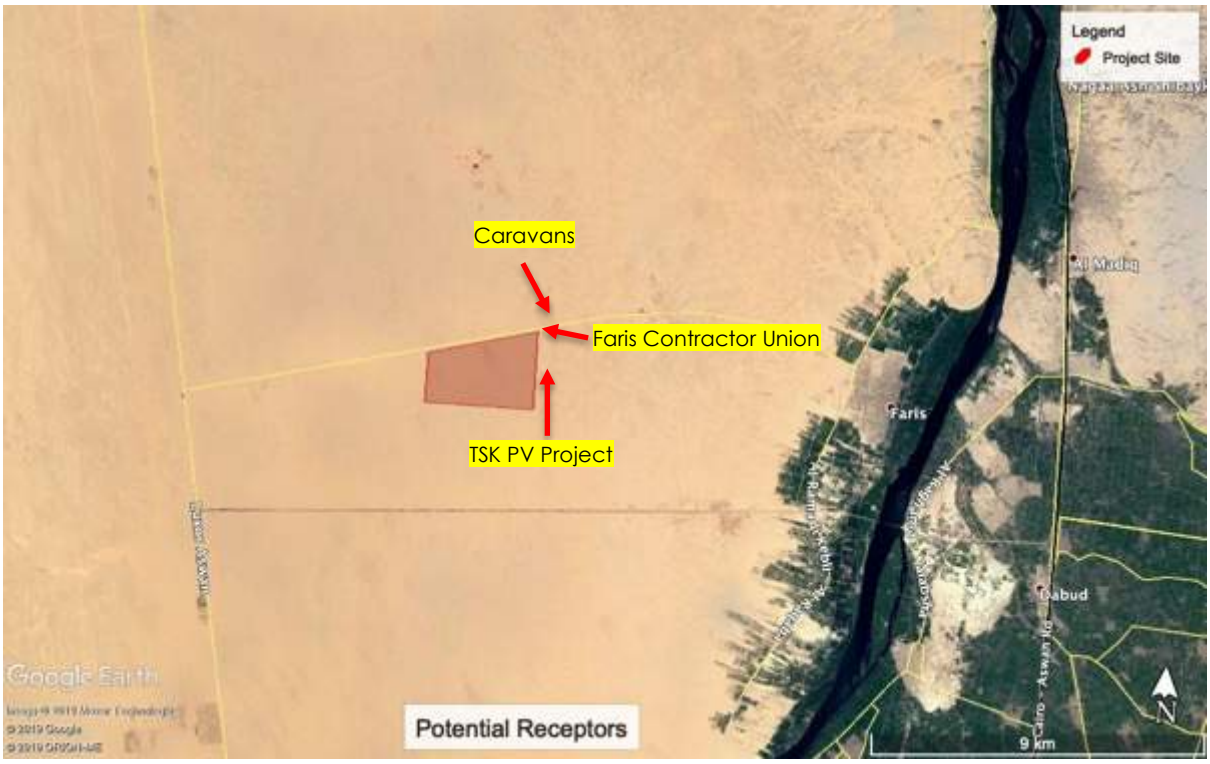
In relation to noise and vibration impacts, the expected range of impacts (area of influence) are likely to be around the Project site within a zone of 2 km. This is due to noise propagation over distance, decreasing in intensity with increased distance from the source. The locations of the sensitive receptors were identified from review of satellite imagery and the site visit conducted in December 2019. The potential sensitive receptors to noise and vibration within 2 km of Project site are shown in the Table and Figure below.

It should be noted that the Faris Contractors Union and Local Contractors (Caravans) are not considered permanent receptors. Whether they relocate or stay once construction commences is unknown at this stage, however, for the purpose of the ESIA and until their status is clarified, they have been considered as sensitive receptors.

Table 6-4 Potential Noise and Vibration Receptors

Receptor	Receptor Type	Distance from the Project Site
Faris Contractor Union	Human/ Commercial	Within the road 50 m setback and suspected to be partially on Project site (north east corner).
TSK PV Project (under construction)	Industrial	Adjacent to Project site from the North East.
Caravans (local contractors)	Commercial	Located across the road to the north east approximately 150 m from the Project site.
Users of the Faris – Luxor Aswan road 1	Infrastructure	Directly adjacent to the northern boundary of the Project site.

Figure 6-1 Potential Noise and Vibration Receptors Associated with the Project



6.4 Potential Impacts

6.4.1 Construction Phase

Construction Noise

Construction activities typically result in temporary and short duration increases in the noise and vibration levels of a site. Noise will be generated by construction and propagated to the surrounding environment via a range of processes. Pertinent construction activities in relation to noise and vibration are likely to include site preparation, earthworks, construction and installation, movement of vehicles, compaction works and piling.

The accumulation of noise from the above sources can introduce potential impacts associated for nearby receptors when generated in tandem.

Impacts to nearby receptors may be apparent, particularly where receptors are located within 2km of the project site due to the flat topography and lack of intervening structures to provide attenuation.

Construction Access Road Noise

The construction and use of northern access road may result in increase in noise level at offsite receptors. Site traffic during the construction phase may also lead to increases in the level of noise along primary access routes to the project site. This is likely to include increase in vehicle

traffic along the Faris – Luxor Aswan Road 1, which will provide the only hardstanding road link to the proposed site access road.

Construction Vibration

Certain construction processes, particularly those involved with site preparation and civil works to improve soil bearing capacity, soil structure and ground stabilization such as e.g. clearing, breaking, piling, vibratory rollers have the potential to create vibration within the vicinity of the works. Vibration, to a lesser extent is also anticipated to occur around the construction site due to the movement of materials and equipment by vehicles.

It is noted that vibratory impacts during construction are not anticipated at any nearby receptors, with the exception of Faris Contractors Union who are situated within the 50 m road setback at the north eastern corner of the Project site.

6.4.2 Operational Phase

Noise

Besides maintenance vehicles and potential low magnitude humming from the electrical transformers (which is not expected be discernible at over 100m distance from source), there will be very few specific point noise sources from the project.

Given the minimal requirements for site activity during operation, impacts from vehicles are also not expected to be major source of noise. As such, operational noise is not expected to be discernible at identified receptor locations.

Vibration

As the PV Project will not contain vibrating, or other major moving parts, it is not anticipated that the project will result in any discernible operational vibration impacts.

6.5 Proposed Assessment Requirements for ESIA

In accordance with the outlined potential impacts, the following table details those impacts that will be scoped in and scoped out of detailed assessment at the ESIA stage.

Table 6-5 Noise & Vibration Impacts for Detailed Assessment at the ESIA Stage

Potential Impact	Scoped In/Out of Detailed Assessment at ESIA	Justification
Construction		
Construction Site Noise	**Scoped In**	Due to the proximity of the nearest human receptors to the eastern and northern boundaries of the Project site,

Potential Impact	Scoped In/Out of Detailed Assessment at ESIA	Justification
		there is a potential for noise generated as a result of construction activities within the site. However, receptors identified to be over 2km away from the Project site will be scoped out from detailed construction noise assessment as they will not be affected by changes in ambient noise levels due to the attenuation of noise by distance propagation.
Construction Access Road Noise	**Scoped In**	During construction of the Project, there will be an increase in vehicle traffic along the Faris – Luxor Aswan road 1 which may result in discernible noise impacts to receptors in proximity to this road.
Vibration	**Scoped Out**	Vibrations propagating from the site (e.g. from site preparation and shallow foundations) are expected to be of low magnitude and will dissipate rapidly as they spread and lose energy from source. Hence, impacts from vibration are not expected to be discernible at receptor locations in proximity to the Project site.
Operation		
Operational Noise	**Scoped Out**	Given that operation of the Project will not include noisy components or include noise generating activities, there will be limited noise sources from the Project. Given the minimal requirements for site activity during operation, noise impacts from vehicles required during the operation and maintenance are not expected to be discernible at receptor locations.
Vibration	**Scoped Out**	Impacts related to vibration are not expected.

6.6 Assessment Methodology at the ESIA Stage

Construction

In order to provide a representative assessment of the significance of potential impacts at the ESIA stage for those potential impacts scoped in for detailed assessment, a noise survey will be undertaken to provide a baseline upon which to assess construction noise and construction access road noise. The noise survey will be undertaken at four (4) accessible, locations along the site's boundaries and additional two (2) locations at receptors within 2 km of the project boundary. At each of the four site boundary locations, noise measurements will be taken for 15-minutes during both day-time and night-time periods. For the receptor locations, noise measurements will be taken continuously for one hour during the day and one hour during the night at each of the two receptor locations. Observations relating to local noise influences during the surveys and noise graphs to illustrate the fluctuations of noise over the respective survey period will also be reported.

Noise measurements will be made using measurement and analysis equipment and protocols in accordance with local and WHO standards and guidelines. The noise survey will be undertaken using the following:

- Sound measurement and analysis device (B&K Sound Analyzer Type 2260) and 2250; and
- Updated acoustic computer software to manipulate and verify the results, to obtain more accurate illustration.

Results of noise monitoring will be compared against all applicable standards as listed in the Standards and Regulatory Section above.

Although the projects potential construction impacts related to vibration have been scoped out of detailed assessment, the ESIA will include best practice mitigation and management measures for the construction to reduce the potential for any associated effects to receptors. The intention will be for these best practice measures to be included into the Construction Environmental Management Plan (CEMP) and construction phase EMS for effective management and implementation on-site.

Operation

The ESIA will also include best practice mitigation and management measures for potential operational impacts related to noise and vibration that have been scoped out of detailed assessment.

7 TERRESTRIAL ECOLOGY

7.1 Standards and Regulatory Requirements

7.1.1 National Requirement

Annex 4 of the Egyptian Law No. 4 of 1994 amended by Law No 9 of 2009 for the Protection of the Environment establishes the requirement for the prohibition of hunting, killing or capturing of wild birds and animals. This includes:

- Any other birds or animals determined in the international conventions to which the Arab Republic of Egypt adheres to and;
- Any other birds or animals designated in a decree to be issued by the Minister of Agriculture in agreement with the EEAA.

7.1.2 Lenders Requirement

IFC Performance Standard 6 requires the consideration of relevant threats to biodiversity and ecosystem services, especially focusing on habitat loss, degradation and fragmentation, invasive alien species, overexploitation, hydrological changes, nutrient loading, and pollution. Performance Standard 6 outlines that impacts on biodiversity and ecosystem services should be avoided where possible. When avoidance of impacts is not possible, measures to minimise impacts and restore biodiversity and ecosystem services should be implemented. Specifically, it is necessary to determine baseline conditions and categorise the projects habitats as 'critical', 'modified' or 'natural' to undertake the necessary assessment.

Similar requirements exist under EBRD PR6 which would need to be complied with if EBRD are providing project finance. The EBRD PR6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources establishes general requirements for the conservation of biodiversity and sustainable management of living natural resources covering aspects such as the assessment of issues and impacts on biodiversity.

Where applicable, the Project will intend to follow the targets set out by the EU Biodiversity Strategy including the Habitats Directive 92/43/EEC, the Birds Directive 2009/147/EC and the EU Regulation 1143/2014 on Invasive Alien Species. It is noted however that the targets are unlikely to be triggered by the Project due to the existing ecological conditions within the Project site.

7.2 Observation and Baseline Condition

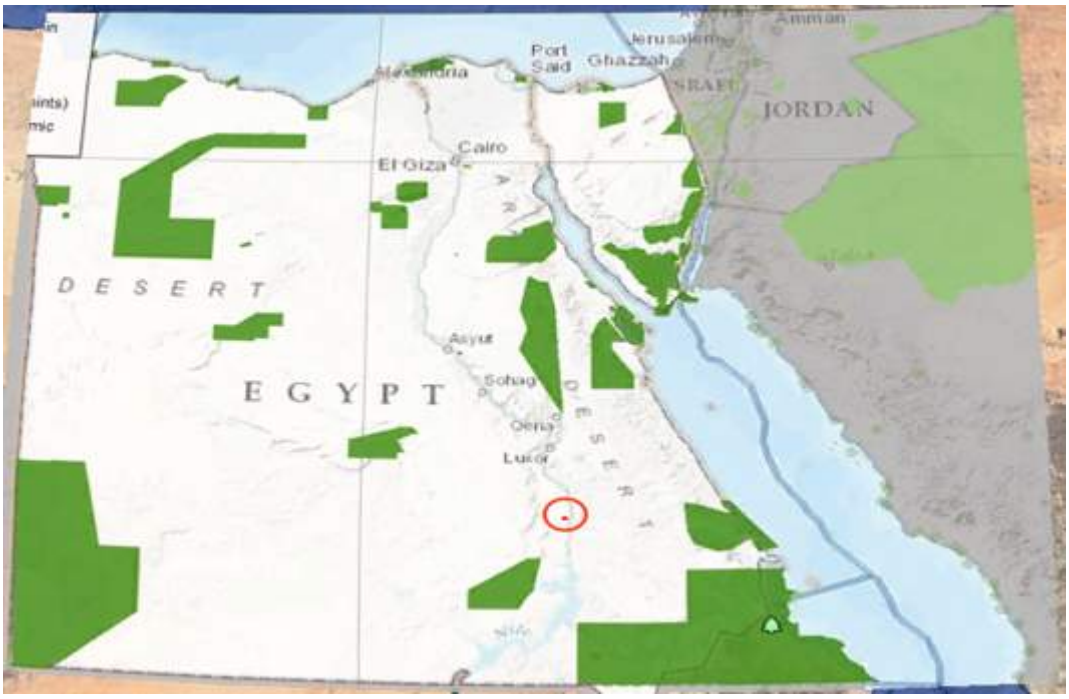
The proposed Project site is predominantly open desert plain with several gently undulating sheets of sand and limited areas and species of low-lying shrubs and grasses.

Due to the largely barren nature of the site, fauna at the project area is expected to be limited. The fauna species which exists in this part of the Western Desert are animals that can withstand high temperature and low water availability. This site may support animals such as; reptiles (e.g. lizards, snakes, etc.), mammals (e.g. rodents, etc.), insects as well as several species of birds. During the site visit, signs of wildlife were observed in the project site. Animal tracks and burrows of rodents (e.g. jerboas and gerbils), as well as insects (e.g. tenebrionid beetles) and fringe-toad lizards were spotted in vegetation patches. Some reptiles may also be present, but are currently in hibernation. However, the presence or absence of such flora and fauna will be confirmed during the ESIA stage.

Plate 7-1 Flora and Evidence of Fauna on Site

It is noted that there are no protected or ecological designated areas in proximity of the project site. The nearest protected areas are the Saloga and Ghazal island in the Nile approximately 3km north of the Aswan Dam, located approximately 70km south of the project site.

Figure 7-1 Protected Areas in Egypt (Ref. Project site in red)



These protected areas do not have habitats that are consistent with those identified on-site and are not otherwise expected to be linked, or provide buffer, transition or support habitats to these areas.

Egypt is known to include highways for bird migration, particularly along areas of the Nile which may provide navigational aid and rest stops for species of birds seeking water and sustenance. The project site does not contain habitats that may be amenable to migrating birds, such as water of areas for foraging, such as mudflats or other productive lands.

7.3 Sensitive Receptors

Table 7-1 Potential Terrestrial Ecology Receptors

Receptor	Receptor Type	Location
Rodents, insects and reptiles	Fauna (wildlife)	Within Project footprint
Undulating Sand Slopes (Sand Sheet)	Terrestrial Habitat	Within Project footprint
Gravel Plains	Terrestrial Habitat	Within Project footprint

7.4 Potential Impacts

7.4.1 Construction Phase

Habitat Loss

It is expected that site preparation activities will include the removal of any vegetation in the project footprint, followed by grading for foundations, and trenching and backfilling for cables and pipelines. This will likely fill/bury animal burrow that may exist.

Loss of low-lying flora on-site may however not be permanent as the project site will not be covered with hard standing or other surfaces. As such there is potential for such flora to re-establish following construction.

Disturbance of Fauna

Construction activities are likely to result in disturbance, or would trigger a flight response from fauna within the project area, particularly birds or any mammals. However, given that reptiles may not abandon burrows during this period, there is a potential for construction activities to result in injury or death of these fauna species in the project footprint and any associated working areas.

7.4.2 Operational Phase

As the majority of the project surface will remain as exposed soil there is the potential for the re-establishment of flora, particularly in areas that are not being used for internal roads. There is also likely to be potential for reptiles to return to the site, where they are small enough to gain access through the perimeter fenceline. The presence of the fenceline may provide an additional layer of protection to such returning species, as predators may be unable to access the site footprint. This is however expected to limit and prevent any future passage or use of the site by larger ground dwelling fauna.

The installation of solar PV panels elevated from the surface will also result large areas of shading in the project site footprint which may provide amenable conditions to certain flora and fauna species, particularly those that seek shade. Alternatively, the presence of shading is also not expected to limit the presence of sun seeking species, as there will also be non-shaded areas between the PV rows.

Migrating birds in proximity to the site are not expected to be impacted by the project directly, but may indirectly be attracted to the site under the influence of 'lake effect', a potential phenomenon whereby birds mistake the reflective surfaces of solar PV panels for the surface of water. Although lacking firm research, there is suggestion amongst the scientific community and avian protection bodies that 'lake effect' has the potential to injure birds of lead to their

mortality where birds attempt to land on the PV panels. As such, there may be potential for such impacts to occur to birds attracted by 'lake effect'.

Selective landscaping around the site borders, using native vegetation, may also increase biodiversity on the site by providing habitats foraging opportunities and refuge for fauna species. Inappropriate landscaping using non-native or non-naturalised species could however result in the introduction of invasive species to the area.

7.5 Proposed Assessment Requirement for ESIA

Table 7-2 Terrestrial Ecology Impacts for Detailed Assessment at the ESIA Stage

Potential Impact	Scoped In/Out of Detailed Assessment at ESIA	Justification
Construction		
Habitat Loss	**Scoped In**	A baseline assessment of flora and fauna species in the project footprint is required as the projects habitats are likely to be lost or modified as a result of the projects construction works.
Disturbance of Fauna	**Scoped In**	It is unknown at this stage whether faunal species of importance are present within the project site.
Operation		
Habitat Re-establishment	**Scoped Out**	Impacts related to habitat re-establishment are expected to be positive to terrestrial ecology. As such these have been scoped out.
Severance	**Scoped In**	Severance may prevent a barrier to several species accessing or using the project site as a through route, as such this will be scoped into the ESIA for detailed assessment.
Lake Effect	**Scoped In**	Although the potential for impacts related to 'lake effect' are largely unknown, it is considered appropriate to scope this in for detailed assessment at the ESIA stag due to the local presence of bird migration pathways.

7.6 Assessment Methodology at the ESIA Stage

Construction

In order to provide a representative assessment of the significance of potential impacts at the ESIA stage for the potential construction impacts that have been scoped in for detailed assessment, it is proposed to undertake terrestrial baseline survey within the site to establish an inventory of the flora and fauna species present, or potentially in the project footprint.

An assessment of the biological environment will involve the description of local biodiversity present both at the Project site and at the surrounding areas that may be directly or indirectly

impacted by project components or activities. The assessment will be based upon a field survey and the review of available secondary data. The study will cover the following aspects:

- Inventory of the existing flora and fauna species;
- Threatened wildlife and habitats (if present); and
- Transient fauna such as migratory birds.

The survey will also map habitats at the project site or within its direct area of influence; according to the habitat categories "critical", "modified", or "natural". A number of parallel, driving belt transects of appropriate length and width will be taken through the area to map habitats of different types. In addition, walking transects of appropriate length will be taken through representative examples of the different habitat types to provide more detailed description of these habitats and their associated biotic communities. In case of sensitive/threatened species or habitats are identified during this baseline surveys, further detailed assessment will be undertaken to assess the significance of impacts and develop proper mitigation plans.

Operation

Further to the ESIA baseline survey outlined above, the ESIA will include a qualitative assessment related to the potential impacts of severance and the potential for 'lake effect' as a result of the project. This will specifically include further research on bird migration routes in Egypt and research within academic papers regarding 'Lake Effect', as well as potential mitigation measures to reduce the potential of such impacts.

The ESIA will also include best practice mitigation and management measures for the operational phase to reduce the potential for any associated effects to receptors; such as the management of landscaped areas and attraction of pests. The intention will be for these best practice measures to be included into the Operational Environmental Management Plan (OEMP) and operational phase EMS for effective management and implementation on-site.

8 GEOLOGY SOILS & GROUNDWATER

8.1 Standards and Regulatory Requirements

8.1.1 National Requirement

There are no soil or groundwater quality standards established in Egypt.

8.1.2 Lenders Requirement

The IFC Performance Standards requires adherence to IFC Performance Standard 3 on 'Resource Efficiency and Pollution Prevention' requires the client and/or the Project to:

- Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; and
- Prevent the release of pollutants to water and land due to routine, non-routine, and accidental circumstances, or when not feasible, minimize and/or control the intensity and mass flow of their release.

As there are no defined soil and groundwater standards for Egypt, the use of the 'Dutch Soil Guideline' or Dutch standards is common practice for the analysis of soils and groundwater, as they are considered a good internation practice.

The Dutch Standards identify maximum allowable concentrations for contaminants in soil and groundwater. The soil intervention values indicate when the functional properties of the soil for humans, plants and animals is seriously impaired or threatened. They are representative of the level of contamination above which a serious case of soil contamination is deemed to exist. Groundwater target values provide an indication of the benchmark for environmental quality in the long term, assuming that there are negligible risks for the ecosystem. The Dutch Standards for the most significant pollutants are presented in the table below. Where a parameter is not covered by the Dutch Standards, other appropriate international standards shall be used.

Table 8-1 Dutch Soil and Groundwater Standards

Parameters	Soil (mg/kg dry matter)		Groundwater (µg/l)	
	Target value*	Intervention value	Target value	Intervention value
Heavy Metals				
Arsenic	29	76	10	60
Barium	160	-	50	625
Cadmium	0.8	13	0.4	6
Chromium	100	-	1	30
Chromium III	-	180	-	-

Parameters	Soil (mg/kg dry matter)		Groundwater (µg/l)	
	Target value*	Intervention value	Target value	Intervention value
Chromium IV	-	78	-	-
Cobalt	-	190	20	100
Copper	36	190	15	75
Lead	85	530	15	75
Mercury	0.3	36 (inorganic) 4 (organic)	0.05	0.3
Molybdenum	3	190	5	300
Nickel	35	100	15	75
Zinc	140	720	65	800
Aromatic Compounds				
Benzene	0.01	1.1	0.2	30
Ethyl benzene	0.03	110	4	150
Toluene	0.01	32	7	1000
Xylene (sum)	0.1	17	0.2	70
Styrene (vinylbenzene)	0.3	86	6	300
Phenol	0.05	14	0.2	2000
Cresols (sum)	0.05	13	0.2	200
Chlorinated Hydrocarbons				
Volatile Hydrocarbons				
monochloroethene (vinyl chloride)	0.01	0.1	0.01	5
dichloromethane	0.4	3.9	0.01	1,000
1,1-dichloroethane	0.02	15	7	900
1,2-dichloroethane	0.02	6.4	7	400
1,1-dichloroethene	0.1	0.3	0.01	10
1,2-dichloroethene (sum)	-	1	0.01	20
Dichloropropanes (sum)	-	2	0.8	80
Trichloromethane (chloroform)	0.02	5.6	6	400
1,1,1-trichloroethane	0.07	15	0.01	300
1,1,2-trichloroethane	0.4	10	0.01	130
Trichloroethene (Tri)	0.1	2.5	24	500
Tetrachloromethane (Tetra)	0.4	0.7	0.01	10
Tetrachloroethene (Per)	0.002	8.8	0.01	40
Chlorobenzenes				
Monochlorobenzene	-	15	7	180
Dichlorobenzenes (sum)	-	19	3	50
Trichlorobenzenes (sum)	-	11	0.01	10
Tetrachlorobenzenes (sum)	-	2.2	0.01	2.5

Parameters	Soil (mg/kg dry matter)		Groundwater (µg/l)	
	Target value*	Intervention value	Target value	Intervention value
Pentachlorobenzene	-	6.7	0.003	1
Hexachlorobenzene	-	2.0	0.00009	0.5
Chlorophenols				
Monochlorophenols (sum)	-	5.4	0.3	100
Dichlorophenols (sum)	-	22	0.2	30
Trichlorophenols (sum)	-	22	0.03	10
Tetrachlorphenols (sum)	-	21	0.01	10
Pentachlorophenol		12	0.04	3

- **Note**: The soil values are calculated for a 'Standard Soil' with 10% organic matter and 25% clay. A case of environmental contamination is defined as 'serious' if >25 m³ soil or >100 m³ groundwater is contaminated above the intervention value.
- ***Source:*** Soil Remediation Circular 2009, Annex 1: Groundwater target values and soil and groundwater intervention values. (*Target values for soil refer to 2000 version as they are not present in the 2009)
- Where contaminants are found to exceed 'intervention' levels, this is considered to be a case of soil contamination, which is dangerous to the health of humans and the natural environment. Such a level of contamination should prompt a need for remediation, appropriate treatment and disposal.

<u>European (EBRD) Requirements</u>

The EBRD PR3 on Resource Efficiency and Pollution Prevention and Control establishes general requirements pollution prevention as follows:

- The assessment process must identify technically and financially feasible pollution prevention and control techniques that are best suited to avoid or minimise adverse impacts on human health and the environment and are appropriate to the nature and scale of the project's adverse impacts and issues; and
- The Project must meet the relevant EU substantive environmental standards, where these can be applied at the project level. Where no EU substantive environmental standards at project level exist, the Project will identify, in agreement with the EBRD, other appropriate environmental standards in accordance with GIP.

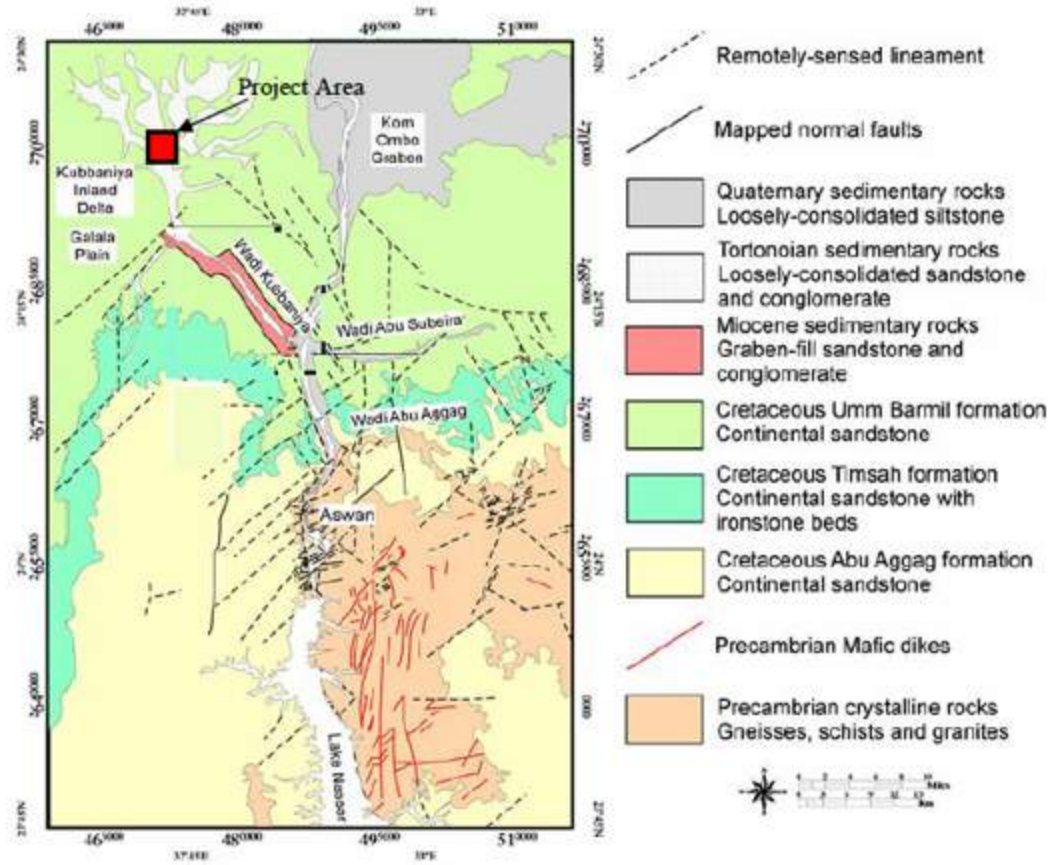
8.2 Observation and Baseline Condition

8.2.1 Geology Soils

The project area is located within the Nile Valley area of Upper Egypt and occupies a portion of a sub-regional sedimentary basin; this sedimentary basin has different depth above basement rocks. Overlying the peneplained igneous and metamorphic rocks o Aswan are the almost horizontal Nubia sandstone beds. The Nubia sandstone beds varies in thickness and is divided into three (3) units; the lower, middle and upper unit.

The presence of conglomerates kaolinized sandstone and sandstone beds of different grade sizes characterize the lower unit. The middle unit is characterized by having sandstone members of different grade sizes¨ sandy shales¨ and ferruginous sandstones while variegated shales¨ sandstones¨ and a quartzite bed characterize the upper limit.

Figure 8-1 Geological Map of Aswan



Source: Geotechnical Investigation Report & Foundation Recommendation prepared by Hamza Associates for Egyptian Electricity Transmission Company (EETC). Originally obtained from Jeff Roden et al., 2011

Based on information provided in the ESIA report (August 2014), The project site is located within a desert plain area west of River Nile; the soil cover is mainly sandy-gravel.

Geotechnical investigations have previously been undertaken at the Project site in May 2016. Ten (10) boreholes were drilled at different locations of the site to a depth of 10m. Surface and subsurface soils encountered during investigation included:

Wadi deposit: reddish brown calcerous wadi deposit that consist of sand, gravel, silt and iron oxides. This layer appears at all the boreholes from ground surface to depth ranging from 1.0m to 6.0m below ground surface.

Sand: Very dense poorly graded calcerous sand with trace of iron oxides. The soil is reddish brown and varies from silty sand to sand with silt. This layer appears in all boreholes from depth ranging from 1.0m to 6.0m with thickness varying from 2.8m to 9.44m.

Silt: Silt was only encountered in borehole 10. This consisted of greyish brown hard silt (5.8m to 8m) and elastic silt (8m to 10m) interbedded by thin (2-5m) and thick (5-10mm) laminae of sandy clay with trace of iron oxides.

Generally, the soil at the site is mainly alkaline with pH ranging from 7.3 to 7.5.

8.2.2 Groundwater

During the 2016 geotechnical investigation, groundwater was not encountered in any of the boreholes at the time of investigation. However, it is anticipated that groundwater may exist at depth lower than 10m.

8.2.3 Contamination Risk

According to the 2014 ESIA report provided by NREA, solid and liquid waste were identified in a small depression located at the northern extent of the Project site. It is envisaged that this waste pile could have been generated by one of the petroleum companies as it included wasted oil samples (crude oil), used safety gloves and wasted food packages that are not usually used by the local inhabitants.

Figure 8-2 Evidence of Site Contamination (Source 2014 ESIA issued by NREA)

Although there is a possibility that this waste may have been cleared from the site, the potential for soil and groundwater contamination cannot be completely ruled out.

Another potential sources of contamination close to the site is the Faris Contractors Union located at the north eastern corner of the Project site within the 50 m setback of the northern road. During the site visit, it was noticed the waste from the nearby TSK PV construction site are stored at this area where the Faris Contractors Union carry out segregation and compaction activities.

Plate 8-1 Faris Contractors Union and Waste Segregation Activities near Project Site

8.2.4 Initial Conceptual Model and Preliminary Risk Assessment for Land Based Contamination

Based on the above findings, the following conceptual model (see table below) has been developed to determine the level of risk of contamination that may exist at the project site. This has been conducted by undertaking a "Source – Pathway – Receptor" analysis of the project footprint and surrounding land uses.

The Contaminated Land Risk Assessment methodology used for this assessment was based on CIRIA C552 (2001) Contaminated Land Risk Assessment – A Guide to Good Practice, in order to quantify potential risk via risk estimation and risk evaluation. This process determines an overall risk category which can be used to identify likely actions for the site, as have been incorporated to the methodology of this ESIA. This methodology uses qualitative descriptors and therefore is a qualitative approach (ref. Appendix B for the CIRIA good practice guidelines).

Table 8-2 Source – Pathway – Receptor Model

Potential Source	Potential Receptor	Potential Transport Pathways
Recent and historic contamination for waste pile (Leaching of oil, greases and other hydrocarbon waste as well as heavy metals).	Soil	Direct contamination to surface and sub soils, limited to isolated areas of soil on-site.
	Groundwater	Migration of leachable hydrocarbons through high porosity soils and transfer via groundwater movement.

Table 8-3 Source – Pathway – Receptor Analysis

Potential Source	Potential Receptor	Potential Transport Pathways	Likelihood of Source – Receptor Linkage	Potential Consequence of Source to Receptor Linkage	Risk Classification
Recent and historic contamination for waste pile (Leaching of oil, greases and other hydrocarbon waste as well as heavy metals).	Soil	Direct contamination to surface and sub soils.	High Likelihood	Minor	**Low Risk**
	Groundwater	Migration of leachable hydrocarbons through high porosity soils.	Low Likelihood	Minor	**Very Low Risk**

Following the outcome of 'Low Risk' for potential soil contamination and 'Very Low Risk' for potential groundwater contamination from the above conceptual model, further soil investigation is not required to be undertaken in accordance with the CIRIA guideline.

8.3 Sensitive Receptors

Table 8-4 Potential Receptors

Receptor	Receptor Type	Location
Local Soil Quality	Natural site quality that influences flora.	Project footprint

Receptor	Receptor Type	Location
Groundwater	Natural site quality that may support local habitats and sub-surface ecosystems.	Project Area

8.4 Potential Impacts

8.4.1 Construction Phase

Cross Contamination

Given the baseline observations of past potential pollution sources on site (i.e. identified wastes, including small volumes of hazardous wastes) a low potential risk exists with regard to encountering contaminated materials within the project site. Such risks although 'low' have the potential to become apparent during excavations and land grading on site.

The potential exposure of site-based pollutants may result in the potential cross contamination with other non-contmainated materials such as other site soils.

Leaks and Spillage

Storage and usage of fuels, chemicals and sanitary provision during the construction phase will introduce risks associated with spills and leaks to ground. Such impacts may result in isolated contamination to site soils. Given the porous nature of the soils at the site, groundwater at depth may be vulnerable to contamination events if not immediately controlled and remediated.

8.4.2 Operational Phase

Spill and Leaks Associated with Operation

Although there will be little or no interaction with hazardous materials or chemicals, storage and usage of any hazardous materials (e.g. chemicals, transformer oils) and sanitary provision during the operational phase will introduce risks associated with spills and leaks to ground. Such impacts may result in isolated contamination to site soils. Given the porous nature of the soils at the site, groundwater at depth may be vulnerable to contamination events if not immediately controlled and remediated.

8.5 Proposed Assessment Requirement for ESIA

Table 8-5 Geology Soil & Groundwater Impacts for Detailed Assessment at the ESIA

Potential Impact	Scoped In/Out of Detailed Assessment at ESIA	Justification
Construction		
Cross Contamination of Potential Recent and Historic Contamination	**Scoped In**	Although the Initial Conceptual Model has identified a 'Low' risk of encountering contamination on site, there is still a potential for cross contamination of potentially contaminated soils within the site during excavation works, land grading and piling. This is due to the past use of an area within the site for disposal of hazardous and non-hazardous waste.
Leaks and Spill Associated with Construction	**Scoped In**	Hazardous materials, fuels and chemicals will be on-site during the construction phase and there is a risk of direct contamination to soil and potential migration to groundwater if not handled or stored accordingly.
Operation		
Leaks and Spill Associated with Operation	**Scoped In**	Although only small quantities of hazardous materials, fuels and chemicals will be on-site during the operational phase of the Project, there is still a risk of direct contamination to soil and groundwater if not handled or stored correctly.

8.6 Assessment Methodology at the ESIA Stage

Although the initial conceptual model has identified a low risk of potential soil contamination on site, in order to provide a representative assessment of the significance of potential impacts at the ESIA stage, soil sampling and analysis for common pollutants (including heavy metals and petroleum-based hydrocarbons) will be undertaken as component of the ESIA. This is also proposed to identify prevailing soil quality conditions for soil types in the project area.

Soil samples will be taken at up to 4 of the locations (within the direct footprint of the project). The samples will be analysed for physiochemical parameters. The location of the exact sampling points will be determined based on the careful review of available secondary data on previous site use, as well as the visual reconnaissance of the site to identify previous contamination areas, if any. The samples will be analyzed for the presence of heavy metals and hydrocarbons in accordance with Egyptian Land Contamination Assessment Standards. This will include arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, mercury, molybdenum, nickel, zinc, nitrate as N (soluble), total cyanide, total phosphorus as P and total petroleum hydrocarbon (TPH), and pH. All results will be provided in mg/kg units.

As impacts to groundwater arising from the project are not expected the ESIA will not include a baseline assessment of this parameter.

The ESIA will include good practice proposed mitigation and management measures in order to protect soil and groundwater quality from potential impacts during construction and operations.

9 WASTE & WASTEWATER MANAGEMENT

9.1 Standards and Regulatory Requirements

9.1.1 National Requirement

The following laws will be applicable with regards to the management of the wastewaters generated by the construction and operation of the proposed 200MW PV Project.

- Law No. 4 of 1994 for the Protection of the Environment, and the executive regulation Decree 338 of 1995, Part III – Protection of Water Environment from Pollution.
- Law No 124/1983 generally prohibits the disposal any industrial wastes, insecticides, and other poisonous and radioactive materials in the Egyptian waters.
- Decree 44/2000 by the Ministry of Housing on Permissible Limits for Discharged Sewage Wastewater.
- Law No 48/1982 prohibits the discharge into the Nile River and associated waterways, irrigation canals, drains, lakes and groundwater without a licence issued by the Ministry of Water Resources and Irrigation.

9.1.2 Lenders Requirement

International financial institutions providing project finance will require adherence with the IFC General EHS Guidelines. With regard to waste, these guidelines require that projects:

- Establish waste management priorities at the outset of activities.
- Identify EHS risks and impacts with regards to waste generation and its consequences.
- Establish a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes.
- Avoid or minimize the generation waste materials, as far as practicable.
- Identify where waste generation cannot be avoided but can be minimized or where opportunities exist for, recovering and reusing waste.
- Where waste cannot be recovered or reused, identify means of treating, destroying, and disposing of it in an environmentally sound manner.

<u>European (EBRD) Requirements</u>

The EBRD PR3 on Resource Efficiency and Pollution Prevention and Control establishes general requirements waste management as follows:

- The Project must strive to avoid the generation of hazardous and non-hazardous waste materials and reduce their harmfulness as far as practicable. Where waste

generation cannot be avoided, the waste must be reused, recycled or recovered, or used it as a source of energy. Where waste cannot be recovered or reused, the waste must be treated and disposed of it in an environmentally sound manner;

- The Project must identify technically and financially feasible alternatives for the environmentally sound disposal of any hazardous waste considering the limitations applicable to trans boundary movement; and
- When waste disposal is transferred offsite and/or conducted by third parties, chain of custody documentation to the final destination must be obtained and only contractors that are reputable and legitimate enterprises licensed by the relevant regulatory agencies must be commissioned. The Project must ascertain whether licensed disposal sites are being operated to acceptable standards. Where this is not the case, alternative disposal options must be considered, including the possibility of developing their own recovery and disposal facilities at the project site.

The European Commission has extensive legislation in regard to solid waste that includes the following:

- Waste Framework Directive 2008/98/EC;
- Hazardous Waste Directive 91/689/EEC; and
- Waste oils Directive 75/439/EEC.

The EBRD PR3 on Resource Efficiency and Pollution Prevention and Control establishes general requirements for minimising water consumption and improving efficiency in its use as follows:

- The Project must seek to minimise water use and utilise water for technical purposes that is not fit for human consumption, where feasible;
- The Project must identify technically and financially feasible techniques for water minimisation, reuse and recycling in accordance with GIP, which should be implemented as part of the project design;
- The Project must consider the potential cumulative impacts of water abstraction upon third party users and local ecosystems; and
- For projects with a high water demand (greater than 5,000 m3/day), a detailed water balance must be developed, maintained and reported annually to the EBRD. This should include an assessment of the specific water use (measured by volume of water used per unit production) must be assessed.

9.2 Potential Impacts

Soils, subsoils and rock are anticipated to be the primary waste requirement associated with the construction phase of the project site given the open barren nature of the site and the excavation requirements for foundations, cabling and internal road construction.

Other waste streams likely to be associated with the project are listed in Table 8-1 below (it should be noted that all waste streams associated with the operational phase are anticipated to be of minimal quantity).

Table 9-1 Anticipated Waste Streams Associated with the Project.

Subject	Construction	Operation
Inert	Subsoil and Rock	-
	Glass	
Non-Hazardous	Concrete	Landscaping waste
	Asphalt	Replacement parts and packaging
	Scrap metal	
	Plastic	General waste from site staff.
	Packaging	
	Municipal waste from construction workers	
Hazardous	Resins and paints	Resins and paints
	Waste oils	Waste oils
	Waste solvents and thinners	Waste solvents and thinners
	Waste fuel and chemicals.	Waste fuel and chemicals.
	Batteries	Batteries
	Used spill kits and clean up materials.	Used spill kits and clean up materials.
Wastewater	Sanitary wastewater	Sanitary wastewater

9.2.1 Construction Phase

Waste

The construction phase can often be the most environmentally damaging phase of a project, particularly in regard to the volumes of waste that are generated, if not properly managed. Such impacts relate to the management of such wastes, particularly hazardous streams.

Wastewater

The Project will require on-site sanitation facilities for the construction workers (expected to be toilets with collection septic tanks). These facilities will require regular emptying and removal from the Project site.

9.2.2 Operational Phase

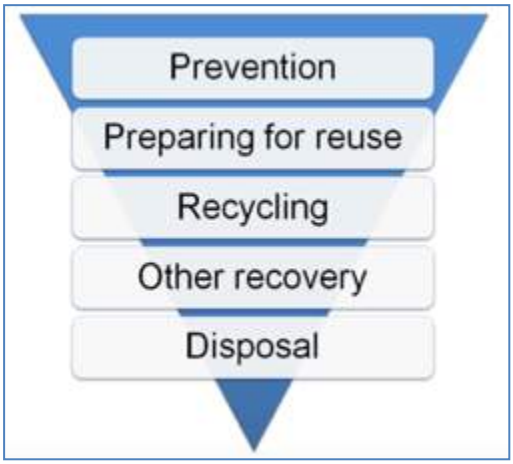
Disposal of material from operations can contribute to wastes directed to landfill resulting in subsequent risk of damage to local hydrological systems and emissions associated with

necessary transport. However, given the nature of the project, quantities of waste likely to arise during operation are expected to be minimal.

9.3 Proposed Consideration for ESIA

Should any evidence of contaminated materials be identified from the soil investigation proposed under Section 8 of this report, the ESIA will consider appropriate disposal routes and potential acceptance criteria for any contaminated materials. This may include a requirement for additional analysis to provide a robust hazard classification.

Also, in preparation of the environmental management plans for the construction and operational phases, a principle component should be application of the waste hierarchy.



Source from Waste Resource Action Programme

The waste hierarchy illustrates best practice for waste management considerations by ensuring consideration of the most sustainable available application for waste management in preference of disposal and eventual contribution to adverse environmental and economic impacts associated with landfill. The availability of waste management facilities for the expected waste streams from the Project will be assessed in the ESIA report.

The waste hierarchy should form a key element of any waste management plan and if implemented effectively will achieve maximum reductions in waste generation. Application also has the potential to reduce costs associated with material procurement, handling, transportation and disposal.

10 ARCHAEOLOGY AND CULTURAL HERITAGE

10.1 Standards and Regulatory Requirements

10.1.1 National Requirement

The project is required to comply with the Egyptian law on the Protection of Antiquities, Law No. 117 of 1983 (amended by Law No. 3 of 2010).

This Law establishes the Ministry of State for Antiquities, previously known as the Supreme Council of Antiquities, as the sole mandated authority permitted to undertake and approve archaeological assessments within Egypt.

10.1.2 Lender Requirements

International financial institutions are likely to require adherence to IFC Performance Standard 8, which requires the identification and protection of features of cultural heritage value.

European (EBRD) Requirements

The EBRD PR 8 for Cultural Heritage outlines requirements for the protection, management and sustainable use of tangible and intangible cultural heritage. The requirements mainly focus on the assessment process, the management of impacts (including a chance finds procedure) and the consultation with affected communities and other stakeholders.

10.2 Observation and Baseline Condition

10.2.1 Archaeology and Cultural Heritage in Egypt

According to the National Environmental Action Plan of Egypt 2002/2017, Egypt's cultural heritage is a major economic asset as well as providing many of the components of national identity and sense of continuity. The major touristic attractions are the Pyramids, the Sphinx, Thebes and the Nubian monuments of the Pharaonic era and Coptic and Islamic monuments. Egypt is the home to five (5) sites that are on the UNESCO list of World Cultural Heritage.

A majority of Egypt's cultural heritage sites are being damaged by one or several of the following problems: sprawl of human settlements; air pollution; rising water table; industrial and vehicular vibrations; garbage pollution. The Sphinx, for example, which has stood for millennia, has been deteriorating at a vastly increased rate during the last 50 or more years. Increased levels of pollution, trigger chemical and biological reactions that weaken the limestone make it more susceptible to wind erosion.

Some of the Archeological and in Egypt as found in the Ministry of Antiquities website and World Heritage Sites as found in UNESCO website include but not limited to:

Archaeological Sites

- The Missing Obelisk – Aswan Governorate
- The Palace City – New Valley Governorate

World Heritage Sites

- Abu Mina – This site occupies approximately 182.7 ha of land and is found in the Alexandria Governorate. It was discovered in 1905 and became a world heritage site in 1979. This cultural heritage is threatened.
- The Whale Valley – Found in the Faiyum Governorate covers an area of 20,015ha. it was chosen by UNESCO as a World Heritage Site for whale skeleton. This site is not threatened.
- Ancient Thebes with Necrropolis – Found in the Qina Governorate. This site occupies approximately 7,390ha
- Memphis and its Necropolis (the pyramid fields from Giza to Dahsur) – This site was considered one of the Seven Wonders of the World in ancient times. This site occupy about 16,358ha and became a World heritage site in 1979.
- Nubian Monuments from Abu Simbel to Philae –These archaeological area contains magnificent monuments as the Temples of Ramses II at Abu Simbel and the Sanctuary of Isis at Philae. It occupies about 374.5ha.

10.2.2 Project Site

Aswan Governorate is rich of antiquity sites including Philae and Abu Simbel Temples, which are UNESCO World Heritage Sites, and the famous temples of Edfu and Kom Ombo. The Supreme Council for Antiquities has identified antiquity sites as protected areas by the Law of Antiquities to preserve their historic value.

The project site does not include any antiquity area, the nearest antiquity sites are the BenbanVillage and the Kom Ombo Temple approximately 20km south east of the Project site.

10.3 Potential Impacts

10.3.1 Construction Phase

Excavation and earthwork activities can potentially result in damage and destruction of undiscovered archaeological artefacts.

Given that there are no identified cultural features or antiquities at or in close proximity to the Project site, the presence of archaeological features within the project footprint is likely to be low, however this cannot be ruled out.

10.3.2 Operational Phase

The operational phase will not result in impacts to archaeology, as the site will be static and excavations will not be required.

10.4 Proposed Assessment Requirement for ESIA

Table 10-1 Archaeology & Cultural Heritage Impacts for Detailed Assessment

Potential Impact	Scoped In/Out of Detailed Assessment at ESIA	Justification
Construction		
Damage to Unknown Buried Archaeology	**Scoped In**	Impacts are generally not expected due to the lack of cultural or known archaeological features at the project site. However, given that the possibility of encountering unknown buried artefacts cannot be completely ruled out, this impact has been 'Scoped In'.

10.5 Assessment Methodology at the ESIA Stage

In order to provide a representative assessment of the significance of potential impacts at the ESIA stage, the Ministry of State for Antiquities will be consulted to confirm the expected absence of archaeological and cultural features of significance within the project area.

Also, site visits will be undertaken and any observations in relation to cultural heritage and archaeology made during such visit will be recorded in the ESIA and mapped.

The ESIA will however not include further survey work such as archaeological digs or other investigations.

The ESIA will include best practice mitigation measures for the construction phase. The intention is to include these mitigation measures into the respective CEMP for effective management and implementation on-site in the unlikely event that any items of archaeological significance are uncovered. This will include a chance finds procedures to appropriately identify and preserve such items.

11 LANDSCAPE & VISUAL AMENITY

11.1 Standards and Regulatory Requirements

Specific legislation in regard to landscape and visual impacts does not exist in Egypt however the consideration of baseline and associated impacts described herein has been undertaken with reference to the guidelines set out by the UK Landscape Institute 'Guidelines for Landscape and Visual Impact Assessment, 3rd Edition' (2013).

11.2 Observation and Baseline Condition

The 200MW PV Project will be developed on land that is predominantly undeveloped and open located left of the Nile River, north west of the town of Kom Umbo city in the Aswan Governorate of Egypt.

The site is generally relatively flat with undulating low lying sand slopes and sparse vegetation of low shrubs and grasses on the low-lying sand slopes. No building, trees or utilities are present within the Project site and at adjacent areas to the south and west.

The anthropogenic contributions to the landscape of the Project area include the following:

- Local Contractors Caravans north of the project site;
- Faris Contractors union north east of Project site;
- TSK PV Plant located east of the Project site;
- The existing 220kV Overhead Transmission Line (OHTL) approximately 100m to the east of the project site; and
- The 2-way single carriageway road that runs perpendicular to the Al Ramadi Kebii – Al Raqaba road and the Luxor-Aswan road and connects the village of Faris to the Luxor-Aswan road.

Figure 11-1 Views Across the Project Site

View Across the Western Region of the Site

View Across the Northern Eastern Region of the Site

View of TSK PV Plant (East of Project Site)

11.3 Sensitive Receptors

With regards to visual receptors, the site visit and satellite imagery of the site did not identify any evidence of permanent dwelling within 1 km from the Project site.

Other permanent dwellings are over 1km from the Project site boundary and may not have no direct visibility of the Project site. This includes the New Faris Village located 3.2km north east of the Project site, the accommodation camp located approximately 4.7km north of the Project site, the private farm approximately 5 km west of Project site and Faris village approximately 8.8km east of the Project site.

11.4 Potential Impacts

11.4.1 Construction phase

The construction of a new development has the potential to result in changes to the landscape character of a locality through land use and topographical changes, as well as causing a disturbance to the current visual envelope.

One of the first stages of construction activities will result in the fencing, levelling, grading and preparation of the site, ahead of construction beginning. The proliferation of other activities throughout the construction period and across the site will eventually result in major land use changes with subsequent construction of small new buildings and the installation of the solar panels will transform the landscape.

The movement of heavy construction vehicles and earthworks on sandy surfaces are also likely to result in dust generation and a resulting temporary haze.

Impacts to landscape character and the visual envelope of surrounding receptors will also occur at night where the addition of lighting during construction will illuminate this area that has previously been free of any light sources. The use of lighting across the site will result in a night time light haze likely to be visible for several kilometres from the project area.

11.4.2 Operational Phase

The development of the Project with the installation of grid like PV arrays is likely to distort the existing undeveloped landscape character. A key change will result from the loss of the view to the characteristic sands and gravel, as these will be replaced with a view of dark coloured flat PV arrays, occupying an expansive area.

Due to the low-lying design of the PV Plant, with PV arrays not exceeding 2-3m in height, views across the wider landscape are unlikely to be significantly impacted.

It is envisaged that only minimal lighting will be required at night-time for security purposes and at key areas in the power house areas of the project. Impacts due to lighting may result in minimal changes to the night-time landscape character and views of the site.

11.5 Proposed Assessment Requirement for ESIA

Table 11-1 Potential Landscape and Visual Impacts for Detailed Assessment at the ESIA

Potential Impact	Scoped In/Out of Detailed Assessment at ESIA	Justification
Construction		
Change in Landscape Character	**Scoped In**	Given the relative flatness of the project site the installation of the solar panels will change the aesthetics of the project area and the solar facility will be visually prominent from a considerable distance. Hence, these impacts have been 'Scoped In'.
Disturbance to Visual Envelope of Receptors	**Scoped In**	

11.6 Assessment Methodology at the ESIA Stage

As the potential impacts in relation to Landscape & Visual Impacts have been scoped in for detailed assessment (as per the process above), a landscape and visual impact assessment is proposed as part of the ESIA.

The ESIA will apply a measure of value/sensitivity to the receptors identified herein and determine the likely associated magnitude of impacts in order to quantify significance of effects and also identify opportunities for mitigation to reduce the magnitude of any identified impacts.

12 SOCIO-ECONOMICS

12.1 Standards and Regulatory Requirements

12.1.1 Lenders Requirements

International financial institutions are likely to require adherence to IFC Performance Standard 1 on Assessment and Management of Environmental and Social Risks and Impacts Performance Standard 2 on Labour and Working Conditions and IFC performance Standard 4 on Community Health, Safety and Security.

IFC PS 1 standard establishes requirements for the assessment of Social risk and impacts associated with the project while IFC PS 2 & 4 establish requirements for the safeguard of the workforce and local community from potential risks associated with the project including impacts associated with introduction of communicable disease, loss of ecosystem function, site access and operation, material use etc.

EBRD

The application of EBRD's performance requirements to the ESIA will ensure that social and economic impacts are fully assessed with suitable provision for the management of identified potential impacts. The notable PR's that will apply to this project include:

- Performance Requirement 1: Assessment and Management of Environmental and Social Impacts and Issues;
- Performance Requirement 2: Labour and Working Conditions;
- Performance Requirement 4: Health and Safety;
- Performance Requirement 10: Information Disclosure and Stakeholder Engagement.

It is recognised that PR5 and PR7 are not triggered by this project as there is no direct land acquisition, involuntary resettlement or interaction with any indigenous people.

12.2 Observation and Baseline Condition

12.2.1 Population and Demographics

According to the World Fact Book, Egypt is the most populous country in the Arab world and the third most populous country in Africa with a population of 97,041,072 individuals (2017 estimate). Out of these, 47,456,696 are females and 49,584,376 are males representing approximately 49% and 51% of the total population respectively. Approximately 95% of the

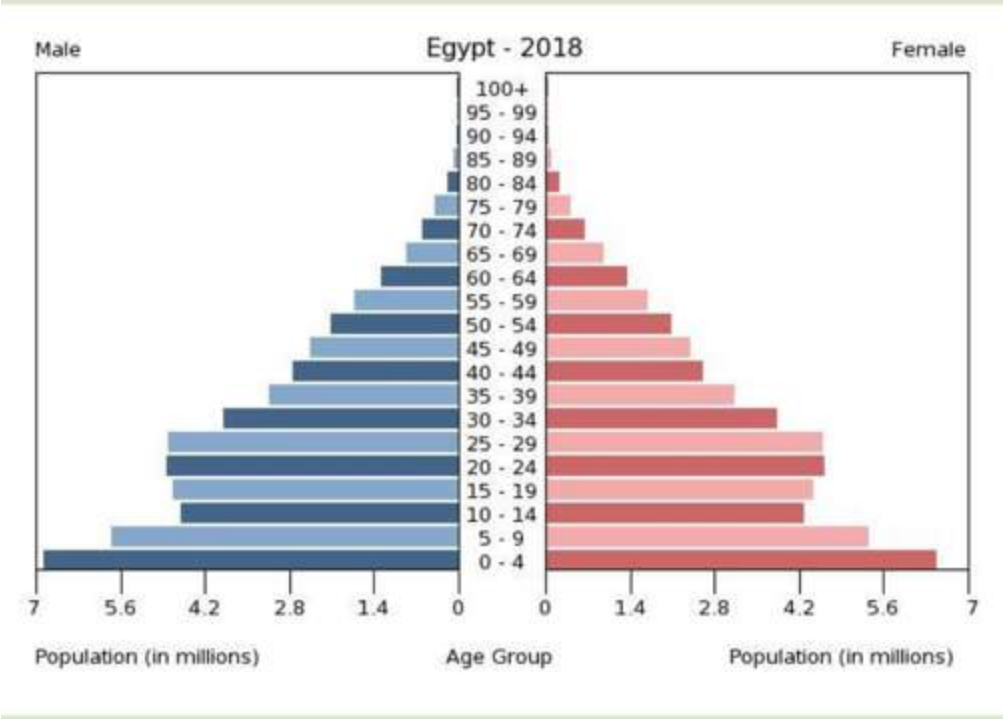
population lives within 20km of the Nile River and its delta while vast areas of the country remain sparsely populated or uninhabited.

Table 12-1 Egypt Population Data Summary

Criteria	Data (2018 Estimate unless specified)
Population	99,413,317
Age Structure	0-14 years: 33.38% (male 17,177,977 /female 16,007,877) 15-24 years: 18.65% (male 9,551,309 /female 8,988,006) 25-54 years: 37.71% (male 19,053,300 /female 18,431,808) 55-64 years: 5.99% (male 2,956,535 /female 2,995,497) 65 years and over: 4.28% (male 2,058,217 /female 2,192,791)
Sex Ratio (Male/ Female)	At birth: 1.06 0-14 years: 1.07 15-24 years: 1.06 25-54 years: 1.03 55-64 years: 0.99 65 years and over: 0.94 Total Population: 1.04

Source: https://www.cia.gov/library/publications/the-world-factbook/geos/eg.html. **Accessed 7th January 2020.**

Figure 12-1 Egypt 2018 Population Pyramid



Source: https://www.cia.gov/library/publications/the-world-factbook/geos/eg.html. **Accessed 6th June 2018**

12.2.2 Economy & Employment

Occupying the northeast corner of the African continent, Egypt is bisected by the highly fertile Nile valley where most economic activity takes place. Egypt's economy was highly centralized during the rule of former President Gamal Abdel NASSER but opened up considerably under former Presidents Anwar EL-SADAT and Mohamed Hosni MUBARAK. Agriculture, hydrocarbons, manufacturing, tourism, and other service sectors drove the country's relatively diverse economic activity (CIA, World Fact Book, 2017).

Official figures from 2017 place the Gross Domestic Product of Egypt at approximately 1.99 trillion dollars. National GDP growth rate for 2017 was estimated to be 4.1%.

Official inflation figure for 2017 was estimated to be 23.5%. This is over 10% higher than the 2016 inflation rate of 10.2%. The high inflation rate in 2017 was majorly influenced by the 3-year 12 billion dollar loan obtained from IMF in late 2016.

Approximately 29.95 million individuals in the country make up the labour force out of which 29.9% are into agriculture, 23.5% into industry and 47.3% in services. 12.2% of the total national populations are unemployed.

12.2.3 Social Development & Infrastructure

Using the United Nations Human Development Index as a guide, Egypt is ranked 111, with an index score of 0.691 (2016) and falls under the median Human Development Index. Compared with other African countries, Egypt is ranked 8th and falls within the top 10 African countries with highest HDI's.

12.2.4 Regional Data

The project site is located within the premises of Faris Village in Kom Ombo District of the Aswan Governorate.

According to the 2010 Egyptian Human Development Report (HDR), the population of Aswan Governorate as of 2008 stand at 1,222,300 individuals. In comparison with the wider population size of 97,041,072, the Aswan Governorate represents only approximately 1.3% of the national population thereby forming one of the smallest rural areas in the country.

The Economic activities in Kom Ombo include agriculture, industry and services. The main economic activity is agriculture where sugar cane is the most dominant crop, vegetables and fruits (especially dates) are also cultivated in cropland in Kom Ombo. There are a number of large industrial facilities in Kom Ombo, in which the largest is the Sugar Factory of Kom Ombo, which is associated with many environmental issues such as air emissions and industrial wastewater discharge, and a number of grain mills. The services sector dominates an

important share from the economic activities in Kom Ombo, there are number of small and medium enterprises including workshops and trading shops

12.2.5 Indigenous People

There are no identified settlements or any evidence of land use within the project area likely to be attributable to indigenous peoples.

12.2.6 Commercial and Industrial

Other than TSK PV Plant, existing 220kV OHTL, New Faris Village and the two existing carriageway roads north and south of the Project site there are no other facilities of commercial or industrial importance near the project site.

12.2.7 Traffic and Transportation

Transport to the site is understood to be via the 2-way dual carriageway bordering the site from the north. This road provides access to the New Faris Village (Housing Development) and is anticipated to be used by any future residents of the development. Currently, the development is empty and has no residents. This road also provides access to the Faris Village residents to connect to the Luxor-Aswan road

12.3 Sensitive Receptors

Table 12-2 Potential Socio-Economic Receptors

Receptor	Sensitivity	Justification
Welfare of Local Population	**High**	Any change to infrastructure, population or regional inputs is also likely to have effects for the welfare of the local population.
Local / Regional Economy	**Low**	The proposed project is likely to influence regional businesses. Not only local contractors and those directly involved in the construction, but also for local commercial operations such as accommodation, food retailers etc.
Users of Faris – Luxor Aswan road 1	**Medium**	It is unknown at this stage the present traffic flows on this road. However, it is not expected that this receptor will be close to reaching its carrying capacity.

12.4 Potential Impacts

12.4.1 Construction Phase

The primary economic impact during construction is likely to result from employment creation during this phase. As well as the direct monetary uplift to the families of those employed, money paid to workers will also stimulate the local economy via the multiplier effect, whereby

money earned on the project expended locally will re-circulate within the local economy. It is likely that part of the construction workers and personnel will be sourced from the local area.

In addition to the direct monetary impact of employment created during construction, there also exists the potential for the project to promote the dissemination of construction and construction support skills from expatriate workers into the local labour force.

Additional secondary impacts are likely to arise from spending on local and foreign goods and services during the construction process. The nature of the development, and specialised nature of required materials, suggests that these will be sourced internationally, apart from construction materials (e.g. concrete, cabling, etc.).

The construction period will result in an increase of vehicles entering the Project site Construction vehicles will include a variety of vehicle classifications, e.g. HGV's, LDV's, trucks, pick-up trucks, excavators and other heavy/light equipment. It is envisaged that all the construction vehicles will connect to the site external access road via the Faris – Luxor Aswan road 2.

Traffic flows on this Faris – Luxor Aswan road 1 is unknown at present however, it is not expected to be high; construction phase traffic may therefore likely to result in significant variation from current condition.

12.4.2 Operational Phase

The completion of the proposed project will result in the secure provision and increased capacity of electrical energy in the Aswan Governorate. Other than the improved electrical infrastructure, the most significant local benefits will result from the potential employment opportunities related to the operation of the facility.

12.5 Proposed Assessment Requirement for ESIA

An assessment of the existing socioeconomic conditions at the project area will be conducted. The assessment will build on the initial desktop review and the findings of the initial field assessment undertaken in the scoping stage. This assessment involves surveying the socio-economic conditions and demographics at the potential influence area of the PV project. It will begin with detailed desktop review of available literature on the area will be carried out to identify and delineate communities that may be affected one way or another by the construction and subsequent operation of the Project. Detailed statistics and demographic data will be obtained from relevant government information sources as available.

Based on the compiled and reviewed secondary data, the team will map and identify key stakeholders, to be engaged in the survey and subsequent consultation process. Care will be exercised to ensure gender and socioeconomic balance in stakeholder identification. The

results of the socioeconomic survey will constitute a socio-economic/ socio-cultural profile of the area where the Project will be located. The profile will particularly cover the following areas:

- Local community structure and demographics;
- Local economy, employment, and employment opportunities;
- Present local land tenure and land use, as well as human utilisation of environmental resources;
- Present conditions of infrastructure facilities and services;
- Socio-cultural attributes and general quality of life;
- Socioeconomic/ sociocultural attributes of local native communities, if any; and
- Public health and safety issues.

Potentially affected communities and key stakeholders, identified based on the outcome of the desktop review and field survey of the project area will be selected for further, in-depth socio-economic investigation. Guides and field tools for interviews will be developed, tested and adapted to the specific target groups. These tools will be designed based on the nature of the affected groups and shall ensure they are given the chance to express all their concerns pertaining to the project in question. Tools will include interview guides as well as key questions and agendas for the focus group discussions and public consultations. These guides will be structured to elicit the following:

- Basic information on the participants (age, education, profession, birthplace, tc.);
- Infra-structure services and public and private facilities available;
- Participant awareness/perception of the need for additional power generation; and
- Community leadership.

13 COMMUNITY HEALTH, SAFETY & SECURITY

13.1 Standards and Regulatory Requirements

13.1.1 Lender Requirements

The project lenders will require compliance with IFC Performance Standard 4: Community Health, Safety and Security. This standard establishes requirements for the safeguard of the local community from potential risks associated with the project including impacts associated with introduction of communicable disease, site access and operation, material use etc. The objectives of IFC PS4 are to:

- *To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances.*
- *To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.*

EBRD

The application of EBRD's performance requirements to the ESIA will ensure that social and economic impacts are fully assessed with suitable provision for the management of identified potential impacts. The notable PR's that will apply to this project include:

- Performance Requirement 4: Health and Safety; and
- Performance Requirement 10: Information Disclosure and Stakeholder Engagement.

The construction phase may present an unwanted opportunity for local communities to access the site, in terms of trespassing, with associated risks to those working at the site and those who are trespassing. Under such circumstances there is potential for incidents to occur particularly as the construction site is a high-risk areas and should only be accessed by trained personnel who are wearing adequate personal protective equipment.

13.2 Observation and Baseline Condition

Project related activities might result in the increase of risks associated with those who live near the Project site or may visit areas in and around active Project sites. These may include Faris Contractors Union present at the north eastern corner of the Project site and the local contractors (Caravans) located north of the Project site.

This chapter has been specifically included to outline and assess the impacts relating to the safety and security of the public and locals who access the surrounding area and may be subject to project related impacts.

The majority of secondary impacts relating to public health in terms of air quality, noise, waste etc., have been addressed in specific chapters elsewhere in this report. This chapter therefore concentrates more specifically on the potential emergency impacts that could relate to the project and the security of the project to avoid instances of trespass, or other misdemeanours.

13.3 Potential Impacts

13.3.1 Construction phase

All construction projects have potential risks relating to public safety that could arise, particularly in regard to the use of high powered equipment, heavy construction equipment, excavations, transportation amongst others, including fire and pollution releases.

Public risks during construction have the potential to result in isolated incidents, which could be of a devastating magnitude to a person or group of people in the wrong place at the wrong time. Unlike the operational phase, there is less opportunity of widespread risks that could potentially affect the public and environment as a single event (e.g. large-scale oil spills, dust dispersion, explosions etc.).

Risks to public safety will be appropriately addressed and prepared in the construction phase 'Emergency Preparedness and Response Plan' and training regarding this plan.

The construction phase of the Project will require additional workforce as well as site-based security at the gates and on patrol around the site. Hence there will be an increase in the population number of the local area. The worker accommodation location is yet to be confirmed at this stage, however it is expected that the majority of site staff will be sub-contractor workers who will be based in the local area of Aswan, and therefore may come into contact with local populations.

13.3.2 Operational Phase

The project will carry various risks that could result in impacts to public safety where such impacts are transferred or received outside of the project site. Such impacts may relate to fire, VOC fumes, explosions, spills of back up fuels, un-warranted releases of wastewater, exposure and security concerns of trespassers.

The extent of such impacts may range outside of the projects boundaries and require the involvement of outside agencies to help manage and abate such impacts (e.g. Civil Defence, Police and Army).

Risks to public safety will be appropriately addressed and prepared for in the operational phase 'Emergency Preparedness and Response Plan' and training.

Transportation impacts during operations are not expected to be significant, as the operation of the solar plants will not require continuous delivery of materials, or other equipment in order to operate. There will be occasional deliveries and waste removals from the site, which will not result in a significant amount of traffic on the site access road, but may result in a noticeable increase of vehicle along the road.

Staff movements will also contribute to a minimal additional vehicle flows on access roads.

13.4 Proposed Assessment Requirement for ESIA

The ESIA will highlight the principle community, health, safety and security issues associated with the project and identify proposed mitigation measures and associated plans that will need to be prepared and implemented to ensure that potential for these impacts are appropriately managed. The ESIA will also discuss the projects security provision and relevant aspects relating to EBRD PRs and IFC PSs such as influx of workers and spread of disease.

14 WORKERS CONDITIONS & OCCUPATIONAL HEALTH & SAFETY

14.1 Standards and Regulatory Requirements

14.1.1 National Requirement

The Minister of Manpower and Emigration oversees the execution and implementation of Labour laws in Egypt. The principal low governing the protection of workers in Egypt is based on Law 137 of 1981 and its executive decrees, however the new Labour Law No 12 of 2003 was recently promulgated which supersedes many of the policies outlined in the Law no.137/1981 policies. This includes certain stipulations and standards for the working environment and the welfare of labor including but not limited to:

- General provisions on labour and working conditions,
- General working conditions,
- Wages;
- Contract termination;
- Leaves;
- Vocational guidance and training;
- Collective association;
- Child labour and;
- Female labour

14.1.2 Lenders Requirement

The applicable IFC Performance Standards that aim to identify and ensure that social and economic impacts of a project are addressed in the relevant areas is the IFC Performance Standard 2: Labour and Working Conditions.

In line with IFC Performance Standard 2 (Labor and Working Condition's), the following conventions must be complied with:

- ILO Convention 87 on Freedom of Association and Protection of the Right to Organize;
- ILO Convention 98 on the Right to Organize and Collective Bargaining;
- ILO Convention 29 on Forced Labor;
- ILO Convention 105 on the Abolition of Forced Labor;

- ILO Convention 138 on Minimum Age (of Employment);
- ILO Convention 182 on the Worst Forms of Child Labor;
- ILO Convention 100 on Equal Remuneration;
- ILO Convention 111 on Discrimination (Employment and Occupation);
- UN Convention on the Rights of the Child, Article 32.1; and
- UN Convention on the Protection of the Rights of all Migrant Workers and Members of their Families.

EBRD

The notable PR's that will apply to this project include:

- Performance Requirement 2: Labour and Working Conditions; and
- Performance Requirement 10: Information Disclosure and Stakeholder Engagement.

In line with EBRD requirements 'Projects are required to comply, at a minimum, with (i) national labour, social security and occupational health and safety laws, and (ii) the fundamental principles and standards embodied in the ILO conventions (EBRD, Performance Requirement 2, 2014).'

14.2 Observation and Baseline Condition

Any construction project will introduce health and safety risks associated with the use of plant, machinery and construction processes. Risks can be severe depending on the type of activities required, materials used and site condition.

For projects in isolated locations or where the local population/skill sets require influx of people from other regions/countries consideration will need to be given associated with accommodation, welfare, sanitary provision, health care, hygiene, food potable water etc.

14.3 Potential Impacts

14.3.1 Construction

Occupational Health and Safety

Common activities undertaken during construction such as the movement of heavy machinery, excavation, handling of chemicals etc. can all introduce significant risk to the health and safety for the associated workforce. In particular, risks are more likely to be apparent for those who are not familiar with the type of works undertaken and/or the associated hazards.

The type of hazards attributable to a construction site will vary significantly dependent on the construction methods employed and the degree of control implemented by the EPC and affiliated sub-contractor. It is therefore of the utmost importance that the EPC and affiliated sub-contractors demonstrate consideration of health and safety risks as part of their chosen construction methods and that these risks are appropriately mitigated.

Worker Conditions

Labour exploitation on construction site unfortunately has become a reality in some parts of the world. Inequalities in income, education and opportunities has led to opportunistic immoral practices with labourers and site staff suffering as a consequence.

To ensure the wellbeing of the staff associated with the project, the EPC and associated subcontractors will need to plan for necessary provisions relative to the requirement of the of the required workforce. This includes appropriate labour accommodation plans and mechanism for inspections and corrective actions.

14.3.2 Operational

Occupational Health and Safety

The risks associated with the operational phase of the project are anticipated to be significantly less than during the construction phase due to reduced site activity and requirements for heavy plant and machinery.

There will be occupational health and safety risks attributable to the operational phase associated with maintenance and inspection requirements. Maintenance and inspection will still require the use of site vehicles and activities that pose risks to human health and safety.

In addition, shading provided by the solar panels could provide refuge for dangerous/poisonous flora such as scorpions and reptiles.

The severity and likelihood of risks during the operational phase will be dependent on the frequency and requirements for planned and unplanned maintenance. The operation and maintenance team will need to ensure that a robust plan is in place to appropriately manage these risks.

14.4 Proposed Assessment Requirements for ESIA

The ESIA will highlight National and Lenders requirements attributable to the project associated with worker conditions (including worker accommodation) and occupational health and safety and identify proposed mitigation measures and associated plans that will need to be prepared and implemented to ensure that potential for these impacts are appropriately managed.

15 REFERENCES

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APPENDIX A – INITIAL SITE VISIT REPORT

Environmental and Social Impact Assessment of Kom Ombo PV Project in Aswan, Egypt

INITIAL SITE VISIT FINDINGS

The EDG Team undertook an initial visit to the ptoject site on the 17th and 18th of December, 2019. The purpose of the visit was to identify and define the project area of influence and to become familiar with the overall environmental and socioeconomic settings of the area. The team also initiated a stakeholder identification/mapping exercise aiming to identify stakeholders and key players that need to be engaged during the scoping phase of the study. The visits to Faris village allowed the preliminary identification of key community players and stakeholders and allowed the team to gain an initial understanding of the living conditions in the village nearest to the site. The developed site knowledge will allow the planning of logistical aspects of the scoping and baseline data collection activities that will follow.

PROJECT SITE DRIVE THROUGH AND SITE SURROUNDINGS

The project site is located in a climatically hyper-arid, mostly barren area with extremely low primary productivity. The area has a rolling topography with an overall gentle slope towards the east and is covered with coarse sand and patches of gravel. No signs of surface drainage channels were observed anywhere within the site or its surroundings Vegetation cover of less than a handful of species is scattered in a number of small patches of vegetation in low-lying areas. Anima llife is expected to be very limited throughout the site and the surrounding area. Nonetheless, signs of wildlife were observed in the project site. Animal tracks and burrows of rodents (e.g. jerboas and gerbils), as well as insects (e.g. tenebrionid beetles) and fringe-toad lizards were spotted in vegetation patches. Some reptiles may also be present, but are currently in hibernation.

The project area didn't have any signs of use by humans, expect on its northeastern corner, where a small building was spotted. The building is located partially on the road's setback zone (50 meters) and partially within the project area. We have spoken with the owners of the building and understand that it has been built recently, and belongs to the Faris Contractors Union; a group of local contractors who are currently providing different services to the neighboring PV project, owned by the New and Renewable Energy Authority (NREA) and TSK. Activities observed include: storage of unsegregated recyclable material, segregation, and compaction. A water truck was also parked next to the building. According to interviewed community members, none of the villagers have a claim to the project land or have been utilizing it in any way.

The project area is bordered by the NREA/TSK PV project on one side, and unutilized desert on the other. While there was an initial governmental plan to develop more PV projects in the unutilized area, currently, this plan cannot be confirmed. On the other side of the road, lies some caravans that are understood to belong to local contractors looking to work in PV projects. Further down the road, there is a small uninhabited settlement of one hundred houses named the New Faris village.

The village was developed by the Ministry of Housing and Governorate of Aswan for unemployed youth in 2005. According to interviewed community members, this settlement was a part of a project to provide unemployed youth with subsidized housing and five feddans for land reclamation. Houses were formally handed over, but without utility connections. After house owners payed the first installment, the project stopped, and the land was never handed over. The location of the land is unknown to the villagers. There is also an informal animal carcasses disposal site near the project area. Animals are disposed of in the dump and near the road (Fig.2).

About 5 km to the west of the site there is a large private farm that seems to cover about 5o feddans of reclaimed desert land. Most of the farm is still under development, but several feddans seem to have already been cultivated with vegetable crops and olive trees. Several kilometers to the south of the farm and about 6 km southwest of the project site, an oil production facility is located and is visible from the road (Fig.3). according to Faris villagers, similar oil pumping installations are scattered throughout the area.

Figure 1: New Faris village

Figure 2: A farm about 5 km west of the site.

Figure 3: Oil production activities 6 km southwest of the site.

PRELIMINARY GROUP MEETINGS FINDINGS

The Project team visited the Faris Village Head and village elders on 17th of December to introduce the project and commencement of the Environmental and Social Impact Assessment (ESIA) study. We have also requested to hold meetings with female and male community members to discuss the project and ensure the involvement of the potentially affected community from the beginning of the study. During the meeting, village elders discussed their expectations and concerns as detailed below. This was followed by a visit to the local council office, where the project and study were also introduced.

On the second day, the team conducted two meetings; one with men (24 participants), and one with women (3 participants) from Faris village. The meetings were planned by the village elders whom we contacted for that purpose prior to the visit.

Figure 4: Meeting with the Fares Community

Figure 6: Old, unused school – built by Egyptian award-winning architect, Hassan Fathy

Figure 6: Health Unit

The meetings started by introducing the project and explaining the purpose of the ESIA, as well as the consultation activities, and announcing that there will be baseline survey meetings in the coming period. This was followed by enquiring about the socioeconomic conditions of the village to further understand the nature of the people and help prepare for community consultation activities.

Findings of Socioeconomic Conditions

Faris is a large village, with approximately 20,000 residents, most of whom work in agriculture. The main problems that were expressed by village inhabitants were the poor conditions they live in, the need for social development projects, and the lack of a proper sewage treatment system. In addition, people suffer from lack of proper healthcare, the limited number of schools, and lack of job opportunities. These concerns will be further assessed during the baseline studies. Another

Figure 7: Fares Village

concern that was raised by community members is their inability to use land allocated for the Project – which is considered part of their village – for other, more labor-intensive projects in the future. Thus, they explained that they feel that their village is entitled for support from ACWA Power to account for their inability to use this piece of land.

Expectations from the Project

=All participants already knew about the project prior to our visit. Villagers stated that they have known about the project since 2011/2012, when a study was conducted on the needs of the community and the possibility of building a PV Plant (possibly a strategic environmental and social assessment). However, they haven't heard about the project since then, until the NREA/TSK project began construction.

Interviewed villagers stated that their main concern is the need for social development projects for their village from ACWA Power. They explained that many villagers live below poverty line and there is a number of people with disabilities who cannot find decent work. Participants also stated that they expect to get jobs from the project, but that they also feel that this is would be insufficient, and that the company should help through corporate social responsibility. One of the participants had expectations that electricity bills will be reduced as a result of the project. However, the team briefly explained that the project feeds into the country's network and will not directly lead to a decrease in the electricity bills of villagers. Another felt that the project would lead to an increase in the village's ambient temperature, and the team briefly explained that this will not happen. +

APPENDIX B - CIRIA GOOD PRACTICE GUIDELINES: CONTAMINATED LAND PRELIMINARY RISK ASSESSMENT

The Contaminated Land Risk Assessment methodology used for this assessment is based on CIRIA C552 (2001) Contaminated Land Risk Assessment – A Guide to Good Practice, in order to quantify potential risk via risk estimation and risk evaluation, which can be adopted at the Phase I stage. This will then determine an overall risk category which can be used to identify likely actions for the cable route. This methodology uses qualitative descriptors and therefore is a qualitative approach.

The methodology requires the classification of:

- the magnitude of the **consequence** (severity) of a risk occurring, and
- the magnitude of the **probability** (likelihood) of a risk occurring.

The potential consequences of contamination risks occurring at this site are classified in accordance with the Table below, which is adapted from the CIRIA guidance.

Classification of Consequence

Classification	Definition of Consequence
Severe	Short-term (acute) risks to human health. Short-term risk of pollution of sensitive water resource or ecosystem. Catastrophic damage to crops/buildings/property/infrastructure, including off-site soils.
Medium	Medium/long-term (chronic) risks to human health. Medium/long-term risk of pollution of sensitive water resource or ecosystem. Significant damage to crops/buildings/property/infrastructure (on or off-site). Contamination of off-site soils.
Mild	Easily preventable, permanent health effects on humans. Pollution of non-sensitive water resources. Localised damage to crops/buildings/property/infrastructure (on or off-site).
Minor	Easily preventable, non-permanent health effects on humans, or no effects. Minor, low-level and localised contamination of on-site soils. Easily repairable damage to crops/buildings/property/infrastructure.

The probability of contamination risks occurring at this site will be classified in accordance with Table below, which is also adapted from the CIRIA guidance. Note that for each category, it is assumed that a pollution linkage exists. Where a pollution linkage does not exist, the likelihood is zero, as is the risk.

Classification of Probability

Classification	Definition of Probability
High Likelihood	Circumstances are such that an event appears very likely in the short-term or almost inevitable in the long-term; or there is already evidence that such an event has occurred.
Likely	Circumstances are such that such an event is not inevitable, but is possible in the short-term and is likely over the long-term.
Low Likelihood	Circumstances are such that it is by no means certain that an event would occur even over a longer period, and it is less likely in the short-term.
Unlikely	Circumstances are such that it is improbable that an event would occur even in the very long-term.

For each possible pollution linkage (source-pathway-receptor) identified, the potential risk can be evaluated, as presented in the Table below. Based upon this, CIRIA C552 presents definitions of the risk categories, together with the investigatory and remedial actions that are likely to be necessary in each case. These risk categories apply to each pollutant linkage, not simply to each hazard or receptor.

Overall Contamination Risk Matrix

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High likelihood**	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Moderate risk	Low risk
	Low likelihood	Moderate risk	Moderate risk	Low risk	Very low risk
	Unlikely	Low risk	Low risk	Very low risk	Very low risk

Definition of Risk Categories and Likely Actions Required

Risk Category	Definition and likely actions required
Very high	Severe harm to a defined receptor is very likely, or has already occurred. The risk is likely to result in a substantial liability. Urgent investigation (if not already undertaken) is likely to be required. Urgent remediation is likely to be required.
High	Harm to a defined receptor is likely. The risk, if realised, may result in a substantial liability. Urgent investigation (if not already undertaken) is likely to be required. Remediation is likely to be required in the long term, possibly sooner.
Moderate	Harm to a defined receptor is possible, but severe harm is unlikely. Investigation is likely to be required to clarify the level of potential liability and risk. Some remediation may be required in the longer term.
Low	Harm to a defined receptor is possible, but is likely to be mild at worst. Liabilities could theoretically arise, but are unlikely. Further investigation is not required at this stage. Remediation is unlikely to be required.

Risk Category	Definition and likely actions required
Very low	Harm to a defined receptor is unlikely, and would be minor at worst. No liabilities are likely to arise. Further investigation is not required at this stage. Remediation is very unlikely to be required.